

Diagnostic X-ray Equipment Model RAY98(W), RAY98(M)

Operation Manual
Technical Manual
Installation manual



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Runyes[®]

Diagnostic X-Ray Equipment
Model RAY98(W), RAY98(M)

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User Registration

On the inscription plate at the back of the instrument, you will find the unit's model number, serial and reference number. Please double check the numbers and fill in the form with them, and quote the reference number, when you are in contact with your distributors.

Product Name:

Product Model:

Serial Number:

Date of Manufacture:

Software Released Version: RAY98-E1.2

*Before operating, please read carefully all safety cautions and instructions for operation. This operator's manual will help you understand all functions of Runyes Diagnostic X-ray Equipment as much as possible.

*Please read carefully the instructions of this operator's manual while servicing and maintaining the units.

*Please keep this manual for your future references.

*If error occurs during operation of the instrument, please get in touch with your local distributor or ours, we will offer you the best qualified service and assistance.

*Product expected service life: 8 years

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1. Introduction

1.1 Purpose

Diagnostic X-ray Equipment is intended to use for medical units for dental X-Ray radiology diagnostic. Contraindications: Forbidden for pregnant women.

1.2 Composed by

Diagnostic X-ray Equipment is composed by X -Ray tube head, time controller, and arms.

1.3 Model

Mobile Type: RAY98(W), RAY98(M).

1.4 Assortment

Type of protection against electric shock: CLASS I ME EQUIPMENT
Degree of protection against electric shock: TYPE B APPLIED PART
Applied parts: Beam limiting device.
Not belong to the category AP or APG device.
Degree of protection against harmful ingress of water: IPX0.
Operation Mode: Continuous.
Disinfection method: See Chapter 8.
















1.5 Obligation of the Installer

Installers are required to:
*Make sure the voltage is accorded with the manufacturer requirement and range.
*Make sure the switch can cut off the power supply when x-ray is working to ensure safety.
*Install and test the equipment according to installation manual provided by manufacturer.
*Provide Operation manual to users.













1.6 Obligation of the users

User's notice:
*Use the equipment according to this operation manual.
*Maintain the equipment according to the maintenance time table suggested by manufacturer. If the equipment maintained not properly by users themselves, manufacturer and dealer will not respond of the accident caused by incorrect operation.
*When some accident happened related to our equipment or during the operation might result in death, hurt, or healthy damage, please inform sanitation management department and manufacturer or dealer immediately.
*When users inform manufacturer, the serial number and the type of related components are required. Users can get the information from technical tag.

1.7 Warning & Prevention

-  It is important to use and operate the equipment, and the equipment should be shielded from the radiation safety requirements of each country and region. Users are responsible for ensuring compliance with local safety requirements.
-  Runyes Diagnostic X-ray Equipment may have ionization radiation which might damage healthy if operate incorrectly. Therefore, it is recommended that only well trained personnel can operate the equipment according with existing laws and regulations.
-  Be careful during operating the cantilever to adjust the tube head, the rotating arm may hurt your hands.
-  Though this equipment is measured up on electromagnetic applicability criterion, we still suggest you do not use the equipment at the place with external electromagnetism. For example, Hertzian waves radiated from cell phone may interfere in X-ray. Please refer to the attached Chapter 16 for EMC.
-  The Operator should not use the system and should inform the Customer service, if the ESSENTIAL PERFORMANCE is lost or degraded due to EM DISTURBANCES.
-  Do cut off the electricity power when conduct the maintenance or other operations.
-  To avoid risk of electric shock, this equipment must only be connected to a supply mains with protective earth.
-  Do not repair this equipment without authorization of manufacturer.
-  Do not modify this equipment without authorization of the manufacturer.
-  Equipment replaceable parts, such as fuse, power cord, handheld exposure device line and other components must use the original factory accessories and be replaced by the dealer service personnel authorized by Runyes.
-  Runyes will provide circuit diagrams, component part lists, and calibration instructions that will assist dealer service personnel authorized by Runyes to repair those parts of the equipment that are designated by the Runyes as repairable by dealer service personnel , not to other personnel.
-  The service personnel of the equipment must be trained by our authorized dealers.
-  Portable and mobile RF communication equipment may affect the performance of Diagnostic X-ray Equipment, and avoid strong electromagnetic interference when using, such as near mobile phone, microwave oven, etc.
-  WARNING: Use of this equipment adjacent to or stacked with other equipment should be avoided because it could result in improper operation. If such use is necessary, this equipment and the other equipment should be observed to verify that they are operating normally.
-  WARNING: Portable RF communications equipment (including peripherals such as antenna cables and external antennas) should be used no closer than 30 cm (12 inches) to any part of the RAY98(W), RAY98(M) Diagnostic X-ray Equipment, including cables specified by the manufacturer. Otherwise, degradation of the performance of this equipment could result.

1.8 Labels

No.	Icon	Description	No.	Icon	Description
1		TYPE B APPLIED PART	2		Fragile, handle with care
3		Refer to instruction manual/booklet	4		Keep dry
5		Fuse	6		Date of manufacture
7		Alternating current	8		Serial number
9		Protective earth (ground)	10		Warning: ionizing radiation
11		X-ray Focus Position and Direction	12		Warning: Crushing of hands

1.9 Conforming standard

X-RAY EQUIPMENT for DENTAL INTRA-ORAL RADIOGRAPHY ++)IEC 60601-1:2005+A1: 2012
X-RAY EQUIPMENT for DENTAL INTRA-ORAL RADIOGRAPHY ++)IEC 60601-2-65:2012
X-RAY EQUIPMENT for DENTAL INTRA-ORAL RADIOGRAPHY ++)IEC 60601-1-3:2008/AMD1:2013

2. Technical Data

2.1 Parameter

Voltage	120V ~ 50/60Hz	230V ~ 50Hz
Fuse	T10AH 250V (5X 20mm)	T8AH 250V (5X20mm)

Power supply impedance: $\leq 0.4 \Omega$
Max power consumption: 1100VA
Ray type: X-ray
Radiation and distribution: 6cm from the beam limiter outlet direction
Dose rate: 6mGy/s
X-ray tube model: D-045
Target material: tungsten
Target angle: 12.5°
FOCAL SPOT: 0.4mm
Anodic angle: 12.5°
Tube voltage: 65kV $\pm 10\%$
Tube current: 7mA $\pm 20\%$
Loading time adjustment range: 0.04s-2.0s $\pm 5\%$ or $\pm 20\text{ms}$, adjustment mode is selected according to R'10 coefficient.
Nominal electric power: 0.455kW(65kV, 7mA, 0.1s)
Combination of loading factors leading to maximum output electric power: 65kV, 7mA
Load circle: 1/30
Inherent filtration: 1.0mmAL/65kV
Extra filtration: 1.5mmAL/65kV
Total filtration: 2.5mmAL/65kV
Half-value layer: 65kV, $\geq 1.6\text{mmAL}$
Leaking radiation rate: $1\text{m} \leq 0.25\text{mGy/h}$ (65kV, 7mA, 1s, loading interval 1s/30s)
Pipe assembly weight: 4kg

