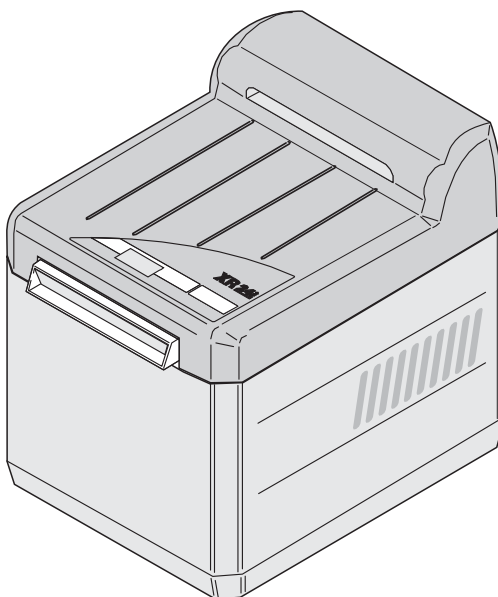


# **INSTALLATION AND OPERATING INSTRUCTIONS**

## **DÜRR XR 24 PRO**

### **X-RAY FILM DEVELOPING APPLIANCE**

GB



9000-600-74/ 30









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# **IMPORTANT INFORMATION**

## **1. INSTRUCTIONS**

### **1.1 EU - Labelling**

The product carries EU labelling in accordance with the Council's guideline on medicinal products (EU 93/42) and complies with the basic requirements contained in appendix 1 of this guideline.

### **1.2 Guidelines**

- The requirement for electromagnetic capability related to electric medical appliances has been complied with.

### **1.3 General Instructions**

- The instructions for mounting and using the appliance are an integral part of the machine. They must always be stored close to the machine. These instructions must be strictly complied with so that the machine can be used and correctly operated in accordance with the relevant regulations. New employees must be acquainted with the instructions for mounting and using the machine
- So that the machine may be operated safely and in a trouble-free manner, original parts must be used. In addition, only accessories mentioned in the technical documentation or expressly released by Dürr Dental for this purpose may be used.
- No **warranty claims** shall be made for damage caused by the use of accessories or consumables manufactured by external companies. Dürr Dental can give no warranty for the safe operating and functioning of the machine.
- With regard to safety, reliability and functionality, Dürr Dental shall only be responsible if the machine has been mounted, assembled, altered, enlarged or repaired by Dürr Dental or by a specialist authorised by Dürr Dental, and if the machine was used and operated in accordance with the instructions for mounting and use.

- The XR 24 PRO developing appliance fulfils the basic norms on safety and technology. All rights of protection are reserved for the circuits, procedures, names, software programs and appliances mentioned in the documentation.
- The technical documentation, or parts thereof, may only be reprinted with the prior written permission of Dürr Dental.

### **1.4 General Safety Instructions**

The appliance was developed and designed in such a way that dangers associated with use in accordance with the relevant regulations are largely ruled out. However, we are obliged to list the following safety measures so that residual dangers can also be ruled out..

- When the machine is being operated, the laws and regulations applying in the place of use must be complied with. It is illegal to reconstruct or alter the machine in any way; contravention of this regulation shall lead to expiry of the permit. If an altered machine is operated, the operator shall be liable to prosecution. When the machine is being operated, the laws and regulations applying in the place of use must be complied with. It is illegal to reconstruct or alter the machine in any way; contravention of this regulation shall lead to expiry of the permit. If an altered machine is operated, the operator shall be liable to prosecution.
- The original packaging must be stored in case the appliance has to be returned. The packaging must be kept out of the reach of children. Only the original packaging can guarantee that the machine is protected in the optimum manner while it is being transported. If the machine has to be returned during the warranty term, then Dürr Dental shall not be liable for any damage which occurred as a result of faulty packaging while the machine was being transported.
- The machine complies with the relevant EU guidelines and may only be used by qualified persons who are capable of operating it in the appropriate manner.



- Before using the machine, the user must always check its functional safety and that it is in proper condition..
- The user must be familiar with the operating instructions for the machine.
- The machine must not be operated in medical rooms where explosions are likely to occur. Explosions may occur in areas where combustible anaesthetics, skin cleaning agents, oxygen and skin disinfectants are used. The machine is not suitable for operation in a combustible atmosphere.

### **1.5 Use of additional apparatus**

- Machines may only be used together or with parts from other systems if a guarantee exists that the safety of the patient, the user and the surrounding area is not adversely affected by his or her doing so. If the user is unable to tell from the available technical data whether or not safety is adversely affected by coupling machines or using parts from other systems, he or she must enquire of the manufacturer or a suitably qualified person in this regard..

### **1.6 Use of orthocromatic (green-sensitive) films**

To prevent incorrect exposure, the luminous power of the darkroom light must be reduced when green-sensitive films are being used. A qualified technician must carry out the necessary work in all such cases..

### **1.7 Safety instructions for electric power protection**

- The developing machine may only be connected to an earthed plug which has been properly installed.
- Before the machine is connected an inspection must be made to ensure that the mains voltage and mains frequency indicated on the appliance match the values for the supply network.
- No extension leads may be used for feeding the current.
- Before it is operated for the first time, the machine and its leads must be checked to ensure that they are not damaged in any way. Damaged leads, plugs and sockets must be replaced immediately..
- The machine may only be operated, i.e., connected to the mains, when sealed (coverings must be attached and lid put on).
- In accordance with IEC 601, the machine should not be operated when patients are present.



## 1.8 Warning instructions and symbols

The following designations and symbols are used for particularly important information in the instructions for mounting and usage:



**Information, requirements and prohibitions on preventing personal injury and extensive damage to property.**



**Warning about dangerous electrical voltage**



Special information concerning the economic and profitable use of the appliance, and other instructions.



EU labelling without Notified Body Number



Comply with instructions for mounting and usage



Mains button on / off



Select parameters



Confirm selection



Switch on mains button



Switch off mains button



Open bibcock - every morning



Close bibcock - every evening



28 x 24 h  
Change chemicals every 4 weeks



Allow chemicals to drain off



Clean machine

## 2. PRODUCT INFORMATION

### 2.1 Use in accordance with regulations

The Dürr XR 24 PRO X-ray developing machine is to be used exclusively for the automatic development of extra-oral and intra-oral X-ray films in accordance with Dürr's recommended list of films.

Use in accordance with the regulations includes compliance with the instructions for mounting and usage as well as compliance with the provisions on setting up, installing and operating the machine, and on warranty. Use in accordance with the regulations also includes compliance with all legal provisions in force in the place where the machine is being used, with regard to work safety and the disposal of chemicals.

### 2.2 Use not in accordance with regulations

If the machine is used for a purpose other than the one stated in the regulations, the manufacturer shall not be legally liable for any damage arising as a result of same. In such cases, the user shall incur the risk.

### 2.3 Product information

The exposed film passes through different zones within the Dürr XR 24 PRO X-ray developing machine: the developing, fixing, rinsing and drying zones.

When the machine has been switched on, the developing bath and the fixing bath are heated to the set bath temperature (e.g. 28°C) at a rate of 0.5°C/min. The machine is then ready to be operated. It starts operating automatically when a film is slid inside. The film is transported through the machine. As soon as the message "MACHINE LOADED" stops flashing on the display, another film can be introduced, or up to 6 intra-oral films, can be introduced together. When the film has passed through the whole of the machine, it switches automatically to stand-by.



### 3. EXTENT OF SUPPLY

#### XR 24 PRO X-ray developing machine

**Model 1700-08** (230 V ~, 50-60 Hz)

**Model 1700-09** (100-110 V ~, 50-60 Hz)

Accessories, complete 1700-001-00

#### 3.1 Special accessories

The following parts are **not** part of the extent of supply.

They should be ordered if required!

XR-Cleaning Set for cleaning rack,

Content:

1 x cleaning tray,

2 x universal cleaner,

2 x sponges 1700-007-00

Cleaning films DÜRR clear100 1410-007-00

Water hose with Aqua-Stop 1330-001-51

Replenishing unit (230 V) 1700-820-00

(110 V) 1700-830-00

Collecting tray, 20 litres  
for developer 1416-021-00

Collecting tray, 20 litres  
for fixer 1416-011-00

DL 24 daylight attachment  
with filtering disc 1700-910-00

suitable for following film sizes:

2 x 3 cm up to max. 15 x 30 cm

DL 26 daylight attachment 1700-920-00

suitable for current film sizes

up to max. 24 x 30 cm

DA 24 darkroom attachment 1700-930-00

suitable for following film sizes:

2 x 3 cm up to max. 24 x 30 cm

suitable for following film sizes:

for model 1700-08, 230 V

T 6,3A 9000-115-25

for model 1700-09, 110 V

T 10A 9000-115-50

#### 3.2 Consumables

DÜRR-AUTOMAT XR

Developer and fixer concentrate

for 2 applications CXB140C99..

Universal cleaner for cleaning

roller packets, two packets CCB600C55..

WR 2000, Spray Cleaner for

carrier rolls, six packets CCB800C55..

### 4. TECHNICAL DATA

#### XR 24 PRO X-ray developing machine

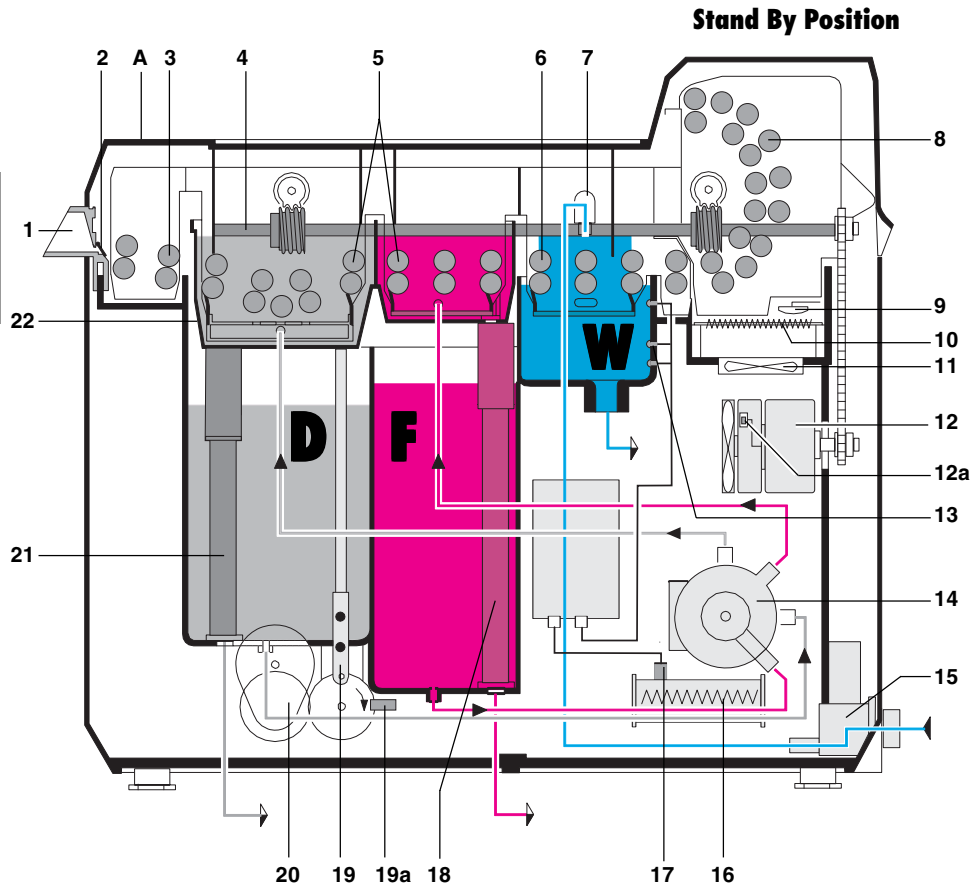
**Model 1700-08 (230 V)**


**Model 1700-09 (110 V)**

Model	1700-08	1700-09
<b>Voltage (V)</b>	230	100-110
<b>Frequency (Hz)</b>	50-60	50-60
<b>Power consumption (A)</b>	4,0	9,2
<b>Fuse (A)</b>	T 6,3	T 10
<b>Heating capacity (W)</b>	950	
<b>Heizleistung</b>		
Bath heating (W)	400	
Drying (W)	450	
<b>Normal heating time (min)</b>	approx. 20 (0,5°C/min)	
<b>Time it takes film to pass through (min)</b>		
normal	2:45 - 20	
<b>Bath circulation (l/min)</b>		
Developer	approx. 1,8	
Fixer	approx. 2,0	
<b>Water through-flow (l/min)</b>	2	
<b>Water pressure (bar)</b>		
min. water pressure	2	
max. water pressure	6	
<b>Tank volume (l)</b>	both 5	
Developer, Fixer		
<b>Temperature range</b>		
Environmental conditions		
for machine in operation	+10 to +28 °C	
Optimal photo quality	up to max. +28 °C	
Storage and transport	-10 to +60 °C	
<b>Air humidity</b>		
Machine in operation	max. 80 %	
Storage and transport	max. 95 %	
<b>Dimensions</b>	T=51 cm, B=42 cm, H=44 cm	
<b>Weight</b>	25 kg	
<b>Protection category</b>	IP20	
<b>Class of protection</b>	I	
<b>Overvoltage category</b>	II	
<b>Certificate-of conformity</b>	EU-Labeling	



