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1. GENERAL

1.1 SAFETY REGULATIONS

Always observe the following safety regulations:

- The machine must be set up at a place where it is continually under supervision and where improper use, especially by children, is excluded.
- The processor may not be installed in direct sunlight (max. 2500 lux).
- The machine must be set up perfectly level.
- Installation, troubleshooting and repairs of an electrical or mechanical nature, may only be carried out by an authorised GE Inspection Technologies service technician.
- When handling chemicals, the safety regulations must be strictly observed. In this regard carefully read the instructions in and on the packaging. Protect your eyes from splashing of chemicals by wearing safety goggles. Always wear the prescribed protective clothing.
- When draining or dumping chemicals and wash water, you must abide by the local regulations and environmental legislation.
- The process chemicals must be collected separately.
- GE Inspection Technologies reserves the right to adapt the equipment to the latest technical specifications at any time.

1.2 INTERNATIONAL STANDARDS AND CERTIFICATES

The NDT U machine meets the specifications of the international standards, regulations and guidelines. They will be defined and delivered on your request.

The NDT U is certified according to:

- TÜV GS
- UL,CSA UL, cUL
- GE CE

2. INSTALLATION

The NDT U processor, provided with any options selected, is installed by an authorised GE Inspection Technologies service technician.

The default process parameters are set up with this installation, including the cycle time.

IMPORTANT:

The “Technical data and installation instructions” for the NDT U contain all the necessary information on the placement into service and assembly of the machine.

2.1 FACTORY SETTING

Factory setting and customization at installation

	Factory setting	Configuration modification	Execution of the modification
Mains cable	UL (US) cable	Europe cable	In delivery package, to install
Mains voltage	230 V – 240 V	200 V or 208 V	Change fuses in cupboard
Basic replenishment quantities in ml / min for D and F	Typically for 50 Hz mains frequency: - DEV = 400 ml/min - FIX = 550 ml/min	Typically for 60 Hz mains frequency: - DEV = 490 ml/min - FIX = 640 ml/min	See installation instructions
Temperature indication / control	Degrees Celsius	Degrees Fahrenheit	See installation instructions

