

# XFM

## Mobile Digital Radiography System with Wireless Flat Panel Detector

Product Data



REV. 9 (September 2017)

## XFM

XFM is ITALRAY mobile digital radiography system with wireless flat panel detector designed to perform x-ray examinations and diagnostic investigations both in the department (Operating Room, Sports Medicine, Emergency Department, Paediatrics, Orthopaedics, and ICU) and in the ward.

With this innovative unit, ITALRAY matches the portability and ease of use of its mobile systems with the innovation of digital technology for the optimization of both image quality and patient dose, and for the immediate availability of diagnostic images through the hospital network (Full DICOM).

XFM is strongly characterized by its extremely light weight (less than 300 kg with motorization kit!), easy manoeuvrability, compact design and limited overall dimensions. This grants for easy moving around every hospital with perfect visibility.

The control panel is a large area 19" LCD high-contrast touch-screen console that can be used also wearing protective gloves. The XFM GUI provides easy access to any available feature through its intuitive and large buttons and manage acquisition of digital radiographic images by means of a portable digital flat panel detector. This portable detector is battery powered and extremely lightweight and it employs wireless image data transmission, thus freeing the room from cumbersome and risky cables.

XFM is supplied with a 40 kW high-frequency microprocessor controlled generator, for shorter exposure times, with a rotating anode with double focus.

More than 1000 anatomical programs (APR) for adult and paediatric applications are available with possibility to perform examinations with two and three point technique. Pre-programmed Anatomical Programs facilitate exam execution and increase system productivity.

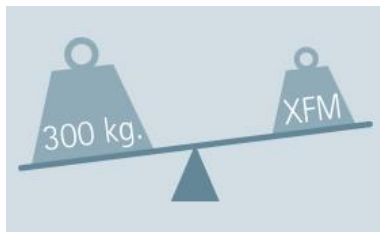
An optional light weight lithium (Li-ion) battery package makes XFM completely "exposure independent" from wall power for very long time (up to 8 hours), allowing extensive operation and more portability since no cable will encumber system positioning.

XFM can be equipped with an optional motorization kit, which together with its extreme light weight, increases system manoeuvrability and grants the user a "one-handed" driving experience. A highly reliable active anti-collision system assures safe transport within every hospital environment.

**MAIN CARACTERISTICS**

**EXTREMELY LIGHT WEIGHT**

XFM is strongly characterized by its extremely light weight (270 kg for standard version, and just 298 kg with motorization), easy manoeuvrability, compact design and limited overall dimensions.



**LIGHTWEIGHT WIRELESS FLAT PANEL DETECTOR WITH BATTERIES**

The portable digital flat panel detector featuring amorphous Silicon (a-Si) technology is battery powered and extremely light weight. It employs wireless image data transmission, thus freeing the room from cumbersome and risky cables.



**RECHARGING FLAT PANEL DETECTOR**

Flat panel detectors are provided with 2 Lithium rechargeable batteries and 1 external battery recharger. Furthermore, XFM has a dedicated bin that keeps the flat panel, if inserted, always in charge and system is all turn on. If the system is turn off, the flat panel is NOT in charge.



**XFM GRAPHICAL USE INTERFACE**

XFM GUI provides an easy and intuitive access to any available feature through its large icons, on the lateral toolbar



**MAIN CARACTERISTICS**

**TRANSPORT BAR WITH SPEED CONTROL JOYSTICK**

XFM can be equipped with an optional motorization kit, which together with the extreme light weight, increases system manoeuvrability and grants the user a "one-handed" driving experience.



A dedicated joystick positioned on the handle bar controls speed and fwd/rwd direction.

**OVER BOOST**

The Over boost feature<sup>(\*)</sup> available on motorized systems allows to momentarily increase the motor power which can be necessary in particular situations ( overcoming of obstacles, high slopes of more than 12°, rapid movements in confined spaces , ... ).



**EXTEND OPERATION AND PORTABILITY WITH LI-ION BATTERY PACK <sup>(\*)</sup>**

Li-ion battery package completes its charge in less than 2,5 hours and, once fully charged, it provides the system a capacity of more than 350 exposures.  
In case of low battery charge, system can equally be connected to wall power supply in order to proceed with examination.



