



Alma-C

Product Data

DESCRIPTION

ALMA "C" is a mobile X-ray device with image intensifier and CCD camera manufactured for use in orthopedics, general surgery, interventional radiology, first aid use and Emergency room.

ALMA "C" is composed by a **counterbalanced C-Arm Stand** and a separate **trolley unit** on wheels with 2 medical grade high res 19 inch monitors (or one 24" monitor) and acquisition workstation with hard disk (memory device) to store acquired images.

The equipment allows for acquisition of X-ray images in the following modes:

- ❖ Continuous fluoroscopy with Low dose or Normal Dose. The high dose mode is OPTIONAL.
- ❖ Pulsed fluoroscopy, with Low dose or Normal Dose, lowering final radiation to patient, improving quality of single frame image and continuous working time. The high dose mode is OPTIONAL.
- ❖ Digital radiography (One shot)
- ❖ Standard radiography

ALMA C-Arm is extremely intuitive to use and easy to move, even in very difficult and restricted areas thanks to its **compact** and **light mechanical structure** (extensive use of aluminum alloy). The reduced footprint helps the unit to move around in very small environments and the wide C-Arm opening and depth permits precise movements and avoids any interference with the operating area.

ALMA "C" perfectly **balanced C-Arm** does not require continuous use of brakes in normal use.

The particular unit balance, the front wheels can be easily lifted in order to overcome any small obstacle that system encounters during its movement. Unit has a wide range of movements with dedicated color coded breaks and buttons to automatically move the C-arm vertically (motorized). Rear wheels are parallel and rotate through the use of a dedicated handle on the C-arm. Front wheels are rotatable and equipped with cable pushers.

A 10" touch screen console, placed in the top part of the system, gives the operator the complete control of all operative parameters settings and viewing all messages of alarm/fault conditions.

The X-ray generator is microprocessor controlled and operates at High Frequency (40 kHz) to guarantee precise and stable high-tension generation. Depending on the tube anode type (either stationary or rotating) two versions of ALMA "C" are available as version with fixed anode and version with rotating anode. The fixed anode provides generator power of **3.5 kW**; for rotating anode, standard generator power is **3.5 kW** and optional **5 kW**.

Thanks to the Real Time processing tools like automatic Brightness/Contrast, Edge Enhancement and Recursive Filtering for noise reduction and thanks to the CCD sensor, the equipment provides very high-quality images.

C-ARM STAND



MONITOR UNIT

Monitor unit with:

- ❖ Live monitor
- ❖ Reference monitor
- ❖ Both medical grade 19" LCD rotatable monitors
- ❖ Patient information, kV - mA values and cumulative dose (*) always possible to be monitored on the live monitor.
- ❖ UPS module (*) allow fluoroscopy exposure without power from the main net

Possible configuration with one 24" LCD monitor



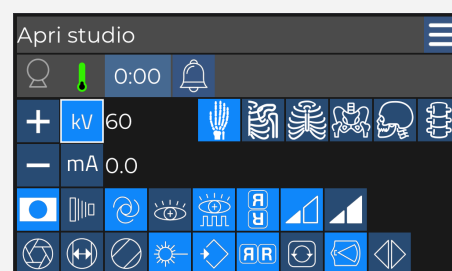
TOUCH SCREEN CONSOLE

A 10" touch screen console, housed in the top part of the rack, gives operator the complete control of all operative parameters settings and viewing all messages of fault conditions. Touch screen is well protected and disinfected (with no-alcoholic disinfectants).

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Anatomical programs:

- Up to 6 anatomical programs, divided per anatomical part of the body (optional) Manual and automatic control of kV, mAs
- Manual and automatic control of kV, mAs



(*) Optional

WIG-WAG
ROTATION

$\pm 12^\circ$ wig-wag movement rotation



CIRCULAR
(ORBITAL)
MOVEMENT

Orbital movement 130° ($-40^\circ / +90^\circ$)



ROTATION
MOVEMENT

Rotation movement $+180^\circ / -120^\circ$



ROTATING AND PROTECTED WHEELS

± 90° rear wheels with cable protection.
Thanks to the particular unit balance, the front wheels can be easily lifted in order to overcome small obstacles.