3. COMPONENTS AND FUNCTIONS

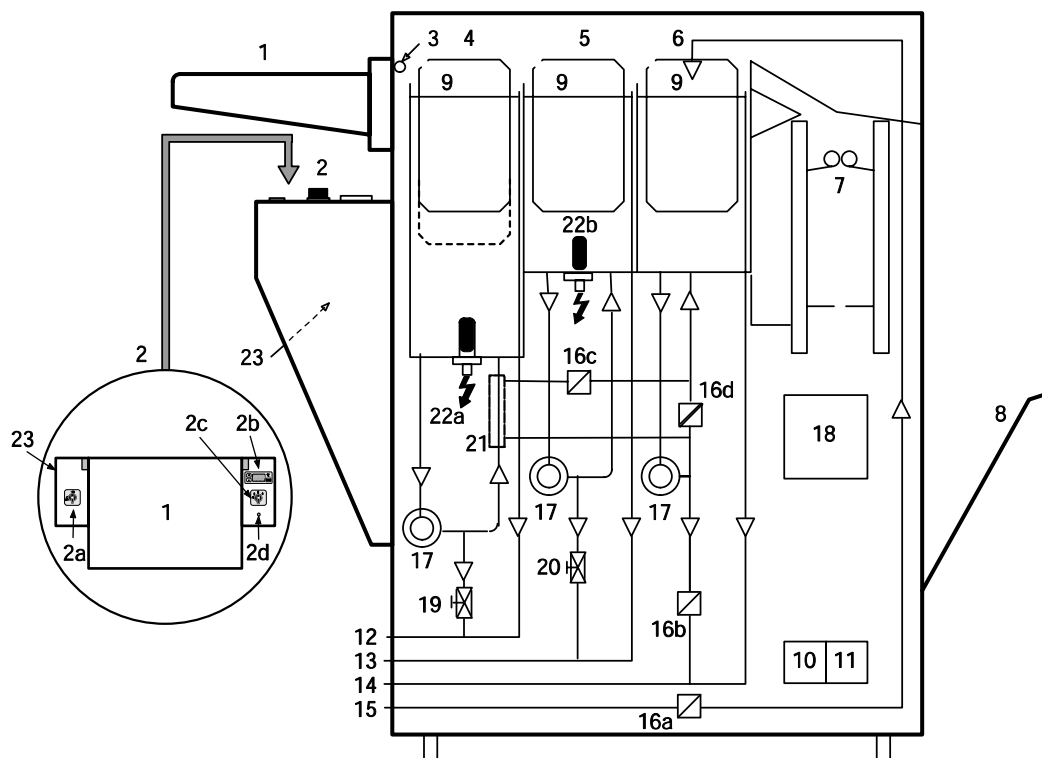


Fig. 1

- | | |
|---|---|
| 1..... Film feed table | 11.... Replenishment pump for fixer |
| 2..... Control panel | 12.... Drain for developer |
| a..... On/Off switch | 13.... Drain for fixer |
| b..... LCD display with actual temperature and settings | 14.... Wash water drain |
| c..... Dryer setting | 15.... Wash water supply |
| d..... OK lamp (film insertion) | 16.... Solenoid valve |
| 3..... Film sensors for replenishment | a..... Water supply |
| 4..... Developer tank | b..... Anti-algae vent |
| 5..... Fixer tank | c..... Developer cooling |
| 6..... Wash tank | d..... Water circulation |
| 7..... Infrared dryer | 17.... Circulation pumps (developer, fixer, water) |
| 8..... Film receiving basket | 18.... Ventilators |
| 9..... Removable upper racks | 19.... Closing tap for developer |
| 10... Replenishment pump for developer | 20.... Closing tap for fixer |
| | 21.... Heat exchanger |
| | 22.... Heater |
| | a..... Developer |
| | b..... Fixer |
| | 23.... Overheating protectors for developer and fixer |

The actual developer temperature of the NDT U appears on the right hand side of the display, next to the film feed table (fig. 1.2b).



4. PLACING THE NDT U INTO SERVICE

IMPORTANT:

Do not switch on the machine prior to filling. The bath heating will immediately switch on, thus activating the thermostat. Moreover, the developer and fixer pumps run dry.

4.1 PREPARATION OF THE CHEMICALS

- Use only chemicals intended for automatic processing.

The NDT system is totally co-ordinated. Optimum film results can therefore only be attained when using NDT chemicals.

- We strongly recommend that the chemicals be prepared in the NDT MIXER or in separate replenishment tanks (see accessories - 10.1).
- Carefully adhere to the preparation data on the packaging of the chemicals.
- First fill the fixer tank, then the developer tank.
- Avoid any mixing of fixer with developer.

4.2 FILLING THE MACHINE TANKS

- Close the drain taps (fig. 1.19 and 1.20).
- Switch off the machine and remove the machine cover.
- Remove the upper racks by lifting them up by the handles on the sides (fig. 2).
- Remove the racks.
- Fill the fixer tank with ready-to-use fixer up to the marker line (fig. 3).

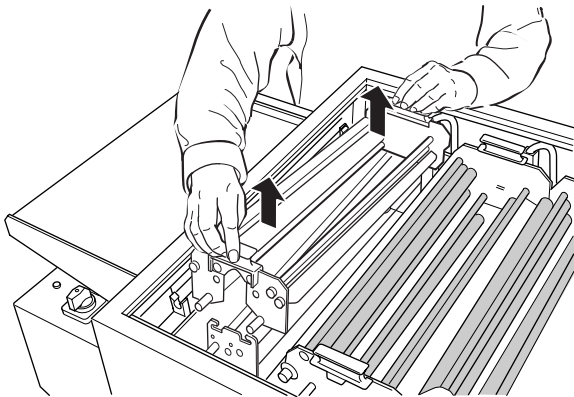


Fig. 2

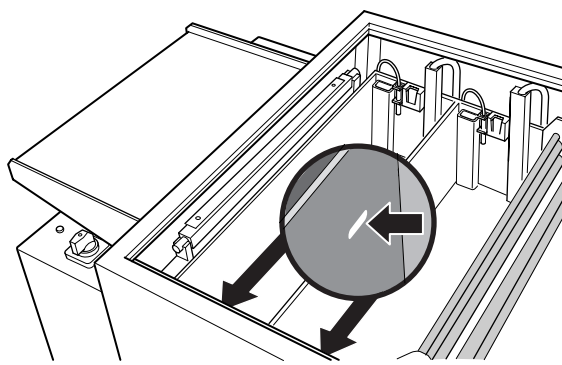


Fig. 3

IMPORTANT:

Be careful that no fixer gets in the developer tank. If this should happen anyway, the developer tank must be completely cleaned after disposing of the spoilt chemicals.

