| Includes the following attached document: |
|---|
| AGFA – DX-D 400 Training and Instruction Protocol (section 9) |

## ► Purpose of this Document

This document describes how to:

- Prepare the DX-D 400 Service Application tasks

- Configure the DX-D 400 System

- Train the customer on the DX-D 400 System

## ► Document History

| Edition. Revision | Release Date | Changes compared to previous version 1.4 |
|---|---|---|
| 1.5 | 09-2016 | Added information about DR 10s and DR 14s detectors. |

## ► Referenced Documents

| Document | Reference |
|---|---|
| Documents are referenced in the corresponding sections. | |

Edition 1, Revision 5
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Service_Manual_standard_e_template_v02
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**AGFA** ◆ *Agfa*
**HealthCare**

## ► Manufacturer

Agfa HealthCare N.V.

### Published by

Agfa-Gevaert HealthCare GmbH
Tegernseer Landstraße 161
D - 81539 München
Germany

**WARNING:**

**Improper operation or service activities may cause damage or injuries.**

INSTRUCTION:

(1) Read the "Generic Safety Directions" prior to attempting any operation, repair or maintenance task on the equipment.
Refer to Document ID 11849633.

(2) Strictly observe all safety directions within the "Generic Safety Directions" and on the product.

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LIST OF CONTENTS

# 1        DX-D 400 Product Description

The DX-D 400 floor mounted X-ray System is an X-ray imaging system used in hospitals, clinics and medical practices by radiographers, radiologists and physicists to make, process and view static X-ray radiographic images of the skeleton (including skull, spinal column and extremities), chest, abdomen and other body parts on adult, pediatric or neonatal patients.

Applications can be performed with the patient in the sitting, standing or horizontal position.

The DX-D 400 X-ray unit can be used in the General Radiology:

- Hospitals / Hospital Satellites

- Imaging Centers

- Emergency work in smaller hospitals / imaging centers

- Orthopedic Clinics/Practices

- Private Practices



Figure 1

**Limitations:**

The DX-D 400 system is not intended for Mammography applications.

## 1.1    Solution Definition

Depending on the installed configuration the DX-D 400 system can be used either for conventional film/screen (Config.1 or 2), for CR (Config.1 or 2) or as an integrated digital X-ray system (Config.3).

It consists of the following components:

- Floor mounted Tube stand

- Wall Bucky Stand with cassette tray or fixed detector

- Table with cassette tray or fixed detector

- X-ray tube with tube head display and collimator

- High frequency generator with manual (touch button) console or soft console (touch screen)

- NX workstation depending on configuration



Figure 2
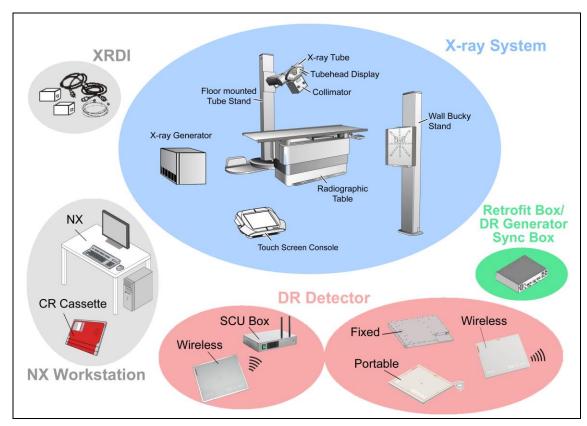
Solution Options:

- Wet film

- CR unit (DX-G, DX-M, CR10-X, CR12-X or CR15-X / CR30-X or CR-30)

- Hardcopy printer

DX-D 400 System Accessories:

- Compression band

- Hand grips for table

- Hand grips for wallstand

- Hand support for wallstand

- Lateral cassette holder 24 x 30 cm

- Lateral cassette holder 35 x 43 cm

- DX-D 400 VACUDAP 2004 (External Dose Area Meter)

- DX-D 400 VACUDAP 2004 (External Dose Area Meter) integrated

## 1.2    DX-D 400 Configurations

The DX-D 400 is available in three different basic configurations. The components depend on the configuration:

- as a non-integrated analog modality with a hard console without software integration  and for CR / Film only:
    o   DX-D 400 analog manual, (Configuration 1)
    o   DX-D 400 analog manual (D), (Configuration 2)

and

- as an integrated Digital Radiography X-ray system with software integration and detector(s):
    o   DX-D 400 digital manual (D), (Configuration 3)

Details see table on next page.

| Configuration* | Table | Bucky in the wall stand | Tubehead Display | Collimator | Control | Image Processing |
|---|---|---|---|---|---|---|
| DX-D 400 analog manual | Fixed or elevating | CR | Analog | Manual or automatic | Hard console with touch screen | Wet film, NX workstation or other CR workstation |
| DX-D 400 analog manual (D) | | | Digital | | | |
| DX-D 400 digital manual (D) | | DR | | Manual | Soft console | NX workstation |

* Meaning of the configuration names:

- analog:   CR - Computed radiography (requires digitizer with cassettes)

- digital:   DR – Digital radiography (has two fixed detectors built in)

- manual:  Not motorized

- (D):       Digital tubehead display

**(Config.1)** | **DX-D 400 analog manual**

Floor mounted Tube Stand
Wall Stand (CR Bucky)
Generator
Analog Tubehead Display
Optional Components
NX Workstation
Hard Console
Manual Collimator **or** Automatic Collimator
DX-G / DX-M
CR 30-X 2nd CR 30-Xm
Radiographic Table - fixed or elevating (CR Bucky)
DX-D400_Config_1.cdr
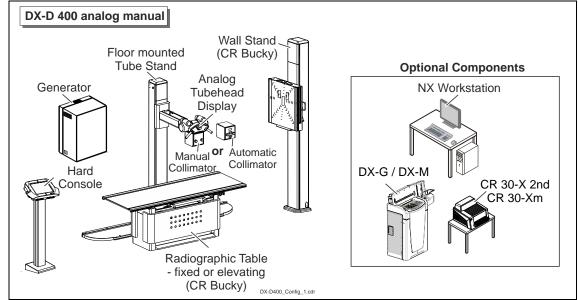
Figure 3

- Floor mounted tubestand with analog tubehead display

- Wallstand with cassette bucky

- non tilting or tilting

- left or right loading

- optional with Automatic Cassette Size Sensing
  - Floating table

- non elevating or elevating

- with cassette tray

- optional with Automatic Cassette Size Sensing
  - Manual or automatic collimator
  - Hard Console

- optional with APR (Automatic Programmer)

- optional with touch screen incl. APR

*(Config.2)*
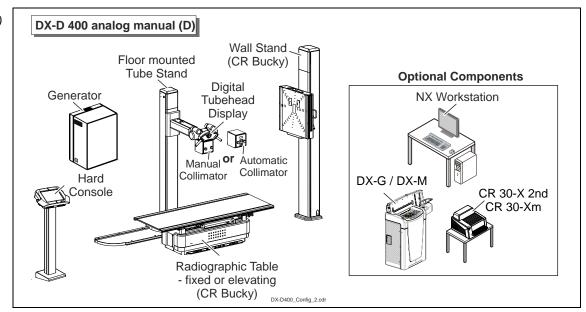
Figure 4

- Floor mounted tubestand with digital tubehead display for angles and SID

- Wallstand with CR bucky

- Non tilting or tilting

- left or right loading

- optional with Automatic Cassette Size Sensing
  - Floating table

- non elevating or elevating

- with cassette tray

- optional with Automatic Cassette Size Sensing
  - Manual or automatic collimator
  - Hard Console

- optional with APR (Automatic Programmer)

- optional with touch screen incl. APR

Figure 5

- Floor mounted tubestand with digital tubehead display for angles and SID

- Wallstand with DR bucky
  - non tilting or tilting

- Floating table with DR bucky
  - non elevating or elevating

- Manual collimator

- NX with touch screen monitor

- Agfa Softconsole

- DX-D Retrofit Box/DR Generator Sync Box
  and up to 3 detectors (different combinations)

### 1.2.1     Wall Stand

Available as non tilting and manual tilting wall stand:

- Vertical bucky assembly

- All standard cassette sizes from 18 to 43 cm are accepted for CR

- Chin rest support at the upper side

- Panel shows AEC detector areas and cassette film size

- Loading of Cassette in Wall Bucky Stand can be adapted at right or left side as per installation requirements.

- Wallstand with fixed detector can be adapted for movement at right or left side.