IMAGE INTENSIFIER

(9"/12") ALMA "C" image intensifier with one of the 2 handles for C-arm sliding



X-RAY OPERATING

Operator Interface

10" Touch screen display managed by a microcontroller board, which displays all operating parameters, anatomical techniques, possible error and status messages, cumulative exam dose in uGy (optional), adjustment of collimator aperture

Selectable Language

Italian, French, Spanish, English, German, etc.

Operating modalities

Radiography:

2 points technique (kV and mAs)

Fluoroscopy:

0 point technique with automatic control of kV, mA

1 points technique with manual control of kV

X-ray Command

Radiography:

Remote control with double click hand switch (PREP-X-RAY) and extension cable (4 m)

Fluoroscopy:

Remote control with multi function footswitch (2 m)

Accessories

24x30 cm cassette holder (optional), set of complete sterile covers (*), *integrated UPS (*)*, *Relè commanding warning light outside of the exam room (*)*

I.I. field selection

Selection of the Electronic Zoom according to the I.I. fields number. In this case the Iris collimator limits the X-Ray Field according to the selected I.I. field

Safety

- Electricity Supply
- mAmin and mAmax
- kV
- Max exposure time
- X-ray tube max temperature
- X-ray tube head thermal units count
- Filament
- Starter
- Anode rotation
- Microprocessor self-control
- Real time tube warming up indicator directly reported on the touch screen control panel

(*) Optional

**X-RAY
OPERATION**

Vertical run (motorized): 45 cm (travel speed 3.5cm/s)
 Horizontal run (motorized): 22 cm
 Lateral arc rotation: +180°/-120° (total 300°)
 Min/max length: 199.7/222.7 cm
 Max width: 85.4 cm
 Control console height: 81 cm
 Braking system: Color coded breaks for every movement with locking system
 Cable pushers: Equipped with cable pushers on C-Arm & Monitor Cart wheels
 Paint: Smooth and easily disinfectable paint permits easy cleaning. Sterile drapes for tube head and image intensifier
 Movement: Steering handle enables forward, lateral or diagonal movement.
 Parallel steering back wheels with parking position for movements along the patient table
 Rotating anterior wheel

**STATIONARY
C-ARM****C-ARM Sg (stationary)**

Image intensifier size: 9"
 Wig-wag: ±12°
 Orbital arc rotation: 130° (-40°, +90°)
 SID: 106.7 cm
 Arc depth: 70 cm
 Usable space between x-ray tube head and I.I.: 85.9 cm
 Min/max height: 187.4/232.5 cm

C-ARM S12 (stationary)

Image intensifier size: 12"
 Wig-wag: ±10°
 Orbital arc rotation: 124° (-34°, +90°)
 SID: 100.4 cm
 Arc depth: 67.8 cm
 Usable space between x-ray tube head and I.I.: 80.3 cm
 Min/max height: 187.4/232.5 cm

**ROTATING
C-ARM****C-ARM Rg (rotating)**

Image intensifier size: 9"
 Wig-wag: ±12°
 Orbital arc rotation: 130° (-40°, +90°)
 SID: 106.7 cm
 Arc depth: 70 cm
 Usable space between x-ray tube head and I.I.: 85.9 cm
 Min/max height: 187.4/232.5 cm

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X-RAY TUBE

Tube type: Dual focus
Inherent filtration: 0.7 mm Al Eq @ 75kV
Focal spots: 2
Total filtration: >3 mm Al
Additional filtration: 1mm Al