- Fill the developer tank with ready-to-use developer up to the marker line.
- Add starter solution (volume as recommended on the packaging) to the developer in the tank, while stirring continually.

- Place the racks carefully back into the corresponding tanks.
- Place the upper racks carefully back on the corresponding lower racks. Notice the arrow that indicates the film-transport direction (fig. 4).

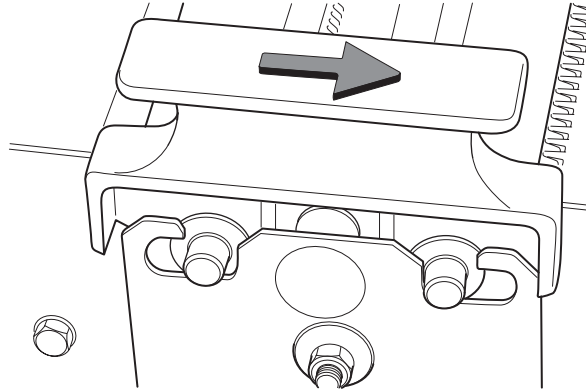


Fig. 4

IMPORTANT:

Notice the corresponding colour indicators of the racks:

Developer	=	red
Fixer	=	blue
Wash	=	white

- Check, before inserting film, that the upper rack is correctly positioned. Be careful that the attachment pins of the upper rack, are firmly clamped to the lower rack (fig. 5).
- Replace the machine cover.
- Switch on the machine.
- Open the cold-water supply.

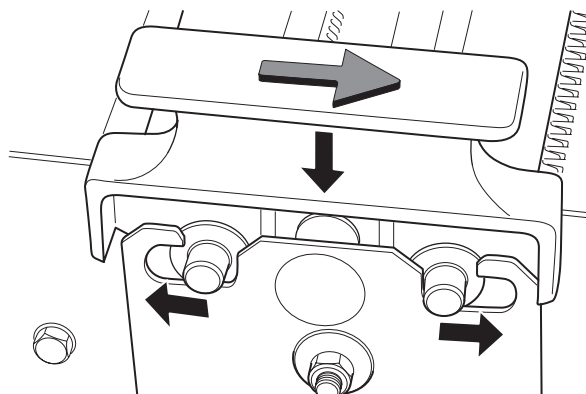




Fig. 5

4.3 PLACEMENT INTO SERVICE

- Check that the developer and fixer tanks are filled.
- Check that the cold water tap is open.
- Place the On/Off switch in position I (ON) (fig. 1.2a; fig. 6.a).
- The wash tank is automatically filled with water. At the same time, the warm-up phase of the developer and fixer begins. The warm-up speed is approx. 1°C (1.8 °F) per minute.
- The actual developer temperature appears on the display.
- The fixer temperature appears on the display when pressing the  or the  key.

4.4 REGULAR CHECKS

Before starting to use the machine each day, check that

- the replenishment tanks or the mixer tanks are sufficiently filled,
- the waste tanks still have sufficient receiving capacity,
- the cold-water tap is open,
- the racks are placed correctly in the machine,
- the liquid levels of developer and fixer are reached,
- the machine cover is correctly closed,
- the film feed table is clean and dry,
- the film receiving basket is correctly positioned.

IMPORTANT:

When the machine cover is open, **the driving motor** is turned off automatically for safety reasons.