Li-ion battery technology grants very good power stability even when battery is below 5% of its charge. This means that, exposures can be taken even when battery charge is almost down.  
Li-ion batteries assures high typical state of charge values and high cycle life, and strong steady battery capacity for temperature variations and high discharge rates.

**HIGH FREQUENCY GENERATOR**

XFM is equipped with a 40 kW microprocessor controlled and high-frequency inverter type generator

Maximum operating voltage reaches 125 kV (**130 kV<sup>(\*)</sup>**) and maximum current 500 mA

Short exposure times, are strongly needed for the radiological examinations requested to this kind of device.

<sup>(\*)</sup>Optional

**MAIN CARACTERISTICS**

**SID MEASUREMENT AND DISPLAY**

Contactless electronic meter with LCD display for SID



**ROTATING (±90°) SWIVEL ARM**

The rotating swivel arm gives the flexibility you have always wanted for a mobile X-ray system: its ±90° rotation provides all the necessary freedom to position the unit for bottom bed and bedside examinations.



**CONTROL AND SAFETY**

**COLLISION PREVENTION**

A unique active contact-less anti-collision system automatically stops the system whenever an obstacle is detected within ±45° (angle) along movement direction. Driver is informed of the obstacle also with visual alerts.



Anti-collision system can be easily disabled when positioning the system next to patient bedside or in narrow spaces.

**SHARING SOLUTIONS**

The wireless digital flat panel detectors can also be shared with ALL other ITALRAY DR and DRF systems, for a maximum optimization of investment.



## TECHNICAL SPECIFICATIONS

### MECHANICAL CHARACTERISTICS

|  |  |
|--|--|
| X-ray monoblock arm rotation                   | ± 90°  |
| X-ray monoblock arm rotation (horizontal axis) | -90° / +180°   |
| X-ray monoblock frontal rotation               | ±90°   |
| Collimator rotation                            | 0° / +90°  |
| Width  | 67 cm  |
| Length   | 125 cm   |
| Height (parking position)                      | 161 cm   |
| Max SID from floor                             | 202,3 cm   |
| Min SID from floor                             | 61 - 60,4 cm (parking position)                                    |
| Max arm extension                              | 112,5 cm   |
| Braking system                                 | Dead man braking system  |
| Weight [kg]                                    | 273 kg (without motorization kit) – 298 kg (with motorization kit) |
| Motorized system movement                      | Yes <sup>(*)</sup>   |

### BATTERY KIT <sup>(\*)</sup>

|                  |                |
|------------------|----------------|
| Type             | Li-ion         |
| Recharging time  | Max. 2,5 hours |
| Battery capacity | 40 Ah          |

### MOTORIZATION KIT <sup>(\*)</sup>

|  |  |
|--|--|
| Max speed  | 2,5 Km/h (up to 5,5 km/h with <b>over-boost</b> option)  |
| Max. ramp angle                                      | 12°  |
| Max. step height                                     | 2 cm   |
| Anti-collision system supplied with motorization kit | Frontal contact less anti-collision sensor that reduces the system speed, whenever an obstacle is detected in front of the machine during system movement. |
| Movement when completely out of batteries            | It is possible thanks to lightweight and comfortable ergonomics  |

