

XR 24 NDT

EN

Manual



9000-608-25/30



hand
made in Germany

 **DÜRR
NDT**

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Important Informations

1. General

1.1 Official guidelines

This product has been subject to conformity acceptance procedures and has been found to conform to all requirements of the European guidelines applicable.

1.2 Notes

- The Installation and Operating Instructions constitute a part of the appliance. They must be made available to the operator. Correct observance of the Installation and Operating Instructions is a basic requirement for using the appliance properly and safely, and new personnel must be instructed accordingly. These Installation and Operating Instructions must be handed over to any subsequent owner or operator of this appliance.
- The safety of the operator and trouble-free operation of the appliance can only be ensured where original engineering manufactured parts are used. Additionally, only those accessories listed in the Installation and Operating Instructions may be used or parts or accessories expressly approved by Dürr NDT. If accessories are used manufactured by third parties, then Dürr NDT can no longer provide any guarantee for safe operation or correction functioning. No liability on the part of the manufacture will be accepted in the case that damage arises through the use of non-approved accessories.
- Dürr NDT cannot be held responsible for the appliance with regard to safety, reliability and function where installation, reset, alterations, extension or repairs were not carried out either by or for Dürr NDT or by a third party specifically approved by Dürr NDT, or if the appliance is not used and operated according to the instructions laid down in the Installation and Operating Instructions.
- These Installation and Operating Instructions accord with the features of the appliance and the level of engineering at the time of first introduction of the model. All circuits, processes, names, software and appliances quoted are protected under industrial property rights.

- This translation of the Installation and Operating Instructions has been carried out in good faith. Liability for incorrect translation will not be accepted. The accompanying German version of these Installation and Operating Instructions are to be used as reference; if you have any doubt to the correct interpretation of the instructions please consult your dealer.
- Any reproduction of these Installation and Operating Instructions, or parts thereof, in any medium whatsoever including electronic is only permitted with the prior written approval of Dürr NDT.
- Keep original packing for possible return of the appliance to the supplier. Do not let the packaging fall into the hands of children. Only the original packing ensures optimum protection for the appliance during transport. If, during the period of guarantee, return of the appliance is necessary, Dürr NDT will not accept claims for damage arising from using incorrect packaging during transport!

1.3 Disposal of appliance

EU Directive(s) 2002/96/EG - WEEE (Waste Electric and Electronic Equipment) of 27th January 2003 and their current application in national law states that products covered by the above directive within the European Union must be disposed of as special waste. If you have any questions concerning the correct disposal of this product please contact Dürr NDT.

1.4 Correct Usage

The Dürr X-ray film developer XR 24 NDT is designed exclusively for the automatic development of X-ray films for industrial applications.

Correct usage of the appliance involves exact observance of the Installation and Operating Instructions and adhering to the conditions concerning set up, instructions for use as well as maintenance.

Additionally, correct usage also involves observing any local or national regulations currently in force concerning health and safety at work or the disposal of chemicals.

1.5 Incorrect usage

Incorrect usage is understood to mean any usage above or beyond the specific use laid down. The manufacturer will accept no claims for any damage or injury arising thereby. All risks will be borne by the operator and/or owner.

1.6 Product description

The exposed film travels through several zones or stages within the Dürr X-ray film developer XR 24 NDT: developer / fixer / rinsing and drying zones.

After switching on the unit the developer and fixer baths are heated up to the set temperature of the baths, e.g. 28 °C (at 0.5 °C / min). After this is complete the unit is ready for use and will start automatically as soon as a film is inserted and the film will be transported through the unit. As soon as the blinking display "MACHINE IN OPERATION" is extinguished a new film or 2 new films alongside each other can be inserted. Once the film transport process is complete the unit switches off automatically and goes into Stand By mode.

1.7 Connecting peripheral appliances

Appliances may only be connected together or connected to parts of other units where it has been absolutely established that such connections will not endanger the safety of the operator and the environment will not be affected in any negative way. If it is not clear from the appliance documentation that such connection is possible then the operator / owner must establish this beyond reasonable doubt, e.g. by contacting the manufacturer or another expert, to ensure that the required safety of the operator and the environment are not put at risk.

2. Safety

2.1 General notes on safety

This appliance has been designed and manufactured by Dürr NDT so that correct usage will result in no danger to operator or patient. However, we feel it is important to describe the following safety measures in order to remove any likelihood of danger.

- When operating this appliance all local and national rules and regulations must be observed! This appliance must not be converted or altered in any way. Dürr NDT accepts no liability claims where an appliance has been converted or altered in any way. In the interests of safe usage of the appliance both operator and owner are responsible for seeing that all relevant appliance are observed.
- Installation must be carried out by a technical expert.
- The operator must carefully check the appliance for safety of function and the proper working condition before every use.
- The operator must be trained in the correct operation of the appliance.
- This product is not to be operated in an area at risk through explosion, or an area with a combustible atmosphere.

2.2 Electrical safety instructions

- The appliance may only be connected to a correctly installed electrical socket.
- Before connecting to the electricity supply the appliance must be inspected and checked that the supply voltage and the supply frequency correspond to that of the local electrical supply.
- Before initial use and start-up the appliance and all supply lines must be checked for any signs of damage. Damaged supply lines and connections must be replaced immediately.
- When using the appliance observe all the relevant electrical safety procedures.

3. Warnings and Symbols

In the operating instructions the following warnings and symbols have been used:



Information including preventative measures to protect injury to persons or damage.



Warning for high voltage.



Extra information concerning economic usage of the appliance and other instructions.



CE-labeling without Notified Part Number



Observe Installation and Operating Instructions



Electrical supply switch ON / OFF



/  select parameters



confirm selection



Switch on supply



Switch off supply



Mornings - open water tap



Evenings - close water tap



28 x 24 h every 4 weeks change chemicals



drain chemicals



clean unit

4. Delivery Contents

X-ray film developer XR 24 NDT

model 1734-08 (230 V ~, 50-60 Hz)

accessories, complete

1700-001-00

4.1 Special accessories

The following parts are not supplied as part of the Delivery Contents clean.

Please order as required!

Water hose with Aqua-Stop 1330-001-51

Regenerationunit (230 V) 1734-820-00

Container, 20 liter for developer.... 1416-021-00

Container, 20 liter for fixer 1416-011-00

Fuse 230 V, T 6.3A..... 9000-115-25

4.2 Disposable materials

NDT Starter-Set,
2x1.5 l developer, 2x1.5 l fixerCXB312A9940

NDT Fixer-Set, 4x1.5 literCXB313A5740

NDT Developer-Set, 2x6 literCXB310A7540

NDT Fixer-Set, 2x6 literCXB310A7540

XR CLEANER NDT, 2 x Pack,
spray cleaner for
transport rollers..... CCB810C5540



5. Technical Data

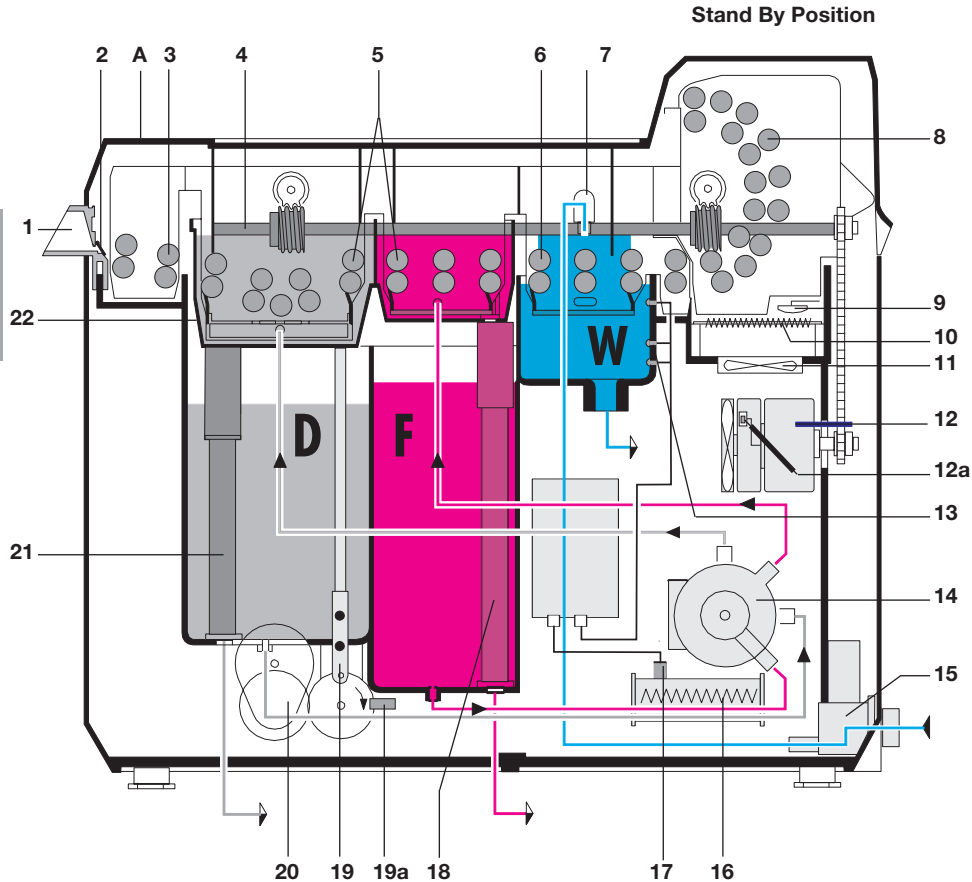
X-ray film developer XR 24 NDT


Model	1734-08
Voltage (V)	230
Frequency (Hz)	50-60
Current consumption (A)	4.0
Fusing (A)	T 6.3
Output(W)	950
Heating	
Bath heating (W)	400
Drying (W)	450
Warm-up time (min)	ca. 20 (0.5 °C/min)
Film processing time (min)	5:30 - 10:00
Bath circulation process	
Developer (l/min)	ca. 1.8
Fixer (l/min)	ca. 2.0
Water flow rate (l/min)	2
Water pressure (bar)	
min. water pressure	2
max. water pressure	6
Tank volumes (l)	
Developer, fixer	je 5
Temperature ranges	
Environmental conditions	
for unit in operation	+10 to +28 °C
Optimum image quality	up to max. +28 °C
Storage and transport	-10 to +60 °C
Relative humidity	
for unit in operation	max. 80 %
Storage and transport	max. 95 %
Dimensions	D=51 cm, W=42 cm, H=44 cm
Weight (kg)	25
Protection category	IP20
Protection class	I
Over voltage category	II
Conformity certification	CE-labeling

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6. XR 24 NDT Functional layout

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- | | | | |
|-----|---------------------------------------|-----|--|
| 1 | Film insertion slot | 18 | Overflow for fixer with drainage plug |
| 2 | Film feed flap | 19 | Lifter |
| 3 | Film insertion slot roller set | 19a | Light barrier for lifting bath |
| 4 | Transport drive | 20 | Lift motor |
| 5 | Developer/fixer roller set | 21 | Overflow for developer with drainage plug |
| 6 | Rinse roller set | 22 | Lifting bath |
| 7 | Water inflow | D | Developer bath |
| 8 | Dryer roller set | F | Fixer bath |
| 9 | Safety switch for "dryer" | W | Water bath |
| 10 | Dryer heater | A | Supply  switch on display |
| 11 | Ventilation fan | | |
| 12 | Drive motor | | |
| 12a | RPM controller | | |
| 13 | Level indicator sensor "water" | | |
| 14 | Rotary pump (for developer and fixer) | | |
| 15 | Water intake valve | | |
| 16 | Process heater | | |
| 17 | PTC-sensing device | | |

7. Functional description

XR 24 NDT

The display panel will light up once the main power switch has been pressed (Ⓢ) (mind.2 s). The warming-up phase for the developer and fixer baths will now begin. The waiting time until the correct temperature is reached will be displayed: "WAITING TIME . . MIN" (display blinks). The unit will not unit during this warming up period.

The bath circulation process runs in parallel to the bath heating. The circulation precess involves the rotatory pump (14) transporting the chemicals from the developer and fixer baths (tank volume of 5 liters each) to the lifting bath (22).