## 5. FUNCTIONAL PRINCIPLE XR 24 PRO



- |     |   |     |   |
|-----|---|-----|---|
| 1   | Film inlet                                | 15  | Water valve   |
| 2   | Start flap                                | 16  | Continuous heater   |
| 3   | Roller packet, film inlet                 | 17  | PTC-sensor  |
| 4   | Drive shaft                               | 18  | Overflow pipe with discharge plug (fixer)   |
| 5   | Roller set, developer/fixer (D/F)         | 19  | Lifting rod   |
| 6   | Roller set, water                         | 19a | Light barrier, lifting tank   |
| 7   | Water inlet                               | 20  | Lifting motor   |
| 8   | Roller set, drier                         | 21  | Overflow plug (developer)   |
| 9   | Safety switch for drier                   | 22  | Lifting tray  |
| 10  | Drier heater                              | D   | Developing bath   |
| 11  | Ventilator                                | F   | Fixing bath   |
| 12  | Drive motor                               | W   | Water bath  |
| 12a | Tachometer generator                      | A   | Mains button  on display |
| 13  | Level sensors (for water)                 |     |   |
| 14  | Circulation pump (f. developer and fixer) |     |   |



## 6. FUNCTIONAL DESCRIPTION OF THE XR 24 PRO

**When the mains button (①) is pressed (min. 2 sec.),** the display is illuminated. The heating-up phase for the developing bath and the fixing bath begins. The time remaining until the correct temperature is reached is displayed in the following manner: **"WAITING TIME... MIN"** (display flashes). The machine does not start at this point.

**The bath begins to rotate when it is being heated up.** While this process is taking place, the chemicals are pumped from the developing tank and the fixing tank (volume of 5 litres for each tank) into the lifting tray (22) via the circulation pump (14).

**When the set temperature is reached,** the display lights up. The "MACHINE EMPTY" message appears, indicating that the machine is now ready to be operated. As soon as the set temperature falls below more than 0.5°C, the continuous heater and the circulation pump (14) are switched on again.

**When a film is slid into the machine,** the start flap (2) opens and the "MACHINE EMPTY" message flashes on the display. At the same time, a signal for lowering the lifting tray (22) is triggered and the water valve (15) opens. The drier heating unit (10), drive motor (12) and circulating pump (14) (for rotating the developing bath and the fixing bath) start up.

**The time it takes the film to pass through the machine** is controlled by a tachometer generator (12a). The lifting tank's rising and falling movements are controlled by the disc's and the light barrier's (19a) rotational speed.

**When the lifting tray (22) is lowered,** the film is carried between the rolls through the developing bath and the fixer bath, as well as through the rinsing and drying zones (8) within the time set for same.

While the film is being developed, water is fed **into the rinsing zone** via water inlet (7). The water is discharged via the outflow pipe. Water flows through continuously at a rate of 2 l/min., with water pressure of 2 bar.

Should the outflow pipe be blocked, a signal is sounded via a level sensor (13). The water valve (15) closes and no more water is fed into the machine.

**When the film has been slid into the machine,** the start flap (2) closes. As soon as the message "MACHINE LOADED" flashing on the display goes out, another film can be introduced, or up to 6 intra-oral films, can be introduced together.

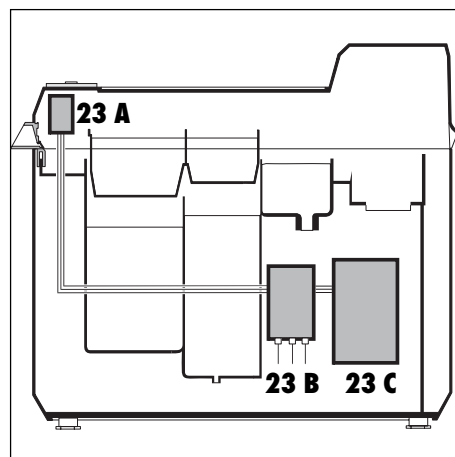
If no other film is slid into the machine when a particular film has passed through it (this is signalled by a sound) the lifting tray (22) moves upwards (to stand-by position), indicating that the machine is now empty. The drive motor (12), water valve (15) and drier heater (10) are switched off. When the machine is in stand-by position, the developer's and fixer's roller packets are completely immersed in the chemicals. This prevents deposits from forming on the rollers.

### 6.1 Arrangement of plates

#### 23 A Operating part

#### 23 B Control part

#### 23 C Power part





## MOUNTING AND ASSEMBLY

### 7. SETTING UP

#### 7.1 Area in which machine is to be set up

- The XR 24 PRO developing machine should only be set up in a dry, well-aired room.
- In winter, the room temperature should not fall below +10°C; in summer it should not rise above +28°C.



**Danger.** The appliance should not be directly exposed to the sun's rays. There is a danger that the chemicals may overheat or that the films might be pre-exposed.

- The room in which the machine is being set up must contain a R3/4" bibcock (27) with a ventilation pipe, an outflow pipe (28) with a ventilated plastic trap, and an earthed plug (26). Ideally, a washbasin should also be situated close to the machine.



The operating staff must have easy access to the bibcock (27) and the earthed plug (26)..

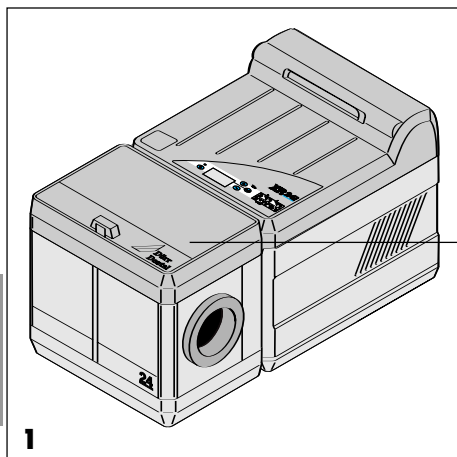
- We recommend that the XR 24 PRO be set up in a darkroom. If the machine is **not** set up in a darkroom, a daylight attachment (24) (DL24 or DL26) must be fixed to it.
- The following should be taken into consideration if the machine is being used with a daylight attachment:



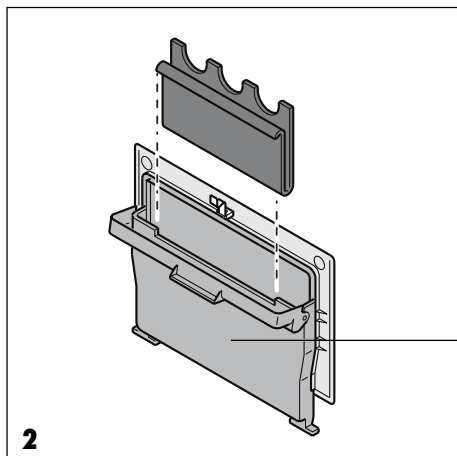
**Danger.** Films should never be stored in the vicinity of an X-ray room

**Danger.** When films are stored in the daylight attachment's film storage part (25), there is a danger that pre-exposure can occur due to stray radiation in the appliance.

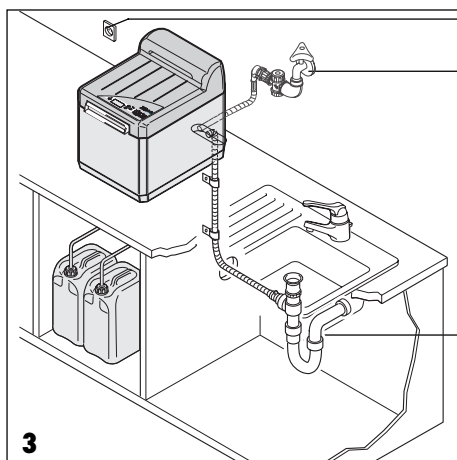
If necessary, a partition with a lead screen may be inserted.



1



2



3

24

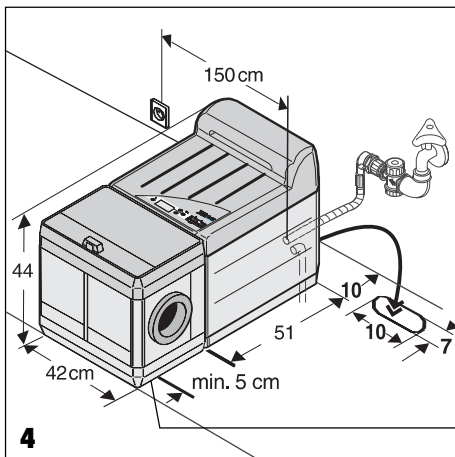
25

26

27

28



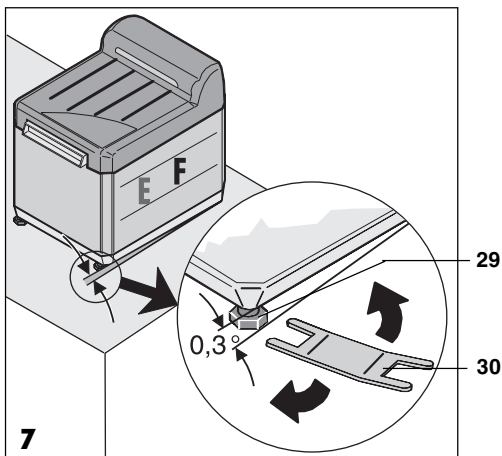


## 7.2 How to set up machine

- Set the machine up on a horizontal, stable, even board at working height.
- When the tubes are being passed under, the board must have an opening measuring ca. 7 x 10 m
- Ensure that additional space is available so that servicing work can be carried out and so that the machine is adequately ventilated:

**There must be at least 10 cm of free space behind the machine and ca. 50 cm free space left and right.**

At the front there must be enough space in case a daylight attachment (24) has to be fixed to the machine. If necessary, detach the installation feet at the front and screw them on to the back.



## 7.3 Setting up the machine

- Undo the plastic bands attached to the cardboard packaging.
- Take out all small parts.
- Grip the sides of the machine and place it in suitable position.
- Set it up close to a mains water supply, an outflow pipe and an earthed pipe (max. distance 1.5 m)
- Set up the appliance so that it has a slight tilt, ca. 0.3 ° to the fixer bath (fig. 8). Adjust the feet of the appliance (29) using the spanner provided (30) as required.



## 8. INSTALLATION

### 8.1 Mains water supply

- Check whether or not pure water is flowing out of the bibcock (27). **When the machine is being installed initially, rinse the pipelines thoroughly!**

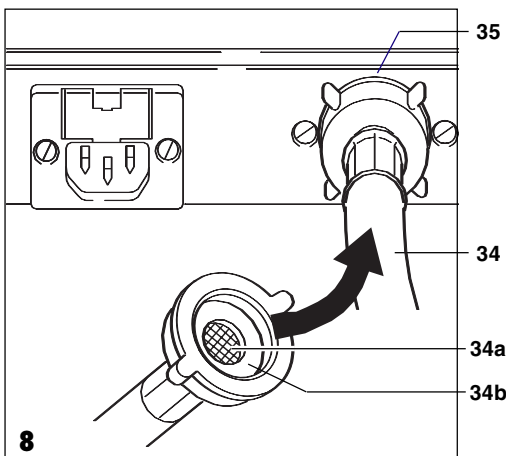
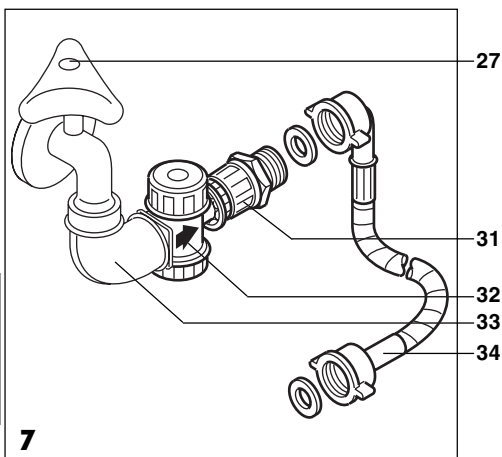
- Because the water quality can vary greatly from region to region, a fine-mesh filter (32) must be inserted between the bibcock (27) and the water pipe (34).