"S" (stationary) CEI OX/110/5

Anode heat capacity: 30 kHU
Anode cooling capacity: 22.68 kHU/min
Focal spot size: 0,5 x 0,5 mm (small focus) 1,5 x 1,5 mm (large focus)
Focal spot power: P_{max} = 1,3 kW (small focus) P_{max} = 4 kW (large focus)

"R" (rotating) IAE X22 / X20 P 3.5 or 5kW

Anode speed: 3000 rpm @ 50 Hz
Anode heat capacity: 200 kHU
Anode cooling capacity: 24 kHU/min
Focal spot size: 0,3 x 0,3 mm (small focus) 0,6 x 0,6 mm (large focus)
Focal spot power: P_{max} = 5 kW (small focus) P_{max} = 17 kW (large focus)

"R" (rotating) IAE RTM70H 15kW

Anode speed: 3000 rpm @ 50 Hz
Anode heat capacity: 300 kHU
Anode cooling capacity: 60 kHU/min
Focal spot size: 0,3 x 0,3 mm (small focus) 0,6 x 0,6 mm (large focus)
Focal spot power: P_{max} = 6 kW (small focus) P_{max} = 25 kW (large focus)

MONOBLOCK

Monoblock type: Oil cooling Monoblock with tube and generator located both on C-arm system

Generator type: Single phase 230V high frequency microprocessor-controlled inverter type

Generator operating frequency: 40kHz

Max. current (radio mode): 65 mA

Pulsed fluoro rate: Up to 2 pps

Continuous thermal distribution: 130W

Exposition time: 1s in digital radiography, no time limitation in fluoroscopy (limited by audible alarm going on every 5 mins) 40mS in digital radiography for 15kW model

mAs range: 1 ÷ 250 mAs (more than 40 steps)

Anatomical programs: Up to 6 anatomical programs, divided per anatomical part of the body (optional) Manual and automatic control of kV, mAs Manual and automatic control of kV, mAs

Anatomical techniques:

- Fluoroscopy:
 - 0 point technique with automatic control for kV and mA
 - 1 points technique with manual control of kV
- Radiography:
 - 2 points (kV, mAs)

"S" (stationary) CEI OX/110/5

Power: 3.5 kW

kV range: 40 ÷ 110 kV

Current range continuous mode: 0.2 – 8 mA

Current range pulsed mode: 0.2 – 8 mA

Current range in digital radiography (one shot) @ 1pps: 0.2 - 10

Monoblock Heat capacity: (720kJ) 960 kHU

"R" (rotating) IAE X20 P

Power: 3.5 / 5 kW

kV range: 40 ÷ 120 kV

Current range continuous mode: 0.2 – 10 mA

Current range pulsed mode: 0.2 – 10 mA

Current range in digital radiography (one shot) @ 1pps: 0.2 - 12

Monoblock Heat capacity: (720kJ) 960 kHU

"R" (rotating) IAE RTM70H

Power: 15 kW

kV range: 40 ÷ 120 kV

Current range continuous mode: 0.2 – 10 mA

Current range pulsed mode: 0.2 – 10 mA

Current range in digital radiography (one shot) @ 1pps: 0.2 - 200 mA (up to 40mS @ 200mA)

Monoblock Heat capacity: (720kJ) 960 kHU (optional 880kJ/1200kHU)

COLLIMATOR

Type: Remote controlled adjustable collimator from the control console with rotating parallel and iris blades.

Aperture: Continuously adjustable - Automatic adjustment to suit I.I. field.

Control: From the stand control panel.

DOSIMETER

Active Area: 72 mm

Minimal Dose Resolution: 1 mGycm²

Maximal Measurable Dose: 999.999 mGycm²

Dose value Store: Fluoro cumulative dose is reported on the exam and Radiography Dose value is directly stored in the image DICOM header and saved in the workstation hard disk.

LASER POINTER

Laser Pointer: Unit is provided with a laser cross mounted on the tube side and pointing towards the image intensifier (optional).

