	Down key	• To move the cursor to the next entry field. • To scroll downwards. • To decrement the number in a(n) (alpha) numerical entry field.
	Left key	• To scroll backwards through multiple choices within a field. • To move the entry position in a(n) (alpha) numerical entry field from right to left. • To toggle between values in a field.
	Right key	• To scroll forwards through multiple choices within a field. • To move the entry position in a(n) (alpha) numerical entry field from left to right. • To toggle between values in a field.

Table 6: Keypad keys

Note: All keys (except the key-operator key) have an LED that is on when the key is valid in a certain situation.

Note: You can press and hold down an arrow key to scroll quickly through a list or a menu.
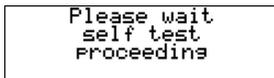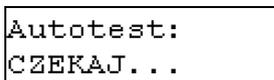
The display

The Drystar AXYS control panel has a backlit LCD display. We distinguish two panel types depending on the selected language:

■ a backlit LCD display with 4 lines for Western languages (e.g. Dutch, French, Portuguese, Swedish,...).

```
     Please wait
      self test
     proceeding
```

■ a backlit LCD display with 2 lines for all other languages (e.g. Greek, Chinese, Korean, Polish,...).

```
Autotest:
CZEKAJ...
```
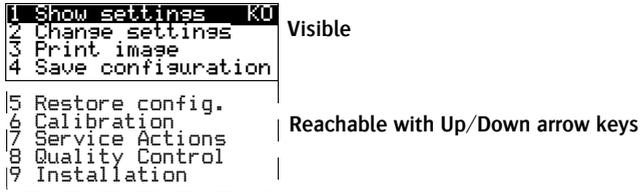
Whether a display is translated or not depends on the operating mode.

General display features

The figure below shows how the display is illustrated in this manual:

```
┌─────────────────────┐
│1 Show settings   KO │  Visible
│2 Change settings    │
│3 Print image        │
│4 Save configuration │
│                     │
│5 Restore config.    │  Reachable with Up/Down arrow keys
│6 Calibration        │
│7 Service Actions    │
│8 Quality Control    │
│9 Installation       │
└─────────────────────┘
```

The visible display lines are indicated in the upper zone. The other possible lines are shown in the lower zone and can be reached by scrolling using the Up/Down arrow keys on the Keypad.

In the upper right corner, the current printer status is displayed:

■ In Operator mode, two characters display the print queue status. Refer to "Managing the print queue" on page 67.

■ In Key-operator mode, two characters are displayed in reverse video to indicate the current menu- or submenu level (e.g. 'KO' for Key-operator main level).

■ A warning, an error or a maintenance request is displayed respectively with the character W, E and M.

Operator mode

In operator mode, appropriate information is displayed in accordance with the status of the printer.

The operator basic screen looks as follows, indicating that the Drystar AXYS is ready for operation and that no job is currently being executed.

```
        READY
```
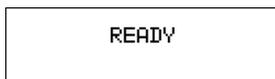
When the printer is busy with at least one print job, the print queue screen is displayed:

```
Mod.name 09:09:40 PR
        film10 of20
                  0%
(X)Operator menu
```

The progress indicator keeps the user informed of the progress of a process (e.g., calculation of a bitmap, printing of a film). The line is gradually filled from left to right, from 0% to 100% as the process proceeds.
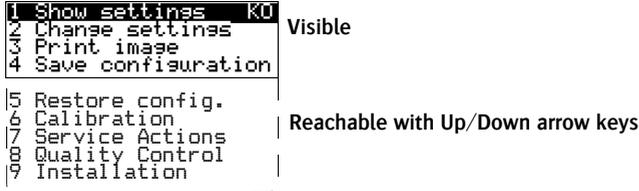
Note: On the print queue screen the modality name defined during installation will be used to refer to the corresponding modality. In case a nickname (daily used name) has been defined during installation, this nickname will be used.

Refer to "Managing the print queue" on page 67

Key-operator mode

In key-operator mode, operation is menu driven. The menu displays the key-operator functions.

```
1 Show settings    KO
2 Change settings
3 Print image
4 Save configuration

5 Restore config.
6 Calibration
7 Service Actions
8 Quality Control
9 Installation
```
Visible

Reachable with Up/Down arrow keys

The display shows only four lines. In the above figure, they are indicated in the upper zone. The other possible lines are shown in the lower area and can be reached by scrolling using the Up/Down arrow keys on the Keypad.

The active keys are indicated by their respective LEDs.

Data entry

When entering numerical or alphanumerical data, always adhere to the following principles:

■ Only (alpha) numerical data can be entered.

■ During data entry, the field is displayed in reverse mode.

■ Increment the number in a(n) (alpha) numerical entry field by pressing the Up key. Transition from 9 to 0 of one figure will also increment the next figure to the left, respecting the valid limits of the range.

■ Decrement the number in a(n) (alpha) numerical entry field by pressing the Down key. Transition from 0 to 9 of one figure will also decrement the next figure to the left, respecting the valid limits of the range.

■ Move the entry position in a(n) (alpha) numerical entry field from right to left by pressing the Left key.

■ Move the entry position in a(n) (alpha) numerical entry field from left to right by pressing the Right key.

■ Press and hold down a key to repeat arrow key actions.

■ To accept an entry in a menu, press the Confirm key.

■ A short beep acknowledges and terminates the entry.

■ The Drystar AXYS will sound a long beep if you press a key that is not to be used at that moment.

Audio signals

The Drystar AXYS gives status information via beeps. The length of the beep indicates the response of the system to a key command.

■ A short beep means that Drystar AXYS has accepted the key command and is starting the operation.

■ A long beep means that you have pressed a non-active key or that the Drystar AXYS has rejected the key command.

Note: Certain conditions can cause an interval beep. An interval beep accompanies an error or warning message. Refer to "Troubleshooting checklist" on page 127.

Working with Compact flash cards (CF-card)

The Drystar AXYS is equipped with an external CF-card slot, which is located at the rear side.