<sup>(\*)</sup> Optional

## TECHNICAL SPECIFICATIONS

### RADIOLOGICAL CHARACTERISTICS

|   |  |
|---|--|
| Switching frequency   | 40 kHz   |
| Output power  | 40 kW  |
| Low ripple  | < 1% at max power  |
| kV range  | 40 – 125 kV (130 kV <sup>(*)</sup> ). Precision: 1kV   |
| mA range  | 50 - 500 mA  |
| Range mAs   | 0,5 - 400 mAs (27 steps)   |
| Time range  | 0,001 - 6,3 s  |
| Maximum monoblock heat content  | 1103 kHU   |
| APR   | More than 1000 anatomic programs. 3 points technique and 2 points technique.   |
| Automatic Exposure Control (AEC)                                      | 3-field solid state sensors <sup>(*)</sup>   |
| Dose Area Product (DAP)   | YES, with dose information stored in image DICOM header <sup>(*)</sup>   |
| X-ray tube type   | Rotating anode   |
| Anode speed   | - 3.000 rpm<br>- Up to 10.000 rpm <sup>(*)</sup>   |
| Anode angle   | 15°  |
| Focal spots   | Small focus: 0,6 x 0,6 mm - Large focus: 1,25 x 1,25 mm  |
| Max power   | 14 kW (s.f.) – 40 kW (l.f.)  |
| Anode material  | RTM  |
| Radiation field   | 43x43 cm @ SID=1 m   |
| Filtration  | Total: 3,7 mm Al (Inherent 0,7 mm + 1 mm additional + 2 mm collimator)   |
| Maximum anode heat content  | 225 kJ (300 kHU)   |
| Maximum continuous anode heat dissipation                             | 750 W (60 kHU/min)   |
| Safety devices  | - Protection and automatic control of filament current.<br>- Protection from over current and over voltage (kV, mA).<br>- Protection from maximum load of X-Ray tube.<br>- Operator error or malfunctioning indication |
| X-ray emission and image acquisition when completely out of batteries | Yes, just with connection to the mains   |
| X-ray emission and image acquisition without connection to the mains  | Yes, with Li-Ion batteries (up to 350 exams with a single full charge, referring to a Chest exam with: 80 kV, 200 mA /12 mAs)  |
| X-ray push button   | - Manual with double click and 4 m extensible cable<br>- Wireless <sup>(*)</sup>   |

<sup>(\*)</sup> Optional

## TECHNICAL SPECIFICATIONS

### COLLIMATOR

|                                       |  |
|---------------------------------------|--|
| Blade control                         | Manual, 6 pairs  |
| Light field source                    | Halogen lamp 100 W.<br>Led lamp (>250 lux @ SID=1m) <sup>(*)</sup>   |
| Time on                               | Standard: 30 s (adjustable)  |
| Collimation                           | Square field, up to 48 x 48 cm @ SID=1 m   |
| Al eq contribution to total filtering | 2 mm Al eq   |
| Additional filtration                 | Additional filters are available for paediatric applications: <ul style="list-style-type: none"> <li>- 0 mm Al eq</li> <li>- 1 mm Al eq + 0,1 Cu</li> <li>- 1 mm Al eq + 0,2 Cu</li> <li>- 2 mm Al eq</li> </ul> |
| SID measurement and display           | <ul style="list-style-type: none"> <li>- Extensible meter (at collimator window)</li> <li>- Optical meter with a display on the cover of monoblock</li> </ul>  |

<sup>(\*)</sup> Optional



## TECHNICAL SPECIFICATIONS

### DIGITAL IMAGING SYSTEM

| <b>FLAT PANEL DETECTOR</b>                         | <b>Mars 1717</b>                                     | <b>Mars 1417</b>            |
|--|--|-----------------------------|
| Technology   | Amorphous silicon                                    |                             |
| Scintillator                                       | Cesium Iodide (CsI)                                  |                             |
| Format (ISO 4090)                                  | 43x43 cm (17"x17")                                   | 35x43 cm (14"x17")          |
| Active detector matrix<br>(Effective Pixel matrix) | 3072 x 3072 pixels                                   | 2304 x 2800 pixels          |
| Pixel pitch  | 139 $\mu$ m  | 150 $\mu$ m                 |
| Detector Battery Indicator and Charger             | Yes and charger for up to 2 batteries simultaneously |                             |
| Battery charge duration                            | 2,5 hours  |                             |
| Max.load capacity                                  | 100 kg   |                             |
| Typical DQE<br>(@ 0lp and RQA5, per IEC 62220-1)   | 52%  |                             |
| Spatial resolution                                 | 3,6 lp/mm  | 3,3 lp/mm                   |
| Weight   | 4,8 kg (including battery)                           | 3,82 kg (including battery) |

## TECHNICAL SPECIFICATIONS

### ACQUISITION WORKSTATION

#### HARDWARE

|                        |   |
|------------------------|---|
| HDD                    | 320 GB (SATA) + 64 GB (MSATA)             |
| CPU                    | Intel                                     |
| RAM                    | 4 GB RAM DDRIII                           |
| CD/DVD recorder        | Yes                                       |
| Operating system       | Windows Embedded                          |
| UPS                    | Yes                                       |
| Image storage capacity | More than 25.000 images (full resolution) |

