CE 0123

PXP-100CA / For Human

Portable X-ray Unit

Product Manual (Operation& Service)

POSKOM Imaging Innovation

POSKOM Co., Ltd.
POSKOM Tower, 227 Sowon-ro, Deogyang-gu, Goyang-si,
Gyeonggi-do, 10534, Republic of Korea
Tel: +82–31–906–9007, Fax: +82–31–908–4208
Http://www.poskom.com E-mail: sales@poskom.com

TABLE OF CONTENTS

PART I. OPERATION MANUAL

PART II. SERVICE MANUAL

PART 1: OPERATION MANUAL

1. General description

1.1. Overview

Introduction

Thank you for purchasing the PXP-100CA portable X-ray system. The PXP-100CAis the lightest weight, most compact sized high frequency X-ray machine in its class on the market today.

All POSKOM Portable series X-ray units are equipped with ripple free, high frequency generators that produce up to 40~50% stronger power output efficiency when compared to conventional X-ray systems. The ideal balance of power and portability makes this the perfect solution for all your indoor and outdoor radiographic needs.

"WARNING: To avoid the risk of electric shock, this equipment must only be connected to supply mains with protective earth."

Contraindication: None

Features are;

-Compact sized body and ultra-light weight
-High frequency type X-ray generator
-High output 110kV, 100mA
-APR pre-set (30) memory PROM's
-Auto line compensation
- Power requirement: 100 ~ 240 VAC, 50 / 60 Hz
- Accessories: Aluminum carrying case, hand switch, power plug

Environmental statement on the lifecycle of this equipment

This equipment contains environmentally dangerous materials (such as lead, dielectric oil, batteries, etc.) which, once the lifecycle of the equipment comes to an end, becomes dangerous and need to be considered as harmful waste according to the international, domestic and local regulations. POSKOM recommends you to contact an authorized representative of manufacturer or an authorized waste management company once the equipment comes to an end to remove this equipment.

SAFETY SYMBOLS

The following safety symbols will be used in the equipment. Their meaning is described below.

	Alternating current		Protective earth (ground)
	Caution		ON (power)
	Non-ionizing radiation		OFF (power)
	General prohibition sign		Ionizing radiation
	Type B Applied Part		General warning sign
	Warning, electricity		Refer to instruction manual
	Date of manufacture		Manufacturer
	Serial number		Authorized representative
	RoHS Compliant		Not for general waste
	Laser beam		Stand-by

IPX0 No protection of equipment against ingress of water with harmful side effects (non-protected)

 "CE" - European Conformity & "0123" - Notified Body no. of TÜV SÜD

1.2. Product manual

This consolidated manual consists of operating and service instructions. This operator's manual provides PXP-100CA operating instructions for X-ray technicians, radiologists and other medical personal trained in the use of X-ray equipment. The service manual provides installation instructions, calibration and routine maintenance directions for field service personnel.

This manual is not designed to replace or substitute certified training in the radiological or medical fields. By reading this manual, the operator should be qualified in the use of equipment of this type. This portable X-ray system is only to be used by licensed practitioners in diagnostic, operative and post-operative procedures.

The PXP-100CA portable X-ray can be used in variety of diagnostic radiographic systems such as a mobile stand or radiographic table integrated with an X-ray tube mounting device. Although many of the features of these portable systems were developed with radiographic application in mind, operation is described in general terms to permit the use of those features in various radiographic applications.

1.3. Intended use

The main concerns about the use of mobile or portable x-ray equipment is the potential for exposure to staff and other members of the public from use of portable equipment in areas not evaluated for shielding.

To ensure that the risk of radiation exposure is associated with the benefit of a high quality radiographic image, the use of portable or mobile x-ray machines for human diagnostic procedures is restricted to patients who cannot be transferred to a stationary machine. Human diagnostic radiographs should be obtained from the use of stationary x-ray units, as much as possible.

Indication:

The POSKOM Portable X-ray Unit is intended for use by a qualified/trained doctor or technician on both adult and pediatric subjects for taking diagnostic radiographic exposures of the skull, spinal column, chest, abdomen, extremities, and other body parts.

Applications can be performed with the patient sitting, standing, or lying in the prone or supine position.

Contraindication:

There are no contraindications for the use of X-radiation for diagnostic purposes provided the practitioner is able to exercise judgment and justify the use of radiation.

1.4. Safety requirement

This manual provides guidelines for the safe use and operation of this medical radiographic system. The operator should be trained in the use of this equipment and refer to this manual in conjunction

with that training.

It is owner's responsibility to ensure that the system is operated by properly trained and qualified personnel who have obtained credentials from local, state, and federal authorities (where required). Potential hazards exist in the use of medical electronic devices and X-ray systems. All users and operators must understand all safety and emergency procedures and operating instructions found in this manual.

This product is in compliance with the following standards:

1.EN 60601-1:2006/A1:2013 Medical electrical equipment - Part 1: General requirements for basic safety and essential performance

2.EN60601-1-2:2015 Medical electrical equipment - Part 1-2: General requirements for basic safety and essential performance - Collateral standard: Electromagnetic compatibility - Requirements and tests.

3.EN60601-2-54:2009/A1:2015 Medical electrical equipment - Part 2-54: Particular requirements for the basic safety and essential performance of X-ray equipment for radiography and radioscopy

4.EN60601-1-3:2008/A11:2016 Medical electrical equipment - Part 1-3: General requirements for basic safety and essential performance - Collateral Standard: Radiation protection in diagnostic X-ray equipment

5.EN 60825-1: 2007 Safety of laser products -Part 1: Equipment classification and requirements

POSKOM and its distributors assume no responsibility or liability for post-sales operating and safety practices, nor can it be responsible for personal injury or damage resulting from misuse of its X-ray systems. Please direct any questions and comments regarding safety issues to POSKOM's service organizations or a local distributor.

1.5. Cautions and warning

Possible hazards are associated with the unsafe operation of X-ray equipment. These hazards are described in the following cautionary signs/warnings and the appropriate safety measures which should be taken.

WARNING

This manual is intended for use by radiologists, x-ray technicians and other certified medical professionals trained in the use of this type of x-ray equipment.

CAUTION

The X-ray radiation could be dangerous for patients and operators unless following safety regulations are strictly observed.

1.6 Product life

The PXP-100CA X-ray unit is designed for a service life of 7 years.

1.7. Disposal

1) Notice for disposal

Comply with your national regulations, guidelines and requirements for the disposal of end-of-life electrical equipment and batteries. Specialist Medical Device dealers will be pleased to provide you with country-specific information concerning disposal.

Make sure the product is not mixed with other types of waste when it is being disposed of Prior to disassembly and disposal your device must not be contaminated and must have been completely reprocessed (Cleaning/Disinfection).

1.8. Classification

The X-Ray Unit covered by this Operation Manual is classified as:

- Protection against Electric Shock: Class I -- Type B device under IEC 60601-1 standard.
- Protection against Harmful Ingress of Water: Ordinary.
- Degree of Safety in the presence of Flammable Anesthetics Mixture with air or with oxygen or with nitrous oxide: Not suitable for use in the presence of Flammable Anesthetics Mixture with air or with oxygen or with nitrous oxide.
- Mode of Operation: Continuous with intermittent loading.

1.9. Essential performance

1) The error in the indicated value of the X-ray tube voltage, in any combination of loading factors, shall not be greater than 10%.
2) The error in the indicated value of the X-ray tube current, in any combination of loading factors, shall not be greater than 20%.
3) The error in the indicated value of the X-ray tube loading time, in any combination of loading factors, shall not be greater than ±(10%+1ms).
4) The error in the indicated value of the X-ray tube current time product, in any combination of loading factors, shall not be greater than ±(10%+0.2mAs).
5) The coefficient of variation of measured values of air kerma shall not be greater than 0.05 for any combination of loading factors.

Note: The device fundamental performance shall be tested once a year contacting POSKOM service or a qualified agent.

2. Operational safety

2.1. Safe use

Expected service-life of POSKOM X-ray units is 7 years. Please see the manufacture date on the device label.

2.2. General rules for safe use

The user's safety, ease of operation and product reliability were our major concerns when designing this X-ray system. We highly recommend observing the following instructions and guidelines for your additional safety when operating this equipment:

(1) This product should be operated only by or under the supervision of a properly trained and qualified professional.

(2) The PXP-100CA is designed for radiographic uses only and not intended for fluoroscopic use or other associated applications.

(3) The PXP-100CA should be used for the diagnosis purposes and is not intended for therapy of any kind.

(4) The PXP-100CA is specified as Class1, type B and IPX0 equipment under EN 60601-1 standards.

CAUTION
This equipment is not protected against ingress of water or liquid.

(5) Do not make any modifications to this equipment. **Any modification made to this unit without the express authorization of POSKOM or an authorized dealer will void your warranty.** If any modifications are required, please contact POSKOM or an authorized dealer immediately for service.

(6) This system has been calibrated for optimal operation.

(7) If you experience any problems with this equipment, turn off the power immediately and notify POSKOM or an authorized dealer of assistance and/or service.

(8) Before connecting this device to any secondary device made by other manufacturers, please contact POSKOM or an authorized dealer for compatibility instructions.

(9) This equipment has been tested and found to comply with the limits for medical devices to the EN 60601-1:2006/A1:2013, EN 60601-1-2:2015, EN 60601-3:2008/A11:2016, and EN 60601-2-54:2009

(10) Do not use in the presence of a flammable anesthetic mixture with air or with Oxygen or Nitrous Oxide

(11) Not to be immersed in water.

(12) Do not to touch signal input, signal output or other connectors, and the patient simultaneously.

(13) Do not expose the device to strong shocks or vibrations.

