Mobile C-arm X-ray machine

Product User Manual

Before operation, please read the user manual and pay attention to all safety precautions.

Please keep this user manual properly so that you can refer to it at any time in the future (keep it for backup).

Please use it correctly based on a full understanding of the content.

Must-read for Users

The company is committed to producing valuable world-class products while also providing high-quality customer service. Please read this user manual carefully to make more effective use of the product.

The company will not be responsible for any abnormal phenomena, instrument failures, and personal injuries caused by violation of the manual warnings and operating requirements in the instructions, and will not promise any guarantees.

If you have any questions or suggestions, please feel free to contact us.

Tootoo Meditech Co., Ltd.
Address: 3A, Phase II, Smart Home, Baolong Street,
Longgang District, Shenzhen, Guangdong, China
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Disclaimer

1. The company shall not be liable for any damage, injury or death caused to the purchaser or third party due to force majeure such as fire, earthquake, or misuse of this product.
2. The company shall not be liable for any loss or injury caused by unauthorized modification of this product or failure to strictly follow the company's user manual.
3. The company shall not be liable for any loss or injury caused by the use of products other than ours.
4. X-ray imaging, acquisition, processing, reading and storage of image data shall comply with the laws of the country and region where the product is used. The user and operator of the product are responsible for maintaining the privacy of the image data.
5. Clinicians bear the responsibility for providing medical services and for incorrect treatment due to incorrect diagnosis.

Copyright

Environmental protection

This symbol is used to indicate that this product must not be disposed of with domestic or commercial waste.

Recycling Equipment

Please do not dispose of this product as household or commercial waste.

Improper disposal of this type of waste may have negative effects on health and the environment.

Some countries or regions, such as the European Union, have established systematic recycling mechanisms. Please contact your local government to inquire about how to dispose of this type of waste.

If there is no relevant guidance, please contact our customer service

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Chapter1 Safety Information

1.1 Overview

This equipment is a radioactive device. Operators should strictly follow the instructions in this manual. It should not be used for any other purpose except medical fluoroscopy and radiography. Any improper operation of the equipment will cause damage to the equipment. This equipment can only be used by people with necessary radiological knowledge and training.

1.2 Precaution


Before operating, read the product instruction and pay attention to all safety precautions.


This equipment is diagnostic equipment, only veterinarian or legally qualified operators can use this product.


The equipment must be stored and operated in a specified environment and maintained by professional maintenance personnel in a safe and operable condition.


The product shall not be altered without the manufacturer's authorization.


This equipment can not be used in combustible gas, corrosive gas and explosive environment.


The equipment should pay attention to prevent liquid or conductive substances into the equipment to avoid short circuit.


Non-authorized personnel are forbidden to disassemble the equipment.


Sales of the product to non-veterinary institutions or non-licensed veterinarians are prohibited.


Before operating the equipment, ensure that there are no other people or obstacles within the scope of mechanical movement of the equipment to avoid collision damage to the equipment or personal injury.


If there is any electrical or mechanical fault, the equipment should not be used until it has been removed.

When using the knob, do not exert too much force, and the direction of rotation of locking and loosening can not be mistaken.

If the device needs to be moved, lower the c-arm center height as far as possible, retract the C-arm to the side near the controller, place the X-ray source component side near the ground, lower the center of gravity of the device, and move the device only after the knobs are locked.

In the use of the equipment, any emergency, can press the emergency stop button, then the equipment will be powered off. After troubleshooting, the top cover of the emergency stop button can be turned counterclockwise to make it automatically reset.

1.3 Safety Symbols and Markers

The safety symbols and markings in the table apply throughout the user manual.

WARNING	Improper use of the product may result in death or serious injury.
CAUTION	Improper use of the product may cause minor personal injury.
CAUTION	Improper use of the product may result in property damage.
	Prohibit operation
	An action that must be performed
Important	Important operations and restrictions. Be sure to read this information in case of property damage and malfunction.
Information	Provides reference and supplementary information. You are advised to read this information.

1.4 Label and Marks

The content of our company's equipment labels and marks are as follows:

1.4.1 Marks on the label:

SN	Sequence code of the product
	Name and address of manufacturer
	Date of produce

1.4.2 Safety warning symbol:

	Electric shock danger label
	Radiation safety Label
	Safety warning label
	Warning hands pinching label
	Beware of laser marking
	No pedaling signs
	Safety sign: It is forbidden to look directly at the laser for a long time

1.4.3 Functional Marks:

	Please refer to the safety instructions.
	The power on
	The power cut off
	C-arm up
	C-arm down
	Focus

	Emergency deactivation

1.4.4 Precautions Label of Transportation Safety :

	Packaging graphic mark used to indicate fragility.
	This symbol is used to indicate rain and damp.
	The packaging graphic symbol is used to indicate holding the device upward.
	This symbol is used to indicate the limit of stack layers.
	Operating temperature range.
	Atmospheric pressure limit range.
	Humidity limit range.
	The transport package must not be tumbled over during handling.

Environment Sign:

	Environmental protection period, more than 10 years will pollute the environment.
	When the end user intends to discard the product, the product must not be disposed of at will, but must be sent to the appropriate facility for recycling and recycling.

1.5 Warning

Observe the following safety precautions and use the equipment correctly to avoid personal injury and equipment damage.

	**Do not use or store near flammable chemicals such as alcohol, thinners, benzene, etc. If chemicals are sprayed or evaporated onto the device, they may cause fire or electric shock through contact with live parts in the device. In addition, some disinfectants are also flammable, so be sure to use them with caution.**
	**Do not connect to any equipment other than those specified. Otherwise, a fire or electric shock may occur.**
	**Do not power the device with a power source other than that indicated on the nameplate. Otherwise, a fire or electric shock may occur.**
	**Do not carry the device with wet hands. Otherwise, an electric shock may occur, which will result in death or serious injury.**
	**Do not place heavy objects such as medical equipment on the cable. Do not pull, bend, bundle, or step on the cable to prevent damage to the sheath. Otherwise, the cable will be damaged, which will result in fire or electric shock.**
	**To avoid the risk of electric shock, this device must be connected to a protectively grounded power supply network. Otherwise, fire or electric shock may occur.**
	**Do not disassemble or modify the device at will.** **Otherwise, fire or electric shock may occur. In addition, touching the integrated components may also cause electric shock, which will result in death or serious injury.**
	**Do not hit or drop the device and its components.** **If the device is subjected to strong bumps, it may be damaged.** **If the device is not repaired in time, it will cause fire or electric shock.**
	**Do not spray liquids or chemicals on the device. Do not allow the device to come into contact with the patient's blood or other body fluids. Otherwise, fire or electric shock may occur.**
	**Do not modify this device without the manufacturer's authorization.**
	**If the device is modified, proper inspection and testing must be performed to ensure that the device can continue to be used safely.**
	**If the device is modified, proper inspection and testing must be performed to ensure that the device can continue to be used safely.**

	**This device should be protected from liquid or conductive substances that enter the instrument to avoid short circuits.**
	**It is forbidden for unauthorized personnel to disassemble the device.**
	**It is forbidden to sell this device to non-medical institutions or non-practicing doctors.**
	**Before operating the equipment, ensure that there are no other people or obstacles within the mechanical movement range of the equipment to avoid collision damage to the equipment or personal injury.**
	**If there is any electrical or mechanical failure in the equipment, it must not be used until it is eliminated.**
	**Do not use excessive force when using the knob, and do not make mistakes in the direction of rotation of locking and loosening.**
	**The equipment may be affected by electromagnetic interference during special diagnosis or treatment.**
	**Do not place medical equipment in places where it is difficult to disconnect the power supply.**

1.6 Safety Regulatory Information

1.6.1 Manufacturer Information

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Web: www.newtootoo.com

1.6.2 Main Safety Features

Classification of medical equipment

Classified by shock protection type	Type I, no application section
Classification by protection against harmful ingress of liquids and particulate matter	The equipment IPX0
Classification by operation mode	Continuous operation
Should not be used in equipment containing mixtures of combustible anesthetics with air or nitrogen oxides.	

1.6.3 Electromagnetic Compatibility Guide and Manufacturer's Declaration

Mobile C-arm X-ray machine hereinafter referred to as this equipment.

Statement: In order to ensure the electromagnetic compatibility of this equipment, this equipment needs to be installed, debugged and used in accordance with the electromagnetic compatibility information provided by random documents, portable and mobile RF communication equipment may affect the electromagnetic compatibility of this equipment, if this situation occurs, please contact the company's personnel to solve it.

1. **Electromagnetic Compatibility:** electromagnetic compatibility refers to the ability of equipment to suppress electromagnetic interference of other equipment without causing similar electromagnetic radiation interference to other equipment. This device can cause electromagnetic interference to other equipment by air or connecting cables.

2. **Solutions to Common Problems of Electromagnetic Compatibility**

Operate in strict accordance with the provisions of the instruction manual of this equipment to ensure that the basic working conditions of the equipment are not affected by electromagnetic interference.

Electromagnetic interference can be mitigated by keeping other devices away from this device. Electromagnetic interference can be mitigated by adjusting the relative position/mounting angle between this device and other equipment.

Electromagnetic interference can be reduced by changing the wiring position of power/signal cables for other devices.

Electromagnetic interference can be reduced by changing the power path of other devices.

⚠CAUTION Use of accessories, transducers, and cables outside the regulations may result in increased emission or reduced immunity from this appliance, except for transducers and cables sold by the manufacturer of this equipment as spare parts for internal components.

This device should not be used close to or stacked with other devices, and if it is necessary to approach or stack it, it should be observed to verify that it can function properly in the configuration in which it is used.

Use of unspecified accessories, transducers or cables with this equipment may result in increased emissions or reduced immunity from this equipment.

a) Electromagnetic Emissions

The equipment is intended to be used in the environment specified below and the purchaser shall ensure that the equipment will be used in such electromagnetic environment.

Emissions Test	Compliance	Electromagnetic Environment-Guidance
RF emissions CISPR 11	Group 1	The system uses rf energy only for internal functions. Therefore, its rf radiation is very low and generally does not cause interference to nearby electronic equipment.
RF emissions CISPR 11	Class A	The system is not suitable for use in household equipment or equipment directly connected to the public power grid (supplying appliances).
Harmonic emissions IEC 61000-3-2	Not Applicable	The system is not suitable for use in household equipment or equipment directly connected to the public power grid (supplying appliances).
Voltage fluctuations/ flicker emissions IEC61000-3-2	Not Applicable	The system is not suitable for use in household equipment or equipment directly connected to the public power grid (supplying appliances).

Electromagnetic Immunity

The equipment is intended to be used in the environment specified below and the purchaser shall ensure that the equipment will be used in such electromagnetic environment.

Immunity Test	IEC60601 Test Level	Compliance Level	Electromagnetic Environment-Guidance

Electrostatic discharge IEC61000-4-2	±6kV contact discharge ±8kV air discharge	±6kV contact discharge ±8kV air discharge	Floor should be made of wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient pulse packet IEC61000-4-4	±2kV for power supply lines ±1kV for input/output lines	±2kV for power supply lines ±1kV for input/output lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC61000-4-5	±1kV differential mode voltage ±2kV common mode voltage	±1kV differential mode voltage ±2kV common mode voltage This test is performed at maximum voltage only。	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines ： IEC61000-4-11	<5 % VT*(VT drops sharply ＞ 95%),lasts 0.5 cycles 40 % VT, (VT drops sharply 60%) , lasts 5 cycles 70 % VT (VT drops sharply 30%),lasts 25 cycles	<5 % VT* (VT drops sharply ＞ 95%), lasts 0.5 cycles 40 % VT, (VT drops sharply 60%) , lasts 5 cycles 70 % VT (VT drops sharply 30%),lasts 25 cycles	Mains power quality should be that of a typical commercial or hospital environment. If the user requires continued operation during power mains interruptions, it is recommended that the system be powered from an uninterruptible power supply.
Power frequency magnetic field （50/60Hz） IEC61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristics of a typical commercial or hospital environment.

Immunity to RF radiation and RF field induced conducted disturbances

The equipment is intended to be used in the environment specified below and the purchaser shall ensure that the equipment will be used in such electromagnetic environment.