To insert a CF-card in the Drystar AXYS:

1 Hold the CF-card vertically with the connector holes in front of the slot and with the flat surface pointing to the left. In that case the cut-away (a) and the rim (b) are pointing to the right.
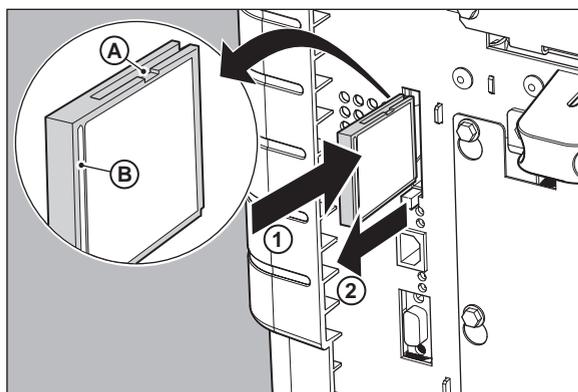

2 Insert the CF-card gently into the slot and push it until the unlocking lever underneath the slot comes out.

> *Note: If you cannot push the CF-card completely into its position, this means that you have to turn it 180 degrees (while keeping the connector holes faced to the slot).*

To remove a CF-card from the Drystar AXYS slot:

1 Push the unlocking lever underneath the CF-card slot.

The CF-card is pushed slightly outward.
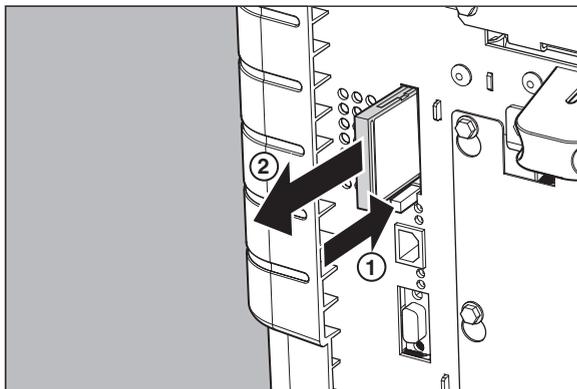
2 Remove the CF-card gently from the slot.

Cooling down the Drystar AXYS

If owing to certain circumstances (e.g. extensive printing), the temperature rises too much, the Drystar AXYS will cool down automatically. The cooling down message will appaear on the display during the cooling down process.

```
COOLING DOWN
 Please wait
```

Switching off the Drystar AXYS

When you want to switch off the printer, the printer will first finish his current print job. Queued print jobs will be stored on the hard disk and will be resumed next time the printer is switched on.

Procedure:

1   Press the Power/Reset button to switch off the Drystar AXYS.

If the printer is printing, it will finish that print job:

```
   Power off after
finishing images in
    progress.
   Please wait
```

When the printer is ready, it shuts down immediately:

```
Power off initiated

    Please wait
```

3 Basic operation (Operator mode)

This chapter will inform on how to manage the print queue, how to print films with priority and how to load new films.

Overview of operator functions

This section focuses on the basic operating principles of the Drystar AXYS. After reading this chapter, the operator should be able to produce diagnostic usable hardcopies. No special technical skills are required.

All basic operator functions can be activated directly by pressing a single key on the keypad.

Function / Task	Description
"Managing the print queue" on page 67	Jobs that have been received are put in a print queue, waiting to be printed.
"Pausing the print queue" on page 69	To pause the print queue. The printer will finish the current print job, but will not start the next print job.
"Viewing the film count info" on page 70	To view the number of films left in the trays.
"Viewing the printer status" on page 71	To view the current events.
"Deleting print jobs" on page 72	To remove a print job from the print queue.
"Loading films" on page 76	Instructions for loading new films on the printer.

Managing the print queue

Checking the print queue

You can always check the status of the print jobs on a connected remote access PC via the operator menu.

✓ *Note: Keep in mind that one print job can hold several films to be printed. In accordance with the acquisition modality used and with the actual settings, films can be grouped in a folder to be submitted as one print job for the Drystar AXYS. Refer to the User manual of the acquisition modality for more information.*

If jobs have been transmitted from the network to the Drystar AXYS, they are put in the print queue on a first in, first out schedule. New jobs that are added to the queue get the 'waiting' status.

As soon as the last film of a job is ejected in the output tray, the next job that has been calculated will be put in printing status.

The local print queue screen

When the Drystar AXYS is printing, the local display shows the 'print' screen:

```
Mod.name 09:09:40 PR
        film10 of20
                 0%
(X)Operator menu
```

■ The screen shows information on the job that is currently being printed: the modality name, the time of receipt of the job and the job status (refer to the table below).

■ The **progress indicator** keeps the user informed of the progress of a process (e.g., calculation of a bitmap, printing of a film). The line is gradually filled from left to right, from 0% to 100% as the process proceeds.

■ The last line gives access to the operator menu to pause the print queue, to view the film count info or to view the printer status. Refer to "Pausing the print queue" on page 69 to "Viewing the film count info" on page 70 or to "Viewing the printer status" on page 71.

A description of the possible status of the jobs is listed in the table below:

Status		Description
PR	Printing	Printing of this job is in progress.
CA	Calculating	The necessary calculations are already being made before printing of the job can be started.
WA	Waiting	Jobs are queued in the printer memory.

✓ *Note: On the print screen the modality name defined during installation will be used to refer to the corresponding modality. If there is also a nickname (daily used name) defined during installation, the nickname is used.*

Pausing the print queue

When the Drystar AXYS is printing, you can always pause the print queue by entering the operator menu.

During a print job, the 'print' screen is displayed:

```
Mod.name 09:09:40 PR
        film10 of 0
▮▬▬▬▬▬▬▬▬▬    0%
(X)Operator menu
```

To pause the print queue, proceed as follows:

1   Press the Escape key to enter the operator menu.

The 'Operator menu' screen appears:

```
    OPERATOR MENU
1 Pause print queue
2 Film count info
3 Printer status
```

2   On the Operator menu press the Confirm key to select 'Pause print queue'.

3   If the printer is printing, it will first finish its current print job.

```
 Finishing current
    print-job,
    please wait.
Do NOT open the tray
```

4   When the printer is ready, the print queue is paused.

```
   PRINTER PAUSED

 Press ✓ to resume
     printing
```

5   To resume printing, press the Confirm key.

Viewing the film count info

When the Drystar AXYS is printing, you can always view the number of films left in the trays by entering the operator menu.