2.2 Beam limiting device

Distance from focus to skin: $20.5\text{cm} \pm 0.5\text{cm}$
Output radiation: circle, diameter $\phi 6\text{cm} \pm 0.5\text{cm}$

2.3 Environmental Requirement

Rotation angle of X-ray Tube Head on Horizontal Plane: 360°
Vertical rotation angle of X-ray Tube Head: $\geq 270^\circ$
Angle indicator: The indexing value is not more than 10 degrees, and the deviation between the indication value of the angle and the actual value is within the range of ± 1 minimum Indexing value.
Vertical Moving Range of X-ray Tube Head: $\geq 500\text{mm}$
Moving range of X-ray tube head: $\geq 600\text{mm}$
Start-up force is no more than 35N.
RAY98(W) Rotation angle of telescopic arm on horizontal plane: $\geq 80^\circ$,
Start-up pull is not more than 20N.
RAY98(M) Rotation angle of telescopic arm on horizontal plane: $\geq 40^\circ$,
Start-up pull is not more than 20N.
RAY98(M) Maximum Outward Size: 880mm long, 850mm wide and 2100mm high.
RAY98(M) The patient max. Weight that the seat can bear: 135kg

2.4 Time controller

Micro-process controller function.
Child(small), Adult(big), digital selection.
Low dose set when operating digital sensor.
Manual switch with 3m spring cable.
Manual switch can be installed from distance.

2.5 Work Environmental Requirement

Working Temp.: 10°C-40°C
Relative Humidity: ≤ 75 %
Atmospheric Pressure: 800hPa~1060hPa

2.6 Transportation and storage conditions

Store Temp.: -20°C-55°C
Transportation Temp.: -20°C-55°C
Relative Humidity: ≤ 85 %
Atmospheric Pressure: 700hPa~1060hPa

⚠ Caution: Diagnostic X-ray Equipment should be stored in non-corrosive gas and drafty environment. Do not tow and throw it during transport to avoid any strong vibration.

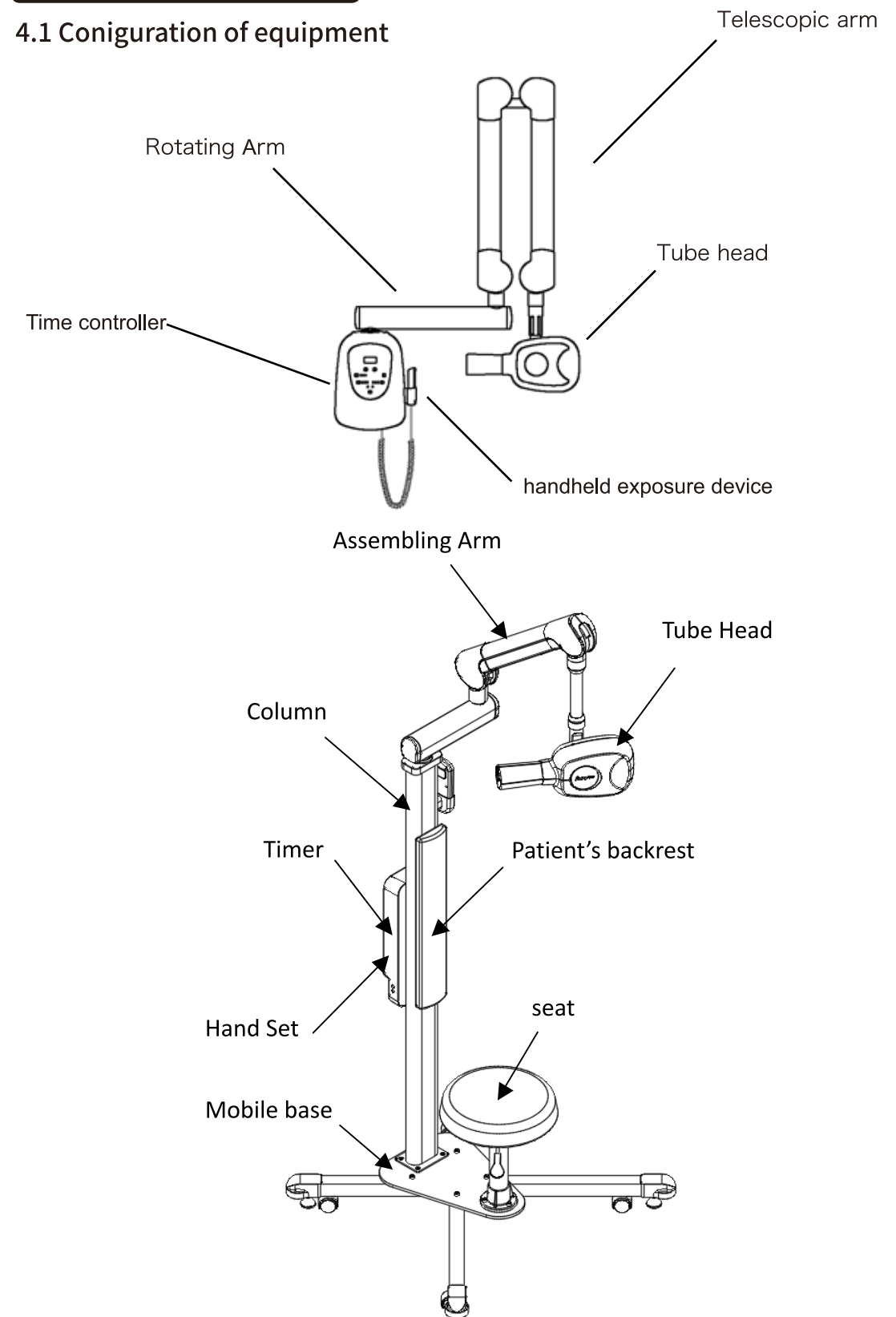
3. Check List - Before Use

User's notice:

- Ensure that you are familiar with the radiation protection measures and manual instructions before use.
- Ensure that the film matches the work requirements and is ready to use.
- Ensure the film and developer/fixing solution are compatible.
- Ensure that the developer/fixing solution is valid for use and is at the proper processing temperature and concentration.
- Ensure the expiration date of the film, do not use expired film.
- If other imaging equipment is used, please ensure that the imaging equipment is in a normal state of availability.
- Ensure that Diagnostic X-ray Equipment has been correctly connected to the power supply.