Immunity Test	IEC60601 Test Level	Compliance Level	Electromagnetic Environment-guidance

Conducted RF GB/T IEC61000-4-6	3 Vrms 150 kHz ~ 80 MHz 3 V/m 80 MHz ~ 2,5 GHz	10 Vrms	Recommended separation distance d= 1.2 p
Radiated RF IEC61000-4-3	3 V/m 80 MHz ~ 2,5 GHz	10 V/m	d= 1.2 p 80M Hz~800M Hz d=2.3 p 800M Hz~2.5G Hz In the equation: P- The maximum output rated power of the transmitter supplied by the transmitter manufacturer, whose unit is watt (W), d - recommended separation distance, whose unit is meter (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey a, a should be less than the compliance level b in each frequency range. Interference may occur in the vicinity of equipment marked the following symbol: 

Note 1: At 80 MHz and 800 MHz, the formula for the higher frequency band applies.

Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

a Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast, and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic field survey should be considered. If the measured field strength in the location where the equipment is located exceeds the applicable RF compliance level above, the equipment should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the equipment.

b Over the frequency range of 150 kHz to 80 kHz, field strengths should be less than 3 V/m.

Recommended distance between portable and mobile RF communication equipment and systems

The system is used in electromagnetic environment where radiative RF interference is controllable. System users or operators can avoid electromagnetic interference as much as possible. To achieve this, the user should meet the minimum distance between the portable and mobile RF communication equipment and the system (in accordance with the maximum output power rating of the communication equipment) as described below.

Max power output rating of transmitter (W)	Separation distance according to frequency of transmitter (m)		
	150 kHz～80 MHz $d = 1.2\sqrt{P}$	80MHz～800MHz $d = 1.2\sqrt{P}$	800 MHz ～2.5 GHz $d = 2.3\sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

For transmitters rated at a maximum output power not listed above, the recommended separation distance d in metres (m) can be determined using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

NOTE 1: At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.

NOTE 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

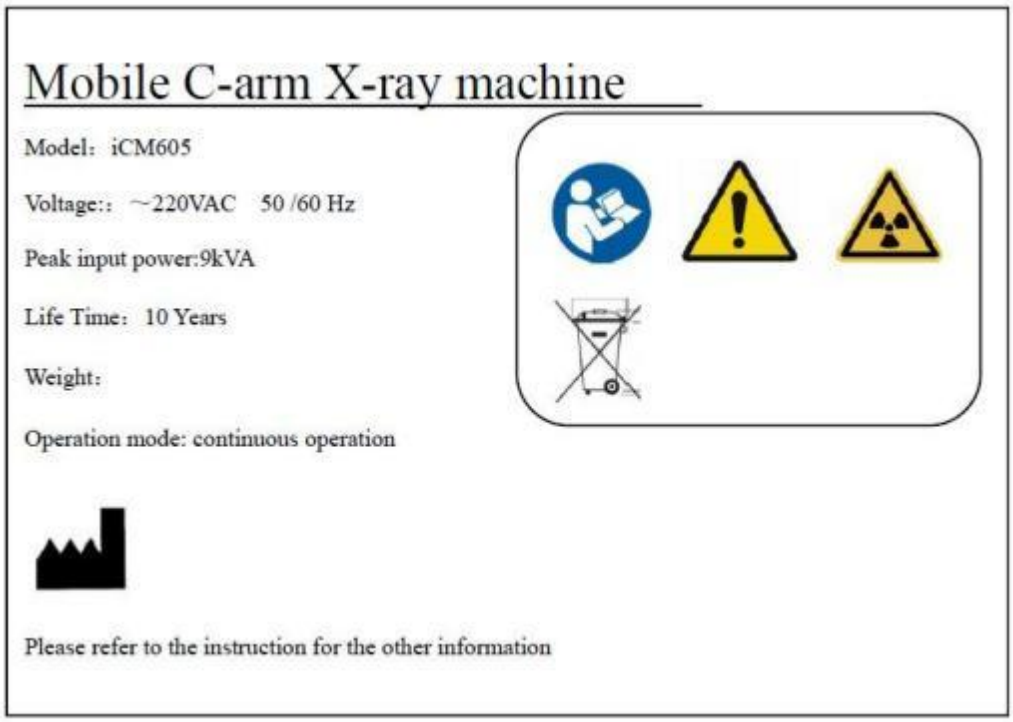
1.6.4.1 Basic Performance

1) Accuracy of loading factors

2) Repeatability of radiation output

3) Imaging performance

1.6.5 **Nameplate**



1.7 Radiation and Magnetic Field

⚠WARNING

Radiation may occur when the equipment is used. Operators must comply with the requirements of relevant laws and regulations.

⚠CAUTION

The operator must comply with the safety exposure requirements and operating guidelines, otherwise the device may be dangerous to both the animal and the operator.

1.8 Noise

The noise generated by the machine in no-load operation should be no more than 70dB (A) (excluding the non-continuous and non-periodic noise within 3s).

1.9 Production date and service life

Production date and service life refer to the equipment nameplate or label.
Service life of the whole machine: 10 years

Chapter 2 Product Overview

2.1 Component of Product

Mobile C-arm X-ray machines consist of X-ray Generator(model: Gemini5, including (including X-ray tube), Collimator, Flat Plate Detector, Mobile C-arm Frame, Image Acquisition Workstation (including Acquisition Software) and Grid.

2.2 Intended Use

This series of products are used for animal surgical fluoroscopy and photography to obtain images for veterinary diagnosis.

2.3 Working Conditions

2.3.1 Environmental conditions

The working environment conditions of the mobile C-arm X-ray machine shall meet:

Temperature: ＋10℃~+40 ℃ Humidity:30% ～75%RH

Air pressure:70kPa～106 kPa

2.3.2 Working conditions

Power supply voltage and phase number:220VAC， network voltage fluctuation should not exceed ±10% of the nominal value

Power supply frequency:50 /60 Hz

Power resistance: should be no more than 1 Ω: Power capacity: 9kVA

⚠WARNING

This equipment is not allowed to be connected to temporary small capacity power generation equipment, nor is it allowed to be used in parallel with other load equipment (such as welding machine, cabinet air conditioner, etc.) in the same circuit.

2.4 Application Part

The product has no application part, and the contact parts with the operator are the rack handle and handle, exposure hand brake, LCD display, and emergency stop switch. The product generally uses conventional materials, and has no unacceptable risk.

Chapter 3 Structure and Working Principle

3.1 Structure

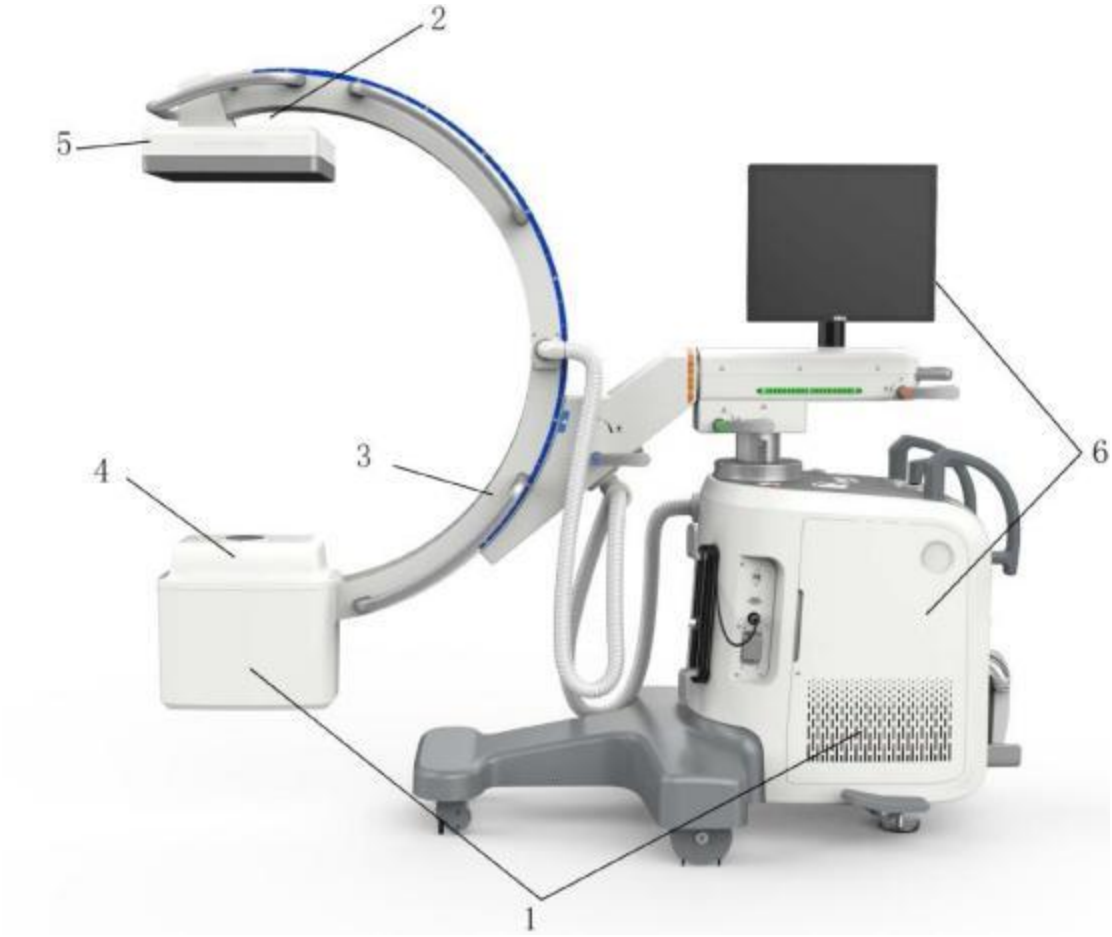


Figure 1

1 X-ray Generator device

2. Flat panel detector

3. Mobile C-arm frame

4. Collimator

5. Grid

6. Image Acquisition Workstation (including Acquisition Software)

3.2 Principle of the system

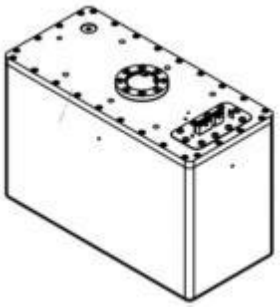
The X-ray generator (inverter unit) provides high voltage to both ends of the X-ray tube filament and the metal target. A large number of electrons are generated on the cathode filament of the X-ray tube, which move at high speed in the vacuum tube and hit the metal target, thereby generating X-rays.

When using X-ray fluoroscopy and photography in hospitals, the X-ray generator emits X-rays that penetrate the bones, muscles and other parts of the human body with different tissue densities. The X-rays that pass through the human tissue and

carry image information are passed through the digital image receiving device to display images of human tissues with different densities for clinical diagnosis.