5. OPERATION

5.1 WARM-UP PHASE AND FILM INSERTION

- On the display you see the current developer temperature: e.g. 26.3°C / 79°F (fig. 6.b).
- The fixer temperature remains minimum 28°C/82°F. If the developer temperature is higher than 28°C/82°F, the fixer temperature will automatically be adjusted to the current developer temperature.
- The OK lamp will light up after switching on the NDT U, when the selected developer temperature has been reached (fig. 6.d).
- Insert 1 or 2 large sheets of cleaning film before the first actual exposure is processed. A cleaning film is an undeveloped NDT film.
- Sheet films are laid with the large side in front on the feed table while holding the end of the film with two fingers (in the middle). With a forward motion and with a light pressure, the film is pushed straight into the insertion slot. Release the film when it is grabbed by the transport system of the developer machine (fig. 7).

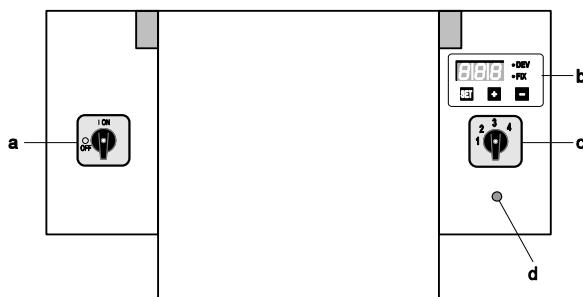


Fig. 6

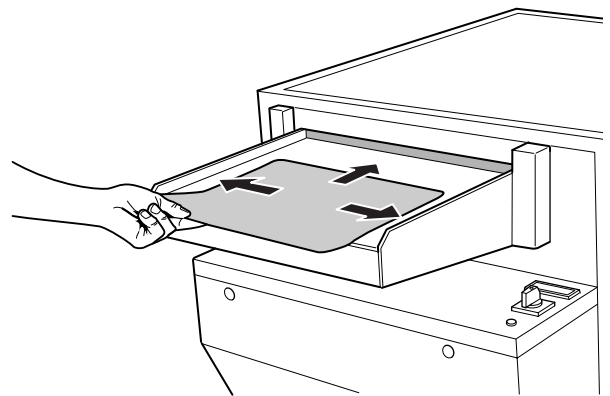


Fig. 7

- Small films can be inserted straight in next to each other and are developed.
 - e.g.: 6 films of 6 cm width
 - 5 films of 7 cm width
 - 4 films of 10 cm width
- Roll film is always inserted with the memory curl down. A few recommendations:
 1. Guide the film on the feed table (always insert straight).
 2. Be sure that the leading edge of the film has rounded corners.
 3. Maximum 6 films may be inserted next to each other.

During the insertion of the film, the OK lamp goes out.

- The next film can be inserted as soon as the OK lamp flashes again and when the buzzer sounds simultaneously.

Films that may be processed

The NDT U can process industrial x-ray films of all common brands that are suitable for machine processing. Both sheet films and roll films can be developed.

- smallest format 6 x 12 cm
- minimum width 3.5 cm
- minimum length 12 cm
- maximum width 43.2 cm
- maximum length 500 cm
- film curl: minimum diameter 30 cm

The receiving basket of the NDT U can be placed in two positions, depending on the film format and the application (fig. 8, fig. 9):

In the default set-up as in fig. 8, all film formats can be processed. Caution! In the case of a roll film, the accumulation of the film against the dryer can cause problems and damages to the film and processor.

For roll film, it is better to place the basket in the position indicated in fig. 9.