**i** The fine-mesh filter (32) protects the flow-through limiter in the appliance's water valve from impurities

- Close the bibcock (27).
- Connect the 90° bow to the bibcock (27). Attach the fine-mesh filter (32) (arrow in flow direction) and double nipple (31) to the bibcock

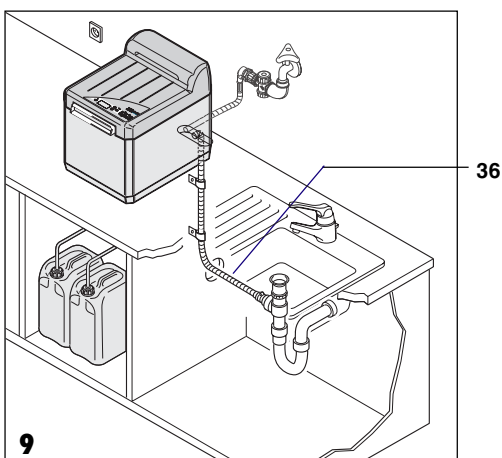
**i** Check whether the strainer (34a) and both seals (34b) are present in the water pipe's (34) threaded joints.

- Connect the water pipe to machine's water intake point (35) (threaded joint with strainer) and to the double nipple (31).

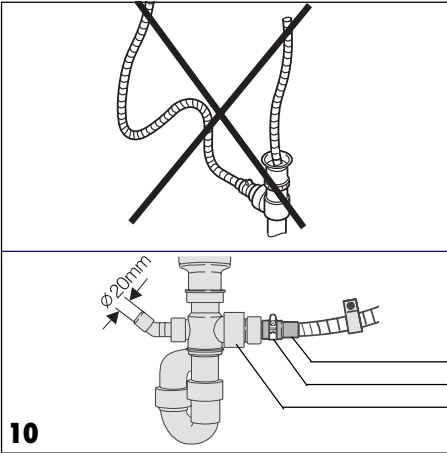


### 8.2 Wastewater connection

- The wastewater connection may only be connected via a **ventilated** siphon.
- Move the outflow pipe (36) to the siphon at a continuous slant. Shorten the pipe to the correct length.



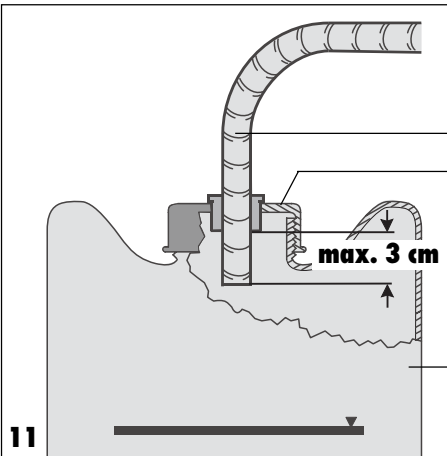




**When moving the outflow pipe, avoid sagging, constrictions and reductions.**

- Cover exterior of end of pipe with UHU plaster
- Screw screwed fitting (37) to pipe and attach to siphon's (25) muff using pipe clip (38).
- Secure outflow pipe using pipe clips, screws and pins.
- The washing basin's outflow point must be open!

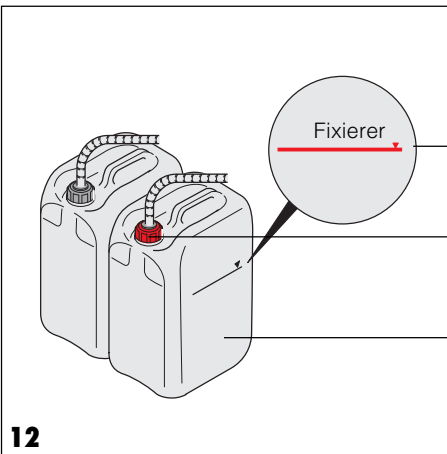
### 8.3 Connection for developer and Fixer outflow pipe



- Set up the collecting tray (39) for the developer (black level marking) and the fixer (red level marking) beneath the appliance so that it is clearly visible and stable
- **Move the pipes (40) at a continuous slant**
- Shorten the pipes to the correct length.
- Feed the pipe for the developer (black marking) into the black lid (41).
- Screw the lid (41) to the collecting tray (39) for the developer
- Secure the pipe for the fixer (red marking) to the collecting tray for the fixer in the same way



**When the full level marking has been reached, empty the collecting tray (danger of overflow). When disposing of the developer and the fixer, regional regulations must be complied with. In Germany and in several other countries X-ray chemicals are classified as special waste, and are disposed of accordingly.**

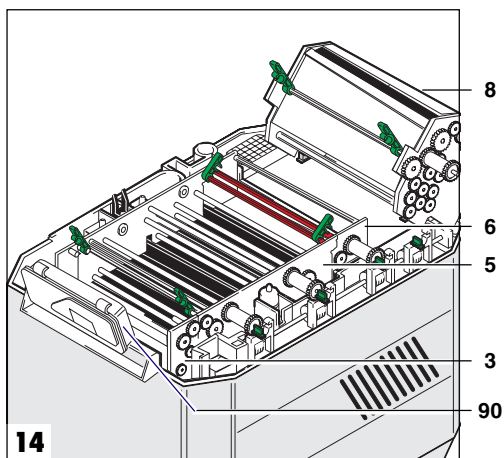
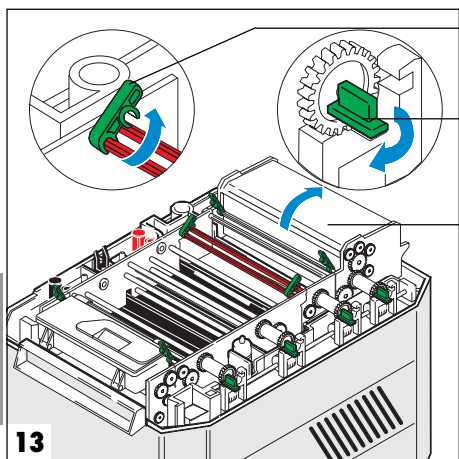




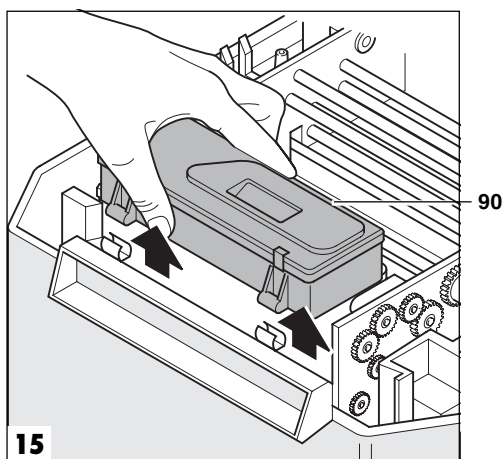
## 44 **9. BEFORE OPERATING MACHINE FOR FIRST TIME**

### 45 **9.1 Cleaning the machine**

- Take lid off.
- Remove floating lid from developing bath and fixing bath
- Open green stop flaps (44) and seals (45).



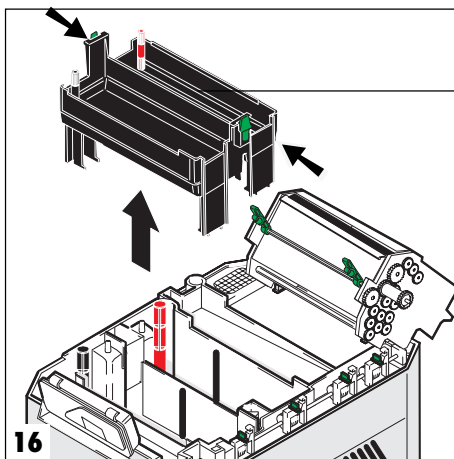
- Swivel drier packet (8) backwards.
- Remove roller packets for water (6) and developer/fixer (5).
- Swivel display (90) upwards.



The display may also be removed and moved to the left.

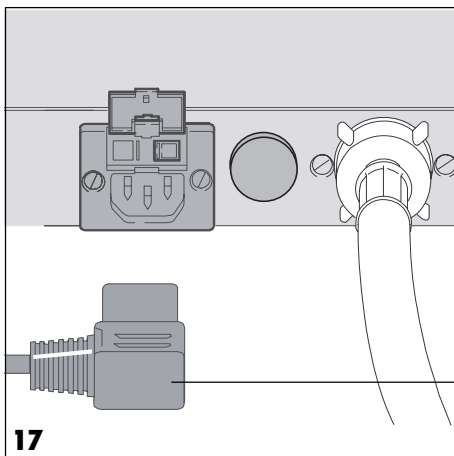
- Remove roller packet film inlet (3).





- Actuate lateral lever and remove lifting tank (22).
- Clean roller packets, lifting tray and tanks with damp sponge

**„Adding chemicals „  
and  
„and inserting roller packets „  
see chapter on USE, Pt.15.1.3**



## 10. POWER POINT (MAINS)



The machine is designed for use with a mains voltage of 230 V or 100-110 V/50-60 Hz (see nameplate). Before connecting the mains cable check whether the required mains voltage is available; otherwise the appliance may be damaged. Use the Dürr mains cable supplied with the machine. The machine may only be connected to the supply network when it has been shut down and when the lateral coverings have been attached and the lid replaced.

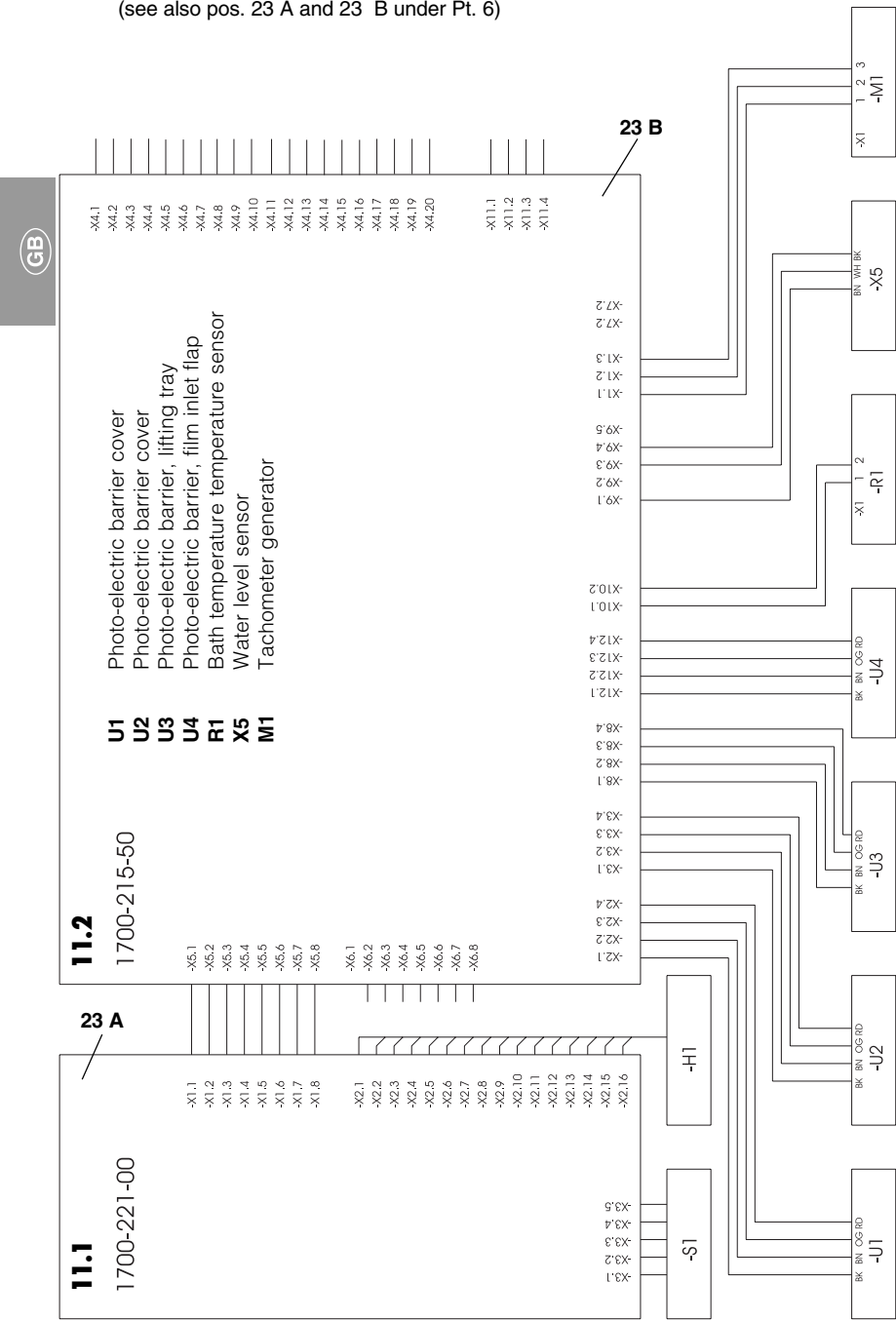
- Plug the mains plug (61) into the machine and the mains socket.