Figure 6

### 1.2.2     Table

- Maximum patient weight: 350 kg (771 lbs)

- Floating table top

- Non elevating or elevating

- For standard cassette sizes from 18 to 43 cm (Config.1 and 2)



Figure 7

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### 1.2.3     Floor mounted Tubestand

- Support for the Tube-Collimator Assembly with Column Control Panel for:
    - Horizontal movement of column
    - Vertical movement of the Tube-Collimator Assembly
    - Rotational Movement of the Tube-Collimator Assembly  (0°, 90° and -90°)
    - Transverse movement of the Tube-Collimator Assembly

*Config.1*
- Analog tubehead display



Figure 8

*Config.2-3*
- Digital tube head display
    - Position data of the Tube-Collimator Assembly (Angle and SID)



Figure 9

### 1.2.4    Collimators

*Config.1-3* • Manual collimator:

   o Collimator controls consist of a push-button to switch on the Collimator Lamp

   o Two knobs to open or close the internal blades of the Collimator.



Figure 10

*Config.1-2* • Automatic Collimator ACSS (automatic cassette size sensing) for CR only

   o A digital function display.

   o Memorization of the two formats that are more frequently used.

   o 5 adjustable fixed fields to be used with one detector (flat panel).

   o ACSS - Automatic Cassette Size Sensing (for CR only)

   o Additional filtration (pushbutton selection)

      - 1mm Al+0.1mm Cu,

      - 1mm Al+0.2mm Cu

      - 2mm Al - (1mm Al optional)



Figure 11

### 1.2.5    X-Ray Tube

| X-Ray Tube | Anode angle | Tube Focus / Power | Heat Capacity (kilo Heat Units) |
|---|---|---|---|
| Toshiba E7884X (default) | | 0.6 mm / 20 KW 1.2 mm / 50 KW | 300 kHU |
| Toshiba E7252X | | 0.6 mm / 27 KW 1.2 mm / 75 KW | 300 kHU |
| Toshiba E7254FX | 12° | 0.6 mm / 40 KW 1.2 mm / 102 KW | 400 kHU |
| Toshiba E7869X | | 0.6 mm / 40 KW 1.2 mm / 100 KW | 600 kHU |

### 1.2.6    Generator

Configurations with 50, 64 and 80 kW generators are available.

### 1.2.7    Tube / Generator compatibility

| 50kw Generator (Low and High Speed) | 64kW Generator | 80kW Generator |
|:---:|:---:|:---:|
| All | E7252X, E7254FX E7869X | E7254FX E7869X |

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### 1.2.8    Grid

A variation of grids is available. Grids fixed in the bucky are always moving grids, removable grids are always static (not motorized). The selection of grids depends on the different DX-D 400 versions and the configuration.

Wallstand:

- 103 LINES, 12:1, FFD 1.5 M  (CR, film)  → non removable grid, moving grid
- 103 LINES, 12:1, FFD 1 M  (CR, film)    → non removable grid, moving grid
- 103 LINES, 12:1, FFD 1.8 M              → non removable grid, moving grid
- 132 LINES 10:1 FFD 1M
- 132 LINES 10:1 FFD 1.5M
- 132 LINES 10:1 FFD 1.8M
- 215 LINES, 12:1, FFD 1 M
- 215 LINES, 8:1, FFD 1.3 M
- 215 LINES, 12:1, FFD 1.5M, delivered without frame
- 215 LINES, 12:1, FFD 1.8M, delivered without frame


Table:

- 103 LINES 12:1 FFD 1M                   → non removable grid, moving grid
- 130 LINES 8:1 FFD 1M
- 215 lines, 12:1, FFD 1 M
- 132 lines, 10:1, FFD 1 M

**Recommended Grid – Detector combination**

|  | DX-D 10 | Varian Fixed | DX-D 30 DX-D 35 | DX-D 40 DX-D 45 | DR 14s DR 10s |
|---|---|---|---|---|---|
| 215 LINES 8:1 FFD 1.3M CARBON COVER | ✓ | ✓ | | | |
| 215 LINES 12:1 FFD 1.5M CARBON COVER | ✓ | ✓ | | | |
| 215 LINES 12:1 FFD 1.8M CARBON COVER | ✓ | ✓ | | | |
| 215 LINES 12:1 FFD 1 M CARBON COVER | ✓ | ✓ | | | |
| 132 LINES 10:1 FFD 1M CARBON COVER | | | ✓ | ✓ | |
| 132 LINES 10:1 FFD 1.5M CARBON COVER | | | ✓ | ✓ | |
| 132 LINES 10:1 FFD 1.8M CARBON COVER | | | ✓ | ✓ | |

Refer to the Agfa website for specifications on the anti-scatter grids that have been found compatible with the system and the DR Detectors.

http://www.agfahealthcare.com/global/en/library/overview.jsp?ID=54332498

### 1.2.9    Control Console

#### Manual (touch button) Console

*DX-D 400 (Config.1)*   All controls, indicators and displays are functionally grouped.

*DX-D 400 (Config. 2)*

- Power on/off

- Workstation selection

- AEC Module

- Focal spot

- Exposure indicators

- Radiographic values

- Anatomical Programmer

- Exposure technique:

    o  kVp with AEC operations - one point technique

    o  kVp and mAs  - two point technique

    o  kVp, mA and Exposure Time - three point technique



Figure 12



Figure 13

- Anatomical Programmer (APR):

    o  With factory pre-programmed anatomical views for automatic selection.

    o  For six patient sizes (three adults and three children)

    o  The operator may manually modify all the original APR techniques and store them for later use.



Figure 14

### X-Ray Soft Console

*DX-D 400
(Config. 3)*

- Located on the right-hand side of the NX wide screen Monitor
  (See red rectangle below.)

- Provides controls for e.g. position information, SID, angle and rotation of tube

- Generator Controls for adjustment of exposure parameters

- Operational Status Bar to show the device status, DAP display and error messages
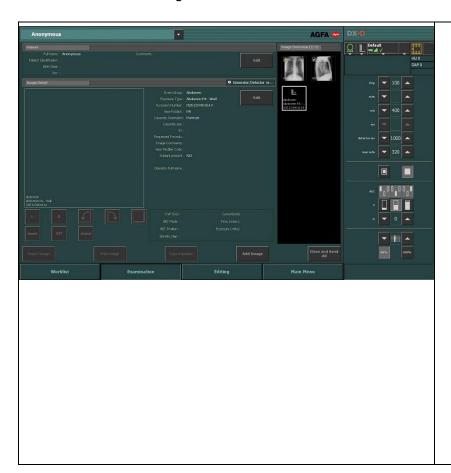


Figure 15                                             Figure 16: Generator Control

### 1.2.10    Detector

With release of this document the following detectors are supported:

| | |
|---|---|
| **Integrated detector**<br>• Fixed in table and/or wallstand<br>• ~ 43 x 43 cm | |
| **DX-D 10**<br>• Portable<br>• Cassette sized<br>• ~ 35 x 43 cm | |
| **DX-D 30C**<br>• Wireless<br>• Cassette sized<br>• ~35 x 43 cm | |
| **DX-D 35C**<br>• Wireless<br>• Cassette sized<br>• ~ 31 x 38 cm | |
| **DX-D 40C/G**<br>• Wireless<br>• Cassette sized<br>• ~ 37 x 44 cm | |
| **DX-D 45C/G**<br>• Wireless<br>• Cassette sized<br>• ~ 29 x 35 cm | |
| **DR 14s C/G**<br>• Wireless<br>• Cassette sized<br>• ~35 x 43 cm | |
| **DR 10s C**<br>• Wireless<br>• Cassette sized<br>• ~ 24 x 30 cm | |

Figure 17

### 1.2.10.1    Basic Detector Data

| | Fixed Detectors | DX-D 10 | DX-D 30C | DX-D 35C | DX-D 40C/G | DX-D 45C/G |
|---|---|---|---|---|---|---|
| |  |  |  |  |  |  |
| **Receptor Type** | Amorphous Silicon | | | | | |
| **Scintillator** | CsI or GOS | CsI or GOS | CsI | CsI | CsI or GOS | CsI or GOS |
| **Data transmission** | Cable | Cable | Wireless | Wireless | Wireless | Wireless |
| **Resolution** | 3.6 lp/mm (CsI) 2.8 lp/mm (GOS) | 3.6 lp/mm (CsI) 2.8 lp/mm (GOS) | 4 lp/mm | 4 lp/mm | 3.1 lp/mm (CsI) 2.8 lp/mm (GOS) | |
| **Energy Range - Standard** | 40 - 150 kV | | | | | |
| **Dynamic Dose Range** | CsI: 0.3 microgray – 60 microgray GOS:0.3 microgray – 75 microgray | | 0.03- 50 microgray | | Max. Exposure Level 90 microgray | |
| **Size** | 42.7 x 42.7 cm (16.8 x 16.8 inch) | 42.7 x 35.6 cm (16.8 x 14.0 inch) | 46 x 38.4 cm (18.1 x 15.1 inch) | 30,7 x 38,4 cm (12.1 x 15.1 inch) | 36,8 x 44,2 cm (14,49 x 17,4 inch) | approx. 28,7 x 35,0 cm (11,3 x 13,8 inch) |
| **Effective Image Area** | 42.4 x 42.4 cm (16.7 x 16.7 inch) | 42.4 x 35.3 cm (16.7 x 13.9 inch) | 35.0 x 42.6 cm (13.8 x 16.8 inch ) | 27,4 x 35 cm (10,9 x 13,8 inch) | 35,8 x 43,0 cm (14,11 x 16,93 inch) | 25,2 mm x 31,6 mm (9,92 x 12,45 inch) |
| **Weight** | | approx. 3.9 kg (8.6 lbs.) | 3.4 kg (7.5 lbs) (incl. battery) | 2.3 kg (5.1 lbs) (incl. battery) | DX-D 40G 3,3 kg (7.3 lbs) (incl. battery) / DX-D 40C 3,4 kg (7.5 lbs) (incl. battery) | DX-D 45C/G 2.2 kg (4,9 lbs) (incl. battery) |