(14) X-radiation may be interrupted by strong electromagnetic interference. Do not use X-ray equipment at not suitable environment e.g. near active HF surgical equipment and the RF shield room of an ME System for magnetic resonance imaging, where the intensity of EM disturbances is high

Checking before operating

Make sure this unit is connected to a well-grounded power supply.

NOTE

- Due to the essential performance and intended use of the device, testing for immunity to electromagnetic disturbances was performed. The device may be susceptible at levels below IEC60601-1-2 immunity test levels. Refer to '1.9 Essential Performance' of the X-ray units. One of Error Codes among #10 to #19 shown in '4. ERROR CODES & COUNTERMEASURES' will appear, if the Essential Performance is lost or degraded due to EM disturbances.

2.3. Electromagnetic compatibility (EMC) information

(1) General

PXP-100CA X-ray Units fulfill the requirements on electromagnetic compatibility according to EN 60601-1-2:2015 (Ed. 4). The equipment is built so that the generation and emission of electromagnetic interference is limited to the extent that other devices are not disturbed in their use in accordance with the regulations and so that the equipment itself is suitably immune to electromagnetic interference in hospitals, transports and home healthcare use environment.

(1) If any interference is produced from the device (confirmed by switching the device power switch state), the user (or a qualified service person) should use one or more of the following means to fix the problem:

(a) Redefine the orientation to place or relocate the affected device.

(b) Increase the distance between the device and the affected device.

(c) The power supply for the device shall be changed to another one different from the power supply for the affected device.

(d) For more advices, please contact the sales agent or the service representative.

(2) To reduce potential interference, do not try to alter the device without our authorization.

(3) Do not use any devices for transmitting RF signals (mobile phones, transmitters, or wireless control products) near the device, otherwise it may result in device performance beyond the published specifications.

WARNING

Portable and mobile RF communication equipment can affect the X-ray Unit.
Electrical medical devices and systems are subject to special EMC measures.
Third-party devices may only be connected in compliance with the EN 60601-1 standard.

WARNING

The EMISSIONS characteristics of this equipment make it suitable for use in professional healthcare facilities and in a residential environment (for which CISPR 11 class B is normally required). Nevertheless, this equipment may not offer adequate protection to radio-frequency communication services. The user might need to take mitigation measures, such as relocating or re-orienting the equipment.

CAUTION

This equipment generates, uses and can radiate radio frequency energy and if not installed and used in accordance with the instructions, may cause harmful interference to other devices in the vicinity. However, there is no guarantee that interference will not occur in a particular installation.

(2) Essential performance

Essential performance (purpose of immunity testing)

Unless the exposure switch is pressed, X-ray is not exposed.

(3) Electromagnetic emissions

These X-ray Units are intended for use in the electromagnetic environment specified below.
The customer or the user of PXP-100CA should assure that it is used in such an environment.

Emissions test	**Compliance**	**Electromagnetic environment – guidelines**
RF emissions CISPR 11.	Group 1.	The POSKOM Portable X-ray Unit use RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause interference in nearby electronic equipment.
RF emissions CISPR 11.	Class A	The POSKOM Portable X-ray Unit is suitable for use in all establishments other than domestic and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions IEC 61000-3-2.	Class A 230V, 50 Hz	
Voltage fluctuations/flicker emissions. IEC 61000-3-3.	Complies 230V, 50 Hz	

(4) Electromagnetic immunity

These X-ray Units are intended for use in the electromagnetic environment specified below. The customer of PXP-100CA should assure that they are used in such an environment.

Immunity test	**EC 60601 test level**	**Compliance level**	**Electromagnetic environment-guidelines**
Electrostatic discharge (ESD) IEC 61000-4-2	±8 kV contact ±15 kV air	±8 kV contact ±15 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient/burst IEC 61000-4-4	±2 kV, AC mains ±1 kV, I/O ports 100 kHz PRR	±2 kV, AC mains 100 kHz PRF	Mains power quality should be that of a typical commercial or hospital environment.
Surges IEC 61000-4-5	± 0.5, 1 kV Line to Line ± 0.5, 1, 2 kV Line to Ground 50 Hz / 60 Hz	± 0.5, 1 kV Line to Line ±0.5, 2 kV Line to Ground 50 Hz	Mains power quality should be that of a typical commercial or hospital environment.
Conducted RF IEC 61000-4-6	3 V (0.15 – 80 MHz) 6 V ISM + Amateur Bands 80% AM 1 kHz	6V Amateur 80% AM at1kHz	Portable and mobile RF communications equipment should be used no closer to any part of X-ray Unit including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. **Recommended separation distance** 80 MHz to 800 MHz: $d = \frac{3.5}{E1}\sqrt{P} = \frac{3.5}{10}\sqrt{P} = 0.35\sqrt{P}$
Radiated RF IEC 61000-4-3	10 V/m 80 MHz to 2.7 GHz	10 V/m 80 MHz	

Where *P* is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey, should be less than the compliance level in each frequency range. Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3V/m.			
Power frequency 50/60 Hz magnetic fields IEC 61000-4-8	30 A/m – 50 or 60 Hz	30 A/m – 50 Hz	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.
Mains voltage dips and interruptions IEC 61000-4-11 Voltage Interruptions (all input current) All phases simultaneously	(> 100% dipinU_T)for0.5periods (at0,45, 90,135, 180,225and315°) (> 100% dipinU_T)for1period (30%dipinU_T)for25/30 periods 100% drop, 5 seconds	(> 100% dipinU_T)for0.5periods (at0,45, 90,135, 180,225and315°) (> 100% dipinU_T)for1period (30%dipinU_T)for25/30 periods 100% drop, 5 seconds	Mains power quality should be that of a typical commercial or hospital environment. X-ray Unit should be powered from an uninterruptible power supply or battery.

Test specifications for ENCLOSURE PORT IMMINITY to RF wireless communications equipment

(IEC 61000-4-3)

Test frequency (MHz)	Band [a] (MHz)	Service [a]	Modulation [b]	Maximum power (W)	Distance (m)	Immunity test level (V/m)
385	380 –390	TETRA 400	Pulse modulation [b] 18 Hz	1,8	0,3	27
450	430 – 470	GMRS 460, FRS 460	FM [c] ± 5 kHz deviation 1 kHz sine	2	0,3	28
710	704 – 787	LTE Band 13, 17	Pulse modulation [b] 217 Hz	0,2	0,3	9
745						
780						
810	800 – 960	GSM 800/900, TETRA 800, IDEN 820, CDMA 850, LTE Band 5	Pulse modulation [b] 18 Hz	2	0,3	28
870						
930						
1 720	1 700 – 1 990	GSM 1800; CDMA 1900; GSM 1900; DECT; LTE Band 1, 3, 4, 25; UMTS	Pulse modulation [b] 217 Hz	2	0,3	28
1 845						
1 970						
2 450	2 400 – 2 570	Bluetooth, WLAN, 802.11 b/g/n, RFID 2450, LTE Band 7	Pulse modulation [b] 217 Hz	2	0,3	28
5 240	5 100 – 5 800	WLAN 802.11 a/n	Pulse modulation [b] 217 Hz	0,2	0,3	9
5 500						
5 785						

Recommended separation distances between portable and mobile RF communications equipment and X-ray Unit. The healthcare professional or the user of X-ray Unit can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and X-ray Unit as recommended below, according to the maximum output power of the communications equipment.

Separation distance according to frequency of transmitter (m)

Rated maximum output power of transmitter (W)	Separation distance according to frequency of transmitter (m)		
	150kHz to 80MHz d = *1.2*√P	*80MHz to 800MHz* d = *1.2*√P	*800MHz to 2.7GHz* d = *2.3*√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 meters (m) can be estimated 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 800MHz, the separation distance for the higher frequency range applies.

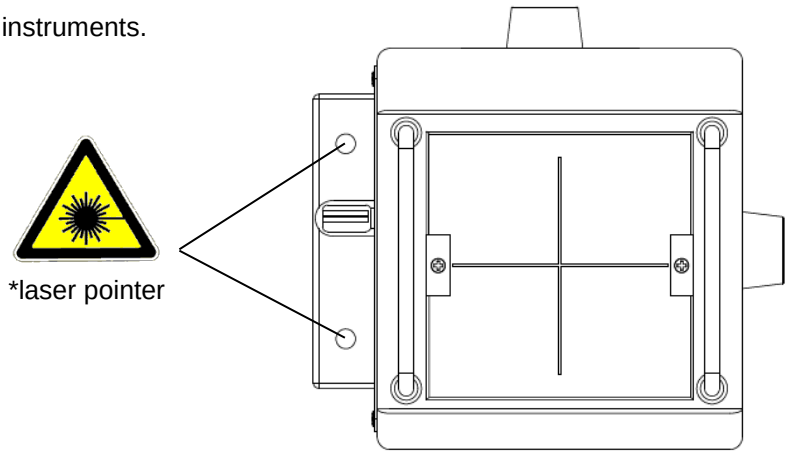
NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by adsorption and reflection from structures, objects and people.

(5) Laser pointer

CAUTION

Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

1) The laser beam is emitted from the front of PXP-100CA
2) Do not place the laser pointer for direct eye exposure.
3) Do not stare into the beam.
4) Do not view directly with optical instruments.



*laser pointer

3. Operating environment

3.1. For proper operation and the longevity of your system, please avoid exposing this equipment to the following conditions:

1) Exposure to water vapor.
2) Direct exposure to sunlight for prolonged periods of time.
3) Exposure to heavy air contaminants and/or dust.
4) Exposure to high humidity conditions.
5) Areas with poor air circulation and/or ventilation.
6) Exposure to a salty atmosphere.
7) Exposure to corrosive gases or harsh chemicals.