WARNING: Do not open the input trays to view the number of loaded films while the Drystar AXYS is printing, but follow the procedure below:

During a print job, the 'print' screen is displayed:

```
Mod.name 09:09:40 PR
         film 0 of 0
                  0%
(X)Operator menu
```

To view the number of loaded films in the trays, proceed as follows:

1 Press the Escape key to enter the operator menu.

The 'Operator menu' screen appears:

```
    OPERATOR MENU
1 Pause print queue
2 Film count info
3 Printer status
```

2 Press the Down key once, followed by the Confirm key to select 'Film count info'.

The following screen appears:

```
Film in UPPER tray:
                  0%
Film in LOWER tray:
                  0%
```

The progress bar indicates the evolutions of the film usage in an input tray. The bar is divided into 10 parts, each part represents approximately 10% of the total films of a film pack. The last part of the bar will disappear when more than 80% of a film pack has been printed.

3 Press the Confirm key to return to the print screen.

Note: When a film job cannot be done because the tray to which the job is assigned is empty, then the printer will check if the films in the other tray can be used for this and other print jobs in the print queue. The printer will skip the print jobs that cannot be done and will resume them later.

Viewing the printer status

When the Drystar AXYS is printing, you can always view the printer status by entering the operator menu.

During a print job, the 'print' screen is displayed:

```
Mod.name 09:09:40 PR
        film10 of20
█████████████    0%
(X)Operator menu
```

To view the printer status, proceed as follows:

1 Press the Escape key to enter the operator menu.

The 'Operator menu' screen appears:

```
     OPERATOR MENU
1 Pause print queue
2 Film count info
3 Printer status
```

2 Press the Down key twice, followed by the Confirm key to select 'Printer status'.

The following screen appears:

```
CURRENT EVENTS:

```

The screen informs you, by means of short event descriptions, about current events. There is only one event per line. An event could be e.g. a current film jams, an empty tray,...

3 Press the Confirm key to return to the print screen.

Deleting print jobs

When the Drystar AXYS is printing, you can always delete print jobs by entering the operator menu.

During a print job, the 'print' screen is displayed:

```
Mod.name 09:09:40 PR
        film10 of20
▮▬▬▬▬▬▬▬      0%
(X)Operator menu
```

To delete a print job, proceed as follows:

1   Press the Escape key to enter the operator menu.

The 'Operator menu' screen appears:

```
      OPERATOR MENU
1 Pause print queue
2 Film count info
3 Printer status

4 Delete jobs
```

2   Press the Down key three times, followed by the Confirm key to select 'Delete jobs'.

A screen appears where you can choose between the option 'All jobs' or one of the jobs in the print queue:

✓   *Note: Only the print queue jobs with a status different from printing (PR) or calculating (CA) will be shown.*

3   Do one of the following:

•If you want to delete all jobs at once, press the up/down arrow keys to select 'All jobs', followed by the Confirm key. Proceed with the next step.

•If you only want to delete a specific job in the print queue, press the up/down arrow keys to select the desired print job, followed by the Confirm key. Proceed with the next step.

4   A screen appears in which you need to confirm your delete request.

Press the Confirm key (YES) to confirm your choice, or the Escape key (NO) to quit the procedure without any changes.

About Drystar AXYS consumables

The Drystar AXYS can handle blue-transparent DT 2 B, clear-transparent DT 2 C (both for general radiography) and optionally the blue-transparent DT 2 Mammo (for the mammography application) films.

Available film formats for general radiography applications are 8x10", 10x12", 11x14", 14x14", and 14x17". Available film formats for the mammography application are 8x10", 10x12" and 11x14".

Both input trays can use all film formats.

When a new film pack is loaded, the Film Identification tag is read and the printer settings are automatically adjusted.

Labeling the input trays

The following film types can be used:

Film type	Film size
Drystar DT 2 B	8x10", 10x12", 11x14", 14x14", and 14x17"
Drystar DT 2 C	8x10", 10x12", 11x14", 14x14", and 14x17"
Drystar DT 2 Mammo (optional)	8x10", 10x12" and 11x14"

✓ *Note: If you want to change the film format, the tray configuration must be modified. Refer to "Changing the film format of the trays" on page 32 for more information.*
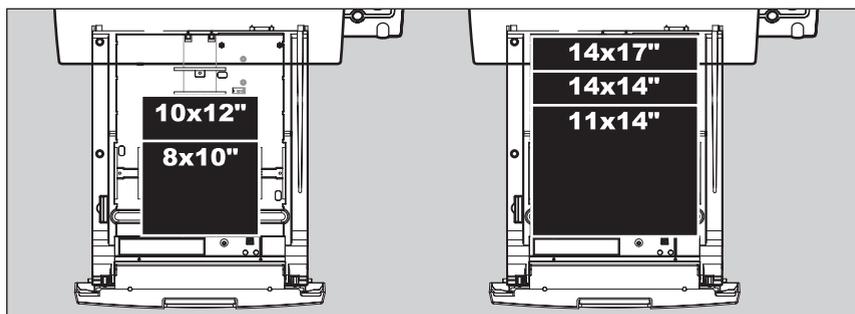
Appropriate labels have been applied on the input tray(s) by the service personnel at installation of the printer, indicating the type of new film to be loaded when the tray is empty.
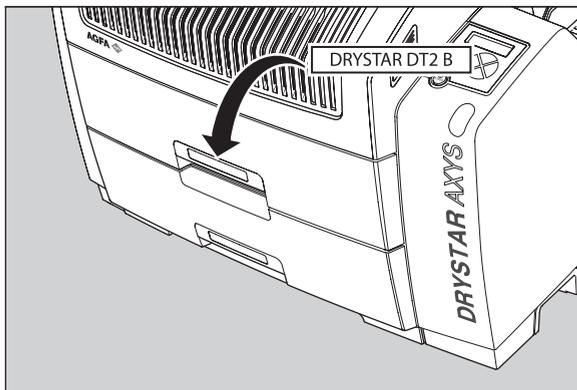
Loading films

This section describes how to load the Drystar AXYS with appropriate Drystar DT 2B and Drystar DT 2C films.

The Drystar AXYS can be loaded with 8x10", 10x12", 11x14", 14x14" and 14x17" films.

✓ *Note: The Drystar AXYS can be loaded with new films in full daylight. Loading films is easy and can be done very quickly. Follow the procedures as described in this section.*

✓ *Note: If you want to change the film format, the tray configuration must be modified. Refer to "Changing the film format of the trays" on page 32 for more information.*

The Drystar AXYS will inform you in several ways when a film tray is empty:

■ an audible signal,

■ the status indicator LED is blinking (red color),

■ the display screen shows a message informing you that the input tray is empty.