| | DR 14s<br>(Pixium 3543 EZ) | DR 10s<br>(Pixium 2430 EZ) |
|---|---|---|
| |  |  |
| **Receptor Type** | Amorphous Silicon ||
| **Scintillator** | CsI or GOS | CsI |
| **Data transmission** | Wireless ||
| **Resolution** | 3,4 lp/mm | 3,4 lp/mm |
| **Energy Range - Standard** | 40 - 150 kV ||
| **Dynamic Dose Range** | CsI : max linear dose ≥ 50µGy;, clipping dose > 85 µGy<br>GOS: max linear dose ≥ 75µGy; clipping dose > 125 µGy | max linear dose ≥ 50µGy;<br>clipping dose > 85 µGy |
| **Size** | approx. 38.5 x 46 x 1.6 cm<br>(15 x 18 x 6.3 inch) | approx. 26.9 x 32.9 x 1.6 cm<br>(10.6 x 12.6 x 6.3 inch) |
| **Effective Image Area** | 33.7 cm x 41.4 cm<br>(13.3 x 16.3 inch) | 22.2 cm x 28.4 cm<br>(8.7 x 11.2 inch) |
| **Weight** | DR 14s C: 3.0 kg (6.6 lbs)<br>DR 14s G: 2.8 kg (6.2 lbs) | 1.6 kg (3.5) lbs<br>(incl. battery) |

### 1.2.10.2    Possible detector combinations

- Two fixed detectors in radiographic table and wall stand

  OR

- Fixed detector in the wallstand and cassette size detector in the table

  OR

- Single cassette size detector to be swapped between table and wallstand

## 1.2.11     CR Unit

Supported Agfa Digitizers:

- CR10-X                                          - DX-G
- CR12-X                                          - DX-M
- CR15-X / CR30-X

References for Digitizer training preparation in the Agfa HealthCare Library:

| Document Type | Agfa HealthCare Library |
|---|---|
| CR 10-X, CR 12-X, CR 15-X User Manual 2491 | Computed Radiography → CR Digitizers → User Manual |
| CR 30-X Changing from analog to digital UM 2397 | |
| CR 30-X/CR 30-Xm User Manual 2386 | |
| DX-G/DX-M User Manual 2321 | |

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# 2       Safety Directions

⚠️ **WARNING:**

**Improper operation or service activities may cause damage or injuries.**

INSTRUCTION:

(1)     Read the "Generic Safety Directions" prior to attempting any operation, repair or maintenance task on the equipment.
Refer to Document ID 11849633.

(2)     Strictly observe all safety directions within the "Generic Safety Directions" and on the product.

Please refer to product-specific safety directions available in the different
User Manuals applicable for the DX-D 400 system.

User Manuals are part of the delivery.
They can also be downloaded from the Agfa HealthCare Library.

| Available Documentation | Path |
|---|---|
| DX-D 400 User Manual 0230 | Direct Radiography → DX-D 400 → User Manual |
| DX-D 400 X-Ray System User Manual 0232 | |
| DX-D Software Console User Manual 0189 | Direct Radiography → DR Components → User Manual |
| DX-D 30C, DX-D 35C User Manual 0197 | Direct Radiography → DR Detectors → User Manual |
| DX-D 40C, DX-D 40G User Manual 0290 | |
| DX-D 45C, DX-D 45G User Manual 0292 | |
| DX-D 10G, DX-D 10C, DX-D 20G, DX-D 20C User Manual 0129 | |
| DR 10s Detector User Manual 0351 | |
| DR 14s Detector User Manual 0350 | |
| DX-D DR Detector Calibration Key User Manual 0134 | |

# 3       Task Overview

The following tables give an overview of basic Service Application tasks.

## 3.1       DX-D 400 analog manual (Config.1 and 2)

*Overview*

| Details see section | Activity | Description | | Required Time |
|---|---|---|---|---|
| 4 | Preparation Activities | Prepare Service Application Tasks after Customer Contract Signature (organize visit). | | 2 hours |
| 5 | System Takeover | System Takeover of the system from Field Service Engineer after installation | | 15 min |
| 6 | Configuration Tasks (= system setup) | Perform default configuration | | 2 hours |
| 7 | Customer Training and Hands-on Assistance on system level | Radiographer training on X-ray system | Operation of X-ray system | 3 hours |

## 3.2       DX-D 400 analog manual (Config.3)

*Overview*

| Details see section | Activity | Description | | Required Time |
|---|---|---|---|---|
| 4 | Preparation Activities | Prepare Service Application Tasks after Customer Contract Signature (organize visit). | | 2 hours |
| 5 | System Takeover | System Takeover of the system from Field Service Engineer after installation | | 15 min |
| 6 | Configuration Tasks (= system setup) | Perform default configuration | | 2 hours |
| 7 | Customer Training and Hands-on Assistance on system level | Radiographer training on NX, X-ray modality and integrated detector | Operation of X-ray modality | 2 hours |
| | | | Operation and workflow of NX workstation | |
| | | | System workflow | |
| | | | Calibration of detector | |
| | | Assist customer in system operation and answer questions to finalize tasks | | 4 hours |

*Pre-requisites*    Prerequisites to keep the timing for the basic application:

The Sales representative has to inform the customer about the activities provided by Application as listed in the table above. No customization is foreseen. Extra activities need to be ordered separately by the customer.

*Restrictions*  DX-D 400 analog manual (Config.1) and DX-D 400 analog manual (D) (Config.2):

- No adaptation of the Anatomical Programmer (APR) with exam tree and X-ray parameters.

- No hands-on session with patients is foreseen.

DX-D 400 digital manual (Config.3):

- 1. No adaptation of the DX-D 400 local exam tree and X-ray parameters

- 2. No protocol codes configured

- 3. No image quality adaptations including taste settings Musica²

# 4    Preparation Activities

<table>
<tr><td colspan="3"><strong>DX-D 400 - Checklist for Preparation Activities</strong></td></tr>
<tr><td colspan="3"><strong>Site:          Location:          Date:</strong></td></tr>
<tr><td colspan="3"><strong>Goal:</strong><br><br>The following list summarizes the activities to prepare the DX-D 400 Service Application tasks.</td></tr>
<tr><td><strong>Topics:</strong></td><td><strong>Done</strong></td><td><strong>Reference</strong></td></tr>
<tr><td colspan="3"><strong>Preparation Activities</strong></td></tr>
<tr><td>Identify persons and representatives of the different groups which are involved in the project.</td><td>☐</td><td><em>Not applicable</em></td></tr>
<tr><td>Identify configuration / customization tasks for the solution together with the customer. Keep in mind the timing for the basic application. Extra activities need to be ordered separately by the customer.</td><td>☐</td><td></td></tr>
<tr><td>Observe if extra application relevant tasks are necessary and have been ordered.</td><td>☐</td><td></td></tr>
<tr><td>The time needed to configure the anatomical programmer (APR) strongly depends on its size. Estimate the additional effort for adaptations of the programs, if the customer does not accept the default.</td><td>☐</td><td></td></tr>
<tr><td>If the customer does not accept the Default DX-D 400 Exam Tree, additional time for exam tree configuration has to be considered. This additional effort should be paid by the customer.<br>Note down requested adaptations, e.g. add exposures, exposure technique, renaming of exposures.<br><br>Prepare the exam tree with the NX Offline Config Tool.</td><td>☐</td><td></td></tr>
<tr><td>Analyze the time plan according to application relevant tasks.</td><td>☐</td><td></td></tr>
<tr><td>Current regulations and guidelines on regional, country and federal state level have to be filtered with respect to the relevance for the project.</td><td>☐</td><td></td></tr>
<tr><td>Analyze the Customer Training Requirements.</td><td>☐</td><td></td></tr>
<tr><td>Define together with the customer when and where the training should take place.</td><td>☐</td><td></td></tr>
<tr><td>Hand over the filled-in Training and Instruction Protocol to the Project Manager.</td><td>☐</td><td></td></tr>
<tr><td colspan="3"><strong>End</strong></td></tr>
</table>