3.2. Keep a safe distance away from strong vibrations. Operate and store in a cool, dry environment.

Operational Environment

Temperature Range	10°C ~ 40°C (50°F ~ 104°F)
Humidity Range	30% ~ 75%RH
Atmosphere Range	700 ~ 1060hPa

Optimal Working Environment

Temperature Range	17°C ~ 23°C (63°F ~ 73°F)
Humidity Range	40% ~ 60%RH
Atmosphere Range	700 ~ 1060hPa

4. Radiation safety

CAUTION

Ionized radiation produced by the unit may be hazardous to patients and operators unless the following safety regulations are strictly observed.

1) Users and operators are required to wear appropriate protective clothing and gear.
2) Users and operators are required to leave a minimum safe distance from any radiant source and secondary radiation zones.
3) Users and operators are required to eliminate all unnecessary objects near the exposure areas.
4) Users and operators are required to leave a minimum safe distance of 2m from the target.
5) Users and operators are requested to use minimum kV and mAs values for experimental use.
6) Users and operators are requested to be cautious and not to exceed the appropriate radiograms in the exposure area.

5. System configuration

This device consists of the following components: Portable X-ray Unit (include Hand-switch)

These components are only provided by the manufacturer (POSKOM). The unit is for generating accurate X-ray source for diagnosis only, and X-ray cassette or FPD for receiving X-ray images can be provided on the request of purchase. The user can purchase X-ray cassette and/or FPD as a patient applied part.

The PXP-100CA consists of the following accessories and parts. The following items should be firmly fixed and connected for normal functionality:

5.1. PXP-100CA Main Components

1) Operation console
2) Power inverter
3) HV tank including X-ray tube
4) Collimator with laser pointer(Optional)
5) Corded hand switch

5.2. Supplemental Accessories

1) Aluminum carrying case
2) Operation & service manual
3) Power cable

6. Specification

6.1. Electronic specification

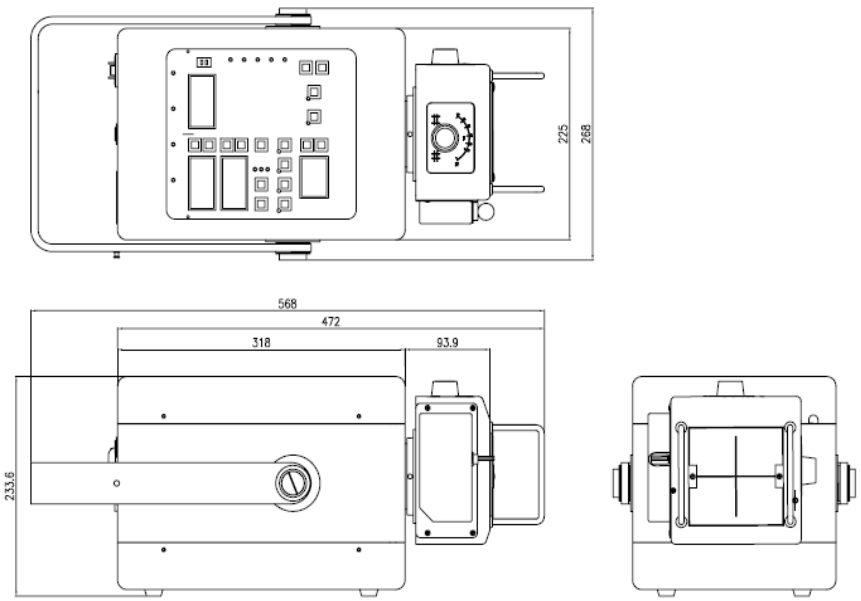
Output Power		5 kW		
Input Power	Voltage	100 V-120 V / 200 V-240 V		
	Phase & Frequency	Single, 50/60 Hz		
	Power Consumption	200VA ~ 600VA		
Radiography kV Range in 1kV steps		Tube voltage	current	mAs
		40 kV ~ 50 kV	20mA	0.1
			40mA	0.2 ~ 0.3
			100mA	0.4 ~ 10
			80mA	12 ~ 32
			60mA	36 ~ 80
			50mA	100
		51kV ~ 60kV	20mA	0.1
			40mA	0.2 ~ 0.3
			80mA	0.4 ~ 8.0
			50mA	9.0 ~ 80
			40mA	100
		61kV ~ 70kV	20mA	0.1
			40mA	0.2 ~ 0.3
			50mA	0.4 ~ 8.0
			40mA	9.0 ~ 80
			30mA	100
		71kV ~ 80kV	20mA	0.1
			40mA	0.2 ~ 0.3
			50mA	0.4 ~ 8.0
			40mA	9.0 ~ 21
			30mA	25 ~ 64
		81kV ~ 100kV	20mA	0.1
			40mA	0.2 ~ 8.0
			30mA	9.0 ~30
			20mA	32 ~ 80
		101kV ~ 110kV	20mA	0.1
			40mA	0.2 ~ 5.0
			30mA	6.4 ~ 12
			20mA	15 ~ 64
MAs Range		0.1 mAs – 100 mAs, 38 steps 0.1, 0.2, 0.3, 0.4, 0.6, 0.8, 1.0, 1.2, 1.4, 1.6, 1.8, 2.0, 2.2, 2.5, 2.9, 3.2, 3.6, 4.0, 4.5, 5.0, 6.4, 8.0, 9.0, 10, 12, 15, 18, 21, 25, 30, 32, 36, 40, 45, 50, 64, 80, 100 mAs		
Max. kV Deviation		±7 %		
Max. mAs Deviation		±10 %		
Indication		kV / mA / mAs / Density: 7-segment LED		
X-ray Tube	Model Name	OX/110-3 (C.E.I)		
	Focal Spot	1.5 mm		
	Target Angle	15 degree		
	Anode Heat Content	33 kJ		
	Max. Anode Heat Dissipation	280 W		
Total Filtration		Min. 3.0 mm Al		

Collimator with Laser Pointer	Type	Double slit type, Manual operation
	Min. X-ray field size	≦5 cm x 5 cm @ 1 m SID
	Max. X-ray field size	≦47 cm x 47 cm @ 1 m SID
	Laser pointer	Class 2 Maximum output < 1.0 mW Wavelength 655±10 nm
	Timer	Push button illuminator with 30 sec timer
	Lamp	3.3 V LED Lamp
Dimension		472 mm X 234mm X 268mm (L X H X W)
Weight		20.5kg

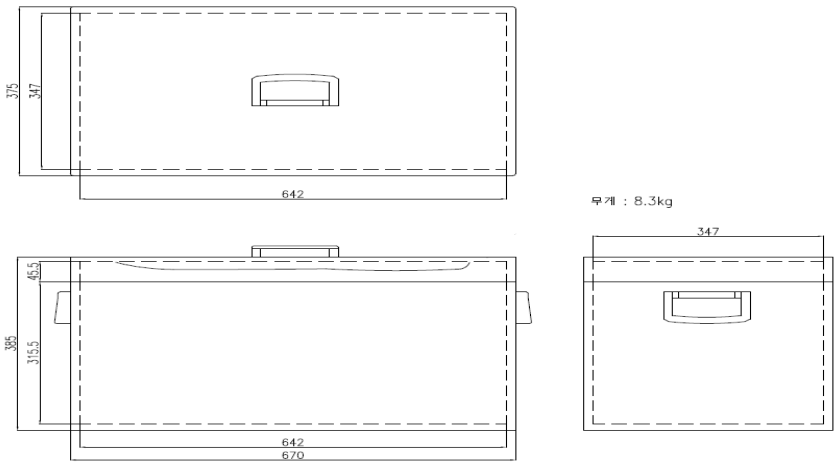
[Table 1. Specifications of Unit]