The film loading procedure is identical for both input trays. In the examples below, we will assume that the lower input tray is to be loaded.

✓ *Note: The procedure is slightly different, depending on the fact whether the Drystar AXYS is printing/calculating or in the ready state.*

✓ *Note: When the printer is in the ready state, go to "When the Drystar AXYS is in the ready state and an input tray is empty" on page 78.*

⚠ **WARNING: Make sure not to load more than one film pack in an input tray. Loading more than one film pack in the input tray may damage the Drystar AXYS.**

When the Drystar AXYS is printing or calculating and an input tray is empty

Procedure

1   The display shows the following message:

```
 EMPTY LOWER TRAY
Do NOT open the tray
(√)Loading procedure
(X)Operator menu
```

2   Press the Confirm key to start the loading procedure.

The following screen appears when the printer is still printing:

```
LOADING PROCEDURE
INITIATED. Finishing
current print-jobs.
Do NOT open the tray
```

3   Wait while the printer finishes printing any current jobs.

When the film path is cleared, the following screen appears automatically:

```
     EMPTY
  LOWER INPUT TRAY
                           ───── Blinking
OK to open the tray
```

4   Open the lower input tray.
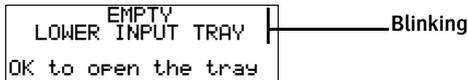
5   Load a new film pack.

Refer to "Film loading procedure" on page 79.

When the Drystar AXYS is in the ready state and an input tray is empty

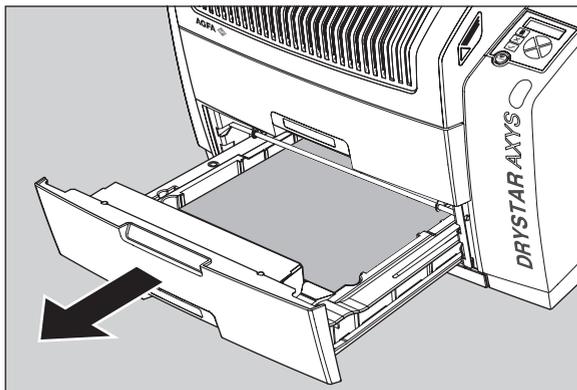**Procedure:**

1   The display shows the following message:

```
       EMPTY
  LOWER INPUT TRAY            ─── Blinking
OK to open the tray
```

2   Open the lower input tray.

3   Load a new film pack.

Refer to "Film loading procedure" on page 79.

Film loading procedure

Procedure

1 Open the empty input tray.

⚠️ **WARNING: To avoid possible film jams, make sure to open input tray all the way.**

2 The printer is ready to start the loading procedure when the following message appears:

```
-Remove old cover
 sheet from tray
-Load new film pack
-Close input tray
```

**3** Remove the white (protective) film sheet.

4 Take film pack, and open it.

Verify that the film type on the film pack corresponds with the sticker on the tray! If you do use an other film type, you are advised to change the label on the tray.
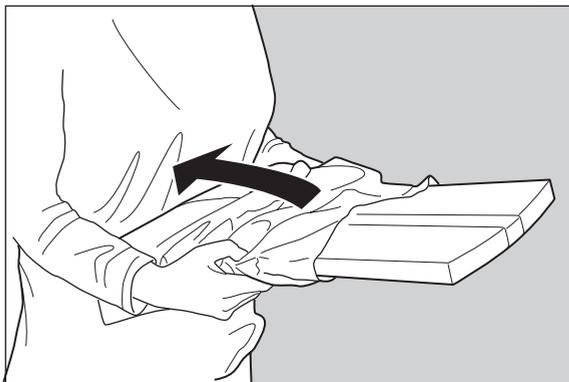

✓ *Note: You can put the film pack onto a table to make manipulation easier. Before you do this, make sure that the table is dust-free!*
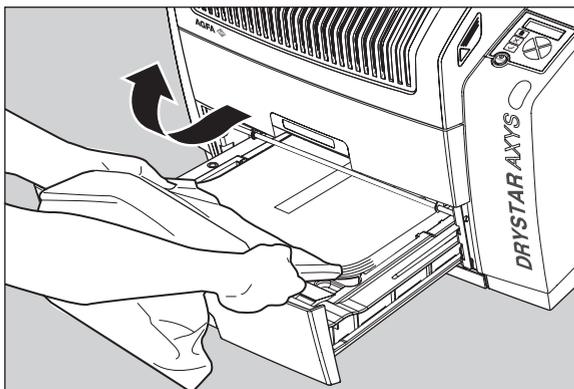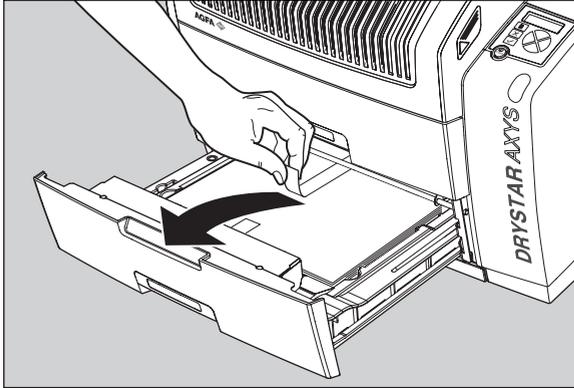
5 Remove the sticker from the film pack.
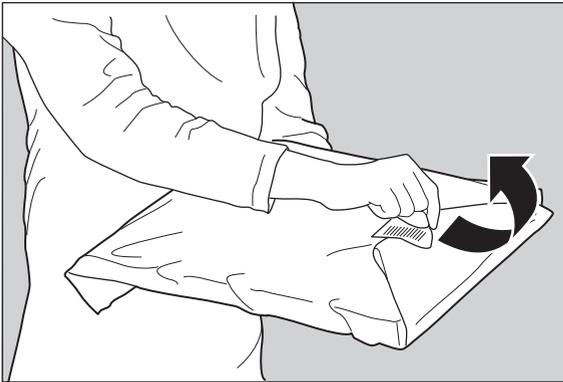
6   Remove the plastic film bag partially.

7   Slide the film pack into the input tray, and remove the plastic film bag completely.

8 Tear the plastic strip around the film pack.

9 Close the input tray.

Note: The Drystar AXYS resumes printing as soon as the tray is closed.