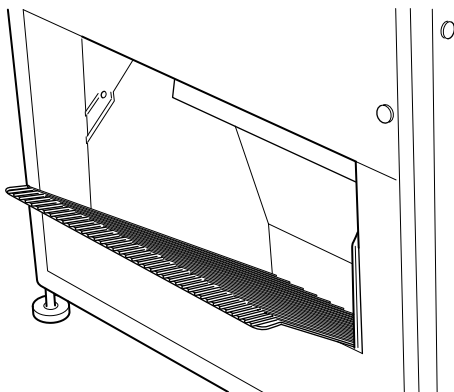


Fig. 8

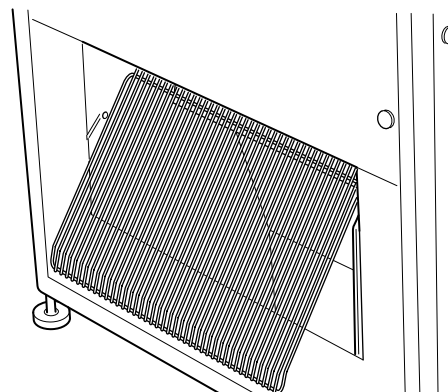







Fig. 9

5.2 DISPLAY FUNCTIONS

- At the request of the customer, the temperature can be displayed in degrees Fahrenheit. This modification can be done during installation by the GE Inspection Technologies service technician.
- The actual developer temperature always appears on the display (fig. 6.b). The desired developer temperature can be set on the display.
- Press the  key shortly. The respective LED lights up on the display.
- The temperature can be set in steps equivalent to 1°C (equal to 1 or 2°F).
- Press the  key to raise the temperature. Press the  key to lower the temperature.
- Press the  or  key shortly in order to let appear the actual fixer temperature. After 5 seconds the display returns to the actual developer temperature.

6. SETTING THE PROCESS CYCLES

6.1 GENERAL

An authorised GE Inspection Technologies service technician can set up the process parameters according to the needs of the user during installation of the NDT U.

A selection can be made from the following process times:

- Standard version: 1.5 – 2.0 – 2.5 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - 10 - 11 - 12 min.
- Off-shore version: 1.5 – 2.0 – 2.5 min.

The NDT U is supplied in the standard cycle: 8 minutes (Developer T° = 28°C/82°F).

6.2 MODIFYING THE DRYER SETTING

The dryer setting can always be modified, from setting 1 to 4, via the switch (fig. 6.c) on the control panel. Setting 1 is the lowest setting value and setting 4 the highest. The standard dryer setting is set to setting 3.

7. TROUBLESHOOTING

IMPORTANT:

Electrical or mechanical malfunctions have to be repaired only by an authorised GE Inspection Technologies service technician.

Both the developer and fixer bath of the NDT U are provided with an overheating protector. When this protector has turned off the heating element, it can be turned on again by pressing down the switch of the overheating protector with a sharp object (for example, a ballpoint). This pinhole is located on the left side of the control panel (fig. 10).

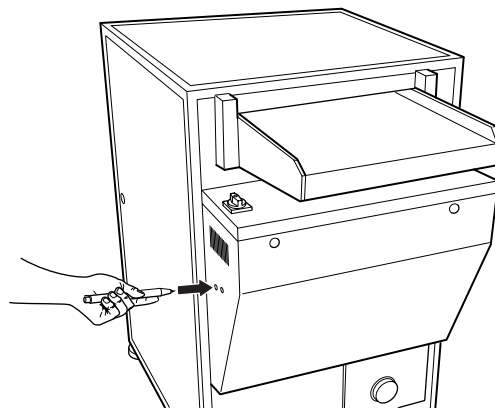


Fig. 10

IMPORTANT:

If one or both overheat protections are turned off the display is no longer activated (dark).

8. MAINTENANCE AND CLEANING

8.1 MAINTENANCE

By carrying out regular maintenance and cleaning, the NDT U will give you the desired film results. The lower the throughput of films the more frequent maintenance will be required.

Film volume

Customers with a low daily film consumption (<5m²) must clean more often.

$$\begin{aligned} 5\text{m}^2 &= 33 \text{ films of } 14'' \times 17'' \text{ format} \\ &= 100 \text{ films of } 10 \times 48 \text{ cm. format} \end{aligned}$$

Periods of stoppage

1. After a relatively short period of stoppage (1/2 hour to a few hours) it is sufficient to insert a few cleaning films to clean the rollers of the processor.
2. After a stoppage of a day or a night it becomes necessary to clean the upper rack with a damp sponge. After that, insert a couple of cleaning films.
3. After a stoppage of a few days to a week, the processor must be completely cleaned. If necessary, contact an authorised GE Inspection Technologies service technician for this.

8.2 CLEANING

The NDT U does not need excessive maintenance and is specially designed for simple and fast cleaning.

Practical:

- Anti-algae vent for the prevention of algae development.
- Removable upper racks.
- Separate draining system for the chemicals.
- To simplify cleaning, it is necessary that there be a cleaning basin with a sprayer in the vicinity of the NDT U (recommended dimensions: 100 x 60 x 15 cm).