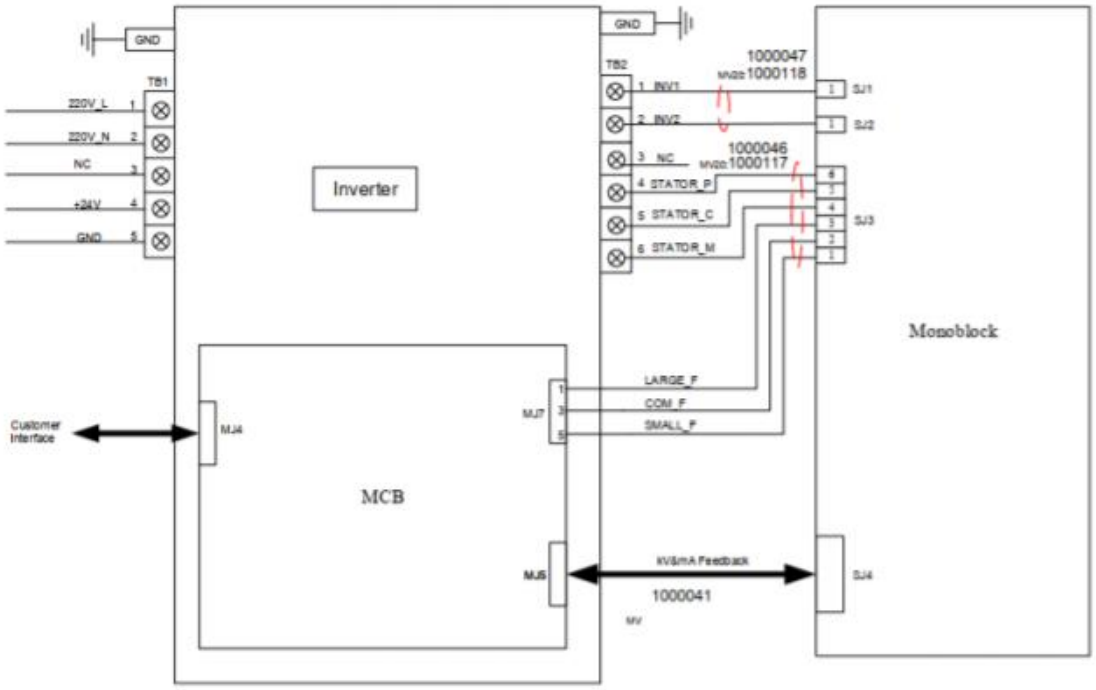
Chapter4 Performance Introduction

4.1 X-ray Generator



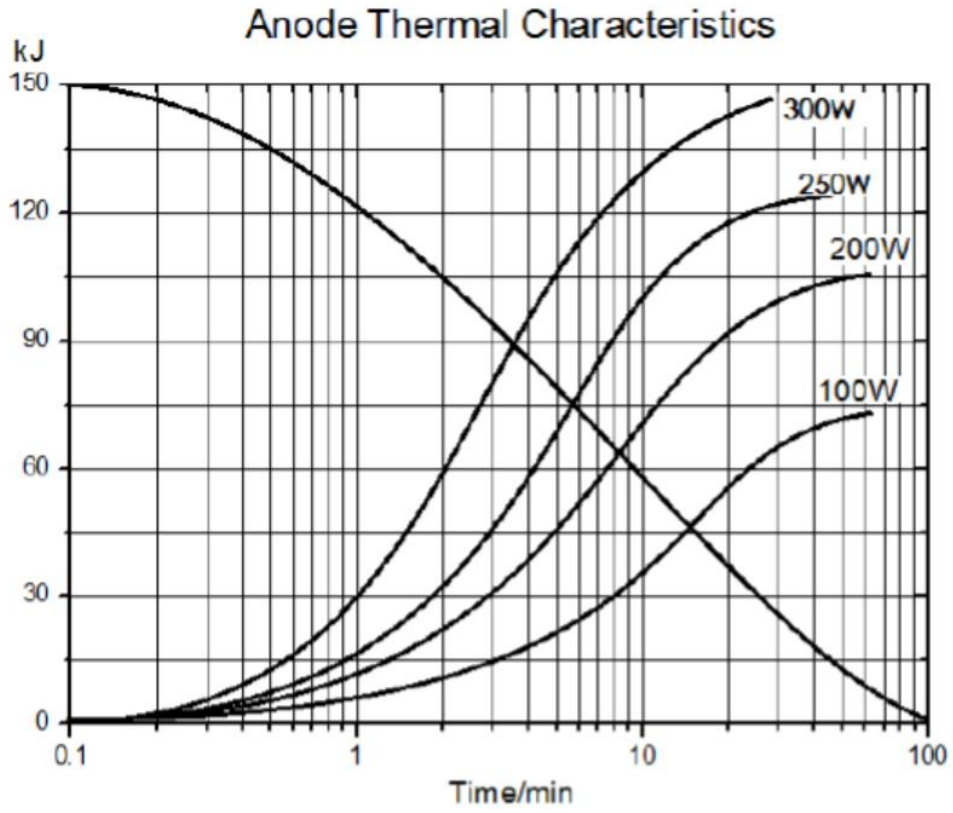
Part	Model	Gemini5
Generator	KV range	Photography mode: 40kV~125kV, continuously adjustable, step size is 1 kV Continuous perspective: 40kV~110kV, continuously adjustable, step size is 1kV Pulse perspective: 40kV~125kV, continuously adjustable, step size is 1kV
	KV precision	The deviation should not be greater than 8%
	mA range	Continuous perspective:0.5mA~6.3mA Continuously adjustable with a step size of 0.1mA Pulse perspective: 0.5 mA~32mA Continuously adjustable, 0.5mA~8mA, step size is 0.1 mA, 8mA~32mA, step size is 1mA Photography mode: 2mA~100mA R'10 number system
	mA precision	The deviation should not be more than 20%
	Nominal electrical power	5 kW
X-ray tube	Nominal voltage of x-ray tube	125kV
	Nominal photographic anode input power	small focus: 5kW, large focus: 17kW
	Continuous anode input power	60W
	Nominal continuous input power	60W
	The anode target Angle	10°

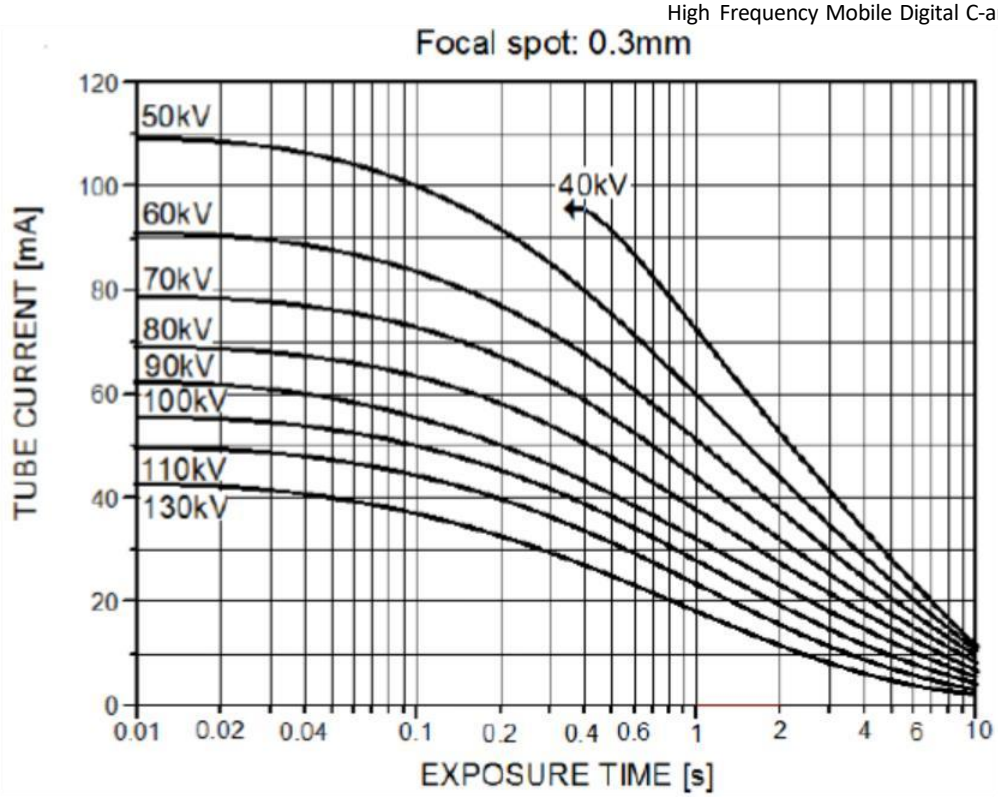
	Target surface material	Rhenium tungsten target surface, molybdenum target
	Nominal focal size	0.3/0.6
	Benchmark axis	Through the mid-pipeline of the X-ray source component window
	The focus is offset from the reference axis	±1 mm
	The angle at which the target faces the reference axis	10°
	Focal spot position tolerance	±1 mm
	Tube core inherently filtered	0.7 mm Al /75kV
	High pressure box with additional filtration	Equivalent filtration of 3.5 mmAl
	High pressure box with total filtration	Equivalent filtration of 4.2 mmAl
	Max symmetrical radiation field	34 cm×34 cm
	Max anode heat capacity	200KHU
	Max anode heat dissipation rate	300W
	Cooling method	Natural cooling
	Weight	20.2kg
	X-ray tube assembly classification	Class I

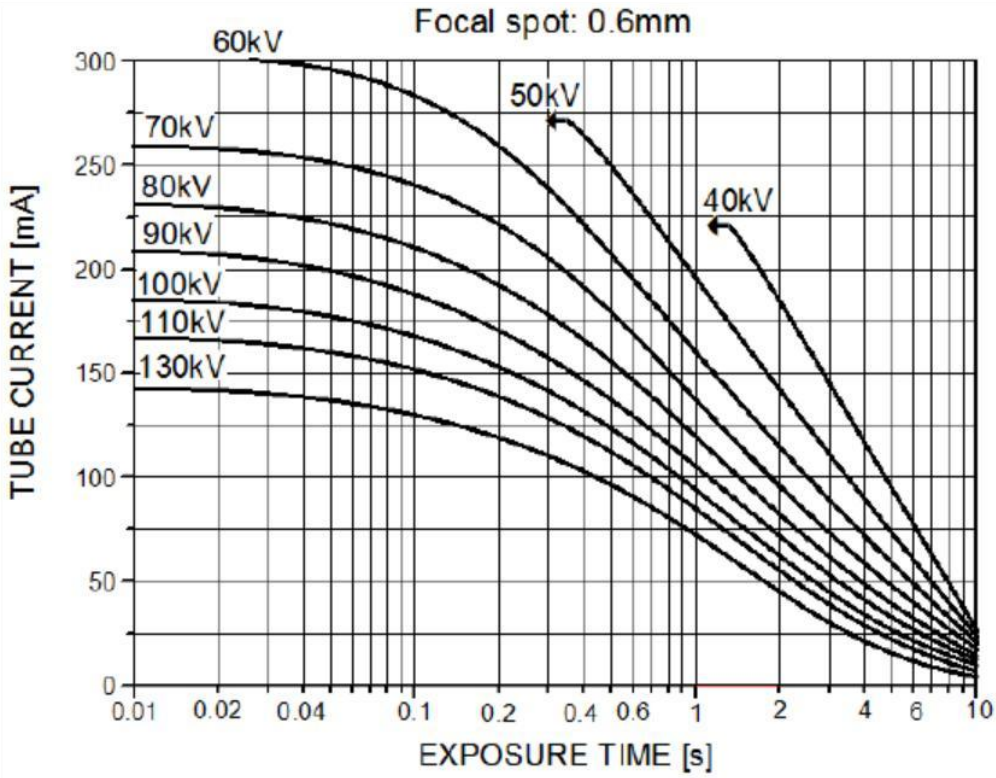


Connection Diagram of Generator

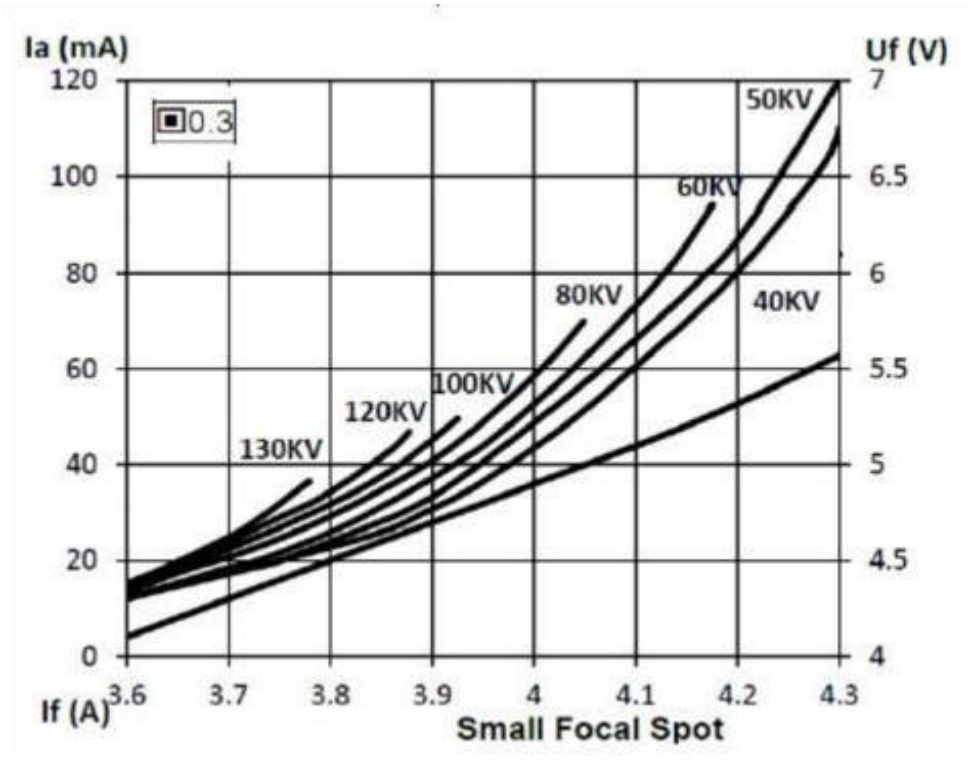
X-ray tube characteristics:

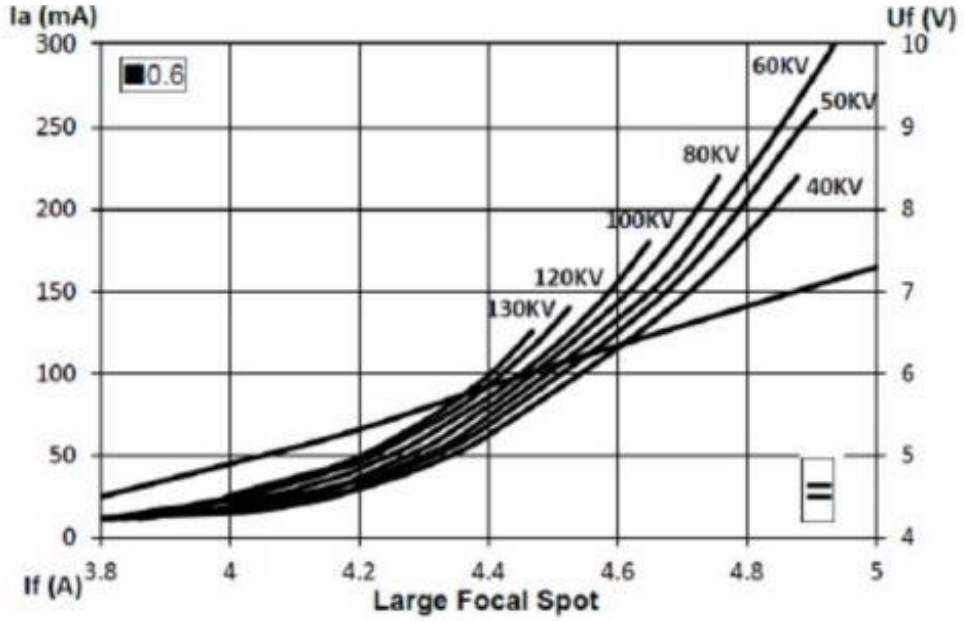



Focal spot: 0.3mm
TUBE CURRENT [mA]
120
100
80
60
40
20
0
50kV
40kV
60kV
70kV
80kV
90kV
100kV
110kV
130kV
0.01
0.02
0.04
0.1
0.2
0.4
0.6
1
2
4
6
10
EXPOSURE TIME [s]

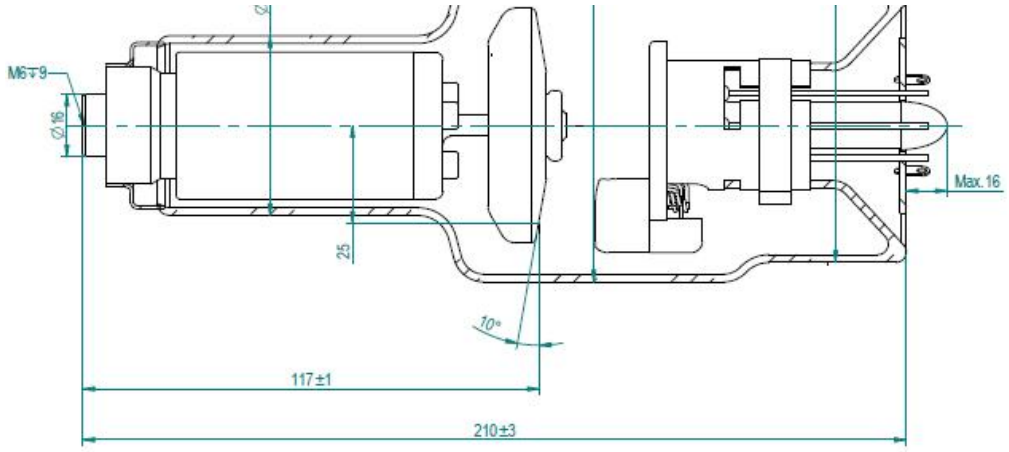

Focal spot: 0.6mm
TUBE CURRENT [mA]
300
250
200
150
100
50
0
60kV
50kV
70kV
80kV
40kV
90kV
100kV
110kV
130kV
0.01
0.02
0.04
0.1
0.2
0.4
0.6
1
2
4
6
10
EXPOSURE TIME [s]

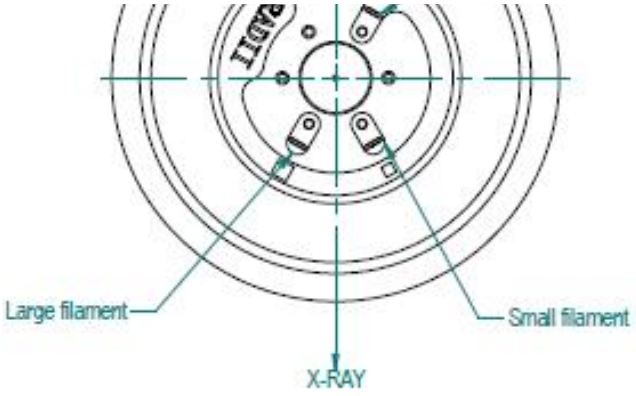
Cathodic Emission Characteristics

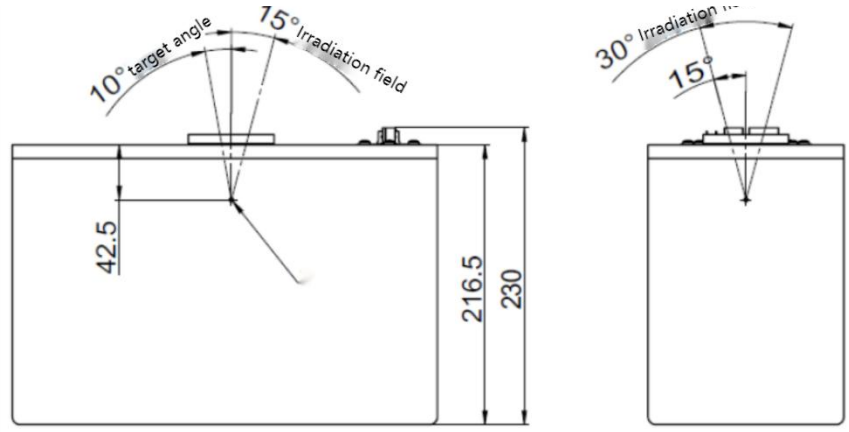




Dimension Diagram of X-ray Tube Outline







4.2 Flat Plate Detector

Flat Plate Detector

Model	Mercu0909F
Detector type	Amorphous Silicon
Scintillation screen	CsI
Effective area（mm）	209.9×209.9
Pixel matrix	1024×1024
Pixel size（um）	205
Spatial resolution（lp/mm）	2.2
The AD converter	16 bit
Size（mm）	270×275×54
Weight（kg）	5.5 kg±120g
Quantum detection efficiency	DQE@20nGy 62% @ 0 LP/mm 50% @ 0.5 LP/mm 42% @ 1.0 LP/mm 30% @ 1.5 LP/mm 21% @ 2.0 LP/mm 9% @ 2.5 LP/mm

4.3 Collimator

Model	Crux603i
Min size of X-ray field	1cm*1cm (SID = 100cm)
Max size of X-ray field	31cm*31cm (SID = 100cm)
X ray field error	Not more than 1% of the SID
Leakage ray	＜0.5mGy/h (IEC 60601-1-3)
The power supply	24V DC/AC(±10%),max.4A
The control mode	Electric
Communication mode	CAN bus
The inherent filtration	NONE
Size	249×122×106mm
Weight	3.0kg

4.4 Grid

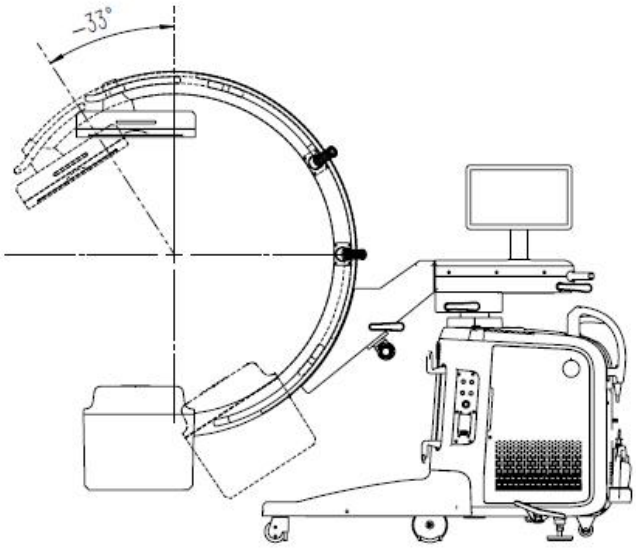
Brand	JPI
Model	JPI Grid -1000
Material	AL
Size	251X266mm
Grid than	10：1

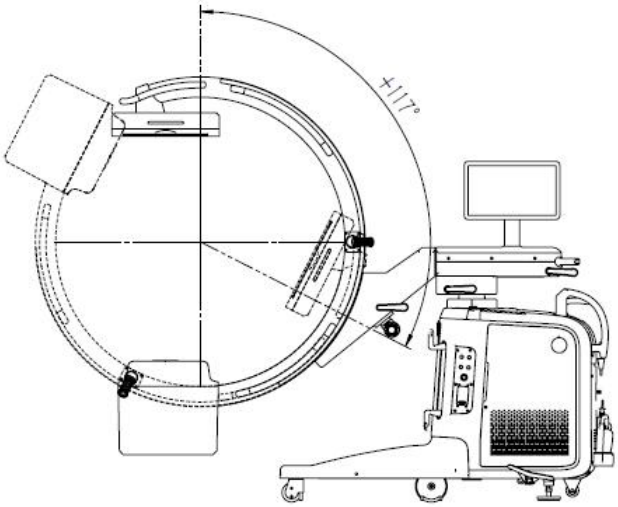
Absorbing materials	Pb
Density	150L/INCH
The focal length	100cm