Once the set temperature has been reached the display lights "MACHINE FREE", i. e. the unit is on "Standby"

As soon as the temperature falls by more than 0.5 °C below the set temperature, the process heater and the rotary pump (14) switch on again.

Insertion of a film causes the film feed flap (2) to open and the display blinks: "MACHINE OPERATING"

At the same time a signal is activated to lower the lifting bath (22) and the water intake valve (15) opens; the dryer heater (10), drive motor (12) and rotatory pump (14) (for developer and fixer bath circulation) start.

The processing time can be checked using the RPM controller (12a).

Lifting and lowering of the lifting bath is controlled by the rotation of the disc (driven via the lift motor (20)) and is monitored by the infrared light barrier (19a).

When the lifting bath (22) is lowered the film passes between the rollers through the developer and fixer baths, then through the rinsing and the drying zones (8) at the set processing time.

During film development water is fed along the water inflow (7) into the rinse zone. The water flows out to the waste water system. There is a continuous flow of water at a rate of ca. 2 l/min, at a pressure of 2 bar.

If the waste water drainage becomes blocked, a level indicator sensor (13) activates an audible signal and the water intake valve (15) closes and the flow of water is interrupted.

After complete insertion of a film the film feed flap (2) closes. As soon as the blinking display "MACHINE IN OPERATION" is extinguished a new film or 6 intraoral films alongside each other can be inserted.

If no further films are inserted after the film process cycle (audible signal) then the lifting bath (22) rises (Stand By Position) "MACHINE FREE".

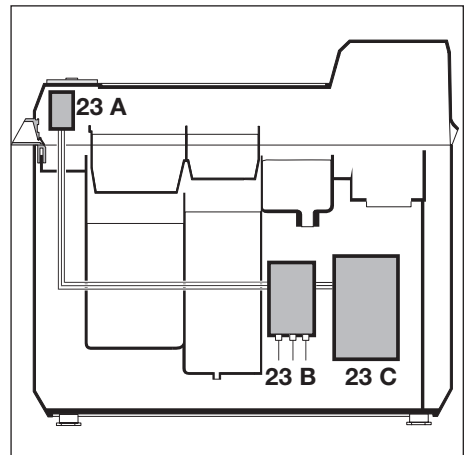
The drive motor (12), water intake valve (15) and dryer heater (10) are switched off. In the Stand By Position the developer and fixer roller sets (5) are completely submerged in the chemicals. This means that the build up of deposits on the rollers can largely be avoided.

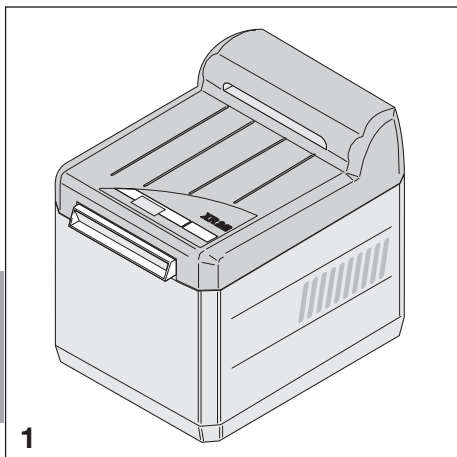
7.1 Arrangement of PCB (main board)

23 A Operating section

23 B Control functions

23 C Performance functions





Mounting

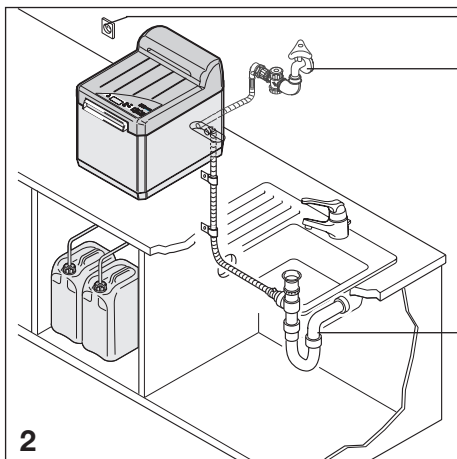
8. Set-up

8.1 Room for set-up

- The developer unit XR 24 NDT may only be set up in a dry, well-ventilated room.
- The room temperature in winter must not fall below +10 °C or exceed +28 °C in the summer



Do not set up the appliance in direct sunlight! Danger of chemicals overheating or premature exposure of the film.



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- The room for set up must be fitted with a water tap (27) R3/4" with pipe ventilation, waste water drainage (28) with ventilated plastic siphon and an electrical safety socket (26). It is also useful to have a wash basin or sink near the developer unit.

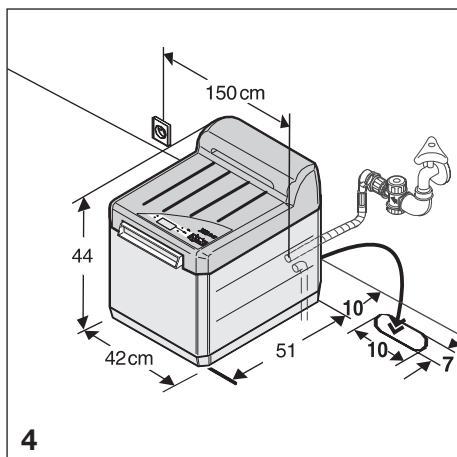


Both the water tap (27) and the electrical safety socket (26) should be easily accessible for personnel.

- We strongly recommend set up of the XR 24 NDT in a darkroom.

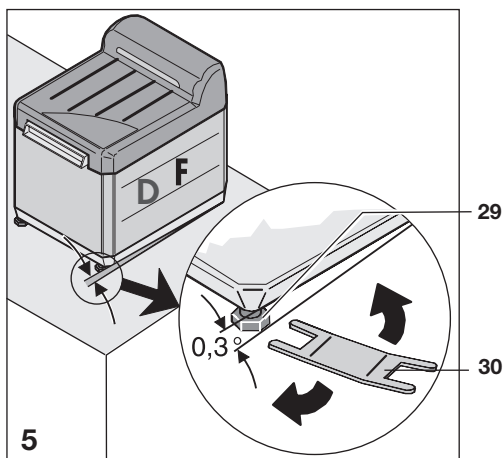


Interference
Portable radio transmitter/receiver appliances (of rated power 2 W or above) must not be operated within a distance of 2 m of the XR 24 NDT developer unit.



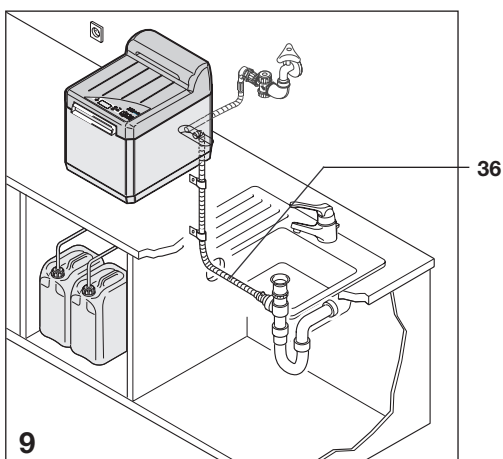
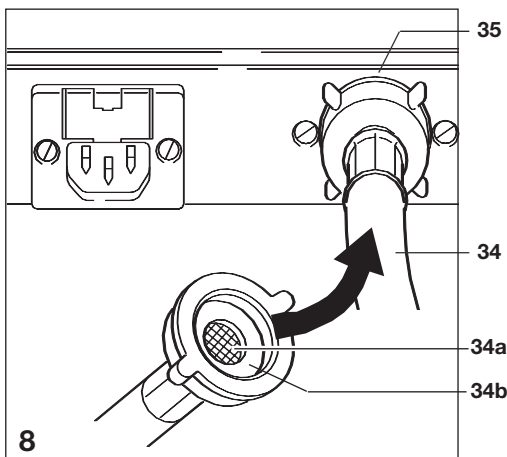
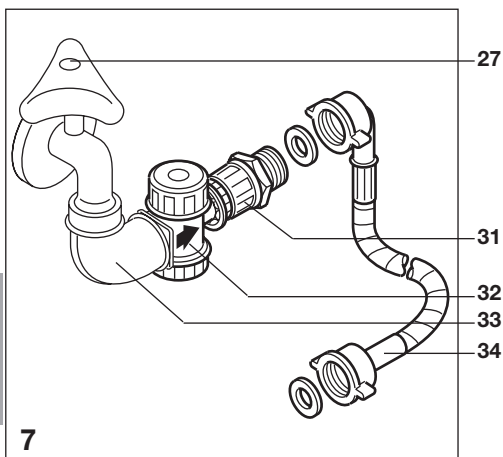
8.2 Set up options

- Set up the developer unit on a horizontal, stable and smooth, flat working surface at a suitable working height.
- When feeding hoses downwards, the working surface needs to have an opening of ca. 7 x 10 cm.
- Take into consideration the room required for maintenance procedures and for adequate ventilation of the unit:
at least 10 cm to the rear, ca. 50 cm free space to left and right.



8.3 Set up

- Set the box upright and cut loose the plastic packing ties.
- Remove all small parts.
- Grasp the unit from the sides and set up as appropriate.
- Set up the unit near the water supply, waste water drainage and electrical safety socket (max. 1.5 m distant).
- Set up the unit with a very slight tilt, ca. 0.3 °, towards the fixer bath (fig. 5).
Adjust the unit legs (29) using the spanner (30) provided as necessary.



9. Installation

9.1 Connecting water supply

- Check firstly that clear, clean water is issuing from the water tap (27)
When installing for the first time, let the water flow thoroughly first!

- Because of the great differences in the regional quality of water, a fine filter (32) must first be installed between the water tap (27) and water hose (34).



The fine filter (32) protects the flow regulator of the water intake valve of the appliance from impurities

- Close the water tap (27)
- Connect an elbow piece, 90° (33), to the water tap (27), then fine filter (32) (arrow in direction of flow) and insert double nipple piece (31)

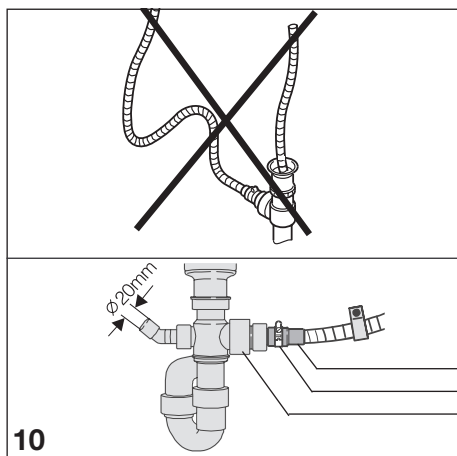


Check whether the coarse filter (34a) and both seals (34b) are present in the threaded connection piece of the water hose (34).

- Connect the water hose (34) to the water inflow connection (35) of the appliance (threaded connection including coarse filter) and fix to the double nipple piece (31).

9.2 Waste water connection

- Waste water connections must include a siphon trap.
- Lay the waste water hose (36) with a continuous incline to the siphon trap: cut the hose to the correct length



When laying the waste water connections please be sure to check the following:

- Avoid hoses from sagging!
- Avoid constriction or reduction of hoses!

- Coat the ends of the hoses on the outside with UHU-Plast
- Fix the screw socket (37) onto the hose and onto the siphon trap (25) using hose clamp (38)
- Secure the waste water hose with hose clamp, screw and dowel.