4. Product composed by

4.1 Configuration of equipment



4.2 Time controller and handheld exposure device



Wall-mounted programmable controller assembly

Handheld exposure device

Mobile programmer component

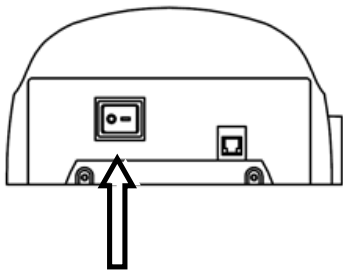
Connect one end of the handheld exposure device to the interface below the program controller and the other end to a handheld exposure device.

Note: handheld exposure device cannot be connected to other devices!

5. Operation

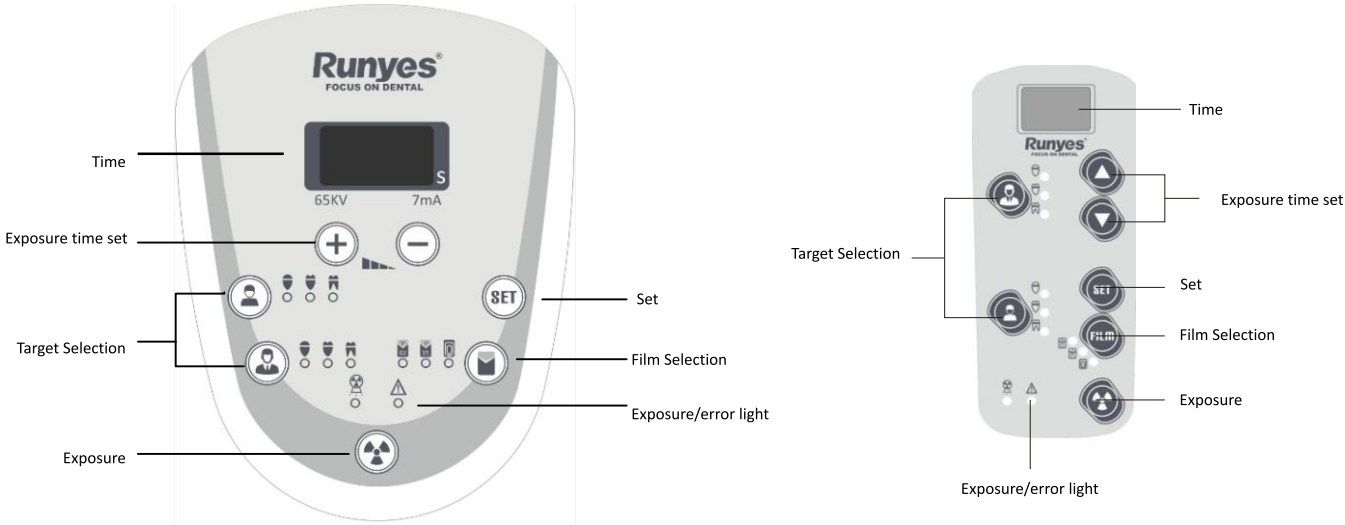
The power switch located at the bottom of the time controller is intended to be used as the isolation device from the mains power supply.









5.1 Starting up



The power switch is located at the bottom of the Time controller, which is the on / off device of the equipment and mains power supply. When the power switch is on, the power switch indicator lights up, indicating that the power supply has been connected. All indicator lights on the time control panel are lit. The time window displays 888 to check whether the display surface is normal.

5.2 control panel and exposure time set



Display Screen		Display exposure time, after exposure, display the exposure waiting time, display error code if there is any error.
Film Selection		Choose low-speed film 02, high-speed film 01, digital imaging equipment. When different modes are selected, the default time will be different.
Position Set and Indicator		Choose the tooth position to be photographed by the child or adult. The exposure time varies with different tooth positions.
exposure time set		After selecting film mode and tooth position, if default time is not suitable, you can press parameter adjustment button, add and subtract exposure time properly. The range is 0.06s~2s.
Exposure		After selecting the exposure time, when the user press the exposure key for the first time, the display will show a countdown of 120 seconds.
SET		When the system's own time is not appropriate, the user can adjust the appropriate time and press the SET key, the system will save the current parameters. The exposure time when the current film mode and tooth position is selected next time is the currently set time. When the user presses the SET key for 5 seconds, the system will return to the factory default parameters.
Exposure Indicator Light		When the exposure key is pressed, the tube head produces X-rays, and the indicator lights yellow.
Error light		When the exposure key is pressed, the indicator light will be red to indicate if there is a fault, and the corresponding code will be displayed in the time window.

The system displays the default exposure time after the self-check. The user can select the system default exposure time by pressing the "Film Selection" and "Target Selection" keys. If the default exposure time does not meet the requirements of the current user's imaging medium, the appropriate exposure time can be adjusted by pressing the "Exposure time set" key. The adjusted time will return to the system default time after rebooting. If the user need to save the adjusted time, after the time is adjusted to the appropriate time, short press the "SET" key to save. All teeth on the panel can be reset.

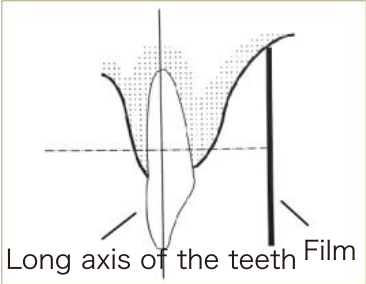
If the user is not satisfied with the time set by him and forgets the original exposure time, he can press the "SET" key for 5 seconds, and the system will return to the factory default time.

If the new equipment is used for the first time, the user should adjust the exposure time to 0.1s value for exposure test. After the equipment is exposed correctly, select another value for exposure.

5.3 Patient positioning

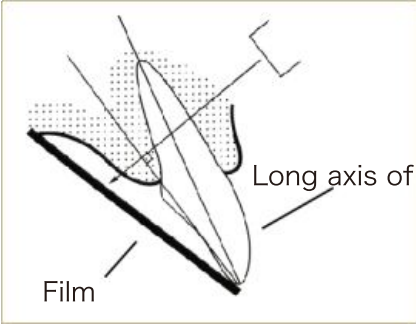
Let the patient sit on the seat and maintain the correct sitting position. The user places the film or digital imaging equipment, adjust the angle and position between the X-ray generator and the patient.