4.5 Mechanical Part

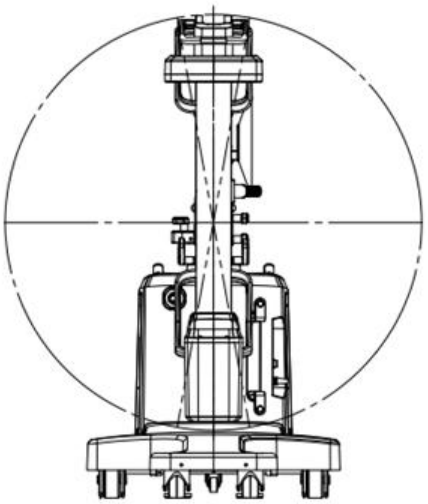
4.5.1 Mobile C-arm Frame

C-arm sliding angle range:-33°～117°

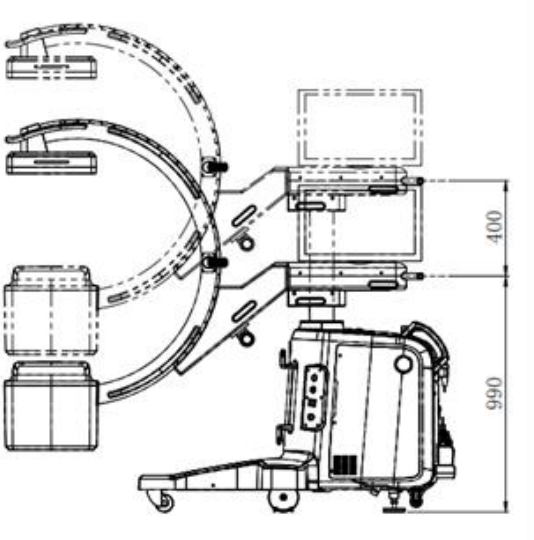




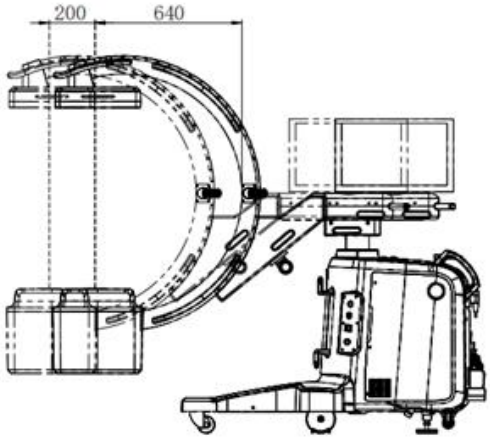
D-arm rotation angle range:±180°



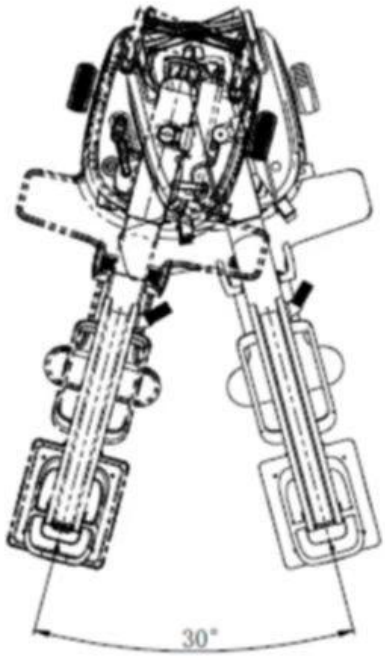
C-arm vertical movement range: 400mm±8mm



C-arm horizontal movement range: 200mm±4mm

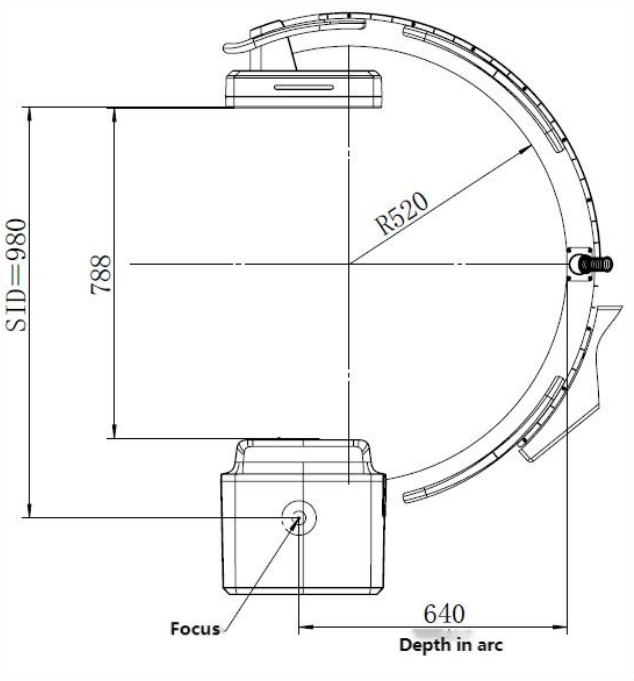


The horizontal swing range: ±15°



The focus image receiver distance of the C-arm is 980mm±10mm
The arc depth of the C-arm is 640mm±10mm

The opening distance of the C-arm is 780mm±10mm
The arc radius of the c-arm is 520mm±5mm



4.6 Image Acquisition Workstation

4.6.1 Workstation host

Min performance of the workstation:

Main configuration	Performance
CPU	Intel Core i5 or higher, at 2.4G Hz or higher
Memory capacity	≥8GB
The hard disk	≥500GB
The operating system	Windows10 pro 64-bit
Bandwidth	Gigabit network

4.6.2 LCD Display

P1917S

LCD minimum performance:

Size	19 inch
Resolution	1280*1024
Type	TFT LCD
Maximum brightness	250cd/ m^2

4.7 Technical Data

4.7.1 Working Power

Maximum output power:

The loading factor combination that results in a maximum output power of 5 kW in the photographic mode is 100 kV, 50 mA

The loading factor combination that results in a maximum output power of 0.693 kW in the continuous fluoroscopy mode is 110 kV, 6.3 mA

The loading factor combination that results in a maximum output power of 2.5 kW in the pulse fluoroscopy mode is 100 kV, 25 mA

4.7.2 Loading Factors and Controls

4.7.2.1 X-ray Tube Voltage:

Photography mode: 40 ～125kV, continuously adjustable, step length of 1kV

Continuous perspective: 40～110kV, continuously adjustable step length of 1kV

Pulse perspective: 40～125kV, continuously adjustable, step length of 1kV

The voltage deviation of the X-ray tube should not be greater than 8%

4.7.2.2 X-ray Tube Current:

a) Adjustment range and adjustment method

Continuous fluoroscopy:0.3～6.3mA. Continuously adjustable, step size is 0. 1mA

Pulse perspective: 0.3～32mA Continuously adjustable, the step size of 0.3～ 8mA is 0. 1mA, and the step size of 8mA ~ 32mA is 1mA.

The deviation of X-ray tube current value should not be greater than 20%.

Loading factor combination of Pulse fluoroscopye:

Voltage Range	Optional Tube Current Range
40～89kV	0.5 mA～32mA
90～100kV	0.5 mA～25mA
101～125kV	0.5 mA～20mA

Photography mode: 2 mA ~ 100 mA. The current is adjusted in steps using the R'10 system.

mA									
2.0	2.5	3.2	4.0	5.0	6.3	8.0	10.0	12.5	16
20	25	32	40	50	63	80	100		

Current loading factor combination of photography mode:

Voltage Range	Loadable Tube Current
40 kV～50 kV	2 mA～100mA
51kV～60 kV	2 mA～80mA
61 kV ～79 kV	2 mA～63mA
80 kV ～100 kV	2 mA～50mA
101 kV ～125 kV	2 mA～40mA

4.7.2.3 Loading time:

a) Adjustment range and adjustment method: 10 ms to 1600ms, using R'10 number system

b) The deviation of X-ray photography design should not be greater than ± (10%+1ms)

Loading factor combination of photography time:

ms									
10	12.5	16	20	25	32	40	50	63	80
100	125	160	200	250	320	400	500	630	800
1000	1250	1600							

4.7.3 Loading factor combination

Photographic mode current-time product loading factor combination:

Voltage Range	Time Produce of Loadable Tube
40 kV～69 kV	0.2 mAs～100 mAs
70 kV～88 kV	0.2 mAs～80 mAs
89 kV～110 kV	0.2 mAs～63 mAs
111 kV～125 kV	0.2 mAs～50 mAs

For any combination of loading factors, the coefficient of variation of the air kerma measurement should not be greater than 0.05.

4.7.4 Imaging performance

4.7.4.1 Spatial resolution

a) When there is no attenuation layer and volume mode, the spatial resolution of the system is no less than 2.2 Lp/mm

b) With the attenuation layer and volume mode, the spatial resolution of the system is no less than 2.2 Lp/mm

4.7.4.2 Low contrast resolution

The low contrast resolution of perspective mode is no more than 5.6% The low contrast resolution of photography mode is not greater than 4%

4.7.4.3 Dynamic range

The discernible dynamic order wedge number of perspective is not less than 14

The number of discernible dynamic order wedges of photography is not less than 16

4.7.4.4 Image uniformity of flat panel detector system

SID is 1000mm, 70kV, 10mAs, and the ratio of the standard deviation of the grey value of the image sampling point to the grey value of the specified sampling point should not be greater than 2.2%, as shown in Formula (1).

$\frac{R}{V_m}$X 100% ≤ 2.2% ……（1）

Type:

R - standard deviation of grey value V_m -- Mean value of grey value.

4.7.4.5 Image brightness stability

Image brightness stability is not more than 15%.

4.7.4.6 Pulse perspective

Provides pulse perspective and adjustable frame rate.

4.7.4.7 Imaging time

The imaging time of fluoroscopy is no more than 1s

The imaging time of photographic mode is no more than 5s.

4.7.4.8 Stabilization time of perspective image

The perspective image stabilization time under continuous and highest pulse perspective frame rate is no more than 2s.

4.7.4.9 Recovery time of perspective

The recovery time of fluoroscopy is no more than 4min. 4.7.4.10 Perspective performance during network transmission

In perspective, network transmission does not affect perspective. 4.7.4.11 Artefact

No artefact affecting the clinical application.

4.7.5 Radiation safety

4.7.5.1 Dose indication

The measurement reference point and calibration information of the dose indication value specified in the instruction manual.

In the process of fluoroscopy, the air kerma is continuously indicated in mGy per minute (mGy/min) with a refresh once per second, and the indication is clearly visible in the normal working position.

Since the last reset, the accumulated Air kerma generated by perspective and photography is continuously indicated in mGy unit, which is refreshed every 5 seconds and is clearly visible in the normal working position.

Air kerma and accumulated Air kerma are clearly

distinguished. Accuracy of Air kerma and Air kerma rate:

The error of the indicated value of the specific Air kerma rate over 6 mGy/min is no more than 35%.

The error of the indicator value of accumulated Air kerma over 100 mGy is not more than 35%.

An indication of the accumulated dose area air kerma by perspective and photography from the last setting of clearing. When the accumulated value of the dose area product exceeds 5uGym^2, the error shall not be greater than ±35%. The indicator unit is Gym^2.

4.8 Size and Weight

Parts	Dimensions (length × width × height)	Weight
Packing case for mobile C-arm	220cm*160cm*155cm	300kg