IMPORTANT:

Do not use the sprayer to clean the NDT U tanks. Liquid running along the outside of the tanks may cause electrocution.

- Do not use hot water when cleaning the machine tanks (for the sake of the overheating protector of the developer tanks)!

The maximum allowed temperature is 40°C/104°F!

IMPORTANT:

Always heed the safety and environmental regulations when you handle chemicals. Also always wear the prescribed protective clothing.

8.2.1 Emptying the machine tanks

To let the machine tanks empty out separately, especially when cleaning, you must take the nature (pH) of the products into consideration.

GE Inspection Technologies supplies the following cleaning products that provide you with adequate cleaning:

Developer zone	DEVCLEAN (ordering code: EBMBU)
Fixer zone	FIXCLEAN (ordering code: 37S2J)
Wash zone	FIXCLEAN (can also be used against algae and calcium)

If you make use of different cleaning products, we advise you to contact your local GE Inspection Technologies-NDT representative to discuss the correct waste tank for the cleaning products.

8.2.2 Anti-algae

- The NDT U has been standard equipped with an anti-algae solenoid valve to empty the wash tank automatically when turning the processor off.

IMPORTANT:

Never mix FIXCLEAN and bleach (sodium hypochlorite) together. These products react to produce dangerous gases that can seriously damage health.

After cleaning with FIXCLEAN, the wash water tank and rack must be thoroughly rinsed three times before another product may be added.

If different products are used, other than those mentioned in the list, contact the authorised GE Inspection Technologies service technician first.

8.2.3 Cleaning the feed table (to prevent impurities or scratches on the film).

- Clean the feed table with a damp sponge or lint-free cloth.
- Wipe the feed table dry.

8.2.4 Cleaning the upper racks

- Remove the machine cover from the NDT U. The driving motor of the processor is turned off automatically.
- Remove the upper rack.
- Clean this upper rack with a damp sponge and then rinse it off.
- Avoid mixing of fixer in developer. For this reason, first clean the rollers in the developer section. Afterwards, rinse out the sponge thoroughly before cleaning the fixer rollers.
- Place the upper rack back on the corresponding lower rack (heed colour indicator). Notice the arrow that indicates the film-transport direction. Check that the attachment pins of the upper rack are firmly clamped to the lower rack.
- Replace the machine cover.

8.2.5 Cleaning the film surface sensor

- Remove the machine cover from the NDT U. The driving motor of the processor is turned off automatically.
- Remove the upper rack from the developer rack.
- Pull the film sensor upwards and remove it from the holder (fig. 11 and fig.12).
- Clean the film sensor with the film detection rollers and the holder with a damp sponge or a lint-free cloth (fig. 13).
- Carefully dry off the whole unit. The rollers may seize if liquid is spilled on them.
- Clean the feed table, including the sensor section.
- Place the film sensor back into the holder and be sure that the film sensor is firmly attached on both sides (press down firmly).
- Place the upper rack back on the lower rack.
- Replace the machine cover.