Parallel line technology



The film or digital sensor is placed in the oral cavity or on the film holder. The film or sensor is parallel to the long axis of the tooth.

Diagonal technology



Allow the patient to put the film or digital sensor in the exposed position of the mouth. Guide the X-rays perpendicular to an imaginary line that bisects the angle between the film or digital sensor plane and the long axis of the tooth.

The average angle of X-ray tilt when projecting upper and lower teeth

Tooth position	X-ray tilt direction	X-ray tube tilt angle
upper jaw incisors	incline to the foot	+42°
upper jaw single tooth bit	incline to the foot	+45°
upper jaw double teeth & 1st Molar position	incline to the foot	+30°
upper jaw 2nd & 3rd Molar position	incline to the foot	+28°
lower jaw tooth bit	incline to the head	-15°
lower jaw single tooth bit	incline to the head	-18°~-20°
lower jaw double teeth & 1st Molar position	incline to the head	-10°
lower jaw 2nd & 3rd Molar position	incline to the head	-5°

5.4 Exposure


There are two exposure methods for the user:



1. Press the exposure key on the handheld exposure device to expose. The yellow indicator lights on the handheld exposure device and the time control panel



2. Press the exposure key on the control panel to expose. The yellow indicator lights on the handheld exposure device and the control panel during exposure.

 During exposure, press and hold the exposure key until the yellow indicator on the handheld exposure device or control panel glows and goes out before releasing the exposure key, otherwise the exposure will be terminated and an error will be reported.

5.5 Turn off

After using it, turn off the machine and unplug the power cord.

6. Error Codes



When an error occurs, the code will be displayed on the time screen.



When an error occurs, press the SET key to clear the code for 3 seconds.

See the error code table for specific error code information.

Error Code Table		
Code	Error Information	Solution
E01	Exposure of medium-range exposure key released too early	Release until exposure light off.
E02	Failed filament preheating	Attempt exposure again, If the problem remains, please contact the distributor.
E03	X-ray tube anode current overload	Attempt exposure again, If the problem remains, please contact the distributor.
E04	X ray tube KV is too high	Attempt exposure again, If the problem remains, please contact the distributor.
E05	X-ray tube anode current overload	Check the connection cable of the key panel and time control panel, try to expose again or please contact the dealer.
E06	X-ray tube KV is too low	Check the connection cable of the key panel and time control panel, try to expose again or please contact the dealer.
E07	mA feedback cable	Check the connection cable of the time control panel and X-ray tube or please contact the dealer.
E08	KV feedback cable	Check the connection cable of the time control panel and X-ray tube or please contact the dealer.

7. Safety

- Only trained and authorized dealer service personnel are allowed to open the chassis and contact the circuit board.
- The power supply must be according with safety regulation and with grounding protection.
- Before cleaning or disinfecting the equipment, the user must turn off the power supply and unplug the power cord.
- Water and other liquids shall not penetrate into the device, they may cause short circuit or corrosion.
- Please make sure the device won't nip the finger of patient or operator during adjusting the position.
- The equipment cannot be used in flammable gas or steam environment.
- Only trained doctors with the necessary knowledge of X-ray protection are allowed to operate the equipment.
- Patients should wear protective equipment when taking X-ray films. The operator and other personnel shall be at least 2 meters away from the source components of dental X-ray machine.
- Ensure that the equipment is under watched.
- The unit contains components that must be disposed of in accordance with existing regulations.
- The operator shall wear a personal dosimeter and comply with local regulations.

8. Cleaning and disinfection

8.1 Cleaning

The User must cut off the power supply before cleaning. The User can use a soft fabric with cleaning solution to clean the equipment. Do not let any liquid into the equipment.

8.2 Disinfection

It is recommended that the user uses 75% alcohol disinfection wipes, or 70% ~ 80% (volume ratio) ethanol disinfectant to soak a clean dry gauze, wipe the surface to be disinfected twice, for 3min. Air dry or wipe off the residual disinfectant with a clean, dry soft cloth.

Note: It is recommended to disinfect once a day.

Cleaning should be done before disinfection.

Ethanol is flammable and there should be no open flame during use.

Those who are allergic to alcohol should use ethanol disinfectant with caution.

After disinfection, the residual disinfectant should be removed in time to avoid direct contact with the patient.

9. Maintenance and inspection



Do not service or maintain the Diagnostic X-ray Equipment while in use with a patient.

The following shall be checked by the operator before use every day:

- Whether the power cord is damaged.
- Check whether the shell of time controller and handheld exposure device is damaged.
- Whether the high-pressure generator has oil leakage.
- Turn on the power switch of the time controller (below the time controller) to check whether the status indicator of the switch green indicator is normal.
- Selecting a set of exposure time, adjusting the position of the head (ball tube) will not endanger anyone. Picked up a handheld exposure device go from equipment as far as possible, and then press the exposure of the keys on the handheld exposure device, check whether exposure in the process of yellow indicator light will light up, the buzzer will send out "beep" prompt.

The authorized maintenance personnel of our company conduct maintenance and calibration inspection for the equipment at the time of installation and every two years.

Check the position of the head (ball tube) and adjust it as necessary:

- Adjust the head tube to rotate around the horizontal axis, and check whether the connection of head tube is loose.
- Adjust the elastic of the cantilever spring.
- Adjust the arm position.

The essential performance of the equipment is tested once a year by the local third-party organization. See table 201.101 in EN 60601-2-65 for the basic performance, 203.6.4.3.102 and 203.6.3.2 in EN 60601-2-65 for the test method.

Service personnel should conduct grounding reliability testing and maintenance on the equipment every 3 years. The steps are as follows:

1. Turn off the device power switch, and unplug the device power cord.
2. Open the time controller shell.
3. Tighten the ground screw with a screwdriver, and check whether there is rust. If there is rust, the ground point needs to be derusted.

10. X-ray Tube Characteristics

Filament voltage: 3.0-3.7V
Maximum filament current: 3.0A
Filament frequency limit: DC or AC (0-20kHz)
Nominal input power of anode: 585W (1s')
Maximum Anode Heat Cooling Rate: 100W
Filament characteristics: See figure 10-3 Filament and Emission Characteristic Curve.
Emission characteristics: See figure 10-3 Filament and Emission Characteristic Curve.
Thermal characteristics: See figure 10-2 X-ray Tube Anode Heating • Cooling Curve.
Exterior dimensions and wiring: See figure 10-1 Mechanical Dimensions and Wiring Diagrams.