4.9 SID

980mm

Chapter 5 Installation

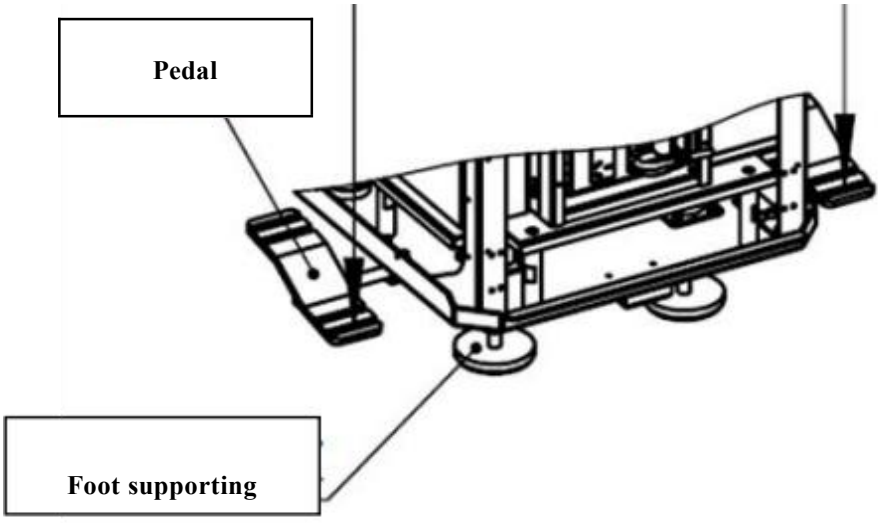
5.1 Preparations before Installation

Phillips
screwdriver
Others

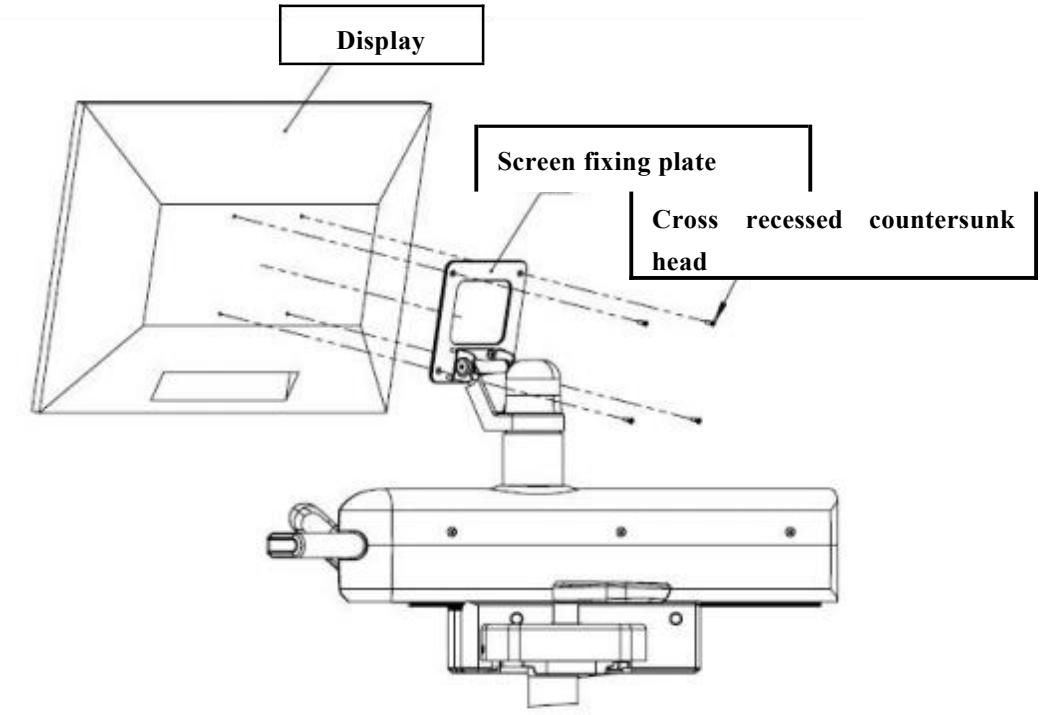
If the room is wet or dry, humidifying equipment or dehumidifying equipment should be added to make the machine room environment meet the requirements of the system. Other equipments are configured according to actual site requirements.

5.2 Display installation

Install the C-arm device smoothly in an appropriate position in the machine room. Press the foot pedal backwards to make the foot support the ground, and the device cannot move as shown in Figure (1). Open the monitor packing box, take out the monitor, and find the Philips screws (M3×10). Fixing them on the screen fixing plate with the cross screwdriver, and connect the insertion line, as shown in Figure (2).



（1）



（2）

5.3 System installation

This product will install the system software when it leaves the factory, without requiring the customer to install the system software.

5.4 Confirmation after installation

Visually inspect the integrity, appearance damage or defect of the equipment, as well as fouling, pasting, wear and breakage which factors would affect System safety.

- The necessary control, safety, display and indication systems of power test
- Detect output parameters related to safety
- Check electrical safety and internal power supply operation
- Special tests required by general engineering practices
- Other necessary inspections as required by the manufacturer.

Chapter 6 Operation

6.1 Preparation Before Use

1) Ensure that the machine is placed stably without tilting or shaking, and ensure that all connections are correct and stable

2) Move and rotate the movable and rotating parts of the equipment to check for abnormal sounds, jamming or signs of damage

3) Check the power plug. If the power plug is damaged, do not use this equipment

4) Check the power cable. If the power cable is damaged, do not use this equipment

5) Check the C-arm system locking brake function and the operation of the C-arm system

6) Check the reverse balance of the C-arm after releasing the brake

7) Check that all exposure indicators can work properly

8) Check whether the flat-panel detector housing and anode tube have mechanical damage

9) Check whether the flat-panel detector filter grid and knurled screws are tightened

10) The solid filter grid can be removed without tools, and the insertion and removal status is clearly visible and clearly indicated. Before the equipment starts working, please adjust the horizontal distance, vertical distance, C-arm rotation position and rotation angle of the equipment to meet user needs.

NOTE: After adjusting the position of the equipment, please lock the brake handle, otherwise it may cause physical harm.

6.2 Operation

6.2.1 Start-up

◆ Plug the power cord into the socket.

◆ Press the power button on the rack console  The rack can be completely energized.

6.2.2 C-arm adjustment

Before the equipment starts to work, please adjust the horizontal distance, vertical distance, rotation position and rotation angle of the C-arm to meet the shooting needs.

◆ Frame lift

Press the rise button on the frame console  Can make the frame rise automatically Press the drop key on the frame console  Can make the frame drop automatically

◆ C-arm orbit movement angle adjustment

● Two or more operators should be present when adjusting the angle of C-arm. One should release the track movement control handle and the other should hold the C-arm handle to prevent accidents

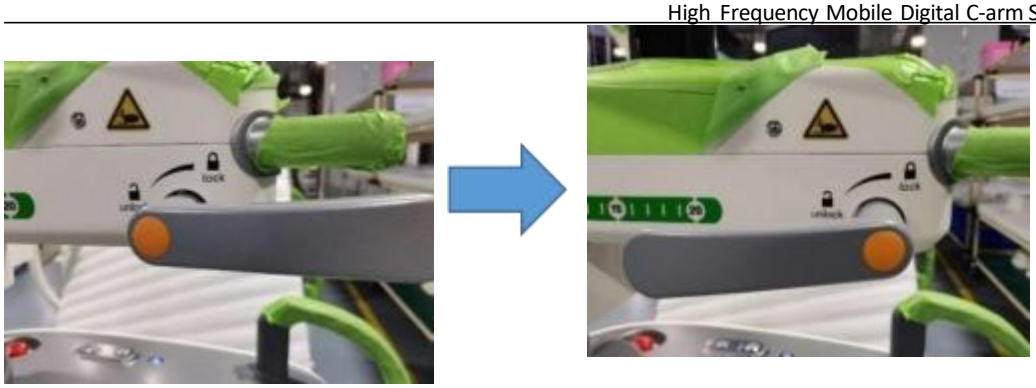
● Adjust the track movement control handle with the blue mark at the connection between the C-arm and the console slowly from 'Lock' to 'Unlock' as shown below

● Slowly rotate the C arm to the desired Angle and then switch from the track move control handle 'Unlock' to 'Lock'

◆ C-arm horizontal rotation angle adjustment

● When adjusting the horizontal rotation Angle of C-arm, two or more operators should be present. One should release the rotation control handle and the other should hold the C-arm handle to prevent accidents

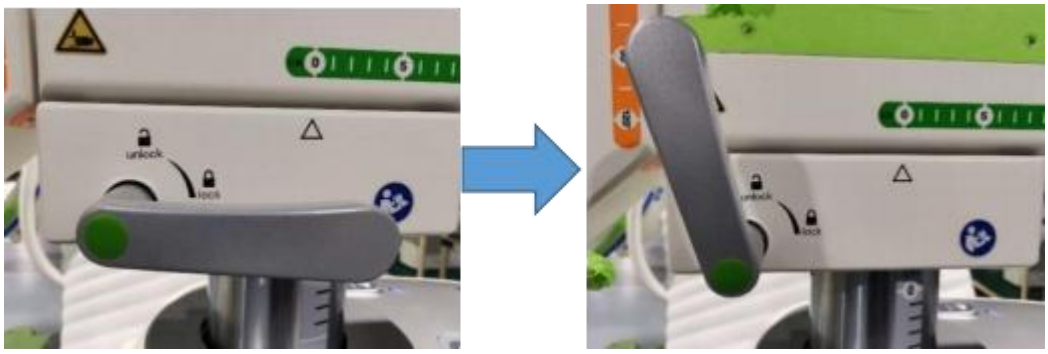
● Adjust the rotation control handle with orange mark on the back end of the horizontal support arm from 'Lock' to 'Unlock' as shown below



● Slowly adjust the C-arm to the desired Angle and then turn the control handle from 'Unlock' to 'Lock'

◆ C-arm forward adjustment

● Adjust the forward control handle with green logo on the front of the horizontal support arm from 'Lock' to 'Unlock', as shown below



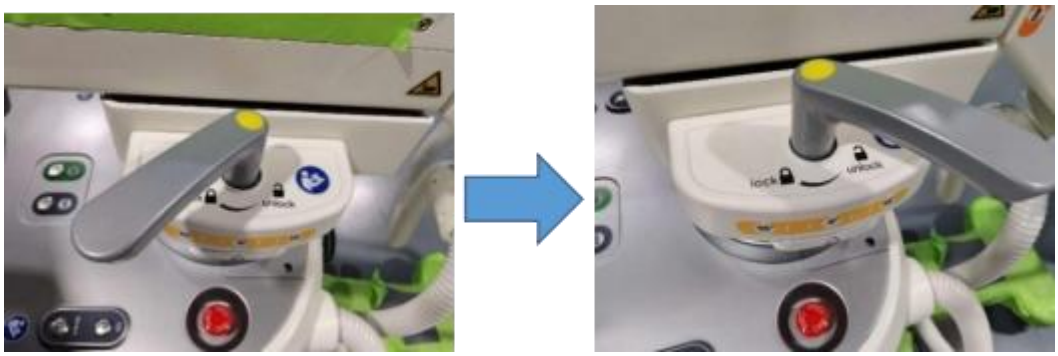
● Adjust the C-arm to the desired distance and then the forward control handle from 'Unlock' to 'Lock'

● Retract the C-arm by following the above steps

◆ Left-right offset angle adjustment of C-arm

● When adjusting the horizontal rotation Angle of C-arm, two or more operators should be present. One should release the rotation control handle and the other should hold the C-arm handle to prevent accidents

● Adjust the offset control handle with the yellow mark on the top of the horizontal support arm from the 'Lock' state to the 'Unlock' state as shown below



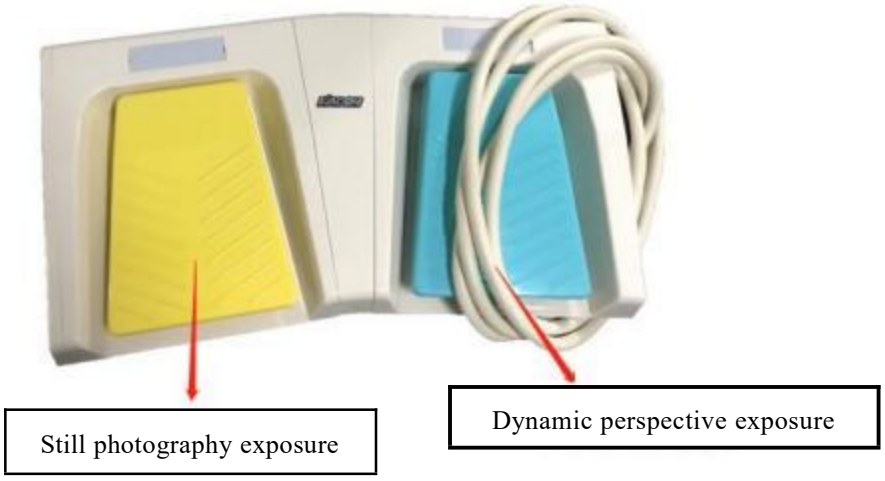
● Adjust the C-arm to the desired angle, then adjust the offset control handle from 'Unlock' to 'Lock'

6.2.3 Software operating

For details, please refer to 《the Acquisition Software Instruction Manual》.

6.2.4 Exposure operation

Exposure operation can be realized in two ways: one is to use the exposure hand brake in the static photography mode or to press the left pedal for exposure; the other is to use the dynamic perspective photography exposure, which needs to press the right pedal to achieve. The following picture shows the function identification of foot brake.



6.2.5 Turn off

◆ Turn off the computer

◆ Press the power off button on the rack control after waiting for the computer to shut down completely

◆ Pull out the power plug, make the rack completely power off

6.3 Precautions in Operation

6.3.1 Basic Precautions

Equipment operators must be trained. Improper use or handling of emergency situations by untrained personnel may pose a danger, in particular, follow the safety measures for the operation of the equipment as stated in the operation manual.