9.3 Connection of developer and fixer waste hoses

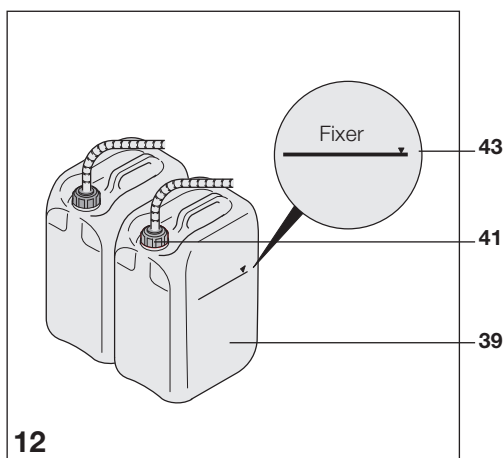
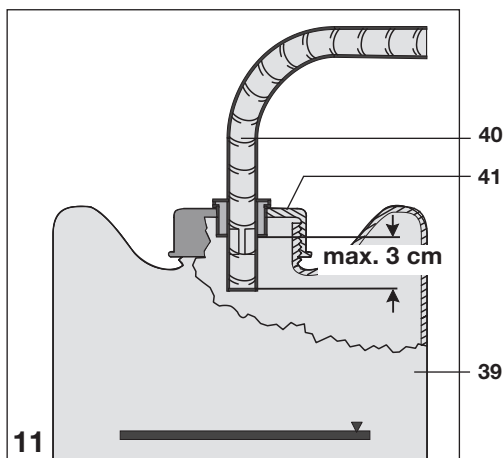
- Set the 10l-collectors (39) for developer (black level indicator marker) and fixer (red level indicator marker) under the appliance so that they are clearly visible but free from any possible spillage or knocking
- Lay the hoses (40) with continuous fall
- Cut the hoses to the correct length.
- Lead the hose for developer (black markings) through the black lid (41).
- Securely screw the lid (41) onto the collector (39) for developer
- Secure the hose for fixer (red markings) in the same way to the collector for fixer



Empty the collectors when they reach the level indicator marker (43) - danger of overflow!

When disposing of developer and fixer observe regional rules and regulations!

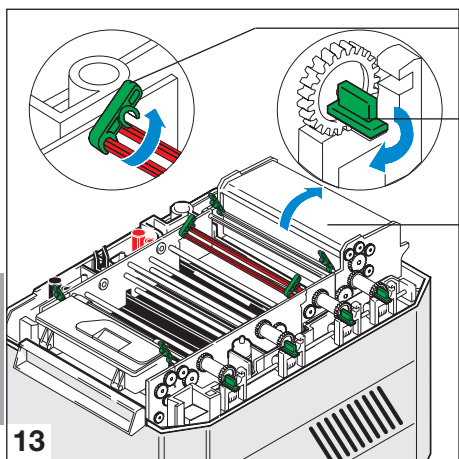
In Germany, and in several other countries, x-ray chemicals must be disposed of as special waste.



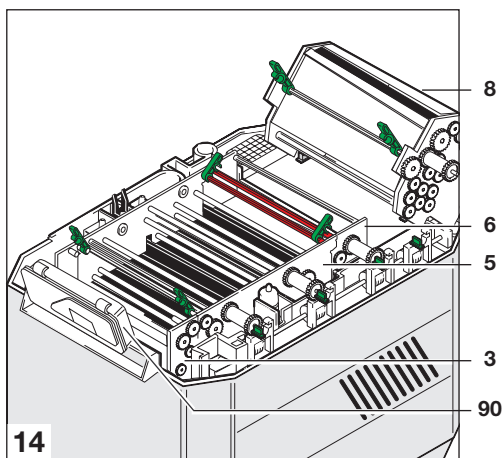
44 10. Commissioning and first set up

45 10.1 Cleaning the unit

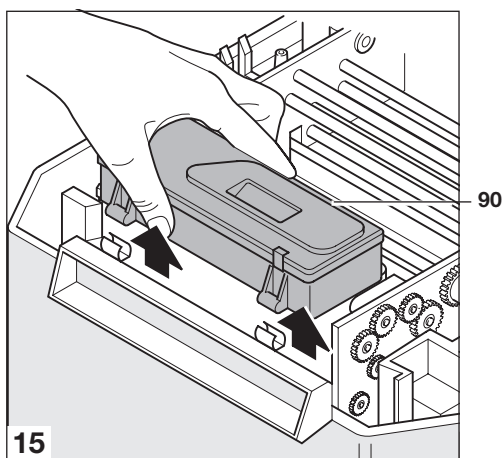
- Remove the lid.
- Remove the floating covers from the developer and fixer baths
- Open the green catches (44) and stop clips (45)

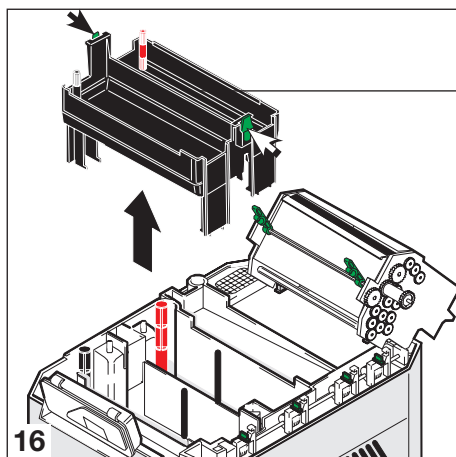


- Swivel the dryer packet (8) towards the rear.
- Remove the roller sets for water (6) and developer/fixer (5).
- Swivel the display (90) upwards.



- The display can also be lifted upwards and then moved to the left.
- Remove the roller set to the film insertion slot (3).



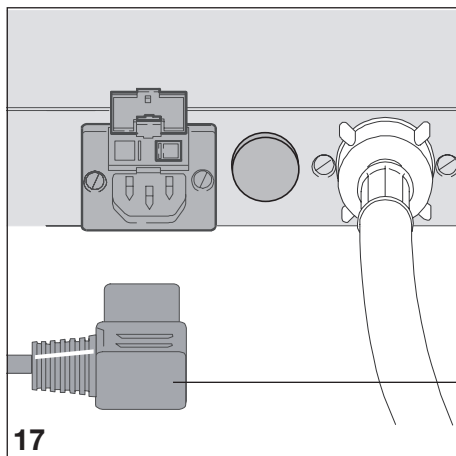


22

- On the side press the lever and remove the lifting bath (22)
- Clean the roller sets, lifting bath and tanks with a wet sponge.

"set up of chemicals"
and
"set up of roller sets"
see section USAGE

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11. Electrical connections



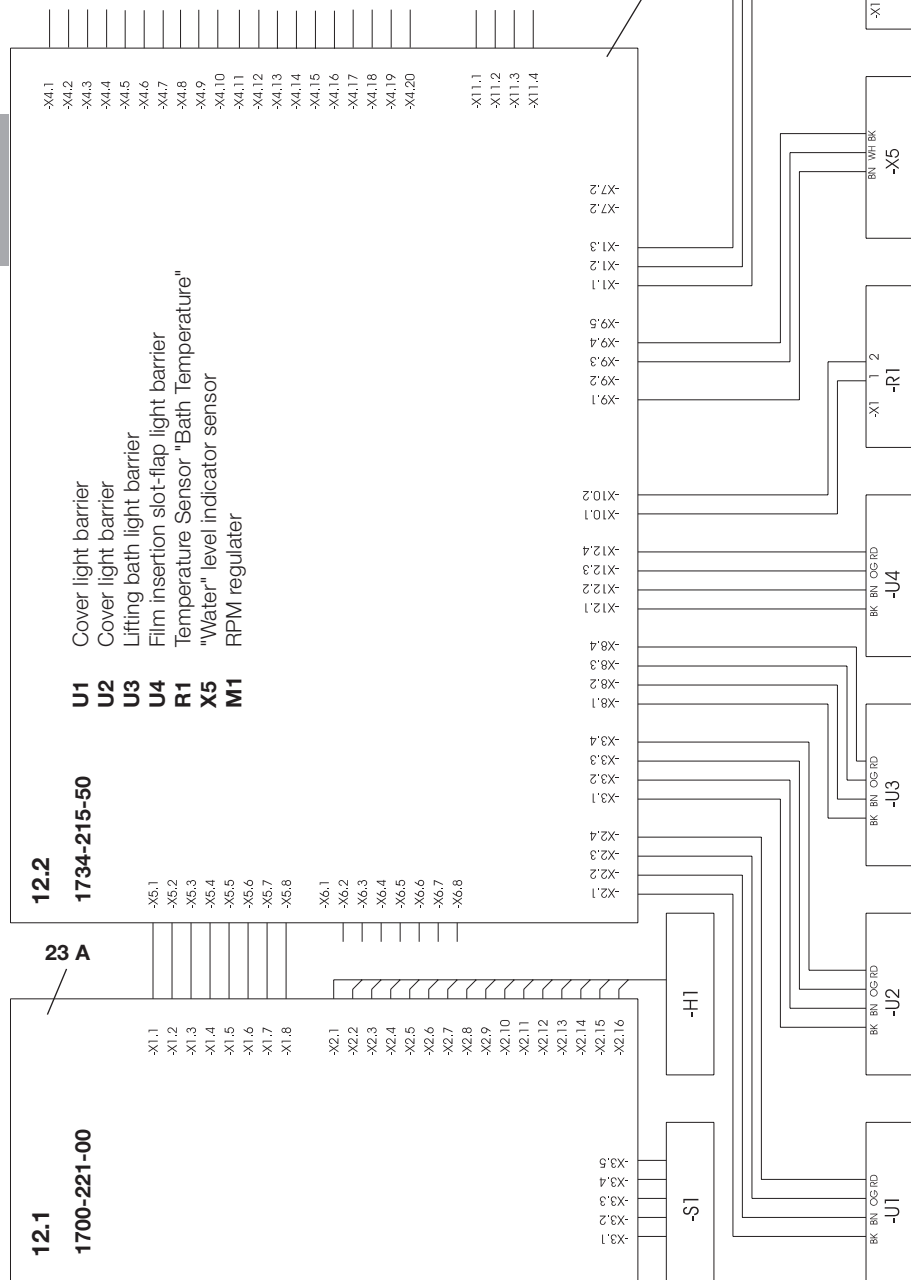
This appliance is designed for a supply voltage of 230 V (see model identification plate). Before connecting the mains power cable it is absolutely vital to check that the required supply voltage is available, otherwise the connection could be damaged. Use the Dürr mains cable supplied.

The unit may only be operated when it is closed - with sides and cover in position - and connected to the mains supply.

- Plug in the unit at the socket (61) in the unit and the mains supply socket.

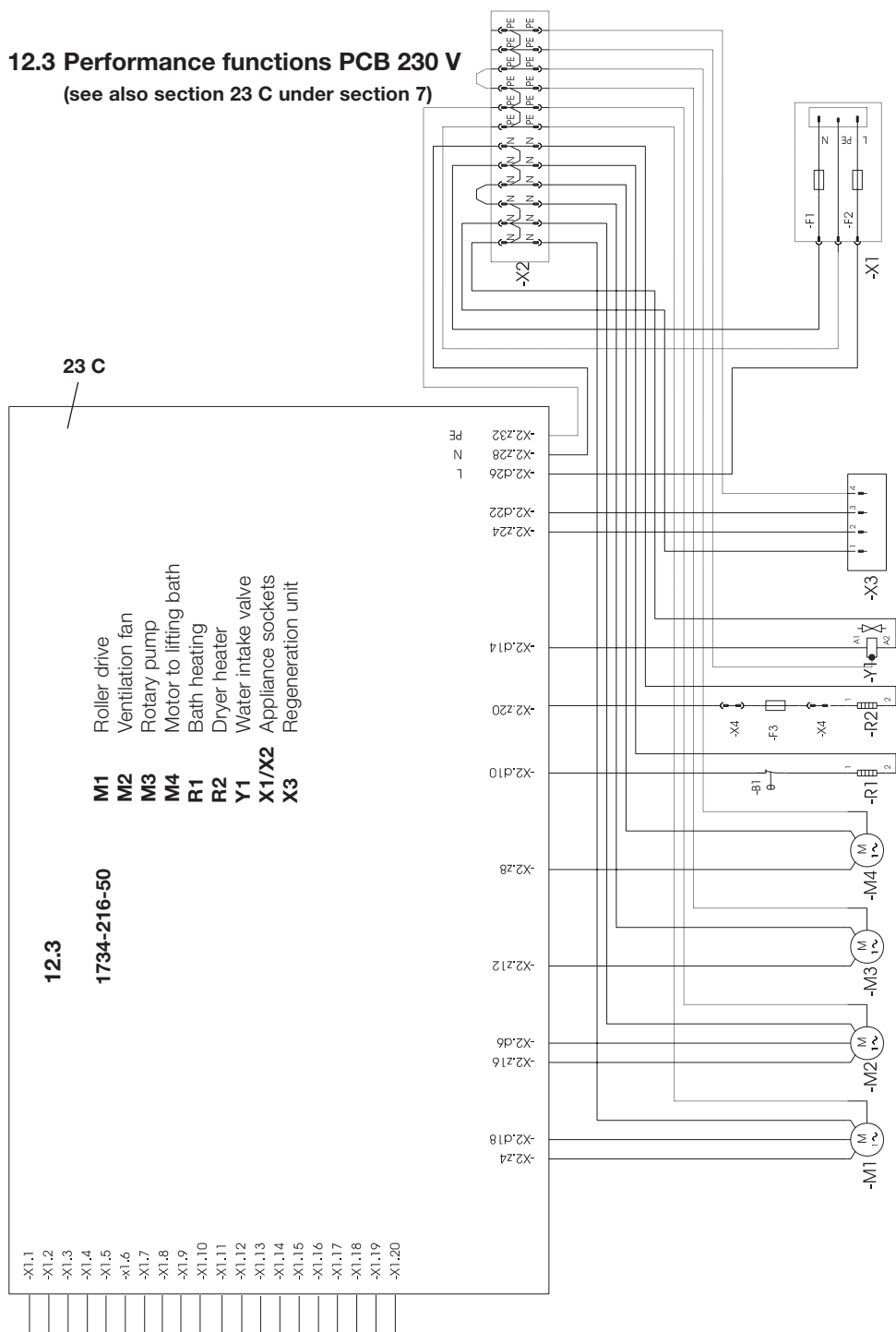
12.2 Controller section PCB

23 B



12.3 Performance functions PCB 230 V

(see also section 23 C under section 7)