# 11. CIRCUIT DIAGRAM

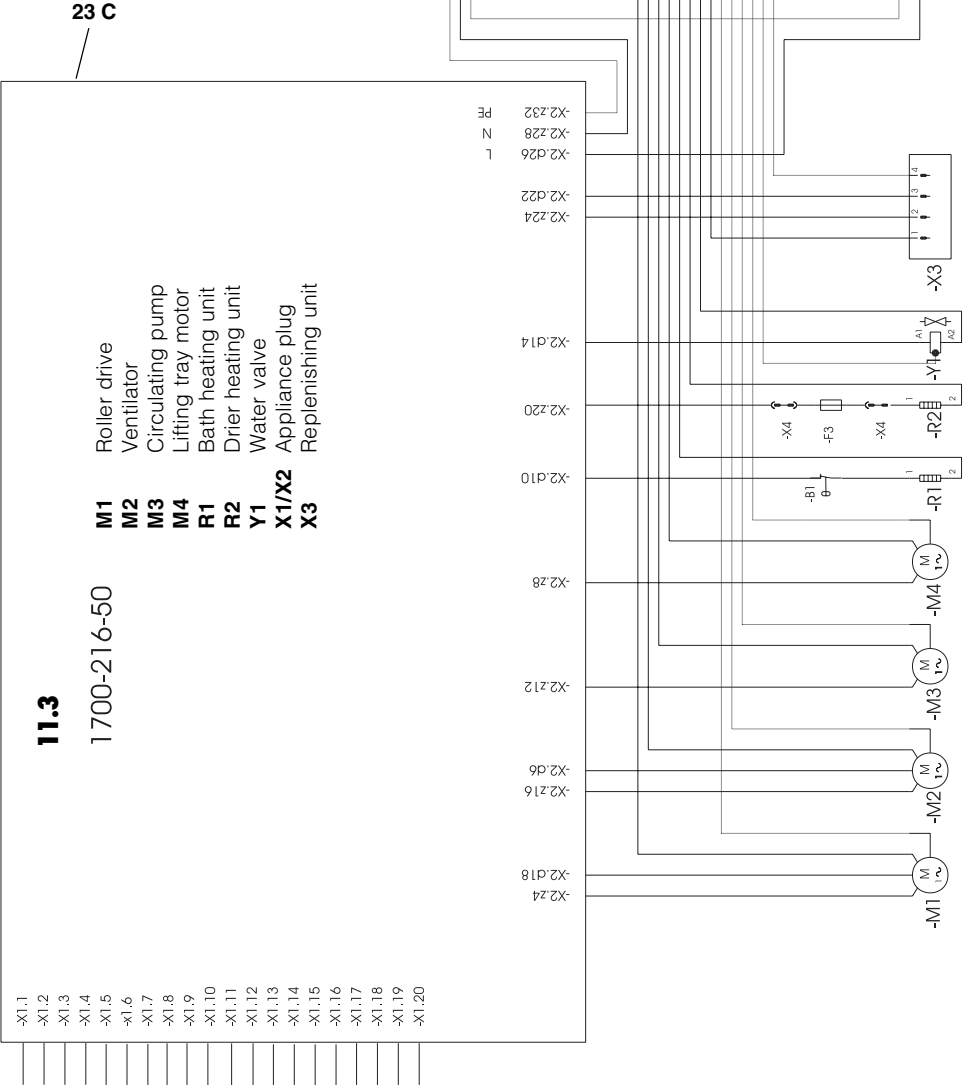
## 11.1 Printed circuit board, operating part / 11.2 Printed circuit board, control

(see also pos. 23 A and 23 B under Pt. 6)





# 11.3 Printed circuit board, power part 230 V (see also pos. 23 C under Pt. 6)





## 12. FIRST TIME OPERATION

The XR 24 PRO developing machine has three settings which determine the amount of time it takes a film to pass through the machine. The following values are set for the machine "ex works":

**Intra-oral films 6 min.** (INTRA program)

**Extra-oral films 4 min.** (EXTRA program)

**Endodontal films 2.45 min.** (ENDO prog.)

Note: It is not possible to archive X-ray films which pass through the machine during this short period of time).

**- Developing bath and fixing bath temperature: 28 °C**

**- Drier capacity: 30%**

When films with different drier capacities, and which pass through the machine in longer or shorter periods of time, are used, the values can be **changed in accordance with the films which are to be processed**. In this context, see the list of films, point 14.7.

For a program overview, see the chapter on USAGE



**The machine may only be connected to the supply network when it has been shut down and when the lateral coverings have been attached and the lid replaced!**



Whenever the machine is switched on using the mains button, the "INTRA" program is started, i.e., whenever the machine is switched off it is reset to "INTRA".



**The operating instructions on the display for the user** are contained in the chapter on USAGE, point 14

Detailed instructions on how to service the machine are listed under maintenance, point 18.6.



**• The developing machine must never be used without roller packets!**

If no roller packets are used, the developing and fixing fluids can spurt up and out of the developing unit when placed under pressure.


**Chemicals irritate the eyes and skin. Serious injuries can be incurred.**

**• If no developing and fixing roller packets are used, the chemicals cannot be directed into the tanks**  
**There is a danger of the chemicals being mixed together.**

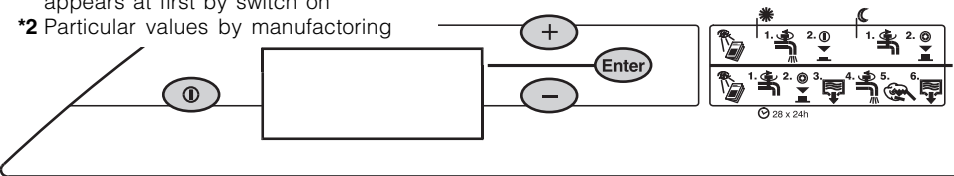
**• The developing machine should never be operated without fluids (chemicals, water). This can lead to malfunctioning of the heating control system.**



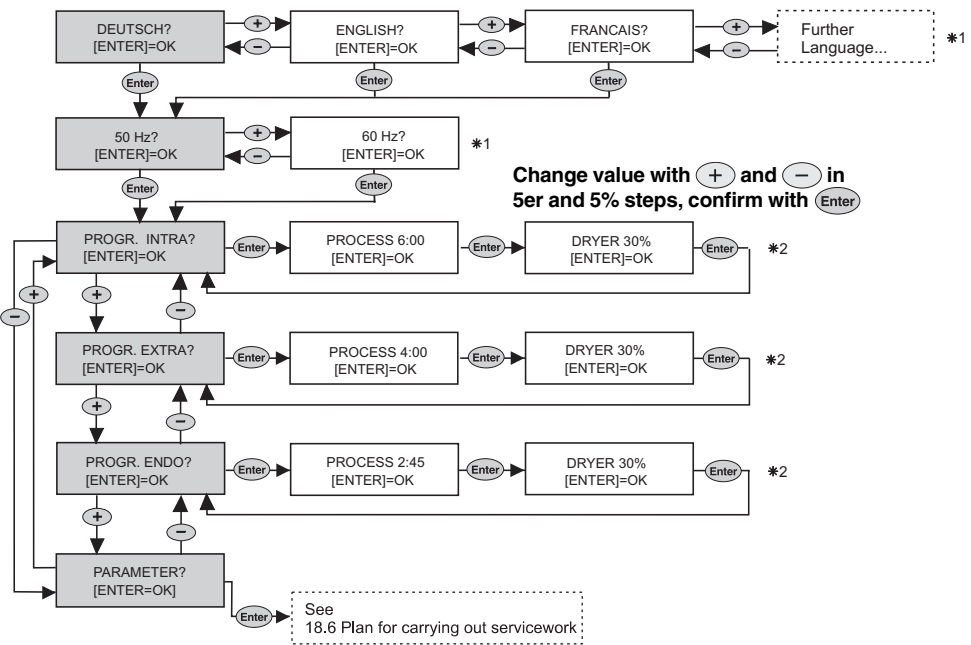
# 12.1 Settings / Servicing work for technician

-  Open the bibcock.
- Check leak tightness of machine and connections
- **Start servicing operation**  
 ① + **Enter** **press at same time** (min. 4 s).  
 Machine now in service mode
- **Select service function**  
 Select with buttons **+** and **-** service funktion
- **Change settings**  
 Change with **+** or **-** parameter value  
 With **Enter** 1 s, confirm new value
- \*1 Selected language, frequency or value appears at first by switch on
- \*2 Particular values by manufacturing
- **End servicing mode**  
 ① Switch off machine using mains button (press for min. 2 sec.)
- Parameters such as language, mains frequency, etc. may be changed on the display if the instructions are followed:

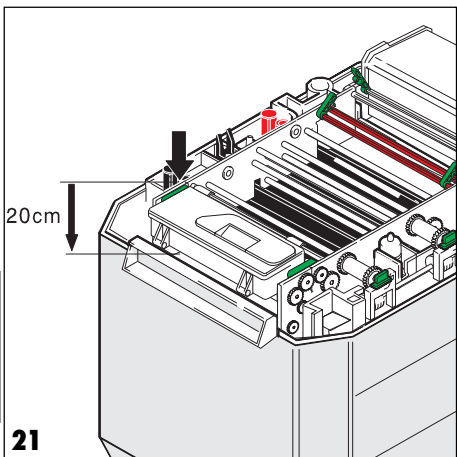
**XR 24 PRO**



## V18







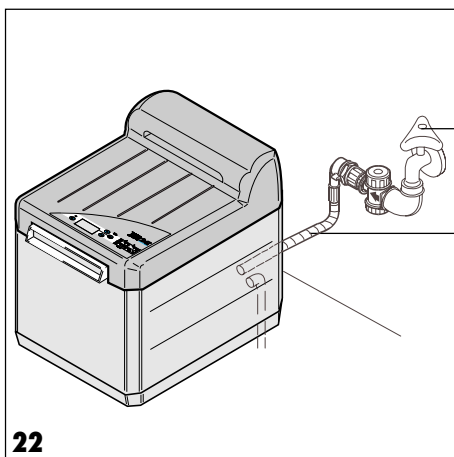
## 12.2 Checking developer temperature and carrying out acceptance test



The following procedure is only valid for, e.g., Germany. Users in other countries should comply with the relevant local regulations!

- Switch on the machine (ⓘ) and wait until the heating phase for the bath has ended (see also point 14.1, "in the morning or before beginning work").
- In order to check the developer temperature, switch off the machine.
- Pull out the mains plug.
- Close the bibcock.
- Take off the lid.
- Measure the developer temperature (to the front and left at a depth of ca. 20 cm). In accordance with the list of films, the developer temperature must amount to, e.g., +28 °C, +/- 0.5.
- Record the temperature in the acceptance log and the constancy test log.
- Replace the lid, plug in the mains plug, open the bibcock and switch on (ⓘ) the machine.
- Insert test film and carry out acceptance test in accordance with ordinance on X-rays. Record the test results in the test log. Store the test film in the archives. Inform operating staff that constancy tests must be carried out on a regular basis.





## 13. TRANSPORTING THE MACHINE

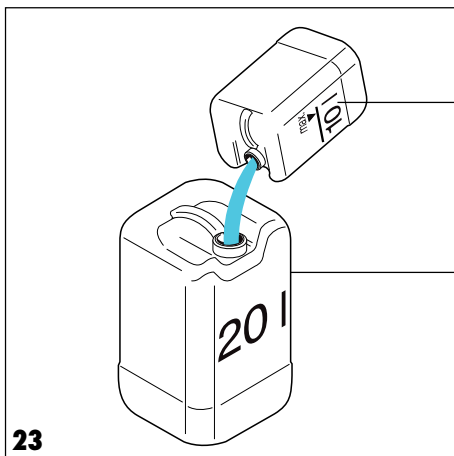
27 Before carrying the developing machine, please note the following:



**The developing machine may only be transported when the tanks are empty.**

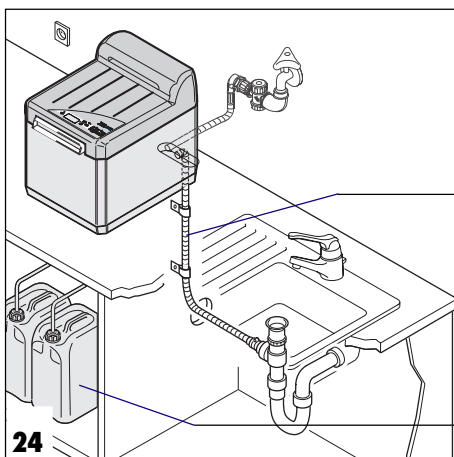
31

- Switch off the machine by pressing the mains button.
- Close the bibcock (27).
- Pull the mains cable out of the earthed socket and the machine.
- Unscrew the water pipe (31) from the machine and the bibcock (27).
- Empty the chemicals out of the collecting trays (39) into the corresponding trays (63).
- Allow the chemicals to flow out of the tanks into the collecting trays (39). See point 15.1.
- Clean the machine (see point 9.1)



39

63



35

39

### 13.1 Removing the outflow pipes

- Remove the outflow pipe (35).
- Disengage the pipe from the collecting tray (39) for the developer and the fixer. Make sure that no chemicals drip out.