# 5 System Takeover from FSE

<table>
<tr>
<td colspan="4" align="center"><strong>DX-D 400 - Checklist for System Takeover</strong></td>
</tr>
<tr>
<td colspan="2"><strong>Site:</strong></td>
<td><strong>Location:</strong></td>
<td><strong>Date:</strong></td>
</tr>
<tr>
<td colspan="4"><strong>Goal:</strong><br><br>The following list details the topics to be checked with the Field Service Engineer to be sure that the technical set-up of the system is complete.</td>
</tr>
<tr>
<td colspan="2"><strong>Topics:</strong></td>
<td><strong>Done</strong></td>
<td><strong>Reference</strong></td>
</tr>
<tr>
<td colspan="4"><strong>System Takeover Activities</strong></td>
</tr>
<tr>
<td colspan="2">Check that all components ordered by the customer are present and technically set-up.</td>
<td>☐</td>
<td rowspan="7" align="center"><em>Not applicable</em></td>
</tr>
<tr>
<td colspan="2">Check that the DX-D 400 System User Manuals are available on site (e.g.: on Documentation DVD, which is part of the delivery).</td>
<td></td>
</tr>
<tr>
<td colspan="2">Check if a backup has been created for the APR configuration files:<br><br>•     APRBckUp.ini<br><br>•     APR.ini<br><br>Check also for the location and the naming of these files:<br><br>If no backup has been performed, refer to section 6.</td>
<td>☐</td>
</tr>
<tr>
<td colspan="2">Check which kind of detector (Gadolinium Oxysulfide or Cesium Iodide) is installed</td>
<td></td>
</tr>
<tr>
<td colspan="2">Have the sensitivity settings been communicated? Which ones?<br><br>Medium: _____ µGy<br><br>Low and High sensitivity dose values are mathematically calculated.</td>
<td></td>
</tr>
<tr>
<td colspan="2">Get informed about any open issue: e.g. missing components, unspecified settings, values or results.</td>
<td>☐</td>
</tr>
<tr>
<td colspan="2">Make sure that any open technical issues have been escalated according to the Agfa service procedures.</td>
<td>☐</td>
</tr>
<tr>
<td colspan="4"><strong>End</strong></td>
</tr>
</table>

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# 6        Configuration

## 6.1        Hard Console – Anatomical Programmer

### 6.1.1        Configuration of the <Anatomical Programmer> (APR)

On the touch console an exam tree can be configured in the **<Anatomical Programmer>** (APR).
The available default configuration can be changed either by the customer or service.

For detailed information of configuration possibilities refer to:
0232 DX-D 400 X-Ray System User Manual.

### 6.1.2        Backup of the Anatomical Programmer File on the Touch Screen Console

It is strongly recommended to make a backup of the APR settings after installation and configuration of the system.

Two different files are available on flash card in the touch console:

- APRBckUp.ini → APR back up file
- APR.ini → APR working file

NOTE:

Make sure a card reader is available.

(1)    Switch off the system.

(2)    Unscrew and remove the generator cable.



Figure 18

(3)  Unscrew and remove rear cover
     (4 screws).



Figure 19

(4)  Take the flash card out.

File location on flash card is:

C:\Nuevo\program files\TPC\APR



Figure 20

(5)  Make a copy of the files:
     o   APRBckUp.ini
     o   APR.ini

(6)  Rename the copied files to, e.g.:
     o   defaultAPRBckUp.ini
     o   defaultAPR.ini

(7)  Return the flash card in the console. Mind its correct position.

(8)  Mount the rear cover and connect the generator cable.

(9)  Switch the system on.

## 6.2 Configuring the NX Workstation - DR specific Configuration for DX-D 400 digital manual (D) (Config.3)

**Required time for a DX-D specific NX configuration:**

Approximately 30 minutes if a local and customized Exam Tree is used. Approximately 4 hours and more have to be estimated only for Exam Tree configuration and customization if the standard default Exam Tree is used.

### 6.2.1 Overview of configuration steps

| DX-D 400 - Checklist for NX Configuration | | |
|---|---|---|
| **Site:** **Location:** | **Date:** | |
| **Task** | | **Section** |
| Prepare the NX configuration with the NX Offline Config Tool | ☐ | 6.2.3 |
| • Configure the X-Ray Device | | 6.2.3.1 |
| • Configure the DR Detector | | 6.2.3.2 |
| • Configure the DR recovery procedure | | 6.2.3.3 |
| Exam Tree Configuration | ☐ | 6.2.4 |
| Import the local default exam tree for DX-D 400 or the customized exam tree. | | 6.2.5 |
| Perform the DX-D 400 specific configuration of the Exam Tree. | | 6.2.6 |
| • Configure the exposure settings. | | 6.2.6.1 |
| • Configure film orientation (optional). | | 6.2.6.2 |
| • Configure the modality settings. | | 6.2.6.3 |
| Configure *Add Image Pane* in *Compose Exam*. | | 6.2.7 |
| Arrange XRG Parameters / User Interface Configuration. | ☐ | 6.2.8 |
| Enable/disable *Create DR Sequence* button | | 6.2.9 |
| Activate settings. | ☐ | 6.2.10 |

### 6.2.2          Prerequisites

- NX Workstation is installed.

- XRDI software is installed.

- CDI software and DR Detector-related software is installed and configured.

- Default DX-D 400 Exam Tree is available.

- Licenses are enabled.

### 6.2.3          Prepare the NX configuration with the NX Offline Config Tool

#### 6.2.3.1    Configure the X-Ray Device

(1)  To add an X-ray device:

- Click the **New** button.

- Type in a reasonable name.

- Click **Upload** to select the corresponding X-ray device model file.



Figure 21

(2)  Mark the model file.

Click **Open** and then **OK**.



Figure 22
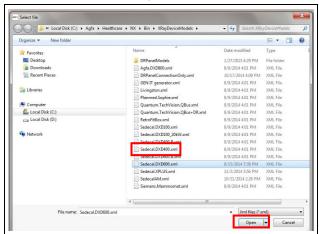
The following table shows a list of available model files:

| Available system | X-Ray device model file to be selected |
|---|---|
| DR 400 Type 5520/100 | Spellman.DR400.xml |
| DR 400 Type 5520/200 | Agfa.DR400.xml |
| DX-D 100 system with a 20 kW generator | Sedecal.DXD100_20kW.xml |
| DX-D 100 system: All except 20 kW generator | Sedecal.DXD100.xml |
| DX-D 300 system | Sedecal.XPLUS.xml |
| DX-D 400, with or without Retrofit Box/DR Generator Sync Box | SedecalAM.xml |
| DX-D 500 system | Siemens.Polydoros+DR.xml |
| DX-D 600 system | Sedecal.DXD600.xml |
| Livingston Mammo generator | Livingston.xml |
| Planmed Mammo generator | Planmed.Sophie.xml |
| Quantum solution CR and DR | Quantum.Techvisison.QBus+DR.xml |
| Quantum solution only CR | Quantum.Techvisison.QBus.xml |
| Retrofit system with Sedecal generator connection (XRDI connection) | SedecalAM.xml |
| Retrofit system with Siemens generator connection (XRDI connection) | SiemensAM.xml |
| Retrofit system without XRDI connection between NX and generator. | DRPanelConnectionOnly.xml |
| Siemens DXSi (XRDI 10) | GENIT generator.xml |
| Siemens DXSI Solution (from XRDI 15 and higher) | Siemens.DXSi.xml.xml |
| Siemens Mammo | Siemens.Mammomat.xml |

⚠ IMPORTANT:

Do NOT use the following model files:

- RetrofitBox.xml:               R&D internal model file. Not relevant for service.
- Sedecal.DXD400.B.xml:     Not used.
- Sedecal.DXD600.xml:         Not used.
- Sedecal.DXD600.B.xml:     Not used.

### 6.2.3.2    Configure the DR detector

(1)  To add a DR detector:

- Select the X-Ray device.
- Click **Add.**



Figure 23

- Highlight the required DR detector model.
- Click **Open** and click **OK.**
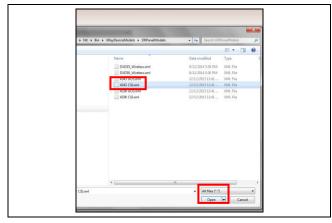


Figure 24

(2) In Detector Settings use the dropdown menu for the **Serial Number** and select:

Wall, Table or Portable
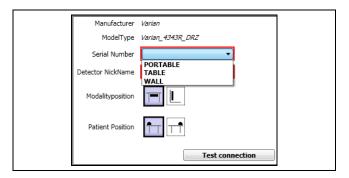


Figure 25

(3) Type in the **Detector Nickname**, e.g. Wall, Table, Large, Small …
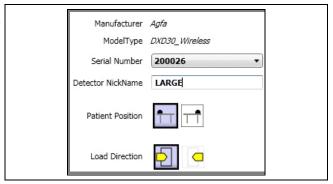


Figure 26

NOTE:

The DX-D Retrofit Box/DR Generator Sync Box settings do NOT need to be configured in the NX Offline Configuration tool.
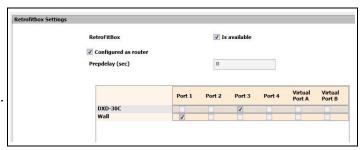


Figure 27

### 6.2.3.3    Configure the DR Recovery Procedure

If an exposure is no longer linked to a thumbnail, it will come in on NX as emergency exposure. The image processing applied to this kind of exposure is defined via Exposure Type.