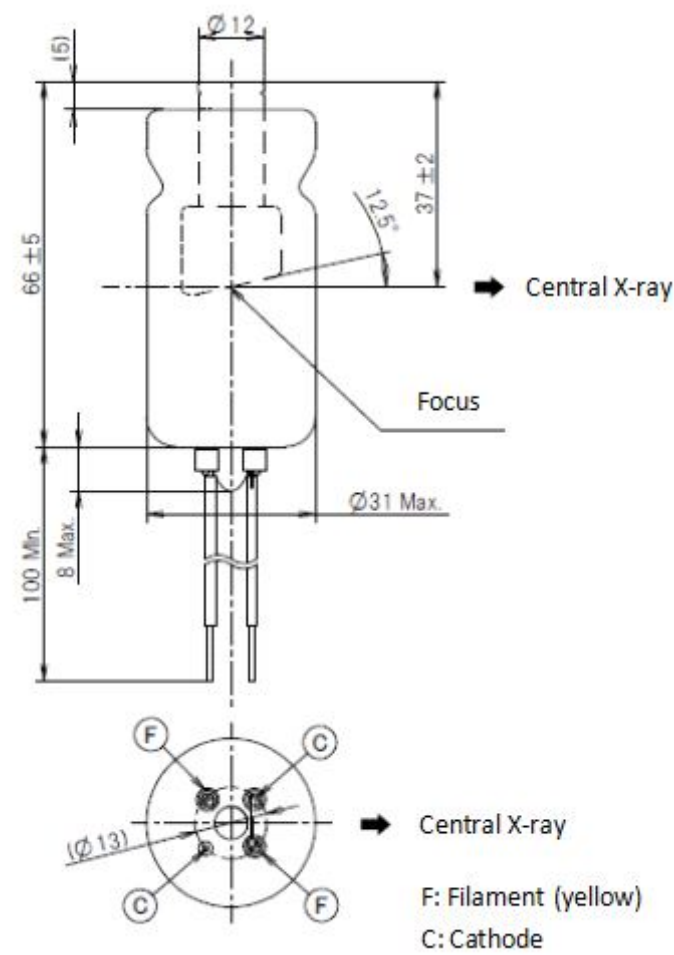


Figure 10-1 Mechanical Dimensions and Wiring Diagrams

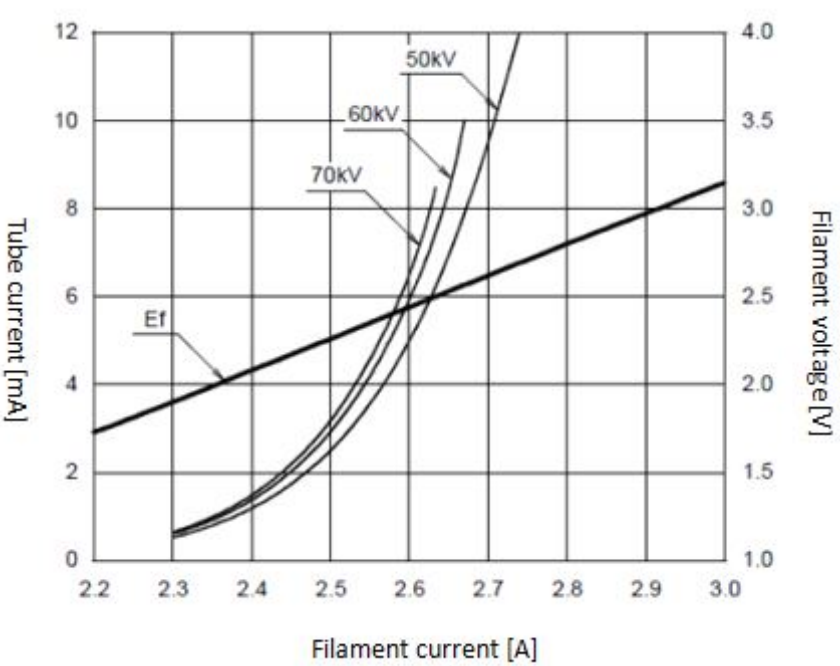


Figure 10-2 X-ray Tube Anode Heating • Cooling Curve

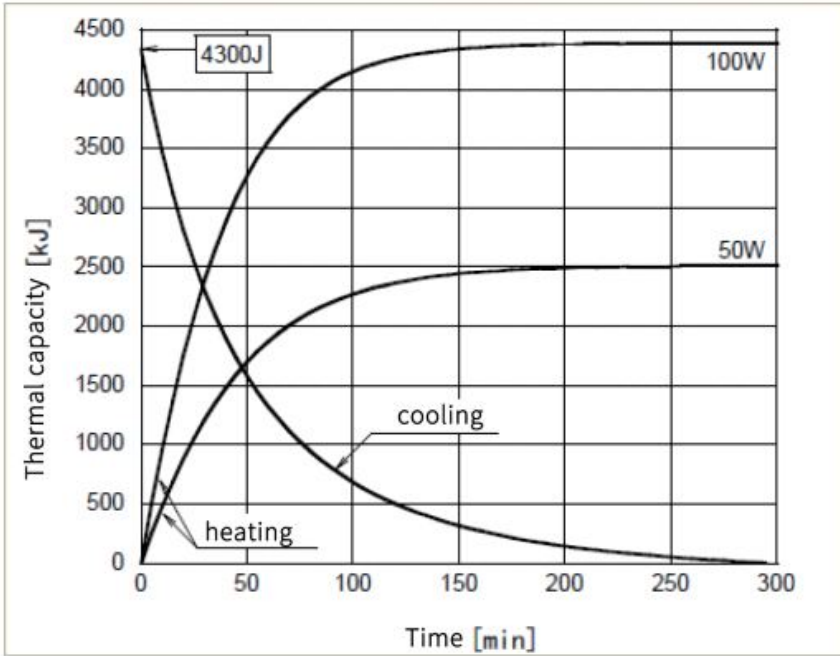


Figure 10-3 Filament and Emission Characteristic Curve

11. Tube Assembly and Nose

This chapter is for service personnel to read.
11.1 Reference Shaft, Dimension, High Voltage Polarity of Tube Assembly.
See figure 11-1, 11-2.