### 13.2 Protection against damage

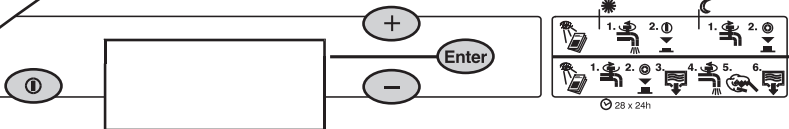
- Protect the machine against mechanical stress and damage
- Ensure that the machine cannot move about when it is being transported.
- Instruct staff charged with transporting the machine.



## USAGE

- ① Mains button
- Enter Confirmation button
- + , - „Browsing through menu“

**XR 24 PRO**



### Program overview

The **intra**, **extra** and **endo** programs are set to particular values when the machine is being manufactured (see below). However, each of them can be adapted by the technician using the list of films.

**INTRA** - Processing time:  $t=6\text{min}$   
 - Bath temperature:  $T=28\text{ }^{\circ}\text{C}$   
 - Drier capacity: 30%

**EXTRA** - Processing time:  $t=4\text{min}$   
 - Bath temperature:  $T=28\text{ }^{\circ}\text{C}$   
 - Drier capacity: 30%

**ENDO** - Processing time:  $t=2\text{min}45\text{sec}$   
 - Bath temperature:  $T=28\text{ }^{\circ}\text{C}$   
 - Drier capacity: 30%

**i** Whenever the machine is switched on using the mains button, the "INTRA" program is started, i.e., whenever the machine is switched off it is reset to "INTRA".

### Service- / and error messages

See point 16.1, error messages on display, indicated by signal

SERV. INTERVAL  
REACHED!

Only when activated  
by the technician!

BEFORE OPENING  
MAIN PLUG PULL

ERROR  
WATER TO LOW!

ERROR  
WATER TO HIGH!

ERROR  
ROLLER DRIVE

## 14. OPERATION

Before operating the machine, please note the following:



- The developing machine must never be used without roller packets.

If no roller packets are used, the developing and fixing fluids can spurt up and out of the developing unit when placed under pressure.

**Chemicals irritate the eyes and skin. Serious injuries can be incurred.**

- If no developing and fixing roller packets are used, the chemicals cannot be directed into the tanks.

**There is a danger of the chemicals being mixed together.**

- The developing unit should never be operated without fluids (chemicals, water). This can lead to a malfunction in the heating control system.



In order to guarantee that the films be of a consistently high quality, the machine must be switched on every day.

Care must also be taken to ensure that the temperature in the area surrounding the machine is not higher than the temperature of the developing bath!


#### Standby-Mode

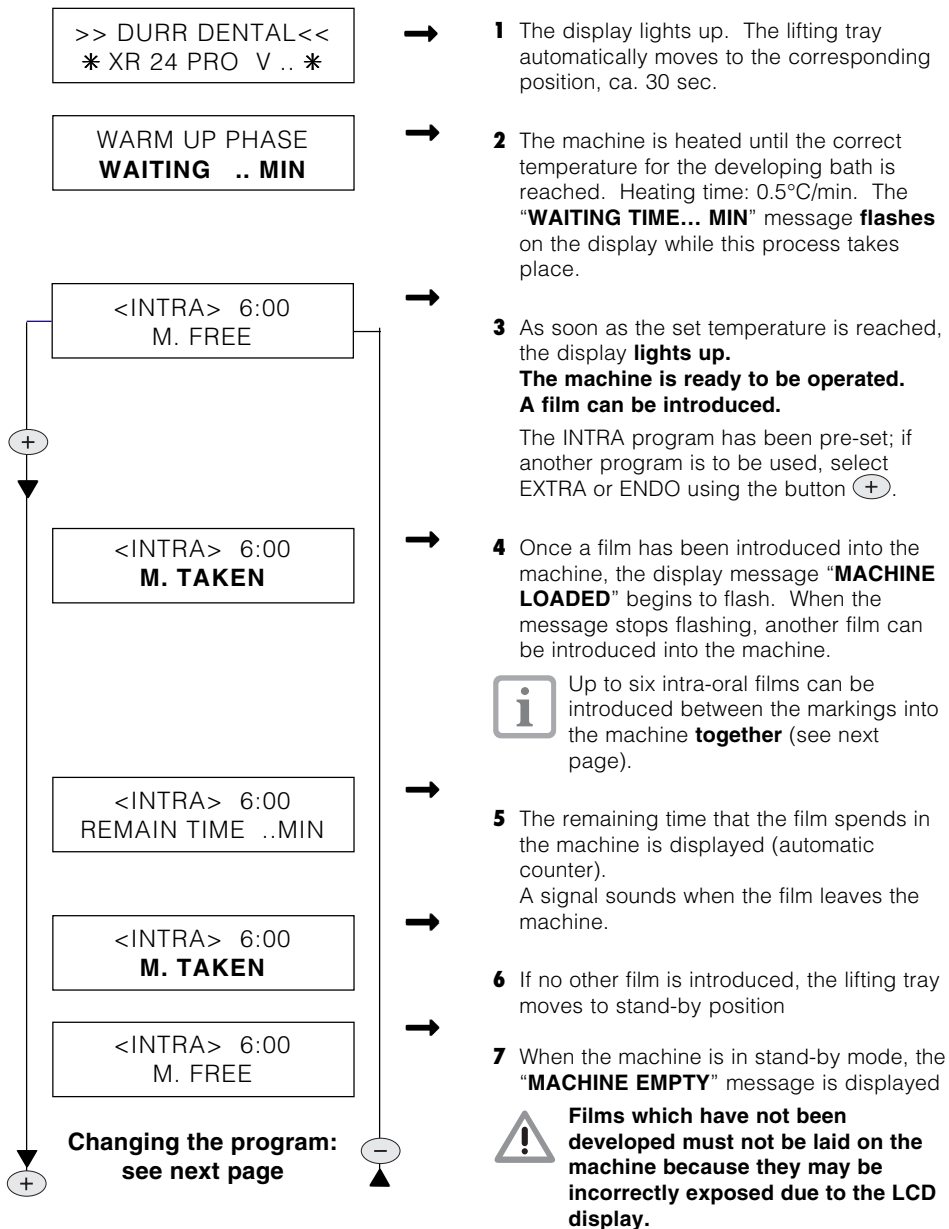
When in the stand-by mode, the machine is ready to be operated. A film may now be inserted into it

Before inserting a film, check the program selection!



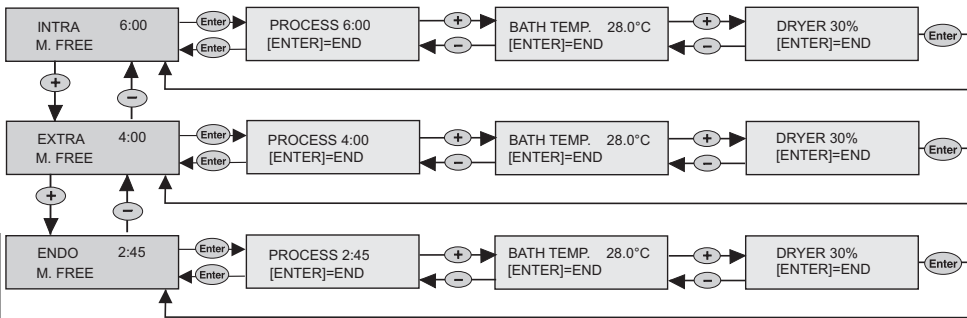
## 14.1 Procedure to be followed every morning or before beginning work

-  Open the bibcock.
- Switch on the machine:
  - ① Press the mains button for ca. 2 sec. until the signal sounds

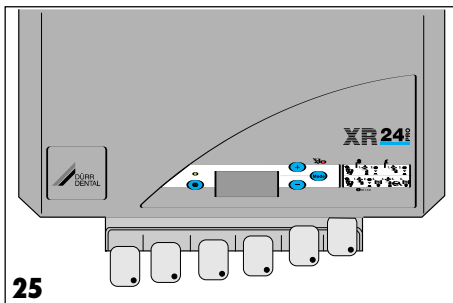




## Changing the program



For error messages, see point 16.1 "error messages on the display".



- Up to six intra-oral films can be introduced into the machine between the markings. If 2 x 3 films are being introduced, ensure that they are not inserted crossways and that the marking point in the developing machine is respected.
- In order to acquire a check photo quickly when the endo program is being used (e.g., when root canals are being treated) (short processing time, 2.45 min.), change.  
See list of recommended films (point 14.7).

### 14.2 Procedure to be followed every evening or after finishing work

- ① Switch off the machine by pressing the mains button.
- ☞ Close the bibcock.

### 14.3 Every week

- Using at least weekly cleaning films, e.g. "DÜRR clear100" before starting work order no. 1410-007-00
- Carry out a constancy test in accordance with the ordinance on X-rays:
  - Expose the film with the set parameters for the constancy parameters.
  - Measure the temperature.
  - Develop the film.
  - Compare the test results with the film for the acceptance test and record the results in the test log.
  - Archive the test film.

### 14.4 Every 4 weeks

- or according to requirements,
- Change chemicals, see para. 15.1

### 14.5 1x a year

- Clean the roller packets with chemicals in the roller tray using the XR Cleaning Set; order no. 1700-007-00; includes instructions on use.
- Check light tightness of darkroom.

### 14.6 When practice is closed

for more than 2 weeks:

- Drain off chemicals.  
Clean tanks and roller packets and allow to dry (see point 15.1)



# 14.7 List of recommended films for Dürr XR 24.. developing machine.

## Intraorale Films

Bath temperature	28 °C
Processing time	6 min
Drier capacity	30 %
Filmtypes	
Kodak Ultra Speed	2,2x 3,5 cm
	3,1x 4,1 cm
	2,7x 5,4 cm
	5,7x 7,6 cm
Kodak Insight	2,2x 3,5 cm
	3,1x 4,1 cm
	2,4x 4,0 cm
	2,7x 5,4 cm
	5,7x 7,6 cm
Agfa Dentus M2 <i>Comfort</i>	
	2 x 3 cm
	3 x 4 cm
	5 x 7 cm

When taking certain examination films (e.g. before root canal treatment) for developing in the „ENDO“ program, bitte please note the following:

i

During this short period of time, X-rays films may not be archived.

If the film is to be archived, it must be fixed and rinsed for 30 sec. as soon as possible after the diagnosis has been made.

i

The processing times for other types of films must be checked against the Dental Sensitivity Index, and adapted accordingly.

## Extraorale Films

Bath temperature	28 °C	
Film formats	bis max. 24 x 30 cm	
Filmtypes	Processing time	Drier-capacity
Kodak		
X-OMAT K	6min	30 %
T-MAT L/RA	4min	20 %
T-MAT G/RA	4min	20 %
Ekta Vision L	6min	30 %
Ekta Vision G	6min	30 %
Agfa		
Dentus RP 6	6 min	30 %
Dentus Ortholux	6 min	30 %



# 15. MAINTENANCE

## Every 4 weeks

**Change chemicals without using replenishing unit (91)** (see paragr. 15.1 below)



Chemicals should be changed every 4 weeks if a maximum amount of 10 intra-oral and 3 extra-oral films are used on a daily basis.

The instructions on how to clean the apparatus should be kept close to the machine and should be displayed in poster (A3) format.

## Every 3 months

**Change chemicals using replenishing unit (91)** (see paragraph 15.1 below).

## 1 x a year

**Clean the roller packets using the XR Cleaning Set**



The tanks do not have to be cleaned with chemicals. Only the roller packets need to be cleaned using chemicals using the XR Cleaning Set (cleaning tray, accessories and instructions for use).  
Order no: 1700-007-00.

## 15.1 Changing the chemicals

### 15.1.1 Drain off the chemicals

- Switch off the machine using the mains button.
- Pull the earthed socket out of the mains plug (61).
- Remove the lid (60).
- Check if the collecting tray (39) is empty; if necessary, empty into main tray (63).