IMAGE
INTENSIFIER

DQE @59,5 keV: 65% (IEC standard)
Scintillator: Caesium Iodide (CsI)
Conversion factor (typical): 250 Cd/m²/mR/s

IMAGE INTENSIFIER (I.I.) 9"

Image field:
- Nominal: 9"/6"/4"
- Working: 215 mm/160 mm/120 mm
Output image diameter: 20 mm
Typical central resolution: 64, 60, 52 lp/ cm (4", 6", 9")
Contrast ratio: 30:1, 25:1, 19:1 (4", 6", 9")

IMAGE INTENSIFIER (I.I.) 12"

Image field:
- Nominal: 12"/9"/6"
- Working: 290 mm/215 mm/160 mm
Output image diameter: 25 mm
Typical central resolution: 56, 50, 44 lp/cm (6", 9", 12")
Contrast ratio: 30:1, 25:1, 22:1 (6", 9", 12")

TV CAMERA

Type: CCD Sensor
Matrix (pixel): 1280x960
Standard video: Digital serialized
A/D Conversion: 12 bit
Bandwidth: 20 MHz
Scansion: 1:1

TV MONITOR
(Trolley)

N°1 Medical Grade Color 24" TFT/LCD

Type: Color medical grade non touch screen
Monitor Position: Monitors are positioned on a separate mobile trolley
Angle View: Vertical and horizontal 178°; anti reflex
Resolution: 1920x1200
Contrast Ratio: 1000:1 (typ.)
Brightness: 430 Cd/m²
Height Adjustment: No
Monitor Rotation: +/- 45°

N°2 Medical Grade Color 19" TFT/LCD

Type: Color medical grade non touch screen
Monitor Position: Monitors are positioned on a separate mobile trolley
Angle View: Vertical and horizontal 178°; anti reflex
Resolution: 1280x1024
Contrast Ratio: 1000:1 (typ.)
Brightness: 330 Cd/m²
Height Adjustment: No
Monitor Rotation: +/- 45°

GRID

SID: 90 cm
Interspace: Al
Ratio: 8:1
Line rate: 103 lines/inch

SYSTEM VERSION

Processor: Intel Processor
 RAM: 4 Gbyte (expandible to 8 Gbyte)
 Hard disk memory: 256 GByte (average of 120.000 images)
 Acquisition frame rate: 2 frame/sec (pulsed fluoroscopy) Up to 25 frame/sec
 Operative System: Windows Embedded
 USB 2.0 ports: 1 (2 *optional)
 LAN/Wireless connection: Both available (wireless optional)
 CD/DVD recorder: OPTIONAL

PROCESSING FEATURES

Real time

Patient and Exam management
 Automatic dose rate regulation
 Automatic Contrast/Brightness control (ABC)
 Edge enhancement
 Noise reduction
 Recursive Filter for motion artefacts
 Left to right, top to bottom image reversals
 Optical magnification
 Digital zoom (three fields)
 360° Digital rotation
 Virtual/Digital Collimation
 Last Image Hold
 Automatic image save
 Patient & Exam Data Management

Post Processing

Horizontal/Vertical image flip / Rotation
 Contrast / Brightness control
 Crop
 Reverse polarity (grey scale)
 Fluoro loop (Cine loop) speed adjustable
 Digital Zoom and Roaming
 Text annotations, length, angles, entering patient demographic data, markings
 Overview (mosaic)
 USB export in BMP format

Optional

Subtraction (D.S.A.) with Max Opacification
 Landmarking
 Pixel shift
 Remasking
 Roadmap
 Video out