To configure the DR Recovery Procedure at least one DR exposure must be set up in the exam tree.

(1) In **Devices** mark X-Ray Device.

(2) Select **Age Group**.

(3) Select an **Exam Group**.

(4) Select an **Exposure Type**.



Figure 28

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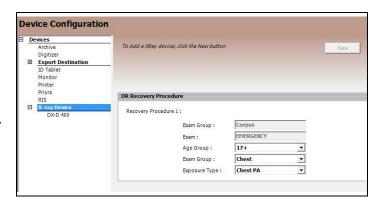
### 6.2.4    The default Exam Tree

IMPORTANT:

- The default factory Exam Tree for GenRad that is delivered on each new NX workstation does not include the modality settings, e.g. the exposure settings and receptor type.

- It is the responsibility of each country/region to optimize the configuration of the default DX-D 600 Exam Tree according to local requirements and to re-use this configuration to avoid unnecessary repetition of work performed on site.

### 6.2.5    Importing the Exam Tree − local default or customized

To import either the local default exam tree or the customized exam tree, follow this procedure:

(1)    Open the Configuration Tool.

(2)    Go to: **Exam Tree Configuration**

(3)    Select: **Add Exams** from **Import…**

(4)    Go to the directory where either the local default exam tree or the customized exam tree is stored, e.g.: *C:\AGFA\Healthcare\NX\bin\Factory Settings*

(5)    Open the prepared exam tree from that folder.

(6)    Click **OK**.

(7)    Select the exams to be included and click **Import**.

NOTE:

After the import, all exposures are visible in the exam tree, regardless of the device configuration. However, in the NX GUI the user will only see those exposures that are relevant.

Example:

If you import an exam tree with CR exposures, but no digitizer is configured, the CR exposures are visible in the Configuration Tool. In contrast, no CR exposures will be visible in the NX GUI after activation.

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### 6.2.6    DX-D 400 specific Exam Tree configuration

✓  NOTE:

For the procedure of how to configure an exam tree on NX, refer to the Service Manual and Key User Manual:

- Chapter 4, *Installation and Configuration Appendices* of the NX Service Manual
- Chapter 6, *Configuring the Examination Tree* of the NX Key User Manual

#### 6.2.6.1    Configuration of the exposure settings

It is possible to configure the Auto Rotate (180 °) function on exposure level to prevent that the customer has to rotate the image manually. This may appear for configurations like right and left exposures for e.g. hand, wrist and elbow.

A target exposure index can also be fixed here, instead of using the dose monitoring tool.

(1)    Go to: **Exam Tree Configuration**

(2)    Select an exposure.

(3)    Check the **Auto Rotate 180 degree** function.
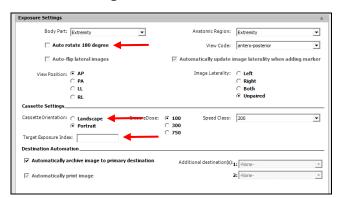


Figure 29

(4)    Select the Cassette orientation.

For fixed detectors always choose orientation **Portrait**.

(5)    Fix a Target Exposure Index (optional).

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### 6.2.6.2 Configuration of film orientation

On CR systems the film orientation is determined by the cassette orientation.
On DR systems with <u>fixed detector</u> the orientation of the detector is fixed to portrait.
Therefore the cassette orientation is not applicable for the film orientation.

In the configuration part **Printer Settings** of the exposures the configuration option
**Film Orientation** is offered:

- Automatic:
  The Region of Interest (ROI) is automatically detected and acts as reference for
  the film orientation (landscape or portrait is automatically chosen).

- Landscape:
  The film orientation is always set to landscape.

- Portrait:
  The film orientation is always set to portrait.
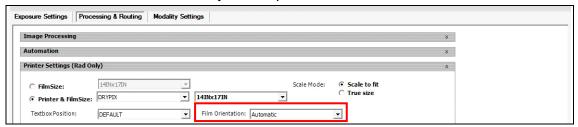


Figure 30

NOTE FOR OPTION **FILM ORIENTATION**:

- Because of anatomical variation the selected film orientation does not always
  deliver the optimal result for the printout.

- Inform the user about this behaviour and the possibility to correct the film
  orientation in the **Editing** pane of the NX user interface.

### 6.2.6.3    Configuration of modality settings

(1)    Go to: **Exam Tree Configuration**

(2)    Select an exposure.

(3)    In the **Modality Settings** pane go to section **General settings**.

The view with ViewName "1" opens. The fields for which a configuration activity is required are marked with a red rim.
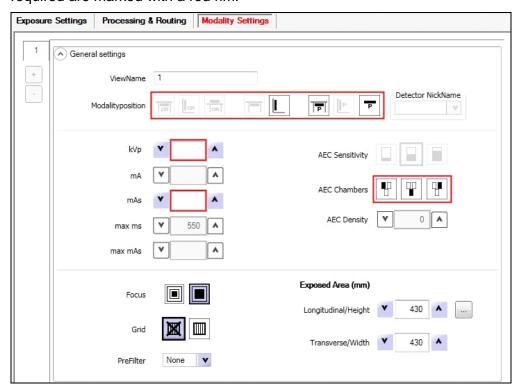


Figure 31: Example screenshot

(4)    Select the correct modality position depending on system configuration, e.g. DR Table, Wall fixed DR detector, Wall DR portable, Table DR portable, Free DR portable, CR Wall, CR Table, CR Free, …



Figure 32: Example screenshot

(5) Select the **Detector Nickname**, if more than one portable detector is configured.

Link the exposure to the detector which will be mainly used for this exposure.
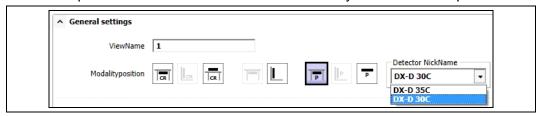


Figure 33

(6) Enter the kVp.

Enter the mAs
or
AEC sensitivity, chambers, density.

Possible ms for fixed detector, DX-D 10 and DX-D 20: 550 or 1000 ms
Possible ms for DX-D 30C/DX-D 35C: 1000 or 3000 ms
Possible ms for DX-D 40/DX-D 45: either 1000 or 3000 ms (time is defined during installation)



Figure 34: Example screenshot

NOTE:

Optional and in combination with AEC the mA and max. mAs can be configured.

For more information refer to the Application Note – NX configuration items in DR systems max mAs and mA (Document ID: 43122034).

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(7)     Select the appropriate Focus, Grid and, if necessary, the PreFilter.
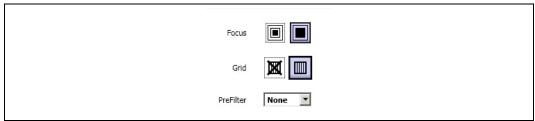
Figure 35

(8)     Configure the **Exposed Area (mm)** (automatic Collimation).

Figure 36

✓ NOTE:

The default programs 20, 24 and 28 are relative positions with defined SIDs, but not defined wall stand height. The tube will always stop perpendicularly to the detector in the wall stand.

The default Auto-Position programs can only be adapted via the Service Tool in the software of the Tubehead display.

Procedures are trained in the DX-D 600 System Application Training.
For booking of Instructor Based Training refer to the Academy Learning Platform (ALP), Hyperlink: https://healthcare.agfa.net/irj

(9)     Repeat steps (2) to (9) for all exposures.

⚠ IMPORTANT:

With the tool *Edit Exposure Modality Settings* in the exam tree configuration it is possible to adapt single or various exposures.

See Application Note - NX 2.0.8900 - NX 3.0.8900 Configuration Improvements on Agfa HealthCare Library: Document ID:47340342
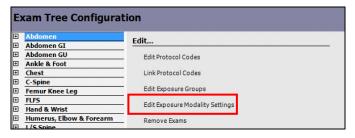


Figure 37



Figure 38
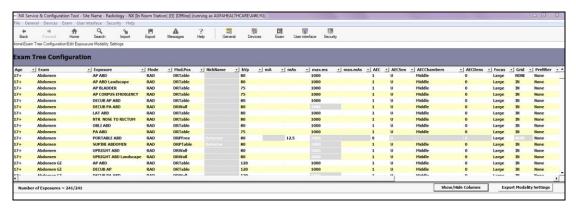
### 6.2.7      Compose exam

(1)    Go to: `User Interface`

(2)    In `Examination Settings` select `Configure Add Image Pane`.