6.2. Main body and carrying case

(1) Main body



(2) Carrying case

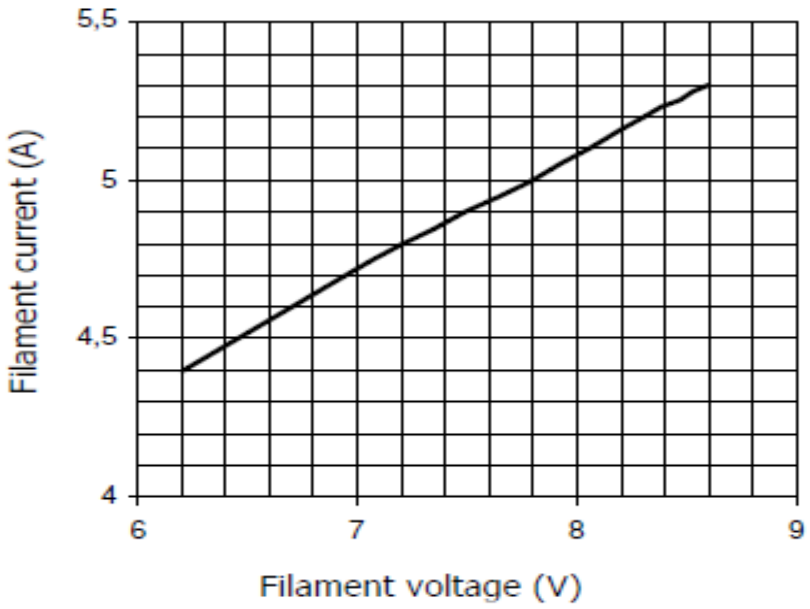


(3) X-ray tube specifications

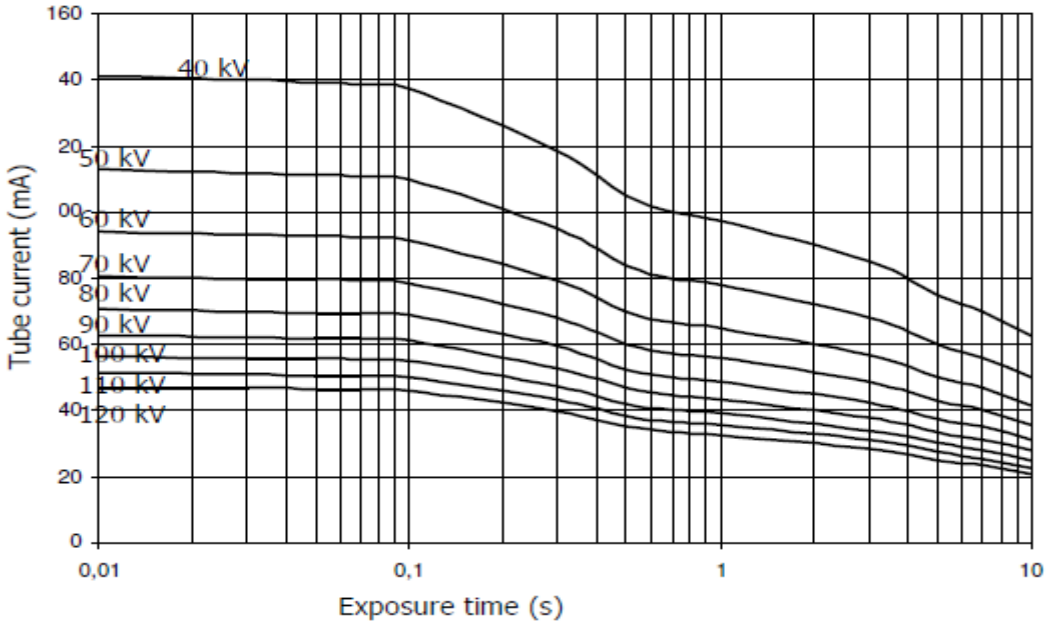
- General details

A. Model name (manufacturer): OX/110-3 (compagnia elettronica italiana s.r.l.)
B. Tube Voltage Range: 40 ~ 120kV
C. Focus size: 1.5×1.5mm
D. Input power (per second): 5500W
E. Anode heat storage capacity: 33kJ
F. Maximum anode cooling rate: 280W

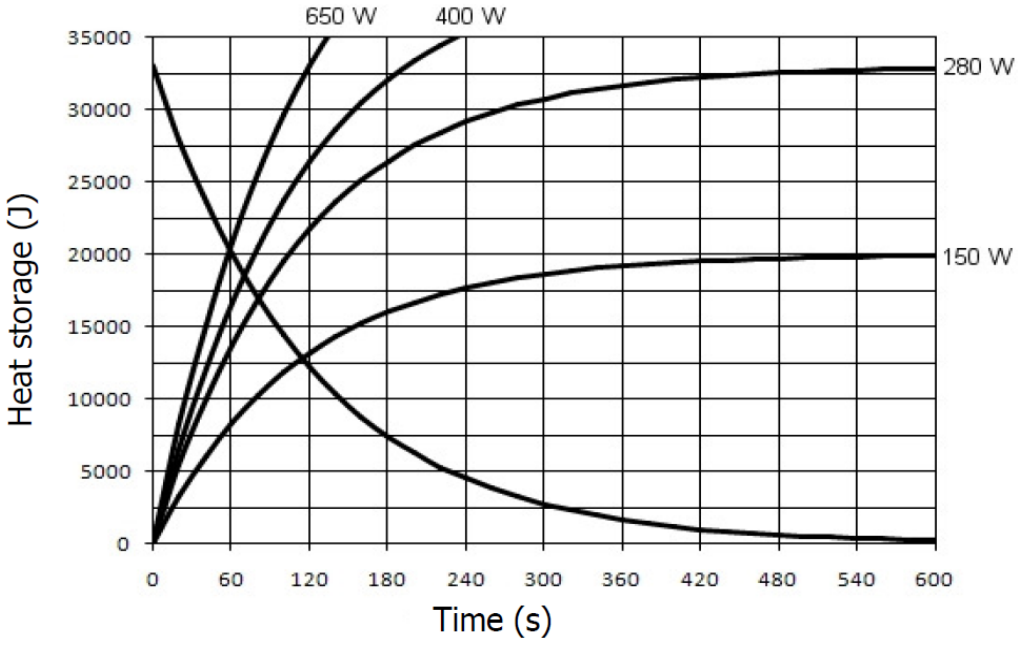
- Filament characteristics



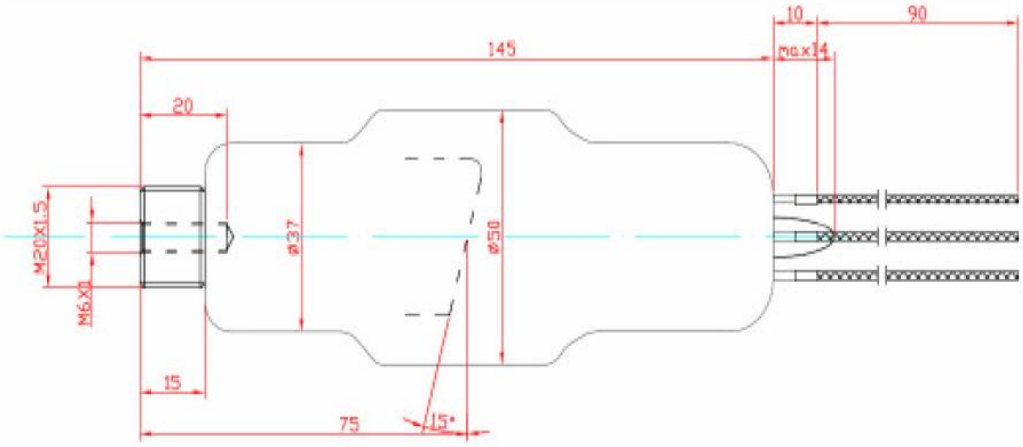
- Maximum output graph



- Anode heat characteristic curve

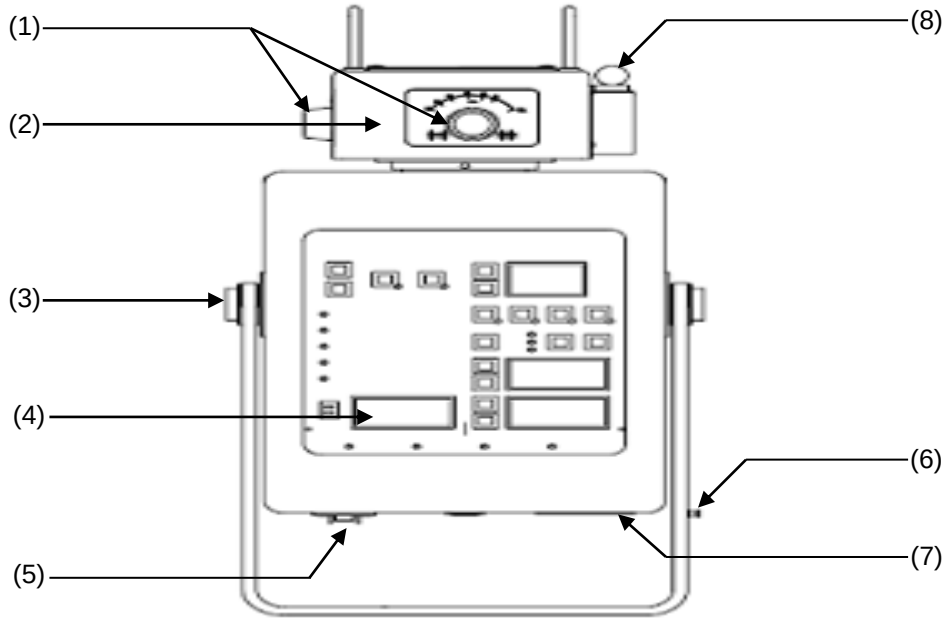


- Dimension



7. Parts description

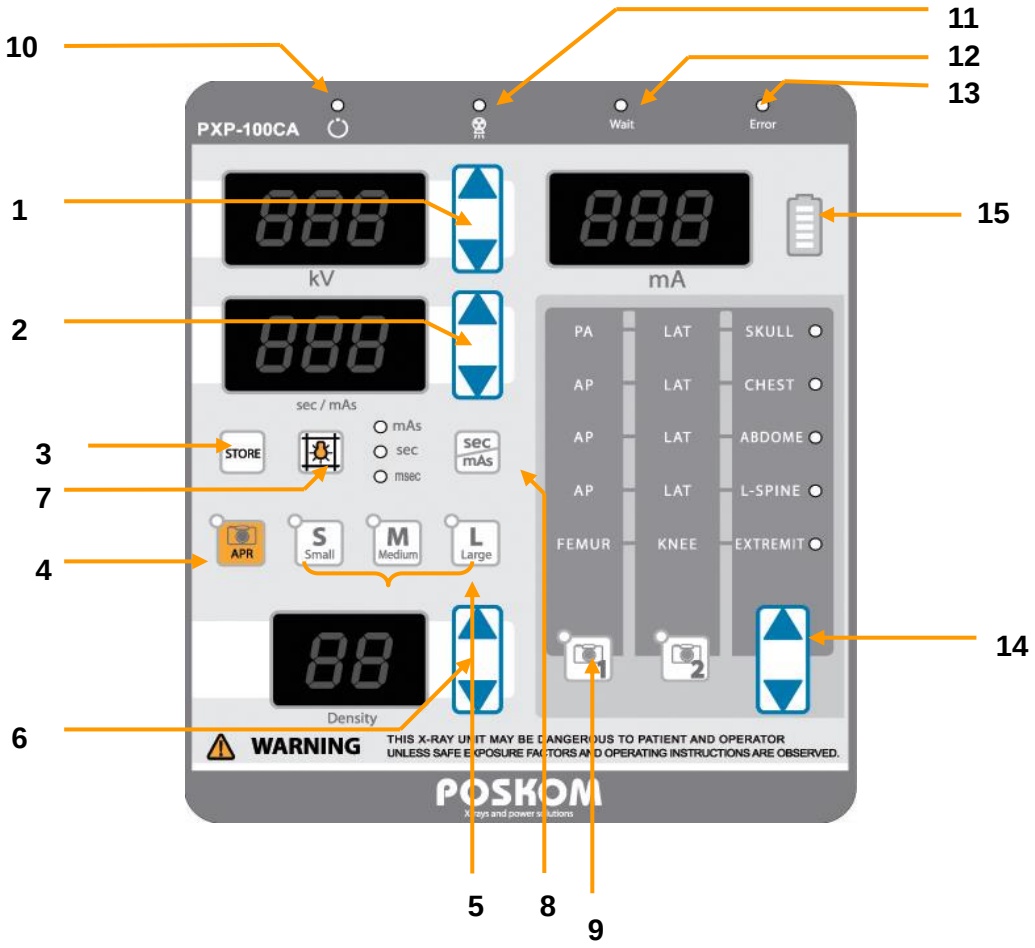
7.1. Part names



(1)	Collimator knob
(2)	Collimator
(3)	Handle
(4)	Operation panel
(5)	Power cable connector
(6)	Hand switch holder
(7)	Hand switch connector
(8)	Measuring tape

