

# RU 24 NDT

Manual

EN



9000-608-26/30



*hand*  
made in Germany

**DÜRR**  
**NDT**



# Contents



## Important information

|   |   |
|---|---|
| <b>1. General</b> .....                 | 4 |
| 1.1 Official guidelines.....            | 4 |
| 1.2 Notes .....                         | 4 |
| 1.3 Disposal of appliance .....         | 4 |
| 1.5 Correct Usage.....                  | 4 |
| 1.6 Incorrect usage .....               | 4 |
| 1.7 Using Peripheral Devices .....      | 5 |
| <b>2. Safety</b> .....                  | 5 |
| 2.1 General notes on safety.....        | 5 |
| 2.2 Electrical safety instructions..... | 5 |
| <b>3. Warning and symbols</b> .....     | 6 |
| 3.1 Model identification plate .....    | 6 |
| <b>4. Delivery contents</b> .....       | 6 |
| 4.1 Accessories.....                    | 6 |
| <b>5. Technical data</b> .....          | 6 |
| <b>6. Functional diagram</b> .....      | 7 |
| <b>7. Functional Description</b> .....  | 7 |



## Installation

|  |    |
|--|----|
| <b>8. Regeneration unit set up</b> .....           | 8  |
| <b>9. Hose connection</b> .....                    | 9  |
| <b>10. Electrical connections</b> .....            | 9  |
| <b>11. Setting the regeneration electronics</b> .. | 10 |
| <b>12. Check settings</b> .....                    | 11 |
| <b>13. Regeneration pump setting</b> .....         | 11 |
| <b>14. Commissioning</b> .....                     | 12 |



## Usage

|   |    |
|---|----|
| <b>15. Cleaning the regeneration unit</b> ..... | 12 |
| Every three months.....                         | 12 |
| <b>16. Disposal of chemicals</b> .....          | 12 |



## Troubleshooting

|  |    |
|--|----|
| <b>17. Tips for Operators and Technicians</b> .... | 13 |
|--|----|



## Important information

### 1. General

#### 1.1 Official guidelines

The product has been subjected to a conformity evaluation process and conforms to the fundamental requirements of the applicable European directives.

#### 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. Any claims arising from damage or injury when using third party or unapproved parts are invalid.
- 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, procedures, proprietary names, software programs and devices are under patent or copyright protection.

- 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.
- A reprint of the Installation and Operating Instructions, also parts of it, is only permitted after written approval of the company 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.

#### 1.5 Correct Usage

The DÜRR regeneration unit RU 24 is solely designed for use in connection with the DÜRR X-ray film developer unit XR 24 NDT. Correct usage of the appliance also involves observance of the Installation and Operating Instructions as well as keeping to set up, operating and maintenance procedures.

#### 1.6 Incorrect usage

Any other usage or usage beyond it is not considered the designated usage. The manufacturer will accept no claims for any damage or injury arising thereby. All risks will be borne by the operator and/or owner.

## 1.7 Using Peripheral Devices

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 executed 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 the appliance check carefully that the supply voltage and the supply frequency of the appliance and the local electrical supply are compatible.
- Before commissioning or before first use the appliance and all supply lines must be checked for any signs of damage. Any damaged supply lines or connections must be replaced immediately.
- When working with the appliance all appropriate electrical safety procedures must be observed.

### 3. Warning and symbols

The Installation and Operating Instructions makes use of the following terms and symbols for important information:



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



Special information regarding the economical use of the equipment and other information



Observe the Operating Instructions



CE-Kennzeichnung

#### 3.1 Model identification plate

The model identification plate can be found on the rear side of the appliance towards the middle

REF Order no. / model no.

SN Serial-No.



Refer to accompanying documentation!