(3)    Open the tab `Compose Exam`.

(4)    Place the exposure thumbnails for all exams and age groups at the preferred position.
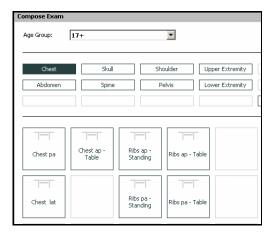


Figure 39

## 6.2.8      Arranging XRG parameters / User Interface configuration

(1)    Go to: **User Interface Configuration → Examination Settings → Configure XRG Parameters**

(2)    Open the **XRG Parameters** screen to set the displayed attributes.
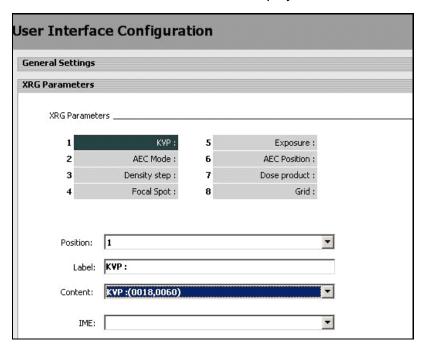


Figure 40: Example screenshot

(3)    Select a value for **Position**.

(4)    Translate the **Label** entry to local language, if necessary.

(5)    In **Content** select the XRG Parameter to be displayed.

### 6.2.9        Enable/disable Create DR Sequence button

(1)        Go to: **General Configuration → Workflow Management → Identification**

(2)        Enable/disable the **Create DR sequence button** according to the customer workflow.
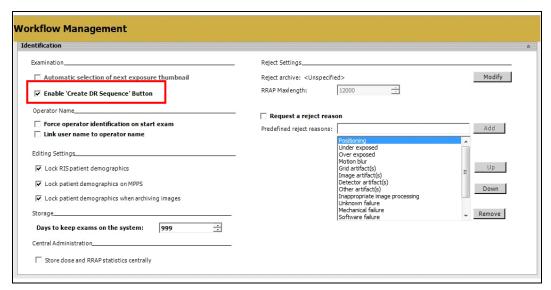


Figure 41

### 6.2.10      Activate the configuration

Apply the configuration settings. In the Configuration Tool menu select:

**File → Activate Configuration**

# 7      Customer Training and Hands-on Assistance

## 7.1      Training Prerequisites and Preparation

For a successful training the following assumptions should be met:

- DX-D 400 is fully installed, configured and functional.

- Date of training is defined.

- List of persons to be trained is available.

- The recommended maximum number per training group is 4 participants.

- No interruptions during training and hands-on assistance may occur.

## 7.2 Training Checklist – General Topics

<table>
<tr>
<td colspan="3"><h3 align="center">DX-D 400 - Checklist for Customer Training</h3></td>
</tr>
<tr>
<td colspan="3"><strong>Site:</strong>      <strong>Location:</strong>      <strong>Date:</strong></td>
</tr>
<tr>
<td colspan="3"><strong>Goal:</strong><br/>After the training the customer should understand the workflow of the DX-D 400 and know how to use the documentation.</td>
</tr>
<tr>
<td><strong>Topics:</strong></td>
<td><strong>Done</strong></td>
<td><strong>Reference</strong></td>
</tr>
<tr>
<td colspan="3"><strong>General Topics</strong></td>
</tr>
<tr>
<td>

- Intended Use
- Available User Manuals
- System Overview
- "Emergency Stop" button(s)
- Safety directions

</td>
<td>☐</td>
<td><em>0232 DX-D 400 User Manual</em></td>
</tr>
<tr>
<td>

- Start-up and Switch off Procedure DX-D 400
    - Start-up Routine
    - Shut-down Routine
    - Rules for detector warm-up
    - X-ray tube warm-up procedure
- Cleaning and disinfection
- Periodic Maintenance

</td>
<td>☐</td>
<td><em>0232 DX-D 400 User Manual</em></td>
</tr>
<tr>
<td colspan="3"><strong>End</strong></td>
</tr>
</table>

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## 7.3     Training Checklist – X-Ray Unit

| DX-D 400 - Checklist for Customer Training | | |
|---|---|---|
| **Site:**          **Location:**          **Date:** | | |
| **Goal:**<br>Training participant knows the different controls of the DX-D 400. | | |
| **Topics:** | **Done** | **Reference** |
| **Floor Mounted Tube Stand** | | |
| •      DX-D 400 Analog Control Panel<br>        or<br>        DX-D 400 Digital Control Panel<br>     o    Movements of column<br>     o    Movement of the Tube-Collimator Assembly<br>     o    Light indicators<br>     o    Angle and SID display (digital control panel only)<br>•   Column Rotation Control | ☐ | *0232 DX-D 400 User Manual* |
| **RAD Table** | | |
| •      Fixed Height Table / Elevating Table<br>     o    Emergency switch<br>     o    Circuit breaker<br>     o    Table top lock switch<br>     o    Bucky handle (CR)<br>     o    Cassette tray (CR)<br>•      Fixed Height Table<br>     o    Table - top brake pedal<br>           (longitudinal and transverse motion)<br>•      Elevating Table<br>     o    Table - top movement pedals (longitudinal and<br>           transverse motion, up and down) | ☐ | *0232 DX-D 400 User Manual* |
| **RAD Wall Stand** | | |
| •      Bucky table top<br>     o    Grooves for standard accessories<br>     o    Chin rest support<br>     o    AEC detector areas | ☐ | *0232 DX-D 400 User Manual* |

| DX-D 400 - Checklist for Customer Training | | |
|---|---|---|
| **Topics:** | **Done** | **Reference** |
| **RAD Wall Stand (continued)** | | |
| • Controls for<br>  o Vertical lock of bucky assembly<br>  o Bucky assembly rotation<br>  o Manual tilting of bucky<br>• Cassette tray (CR) | ☐ | |
| **Grid** | | |
| • Kind of grid used in table and wallstand<br>• General rules for using grids, e.g. SID, Range of SID | ☐ | *0232 DX-D 400 User Manual* |
| **Collimator** | | |
| • Manual Collimator<br>  o Push-button to switch on the Collimator Lamp<br>  o Knobs to open or close the internal blades of the Collimator<br>• Automatic Collimator (CR)<br>  o Collimator Display<br>  o Motorized Blade Control<br>  o Manual Blade Control<br>  o Automatic Mode Indicator (Green)<br>  o System not ready Indicator (Red)<br>  o Manual Mode Indicator (Yellow)<br>  o Manual Mode -- Setting of SID<br>  o Cassette-Film Size Memory<br>  o Collimator Lamp Control<br>  o Automatic cassette size sensing – ACSS<br>    (if table and wall stand are adapted accordingly) | ☐ | *0232 DX-D 400 User Manual* |
| **Check next page →** | | |

### 7.3.1    Training Checklist – Manual (Touch Button) Console

| **DX-D 400 - Checklist for Customer Training** | | |
|---|:---:|---|
| **Topics:** | **Done** | **Reference** |
| **Manual (Touch Button) Console → In case the system is installed with softconsole, see next list** | | |
| • Radiographic and General Controls<br>  o Power on/off<br>  o Workstation Selection<br>  o Focal Spot Indicator<br>  o Radiographic Parameter | ☐ | *0232 DX-D 400 User Manual* |
| • Automatic Exposure Control<br>  o Activation of AEC<br>  o Exposure Detector Fields (Ion Chamber)<br>  o Film/Screen Combination<br>  o Density Compensation<br>  o AEC Reset | ☐ | |
| **The Anatomical Programmer (APR)** | | |
| • APR display<br>• APR selectors<br>• APR regions, views and projections<br>• Patient size<br>• "Store" button (how to manually rewrite and store the exposure technique)<br>• "Modify" button (only for key users):<br>  o Restore Default<br>    - Replace the data stored in the "APR Working File" with the data stored in the "APR Backup File"<br>  o Edit<br>    - Create, modify or delete the APR techniques<br>    - Change the operator password<br>    - Transfer APR Techniques to APR Backup File<br>  o Exit<br>    - Back to the Main APR screen | ☐ | *0232 DX-D 400 User Manual* |
| **Check next page →** | | |

| **DX-D 400 - Checklist for Customer Training** | | |
|---|---|---|
| **Topics:** | **Done** | **Reference** |
| **Exposure Controls and Status Indicators** | | |
| • X-Ray Handswitch<br>Two stages (Preparation and X-Ray exposure)<br>Advise the radiographer to verify the exposure settings for correctness before doing the exposure.<br><br>• "Ready" indicator<br><br>• "X-Ray" on | ☐ | *0232 DX-D 400 User Manual* |
| **SELF- DIAGNOSIS INDICATORS** | | |
| • Door open<br><br>• Generator overload<br><br>• Tube overload<br><br>• Rotor error<br><br>• Heat<br><br>• Tech | ☐ | *0232 DX-D 400 User Manual* |
| **End** | | |