Note: Loading instructions are also available on the input tray cover.

Note: Never load another film format when the input tray is not empty. Intermediate changing of film formats increases the risk for dust, which can damage the thermal print head (TPH).

Note: The system performs an automatic calibration when the film format has been changed.

Note: When a film job cannot be done because the tray to which the job is assigned is empty, then the printer will check if the films in the other tray can be used for this and other print jobs in the print queue. The printer will skip the print jobs that cannot be done and will resume them later.

Note: When a film sheet is inserted wrongly in the input tray, then the printer will print on the back-side (non-emulsion side). As a result, a film jam occurs.

Note: The operator will be informed of this back side printing and will be asked to remove the film jam (refer to "Clearing of film jams" on page 129) and to check whether the loading procedure was followed correctly (refer to "Film loading procedure" on page 79).

WARNING: Never reuse a jammed film. Refer to "Clearing of film jams" on page 129.

Checking the correct position of a film in the input tray

You can verify that the film is properly loaded by watching the lower right corner of the films in the input tray. The rounding of this corner should be smaller than the other three corners. This is also indicated on the sticker at the right side of the input tray cover.
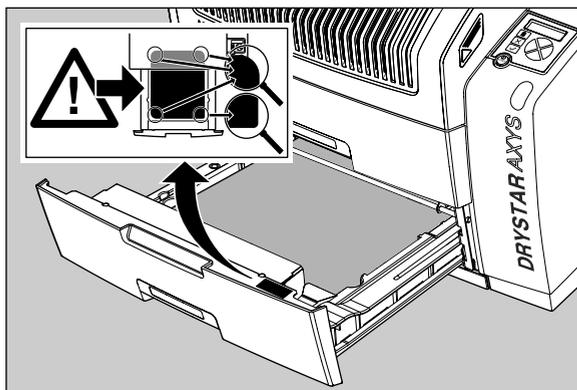
When the tray is closed, the Film Identification tag is read and the printer settings are automatically adjusted if the film properties have changed. The Film Identification tag is located on the protective sheet on the backside of the film pack. The figure below shows the film pack upside down.
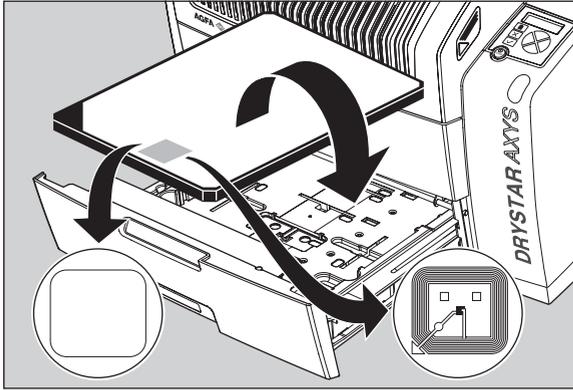
✓ *Note: For some new film types, the Film Identification tag will be covered by a sticker and therefore will not be visible.*

4 Advanced operation (Key-operator mode)

....

This chapter consists of the following topics:

Overview of key-operator functions

The key-operator menus make it possible to use the Drystar AXYS advanced functions.

✓ *Note: These functions are describedin detail in the Drystar 5302 advanced functions.*

For general information on the key functions of the Drystar AXYS, refer to "Overview of user interface controls" on page 15.

The Drystar AXYS features the following functions on the main menu level of the key-operator mode:

Menu item	Function	Page (Ref. manual)
Show settings	To consult the current settings of the printer.	*95*
Change settings	To change the current settings of the printer.	*105*
Print image	To print one of the Drystar AXYS test images. To load and print images from an external CF-card.	*139*
Save configuration	To make a back-up of the printer settings.	*145*
Restore configuration	To restore the back-up of the printer settings.	*151*
Calibration	To calibrate the printer.	*159*
Service actions	To view error, repair and maintenance data.	*168*
Quality Control	To control with a daily procedure the image quality respectively of general radiography & mammography (optional) applications.	*87* & *104* (this manual)
Installation	To install or update the Drystar AXYS software.	*203*

✓ *Note: Refer to the indicated page of the Drystar AXYS Reference manual for an explanation of the function and the appropriate procedures.*

Quality Control for general radiography applications (DT 2 B & DT 2 C)

In order to establish and maintain consistent image quality, a regular evaluation of image quality is advised.

The Drystar AXYS contains an automatic QC procedure for general radiography applications and has been designed to comply with the grayscale reproduction constancy test, according to the international standard IEC 1223-2-4. If the option for the mammography application is activated, another QC procedure is available for the mammography application (refer to "Quality control for mammography application (DT 2 Mammo) (optional)" on page 104. In this chapter we will discuss how to control the quality of general radiography applications.

Local Regulations may require other procedures.

The Drystar AXYS Hard copy quality control procedure consists of two main steps:

■ Before initial use, establishing a number of reference values that will be used for further follow-up and verifying initial image quality.

Refer to "Establishing the reference values and verifying image quality for general radiography applications (DT 2 B and DT 2 C)" on page 88.

■ After establishing these values, performing regular daily, weekly and annual quality tests.

Refer to "Quality Control for general radiography applications (DT 2 B & DT 2 C)" on page 87.

✓ *Note: Repeat the two main steps of the Hard Copy quality procedures for each input tray loaded with DT 2 B and/or DT 2 C films.*

The results of these tests are recorded on Quality Control Charts.

The QC image (Refer to "QC test image for general radiography applications (DT 2 B and DT 2 C)" on page 90) has several additional fields where the QC data can be filled in. This image should be filed as part of the QC procedure.

For more information, please refer to "Quality Control Charts" on page 149.

Establishing the reference values and verifying image quality for general radiography applications (DT 2 B and DT 2 C)

After installation of a new Drystar AXYS and before initial use you must establish Quality Control aim values. These values will be used as the base line for comparison when daily Quality Control is done. These values should be determined again after major service, repair or software update.

The following Quality Control aim values must be determined:

■ The daily operating density levels. Refer to "Establishing the daily operating reference density levels for general radiography applications (DT 2 B and DT 2 C)" on page 91.

■ Drystar AXYS image geometry. Refer to "Establishing the image geometry reference values for general radiography applications (DT 2 B and DT 2 C)" on page 95.