Date of manufacture



Dispose of correctly in accordance with EU-guidelines (2002/96/EG-WEEE)

### 4. Delivery contents

**Regeneration unit RU 24 NDT for developer unit XR 24 NDT**

230V - 240V, 50Hz - 60Hz ..... **1734-820-00**

#### 4.1 Accessories

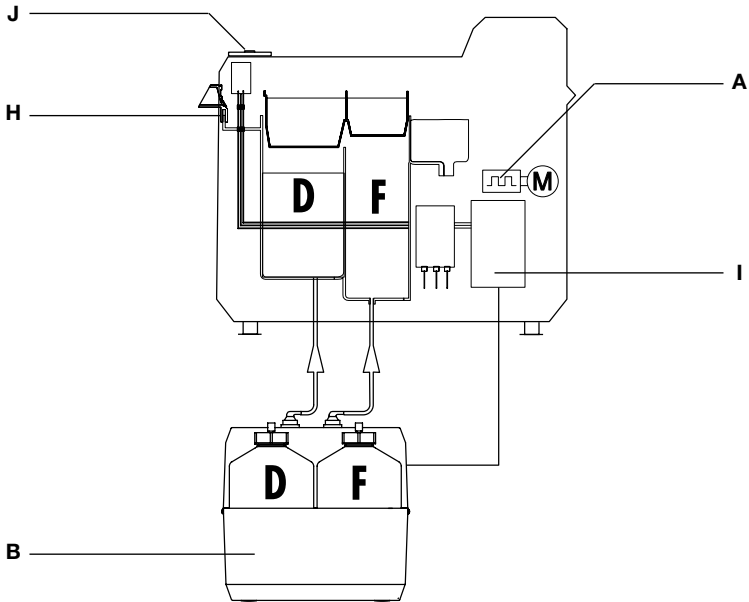
1 Installation kit XR 24 NDT ..... 1734-820-04

### 5. Technical data

|                                   |                    |
|-----------------------------------|--------------------|
| <b>Model</b>                      | <b>1734-820-00</b> |
| <b>Voltage (V)</b>                | 230 - 240          |
| <b>Frequency (Hz)</b>             | 50/60              |
| <b>Current consumption (A)</b>    | 0.9 / 0.65         |
| <b>Output (W)</b>                 | 50 - 80            |
| <b>Dimensions (cm, L x W x H)</b> | 32 x 36 x 37       |
| <b>Weight (empty) (kg)</b>        | 4                  |

## 6. Functional diagram

### Regeneration unit RU 24 NDT in combination with developer unit XR 24 NDT



## 7. Functional Description

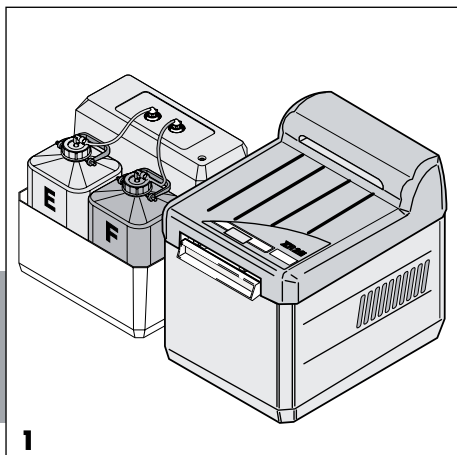
Using the XR 24 NDT the regeneration pump switches on after every 100 cm of developed film material. For the period that the film insert flap (light sensor H) is operated, impulses are generated in proportion to the length of film used, and these are then counted by a impulse generator.

The software of the service program of the XR 24 NDT allows the running time of the regeneration pump to be set infinitely between 0 s and 60 s.

The pump running time is factory set at 21s. During this time the pump supplies ca. 225 ml of fresh chemicals from the 5 l container of the regeneration unit to the developer bath (D) and ca. 300 ml to the fixer bath of the developer unit.

Switching off the pump after a regeneration impulse also sets the clock back to 0. On the other hand, when switching off the developer unit or as a result of a power outage the clock will maintain the current value.

- A)** Impulse generator drive motor XR 24 NDT
- B)** Regeneration unit RU 24 NDT
- H)** Light barrier to film insert flap
- I)** PCB
- J)** Display



## Installation

### 8. Regeneration unit set up

- Set up the regeneration unit RU 24 NDT next to the developer unit:  
Where sufficient space allows, always choose this option.
- Set up the regeneration unit RU 24 NDT in a cupboard below the developer:  
Instruct the operator to check the level of chemicals frequently .