### 7.3.2     Training Checklist – Soft Console

| Software Console → in case system is installed with hardconsole see checklist before | | |
|---|---|---|
| • Top Pane<br><br>  o Operational Status Bar with:<br>    - Device status (filtering, grid, alignment status, etc.)<br>    - DAP display frame<br>    - Error status bar<br><br>• Generator Tab<br><br>  o Radiographic Parameters<br><br>  o Focal Spot Indicator<br><br>  o Automatic Exposure Control<br>    - AEC chamber selection<br>    - Sensitivity<br>     If it is necessary to adapt the cut-off dose, train not to change the *Sensitivity*, but to use the function *Density* instead.<br>    - Density<br>    - Patient thickness | ☐ | *0289 DX-D Software Console User Manual*<br><br>*Application Note - NX configuration items in DR systems_max mAs and mA (Document ID: 43122034)* |
| **X-ray Generator Control** | | |
| • Buttons to switch on and off<br><br>• X-Ray Handswitch<br>Two stages (Preparation and X-Ray exposure)<br><br>Advise the radiographer to verify the exposure settings for correctness before doing the exposure. | ☐ | *0232 DX-D 400 User Manual* |
| **End** | | |

## 7.4        Detector

### 7.4.1        Wireless Detector - DX-D 30C/35C

<table>
<tr><td colspan="3"><h3 style="text-align:center">DX-D 400 - Checklist for Customer Training</h3><p style="text-align:center">Wireless Detector DX-D 30C/35C</p></td></tr>
<tr><td><strong>Site:</strong></td><td><strong>Location:</strong></td><td><strong>Date:</strong></td></tr>
<tr><td colspan="3"><strong>Goal:</strong><br>Training participant knows how to work with the wireless detector.</td></tr>
<tr><td><strong>Topics:</strong></td><td><strong>Done</strong></td><td><strong>Reference</strong></td></tr>
<tr><td>Starting the DX-D 30C/35C<br><br>• Attachment of a fully charged battery pack<br><br>• Switch on the detector</td><td>☐</td><td><em>0197 EN UM DX-D 30C</em></td></tr>
<tr><td>Stopping the DX-D 30C/35C<br><br>• Turn off detector<br><br>• Remove battery pack</td><td>☐</td><td></td></tr>
<tr><td>Detector status information</td><td>☐</td><td></td></tr>
<tr><td>Charging the battery and information about charge status</td><td>☐</td><td></td></tr>
<tr><td>Information about grid specification and how to attach the grid (optional)</td><td>☐</td><td></td></tr>
<tr><td>• Labels on the DR detector<br><br>• Positioning the DR Detector<br><br>• Detector orientation<br><br>• Charging the detector<br><br>• Use of protective plastic bag<br><br>• Cleaning and Disinfection</td><td>☐</td><td><em>Not applicable</em></td></tr>
<tr><td colspan="3"><strong>End</strong></td></tr>
</table>

### 7.4.2 Wireless Detector - DX-D 40C/G and DX-D 45C/G

<table>
<tr><td colspan="3"><strong>DX-D 400 - Checklist for Customer Training</strong><br>Wireless Detector DX-D 40C/G / DX-D 45C/G</td></tr>
<tr><td colspan="3"><strong>Site:</strong>             <strong>Location:</strong>             <strong>Date:</strong></td></tr>
<tr><td colspan="3"><strong>Goal:</strong><br>Training participant knows how to work with the wireless detector.</td></tr>
<tr><td><strong>Topics:</strong></td><td><strong>Done</strong></td><td><strong>Reference</strong></td></tr>
<tr><td>Starting the DX-D 40C/G or DX-D 45C/G<br><br>•    Attachment of a fully charged battery pack<br><br>•    Switch on the detector</td><td>☐</td><td rowspan="5"><em>0290<br>DX-D 40C,<br>DX-D 40G<br>User Manual</em><br><br><em>0292<br>DX-D 45C,<br>DX-D 45G<br>User Manual</em></td></tr>
<tr><td>Stopping the DX-D 40C/G or DX-D 45C/G<br><br>•    Turn off detector<br><br>•    Remove battery pack</td><td>☐</td></tr>
<tr><td>Detector status information</td><td>☐</td></tr>
<tr><td>Charging the battery and information about charge status</td><td>☐</td></tr>
<tr><td>Information about grid specification and how to attach the grid (optional)</td><td>☐</td></tr>
<tr><td>•    Labels on the DR detector<br><br>•    Positioning the DR Detector<br><br>•    Detector orientation<br><br>•    Charging the detector<br><br>•    Use of protective plastic bag<br><br>•    Cleaning and Disinfection</td><td>☐</td><td><em>Not applicable</em></td></tr>
<tr><td colspan="3"><strong>End</strong></td></tr>
</table>

### 7.4.3    Wireless Detector DR 14C/G and DR10C

<table>
<tr>
<td colspan="3"><p align="center"><strong>DX-D 400 - Checklist for Customer Training</strong><br>Wireless Detector DR 14C/G and DR10C</p></td>
</tr>
<tr>
<td colspan="3"><strong>Site:</strong>           <strong>Location:</strong>                      <strong>Date:</strong></td>
</tr>
<tr>
<td colspan="3"><strong>Goal:</strong><br>Training participant knows how to work with the wireless detector.</td>
</tr>
<tr>
<td><strong>Topics:</strong></td>
<td><strong>Done</strong></td>
<td><strong>Reference</strong></td>
</tr>
<tr>
<td>Starting the DR 14C/G and DR10C<br><br>•  Attachment of a fully charged battery pack<br>•  Switch on the detector</td>
<td>☐</td>
<td rowspan="7"><em>0350<br>DR 14s<br>Detector<br>User Manual</em><br><br><br><br><em>0351<br>DR 10s<br>Detector<br>User Manual</em></td>
</tr>
<tr>
<td>Stopping the DR 14C/G and DR10C<br><br>•  Turn off detector<br>•  Remove battery pack</td>
<td>☐</td>
</tr>
<tr>
<td>Detector status information</td>
<td>☐</td>
</tr>
<tr>
<td>DR detector sharing<br><br>•  Linking of detector<br>Additional necessary information for the customer:<br><br>•  In case of DR detector sharing where the systems work in different sync mode (Exposync / Auto Trigger Mode): It is required to switch off / on the DR detector after linking.<br><br>•  Before linking a DR detector on another system, ensure that the last image has been transferred. Linking fails with error messages on NX (e.g. TRIMESS119) if there is still an image on the DR detector. In this case return to the WiFi range of the previous DR detector and wait until the image is transferred.</td>
<td>☐</td>
</tr>
<tr>
<td>Automatic exposure detection</td>
<td>☐</td>
</tr>
<tr>
<td>Charging the battery and information about charge status</td>
<td>☐</td>
</tr>
<tr>
<td>DR 10s / DR 14s specific characteristics to be known by customer:<br><br>•  When moving the DR 10s / DR 14s DR detector out of the WiFi range and moving back in the WiFi range, it may take up to one minute until the panel is reconnected and the thumbnail is ready for exposure.</td>
<td>☐</td>
</tr>
<tr>
<td colspan="3"><strong>Check next page →</strong></td>
</tr>
</table>

| | | |
|---|---|---|
| • For calibration the detector needs to have stable operating temperature. Before each exposure the detector temperature is compared with the temperature during calibration. In case of a deviation of ± 6°C a corresponding warning message is displayed. | ☐ | 0351 DR 10s Detector User Manual |
| Stand by (sleep) mode and switch off automatically <br><br> • Modes are activated after specific time (configurable) <br><br> • Sleep mode can be deactivated with a short delay: After selecting an exposure on the NX workstation. <br><br> • Automatically switch off: DR Detector must be started again using the power button. <br><br> Additional necessary information for the customer: The timers do not work in following cases: <br><br> • When in NX a thumbnail for DR 10s / DR14s is selected. <br><br> • When NX is not running. <br><br> • When the DR detector is out of Wi-Fi range. <br><br> • During DR detector calibration <br><br> • In case of a DR 10s / DR 14s related error | ☐ | |
| Information about grid specification and how to attach the grid (optional) | ☐ | |
| • Labels on the DR detector <br><br> • Positioning the DR Detector <br><br> • Detector orientation <br><br> • Charging the detector <br><br> • Use of protective plastic bag <br><br> • Cleaning and Disinfection | ☐ | *Not applicable* |
| **End** | | |

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### 7.4.4 Checklist for Customer Training "DR Detector Calibration"