#### SOFTWARE

|                         |   |
|-------------------------|---|
| Image acquisition times | For diagnostic image: < 10 s<br>For preview image: 3 s  |
| Image size              | Max 15 MB (12,5 MB typ.)  |
| Image enhancement       | Everest-X   |
| Display functions       | Image Flip/Mirror, R.O.I., Pan/Zoom, Window/Level, Automatic Window/Level, Annotations, Linear and angular measurements, Greyscale Inversion, Image Rotation, Electronic Collimators, Spatial Filters, Multi-Images Visualization |
| APR                     | Yes, preconfigured and editable   |
| Exposure Index          | Yes   |
| Deviation Index         | Yes   |
| Reject analysis         | Yes   |
| Multi-language          | English, Italian, Russian, French, Spanish.   |
| Operator interface      | Rear-lit High-Contrast 1280x1024 19" LCD touch screen display for all the operating parameters and messages for any possible anomalous conditions. <b>It can be used also wearing protective gloves</b>                           |

#### IMAGE DISPLAY SYSTEM

|            |  |
|------------|--|
| Type       | LCD touch screen with capacitor technology |
| Size       | 19"  |
| Resolution | 1280 x 1024                                |
| Contrast   | 2000:1                                     |
| Brightness | 600 cd/mq led                              |

<sup>(\*)</sup> Optional

**TECHNICAL SPECIFICATIONS**

**NETWORKING**

**DICOM functions**

|                                    |   |
|------------------------------------|---|
| DICOM Storage (SCU)                | Yes. Send Image to PACS   |
| DICOM Modality worklist (SCU)      | Yes. Interface with HIS / RIS with auto refresh option  |
| DICOM Print management Class       | Yes. Covers the general cases of printing medical images in standardized layouts.   |
| DICOM Media exchange (DICOM DIR)   | Yes <sup>(*)</sup> . Patient images export to DVD/CD  |
| DICOM MPPS (SCU)                   | Yes <sup>(*)</sup> . Send the status of exams to HIS / RIS  |
| DICOM Storage commitment (SCU)     | Yes <sup>(*)</sup> . Send commitment status   |
| DICOM Verification (SCU)           | Yes <sup>(*)</sup>  |
| DICOM Query / Retrieve (SCU)       | Yes <sup>(*)</sup> . Query and retrieve images from PACS  |
| DICOM Grayscale print (SCU)        | Yes <sup>(*)</sup> . Support DICOM printers   |
| DICOM Structured Dose Report       | To exchange structured data produced in the course of image acquisition or post-processing.   |
| <b>IHE Integration Profile</b>     |   |
| Scheduled Workflow                 | Acquisition Modality : Patient Based Worklist Query / Assisted Acquisition protocol Setting / PPS Exception Management  |
| Patient Information Reconciliation | Acquisition Modality  |
| Consistent Presentation of Image   | Acquisition Modality  |
| Radiation Exp. Monitoring          | Acquisition Modality  |
| Network                            | 3x Ethernet 10/100/1000 Mbit, Base-T, RJ45 integrate  |
| Access point                       | WLAN (standard IEEE 802.11) <sup>(*)</sup>  |
| <b>REMOTE ASSISTANCE</b>           |   |
| Remote access                      | XFM is equipped with a remote service system that allows ITALRAY service engineers to have access the system via remote network for servicing and upgrading purposes. The remote servicing system availability is subordinate upon the technical/policy characteristics of the local Hospital network |

<sup>(\*)</sup>Optional

## TECHNICAL SPECIFICATIONS

### INSTALLATION DATA

|                          |  |
|--------------------------|--|
| Power supply             | Single phase, 230 Vac (110Vac optional) $\pm 10\%$ |
| Frequency                | 50/60 Hz   |
| Maximum Absorbed Current | 16 A   |