7.2. OP Console and panel display

Illustraion1. Operation panel and display



[1]	kV up/down Switch	[9]	APR Region Selection
[2]	sec&mAs up/down Switch	[10]	Ready LED
[3]	APR Store Switch	[11]	Exposure LED
[4]	APR Mode Selection Switch	[12]	Wait LED
[5]	APR Size Selection	[13]	Error LED
[6]	Density up/down	[14]	APR up/down switch
[7]	Collimator Lamp/Laser Switch	[15]	Capacitor charge indicator
[8]	mAs/sec Selection Switch		

[1] kV up/down Switch

Allows the user to input the kV value for X-ray exposures. The kV value will decrease/increase by -/+1 with every push of the button (refer to Table 1, unit specifications for usable kV scopes).

[2] sec&mAs up/down Switch

Allows the user to input the sec&mAs value for X-ray exposures. The sec&mAs value will decrease/increase by -/+ step with every push of the button (refer to Table 1, unit specifications for usable mAs scopes).

[3] APR Store Switch

The user is able to store 15 APR data values (kV and mAs) with the #1~5 APR button combinations. Press the APR button combination for 1 second to store your APR. An audible beep will confirm the user's APR has been successfully set.

[4] APR Mode Selection Switch

Enter APR Mode.

[5] APR Size Selection

Choose the radiography size with patient size selection button out of 3 option

[6] Density up/down

Adjust the sec&mAs setting with the density selection button.

[7] Collimator Lamp/Laser Switch

1)Press once to turn the collimator lamp on.
2)Press again and the collimator lamp will turn off and the laser will turn on.
3)Press a third time to turn off all lamps and lasers.

[8] mAs/sec Selection Switch

The mAs or sec radiography mode selected by pressed button.

[9] APR Region Selection

The user is able to store 30 APR data values (kV and mAs) with the region, direction and patient size combinations. Press the APR Store button for 1 second to store your APR. An audible beep will confirm the user's APR has been successfully set.

[10] Ready LED

The ready LED will light when the 1st step of the hand switch is pressed. Your unit will then be ready to make an exposure.

[11] Exposure LED

The x-ray LED will light after pressing the 1st and 2nd steps of the hand switch and will remain lit while producing an x-ray exposure.

[12] Wait LED

The wait LED will be lit after an x-ray exposure is produced. It will remain lit for about 0.5 sec. until the next exposure can be produced.

[13] Error LED

The LED is lighted in case of errors occurred from Generator.

[14] APR up/down switch

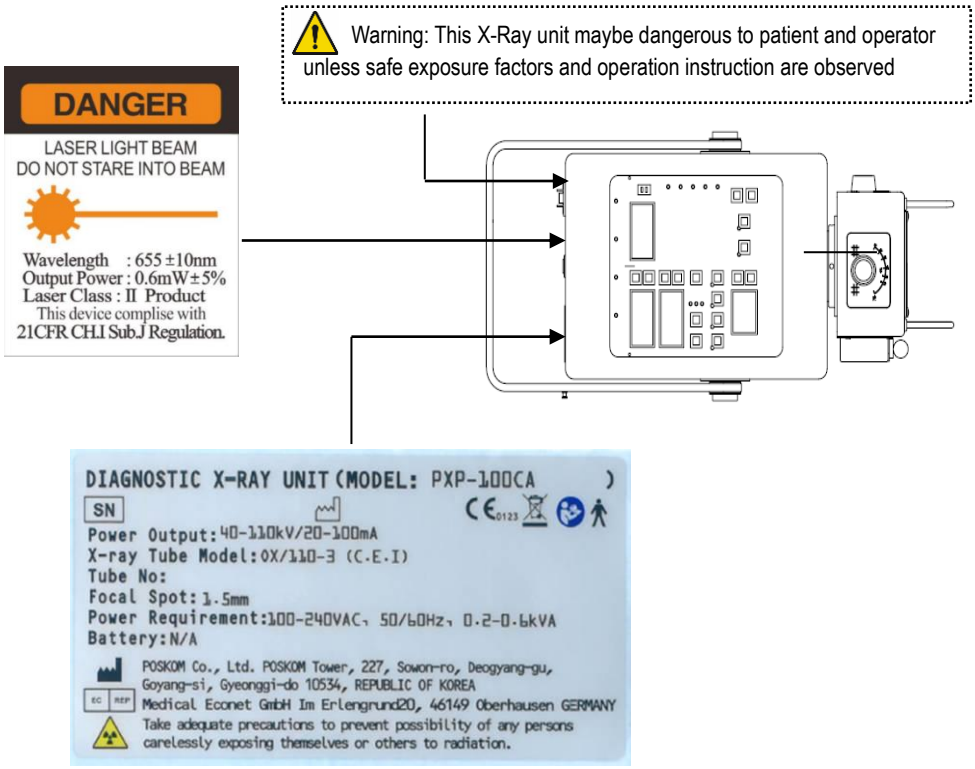
Choose the APR setting with up/down switch.

[15] Capacitor charge indicator

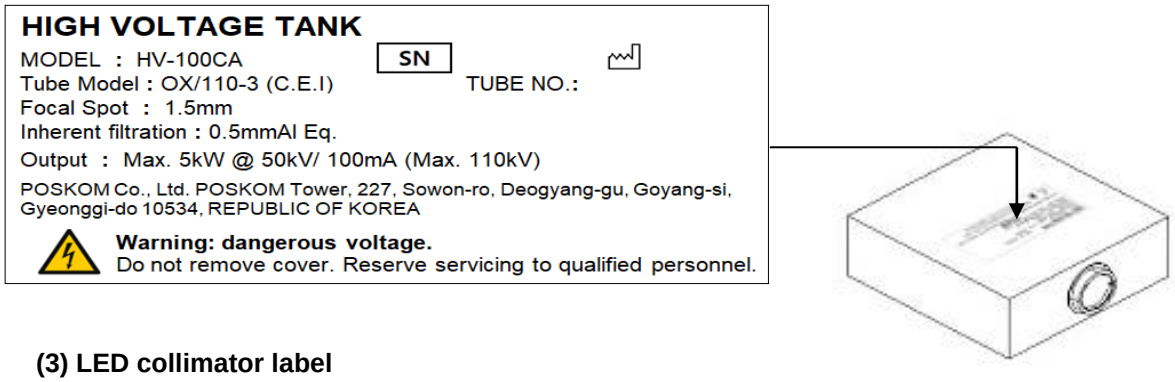
This indicator shows the capacitor charge status. The capacitor must be full charged when exposing the X-ray.

7.3. Label attachment location

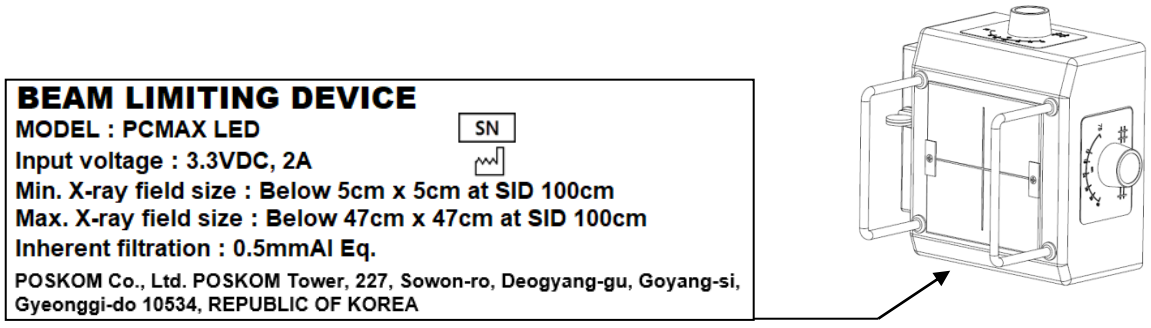
(1) Main body label



(2) High-voltage generator label



(3) LED collimator label



8. Operation

8.1. Operating preparation

(1) Always wear a lead apron during X-ray exposures.
(2) Please leave at least 2 meters (≈ 6.5 feet) between the operator and the unit. Use the supplied extended hand switch cable in order to keep minimum safe distance from the unit.
(3) Use the proper beam size and technical values to produce the best radiographic results while minimizing exposure dose.
(4) Please make special note of the decimal point on the mAs display in order to acquire the appropriate intended mAs values.
(5) During indoor radiographic use, remember to keep all bystanders at a minimum safe distance and use the appropriate safety gear while producing exposures.
(6) Please pay attention to the proper management and regular maintenance of this equipment.
(7) Cumulative doses of radiation are a serious hazard to patients and users of this device. Please observe the guidelines set forth by your local authorities regarding additional requirement for protective devices when dealing with machines producing high kV and mAs radiation values.