13. Commissioning and first set up

The developer unit XR 24 NDT has 3 **processing time** alternatives, and is factory set as follows:

10:00 min - Program **REG. GRAIN**

8:00 min - Program **MTID. GRAIN**

5:30 min - Program **FINE GRAIN**

Please note: X-ray films are not suitable for archiving at this processing time.

When using film types which require a different processing time, **set the values according to the type of film being used.**

- developer / fixer bath temperature 28 °C

- dryer performance 30%

Films should emerge dry from the unit. The dryer performance should be set according to film type.

Program overview, see section Usage



The unit may only be operated when it is closed - with sides and cover in position - and connected to the mains supply.



Every time the unit is switched on at the main power switch the program "REG. GRAIN" is automatically started, i.e. after switching off there is an automatic default selection of "REG. GRAIN"



Instructions concerning the operation and display for the operator can be found in section "USAGE", section 15.

A complete plan for service operation can be found under Maintenance, section 19.6.



Before developing the first film the lifting tank of the developer and fixer baths must be filled to the overflow level, otherwise the film development quality may be impaired.

Always use cold water when making up the chemicals.

The developer unit must never be operated without its roller sets!

Without the roller sets it is possible that the developer and fixer fluids will be placed under pressure and will splash vertically upwards out of the developer unit.

Chemicals attack eyes and skin and there is the possibility of severe injury to the eyes.

Without the developer and fixer roller sets there can be no circulation of chemicals in the baths.

There is the danger of mixing of chemicals.

Never operate the developer unit without fluids (chemicals, water), as this can lead to the heating controller breaking down.

EN

- # XRR 24^{NPT}



DEUTSCH?
[ENTER]=OK

ENGLISH?
[ENTER]=OK

FRANCAIS?
[ENTER]=OK

Further Language...

50 Hz?
[ENTER]=OK

60 Hz?
[ENTER]=OK

PROGRAMM REG.GRAIN?
[ENTER]=OK

PROCESS 10:00
[ENTER]=OK

DRYER 30%
[ENTER]=OK

PROGRAMM MID.GRAIN?
[ENTER]=OK

PROCESS 8:00
[ENTER]=OK

DRYER 30%
[ENTER]=OK

PROGRAMM FINE.GRAIN?
[ENTER]=OK

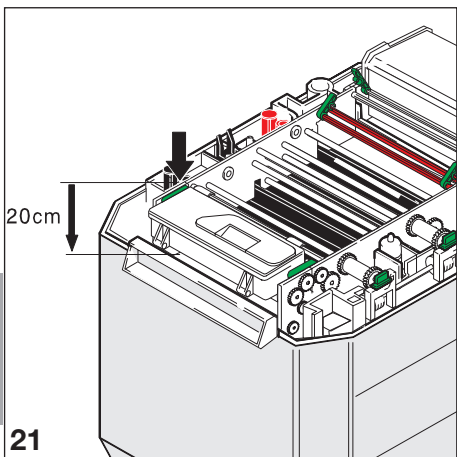
PROCESS 5:30
[ENTER]=OK

DRYER 30%
[ENTER]=OK

PARAMETER?
[ENTER]=OK

See 19.6 Plan for carrying out service work

Change values using + and - in 5 and 5% steps, confirm with Enter

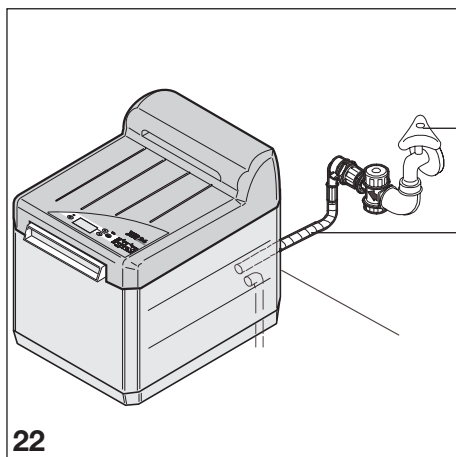


13.2 Check temperature of the developer



The following procedure is applicable for Germany. In other countries different regulations may apply!

- Switch on the unit (I) and wait for the developer bath to reach operating temperature, see also "Section 15.1 morning or before surgery opening"
- In order to check the temperature of the developer, switch off the unit.
- Unplug at the mains and remove all power.
- Close the water tap .
- Remove the lid.
- Measure the temperature of the developer (front left at a depth of ca. 20 cm). The temperature of the developer must be $+28^{\circ}\text{C} \pm 0,5^{\circ}\text{C}$.
- Replace lid, plug in at the mains, open water tap, (I) switch on unit so .



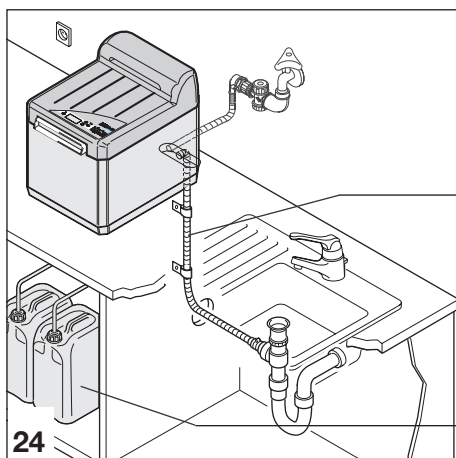
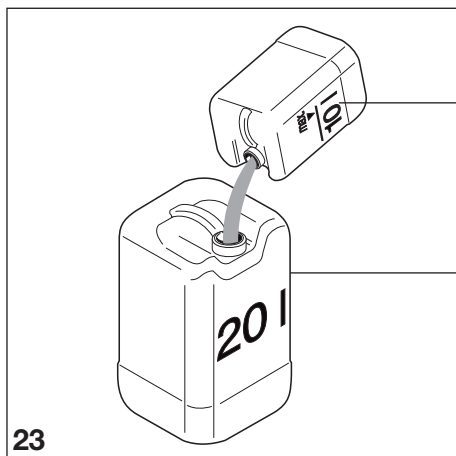
14. Transport

Before transporting the developer unit please note the following points:



The developer unit must only be transported with completely empty baths.

- Press the power switch to turn the unit off.
- Close the water tap (27)
- Unplug at the mains and remove all power.
- Unscrew the water hose (31) from the unit and water tap (27).
- Empty the chemicals from the collectors (39) into appropriate canisters (63).
- Drain the chemicals from the baths into collectors (39), see section 16.1.1
- Clean the unit, see section 10.1



14.1 Remove the drainage hoses

- Remove waste water hose (35).
- Loosen the hose from collector (39) for developer and fixer. Ensure that no drops of chemicals spill or are splashed.

14.2 Protection from damage

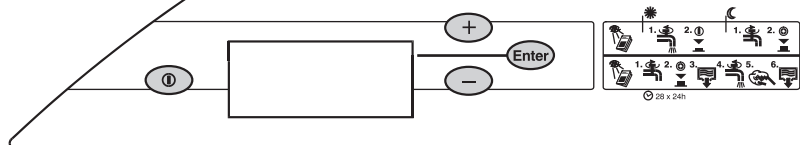
- Protect the developer unit from any physical load bearing and damage
- Ensure that the unit cannot move freely during transport.
- Inform transport personnel.



Use

- ① Power - switch
- Enter Confirm - key
- + , - "Search menu

XR 245



Program overview

The programs **FINE GRAIN**, **MID. GRAIN** and **REG. GRAIN** are factory **set** (see below); your Service Technician can set them, however, to your individual requirements.

REG. GRAIN - Process time: t=10min
 - bath-temperature: T=28 °C
 - dryer performance: 30%

REG. GRAIN - Process time: t=8min
 - bath-temperature: T=28 °C
 - dryer performance: 30%

REG. GRAIN - Process time: t=5min
 - bath-temperature: T=28 °C
 - dryer performance: 30%

Films should emerge dry from the unit. The dryer performance should be set according to film type.



Every time the unit is switched on at the main power switch the program "MID. GRAIN", is automatically started, i.e. after switching off there is an automatic default selection of "MID. GRAIN"

Service / Fault message

see section 17.1 Fault message on display with audible signal

SERVICE INTERVAL
REACHED!

Only when activated
by the Service
Technician!

BEFORE OPENING
DISCONNECT FROM
MAINS

FAULT WATER TOO
LOW!

FAULT WATER TOO
HIGH!

FAULT
ROLLER DRIVE

15. Operation

Before operation please note the following points:



The developer unit must never be operated without its roller sets!

Without the roller sets it is possible that the developer and fixer fluids will be placed under pressure and will splash vertically upwards out of the developer unit.

Chemicals attack eyes and skin and there is the possibility of severe injury to the eyes.

Without the developer and fixer roller sets there can be no circulation of chemicals in the baths.

There is the danger of mixing of chemicals.

Never operate the developer unit without fluids (chemicals, water), as this can lead to the heating controller breaking down. Regulate the heating.



The unit should be switched on every day in order to maintain constant image quality.



Ensure that the ambient temperature of the environment does not exceed that of the developer bath!

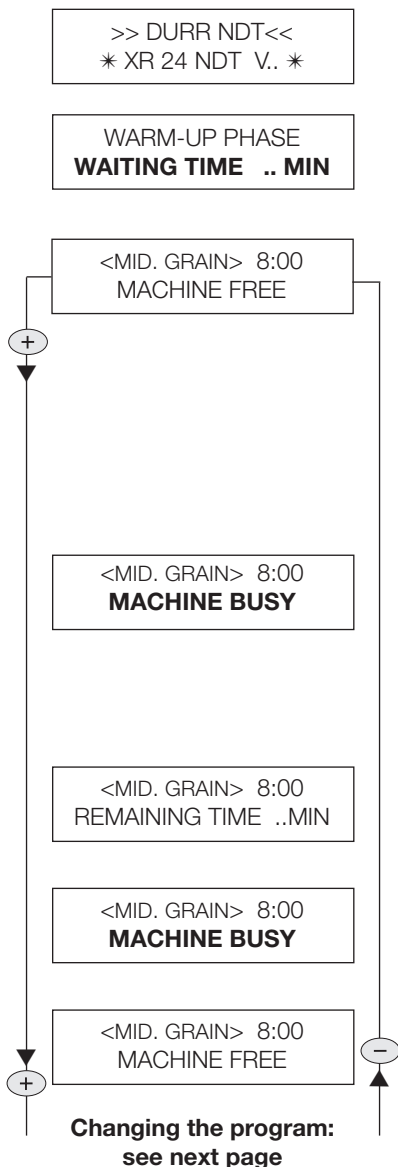
Standby-Modus




Once the film exits the unit the Standby-Mode is activated.