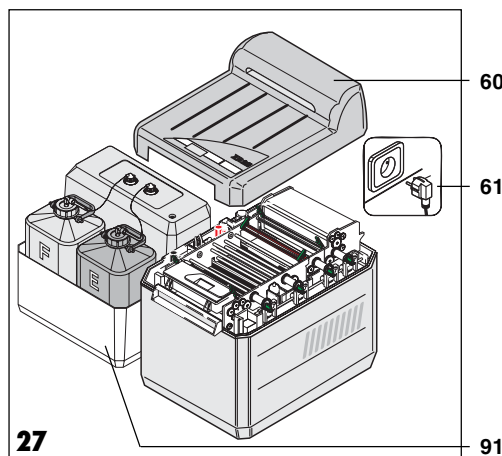


It is important that the collecting tanks be empty; if they are not, there is a danger that they will overflow if the chemicals are drained out of the tanks.

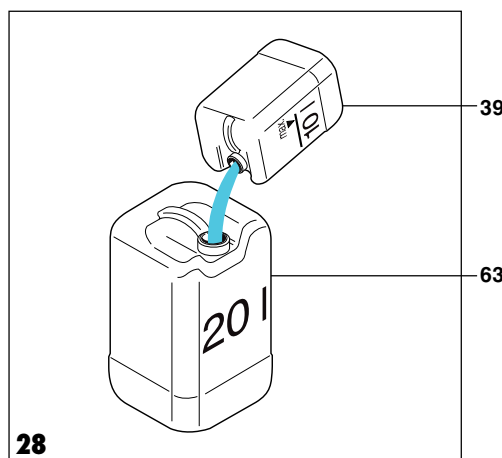
- Remove floating lid from developing bath and fixing bath. Drain and put to one side
- Unscrew small plugs from lifting tanks, then unscrew large plugs from tanks
- Empty collecting tray
- Unscrew lid from collecting tray. Hang pipe ends in neutral tray



This prevents water from getting into the collecting tray and the main tray when cleaning is being carried out.

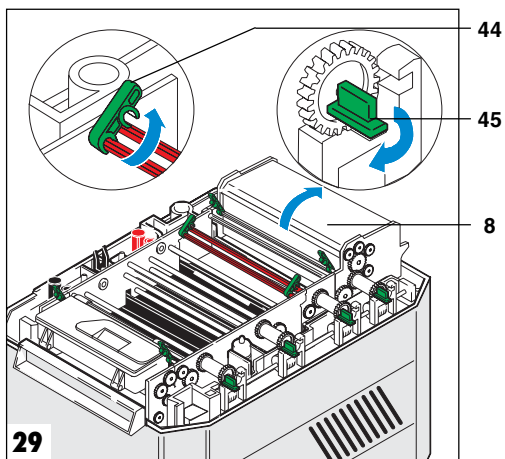


27



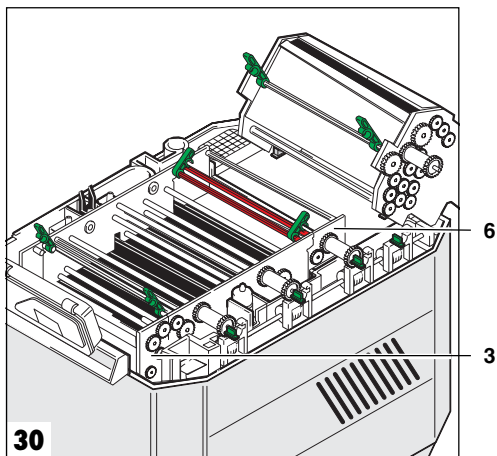
28



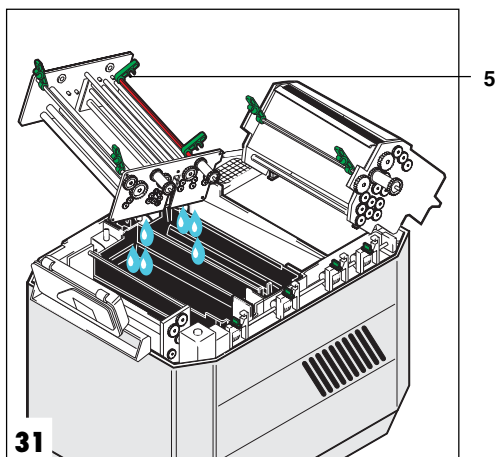


### 15.1.2 Cleaning tanks and roller packets

- Open green stop flaps (44) and seals (45).
- Swivel drier packet (8) backwards

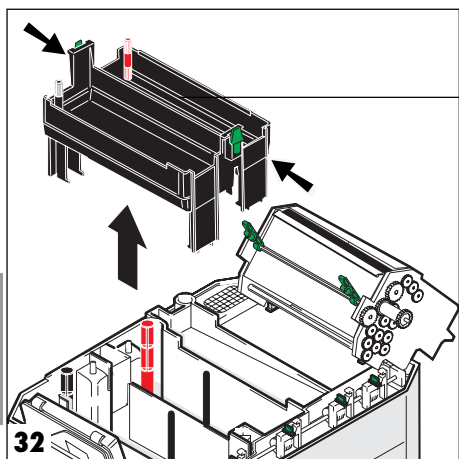


- Swivel display (90) upwards. If a daylight attachment is being used, the display must be removed and moved to the left
- Remove insertion packet for water (6) and film (3)



- Remove roller packets for water (6) and developer/fixer (5); tilt sideways to allow chemicals to drain off





22

- Place roller packets in washbasin. Spray with, e.g., WR 2000 Spray Cleaner and allow to work in for ca. 10 min.
- Actuate lateral lever and remove lifting tank (22).

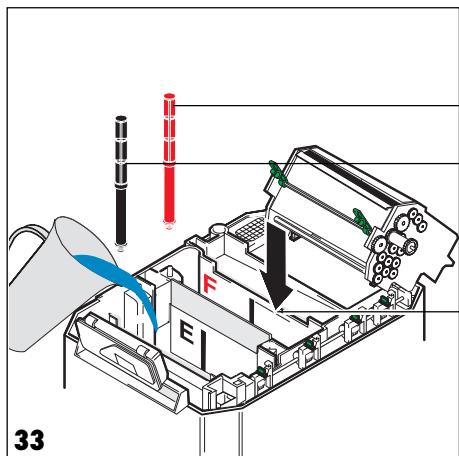


Rinse using the sponges; black for developing and red for fixing tank

- Rinse the lifting tank (22) with warm water (min. 40 °C) and clean thoroughly using the appropriated sponges as above.
- Rinse tanks (22) with suitable sponges under warm water
- Rinse roller packets with suitable sponges under warm water
- Screw large plugs (18, 21) into tanks
- Fill developing (E) and fixing tanks (F) to marking (54) with **40 °C warm water**.
- Starting the developer and fixer packets



**The developing machine must never be used without roller packets. If no roller packets are used, the developing and fixing fluids can spurt up and out of the developing unit because the water is not being redirected into the tanks! Chemicals irritate the eyes.**

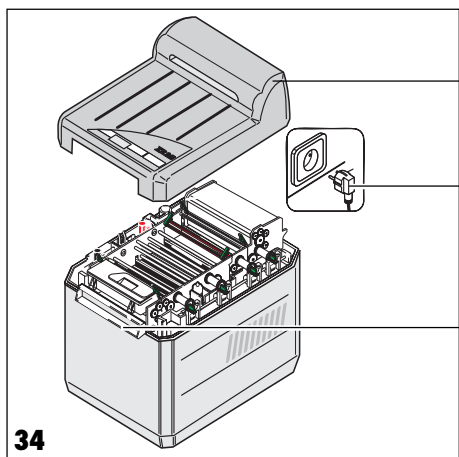


18

21

54

- Close green stop flaps and seals
- Swivel display back into place
- Replace lid (60)
- Plug in mains plug (61). Switch on machine by pressing mains plug.
- Start up machine. Insert 3 x 4 films into lay-in point (1) until start flap is actuated. Leave films lying in this position for about 4 min.
- Allow machine to run for ca. 10 min. (pipes and circulatory pump are thus automatically cleaned).
- 10 min. later, switch off machine by pressing mains button and pull out mains plug (61).
- Remove lid (60)
- Swivel display upwards
- Open green stop flaps (44) and seals (45).



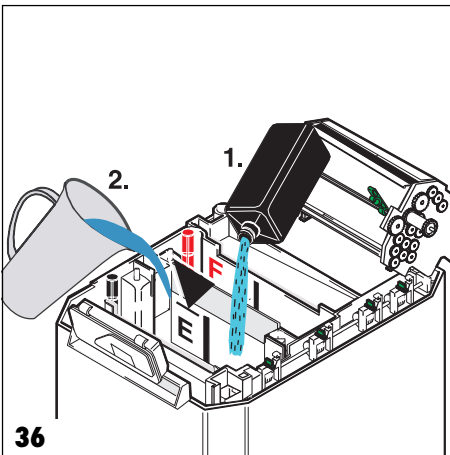
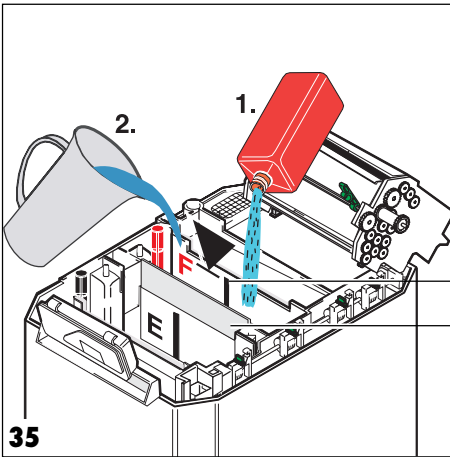
60

61

1

34





- Remove roller packets for water (6) and developer/fixer (5); tilt sideways to allow water to drain off.
- Unscrew large plugs for developer (21) and fixer (18); allow water to drain off from these.

### 15.1.3 Pouring in chemicals



The information on pouring in the chemicals refers to the "DÜRR AUTOMAT XR" chemistry.

- Screw the large plugs for the developer (21) and the fixer (18) into the tanks (see pg. 28)
- Reconnect developer and fixer pumps to collecting trays
- Place partition (52) between developing and fixing tank.



The partition prevents chemicals from mixing together when they are being poured in.



**Chemicals can cause damage to health. They irritate eyes and skin. Danger of serious injury to eyes exists. Irreversible injuries may be caused.**



**Wear protective gloves and glasses when pouring in chemicals.**



**If chemicals get into eyes, wash thoroughly with water and consult doctor.**



**Clean hands under running water when work has been carried out.**

**For further information on safety measures, see following internet site:**  
<http://www.duerr.de>.



Dürr Dental has converted from the two-part to the **one-part** "DÜRR AUTOMAT XR" chemistry (pict. 35 and 36). The advantages are:

- **These are easier to handle and**
- **result in a more constant development quality**

#### 1. Filling the fixing tanks (F) (Picture 35)

Carefully pour into large red bottle (avoid splashes so that chemical do not mix together) and fill with water (max. 20 °C) to upper marking (54).

#### 2. Filling the developing tanks (E) (Pict. 36)

Carefully pour into large black bottle (avoid splashes) and fill with water (max. 20 °C) to upper marking.



- Insert lifting tray (22)
- Screw small plugs into lifting tray

#### 15.1.4 Inserting roller packets



**Danger. The developing machine must never be used without roller packets.**

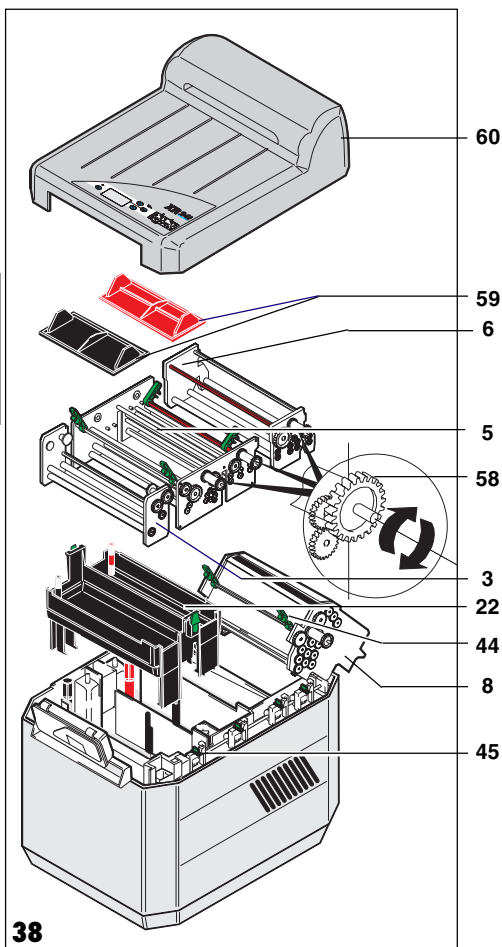
If no roller packets are used, the developing and fixing fluids can spurt up and out of the developing unit when placed under pressure.