DICOM functions

USB Recorder

Optional

Store SCU: Allows send images to a Dicom server for archiving
 Print SCU : Send the images to be printed in panoramic mode or via film composer to the Dicom printer
 Worklist SCU (in order to receive exams from RIS/HIS) : Queries and receives from a Dicom server the list of patients to be examined on the acquisition system
 Media storage CD/DVD w DICOM viewer: Burn patient images to CD or DVD with the possibility of adding a viewing program
 MPPS (Modality Performed Procedure Step): Inform the server that the exam is in progress and then that it is completed by sending the indication of the references to the images and, if available, the total dose of the examination.
 Query/Retrieve: Queries and receives images of a given patient from a server for consultation

Storage/Commitment: It asks and waits for confirmation from the storage server that the images sent are saved correctly safe by allowing deletion from the acquisition unit's own archive

DICOM transmission type: Cable or Wireless

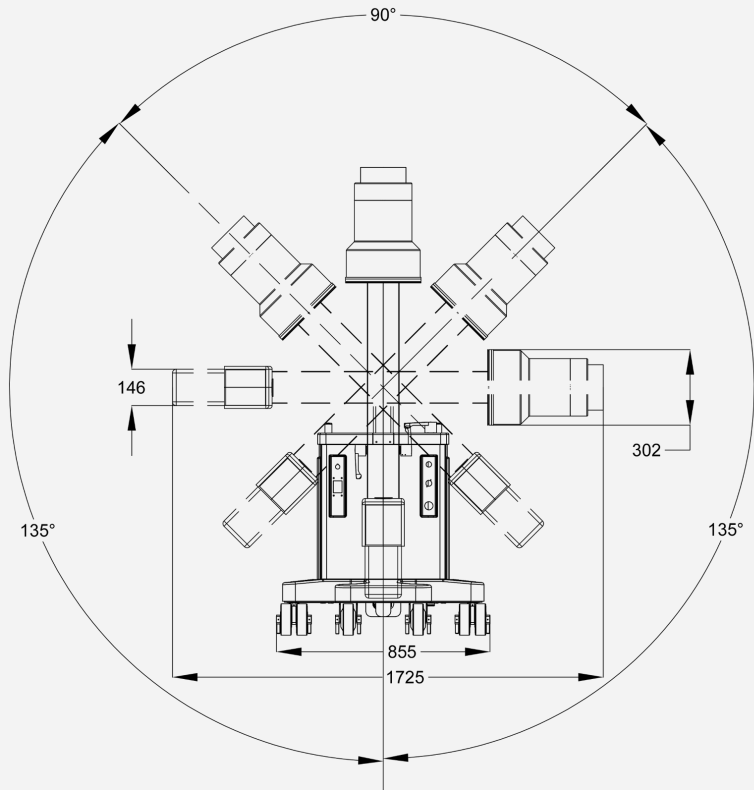
Dose report: Possibility to print a dose report at the end of the examination