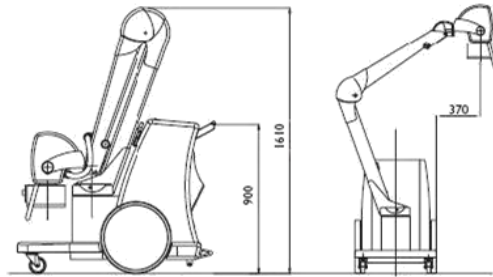
### ENVIRONMENTAL CONDITIONS

|                              |                      |
|------------------------------|----------------------|
| <b>OPERATING</b>             |                      |
| Temperature                  | +15°C ÷ +35°C        |
| Humidity                     | 20% ÷ 80%            |
| Atmospheric Pressure         | 600 mbar ÷ 1100 mbar |
| <b>TRANSPORT AND STORAGE</b> |                      |
| Temperature                  | -10°C ÷ +55°C        |
| Humidity                     | 20% ÷ 80%            |
| Atmospheric Pressure         | 500 mbar ÷ 1100 mbar |

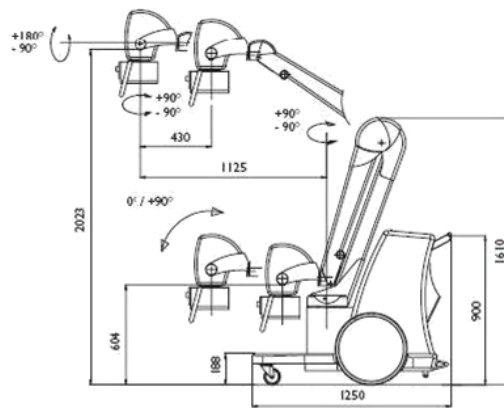
SIZE AND DIMENSIONS

XFM

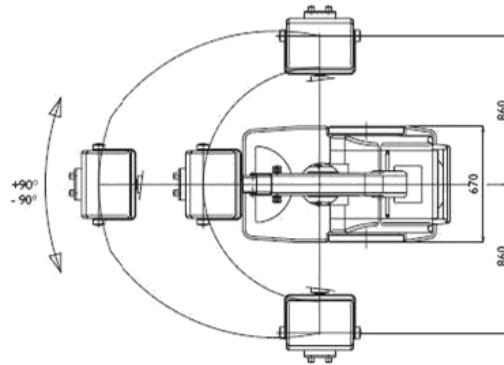
FRONT VIEW



LATERAL VIEW



TOP VIEW



**ACCESSORIES**

**APRON HANGER**



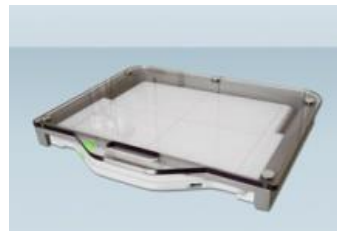
**VERSATILE STORAGE AREA FOR GLOVES, SWIPES, DISINFECTANT, ...**



**DOUBLE-CLICK WIRELESS CONTROL (\*)**



**WEIGHT DISTRIBUTION SUPPORT FOR WIRELESS DETECTOR (UP TO 350 KG) (\*)**



**CLIP-ON GRID SUPPORT WITH HANDLE (\*)**



(\*) Optional

## CERTIFICATION, INSTALLATION AND WARRANTY

### CERTIFICATION

According to European Directive 93/42 CEE XFM is a class II b device. XFM has been developed in compliance with the UNI EN ISO 9001:2008 and UNI EN ISO 13485:2012. Moreover, XFM complies with followings Technical Norms from CEI EN 60601-series:

- EN 60601-1 Medical electrical equipment. General requirements for safety Classification: CLASS 1; TYPE B
- EN 60601-1-2 Medical electrical equipment. General requirements for safety - Collateral standard: Electromagnetic compatibility – requirements and test
- EN 60601-1-3 General requirement for radiation protection in diagnostic X-Ray
- EN 60601-1-6 Medical electrical equipment. General requirement for basic safety and essential performance
- EN 60601-2-54 Medical electrical equipment. Particular requirements for the basic safety and essential performance of X-ray equipment for radiography and radioscopy
- EN 62304:2006 Medical device software; software life cycle processes

### INSTALLATION

Only authorized technical personnel that has been appropriately trained by ITALRAY can install XFM. Upon request, ITALRAY Installation Office can prepare system installation layouts (including eventual construction/electrical)

### WARRANTY

ITALRAY guarantees its products for one year from the delivery date. ITALRAY can offer to its customers a wide range of service plans that will perfectly fit all needs and preferences

**ITALRAY reserves the right to make modifications without any prior notice.**



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