**Chemicals irritate the eyes and skin. Serious injuries can be incurred.**

If no developing and fixing roller packets are used, the chemicals cannot be directed into the tanks.

**There is a danger of the chemicals getting into the eyes or being mixed together.**

- Insert drying packet (8) and swivel backwards
- Insert, one after the other, roller packets for water (6), developer/fixer (5) and film lay-in (3).
- Make sure that conduits interlock. If necessary, rotate driving toothed wheel (58) until it meshes with the worm on the drive shaft
- Swivel drier packet (8) forwards
- Close green stop flaps (44) and seals (45)
- Insert floating lid (59) for developing bath and fixing bath
- Swivel display backwards, or insert.
- Replace lid (60). Ensure that the bottom edge of the lid meshes completely with the conduits in the casing coverings.
- Plug in mains plug.



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# TROUBLESHOOTING


## 16. TIPS FOR THE USER



If faults cannot be remedied by using the following information, the Dental Depot technician should be contacted for further technical assistance.

Error	Possible causes	Remedying faults
1. Completely out of order	<ul style="list-style-type: none"><li>• Mains cable not correctly plugged in</li><li>• Lid not replaced</li><li>• Mains button pressed for too short a time</li></ul>	<ul style="list-style-type: none"><li>• Plug mains cable into back of machine and into earthed socket</li><li>• Replace lid correctly</li><li>• Press mains button for min. 2 sec.</li></ul>
2. Films too bright	<ul style="list-style-type: none"><li>• Developer run down</li><li>• Film exposure time for camera too short</li><li>• Developing bath temperature too low</li></ul>	<ul style="list-style-type: none"><li>• Change chemicals (see point 15.1).</li><li>• Set correct exposure time on camera (if possible)</li><li>• Have technician check and, if necessary, set same.</li></ul>
3. Films too dark	<ul style="list-style-type: none"><li>• Film exposure time for camera too long</li><li>• Developing bath temperature too high</li></ul>	<ul style="list-style-type: none"><li>• Set correct exposure time on camera (if possible)</li><li>• Have technician check and, if necessary, set same.</li></ul>
4. Yellow-green veil on film	<ul style="list-style-type: none"><li>• Film not completely fixed</li><li>• Film developed in ENDO program (with processing time of 2.45 min.)</li></ul>	<ul style="list-style-type: none"><li>• Check whether fixer is still in working order. Wave intra-oral films about for ca. 40 sec. in the fixer. If the film is transparent, the fixer is in working order. If veils are still present, change the chemicals (see point 15.1).</li><li>• Select program with longer processing time. Monitor time it takes film to pass through machine (see list of recommended films, point 14.7).</li></ul>
5. Dark veil on film	<ul style="list-style-type: none"><li>• Lid of daylight attachment open.</li><li>• Light entering into darkroom, e.g., via keyhole</li><li>• Darkroom light incorrectly attached or light travelling in wrong direction</li></ul>	<ul style="list-style-type: none"><li>• When orthochromatic (green-sensitive) films are being processed, lid must be closed; otherwise films will be pre-exposed</li><li>• Check light tightness of darkroom; if necessary, seal room</li><li>• Lamp should only emit rays indirectly</li></ul>
6. Green-brownish veil on film	<ul style="list-style-type: none"><li>• Chemicals exhausted</li></ul>	<ul style="list-style-type: none"><li>• Pour in new chemichals</li></ul>



Error	Possible causes	Remedying faults
<b>7. Increased basic veil on film</b>	<ul style="list-style-type: none"> <li>Film concealed</li> <li>Film incorrectly stored</li> </ul>	<ul style="list-style-type: none"> <li>Check expiration date</li> <li>Check storage provisions, expiration date or manufacturer's data on film packaging.</li> </ul>
	<ul style="list-style-type: none"> <li>Developing bath temperature too high as room temperature is too high</li> </ul>	<p> <b>Do not store films near camera. Pre-exposure of films can result due to stray radiation.</b> If necessary, a partition with a lead screen may be inserted.</p> <ul style="list-style-type: none"> <li>Lower room temperature</li> </ul>

## 16.1 Error messages on display with signal tone

Display reading	further message follows ...	possible causes	Remedying faults
BEFORE OPENING MAIN PLUG PULL	At beginning and/or during developing process.	Securing relays on PCB is defect	Arrange maintenance work by contacting customer service staff. Machine can still be operated. Before opening main plug pull
SERV. INTERVAL REACHED!	Once machine has been switched on	Servicing interval has been reached.	Arrange maintenance work by contacting customer service staff. Machine can still be operated.
ERROR WATER TO LOW!	After a film has been laid in with a delay of ca. 35 sec.	Water feed for water bath is interrupted	Check whether bibcock is open and/or feed pipe is connected
ERROR WATER TO HIGH!	At beginning and/or during developing process.	<ul style="list-style-type: none"> <li>Water outflow pipe choked up, incorrectly laid or not ventilated</li> <li>Electrical bridging caused by calcified level sensors.</li> </ul>	Unblock pipes; check whether if water outflow pipe is correctly laid (water pockets). Further work may be carried out once fault has been remedied
ERROR ROLLER DRIVE	At beginning and/or during developing process	Rotational signal from motor interrupted; cable or plug defective	Arrange maintenance work by contacting customer service staff. Faults which occur when films are being developed; film is only carried in shortest processing time (2.45). <b>Inadequate fixing</b>



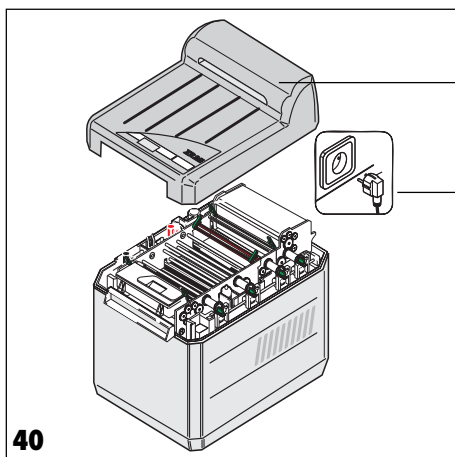
## 17. TIPS FOR TECHNICIANS also see pt.18. Trouble Shooting Tips

Error	Possible causes	Remedying faults
<b>1. Completely out of order</b>	<ul style="list-style-type: none"> <li>• Fuses in house defective</li> <li>• Fuses in appliance defective</li> </ul>	<ul style="list-style-type: none"> <li>• Check fuses; replace if necessary</li> <li>• Check fuses; replace if necessary (see point 18.8)</li> </ul>
<b>2. No fresh water being fed into machine</b>	<ul style="list-style-type: none"> <li>• Water valve blocked or defective</li> <li>• Water feed blocked</li> <li>• Level sensors calcified (electrical bridging).</li> </ul>	<ul style="list-style-type: none"> <li>• Check water valve; replace if necessary (see point 18.10)</li> <li>• Clean fine-mesh filter and strainer in water pipe</li> <li>• Clean level sensor (see point 18.2).</li> </ul>
<b>3. Incorrect developing temperature</b>	<ul style="list-style-type: none"> <li>• Flow heating unit defective</li> <li>• Air in system, circulating pump not ventilated. (If machine is filled with water or chemicals at 20°C, the machine starts without being heated up.)</li> </ul>	<ul style="list-style-type: none"> <li>• Replace flow heating unit and PTC sensor (see point 18.9).</li> <li>• Ventilate the circulating pump, so that the machine is repeatedly started in succession. Mains switch ON /OFF.</li> </ul>
<b>4. Films too bright</b>	<ul style="list-style-type: none"> <li>• Developing temperature too low</li> </ul>	<ul style="list-style-type: none"> <li>• Measure the temperature and key it into the service menü „CALIBRATION ?“</li> </ul>
<b>5. Films too dark</b>	<ul style="list-style-type: none"> <li>• Flow heating unit defective</li> </ul>	<ul style="list-style-type: none"> <li>• Replace flow heating unit and/or PTC sensor (see point 18.9).</li> </ul>
<b>6. Yellow-green veil on film</b>	<ul style="list-style-type: none"> <li>• No chemicals in roller packets for developer and fixer (bath level too low).</li> <li>• Chemicals not being circulated</li> </ul>	<ul style="list-style-type: none"> <li>• Check sealing lip profile and roller packet; replace if necessary.</li> <li>• Check circulating pump for possible air in pipe</li> </ul>
<b>7. Green-brownish veil on film</b>	<ul style="list-style-type: none"> <li>• Film not rinsed</li> </ul>	<ul style="list-style-type: none"> <li>• Level sensor in water bath has switched off water valve; check water outflow pipe and, if necessary clean and lay in accordance with regulations (see 8.2)</li> <li>• Further possibilities: see remedying faults, pt.17.2 (no feeding of fresh water)</li> </ul>
<b>8. Film not completely dried</b>	<ul style="list-style-type: none"> <li>• Drier capacity incorrectly set</li> <li>• Ventilator defective</li> <li>• Heating unit defective</li> </ul>	<ul style="list-style-type: none"> <li>• Set drier capacity in accordance with list of recommended films (see pt. 14.7)</li> <li>• Change ventilator</li> <li>• Check temperature-locking device</li> </ul>

### 16.1 Error messages on display with signal tone

see 16.1





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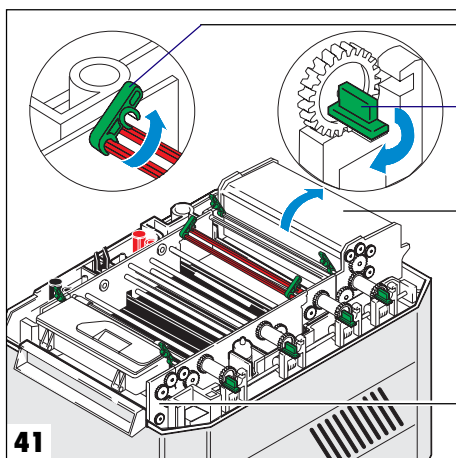
## 18. TROUBLESHOOTING TIPS

### 18.1 Before beginning work

- Ⓢ Switch off machine using mains button
- Pull out mains plug (61)
- Remove lid (60)
- Remove casing coverings required for carrying out work

### 18.2 Removing front covering

- Swivel display upwards
- Open green stop flaps (44) on film insertion packet (3)
- Remove film insertion packet (3)
- Unscrew two grey rapid seals (68) from the front covering (56)
- Unscrew 3 Philips screws (57) and remove front covering (56)



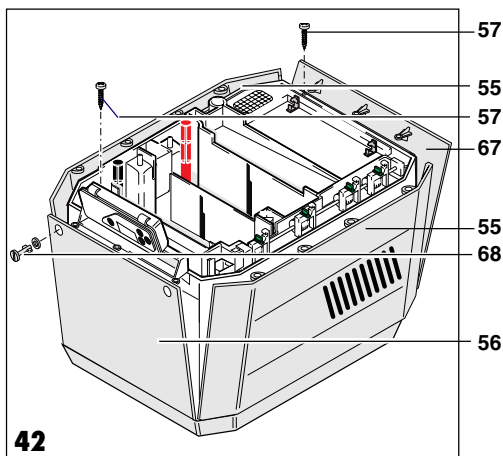
41

### 18.3 Removing rear covering

- Open stop flaps (44) and seals (45) on drier packet (8)
- Swivel drier packet (8) backwards and remove
- Unscrew 3 Philips screws (57) and remove rear covering (67)

### 18.4 Removing lateral coverings

- Remove front (56) and rear (67) covering; pull lateral covering upwards and outwards



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### 18.5 After work has ended