Before equipment use

- To ensure that the equipment can work stably, it is necessary to check the equipment.
- In cold areas, the sudden heating of the equipment may cause condensation of the equipment. In this case, please give the X-ray machine, flat plate detector and computer a period of time to warm up, and then carry out the exposure image acquisition operation after the condensation evaporates to ensure the stable and reliable image quality.

Equipment in use

- When adjusting the C-arm, please release the corresponding brake handle first. Please do not release more than two brake handles at the same time.
- Please be careful not to encounter patients or obstacles during the adjustment of c-arm.
- Tighten the brake handle after adjusting the C-arm; Otherwise, the patient and the device may be damaged.
- Do not place heavy objects on the C-arm. Otherwise, the center of gravity will be offset and the device will fall down.
- X-ray beam is positioned by laser, and the laser intersects with the center of the plate to ensure that the X-ray beam is emitted vertically from the plate.

After equipment use

- After the use of the equipment, please adjust the C-arm to the factory position and lock the brake wrench in time.

⚠CAUTION When operating the moving parts of the equipment, be careful to avoid mechanical collision or injury to personnel in the examination room due to improper operation.

⚠CAUTION When moving, ensure that the device components do not collide with patients or any other obstacles around them.

⚠CAUTION The equipment can not be subjected to severe impact, and the moving parts are prohibited from directly hitting other object. Cables should not be too twisted. Do not force moving parts without removing the brakes.

WARNING The animal's whole body is at risk of radiation exposure and must be protected with additional shielding in accordance with radiation protection safety regulations.

WARNING Attention should be paid to all mechanical parts not to collide with the patient during operation. Impact can cause serious injury to the animal and human body.

6.3.2 Electrical safety precautions

Untrained maintenance personnel shall not open the X-ray source components and flat panel detector without authorization.

Avoid contact between the metal part of the circuit and any conductor.

When cleaning the equipment, do not turn on the power supply temporarily to avoid short circuit.

Use the equipment within the safe voltage permitted by the equipment.

Avoid using the equipment in strong magnetic area, so as not to affect the image quality.

6.3.3 Radiation protection

WARNING Excessive X-ray radiation causes irreversible damage to animal and human tissues. Therefore, unauthorized or unqualified people are not allowed to operate the equipment or avoid irrelevant personnel from contacting X-rays.

WARNING Qualified and authorized operators shall be familiar with the recommendations of the International Commission on radiation protection in the annual publication No. 26 of ICRP and relevant national standards before operation.

WARNING During X-ray setting out, operators must wear X-ray protective clothing, protective glasses and other protective equipment.

6.3.4 Safety of Laser Positioning Lights

⚠ WARNING Laser beams may cause eye damage.

Avoid opening the eyes of the animals and their auxiliary examiners before turning on the laser.

Make sure the laser positioning light is turned off before leaving the animal and its auxiliary inspector.

When the laser positioning key is pressed, the laser positioning light turns on.

Instruct the auxiliary inspector to keep the laser positioning light tightly closed before turning it off.

The laser positioning light will automatically start the 30s delay when it is turned on, and if it is not turned off within 30s, it will automatically turn off.

Chapter 7 Troubleshooting

In case of failure and equipment readjustment, do not repair or readjust without permission. Be sure to contact the manufacturer or the service agent designated by the manufacturer. If the manufacturer or the service agent designated by the manufacturer repairs and readjusts, the manufacturer shall not be responsible for the resulting faults and personal injuries. The manufacturer shall not be responsible for the failure and damage caused by any combination with the equipment of other unapproved manufacturers.

As a manufacturer, it is not responsible for the safety, reliability and performance of components under the following circumstances:

- use components in a different way than specified in the operating manual.
- installation, upgrade, reset, modification or repair by unauthorized personnel.
- when replacing components affecting product safety, original accessories are not used.
- the electrical wiring in the room where the system is placed does not meet the requirements of local regulations.

7.1 Breakdown Maintenance

Troubleshooting includes system performance and system safety inspection. The operator must check the obvious faults of the equipment (see the table below).

Maintenance items	Maintenance contents
Power plug	Discard if damaged
power cable	Discard if damaged
Connectors and relays	Contact wear, corrosion, spark, terminal slack, damage
Circuit board	Functional status, damaged
wiring	Endpoint connection, damage (especially wiring in curved areas)
Ground wire	Break loose, terminal, grounding resistance (below 0.1 Ω)
High voltage cable	Check for damage to the cable plug socket
screw	Loosen, fall off
Exposure indicator	Check that it is working properly
The C-arm system and the monitor cart lock brake function and the C-arm system steering	Functional status is normal
C-arm counterbalance after release brake	Check balance after release
Appearance	Damage and deformation
Emergency stop function of motor drive system	Press/cancel for motion stop/enable

⚠CAUTION

Only authorized and trained operation technicians can judge and solve the fault of the equipment, especially they must understand the possible dangers of wrong operation of the equipment or the handling methods in case of abnormal conditions.

7.2 Equipment Failure

Failures in equipment operation are mostly caused by incorrect operation or sudden changes in power supply voltage make the equipment operate under abnormal conditions. In case of emergency failure of the equipment, please stop using the equipment immediately. Do not use the equipment until the failure is eliminated. Check and record the fault condition. If it still cannot be solved, notify the nearest service agent or manufacturer, and inform the equipment serial number and detailed fault condition.

⚠CAUTION Only authorized and trained operation technicians can judge and solve the fault of the equipment, especially they must understand the possible dangers of wrong operation of the equipment or the handling methods in case of abnormal conditions.

7.2.1 Fault maintenance

The following failures are just a few of the possible ones:

Fault Code	Fault Information	Fault Analysis
1	Click any button and there is no response	1. If the power supply indication is abnormal, check the power supply and restart the device 2. If the power indicator is normal, check whether the button is damaged
2	Click the button without any movement	1. If the power supply indication is abnormal, check the power supply and restart the device 2. If the power supply indication is normal, check the system error prompt, check the corresponding sensor and its control panel or check whether the device moves to a certain limit position and whether the limit switch is normal

3	There is too much noise in motion	No error warning, check electromagnetic brake or other mechanical obstruction
4	Unable to expose	The workstation operation interface can indicate the high-voltage state, record error information, press the reset button to cancel the error report, and contact the maintenance personnel if it fails again
5	Image quality degradation	According to the classification of image quality problems, contact maintenance personnel
6	The shooting part is not in the center, and the deviation is large	Adjust the X-ray source components to align with the plate detector center

Software error:

Software error code	Error reason	The solution
ERR100	KW adjustment has reached the limit	Reset
ERR101	KV adjustment has reached the limit	Reset
ERR102	mA adjustment has reached the limit	Reset
ERR103	ms adjustment has reached the limit	Reset
ERR104	mAs adjustment has reached the limit	Reset

Operator error, the following errors are just a few of the possible errors: The cause of the error may be:

- The equipment is damaged due to collision with obstacles when adjusting c-arm position.
- Installing heavy objects on the C-arm causes the device to fall down and damage the device.
- Improper parameter selection;
- Auto exposure control AEC unit selection error
- Exposure switch prematurely released
- The X-ray room door opens when exposure is operated
- Failure to release brake handle
- Braking device didn't hold up
- Brake handle not tightened
- Mistakenly click "Shutdown" when clicking "Exit system".

7.3 Replaceable Parts

Parts replacement requires a maintenance professional. Fuse replacement:

Please disconnect the power supply of the network before replacement, open the mobile C-arm frame shell with a tool by professionals, take out the old fuse, replace the new fuse, and be sure to install the fuse box completely after the replacement is completed to ensure that the fuse box does not fall during the operation of the machine and during transportation.

Fuse name	Model/Specifications	Correct replacement method	Correct replacement method
Little fuse	0215004.MXP 4A,250V,Slow	The whole machine power. Remove the frame cover and find the fuse plate (visible). Cut off the damaged fuse and put on a new fuse.	Replacement this part should disconnect the power of the equipment and the network power supply and wait 10 minutes to replace it, otherwise there may be a risk of electric shock.

⚠ WARNING If the fuse is not replaced properly, it may lead to the risk of electric shock

7.4 X-ray Safety System

Exposure to X-rays is harmful to human health. During the use of X-ray equipment or radioactive sources, appropriate safety protection measures shall be taken and all regulatory requirements must be met. Therefore, this manual should be read and understood in detail before putting the system into use.

Although the system uses high-performance X-ray protection devices and can provide effective X-ray radiation protection, the system cannot provide all protection, and the system cannot force operators to take sufficient preventive measures to avoid direct radiation or secondary radiation to themselves or others due to human negligence, ignorance or carelessness.

The operators of this system shall receive appropriate training and take appropriate protective measures to ensure that personnel are not injured. All personnel authorized to use the system should be aware of the risk of excessive exposure to X-ray radiation. The company and its agents and sales representatives shall not be liable for the damage or damage caused by exposure to X-ray radiation when purchasing the system.

A variety of protective materials and devices are available, and users are recommended to use such materials and devices.

Make sure that all necessary radiological protection measures have been taken before radiological examination.

During the radiation examination, the personnel in the examination room must strictly abide by the mandatory rules on radiation protection. Details are as follows:

a) Where necessary, try to use protective articles to block rays.

b) Try to use special X-ray protective clothing.

c) Distance is the best way to protect rays, so keep away from ray sources and photographed targets as far as possible. The greater the distance from the focus to the skin, the less the skin will be affected by radiation;

d) Avoid walking or standing within the range of radiation exposure.;

e) Try to use the smallest exposure area, and the dispersion of X-ray is related to the size of the subject.

f) Try to keep the examined area of the patient away from the radiation source.

g) Time protection: all personnel shall stay in the X-ray field as little as possible.

h) Distance protection: all personnel shall keep away from X-ray sources as far as possible.

i) Shielding protection: isolate indoor operation, and veterinarians and caregivers use lead gloves, lead clothes, lead glasses, lead hats, etc.

⚠CAUTION While operating or servicing x-ray equipment, always keep a distance not less than two meters from the focal spot and X-ray beam, protect body and do not expose hands, wrists, arms or other parts of the body to the primary beam.

⚠CAUTION Please comply with the national regulations on "medical X-ray diagnostic radiation health protection and image quality assurance management", and do a good job in the architectural design, protective facilities and license application of the site and machine room of medical X-ray diagnostic equipment; Ensure the operator's qualification, health and personal dose monitoring; When examining patients, we should pay particular attention to the maximum allowable dose of X-ray radiation and the annual dose equivalent limit of a single organ, so as to maximize the benefit of diagnosing diseases and reduce the risk of harmful radiation injury to the subject as much as possible.

Chapter 8 Maintenance

8.1 General principles

In order to ensure the lasting performance of this equipment, a regular inspection plan must be formulated.

A functional check does not indicate whether the equipment is operating according to specifications. Only regular maintenance can detect potential problems.