WARNING

Please check if the voltage and current of your power supply observes the specifications written on the system's labels, found on the backside of the machine's body. The levels of voltage must be within ±10% of these standard values.

CAUTION

Please check all connection lines before operating and producing X-ray exposures from this machine.

WARNING

In case of any trouble, power down the unit immediately and contact POSKOM or an authorized distributor.

8.2. Positioning of patient

A. Place the loaded cassette on the patient's backside.

B. Arrange the SID (Focal Spot to Image Receptor Distance) with measuring tape.

C. Turn on the collimator laser pointer with the "Laser Pointer Switch."

D. Arrange the beam size according to the scale of the X-ray film with the collimator knob.

E. Collimator and laser pointers will turn off automatically.

CAUTION

During initial installation or operation after a long period of non-use, pre-heating procedures are highly recommended to insure the safety and longevity of the X-ray tube. Follow these pre-heating instructions:

Operate the machine with low kV values (50kV 0.2mAs) three times in row.
Follow this up with higher value [80kV 5mAs] exposures again, three times in row.
Follow this up with higher value [110kV 5mAs] exposures again, three times in row.

9. How to operate

9.1. General mode

A. Open the carrying case.

B. Connect Power supply cable and hand switch as following.

※Connect Power cable



※Connect Hand Switch



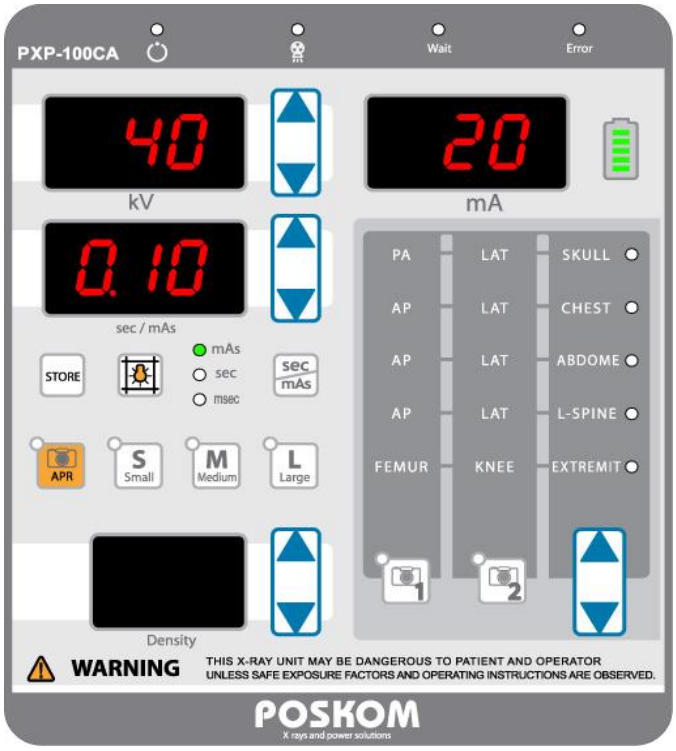
※CAUTION※

Please use designated electronic parts (Power plug and Hand switch) and be careful not to apply other components.

※CAUTION※

| and ○ on power switch represent ON and OFF, respectively

C. Turn on the power on switch and initial conditions are displayed as follows.



D. Select kV settings by [1] kV up/down switch. The speed of increasing or decreasing values is faster by keep pressing the buttons.

E. Select sec &mAs values by [2] sec &mAs up/down switch. The sec segment displays the real value of sec without separate table.

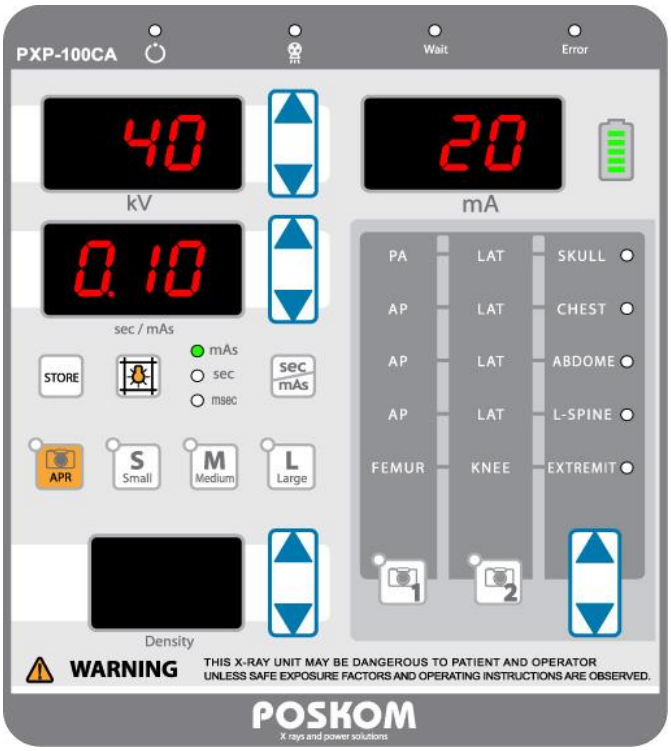
F. After setting the radiography conditions, make the X-ray at prep position by pressing the 1st stage of hand switch.

G. Press the 2nd step of hand switch and make exposure as soon as the [10]ready LED is lighted on. The [11] exposure LED is lighted on during exposures.

H. The [12] wait LED is lighted off for 0.5 seconds after the X-ray exposures.

9.2. APR mode

A. Turn on the power on switch and initial conditions are displayed as follows.



B. Select [4] APR Switch.

C. Select the kV values by [1] kV up/down switch.

D. Select sec &mAs values by [2] sec &mAs switch.

E. Selected kV and mAs values by [3] Store button.

F. After setting the radiography conditions, make the X-ray at prep position by pressing the 1st stage of hand switch.

G. Press the 2nd step of hand switch and make exposure as soon as the [10] ready LED is lighted on. The [11] exposure LED is lighted on during exposures.

H. The [12] wait LED is lighted off for 0.5 seconds after the X-ray exposures.

I. Return to the normal mode by pressing APR switch.

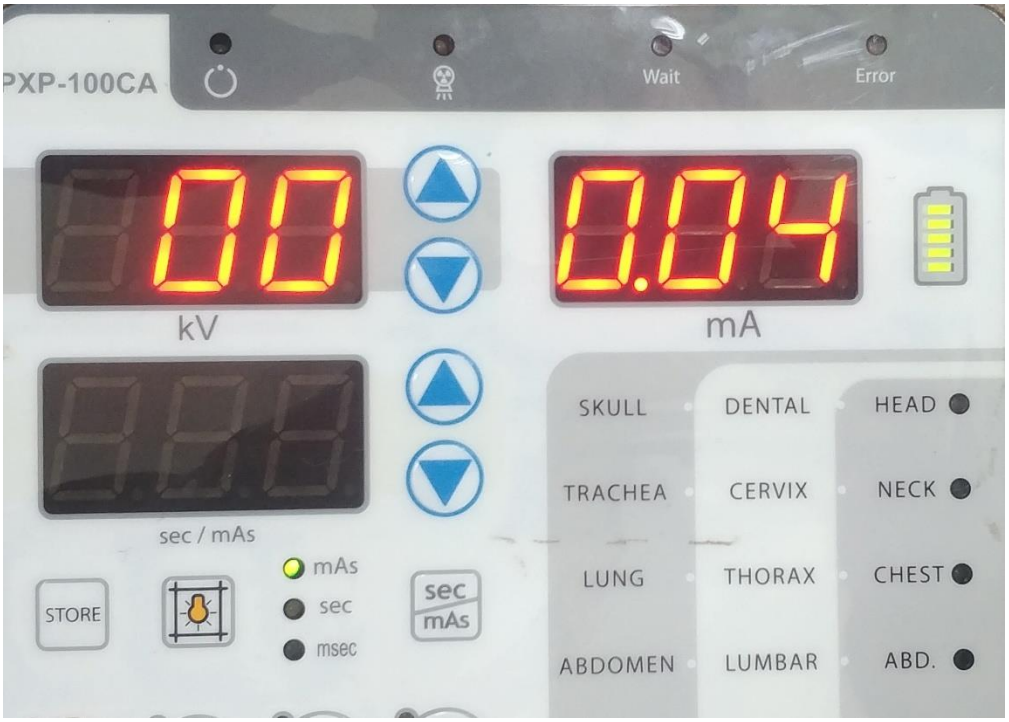
※NOTICE※

Under APR mode, the last saved technique values are automatically selected and display and saving of data is available only at X-ray exposures.

NOTE

Exposures may be produced immediately by pressing the hand switch completely through the 2nd step. This is only possible when the tube's filament is preheated and ready for an exposure.

9.3. DAP display (Option)



A. After X-ray beam emitted, display exposure dose for 1sec.(unit: μGym²)

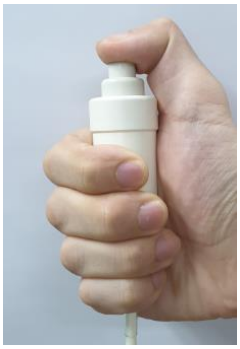
B. Press the mAs/sec switch for 3 seconds to display the previous DAP value.

