

CARMEX

Mobile C arm unit for fluoroscopy and radiography



PRODUCT DATA

Product data

CARMEX – Rev. 01 (January 2018)

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DESCRIPTION

CARMEX is a mobile X-ray device with image intensifier manufactured for use in orthopaedic, traumatology, abdominal, urology operating theatres.

CARMEX is composed by a Stand and a Monitor Unit, and depending on user needs it can be provided with standard Video Memory (video memory for acquiring and displaying images with last image hold on 2 monitors) or with optional Workstation with Video Processor (video processor: for image acquisition, display and post-processing).

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

- Continuous fluoroscopy;
- Pulsed fluoroscopy;
- Digital Radiography;
- Digital Subtraction Angiography (D.S.A.), for VIDEO PROCESSOR version only, (*);
- Standard radiography with CR and/or cassette-film.

CARMEX basic version:



CARMEX 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 aluminium alloy). The reduced footprint helps the unit to move around in very small environments.

CARMEX C-Arm is perfectly balanced and does not require continuous use of brakes in normal use. Wheels are equipped with cable pushers and controlled/braked with a single handle.



Thanks to the particular unit balance, the front wheels can be easily lifted in order to overcome any small obstacle that system encounters during its movement.

A 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 (40kHz) to guarantee precise and stable high tension generation. Depending on the monoblock anode type (either stationary or rotating) two versions of CARMEX is available as "F" version with fixed anode and the "R" version with rotating anode. Standard generator power is 3,5 kW (for both "F" and "R" versions) and for "R" version an optional 5 kW is available for specific applications as spine surgery.

Thanks to the Real Time processing tools like automatic Brightness/Contrast, Edge Enhancement and Recursive Filtering for noise reduction and thanks to the 1k x 1k CCD sensor, Image quality is astonishing.



Available accessories

STANDARD

- Operativity keyboard for patient data information entry
- Multifunction dual fluoroscopy footswitch
- Radiography hand switch with extension cable
- Set of covers for the entire system with the possibility of sterilization
- Remote control for reviewing images

OPTIONAL

- Laser Localizer
- Dosimeter (DAP Chamber) with presentation on final image in case of digital workstation
- Automatic Contrast/Brightness in area's with metal implants
- Thermal Printer
- 24x30 Cassette holder

OPTIONAL DICOM FEATURES

- DICOM Store
- DICOM Print
- DICOM Worklist
- DICOM Media Interchange (burn data to CD/DVD)
- DICOM Modality Performed Procedure Step (MPPS)
- DICOM Query/Retrieve
- DICOM Storage/Commitment.

TECHNICAL FEATURES

MECHANICAL DATA (C- ARM)				
		"F" version		"R" version
I.I. size		9"	12"	9" 12"
Vertical run (motorized)		45 cm		
Horizontal run		22 cm		
Wig-wag		$\pm 12^\circ$	$\pm 10^\circ$	$\pm 12^\circ$ $\pm 10^\circ$
Lateral arc rotation		$\pm 270^\circ$ (total 540°)		
Orbital arc rotation		130° ($90^\circ + 40^\circ$)		
S.I.D:		96.9 cm	95.5 cm	96.9 cm 94.2 cm
Arc depth		71,5 cm	68,5 cm	71,5 cm 68,5 cm
Free space between x-ray tube head and i.i.		78,3 cm	73,3 cm	78,3 cm 73,3 cm
Min/max length		1790/2425 mm		
Max width		775 mm		
Min/max height		1785/2270 mm	1852/2302 mm	1785/2270 mm 1852/2302 mm
Weight	C-arm stand	273 kg	282 kg	280 kg 290 kg
	Monitor unit	115 kg		
Movement		Manual – Parallel steering back wheels with parking position for movements along the patient table Rotating anterior wheel		

ENVIRONMENTAL CONDITIONS (DELIVERY AND STORAGE CONDITIONS)	
Temperature	$-10 \div 55^\circ \text{C}$ (suggested: $0^\circ \div 40^\circ \text{C}$)
Relative humidity	$20 \div 90\%$
Atmospheric pressure	$500 \text{ hPa} \div 1060 \text{ hPa}$

ENVIRONMENTAL CONDITIONS (OPERATING CONDITIONS)	
Temperature	$10 \div 40^\circ \text{C}$
Relative humidity	$30 \div 70\%$
Atmospheric pressure	$700 \text{ hPa} \div 1060 \text{ hPa}$

	"F" version	"R" version
GENERATOR		
Power	3,5 kW	3,5 kW (5 kW optional)
Type	Microprocessor controlled	
Generator operating frequency	40 kHz	
kV range	40 ÷ 110 kV	40 ÷ 120 kV
Max. Radiographic current	65 mA	
Max. Image Tube current (fluoro mode)	6 mA (continuous) 8 mA (pulsed)	
Max mA in digital radiography	12 mA	14 mA
mAs range	1 ÷ 250 mAs	
Anatomical Programs (APR)	Yes, 20 available anatomical programs. More than 1000 combinations.	
RX MONOBLOCK		
Type	Fixed anode	Rotating anode
Speed	-	3000 rpm @ 50 Hz
Focus	0,5x0,5 mm – 1,5x1,5 mm	0,3x0,3 mm – 0,6x0,6 mm
Anode heat capacity	52 kHU	200 kHU
Anode continuous dissipation	660 HU/sec	1 kHU/sec
Monoblock heat capacity	685 kHU (500kJ)	800 kHU (585kJ)
Additional filtration	1 mm Al	
Total filtration	>3 mm Al	