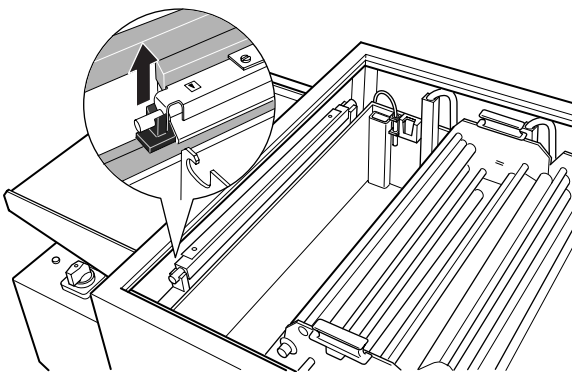


Fig. 11

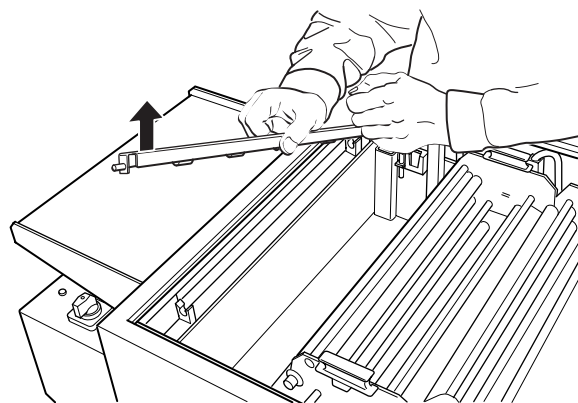


Fig. 12

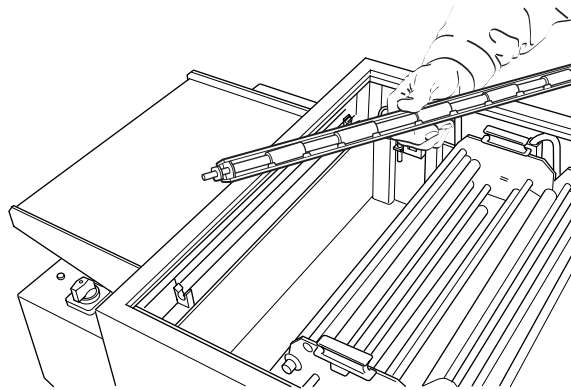


Fig. 13

8.2.6 Cleaning the transport tracks

- Turn off the NDT U.
- Remove the machine cover.
- Remove the upper racks.
- Lift the transport tracks carefully out of the tank.
- Carefully clean the lower and upper racks with a soft sponge under running water. In this way, the silver layer that is on the rollers of the developer rack, is not removed.
- When they are very dirty, you can use special cleaning agents. Only use the recommended cleaning agents or abrasive free, neutral soaps.
- Place the racks carefully back into the corresponding tanks (notice the colour indicator).
- Place the upper rack carefully back on the corresponding lower rack (notice the colour and the arrow).

IMPORTANT:

Check that the colours of the upper and lower racks correspond with that of the respective tanks:

Developer	=	red
Fixer	=	blue
Wash	=	white

It is recommended that the tanks be filled before the racks are put back in place (as described in 4.2).

8.2.7 Time periods for cleaning and maintenance

In connection with the maintenance of your developer machine, GE Inspection Technologies provides suitable maintenance contracts. You can obtain more information from your GE Inspection Technologies representative.

Period	Maintenance / cleaning
Daily	<i>Before starting to work</i>
	<ul style="list-style-type: none"> • Clean the feed table
	<ul style="list-style-type: none"> • Clean the upper racks
	<ul style="list-style-type: none"> • Run several cleaning films through
	<i>After finishing work</i>
	<ul style="list-style-type: none"> • Clean the upper racks • Add anti-algae product to the wash water. • Turn off the NDT U. The wash water tank empties automatically. • Leave the machine cover standing open.
Weekly	<ul style="list-style-type: none"> • Clean the racks.
	<ul style="list-style-type: none"> • Check the operation of the film surface sensor (see 8.2.11)
Every 2 to 6 months	<ul style="list-style-type: none"> • Clean the racks, the tanks, the circulation pumps and the drain piping.
	<ul style="list-style-type: none"> • Major maintenance, if desired, can be carried out by an authorised GE Inspection Technologies service technician.

8.2.8 Major maintenance

For a thorough maintenance procedure, GE Inspection Technologies provides an extensive series of formulae via the GE Inspection Technologies Service department in your country.

In consultation with GE Inspection Technologies, a maintenance schedule is worked out that is ideally suited to your specific needs.

8.2.9 Useful tips

Preparing replenishment liquid (diluting concentrates):

The correct dilution method is indicated on the package concerned. If you deviate from these instructions, for example, by adding products in the wrong sequence or by insufficient stirring, a precipitate can develop that does not dissolve later and can cause problems in the filters and the racks in the machine.

Remove residues of ready-to-use chemicals from receptacles before preparing new chemicals. They can also cause a similar precipitation. For the preparation of chemicals it is therefore better to use a NDT MIXER.

Chemicals that have been diluted incorrectly must be discarded. Pour them into the corresponding waste tanks for used chemicals.

Cleaning agents can also be dumped in the corresponding waste tanks. For information see the table below:

Cleaning product	Can be dumped in...
DEVCLEAN	Fixer waste tank
FIXCLEAN	Developer waste tank

If necessary, contact an authorised GE Inspection Technologies service technician to have your mixer and replenishment system thoroughly cleaned. The above-mentioned products can also be used for this purpose.