10. Remote control function &operation

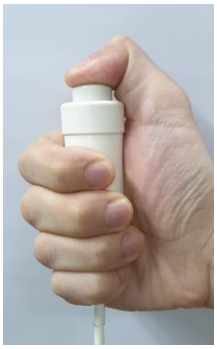
10.1. Introduction

The exposure hand switch consists of a two step hand switch. The 1st step of the hand switch is called the Preparation (PREP or Ready) step. The 2nd step of the hand switch is called the Exposure (Exp. or X-ray out) step.

All of remote control functions are operated by depressing the first stage of the hand switch (Ready Step). Further explanation on each function and the setting of technical values are as follows:



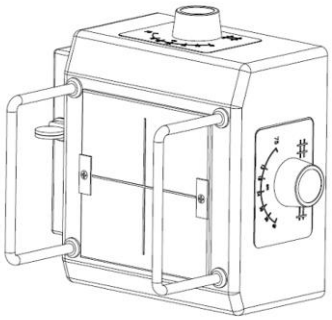
Stand-by



Ready (1st step, PREP mode)

Exposure (2nd step)

10.2. Collimator turned on



Collimator is supplied with a SID guard.
Collimator Lamp: Collimator lamp is provided with a thermal protection that may reduce the lighting time of the lamp and even turn the light off in case it is on for an excessive period of time. In case this happens, stop using the Unit for 1 minute before turning On Collimator lamp again.

WARNING
Prolonged lighting of the lamp will produce overheating in the collimator internal area unless the lamp is allowed to cool.

Collimator lamp with laser pointer: After pressing the Collimator Lamp push-button, laser light points at the patient and after one second later, the Collimator Lamp lights. They remain lighting for 30 seconds before they switch off automatically.

Collimator control knobs: These knobs are used to open or close the Collimator blades in order to limit the X-ray beam. The final image film may be checked switching on the Collimator Lamp.

The table on the Collimator shows the number to be set with the knobs to open the blades according to the SID (Source-Image Distance) and film size to be used.

CAUTION

In order to apply the lowest Dose to patient, it is recommended to use the larger SID that film size allows.

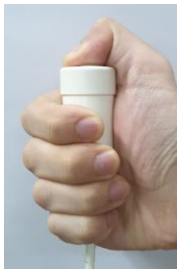
Image/Reception area: The collimator projects a lighted area with reference axis on the image reception area that coincides with X-ray projection area.

10.3. X-ray exposure

WARNING

Minor radiation scattering may occur while X-rays are being exposed. Operators and patients should always wear a lead apron and any other protective gear as required by law.

After the X-ray exposure technique is selected and collimator light beam size is adjusted with the collimator blade knob, an X-ray exposure may be produced. All X-ray exposures should only be produced by a qualified medical professional.



<1st step><2nd step>

X-RAY EXPOSURE SEQUENCE:

A. Press the Prep. hand switch (1st stage) and hold

B. Press down the 2nd stage hand switch. Exposure will be made automatically by the exposure timer.

10.4. Remote control override

NOTE TO THE USER

All of the before mentioned remote control hand switch functions and operations can also be accomplished via the one-touch control panel. All exposure functions and parameters can be overridden through the main control panel prior to final exposure.

(See user's manual for directions on how to use the main control panel)

11. Cleaning and disinfection

The following cleaning solutions will not harm the models PXP-100CA X-ray Units.

- Gentle dish soap and water
- Dry microfiber cleaning cloth or a chamois (static-free cloth without oil)
- Static-free cloth wipes

A. Never use anything other than soap and water to clean plastic surfaces. Other cleaners may damage the plastic.

B. Never use any corrosive, solvent or abrasive detergents or polishes**.**

C. Ensure that no water or other liquid can enter any equipment. This precaution prevents short circuits and corrosion forming on components.

D. Methods of disinfection used must conform to legal regulations and guidelines regarding disinfection and explosion protection.

E. If disinfectants are used which form explosive mixtures of gases, these gases must have evaporated before switching on the equipment again.

F. Disinfection by spraying is not recommended because the disinfectant may enter the X-ray equipment.

G. If room disinfection is done with an atomizer, it is recommended that the equipment be switched OFF, allowed to cool down and covered with a plastic sheet. When the disinfectant mist has subsided, the plastic sheet may be removed and the equipment be disinfected by wiping.

Physical inspection:

Any negative findings should be brought to the attention of the Asset Manager so appropriate action may be taken and, if necessary, informed to the responsible service engineer or POSKOM.

12. Storage, transport and package

12.1. Storage and transport:

1) Ambient temperature: -25 ℃ ~ 60 ℃
2) Relative humidity: 10% ~ 95%
3) Atmospheric pressure: 700hPa ~ 1060hPa
4) No corrosive gases, good ventilation indoors
5) Transport requirements are as required by the contract, and package symbols are compliant to requirements.

12.2 Package symbols

				
Recycled Package	UP	Fragile Handle with care	Use No Hand Hooks	Keep dry

12.3 Unpacking and check

1) The whole loading and unloading process shall be steady and slow. Handle carefully in transport and placement. No tilt, collision, flipping or vibration.
2) The unit should be placed in the direction according to the box symbol. Do not reverse the direction
3) Storage environment requirements: Temperature -25℃~60℃, relative humidity 10% ~ 95%, no source of corrosion, or strong power supply.
4) Clean indoor environment with heat source.
5) The package cartons should be placed separately, no stacking;
6) After unpacking, check if the configuration is complete based on the packing list.

WARNING

In rain and foggy weather, the package cartons of the unit should be covered before handling, and placed in the indoor environment that meets the requirements above after unloading. Keep away from rain, fog invasion and the sun

13. Exclusion of liability

In the following cases the manufacturer declines all liability:

If you have any questions, contact your dealer or POSKOM.

- Use of POSKOM Portable X-ray Unit for purposes and applications that differ from the specific requirements made in this User Manual.
- Cleaning and disinfection methods contrary to the directions in this User Manual.
- Work or repairs performed by unauthorized persons.
- Rights under the warranty or statutory guarantee are rendered void if the device is opened without permission.
- have been caused by damage in transit to POSKOM/to a service partner authorized by POSKOM for the purpose of repair;
- have been caused by atmospheric events such as lightning strike, fire and moisture.

PART II. SERVICE MANUAL

1. Notice

1.1. If the output calibration is needed after periodical inspections or repairs, please observe following rules and methods.

CAUTION

The ionized radiation is dangerous for the operator if the following safety measures are not strictly observed.

1.2. This manual is designed to ensure correct use and operation of PXP-100CA. Please read all the lines thoroughly before you use this equipment.

1.3. Incorrect use and operation exceeding described conditions in this manual may occur damage of the machine and shorten its life. Particular attention must be paid to all the warnings, cautions and notes incorporated herein.

1.4. This equipment should be only by the legally qualified persons and practitioners.

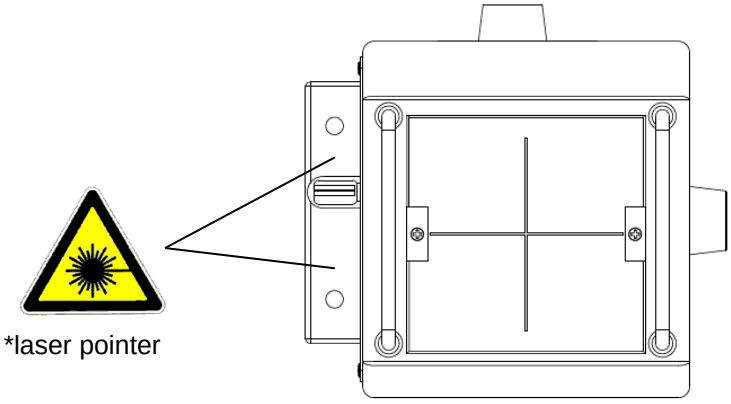
1.5. As for AC cable and software, only the one developed and supplied by POSKOM should be used.

1.6. No responsibility is taken by POSKOM for any infringement of patients or other rights of the third parties which many results from the use of this manual.

1.7. Always keep the manual at hand for your reference.

1.8. Laser pointer

1) By pressing the Collimator lamp/laser on switch [7], laser pointers are lighted.
2) Do not place the laser pointer for direct eye exposure.
3) Do not stare into the beam.



*laser pointer

2. Regular maintenance

2.1. Overview

This device should be inspected regularly in accordance with the instructions described in this manual.

2.2. Periodical inspections

1) Every 6 Month:

A. Check all visual displays: display readout windows (FNDs), LEDs and other indicators.

B. Check all functions: operation switches, collimator, laser pointer and program pad.

C. Check all calibrations in accordance with section 4 of this service manual.

D. Execute additional tests as required by local laws and regulations.

2) Every 12 Month:

A. Check for damages to the outer case and operation console, including all buttons.

B. Check cable connections to main body, hand switch cable, collimator cable and other connections.

C. Open the top cover and check for any visible damage including missing or loosened ground connections, oil leakage, damaged cables, etc.