In Standby-Mode the unit is still operational and simply awaits the next insertion of a film. Before inserting a film check the program selection!

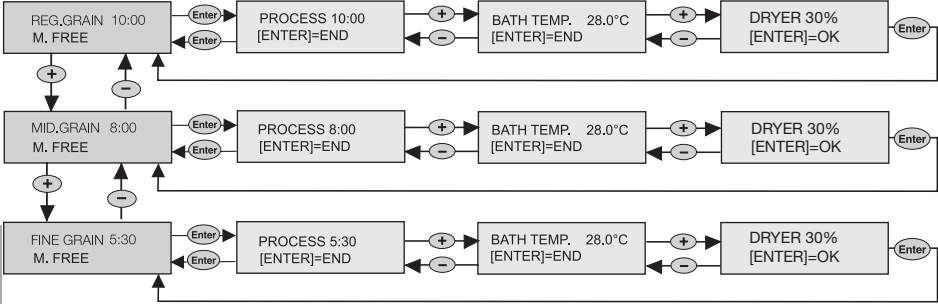
15.1 Mornings or before surgery begin

-  Open the water tap.
- Switch on the unit:
-  Press the power on switch ca. 2 s until an audible signal is heard

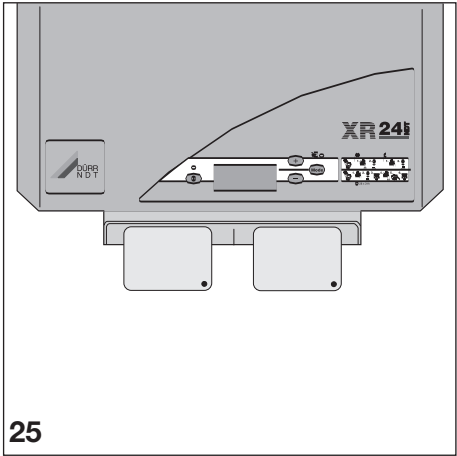


- ➡ **1** LED on display lights up. Lifting bath automatically begins to move into the correct position, ca. 30 s.
- ➡ **2** The unit initiates the warming-up phase until the correct temperature of the developer bath is reached. Warm-up time: 0.5 °C/min. During this warm-up time a message **blinks** on the display **"WAITING TIME .. MIN"**
- ➡ **3** As soon as the set temperature has been reached **the display panel** lights up **The unit is ready for operation. A film can be inserted.**
The program MID. GRAIN is automatically selected, where a different program is desired then use key  to change program to REG. GRAIN or FINE GRAIN.
- 4** Before commencing developing every day run two cleaning films through the unit.
- ➡ **5** Once a film has been inserted the display **blinks: "MACHINE in OPERATION"**, as soon as this message stops blinking then the next film(s) can be inserted.
 Two films can be inserted alongside each other but within the markings, see fig. 25.
- ➡ **6** The remaining developing time for the film(s) in the unit is displayed (automatic countdown). An audible signal is heard when the films exit.
- ➡ **7** If no further film is inserted the lifting bath moves to the "Stand by"-Position
- ➡ **8** Unit in "Stand by"-Position message: "MACHINE FREE" appears on display
 **Film material which has not been exposed must not be placed on the unit as the LCD-Display may lead to incorrect exposure.**

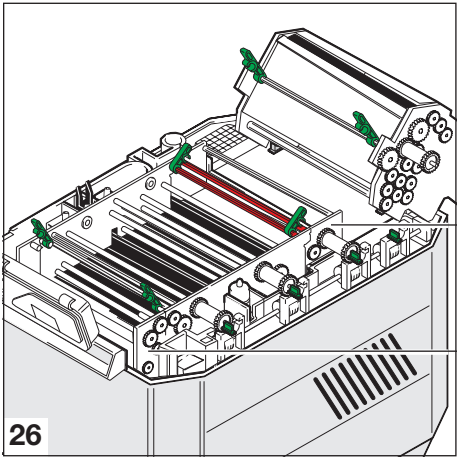
Changing the program:



If there is a fault message see section 17.1 "Fault message on display"



25



24

- 2 Films can be inserted together side by side. Ensure that the marking goes into the developer unit last.
- To obtain a fast control image change to program "FINE GRAIN" (short process time: 5:30 min).

15.2 In the evening or after surgery hours

- Turn off the unit at the main power switch.
- Close the water tap.

15.3 Operation interruption

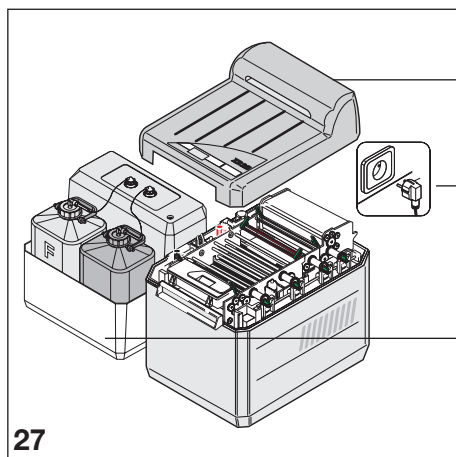
- of more than 1 week:
- Drain off the chemicals.
 - Clean baths and roller sets and leave to dry. See 16.1.1

15.4 Film recommendations

Temperature of the bath(s): 28 °C

Dryer performance: 30 %

Manufacturer	Film type	Processing time
Agfa	Structurix D2, D3 Film	8
Agfa	Structurix D3SC Film	8
Agfa	Structurix D4-D8 Film	8
Kodak	INDUSTREX AA400 Film	10
Kodak	INDUSTREX DR50 Film	10
Kodak	INDUSTREX High Speed HS800 Film	10
Kodak	INDUSTREX M100 Film	10
Kodak	INDUSTREX MX125 Film	10
Kodak	INDUSTREX T200 Film	10
Fujifilm	FUJI IX-25, FUJI IX-50	8
Fujifilm	FUJI IX-80, FUJI IX-100	8
Fujifilm	FUJI IX-150	8



27

16. Maintenance

- 60 Every 2 months**
Change the chemicals,
Clean baths and roller sets,
make up chemicals

61 see section 16.1

- Check darkroom for stray lighting!

16.1 Change the chemicals

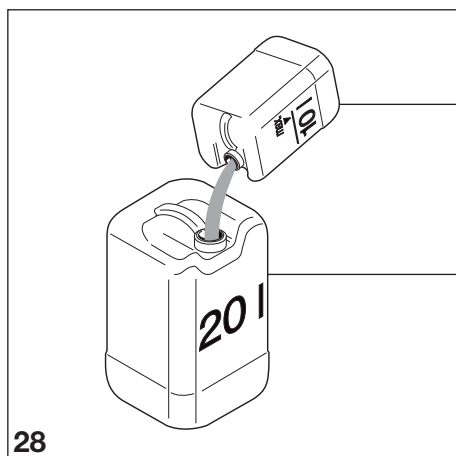
16.1.1 Drain the chemicals

- 91**
- Press the power switch to turn the unit off.
 - Remove the mains plug (61) from the electrical safety socket.
 - Remove cover (60).
 - Check whether the collector (39) is empty, if necessary pour into the collection canister (63)

i It is extremely important that the collector is empty, otherwise there is the danger of overflow, when the chemicals are drained from the baths.

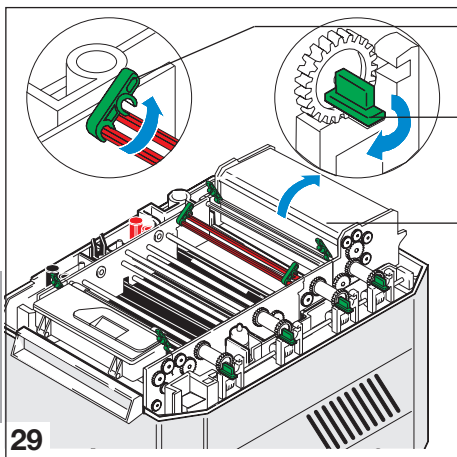
- Remove the floating covers from developer and fixer baths, leave to dry and place to one side.
- First remove the small plug from the lifting bath, then the large plugs from the baths.
- Empty the collector.
- Unscrew the lid of the collector, hang the hose ends in a neutral container.

i This will prevent water from entering either the collector or the canister during cleaning.



28

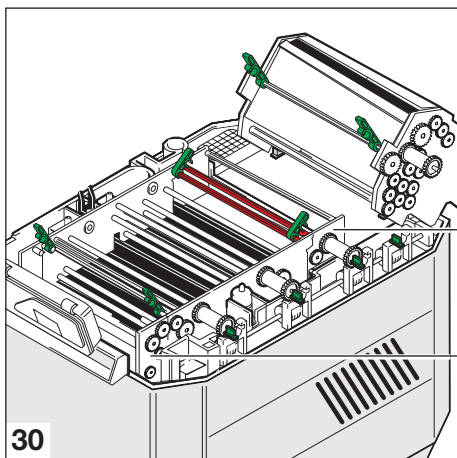
EN



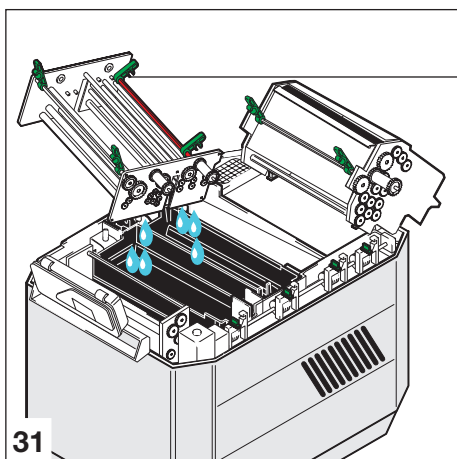
Cleaning and making up of chemicals for the developer unit are based on the use of Dürr XR 24 NDT chemicals. When using chemicals from third party suppliers be sure to observe the manufacturer's instructions!

16.1.2 Clean baths and roller sets,

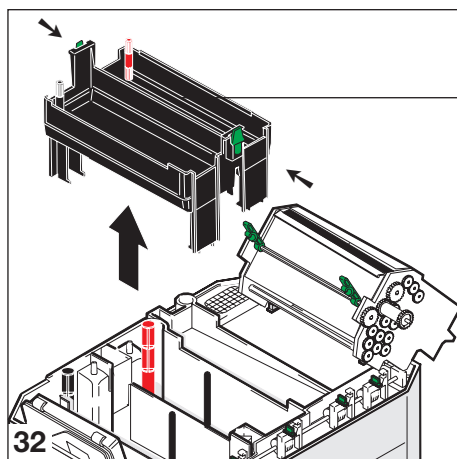
- Open the green catches (44) and stop clips (45)
- Swivel the dryer packet (8) towards the rear.



- Swivel the display upwards
- Remove the rinse and (6) film insert roller sets (3)



- Lift the developer and fixer roller sets (5), tilt to the side and let the chemicals run off

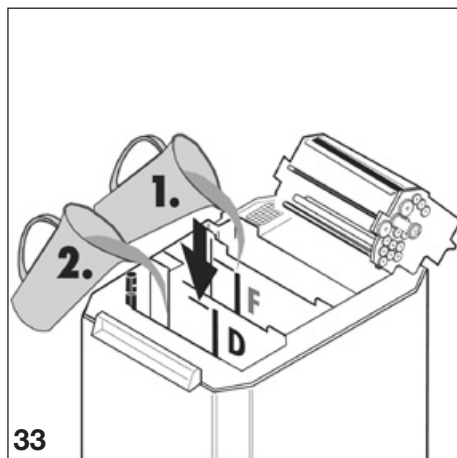


22

- Place the roller sets in the sink, spray using "spray cleaner and allow ca. 10 min to take effect.
- On the side press the lever and remove the lifting bath (22)
- Rinse the lifting bath (22) thoroughly under warm, running water (min. 40 °C).
- Rinse the roller sets thoroughly under warm, running water .
- Screw the large plugs (18, 21) into the baths.
- First fill the fixer bath with water, fig. 33.
- Then fill the developer bath with water.
- Place developer and fixer roller sets in position.