<table>
<tr><td colspan="4"><strong>Checklist for Customer Training "DR Detector Calibration"</strong><br>DR Detector Calibration</td></tr>
<tr><td><strong>Site:</strong></td><td colspan="2"><strong>Location:</strong></td><td><strong>Date:</strong></td></tr>
<tr><td colspan="4"><strong>Goal:</strong><br>Training participant is able to calibrate the DR Detector.</td></tr>
<tr><td colspan="2"><strong>Topics:</strong></td><td><strong>Done</strong></td><td><strong>Reference</strong></td></tr>
<tr><td colspan="4"><strong>Calibrating the detector</strong></td></tr>
<tr><td colspan="2">Calibration Frequency</td><td>☐</td><td rowspan="2"><em>0134 DX-D DR Detector Calibration Key User Manual</em></td></tr>
<tr><td colspan="2">Calibration Workflow<br><br>•    Required material<br><br>•    Preconditions (e.g. warm-up of detector, …)<br><br>•    Procedure</td><td>☐</td></tr>
<tr><td colspan="4"><strong>End</strong></td></tr>
</table>

## 7.5      Checklist for Customer Training "NX Workstation"

| **Checklist for Customer Training "NX Workstation"** | | |
|---|---|---|
| **Site:**                    **Location:**                    **Date:** | | |
| **Goal:**<br>Training Participant is able to operate the NX workstation. | | |
| **Topics:** | **Done** | **Reference** |
| **NX General** | | |
| Explanation of the NX User Manual | ☐ | *NX User Manual* |
| Intended use and limitations of the system | ☐ | |
| **Basic Workflow** | | |
| Opening a patient from the RIS | ☐ | *NX Key User Manual* |
| Manually entering patient data | ☐ | |
| Composing the examination | ☐ | |
| Selecting and Performing X-Ray Exposures<br><br>• DR workflow<br><br>• CR workflow | ☐ | |
| Performing quality control | ☐ | |
| Editing possibilities<br>E.g. annotations | ☐ | |
| "Close and Send" Function | ☐ | |
| **Worklist Window** | | |
| Different panes:<br><br>• Search pane<br><br>• Worklist pane<br><br>• Closed Exams pane<br><br>• Manual Worklist pane<br><br>• Image Overview pane<br><br>• Action Buttons | ☐ | *NX User Manual* |
| **Check next page** → | | |

| Checklist for Customer Training "NX Workstation" | | |
|---|---|---|
| **Topics:** | **Done** | **Reference** |
| Browsing through the lists | ☐ | |
| **Examination Window** | | |
| Different panes:<br><br>• Patient pane<br><br>• Image Detail pane<br><br>• Image Overview pane<br><br>• Action buttons | ☐ | *NX User Manual* |
| Using Examination:<br><br>• Image indicators as modality status, status indication of DR detector and problem status<br><br>• Tools for performing basic QC (R,L marker, Flip, Rotate)<br><br>• Edit patient data<br><br>• Edit image data<br><br>• Finalizing the exam after the images have been received | ☐ | *NX User Manual* |
| **Editing Window** | | |
| Advanced editing possibilities:<br><br>• Adding annotations to an image and using measurement tools<br><br>• Rotating or flipping an image, show or hide square marker<br><br>• Zooming in or out on an image, applying shutters<br><br>• Working with collimation/cropping, collimation/cropping rules for DR and CR<br><br>• Cropping (DR) and Black border (CR)<br><br>• Use of window/level<br><br>• Adjusting the Musica² image processing parameters and explaining the impact of taste adjustments on images | ☐ | *NX User Manual*<br><br>*NX Service Manual, chapter 5, "Software Options − Musica² Image Processing Software"* |
| **Check next page →** | | |

| Checklist for Customer Training "NX Workstation" | | |
|---|---|---|
| **Topics:** | **Done** | **Reference** |
| **Editing Window (continued)** | | |
| Printing images (including Multi Patient Print) | ☐ | *NX User Manual* |
| Action buttons:<br>Reject, save as new, print sheet, send image, close<br>and send all | ☐ | |
| **Main Menu** | | |
| Different panes:<br><br>• Functionality overview pane<br><br>• Workspace area<br><br>• Image Overview Pane<br><br>• Action buttons (individually configurable) | ☐ | *NX User Manual* |
| Monitoring and Management<br><br>• Queue Management<br><br>• Delete Examination<br><br>• Lock Examinations | ☐ | *NX User Manual* |
| Quality assurance tasks<br><br>• Dose Consistency Reporting<br><br>• Repeat Reject Program<br><br>• Read and initialize cassettes (optional) | ☐ | *NX User Manual* |
| "Import" and "Export" Functions | ☐ | |
| **Check next page →** | | |

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| Checklist for Customer Training "NX Workstation" | | |
|---|---|---|
| **Topics:** | **Done** | **Reference** |
| **Training for optional Application Packs** | | |
| "NX 3.0 Features License":<br><br>• Full Screen Mode<br><br>• Configurable UI button to call up 3rd party application<br><br>• Forced entry of operator ID<br><br>• Mandatory Patient fields<br><br>• Multiple DICOM export destinations<br><br>• Export of technical or clinical images to hard disk<br><br>• Print entire study in one click | ☐ | *NX User Manual* |
| **Image Quality** | | |
| Highlight that the basic rules to create an X-ray exposure are still valid and important for the image quality (e.g. collimation of X-ray beam). | ☐ | *Not applicable* |
| Explain the usage of lead markers. | ☐ | |
| Explain the dependencies between X-ray dose, signal-to-noise ratio (SNR) and density. | ☐ | |
| Point out that modifications in the image processing may cause image details to get lost (exaggerated MUSICA settings). | ☐ | |
| Explain burning/clipping artifacts (exaggerated W/L settings). | ☐ | |
| Highlight that the scaling factor of images is independent of real body part size. | ☐ | *Not applicable* |
| Explain the meaning and usage of the "Exposure Index" (EI) as dose indicator, range of over/under exposure. | ☐ | |
| Explain the limitation of over/under exposure (dynamic range of a DR detector versus CR):<br>e.g. clipping provoked by a too high exposure | ☐ | |
| **End** | | |

# 8      DX-D 400 Glossary

| Term | Description |
|------|-------------|
| **AEC** | Automatic Exposure Control |
| **APR** | Anatomical Programmer |
| **ACSS** | Automatic Cassette Size Sensing |
| **Black border** | Function of MUSICA image processing software: The black border masks non-relevant image areas, which are outside the manually collimated image area. |
| **Collimation** | 1. Collimation at NX, performed by defining a new region of interest and consecutive re-processing of the image.<br><br>2. Collimation at X-Ray device, made by a diaphragm, an X-ray tube head attachment consisting basically of a sheet of lead with a hole that determines the size and shape of the primary beam. |
| **Cropping** | For DR: Region of Interest/Collimated Area is detected with same algorithm as for Black Border CR images. Non-relevant image areas are not masked, but cropped. |
| **DAP** | Dose Area Product (DAP), is a multiplication of the dose and the area exposed, often expressed in Gy x cm$^2$. |
| **meter** | Measurement tool to measure the DAP |
| **DI** | Deviation Index |
| **DX-D 400 M** | **M** stands for "manual version" of the DX-D 400 system |
| **EI** | Exposure Index |
| **Grid** | Also called anti-scatter-grid. A device constructed of alternating strips of lead and a radio-transparent medium (such as aluminum or plastic composites) which are oriented in such a way that most of the primary radiation will pass through the grid between the strips while most of the scattered radiation will intersect the lead strips and be absorbed. |
| **Grid ratio** | The ratio of the height of the lead grid strips to the distance between the strips. |
| **TEI** | Target Exposure Index |
| **µGy** | Microgray; an SI unit of absorbed dose equal to 10−6 grays.<br><br>SI = International System of Units |
| **XRDI** | X-ray Device Interface |

# 9       AGFA – DX-D 400 - Training and Instruction Protocol

After filling out this form, hand over a copy of the form to the Agfa project manager.

| Site Information |
| --- |
| [To be adapted locally:<br>e.g. name of site, name of contact person, site address<br><br>*Remove this blue text bloc from final version*] |

| DX-D 400 System Description | |
| --- | --- |
| **X-Ray System** | **CR System** |
| [To be adapted locally:<br>e.g. floor mounted X-ray Unit, Generator,<br><br>*Remove this blue text bloc from final version*] | [To be adapted locally:<br>e.g. digitizer<br><br><br>*Remove this blue text bloc from final version*] |

| Objective of Training |
| --- |
| DX-D 400 can be operated successfully. |

| Key Aspects |
| --- |
| [To be adapted locally, e.g.:<br>DX-D 400 workflow<br>Handling instruction of the X-Ray System<br><br>*Remove this blue text bloc from final version*] |

| Notes |
| --- |
| [To be adapted locally:<br><br>*Remove this blue text bloc from final version*] |

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## AGFA – DX-D 400 Training and Instruction Protocol

**Participants List**

| Date | Name, Title | Signature |
|------|-------------|-----------|
|      |             |           |
|      |             |           |
|      |             |           |
|      |             |           |
|      |             |           |
|      |             |           |
|      |             |           |
|      |             |           |
|      |             |           |
|      |             |           |

**Instruction carried out by:** _____

**Date:** _____

**Signature:** _____