Once Quality Control aim values are established you must evaluate the Spatial Resolution, the Artifact Levels and the Low Contrast Visibility to determine if the image quality is acceptable. Refer to "Verifying Acceptable Spatial Resolution, Artifact Levels and Low Contrast Visibility for general radiography applications (DT 2 B and DT 2 C)" on page 96.

The Quality Control aim values, the Spatial Resolution and Artifact Levels and the Image Geometry values are all recorded on the Quality Control charts. Refer to "Charts for general radiography QC" on page 150.

On these charts, the following test conditions are also recorded:

- The type and serial number of the Drystar AXYS.

- The type and emulsion number of the film used to determine the reference values.

- The type of densitometer used.

- The time (day, month, year) that the values were established.

WARNING: Before you can establish the daily operating levels, the Drystar AXYS must be switched on for at least 15 minutes and it must be calibrated as well.

WARNING: Refer to "Switching on the Drystar AXYS" on page 48.

QC test image for general radiography applications (DT 2 B and DT 2 C)

The QC image has several additional fields where the QC data can be filled in. This image should be filed as part of the QC procedure.

Note: Note that the dimensions A and B are not indicated on the printed film.

Establishing the daily operating reference density levels for general radiography applications (DT 2 B and DT 2 C)

This procedure enables you to establish the base line values for:

■ Low density

■ Mid density

■ High density

⚠️ **WARNING: The densitometer of the Drystar AXYS is calibrated at installation. Authorized service personnel should recalibrate the densitometer annually or after major service or repair.**

Procedure

1   Press the Key-operator key to enter the Key-operator mode.

2   Press the down key seven times, followed by the confirm key to select 'Quality Control'.

```
1 Show settings    KO
2 Change settings
3 Print image
4 Save configuration

5 Restore config.
6 Calibration
7 Service Actions
8 Quality Control
9 Installation
```

A confirmation screen appears:

```
Start QC          QC
Procedure?

YES(/)         NO(x)
```

3 Do one of the following:

•Press the Confirm key (YES) to start the QC procedure and proceed with step 4.

•Press the Escape key (NO) to quit.

4 Define the tray for printing.

The 'Select tray' screen appears:

```
select tray      KO
1.Upper tray
2.Lower tray
```

5 Press the Up/Down arrow keys to select the desired tray, followed by the Confirm key.

The following screens appear successively:

```
Queuing file     QC

Please wait
```

```
    QC procedure  QC
    in progress
    Please wait
                   0%
```

The Drystar AXYS will automatically print the QC test image.

6 After the image is printed, the system will display all measured optical density values:

```
QC readings:      QC
Max D:0.0 Hi D:0.0
Mid D:0.0 Lo D:0.0
Base + Fog: 0.0

DD: 1.56
(Densitometer=MB924)
```

The density levels are displayed, e.g:
Max D: 3.2   Hi D: 1.91
Mid D: 1.13   Lo D: 0.35
Base+Fog: 0.19
DD: 1.56

The displayed values (that have to be monitored) represent the following steps on the test film:

Operating Level		Value (Macbeth units) (according to IEC 1223-2-4 or better)
Low density	the density value of the low density step	0,4 ± 0,05
Mid density	the density value of the mid density step	1,2 ± 0,15
High density	the density value of the high density step	2,0 ± 0,2
Base + Fog, Density difference (DD), Maximum density (Max D)	These values are displayed but not important for the QC procedure for general radiography applications.	

> ⚠ **WARNING: If the mid density value does not meet or exceeds the recommended values, the reason must be found and the problem solved before any further clinical films can be printed.**
>
> **WARNING: Refer to "Preventive maintenance schedule" on page 121 and "Maintaining image quality and resolving image quality problems" on page 258 (Reference manual), or call your local Agfa service organization.**

7 Record the low, mid and high density levels on Chart 1 ('DrystarAXYS Determination of Operating Levels'). Refer to "Quality Control Charts" on page 149.

8 Press the Confirm key to return to the main menu.

9 Repeat step 1 through 8 once a day for five consecutive days, as indicated on the Drystar AXYS Chart 1.

10 Calculate the average value of the densities from the five images. These values represent operating levels, or aim values, for each density.

11 Record the respective aim (average) values as the 'Operating levels' on Charts 2A and 2B ('Drystar AXYS Daily Density Control Chart'). Refer to "Quality Control Charts" on page 149.

The calculated 'Operating levels' should be as following:

Operating Level	Value (according to IEC 1223-2-4 or better)
Low density	0,4 ± 0,05
Mid density	1,2 ± 0,15
High density	2,0 ± 0,2

12 These charts will be used for the daily quality test. For more information, refer to "Performing the daily QC test for general radiography applications (DT 2 B and DT 2 C)" on page 99.

Establishing the image geometry reference values for general radiography applications (DT 2 B and DT 2 C)

Procedure

1   Print the QC test image or use the previously printed test image.

For an example, see "QC test image for general radiography applications (DT 2 B and DT 2 C)" on page 90.

2   To determine the reference values for geometry, measure the distances A and B of the geometric square on the test image.

> **WARNING: Make sure to measure distance A from the left edge of the left line to the right edge of the right line and distance B from the upper edge of the upper line to the lower edge of the lower line.**
>
> **WARNING: We strongly recommend using a 30 cm (12-inch) machinist scale with 0.5 mm divisions (1/64 inch).**

3   Record these values as reference dimensions Aref and Bref on Chart 4 ('Drystar AXYS Geometric Consistency Control Chart'). Refer to "Quality Control Charts" on page 149.

These charts will be used for the annual quality test. For more information, refer to "Performing the Annual QC tests for general radiography applications (DT 2 B and DT 2 C)" on page 103.

4   Save this film for future reference.

Verifying Acceptable Spatial Resolution, Artifact Levels and Low Contrast Visibility for general radiography applications (DT 2 B and DT 2 C)

⚠️ **WARNING:** *Good viewing conditions are important for the correct interpretation of both diagnostic and test images. Make sure that the light box intensity (luminance) is between 2000 and 4000 cd/m² (4500 and 6500 °K). Use a magnifying glass and use shutters to collimate. Make sure the ambient light is low.*

Procedure

1 Print the QC Test image or use the previously printed QC Test image used to establish the daily operating density levels.