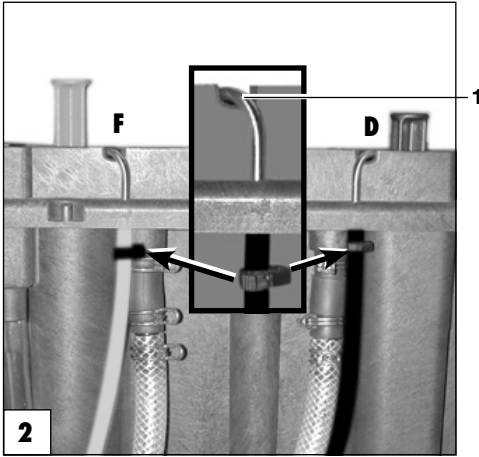


**Setting up the regeneration unit RU 24 NDT above the developer unit is not permitted, as this set up means that it is possible that chemicals can drip or splash or even be fed into the baths of the developer unit uncontrollably.**

Make sure that the connecting hoses from the regeneration unit RU 24 to the developer are laid with no kinks or bends. The distance between the regeneration unit and the developer must not exceed 2m.

Ensure during set up that developer unit and the collectors are easily accessible for staff.

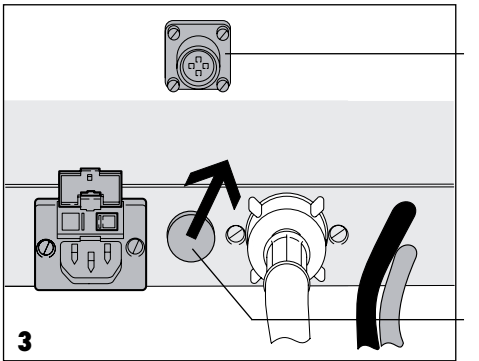




## 9. Hose connection

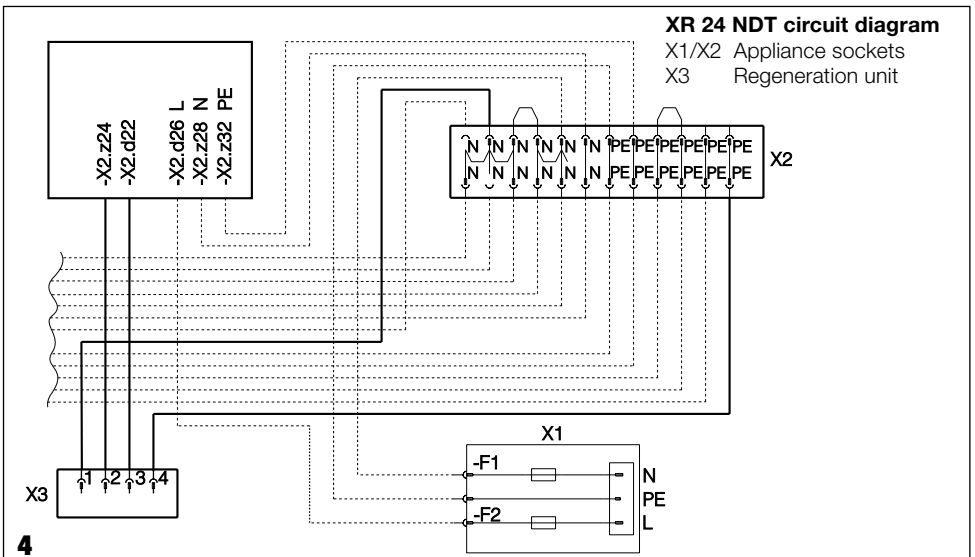
**i** Connection of the regeneration unit is made via inlet pipe (1).