8.2.10 What about environmental regulations?

As for photo chemicals, there are also special regulations for cleaning products with regard to their disposal and local regulations MUST be followed.

8.2.11 Functional check-up

- Temperature: before the insertion of films, check that the actual temperature of the solution agrees with the value indicated (use a calibrated thermometer for this).
- Inspect film sensor:
 - Are the detection rollers clean?
 - All magnetic rollers must turn easily and evenly to ensure a correct replenishment volume (the rollers can seize up if liquid is spilled on them).
 - To test the operation of the surface sensor, use a film strip that is approx. 35 mm wide. Move the film back and forth under one of the 5 detection rollers to activate this roller. The flashing light for the film insertion will turn off. Repeat this procedure for each sensor roller.

9. TECHNICAL DATA

The following tables show the standard values (the right to make modifications is reserved):

<i>Film developer machine</i>	<i>Type</i>	<i>Power connections</i>
NDT U (standard)	8196/148	200, 208, 230-240 Volt / 50,60 Hz
NDT U (off-shore)	8196/149	200, 208, 230-240 Volt / 50,60 Hz
Characteristics		
Dimensions	Length (max)	120 cm (including basket)
	Width	68 cm
	Height (max)	105 cm
	Footprint	73 x 68 cm
Weight	Empty	175 kg
	With tanks full	250 kg
Electrical connection		16 A
Power supply	Voltage	200-240 V
	Frequency	50/60 Hz
	Capacity (max)	3300 W
	Stand-by	1155 W
Dryer	Number of dryer levels	4
	Default setting	setting 3 for 8 min. cycle
Noise level	In operation	60 dBA
	Stand-by	50 dBA
Tank capacity	Developer	24 l
	Fixer	20 l
	Wash	20 l

The following data apply for film processing during a standard processing of 8 minutes:

Film		
Process time	Default setting	8 min. - 28°C/82°F
	Limits	1.5 to 12 minutes
Process speed	Default setting	23 cm/min
	Limits	128 to 15.4 cm/min
Film	Types	NDT and all industrial x-ray films suitable for machine processing
	Width (max)	43.2 cm
	Length (min. / max)	12 cm / 500 cm
	Smallest format	6 x 12 cm
	Capacity per hour	9 x 12 cm 375 films/hour 35 x 43 cm 36 films/hour

Liquids			
Water	Connection	Permanent connection 3/4 "	
	Standard usage	6 l/m ²	
	Usage limits	6 - 20 l/m ²	
	Pressure (min/max)	1-8 bar	
	T°(min)	5°C/41°F	
	pH value	6.5 to 8	
Chemicals	Aut. devel.	Devel.	G 135 + G 135 S (starter)
		Fixer	G 335
	Replenishment -	Devel.	0.9 l/m ²
	Factory setting	Fixer	1.2 l/m ²
Temperatures	Factory setting	Devel./Fix.	28°C/82°F
	Setting range	Devel./Fix.	20 - 40°C/68 - 104°F
	Warmup time from 20 to 28°C/68 to 82°F		8 min

* In the case of a water pressure >3 bar, we advise you to install a pressure limiter.

10. ACCESSORIES AND PERIPHERAL EQUIPMENT

The right to make modifications is reserved.

10.1 ACCESSORIES

	Ordering code
• Darkroom panel	39X91
• Water filter with filter cartridge (type 8188-500)	2G2YV
• Two replenishment tanks of 30 litres with a level sensor	3779N
• Two replenishment tanks of 80 litres with a level sensor	3778L
• Lighttight cover for the feed table (type 8196/160)	38KTB
• Feeder speed connection (type 8196/180)	EA2DK

10.2 PERIPHERAL EQUIPMENT

• The NDT MIXER (50 Hz) (type 5280/200)	3U66F
• The NDT FEEDER (50/60 Hz) (type 5204/340)	3677A
UNIVERSAL magazine (type 5204/401)	368AJ
FLIPTOP magazine (type 5204/431)	3679E
• Standard developer rack (type 8196/146)	38P5L
• Offshore developer rack (type 8196/147)	38P4J