2 Visually check the QC test image for artifacts: no significant disturbing artifacts should be visible.

3 Check the spatial resolution in each of the three circles (refer to item 1, 2 and 3 on the "QC test image for general radiography applications (DT 2 B and DT 2 C)" on page 90). Within each circle there are three groups, each consisting of five dots. All five dots of each group must be visible with a magnifying glass. The smallest cluster of 5 dots is only visible if the viewing conditions are good.

4 Check the Low Contrast Visibility at both the high (100 / 95%) and low end (0 / 5%) of the density scale. You should be able to see the circle in the square (refer to item 1 on the "QC test image for general radiography applications (DT 2 B and DT 2 C)" on page 90 and the upper circle (refer to item 2 on the "QC test image for general radiography applications (DT 2 B and DT 2 C)" on page 90.

5 Record these values at the top of Chart 3 ('Drystar AXYS Artifacts and Spatial Resolution Control Chart'). Refer to "Quality Control Charts" on page 149.

6   These charts will be used for the weekly quality test. For more information, refer to "Performing the Weekly QC tests for general radiography applications (DT 2 B and DT 2 C)" on page 101.

WARNING: In case of significant artifacts or insufficient spatial resolution, the reason must be found and the problem solved before any further clinical films can be printed.

WARNING: Refer to "Preventive maintenance schedule" on page 121 and "Maintaining image quality and resolving image quality problems" on page 258 (Reference manual), or call your local Agfa service organization.

Performing quality control (QC) tests for general radiography applications (DT 2 B and DT 2 C)

The following procedures must be performed daily, weekly or annually as indicated.

The reason for performing quality control tests is to determine if any significant image quality variation or deterioration has occurred which may require corrective action. Comparing the results of the tests with the reference values previously established does this.

This procedure allows the operator to take the necessary preventive actions before any image quality loss can take place.

Performing the daily QC test for general radiography applications (DT 2 B and DT 2 C)

⚠️ **WARNING:** *This test must be performed every day before any clinical film can be processed.*

Procedure

1 Turn on the Drystar AXYS and wait at least for 15 minutes. Refer to "Switching on the Drystar AXYS" on page 48.

2 Press the Key-operator key to enter the Key-operator mode.

3 Press the down key seven times, followed by the ok key to select 'QC'.

```
1 Show settings    KO
2 Change settings
3 Print image
4 Save configuration

5 Restore config.
6 Calibration
7 Service Actions
8 Quality Control
9 Installation
```

A confirmation screen appears:

```
Start QC           QC
Procedure?

YES(/)        NO(x)
```

4 Do one of the following:

•Press the Confirm key (YES) to start the QC procedure and proceed with step 5.
•Press the Escape key (NO) to quit.

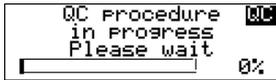**5** Define the tray for printing.

The 'Select tray' screen appears:

```
select tray        KO
1.Upper tray
2.Lower tray
```

6 Press the Up/Down arrow keys to select the desired tray, followed by the Confirm key.

The following screens appear successively:

```
Queuing file      QC

Please wait
```

```
     QC procedure    QC
       in progress
       Please wait
    [            ] 0%
```

The Drystar AXYS will automatically print the QC test image.

After the image is printed, the system will display all measured optical density values:

```
QC readings:      QC
Max D:0.0 Hi D:0.0
Mid D:0.0 Lo D:0.0
Base + Fog: 0.0

DD: 1.56
(Densitometer=MB924)
```

The density levels are displayed, e.g:
Max D: 3.2   Hi D: 1.91
Mid D: 1.13   Lo D: 0.35
Base+Fog: 0.19
DD: 1.56

7 Record the low, mid and high density values on Charts 2A and 2B ('Drystar AXYS Daily Density Control Chart'). Also record the date and time of the test on the charts and on the QC test images. Refer to "Quality Control Charts" on page 149.

8 Press the Confirm key to return to the main menu.

⚠ **WARNING: In case the measure results are not within the aim values, the reason for the unacceptable density variations must be identified and resolved before any further clinical films can be processed. This may include repeating the film calibration procedure.**

WARNING: For possible causes of non-compliance and the respective actions, refer to "Preventive maintenance schedule" on page 121 and "Maintaining image quality and resolving image quality problems" on page 258 (Reference manual).

Performing the Weekly QC tests for general radiography applications (DT 2 B and DT 2 C)

Spatial Resolution, Artifact Test and Low Contrast Visibility

To identify artifacts and verify spatial resolution you must perform the following test weekly or as needed for troubleshooting image quality problems.

⚠️ **WARNING:** *Good viewing conditions are important for the correct interpretation of both diagnostic and test images. Make sure that the light box intensity (luminance) is between 2000 and 4000 cd/m² (4500 and 6500 °K). Use a magnifying glass and use shutters to collimate. Make sure the ambient light is low.*

Procedure

1 First, print out the QC test image. Refer to "Performing the daily QC test for general radiography applications (DT 2 B and DT 2 C)" on page 99.

2 Check the QC test image visually for artifacts: no significant disturbing artifacts should be visible.

3 Check the spatial resolution in each of the three circles (refer to item 1, 2 and 3 on the "QC test image for general radiography applications (DT 2 B and DT 2 C)" on page 90). Within each circle there are three groups, each consisting of five dots. All five dots of each group must be visible with a magnifying glass. The smallest cluster of 5 dots is only visible if the viewing conditions are good.

4 Check the Low Contrast Visibility at both the high (100 / 95%) and low end (0 / 5%) of the density scale. You should be able to see the circle in the square (refer to item 1 on the "QC test image for general radiography applications (DT 2 B and DT 2 C)" on page 90 and the upper circle (refer to item 2 on the "QC test image for general radiography applications (DT 2 B and DT 2 C)" on page 90).

5 Record these values on Chart 3 ('Drystar AXYS Artifacts and Spatial Resolution Control Chart').

WARNING: In case of significant artifacts, insufficient spatial resolution or failure of any other recommended QC tests, the cause of the problem must be identified, and corrective action must be taken before the Drystar AXYS can be used for any further clinical imaging.

WARNING: Refer to "Preventive maintenance schedule" on page 121 and "Maintaining image quality and resolving image quality problems" on page 258 (Reference manual), or call your local Agfa service organization.

Performing the Annual QC tests for general radiography applications (DT 2 B and DT 2 C)

Geometric Consistency Test

To be able to notice fluctuations in image size and aspect ratio, you must perform this procedure once a year.

