Digital Mammographic unit with advanced technology Amorphous Selenium Flat Panel Detector
Digital Mammographic Unit, available with two different C-Arms:

**STANDARD C-ARM**

Standard C-Arm, with FFD 66.2 cm

**ISOCENTRIC C-ARM**

Isocentric C-Arm, with FFD 66.7 cm to eliminate the C-Arm height adjustments, when doing Cranio-Caudal ad lateral projections

**Milady DG is composed of:**

- Mammography Unit with X-Ray tube and Direct Conversion Amorphous Selenium Detector
  - 18 x 24 or 24 x 30 cm format
- Integrated X-Ray Control and image acquisition console
- Diagnostic station (optional)

**The mammographic unit is inclusive of:**

- High Frequency X-Ray Generator
- X-Ray tube
- Stand with vertical and rotational movement of the C-Arm
- Microprocessor controlled control panel
- Direct conversion Full Field Flat Panel Detector
- Keyboard over the defector for automatic image tagging
- AEC (Automatic Exposure Control) device
- ULTRA software for advanced exposure control
- μPress compression device
- Device for geometric magnification
- Auxiliary display on bottom unit
- Two emergency STOP push-buttons

**Standard accessories:**

- 18 x 24 cm normal breast shifted compression plate
- 9 x 21 cm straight compression plate for magnification
- Automatic filter Rh/Ag
- Automatic collimator
- Collimation plate for beam alignment
- Polycarbonate screen to keep patient’s face out of x-ray beam
- Two pairs of compression foot pedals
- Phantom for periodical system calibration
### TECHNICAL FEATURES

**H.V. GENERATOR**
- **Line voltage compensation**: AUTOMATIC
- **Inverter Technology**: Current fed, Mosfet bridge with output current limit capability and short circuit protection
- **Inverter Frequency**: 50 kHz
- **Ripple Frequency/Amplitude**: 100 kHz < 2%
- **Nominal Power**: 5.0 kW
- **kV range**: 20 / 35 kV
- **kV resolution (Man & Auto mode)**: 0.5 kV
- **kV precision**: ±1%
- **kV repeatability**: ± 0.1%
- **kV rise time**: ≤1.5 ms from 0 to 100%
- **kV display**: XX.X kV (3 digits)
- **mAs range**: from 1 to 640 mAs
- **mAs values according to R’20 series**: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 13, 16, 20, 25, 32, 40, 50, 63, 80, 100, 130, 160, 200, 250, 300, 400
- **mAs resolution (Automatic)**: 0.1 mAs
- **mAs display**: XXX.X mAs (4 digits)
- **Exposure Time**: Automatically selected as a function of selected mAs
- **Safety timer**: 10 s
- **Anode rotation speed**: 3,000 rpm 50 Hz, 10,000 rpm 150 Hz (optional)
- **Target material**: RT (Tungsten + Rhenium)
- **Maximum Anode Heat Content**: 225 kJ (300 kHU)
- **Maximum Anode Cooling rate**: 500 W
- **Maximum X-ray Tube Assembly Heat Content**: 320 kJ (440 kHU)
- **Housing continuous Heat Dissipation**: 80 W (108 HU/s)
- **Cooling method**: Free air convection
- **Anode Disc Target Angle**: 10° / 16°
- **Anode Disc Diameter**: 80 mm
- **Power**: 5600 W large 1400 W small
- **Focal spots**: 2
- **Focal spot size according to IEC 336**: 0.1 small 0.3 large
- **mAs range**
  - Small focus: 1/130 mAs (from 20 to 30 kV)
  - 1/100 mAs (from 31 to 35 kV)
  - Large focus: 1/300 mAs (from 20 to 24 kV)
  - 1/000 mAs (from 25 to 35 kV)
- **X-ray Window**: 0.5 mm Beryllium
- **Inherent filtration**: 0.0 mm Al IEC 522/1976
- **HVL measured at 28kV**: >0.3 mm Al equiv.
- **Total filtration**: >0.5 mm Al

**X-RAY TUBE ASSEMBLY**

**I.A.E. XM 1016 T**

- **Power**: 5600 W large 1400 W small
- **Focal spots**: 2
- **Focal spot size according to IEC 336**: 0.1 small 0.3 large
- **mAs range**
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- **X-ray Window**: 0.5 mm Beryllium
- **Inherent filtration**: 0.0 mm Al IEC 522/1976
- **HVL measured at 28kV**: >0.3 mm Al equiv.
- **Total filtration**: >0.5 mm Al
## TECHNICAL FEATURES