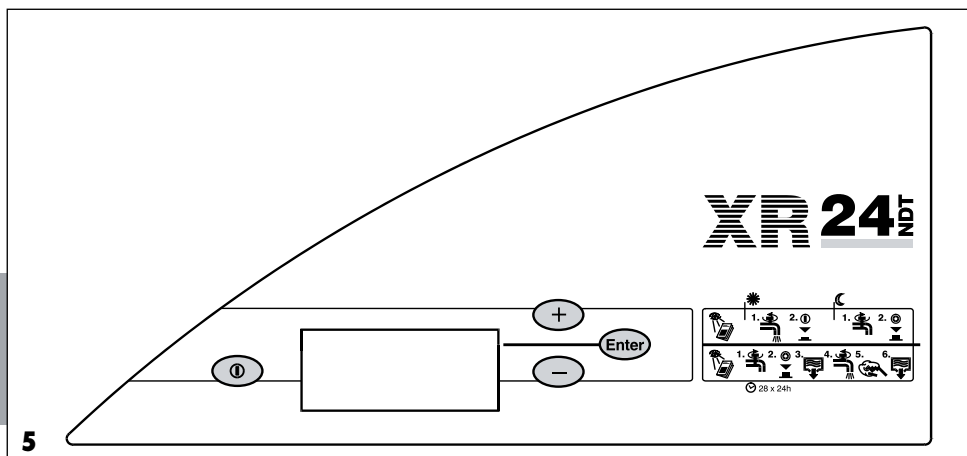
Use installation set 1734-284-00 "Inlet pipe for regeneration unit" with installation instructions (9000-608-39/01) included.



## 10. Electrical connections

- Remove the circular cap (3) from the hole in the rear side of the developer unit.
- Take the connection interface (2) from the installation set provided 1734-284-00.
- Insert the connection piece into the hole provided and secure using the 4 screws.
- Connect the cables according to the circuit diagram (fig. 4).
- Connect the regeneration connector to the interface socket and secure using the locking ring.





## 11. Setting the regeneration electronics



**Before setting up the regeneration electronics be sure to fill the baths of the developer unit with water.**



The setting for the pump running time should be individually set according to the type of film being used.

The regeneration function ON / OFF as well as the regeneration time set will appear on the display (fig. 5) of the developer unit.

Refer to the Installation and Operating Instructions X-ray film developer unit XR 24 NDT (9000-608-25/30).

See section 19.6 Service program sequence.

- Start service function
  - ⓘ Switch off unit at main power switch (press min. 2 s)
  - ⓘ **Enter** + simultaneously press (min. 4 s) unit in service mode
- Servicefunktion anwählen
  - +** Use keys and **-** to select REGENERATION then choose REGEN.ON.
- Change settings (factory set at 56 s)
  - +** Use or **-** to alter parameters
  - Use **Enter** 1 s, to confirm new value
- End service function
  - ⓘ Switch off unit using power switch (press min. 2 s)

## 12. Check settings

### Check regeneration impuls for film length

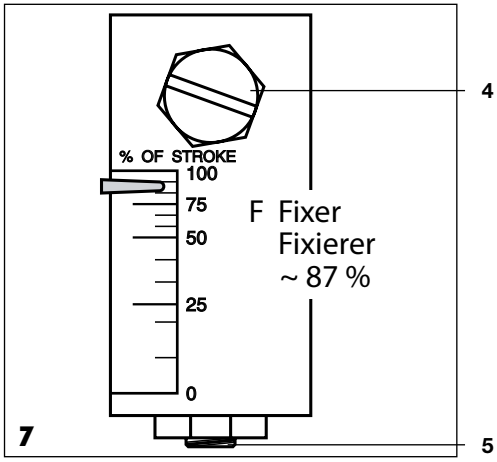
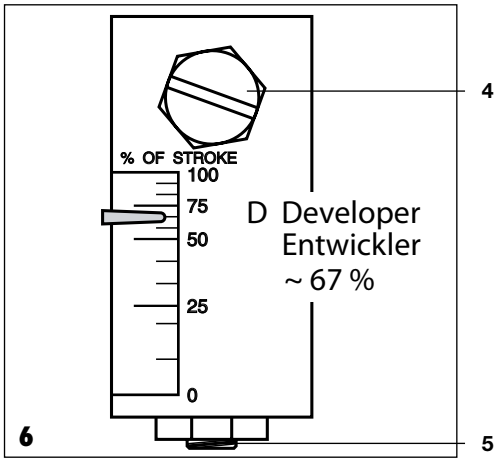
- Switch on developer unit and select program "FINE GRAIN" . (film processing time 5:30 min)
- Place a film into the film insertion slot in such a way that it is not transported but still the flap is activated. After ca. 7.5 min the regeneration pump must switch on and developer and fixer fluids are pumped into the baths of the developer unit.
- Check system for any signs of leaks.