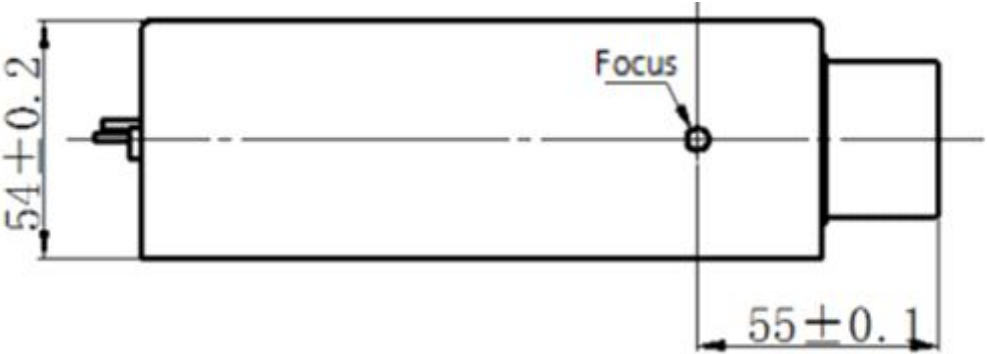


Figure 11-1

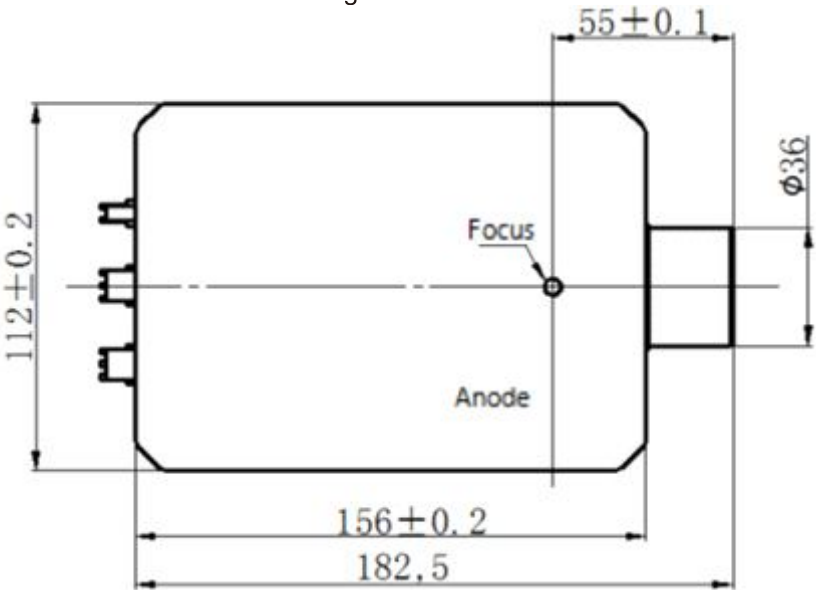


Figure 11-2

11.2 Pipe Assembly Wiring

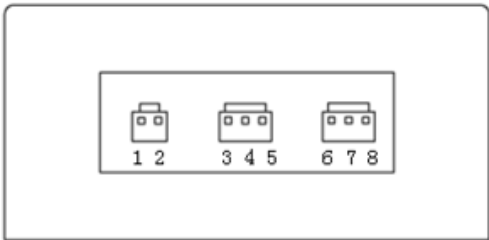


Figure 11-3

- 1: Filament Drive Input
- 2: Filament Drive Input
- 3: High Voltage Drive Input
- 4: Empty
- 5: High Voltage Drive Input
- 6: Tube Current Feedback Output
- 7: Common End
- 8: Tube Voltage Feedback Output

11.3 Head reference shaft, dimensions. See figure 11-4, 11-5, 11-6.

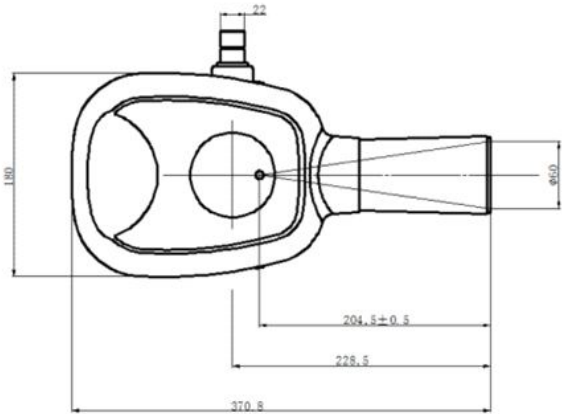


Figure 11-4

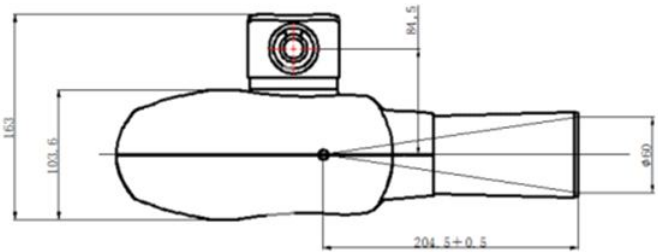


Figure 11-5

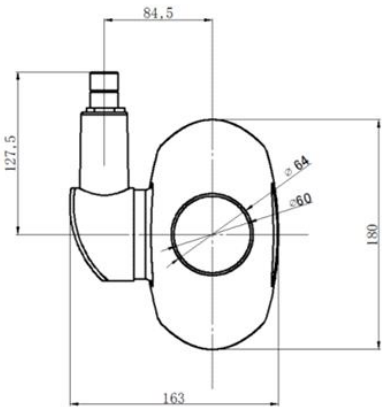


Figure 11-6

12. Installation Manual

Note: the installation and of the equipment requires the operation of authorized dealer service personnel.

12.1 RAY98(W) installation dimensions and equipment specifications

Reference: due to the limited space of individual clinics, the minimum operating room size is 1.3m, 1m wide and 2.2m high.
Note: operating within the size of the safe room and the minimum operating room size can cause the device to be damaged. Please use it carefully.