Procedure

1   First, perform the daily test.

2   Use the QC test image of the weekly test and measure the dimensions A and B of the geometric square. Refer to "Establishing the image geometry reference values for general radiography applications (DT 2 B and DT 2 C)" on page 95.

> **WARNING: Make sure to measure distance A from the left edge of the left line to the right edge of the right line and distance B from the upper edge of the upper line to the lower edge of the lower line.**
>
> **WARNING: We strongly recommend using a 30 cm (12-inch) machinist scale with 0.5 mm divisions (1/64 inch).**

3   Record these values as measured dimensions A and B on Chart 4 ('Drystar AXYS Geometric Consistency Control Chart').

4   Compare the measured A and B dimensions with the reference dimension values, Aref and Bref on Chart 4 ('Drystar AXYS Geometric Consistency Control Chart').

The differences between measured dimensions of A and B and the reference values Aref and Bref should be less than or equal to 1.0%.

5   Check for image distortion.

6   Calculate the aspect ratio by dividing A by B.

The result must be 1 +/- 0.01

> **WARNING:** *If the image size or distortion values are outside of limits, contact Agfa service to resolve the problem.*

Quality control for mammography application (DT 2 Mammo) (optional)

In order to establish and maintain consistent image quality, a regular evaluation of the image quality is advised.

The Drystar AXYS contains an automatic QC procedure for general radiography applications (refer to "Quality Control for general radiography applications (DT 2 B & DT 2 C)" on page 87). If the option for the mammography application is activated, another QC procedure is available for the mammography application. This QC procedure has been designed to comply with the NEMA Standards publication XR 23-2006. In this chapter we will discuss how to control the quality of mammography applications. This procedure is automatically selected when there is Mammo media in the input tray.

Local Regulations may require other procedures.

The Drystar AXYS Hard Copy quality control procedures consist of two main steps:

■ Before initial use, establishing a number of reference values that will be used for further follow-up and verifying initial image quality.

■ Refer to "Establishing the daily operating reference density levels for mammography application (DT 2 Mammo) (optional)" on page 108.

■ After establishing these values, performing regular daily, weekly and annual quality tests.

■ Refer to "Performing quality control (QC) tests for mammography application (DT 2 Mammo) (optional)" on page 115.

Note: Repeat the two main steps of the Hard Copy quality procedures for each input tray loaded with DT 2 Mammo films.

The results of these tests are recorded on Quality Control Charts.

The QC image (refer to the "QC test image for mammography applications (DT 2 Mammo) (optional)" on page 107) has several additional fields where the QC data can be filled in. This image should be filed as part of the QC procedure.

For more information, please refer to "Quality Control Charts" on page 149.

Establishing the reference values and verifying image quality for mammography application (DT 2 Mammo) (optional)

After installation of a new Drystar AXYS and before initial use you must establish Quality Control aim values. These values will be used as the base line for comparison when daily Quality Control is done. These values should be determined again after major service, repair or software update.

The following Quality Control aim values must be determined:

■ The daily operating density levels. Refer to "Establishing the daily operating reference density levels for mammography application (DT 2 Mammo) (optional)" on page 108.

■ Drystar AXYS image geometry. Refer to "Establishing the image geometry reference values for mammography application (DT 2 Mammo) (optional)" on page 112.

Once Quality Control aim values are established you must evaluate the Spatial Resolution, the Artifact Levels and the Low Contrast Visibility to determine if the image quality is acceptable. Refer to "Verifying Acceptable Spatial Resolution and Artifact Levels and Low Contrast Visibility for mammography application (DT 2 Mammo) (optional)" on page 113.

The Quality Control aim values, the Spatial Resolution and Artifact Levels and the Image Geometry values are all recorded on the Quality Control charts. Refer to "Charts for mammography QC (optional)" on page 155.

On these charts, the following test conditions are also recorded:

■ The type and serial number of the Drystar AXYS.

■ The type and emulsion number of the film used to determine the reference values.

■ The type of densitometer used.

■ The time (day, month, year) that the values were established.

WARNING: **Before you can establish the daily operating levels, the Drystar AXYS must be switched on for at least 15 minutes and it must be calibrated as well.**

WARNING: **Refer to "Switching on the Drystar AXYS" on page 48.**

QC test image for mammography applications (DT 2 Mammo) (optional)

The QC image has several additional fields where the QC data can be filled in. This image should be filed as part of the QC procedure.
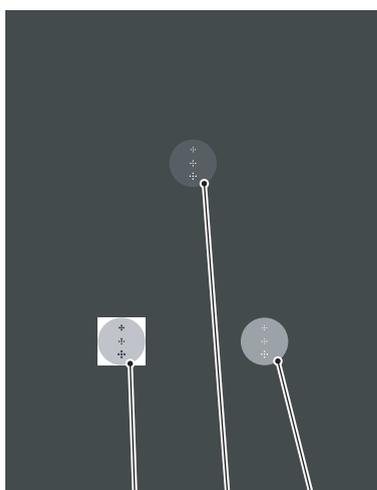
✓ *Note: Note that the dimensions A and B are not indicated on the printed film.*

Quality Control Test Image

Identification

Initials:_____ Date:_____

Time:_____

↓ **Geometry test**

Daily density tests

Max D _____

Hi D _____

Mid D _____

Lo D _____

Base + Fog _____

DD
Density Difference
(Hi D - Lo D) _____

Weekly spatial Resolution test

Sets of dots visible?
☐ Yes ☐ No

Max D | Hi D | Mid D | Lo D | Base + Fog

Dimension B

Dimension A

① ② ③

Establishing the daily operating reference density levels for mammography application (DT 2 Mammo) (optional)

This procedure enables you to establish the base line values for:

■ Low density

■ Mid density

■ High density

WARNING: The densitometer of the Drystar AXYS is calibrated at installation. Authorized service personnel should recalibrate the internal densitometer annually or after major service or repair.

Procedure

1 Press the Key-operator key to enter the Key-operator mode.

2 Press the down key seven times, followed by the confirm key to select 'Quality Control'.

```
1 Show settings    KO
2 Change settings
3 Print image
4 Save configuration

5 Restore config.
6 Calibration
7 Service Actions
8 Quality Control
9 Installation
```

A confirmation screen appears:

```
Start QC          QC
procedure?

YES(✓)        NO(x)
```