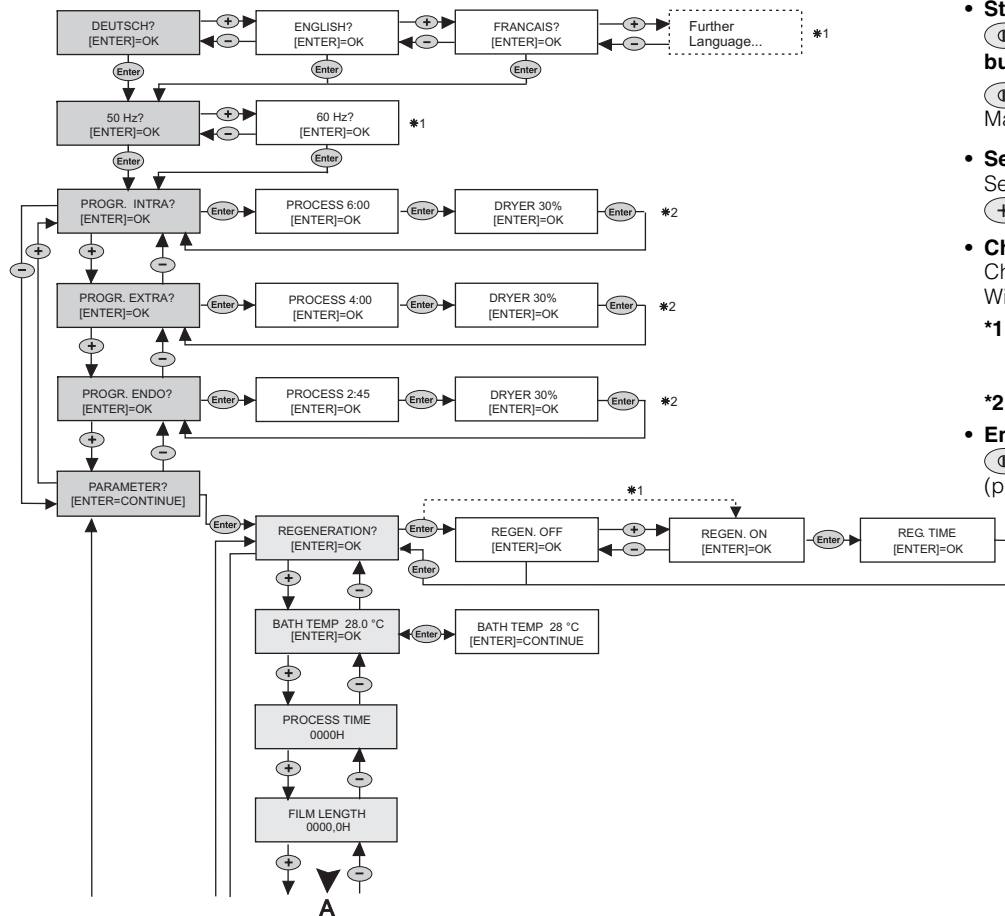
- Reattach casing coverings in accordance with regulations (see also point 9.5)



**Never operate appliance if casing coverings have not been correctly attached and screwed on. The machine is live; danger of electric shocks exists.**

- Replace lid (60). Plug in mains plug





### 18.6 Plan for carrying out service work

- **Start service operation**

- ⓘ **Switch off machine using mains button** (press for min. 2 s)
- ⓘ + **Enter** **press at same time** (min.4 sec)  
Machine now in service mode

- **Select service unction**

Select buttons and service function with

- +** and **-**

- **Change settings**

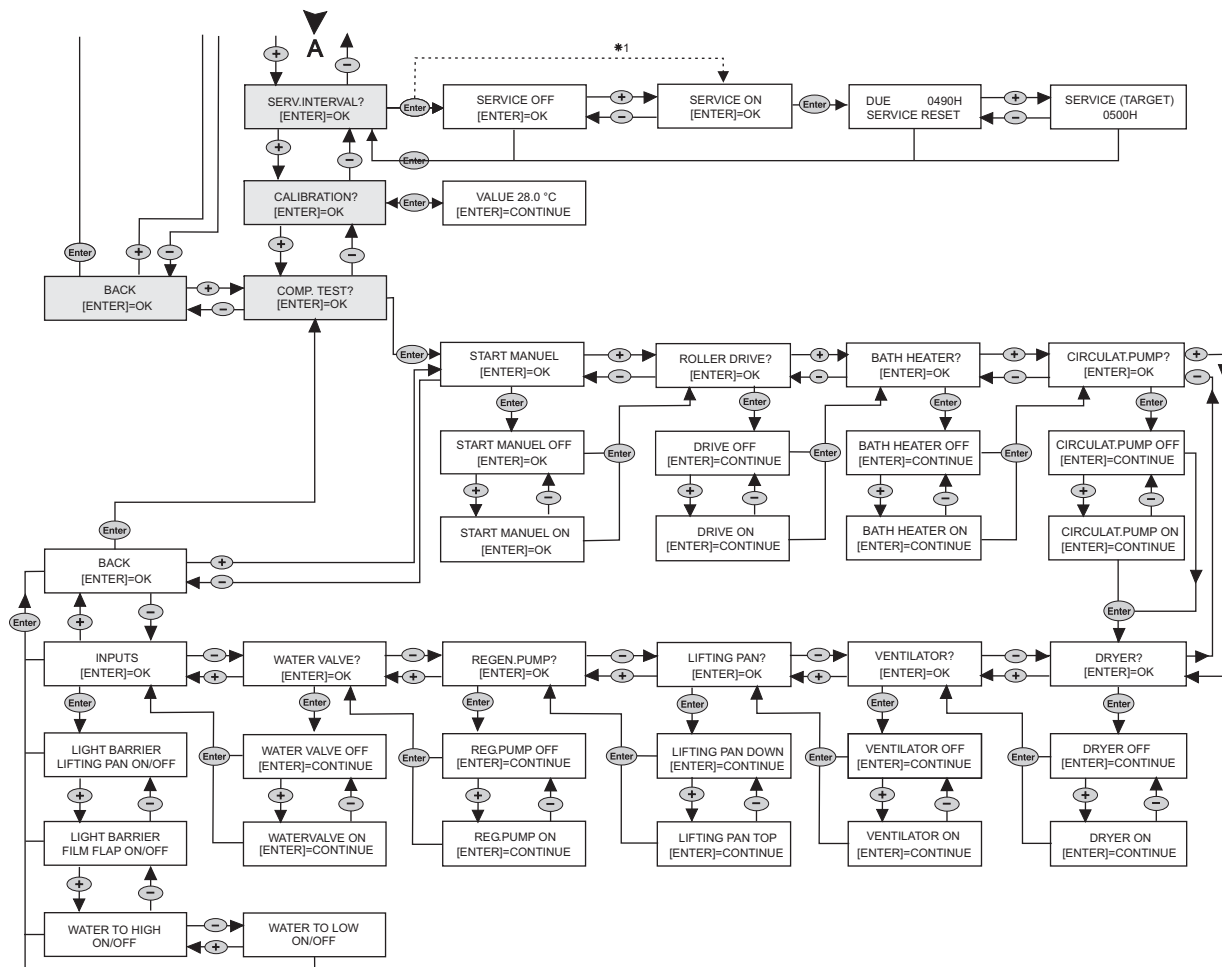
Change with **(+)** or **(-)** parameter value  
With **(Enter)** 1s, confirm new value

- \*1 The language, frequency or value settings selected appear first when switched on again
- \*2 Factory default settings

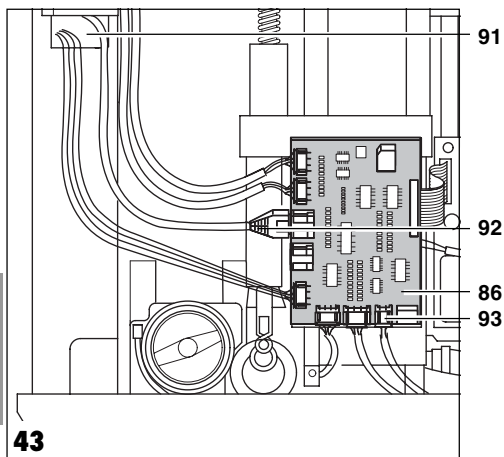
- **End servicing mode**

- ① Switch off machine using mains button (press for min. 2 sec.)



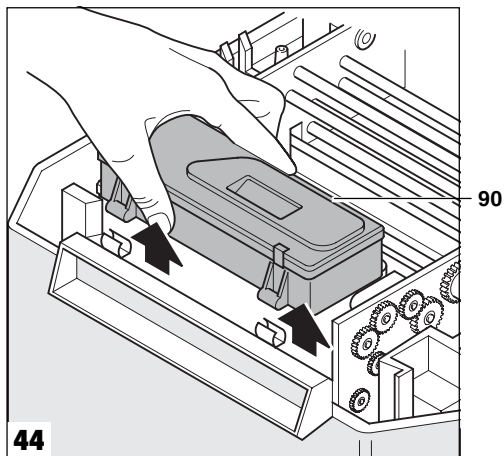




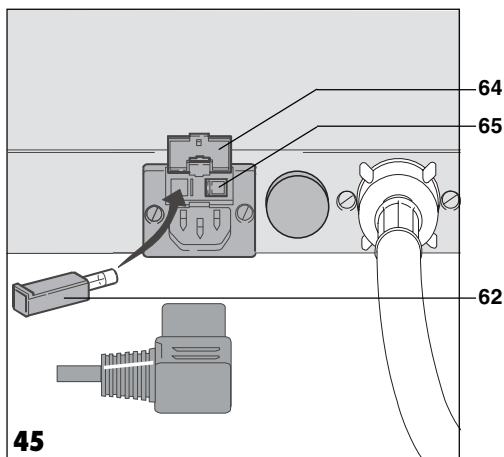


## 18.7 Changing the display

- Pull the display cable's (92) plug out of the plate (86) and pull through openings (91)..



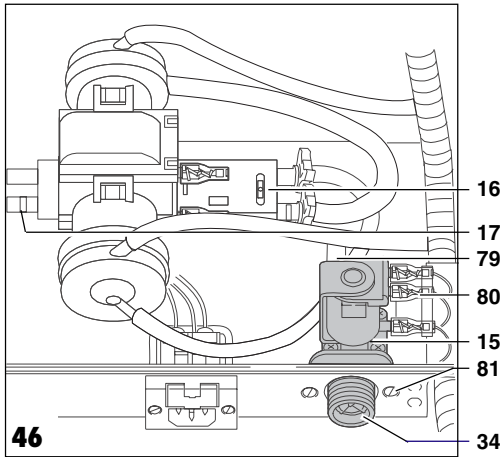
- Pull display (90) upwards.
- Attach new display in reverse sequence.



## 18.8 Checking appliance fuses

- Open flap (64) on rear of unit by applying slight pressure with screwdriver.
- Press spring together and pull out fuse holder (65).
- Check fuse; replace if necessary. For order number, see point 3.1, special accessories





## 18.9 Replacing flow heating unit with PTC sensor

- Remove all coverings.
- Allow chemicals to drain out (see point 15.1.1)
- Pull out plug (93, photo 43) on plate.
- Twist screw on circulating pump holder and raise circulating pump.
- Pull both plugs out of the circulating pump and pull plug on flow heating unit (16) out.
- Remove flow heating unit from holder and pull out pipes.
- Insert new flow heating unit in accordance with regulations.
- Put up all plugs on circulating pump and flow heating unit.  
Check for 230 V or 110 V plug connection.
- Put plug (93, photo 43) back up on plate (86)..
- Reattach casing coverings in accordance with regulations.

## 18.10 Checking the water valve

If the water valve has not been switched on:

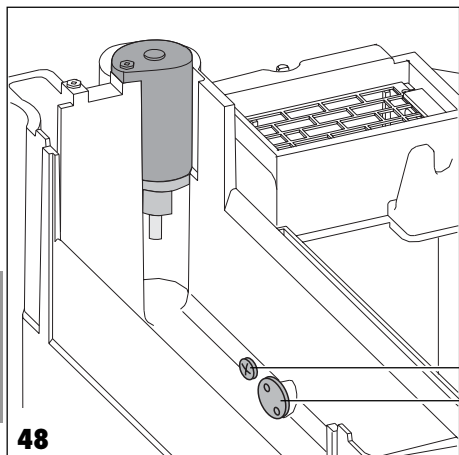
- Start servicing mode (see point 18.6).  
Select "Individual Test" menu and then "Water Valve"..
- If the valve is not switched on despite the presence of voltage, replace the whole valve (15) (see point 18.11, "Replacing the water valve")

## 18.11 Replacing the water valve

Firstly, check water valve (see point 18.10); replace if defective.

- Close bibcock
- Remove water pipe carefully from water feed (34).
- Pull mains cable (80) out of valve
- Pull internal water pipe (79) carefully out of valve at rear
- Unscrew Philips screws (81) beside water feed and replace complete valve





## 18.12 Cleaning the water level sensor

- Close bibcock.
- Remove lid.
- Open green stop flaps and seals
- Swivel drier packet backwards.
- Remove water roller packet.
- Clean level sensors (82 and 83) so that no calcified bridges can form.
- In order to check functionality, operate machine without water roller packets.
- Simulate laying-in of film; the message "WATER LOW" will appear on the display
- If a bridge forms between both level sensors (82 and 83), the message "WATER HIGH" will appear on the display; the sensors are now clear. The cleaning process has ended. If deviations occur, see troubleshooting, point 16.1.

## 18.13 Changing the light barrier

**For this purpose, use light barrier spare parts kit (order no: 17000-993-00).**

A description can be found in the spare part kit.

## DISPOSAL

### 19. DISPOSING OF UNIT

The built-in electronic plate and components must be disposed of in the same way as electronic scrap metal.

The remaining structural components can be disposed in accordance with the relevant local regulations.