### FILTER PROPERTIES
- • 50 µm Rhodium: 0.51mm Aleq @ 28 kV, measured with W target and no additional filters
- • 50 µm Silver: 0.38mm Aleq @ 28 kV, measured with W target and no additional filters

### TUBE ASSEMBLY THERMAL OVERLOAD PROTECTION
- • With active temperature sensor under main CPU control: Upper limit temperature 65° outside tube assembly, HU and °C display available in technical menu

### DIGITAL FLAT PANEL DETECTOR
- • Top Cover: Carbon fiber 0.1 mm Al equivalent
- • Technology: Amorphous Selenium (a-Se)
- • Digitalization type: Logarithmic
- • Pixel Pitch: 85 x 85 µm
- • Resolution: 2016 x 2816 (18 x 24 cm format) 2816 x 3584 (24 x 30 cm format)
- • Active Area: 17.2 x 23.9 cm (18 x 24 cm format) 23.9 x 30.5 cm (24 x 30 cm format)
- • Selenium thickness: 200 µm
- • Depth: 13 bit
- • Fill factor: 70% geometric
- • MTF (Modulation Transfer Function): 52% a 5 lp/mm
- • DQE (Detector Quantum Efficiency): 0.58 (@ 1 lp/mm for exposure of 10 mR) 0.22 (@ 5 lp/mm for exposure of 10 mR)
- • Read Time: < 1.4 s
- • Time Between X-Ray Images: < 15 s (24 x 30 cm)

### AUTOMATIC EXPOSURE CONTROL
- • Controlled parameters: Auto kV / Auto mAs (ZERO POINT mode) Manual kV / Auto mAs (ONE POINT mode)
- • Auto parameters selection criteria: Dual mode: PRE and FAST
  - PRE: tissue composition based (parameters evaluated by short X-Ray exposure)
  - FAST: compressed breast thickness based
- • Sensitive area (only for PRE mode): Mosaic of 96 areas of detector automatically selected in function of breast size and projection

### IMAGE QUALITY
- • Spatial resolution: Complying with:
  - “European Guidelines for quality assurance in mammography screening”, third edition, and with
  - “Recommended specifications” for Quality assurance in mammography of American College of Radiology

### GRID
- • Bucky factor: 1.85
- • Ratio: 6:1
- • Lines/cm: 36
- • Contrast factor: 1.54
## TECHNICAL FEATURES

<table>
<thead>
<tr>
<th>C-ARM</th>
<th>F.F.D.</th>
<th>66.2 cm</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Motorized rotation</td>
<td>± 180° (90°/5 sec with acceleration and deceleration ramp for smooth operation)</td>
<td></td>
</tr>
<tr>
<td>• Display of angle rotation</td>
<td>On control panel and on auxiliary display</td>
<td></td>
</tr>
<tr>
<td>• Projection preset positions</td>
<td>Fully programmable at any position with audible alert (Manual rotation). Programmable projections LAT-OBL-CC-OBL-LAT and CW-CCW continuous rotation to any position over ± 180° (Motorized rotation)</td>
<td></td>
</tr>
<tr>
<td>• Vertical movement with respect to Breast support (C-ARM in vertical position)</td>
<td>618 mm min to 1323 mm max</td>
<td></td>
</tr>
<tr>
<td>• Patient protection</td>
<td>Removable Lexan screen for patient’s face protection</td>
<td></td>
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</tbody>
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<table>
<thead>
<tr>
<th>ISOCENTRIC C-ARM</th>
<th>F.F.D</th>
<th>66.7 cm</th>
</tr>
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<tbody>
<tr>
<td>• Motorized rotation</td>
<td>± 180° (90°/5 sec with acceleration and deceleration ramp for smooth operation)</td>
<td></td>
</tr>
<tr>
<td>• Display of angle rotation</td>
<td>On control panel and on auxiliary display</td>
<td></td>
</tr>
<tr>
<td>• Rotation for biopsy projections</td>
<td>Motorized ±15° microprocessor controlled</td>
<td></td>
</tr>
<tr>
<td>• Projection preset positions</td>
<td>Fully programmable at any position with audible alert (Manual rotation). Programmable projections LAT, OBL, CC, OBL, LAT and CW, CCW continuous rotation to any position over +/-180° (Motorized rotation)</td>
<td></td>
</tr>
<tr>
<td>• Vertical movement with respect to Breast support (C-ARM in vertical position)</td>
<td>750 mm to 1450 mm (motorized)</td>
<td></td>
</tr>
<tr>
<td>• Protection of examination field</td>
<td>Removable lexan screen</td>
<td></td>
</tr>
</tbody>
</table>