Printer: Sony printer models UP898, UP971

UPS: Dedicated UPS with 20 min backup time for safe system switch off

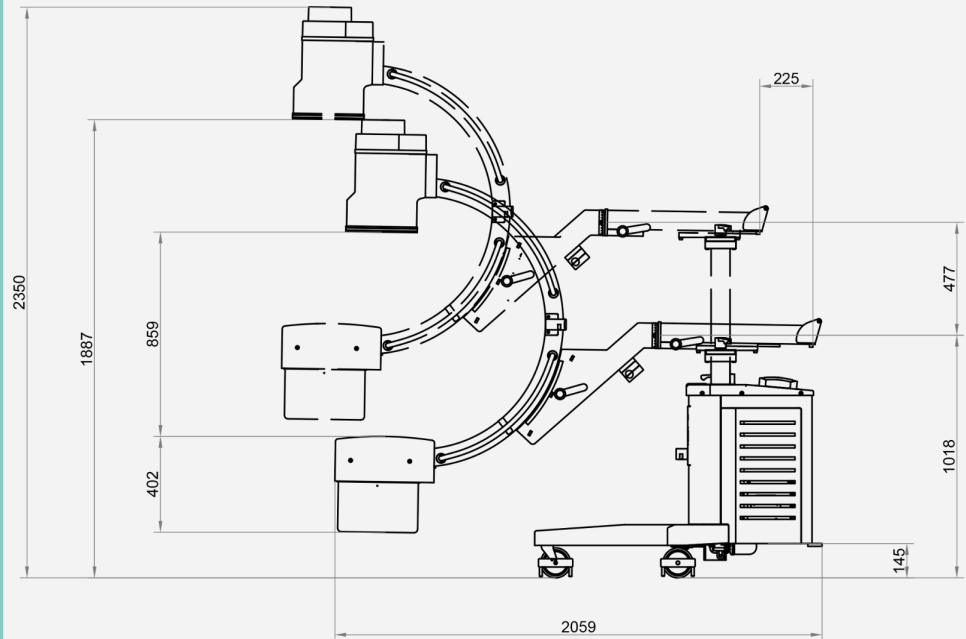
SIZE AND DIMENSIONS

Front view

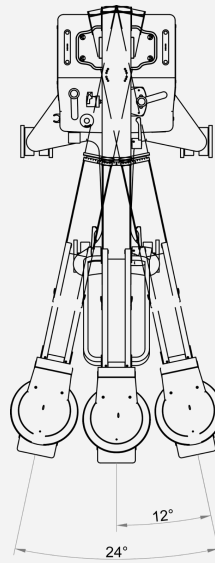


SIZE AND DIMENSIONS

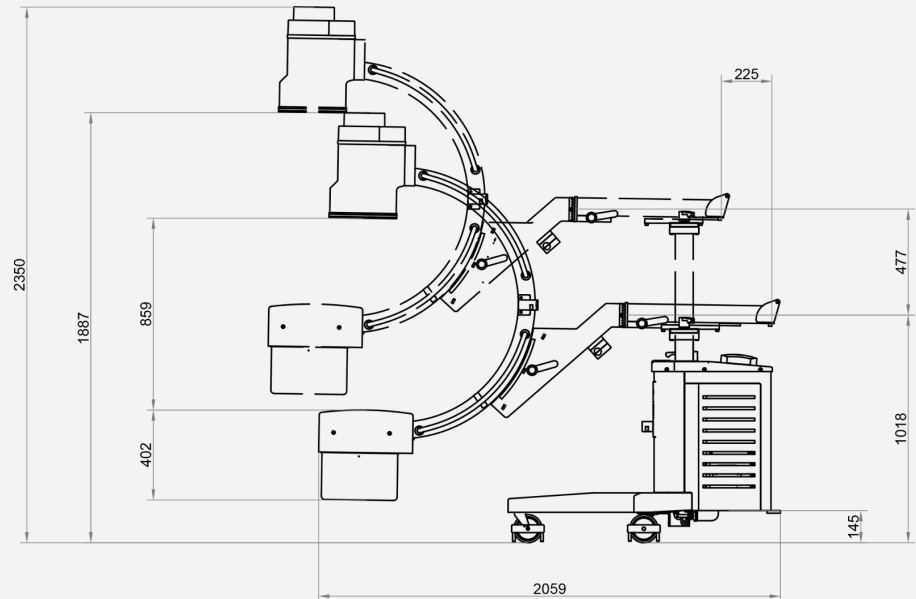
Lateral view



Top view



Side view



ACCESSORIES

(*)Optional

Laser Localizer^(*)

The X-Ray Tube Head with Collimator where Laser Localizer and Dosimeter can be positioned



Thermal Printer^(*)

The Monitor unit with thermal printer



INSTALLATION AND WARRANTY

Installation

Only authorized technical personnel that has been appropriately trained by ALMAX can install ALMA C.

Warranty

ALMAX IMAGING guarantees its products for two (2) years from the delivery date. ALMAX IMAGING can offer to its customers a wide range of service plans that will perfectly fit all needs and preferences.

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ALMAX IMAGING
X-RAY, NOTHING ELSE