COLLIMATOR		
Type:	Iris shaped, motorized with rainbow blending	
Aperture:	Continuously adjustable - Automatic adjustment to suit I.I. field	
Control:	From stand control panel	

IMAGE SYSTEM

IMAGE INTENSIFIER	9"	12"
Model	E 5830SD	TH 9432 HP2
Image field:		
Nominal:	9"/6"/4"	12"/9"/6"
Working:	215 mm/160 mm/120 mm	290 mm/215 mm/160 mm
Output image diameter	20 mm	25 mm
Typical central resolution	64, 60, 52 lp/ cm (4", 6", 9")	56, 50, 44 lp/cm (6", 9", 12")
Contrast ratio	30:1, 25:1, 19:1 (4", 6", 9")	30:1, 25:1, 22:1 (6", 9", 12")
DQE @59,5 keV	65% (IEC standard)	
Scintillator	Caesium Iodide (CsI)	
Conversion factor (typical)	250 Cd/m ² / mR/s	

GRID	
SID	90 cm
Ratio	8:1
Line rate	103 lines/inch (40 l/cm)

TV MONITOR	N°2 Medical Grade Color 19" LCD
Technology	TFT
Angle of view	Vertical and horizontal 178°
N° of lines	1024
Resolution	1280x1024
Contrast ratio	800:1 (typ.)
Brightness	(monochrome monitor 800 Cd/m ²) 400 Cd/m ²
Size and dimensions	432x467x251 mm
Max consumption	80 W
Height adjustment	20 cm

TV CAMERA	Standard	High Res (Opt)
Resolution (pixel)	980x980 pixel	1024x1024 pixel
Standard video	Digital serialized	Digital serialized
A/D Conversion	10 bit	12 bit
Bandwidth	20 MHz	40 MHz
Scansion	1:1	1:1
Resolution		2.2 lp/mm

MEMORY/VIDEO PROCESSOR		
	Video memory	Video processor
Hard disk memory	L.I.H. 30.000 images memory 256 GB capacity Hard-disk	1TByte (average of 360.000 images)
Acquisition frame rate	1 frame/sec (pulsed fluoroscopy) x-ray time: 880 ms (one-shot fluoroscopy)	30 frame/sec
Operative System	-	Windows Embedded
REAL TIME PROCESSING		
Max Opacification	-	X (*)
Virtual collimator	X	X
Contrast / Brightness control	-	X
Gray scale inversion	-	X
Edge enhancement	X	X
Subtraction (D.S.A.)	-	X (*)
Noise reduction	X	X
Recursive Filter	X	X
Horizontal image flip	X	X
Digital rotation	X	X
Virtual/Digital Collimation	-	X
Last Image Hold	X	X
POST PROCESSING		
Patient & Exam Data Management	X	X
Horizontal image flip	X	X
Contrast / Brightness control	-	X
Edge enhancement	-	X
Reverse polarity (grey scale)	-	X
Fluoro loop	-	X
Digital Zoom	-	X
360° Digital Rotation		
Subtractions (D.S.A.)	-	X (*)
Landmarking	-	X (*)
Digital zoom (2x)	-	X
Pixel shift	-	X (*)
Text annotations, length, angles	-	X
Overview (mosaic)	-	X
Print out	X (*)	X (*)
USB export		X

MEMORY/VIDEO PROCESSOR		
	Video memory	Video processor
DICOM FUNCTIONS		
Store SCU	-	X (*)
Print SCU	-	X (*)
Worklist SCU	-	X (*)
CD/DVD Recorder w DICOM viewer	-	X (*)
USB Recorder w DICOM viewer	-	X (*)
Modality Performed Procedure Step	-	X (*)
Query/Retrieve	-	X (*)
Storage/Commitment	-	X (*)
DICOM transmission type		Cable or Wireless (*)
Printer	Analogical / digital Sony printer models UP970 and UP 990	Analogical / digital Sony printer models UP970 and UP 990

(*) Optional

CERTIFICATIONS

The CARMEX mobile x-ray unit is a II b class device, according to 93/42 CEE European directive. The device is made according to directives 93/42/EEC, the harmonized norms applicable are:

CEI EN 60601-1	CEI EN 60601-1-6
CEI EN 60601-1-2	CEI EN 60601-2-28
CEI EN 60601-1-3	CEI EN 60601-2-54

INSTALLATION AND WARRANTY

CARMEX mobile x-ray units need only the installation of the monitors up to the monitor trolley, the connection of the two parts (C-arm and monitor unit) and the power supply connection with single phase 230 Vac, earthen.

All ITALRAY device has one-year factory warranty, from delivery date. The customer can extend the warranty by subscription of technical service agreement.

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