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<tr>
<th>ACR DISPLAY</th>
<th>Display</th>
<th>3 displays (7 segments) + 18 Leds</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Information</td>
<td>C-arm rotation angle</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Compression thickness</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Compression force</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Projection</td>
<td></td>
</tr>
</tbody>
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<thead>
<tr>
<th>AUTOMATIC COLLIMATOR</th>
<th>Light beam</th>
<th>By push-button and automatic switch ON when operating compression. Electronic timer</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Light intensity</td>
<td>≥ 150 lux</td>
<td></td>
</tr>
<tr>
<td>• Light BEAM collimation accuracy</td>
<td>according to IEC 601-1-3</td>
<td></td>
</tr>
<tr>
<td>• Mirror</td>
<td>with automatic OUT of FIELD function</td>
<td></td>
</tr>
<tr>
<td>• Formats</td>
<td>18 x 24 and 14 x 12 cm for magnification (with Detector 18 x 24 format)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>24 x 30 and 14 x 12 cm for magnification (with Detector 24 x 30 format)</td>
<td></td>
</tr>
</tbody>
</table>
### TECHNICAL FEATURES

**COMPRESSION SYSTEM**

- **μ PRESS**
- **Compression Plate movement**
  - Manual or motor driven
- **Compression Plates (standard for 18 x 24 cm)**
  - 18 x 24 cm shifted, 9 x 21 cm for magnification
- **Compression Plates (optional for 24 x 30 cm)**
  - 18 x 24 cm shifted, 24 x 30 cm shifted, 9 x 21 cm straight
- **Maximum free space available between Compression Paddle and image receptor**
  - 325 mm with shifted Compression Plates in Magnification Mode
    - (straight compression plate)
    - MAG. X2 = 131 mm
    - MAG X1.5 = 231 mm
- **Compression Thickness Display**
  - Displayed in mm
- **Compression plate release after exposure**
  - Selectable from control panel, automatic or manual for 2D biopsy
- **Compression plate aluminium equiv.**
  - Less than 0.2 mm Al (0.135 mm Al≈30 kV)
- **Compression Force adjustment**
  - Adjustable from 30 to 150N or 200N
- **Compression Force display**
  - Effective applied force with 0.1 kg resolution

**GEOMETRICAL MAGNIFICATION**

- **Small Focus selection**
  - Automatic once fitted
- **Magnification ratio**
  - x1.5 / x2

**DOSE CALCULATOR**

- **Calculated dose**
  - Average Glandular Dose (AGD)
- **Data visualization**
  - mGy on display, on Acquisition Work Station

**CONTROL PANEL**

- **Technology**
  - Microprocessor controlled with unique safety features exceeding IEC 601-1-4-1, all functions under active operator control
- **Display**
  - GRAPHIC LCD Display 240x128 dots
- **Alarm messages**
  - In several languages selectable
- **Special features**
  - Tube Thermal Unit display and active protection
  - Technical display for self-test and defective block identification, firmware release, exposure counter and last exposure time/date
- **Statistics function**
  - Average dose, amount of exposure for every kV value, amount of exposure in every test technique
- **Diagnostic functions**
  - Selectable service functions on LCD display for hardware testing of each specific board with input status display, single status display on ON/OFF function

**AUXILIARY DISPLAY**

- **Display**
  - 3 rows, 7 segments display
- **Information**
  - Compression force
  - C-arm rotation angle
  - Compression thickness

**FOOT PEDALS**

- **For compression**
  - Two pairs
## TECHNICAL FEATURES

### ACQUISITION STATION

- Workstation integrated with anti-x protective barrier for operator

- **DICOM Interface**
  - 3.0 MG modality
  - IHE conformity for the PIR, SWF and mammography profiles

- **Anti-X protection screen**
  - Integrated
  - Pb equivalence > 0.34 mm @ 35 kV