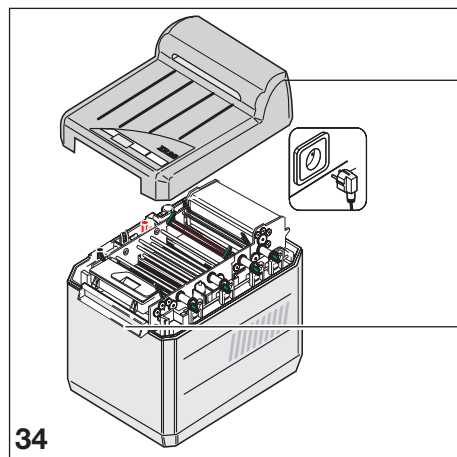


Do not operate the developer unit without developer/fixer roller sets. Without developer/fixer roller sets water will splash upwards out of the unit as there will be no circulation of the water in the baths. Danger of eye injury!



33

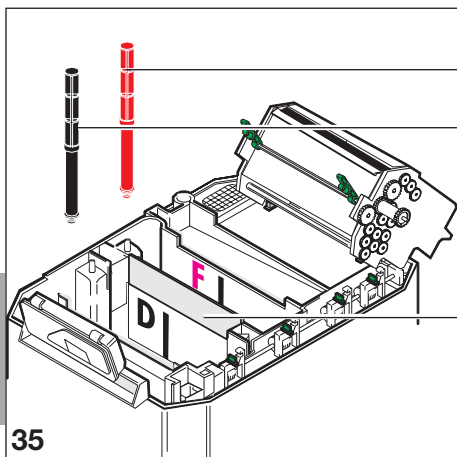
- Close the green catches and clips.
- Swivel the display back into position.
- Replace cover (60).
- Plug in at mains (61), press power switch on.
- Start up unit, place cleaning film in film insertion slot (1) until the film feed flap is actuated, leave the film ca. 4 min in this position.
- Let the unit run ca. 8 min (the hoses and rotatory pump will be automatically cleaned).
- After ca. 8 min switch off the unit and disconnect at the mains (61).
- Remove cover (60).
- Swivel the display upwards
- Open the green catches and clips.
- Lift the developer and fixer roller sets, drain and remove.
- Unscrew the large plugs for developer (21) and fixer (18) from their baths and drain the water.



60

1

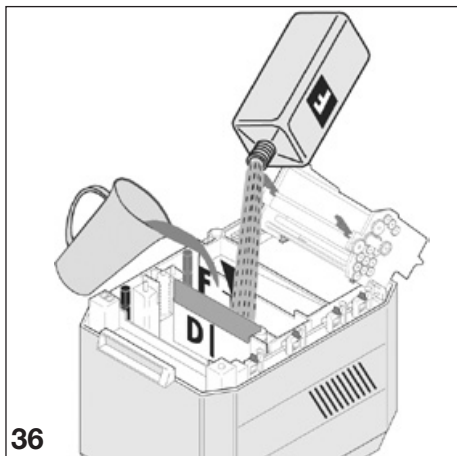
34



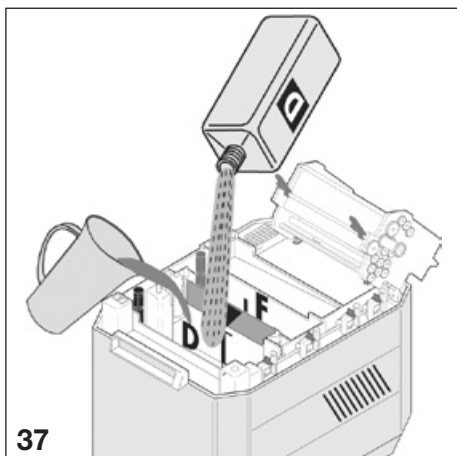
18

21

52



36



37

16.1.3 Make up chemicals

- Screw the plugs for fixer (18) and developer (21) into their baths.
- Replace the developer and fixer hoses back in their collector.
- Put in place the separating barrier (52) between developer and fixer baths.



Chemicals are dangerous to health or aggressive. Irritate skin and eyes. Danger of severe eye injury. Damage irreversible.



When filling chemicals always wear protective gloves and protective glasses.



If there is any contact with the eyes, immediately rinse thoroughly with water and consult a doctor as soon as possible.



Clean your hands thoroughly under running water after finishing.

Please also refer to our special safety brochure which you can find on the internet at: <http://www.duerr-ndt.de> or order it direct from Dürr NDT.



Usage of chemicals from third party suppliers

When using chemicals from third party suppliers please refer to the manufacturer's instructions when making up the chemicals.

All developer units which have already been operated using chemicals from third party suppliers can be converted to Dürr XR 24 NDT chemicals at any time.

Please note that the baths should be cleaned thoroughly before changing chemical source (refer to the manufacturer's instructions)



Usage of Dürr XR 24 NDT chemicals

Dürr NDT developer and fixer chemicals are based largely on natural ingredients. Components such as Hydroquinol or aldehyde are avoided as far as possible.

This reduces the accumulation of dirt in the unit and thereby also reduces cleaning.

Concentrations

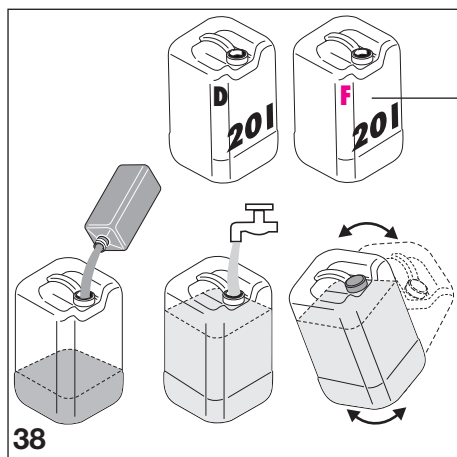
1.5 l concentrated liquid mixed with water provide
5 l usable solution

6 l concentrated liquid mixed with water provide
20 l usable solution

1.5 liters concentrated chemical in the baths of the developer unit

1. Filling fixer bath (F) (fig. 36)

Pour the 1.5 liter bottle (fixer concentrated liquid) carefully (avoid splashes which can lead to mixing of chemicals) into bath and then fill to top marking (54) with cold water.



38

55

2. Filling developer bath (D) (fig. 37)

Pour the 1.5 liter bottle (developer concentrated liquid) carefully (avoid splashes) into bath and then fill to top marking (54) with cold water.

6 liters chemical concentrate in 20 liter container

Two clean and empty 20 liter canisters (55) are required: for fixer and developer.

- Empty 6 liter bottle of fixer (F) into canister and fill with cold water to the 20 liter level.
- Empty 6 liter bottle of developer concentrated liquid (D) into canister and fill with cold water to the 20 liter level.
- Place a cover securely on each container and mix the contents.

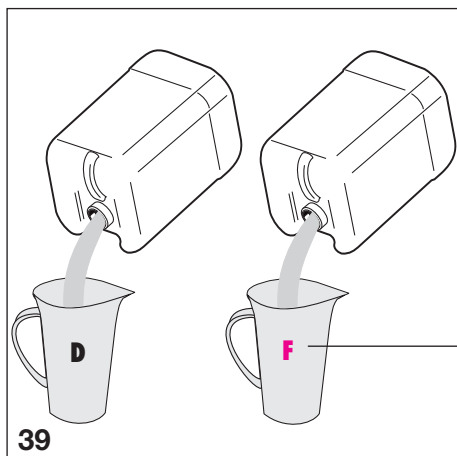
EN

1. Filling fixer bath (F) (fig. 40)

- Using a suitable container with a spout opening (56) carefully pour some of the fixer mixture into the fixer bath of the unit as far as the upper marking (54) (avoid splashes which might cause mixing of chemicals).

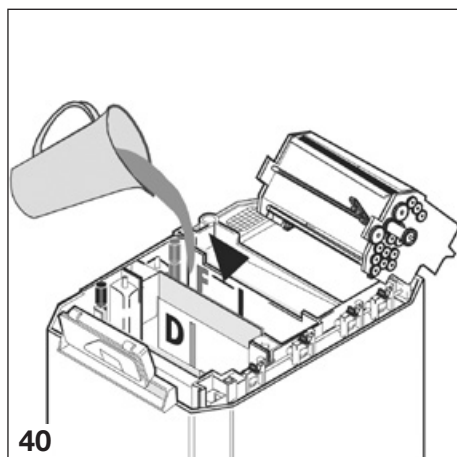
2. Filling developer bath (D) (fig. 41)

- Using the container (56) carefully pour some of the developer mixture into the developer bath of the unit as far as the upper marking (54) (avoid splashes which might cause mixing of chemicals).
- The remaining chemical mixtures should be stored in the 20 liter containers in a dark place until needed.
- Rinse the empty containers as well as the filling vessel thoroughly with water and keep for further use.

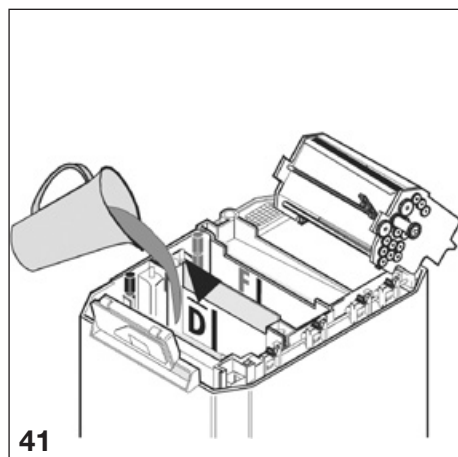


39

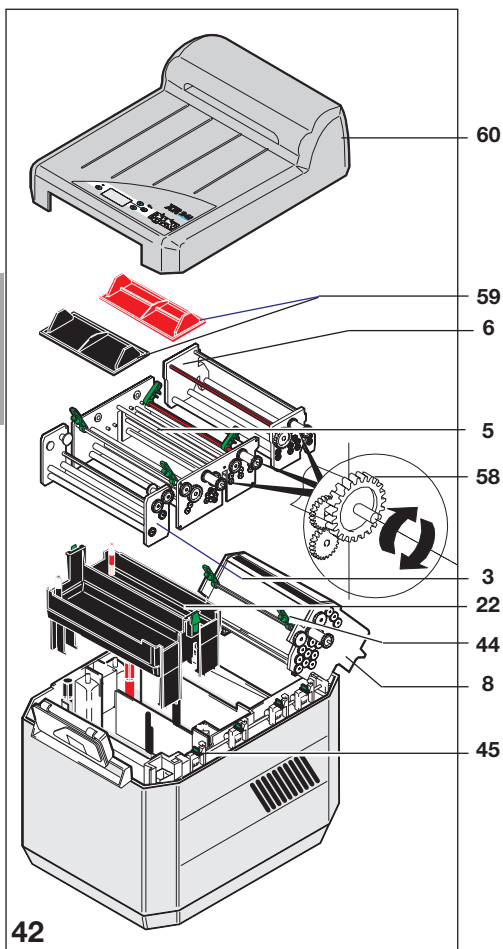
56



40



41



- Remove separating wall or barrier.
- Place lifting bath (22) in position.
- screw in the small plug of the lifting bath.

16.1.4 Insert roller sets



The developer unit must never be operated without its roller sets!

Without the roller sets it is possible that the developer and fixer fluids will be placed under pressure and will splash vertically upwards out of the developer unit.

Chemicals attack eyes and skin and there is the possibility of severe injury to the eyes.

Without the developer and fixer roller sets there can be no circulation of chemicals in the baths.

Danger of chemicals get into the eyes and danger of mixing of chemicals.

- Insert dryer packet (8) and swivel towards the rear.
- Place roller sets for rinse (6), developer/fixer (5) and film insertion slot (3) in place respectively
Check that the guides slot into each other. If necessary, rotate the toothed wheel of the drive (58) until the worm screw correctly engages with the transport drive
- Swivel the dryer packet (8) forwards.
- Close the green catches (44) and stop clips (45)
- Place floating covers (59) for developer and fixer baths in position
- Swing display back, i.e. in position.
- Replace cover (60). Be careful to ensure that the lower lip of the lid aligns completely with the guide of the housing cover
- Plug in at the mains.