### Check the amount of fluid pumped by the regeneration unit.

- Fill two measuring beakers with water (ca. 0.5 Liter) and place these into the regeneration unit. Position the suction tubes of the regeneration unit into the measuring beakers.
- The pumps can be operated using the service mode of the XR 24 NDT in order to check the flow amounts of fluids actually transported.



(See Installation and Operating Instructions X-ray film developer XR 24 NDT, order number 9000-608-25/30 section 18.6 Service operation sequence)



## 13. Regeneration pump setting

Setting the piston stroke in the regeneration unit allows the flow of the chemicals supplied to be regulated (fig. 6).

- Loosen the hex. socket screw (5).
- Alter the setting on the piston stroke by altering the hex. screw (4) with a screwdriver or wrench:  
 Pointer towards 100% = greater flow  
 Pointer towards 0% = less flow.
- Finally tighten the hex. socket screw again (4).

## 14. Commissioning

After completion of the setting procedure, drain off the water from the regeneration containers and from the baths of the developer unit and make up the chemicals according to the Installation and Operating Instructions.



## Usage

## 15. Cleaning the regeneration unit

### Every three months

- Check that the collector vessel of the developer is empty, if not empty contents into collection container.



It is important that the collector is empty, otherwise there is the danger of overflowing when the chemicals are now drained from the baths.

- Drain the chemicals from the baths of the developer unit and of the regeneration container and rinse these with warm water. Fill both the unit and the regeneration containers with warm water and close the lids.
- Switch on developer unit and select program "FINE GRAIN". (Film processing time is 5:30 min)
- Place a film into the film insertion slot in such a way that it is not transported but still the flap is activated.
- Wait ca. 30 min until the regeneration unit has operated 4 times. Remove the film from the insertion slot and allow the final cycle to complete. (Lifting bath in upper position.)
- Switch off developer unit.

## 16. Disposal of chemicals



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

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



## Troubleshooting

### 17. Tips for Operators and Technicians

Repair work and maintenance above and beyond normal routine maintenance of the appliance may only be carried out by suitably qualified personnel or by one of our service technicians.



Before any trouble shooting, switch off all power.

| Problem  | Probable cause   | Solution   |
|--|--|--|
| <b>1. Regeneration vessels are empty within a few hours</b>                    | <ul style="list-style-type: none"> <li>• Regeneration time set too long.</li> <li>• Electronics do not switch off.</li> </ul>  | <ul style="list-style-type: none"> <li>• Check regeneration time, and regeneration amounts.</li> <li>• Change electronic parts.</li> </ul>   |
| <b>2. Films not sufficiently fixed - causing increased background foginess</b> | <ul style="list-style-type: none"> <li>• Regeneration tank empty.</li> <li>• Pump cycle too short.</li> <li>• Regenerating tank or connection hoses incorrectly connected.</li> <li>• Nonreturn valve of the regenerating pump blocked or incorrectly set up.</li> <li>• Regeneration hoses blocked or kinked (from regeneration unit to developer unit).</li> <li>• Film shelf life exceeded.</li> <li>• Chemical shelf life exceeded.</li> </ul> | <ul style="list-style-type: none"> <li>• Refill regeneration tank. If there is still no improvement, change chemicals in unit.</li> <li>• Set higher pump cycle time.</li> <li>• Drain the chemicals from the unit and clean thoroughly. Insert and secure the regenerating vessels and use fresh chemicals.</li> <li>• Clean non-return valve, replace if required. Ensure correct placement of parts!</li> <li>• Lay hoses without kinks and bends.</li> <li>• Observe shelf life on film packaging.</li> <li>• Observe shelf life on chemicals packaging. Where shelf life exceeded, dispose of correctly.</li> </ul> |
| <b>3. Regeneration pump does not operate</b>                                   | <ul style="list-style-type: none"> <li>• Tachogenerator of motor or electronics defect.</li> <li>• Cable connection to regeneration unit loose or interrupted.</li> <li>• Regeneration pump motor blocked.</li> </ul>  | <ul style="list-style-type: none"> <li>• Check the impulse of the light barrier against impulses of the drive motor or replace the electronics.</li> <li>• Check all cable connections.</li> <li>• Check the motor for mechanic fault (e.g. rotate ventilation wheel).</li> </ul>  |





**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