- **Acquisition software**
  - Complete of:
    - Remotized mammo control panel
    - Off-line images display and viewing
    - Local fully functional operational mode
    - Patient information local DataBase
    - Mammo tools to set the exposure parameters and the ACR view
    - PC tools to make operations on the local PC of the acquisition station:
      - Local opening of new studies (i.e. not from the worklist)
      - Local studies storing (i.e. in the internal memory of the acquisition station)
      - Local studies reloading (i.e. in the internal memory of the acquisition station)
      - Local database managing
    - Graphic tools to manipulate images:
      - Selection and positioning of images to display
      - Display protocol with ACR predefined views
      - Current session loaded images
      - GOP® images enhanced (GOP® is a post-processing algorithm specific for mammography that enhance the quality of the acquired images)
      - Fit to window, Zoom, Pan, Magnification lens
      - 1:1, Effective size
      - AOI operations
      - DICOM W/L, High/Very High/Skin contrast
      - Histograms
      - Override ACR settings
      - Mirroring operations on ACR standard views (CC, MLO)
    - DICOM tools:
      - Worklist studies opening and closing
      - Sending of locally stored studies to the appropriate RIS server
      - Studies printing
      - Studies recording on CD/DVD

- **HIS-RIS-PACS Interface**

- **Conformities:**
  - DICOM 3.0 MG:
    - DICOM STORE SCU
    - DICOM PRINT SCU
    - DICOM WORKLIST MANAGEMENT SCU
  - IHE (PIR-Patient Information Reconciliation, SWF-Scheduled Workflow, MI-Mammography Image)
  - CONNECTATHON 2007
**Environmental Conditions**

- Storage and delivery conditions (while packed): Detector special transport package.
- Operating conditions:
  - Temperature: +20°C / +25°C (24h)
  - Barometric pressure: 700 hPa/1060 hPa (24h)
- Protection degree according to standard: IEC 529 IP 10
- Heat dissipated in max load condition of 35 kV 500 mAs (1 shot every 5 minutes): 316 kCal/h

**EnvironMental ProtEction and WastE disPosaL**

Device contains some of its parts and subassemblies, solid and liquid substances that must be disposed only by designated companies according to local laws. More specifically, device contains:

- Tube assembly: Beryllium, lead, glass, dielectric oil (PCB free), other metals and plastic.
- H.V. transformer: Dielectric oil (PCB free), plastic, copper other metals.
- Other subassemblies: Plastic, other metals, electronic components, glass-epoxy printed circuits, amorphous selenium.

**Diagnostic Station**

- The Viewing/Reporting Diagnostic Station is inclusive of:
  - Workstation with DVD Recorder
  - Software for image management and processing:
    - Configurable viewing protocols
    - Fast scroll and positioning of images on displays
    - Enability to set personal menu of graphic windows for any user
    - Enability to annotate, mark and export key images
    - DICOM 3.0 MG Conformity:
      - DICOM STORE SCU
      - DICOM PRINT SCU

**Very High Resolution Dual Headed Digital Flat Panel Display System (5 Megapixel)**

- Display Type: AMLCD (Active Matrix Liquid Crystal Display)
- Viewable Size: 21.3” diagonal
- Display Resolution:
  - Portrait: 2048 x 2048 pixels
  - Landscape: 2560 x 2048 pixels
- Contrast Ratio: 600:1
- Brightness: 700 cd/m2
- Viewing Angle: 170° H/V
- Shades of gray: 3061
**TECHNICAL FEATURES**

**CLASSIFICATION (IEC 601-1)**

- Protection against electric shock: Class I, with type B applied parts.
- Protection against harmful ingress of water: IPX0
- Degree of safety in the presence of flammable anesthetics mixture with air or oxygen or nitrous oxide: Not suitable for use in the presence of Flammable Anesthetics Mixture with air or oxygen or nitrous oxide
- Mode of operation: Continuous operation with intermittent loading

**MAINS CHARACTERISTICS**

- Line voltage: 220/230/240 Vac ±10% 50/60 Hz
- Power: 6.6 kVA (0.5 kVA stand-by)
- Current absorption: 30 A peak
- Number of phases: 1 or 2 configurable
- Connection: Permanently installed (IEC 601-1)
- Maximum apparent resistance: 0.50 Ω

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**Dimensions in mm**

**ISOCENTRIC C-ARM**

- h max 1450 mm
- h min 750 mm

**STANDARD C-ARM**

- h max 1323 mm
- h min 618 mm

**Dimensions in mm**

The images depict the dimensions of the isocentric and standard C-arms, with specific measurements for height in both maximum and minimum configurations.
Specifications subject to change without prior notice. Les caractéristiques peuvent être modifiées sans préavis.

Milady DG
Digital Mammographic Unit

Dimensions in mm

ACQUISITION STATION

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