Trouble-shooting

17. Tips for operators



If it is not possible to solve the problems listed here with the aid of these Troubleshooting Tips, then please call your Service Technician who will be glad to help.

Problem	Probable cause	Solution
1. Completely not operational	<ul style="list-style-type: none">• mains cable not correctly plugged• Cover not in position• Power switched not pressed long enough	<ul style="list-style-type: none">• Plug mains cable in at electrical safety socket and connector into rear side of unit• Place cover on correctly• Press power switch min. 2 s
2. Film too bright	<ul style="list-style-type: none">• Developer used up• Film exposure time on imaging system too short• Developer bath temperature too low	<ul style="list-style-type: none">• Change chemicals (see section 16.1)• Check regeneration levels.• Set exposure times (where possible)• Ask Service Technician to check and reset if necessary.
3. Film too dark	<ul style="list-style-type: none">• Film exposure time on imaging system too long• Developer bath temperature too high	<ul style="list-style-type: none">• Set exposure times (where possible)• Ask Service Technician to check and reset if necessary.
4. Yellowish-green smear to film	<ul style="list-style-type: none">• Film not fixed correctly• Film developed using program FINE GRAIN (with process time 5:30)	<ul style="list-style-type: none">• Check whether fixer is still all right for use: allow D4 films to lie ca. 56 s in fixer. If the film becomes transparent then the fixer is usable. If the smearing persists, change the chemicals (see sec. 16.1ff)• Choose a program with a longer process time. Observe film processing times
5. Dark smear or streaks to film	<ul style="list-style-type: none">• Light exposure into the darkroom, e.g. through keyhole• Darkroom lighting incorrectly installed or pointing in wrong direction	<ul style="list-style-type: none">• Check the darkroom for stray ambient light, if necessary black out light sources• Lamps should only shine indirectly
6. Greenish-brown smear to film	<ul style="list-style-type: none">• Chemicals used up	<ul style="list-style-type: none">• Mix up new batch of chemicals
7. Film is streaky	<ul style="list-style-type: none">• Mixing of chemicals	<ul style="list-style-type: none">• Mix up new batch of developer chemicals

Problem	Probable cause	Solution
8. General background fog to film	<ul style="list-style-type: none"> Film stored too long Film incorrectly stored 	<ul style="list-style-type: none"> Check shelf life of film Observe correct storage conditions, shelf life and manufacturer's instructions on film packaging.
	<ul style="list-style-type: none"> Developer bath-temperature too high due to excessive room temperature 	<ul style="list-style-type: none"> Reduce the room temperature



Stray ambient light can lead to pre-exposure of film material.

If necessary a separating wall or barrier of lead protection can be put up.

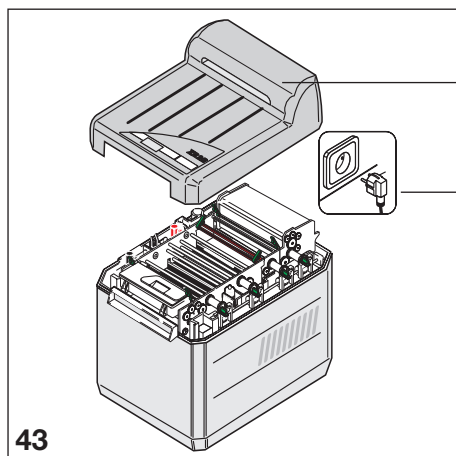
17.1 Fault message on display with audible signal

Display	further message to come...	Cause	Solution
BEFORE OPENING DISCONNECT FROM MAINS	Either at beginning of or during developer process	Safety relay on PCB (main board) defect	Arrange maintenance by our service technician. Work can continue. Before opening unplug at the mains and remove all power!
SERVICE INTERVAL REACHED!	After switching on the unit	Service interval reached.	Arrange maintenance by our service technician. Work can continue.
FAULT WATER TOO LOW!	After insertion of a film with delay of ca. 35 s	Water inflow to water bath interrupted	Check whether the water tap is open and/or inflow hose is connected
FAULT WATER TOO HIGH!	Either at beginning of or during developer process	<ul style="list-style-type: none"> - Waste water drainage blocked, badly laid or not ventilated - Electrical bridging caused by accumulation of lime scale on level sensor. 	Remove blockage or check whether the waste water drainage-hose has been laid correctly (water pocket). Work can only be continued after removal of problem
FAULT ROLLER DRIVE	Either at beginning of or during developer process	RPM-Signal from motor interrupted, possibly cable or connector defect	Arrange maintenance by our service technician. Problem during film development: film is only carried at shortest process time (5:30min) ! Too little fixing process!

18. Tips for technicians see also section 19 Tips on Troubleshooting

Problem	Probable cause	Solution
1. Completely not operational	<ul style="list-style-type: none"> • Mains fuse defect • Appliance fusing defect 	<ul style="list-style-type: none"> • Check fuse and replace where necessary • Check fuse and replace where necessary (see section 19.8)
2. Supply of fresh water interrupted	<ul style="list-style-type: none"> • Water intake valve blocked or defect • Water inflow blocked • Level indicator sensor has lime scale (electrical bridging) 	<ul style="list-style-type: none"> • Check valve and replace where necessary (see section 19.10) • Clean fine filter or coarse filter in water hose • Clean level indicator sensor (see section 19.12)
3. Developer temperature not suitable	<ul style="list-style-type: none"> • Process heater defect • Air in system, rotary pump not vented. (Unit filled with water or chemicals at ca. 20 °C starts without warm-up.) 	<ul style="list-style-type: none"> • Process heater and PTC-sensing device need replacing (see section 19.9) • Vent rotary pump by starting and stopping the unit several times over a short period. Electrical supply switch ON / OFF
4. Film too bright	<ul style="list-style-type: none"> • Developer bath temperature too low 	<ul style="list-style-type: none"> • Check process heater and/or PTC-sensor, replace if necessary (see section 19.9) • Measure the temperature and enter "CALIBRATION?" in service menu
5. Film too dark	<ul style="list-style-type: none"> • Temperature of developer too high or process heater defect 	<ul style="list-style-type: none"> • Check process heater and/or PTC-sensor, replace if necessary (section 19.9) • Measure the temperature and enter "CALIBRATION?" in service menu
6. Yellowish-green smear to film	<ul style="list-style-type: none"> • No chemicals in developer/fixer roller sets (level in bath too low) • No agitation or circulation of chemicals 	<ul style="list-style-type: none"> • Check the profile of seals and roller sets, if necessary replace. • Check rotary pump for possible signs of air in hose
7. Greenish-brown smear to film	<ul style="list-style-type: none"> • Film not rinsed 	<ul style="list-style-type: none"> • Level indicator sensor in water bath has closed off the water intake valve - check waste water drainage, if necessary clean and realign hoses (see 9.2) • Further possibilities, see above: Solutions for 2. "No fresh water inflow"
8. Film not completely dry	<ul style="list-style-type: none"> • Dryer performance incorrectly set • Ventilation fan defect • Heating defect 	<ul style="list-style-type: none"> • Reset the dryer performance • Replace the ventilation fan • Change the temperature control fuse

Fault message on display with audible signal see 17.1



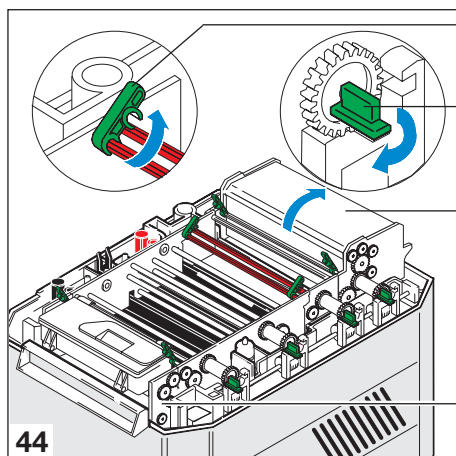
19. Tips for Troubleshooting

19.1 Before beginning work

- Turn off the unit at the main power switch.
- Disconnect the plug (61).
- Remove cover (60).
- The housing panels required for working need to be removed.

19.2 Remove front panel

- Swivel the display upwards
- Open the green catches (44) above roller sets (3)
- Remove the roller set to the film insertion slot (3).
- Unscrew the two grey rapid release catches (68) from the front panel (56).
- Unscrew the 3 Philips screws (cross-headed) (57) and remove the front panel (56).

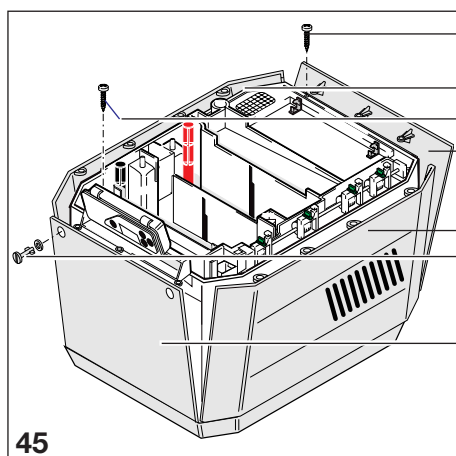


19.3 Remove rear panel

- Open the green catches (44) and clips (45) holding dryer packet (8).
- Swivel the dryer packet (8) towards the rear and detach.
- Unscrew the 3 Philips screws (cross-headed) (57) and remove the rear panel (67).

19.4 Remove side panels

- Remove front (56) and rear panels (67), lift the side panels (55) upwards.



19.5 After completing work

- Replace all housing panels to their original positions.



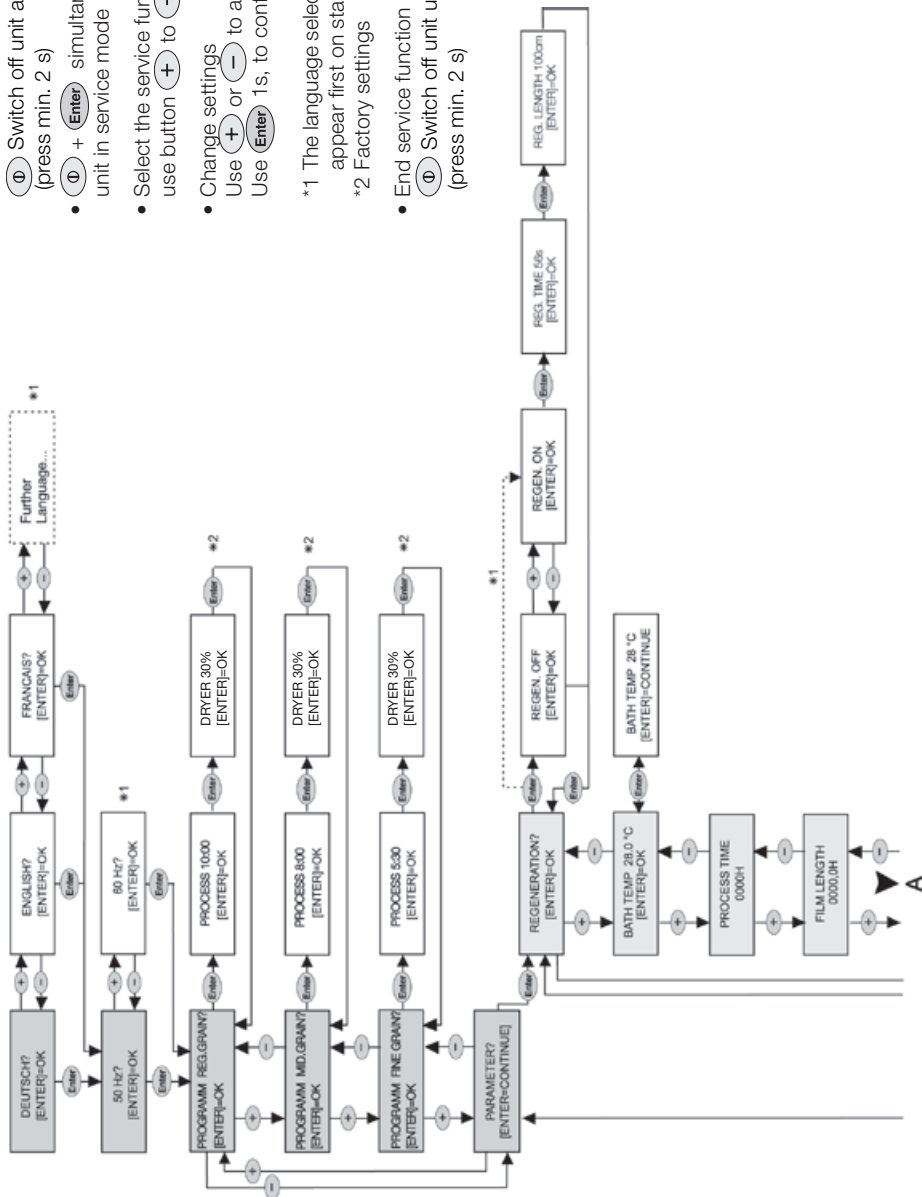
Never operate the unit if the panels are not correctly positioned or not screwed into place! The unit is connected to power supply - Danger of electric shock.