8.2 Quality control procedures

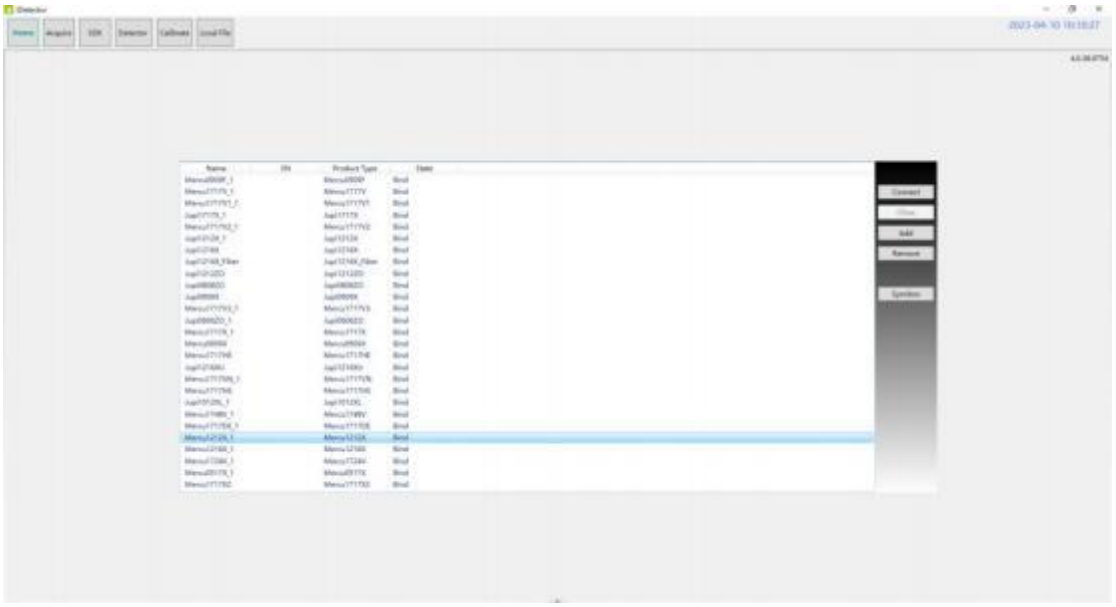
8.2.1 Periodic testing of basic safety

Test the project	Measure	Method	Recommended frequency
Radio protection	Regularly tested by maintenance personnel	When the equipment is exposed normally, the specific kinetic energy of air in any 100cm² area (the main linear size is not more than 20cm) within 1h should not exceed 1.0mGy using the X-ray patrol instrument 1 m from the focal point.	Once a year
Grounding resistance		With a current source with a frequency of 50 Hz and a no-load voltage of no more than 6V, 25A or 1.5 times the highest rated current of the relevant circuit is generated, the larger of the two (±10%), in the time of 5s~10s, the protective grounding point of the protective grounding terminal or appliance input socket or the protective grounding pin of the network power plug and each protective grounding component circulates, and the impedance between the protective grounding pin in the network power plug and any protected grounding parts should not exceed 200 mΩ	Semi-annually

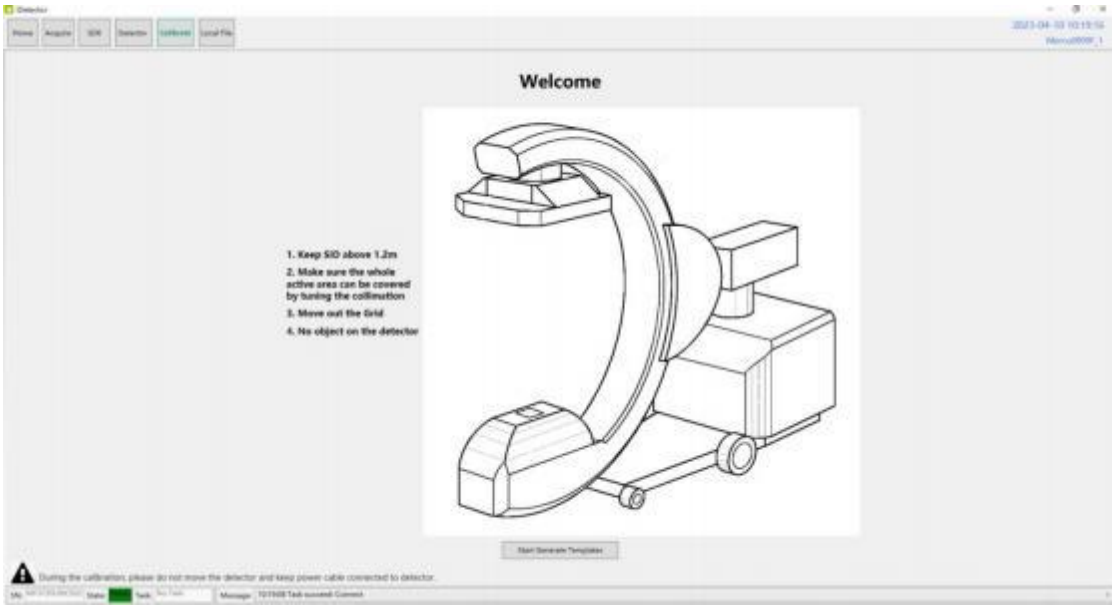
8.2.2 Flat panel detector calibration

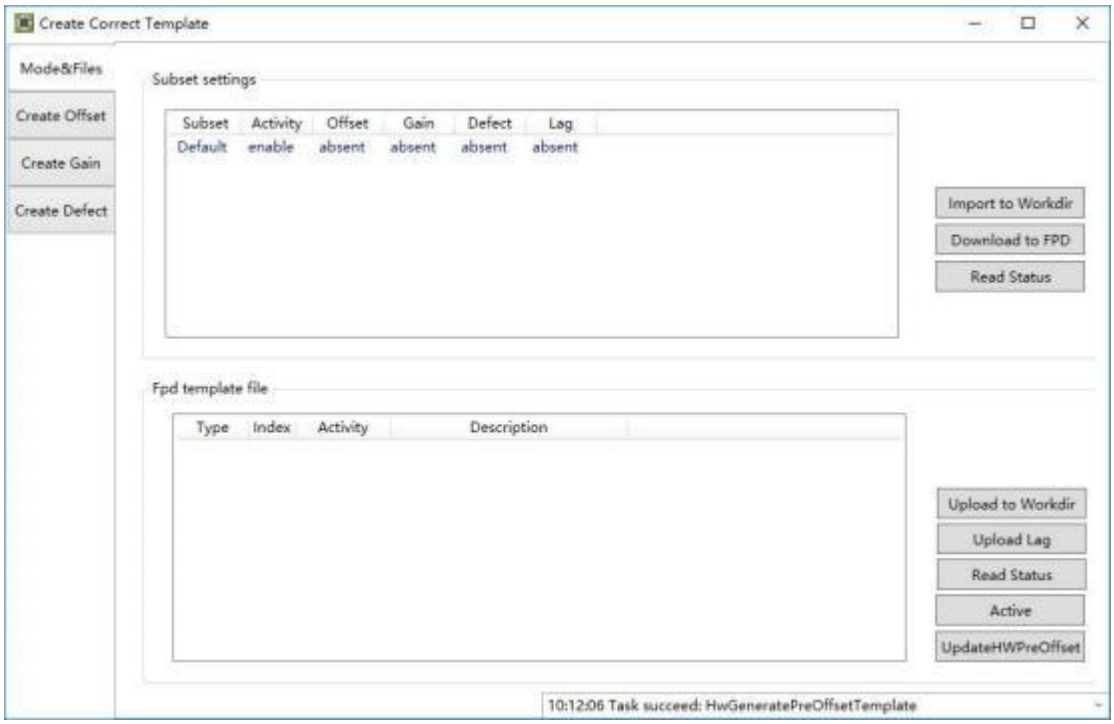
Detector calibration is required once a year, and the operation is as follows:

1) Open iDetector.exe after you can see the main interface as follows, the main function of this interface is to connect the dynamic flat panel detector, click the corresponding flat panel model and click "Connect" (this interface is used to generate calibration templates).



2) Click Start Generate Templates to enter the template generation page.





Button	Illustrate
Mode&Files	Working mode selection when creating templates (Mercu tablets must be selected, other tablets do not have this parameter)
DownloadFile	Download the local template to the probe
UpLoadFile	Upload the template from the probe to the local computer
SelectFile	Enable the template in the probe
ReadStatus	Reads the status of the current probe correction template
Start Generate Templates	Enter the template generation process

8.3 Maintenance period of equipment

Period of time	Maintain people	Inspection content
Daily inspection	Operator	Check the power plug. Do not use the device if the power plug is damaged. Check power cables. Do not use the equipment if the power cable is damaged. Check the locking brake function of the C-arm system and the operation of the C-arm system. Test that all exposure indicators can work normally. Inspect the shell of plate detector and anode ball tube for mechanical damage.
		Check whether the filter grid and knurling screws of the flat plate detector are tightened. Check the emergency stop function of the emergency stop button.
Weekly inspection	Maintenance staff	Check the X-ray source assembly for oil leakage. Check whether there is abnormal sound when the X-ray source assembly is exposed.
Every six months check	Maintenance staff	Check the machine grounding resistance: （< 0.2Ω ） Check and eliminate looseness of fixing screws in mechanical parts. Check circuit board fixation, corrosion status, vacuum cleaner to remove dust on it. Check whether the C-arm moves freely and has abnormal sound. Check whether the handle is used normally and the whole machine moves freely. Check the X-ray generator assembly and the center of the beam limiter. Check whether flat plate detector is calibrated.

		Check whether the filter grid and knurling screws of the flat plate detector are tightened. Check the emergency stop function of the emergency stop button.
Weekly inspection	Maintenance staff	Check the X-ray source assembly for oil leakage. Check whether there is abnormal sound when the X-ray source assembly is exposed.
Every six months check	Maintenance staff	Check the machine grounding resistance:（< 0.2Ω ） Check and eliminate looseness of fixing screws in mechanical parts. Check circuit board fixation, corrosion status, vacuum cleaner to remove dust on it. Check whether the C-arm moves freely and has abnormal sound. Check whether the handle is used normally and the whole machine moves freely. Check the X-ray generator assembly and the center of the beam limiter. Check whether flat plate detector is calibrated.

8.4 Cleaning and disinfection

It is recommended to carry out cleaning work 1 to 2 times a day. Professional cleaners can wipe the detector housing twice with anhydrous alcohol with an ethanol content of 75%, acting for three minutes to keep the surface clean.

The equipment shell and display screen are wiped with a dry rag to remove surface dust.

After cleaning and disinfection, the room is fully ventilated, and then turn on the power, such as indoor residual flammable gas, when the power is on, there is a risk of fire and explosion..

CAUTION Note: the use, storage and discharge of all disinfectants must comply with the instructions on the relevant labels.

Chapter 9 After-sales Service

9.1 Maintenance

As long as the maintenance is carried out on time according to the instructions, the product failure rate can be minimized, but sometimes the product still has failures. If the product fails and cannot be eliminated, please contact the company's after-sales service department or product dealer, and provide the following information according to the nameplate of the product:

Product name and
model Product ID
Product fault description (as detailed as possible)

9.2 Support of Maintenance Parts

The parts that affect the performance of the product (the part required to maintain the operation of the product) will be reserved for 5 years after the termination of production, so as to prepare materials for maintenance.

9.3 Contact Information

If you have any questions about maintenance, technical specifications or instrument failure, please contact your dealer or our after-sales service department.

After sales service:
After sales service
address: After sales
service contact:

9.4 Manufacturer's Declarations

Parts that affect the performance of this product (the parts necessary to keep the product running) will be stocked for 5 years after the end of production to allow for repairs.

If required, circuit diagrams, component lists, illustrations, calibration specifications, or other information that will assist maintenance personnel in repairing ME equipment parts that can be repaired by maintenance personnel designated by the manufacturer.

9.5 Training

After-sales service personnel train operators on site in accordance with the instructions.

Chapter 10 Transportation and Storage

10.1 Transportation

Ensure that the equipment is firmly and reliably fixed in the packing box before transportation;

Load the packing box into the transport vehicle with a forklift or crane and fix the packing box firmly.

Ensure that the transport vehicle runs smoothly during transportation.;

When unloading, use a forklift or crane to unload each packing box from the transport vehicle and place it on the finger positioning ground near the machine room. Be careful:

1) Keep the package intact when disassembling to reduce damage; The unloaded packages shall be kept as standby supplies;

2) If the removed equipment cannot be installed immediately, it shall be packed and kept. Place neatly and pay attention to moisture.

3) Before unpacking, if there are relevant data instructions outside the packing box, you should read them first. If you also need to refer to them during installation, please put the data close to the operation position for easy reading at any time.

10.2 Storage

In the packaging state, the equipment must be able to be stored for no more than 240 hours under the environmental conditions not exceeding the following range

(1) Ambient temperature: - 20 ℃ ~ 55 ℃

(2) Relative humidity: 10% ～ 90% (no condensation)

(3) Atmospheric pressure: 50kPa ~ 106 kPa.

Chapter 11 Disposal After Scrapping

On the premise of correct use, the service life of the equipment is 10 years. After the X-ray tube is damaged, it can be sent to our company for replacement. When the equipment is damaged and difficult to repair after 10 years of correct use, and the safety performance cannot be guaranteed, the equipment shall be scrapped. After the equipment is scrapped, the transformer oil in its X-ray source assembly shall be recycled by a special industrial waste oil acquisition station. The rest shall be handled according to the waste disposal procedure of the hospital.