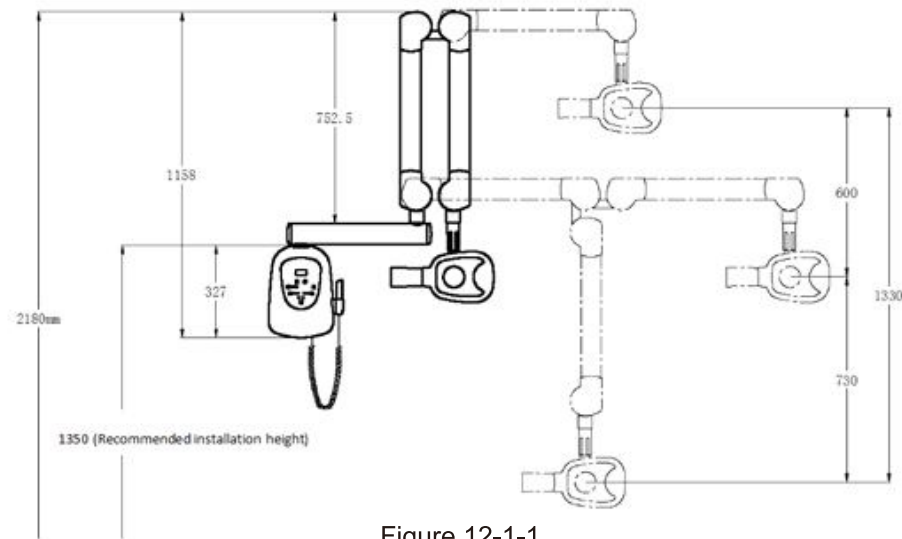


Figure 12-1-1

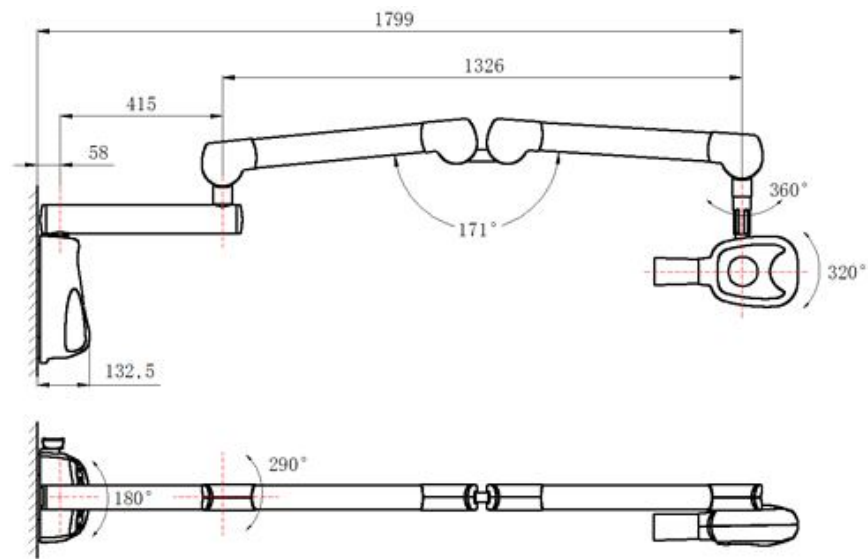


Figure 12-1-2

12.2 RAY98(M) installation dimensions and equipment specifications

Reference: due to the limited space of individual clinics, the minimum operating room size is 1.3m, 1m wide and 2.2m high.
Note: operating within the size of the safe room and the minimum operating room size can cause the device to be damaged. Please use it carefully.

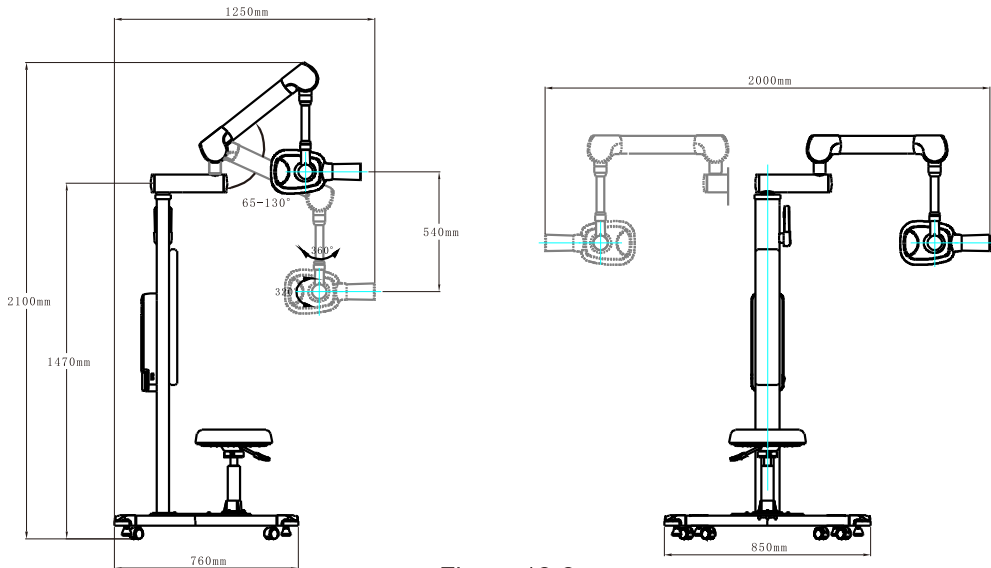


Figure 12-2

12.3 Electrical Connection

There are two groups of wires from the head assembly to the time controller, one is four core wires, which are connected to the filament drive and high voltage drive of the time controller. The other group is three core wires, which are connected to the signal sampling interface of the time controller. The wire interface is shown in figure 12-3 and 12-4. Installation, plug into the corresponding connector can be.

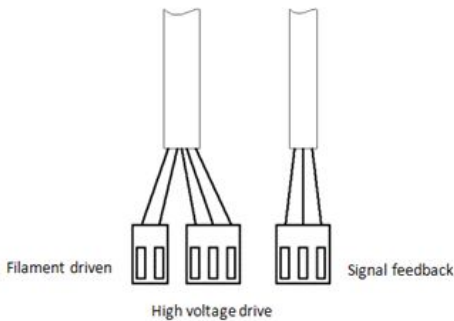


Figure 12-3 Head assembly lead-out wire

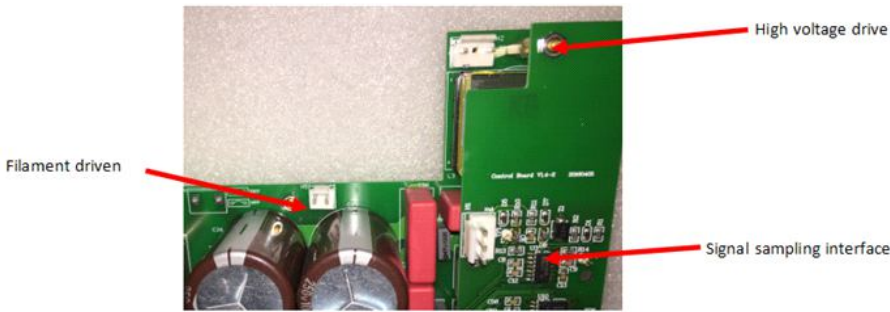


Figure 12-4 Head assembly lead-out wire

13. Packing List

RAY98(W):

No.	Part	QTY	Remark
1	Tube head	1	
2	Telescopic arm	1	
3	Rotating arm	1	
4	Time controller	1	
5	Handheld exposure device	1	Line length: 5m /unshielded
6	Power cord	1	Line length: 2m

WARNING: Use of accessories, transducers and cables other than those specified or provided by the manufacturer of this equipment could result in increased electromagnetic emissions or decreased electromagnetic immunity of this equipment and result in improper operation.