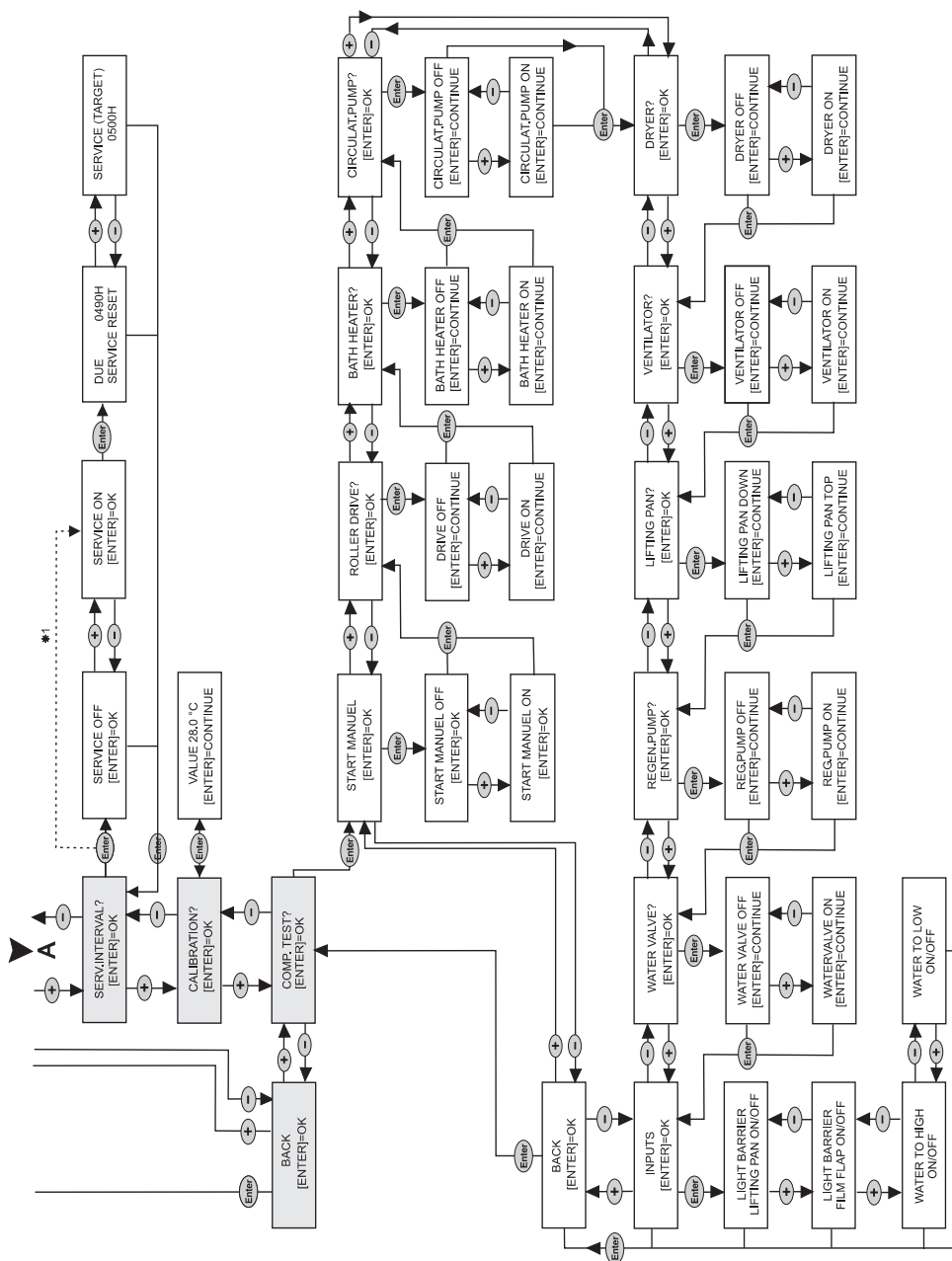
- Replace cover (60), plug in at the mains

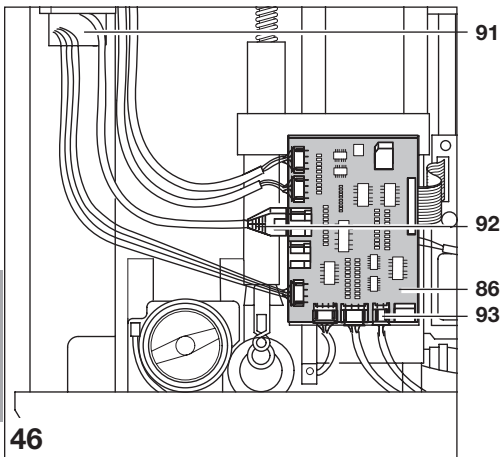
V1.0

19.6 Service operation plan

- Start service function
- ① Switch off unit at main power switch (press min. 2 s)
- ① + **Enter** simultaneously press (min. 4 s) unit in service mode
- Select the service function use button **+** to **−** select service function
- Change settings Use **+** or **−** to alter parameters Use **Enter** 1s, to confirm new values
- *1 The language selected, frequency or values appear first on start up
- *2 Factory settings
- End service function
- ① Switch off unit using power switch (press min. 2 s)

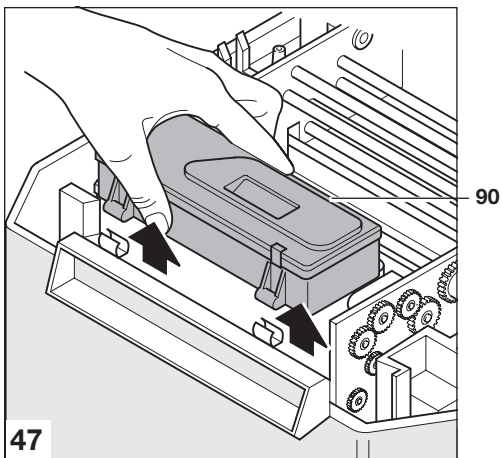




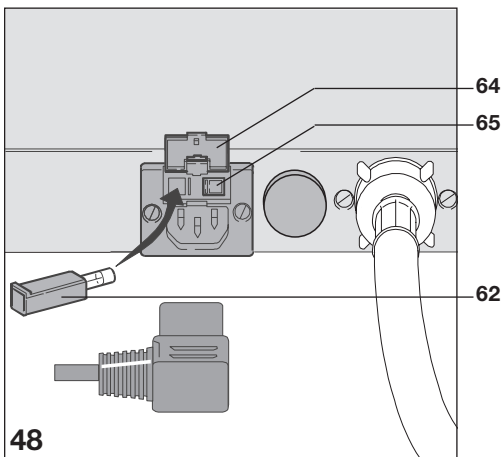


19.7 Replacing display unit

- Disconnect the connector of the display cable (92) from the PCB (main board) (86) and guide through the opening (91).

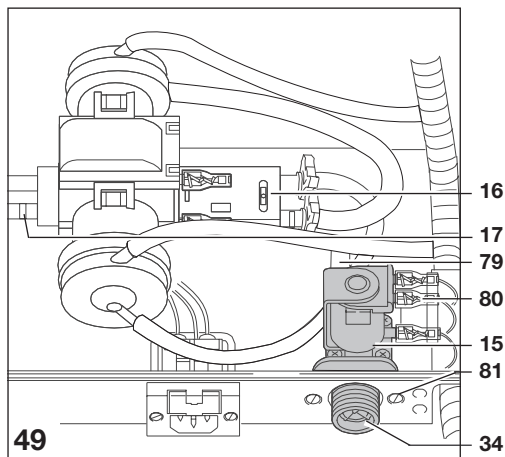


- Lift off the display (90) upwards.
- Insert new display in reverse sequence.



19.8 Check the fusing of the unit

- Open the flap to the rear of the unit (64) by pushing not too hard with the tip of a screwdriver.
- Press the spring and remove the fuse holder (65).
- Check fuse and replace where necessary. For order number see section 4.1 Special accessories



19.9 Replacing process heater with PTC-sensor

- Remove all panels.
- Drain off chemicals (see section 16.1.1)
- Disconnect connector (93, fig. 43) at PCB (main board) (86).
- Unscrew the screw on mounting of the rotatory pump and lift this upwards.
- Remove both the two connectors from the rotatory pump and also the connector on the process heater (16).
- Remove the process heater from its mounting and disconnect the hoses.
- Install the new process heater according to instructions.
- Replace all connections to rotatory pump and process heater.
- Reconnect connector (93, fig. 43) at PCB (main board) (86).
- Replace all housing panels to their original positions.

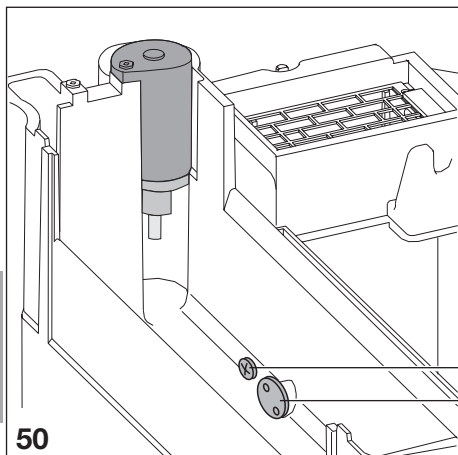
19.10 Check water intake valve

- When water intake valve is not switched on:
- Start service operation (see section 19.6), menu "INDIVIDUAL TEST" and then select option "Water intake valve".
- If the valve does not activate despite unit being switched on (voltage) then replace the complete valve set (15), see section 19.11 "Replace water intake valve".

19.11 Replace water intake valve

First check water intake valve, see section 19.10, if defect then replace it.

- Close the water tap.
- Remove the water hose carefully from water inflow (34) of the appliance.
- Disconnect the connection cable (80) from the valve unit
- Carefully disconnect the internal water hose (79) to the rear of the valve
- Undo the screw (81) to the side of the water inflow and replace the complete valve



19.12 Level indicator sensor "water"

- Close the water tap.
- Remove the lid.
- Open the green catches and clips.
- Swivel the dryer packet towards the rear.
- Remove the roller set "Water".
- Clean the level indicator sensors (82)+(83), in order to avoid any formation of a bridge caused by lime scale.
- To test the function the unit must be operated without the roller set "water".
- Simulate a film insertion and the display should cause message "Water too low" to appear.
- Build a bridge between the two level indicator sensor (82)+(83), and the message "Water too high" should appear - the sensors are now freed. Cleaning is complete. If there is any deviation, refer to section Troubleshooting, 17.1

19.13 Changing light barrier sensors

The light barrier spare parts set is required order number 1734-993-00.

Instructions are included with the spare parts set, please refer to these.

Dürr NDT GmbH & Co. KG

Höpfigheimer Straße 22 · 74321 Bietigheim-Bissingen, Germany

Tel: +49 7142 993811-0 · Fax: +49 7142 993811-299

info@duerr-ndt.de · www.duerr-ndt.de