RAY98(M):

No.	Part	QTY	Remark
1	Tube head	1	
2	Assembling arm	1	
3	Column	1	
4	Mobile Base	1	
5	Time controller	1	
6	Hand switch	1	
7	Seat	1	
8	Patient's backrest	1	

14. Fuse check and replacement

14.1 Fuse Check

If there is no response after turning on the power switch, please check whether the fuse is burnt out after removing the power supply and other reasons. Replace the fuse if it burns out. For the operation method, see 14-2.

The inspection of the fuse shall be carried out by our authorized dealer service personnel.

14.2 RAY98(W) Fuse inspection and replacement method

The fuse holder is located at the bottom of the time controller, as shown in Figure 14-1. When replacing, turn out the fuse holder cap anticlockwise, as shown in Figure 14-2. Then replace the fuse and tighten it clockwise.



Figure 14-1



Figure 14-2

14.3 RAY98(M) Fuse inspection and replacement method

Fuse holder and power socket is an organic whole, behind the pillar of the X-ray Equipment at the bottom, as shown in figure 14- 3. The replacement procedure is as follows:

1. Turn off the device power and unplug the device power cord.
2. Use a tool, such as a flat-blade screwdriver, to pull out the fuse holder (see figure 14-4).
3. Remove the fuse and check whether the fuse is blown.
4. Install the new fuse into the fuse holder and push it back to the power socket.
5. Plug in the power cord and turn on the power switch to see if the device is energized normally.



Figure 14-3



Figure 14-4

The fuse specifications are as follows:

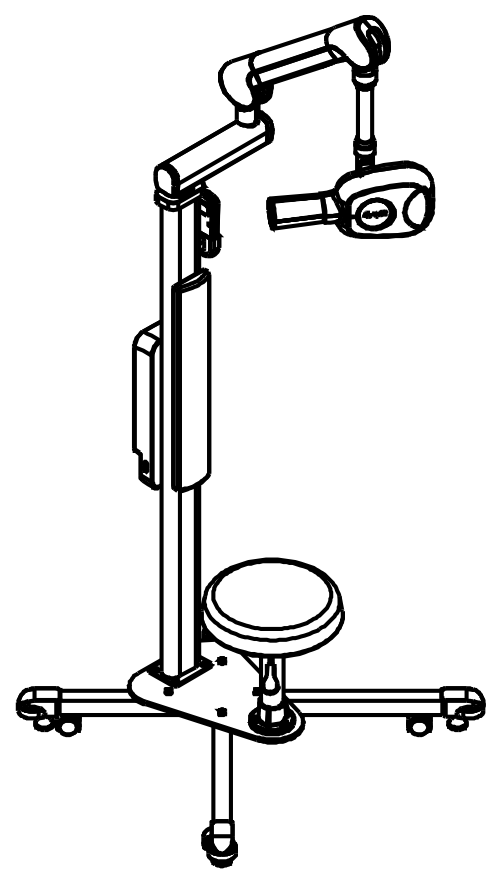
Voltage	230V ~ 50Hz	120V~50/60Hz
Fuse	T8AH 250V (5×20mm)	T10AH 250V(5×20mm)

15. Waste Treatment

In order to reduce the burden on the environment, please dispose according to the local laws and regulations and environmental provisions or contact the local dealer for disposal. When dealing with obsolete products, necessary protection must be taken to avoid injury.

16. RAY98(M) Precautions for use

- 1. When moving equipment, the equipment should be enclosed as shown in figure 15-1, and the inclination angle should not be more than 10°
- 2. When the equipment is installed, the inclination angle of the equipment should not be more than 5°, and the Fan-shaped rotation of the expansion arm on the horizontal plane corresponding to the middle line should not be more than 60°, as shown in figure 15-2.



17. Electro Magnetic Compatibility

This device complies with the relevant requirements of IEC60601-1-2: 2014 standard for electromagnetic compatibility which shown as below:

Emission and Immunity test		Basic Standard	Compliant Level/Note
Electromagnetic compatible emission	Radiated Emission	CISPR 11	Group 1, Class B
	Conducted Emission	CISPR 11	Group 1, Class B
	Harmonic Current	IEC61000-3-2	Class A
	Voltage Fluctuations and Flickers	IEC61000-3-3	Clause 5 of IEC 61000-3-3
Electromagnetic compatible immunity	Electrostatic Discharge	IEC 61000-4-2	Contact: ±8KV Air: ±2KV ±4KV ±8KV ±15KV
	Radiated RF Electromagnetic Fields	IEC 61000-4-3	3V/m 80 MHz to 2.7GHz 1KHz 80%AM
	Electrical Fast Transients and Bursts	IEC 61000-4-4	power port: ±2kV
	Surges	IEC 61000-4-5	line-to-line:±0.5KV ±1KV Line-to-ground:±0.5KV ±1KV ±2 KV
	Conducted Disturbance, Induced by RF Fields	IEC 61000-4-6	3Vrms 150 kHz to 80 MHz 6 Vrms ISM frequency band
	Power Frequency Magnetic Field	IEC 61000-4-8	30A/m 50Hz/60Hz
	Voltage Dips, Short Interruptions and Voltage Variations	IEC 61000-4-11	0% UT, 0.5T at 0°, 45°, 90°, 135°, 180°, 225°, 270° and 315°; 0% UT, 1T at 0°; 70% UT, 25T at 0°; 0% UT, 250T

ENCLOSURE PORT IMMUNITY to RF wireless communications equipment

Test Frequency (MHz)	Band (MHz)	Modulation	LMMUNITY TEST LEVEL (V/m)
385	380-390	Pulse Modulation 18Hz	27
450	430-470	FM ±5kHz deviation 1kHz sine	28
710	704-787	Pulse Modulation 217Hz	9
745			
780			
810	800-960	Pulse Modulation 18Hz	28
870			
930			
1720	1700-1990	Pulse Modulation 217Hz	28
1845			
1970			
2450	2400-2570	Pulse Modulation 217Hz	28
5240	5100-5800	Pulse Modulation 217Hz	9
5500			
5785			