D. Execute additional tests as required by local laws and regulations.

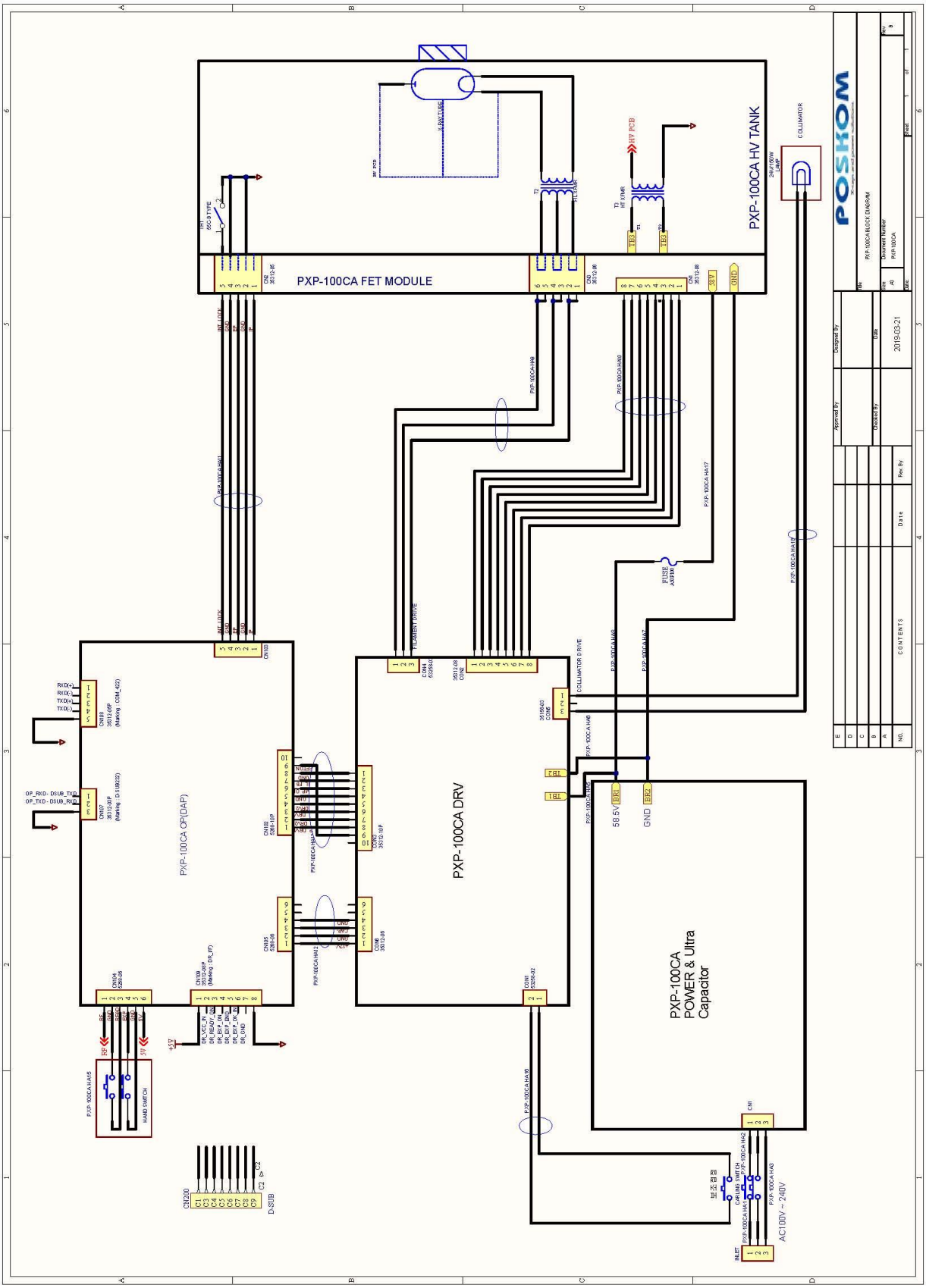
CAUTION

When cleaning, use a soft (microfiber) cloth. A slightly damp cloth may be used for excessive dirt. Harsh chemicals such as benzene should not be used in cleaning and may cause permanent damage to your device and its surfaces.

WARNING

This equipment should be handled and operated by certified persons and practitioners only.

3. Block diagram



4. Calibration

*** Preparation**

Following tools and instruments are needed.

a. Tools: Philips screwdriver No.1 & 2, Straight slot screwdriver

b. Instruments: DVM, oscilloscope (Tektro TDS 3032 and equivalent device)

4.1. Calibration process

4.1.1. Line Power Supply

-Line switch should be at off position.

-Connect power line cord to the power outlet.

-Turn on the line switch.

-Then the LED on the operation panel illuminates.

4.1.2 Calibration procedures are composed of three steps.

-Tube voltage confirmation and calibration.

-Tube current confirmation and calibration.

-Filament preheat calibration

A. Calibration and Confirmation of Tube Voltage

-Turn off the line switch.

-Lift up the control panel from the unit, and then the PCB OP board appears.

-All DIP switches on the PCB OP board are turned off.

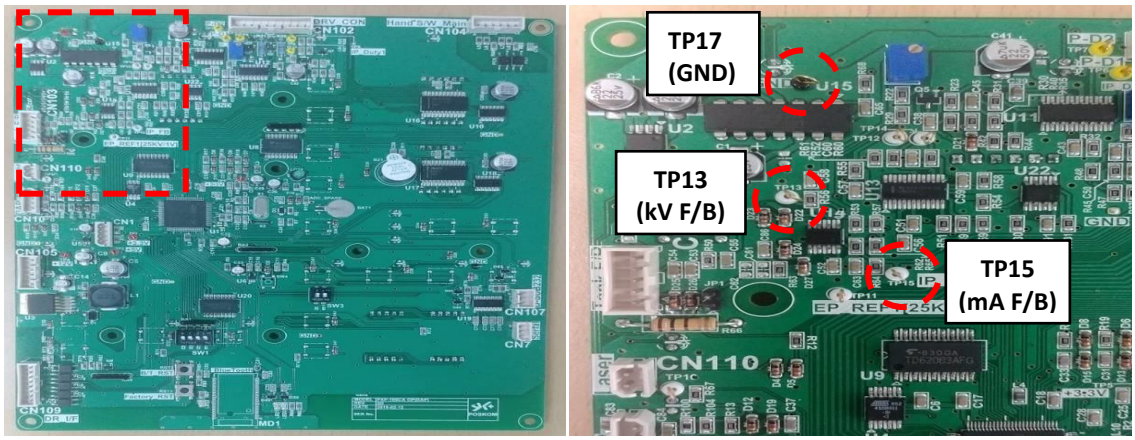
(Note: DIP switch is usually located in this position.)

-Connect the channel one probe of the oscilloscope to TP15 (mA F/B).

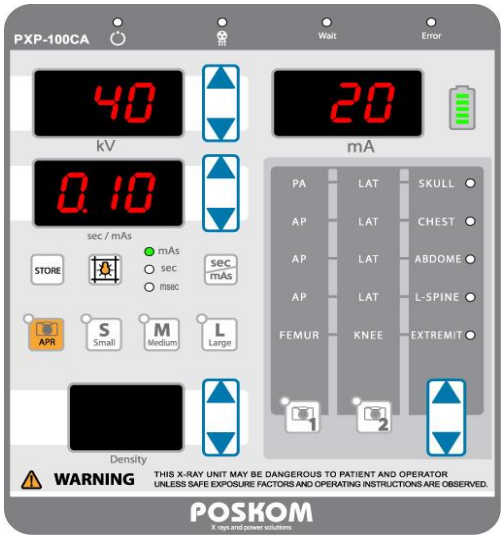
-Connect the channel another one probe of the oscilloscope to TP13 (kV F/B).

Channel 1 is mA, and 1 V = 10mA Channel 2 is kV, and 1 V = 25 kV

-Connect the ground to TP17 (GND).



- Turn on the line switch and display indicates as follows.



-Set the kV and the mAs at 40kV and 0.1mAs (20mA). Then observe mA waveforms of the oscilloscope channel 1.

-If the value at channel 1 is not 2V (20mA), adjust the mA output with VR2 of HT board. And observe if the waveform of the oscilloscope channel 2 is 40kV (1.625V).

-Set the conditions as 100kV and 0.2mAs (40mA) and observe mA waveforms of the oscilloscope channel 1.

-If the value at channel 1 is not 4 V (40mA), adjust the mA output with VR2 of OP board. And observe if the waveform of the oscilloscope channel 2 is 100kV (4V).

※ CAUTION ※

As the kV value of channel 2 is automatically adjusted by standard parameters, Additional calibration is not required.

B. Calibration and Confirmation of Tube Current

-Turn off the power switch.

-Lift up the control panel from the unit, and then the PCB OP board appears.

-All DIP switches on the PCB OP board are turned off.

(Note: DIP switch is usually located in this position.)

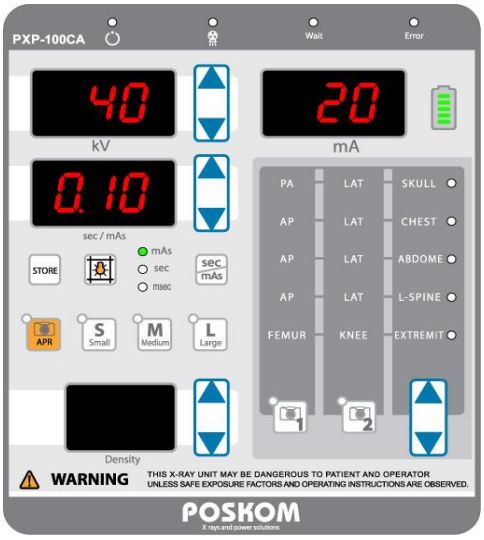
-Connect the channel one probe of the oscilloscope to TP15 (mA F/B).

-Connect the channel another one probe of the oscilloscope to TP13 (kV F/B).

Chanel 1: mA, 1V = 10mA
Chanel 2: kV, 1V = 25kV

-Connect the ground to TP17 (GND).

-Turn on the line switch and the display indicates as follows.



-Set the kV and the mAs as 40kV and 0.2mAs (40mA) Then observe mA waveforms of the oscilloscope channel 1.

-If the value at channel 1 is not 4V (40mA), adjust the mA output with adjustment data of OP B/D.

-Under normal mode, press [‘S’+‘L’+‘kV_Down’] Key over 2 seconds.

The kV display segment of FND is displayed as CXX.

Calibration Code Calibration Data

Press kV up switch (Refer to the OP sheet) and it displays as follows.

Calibration Code Calibration Data

C01 is calibration code of tube current (40mA at 40-50kV)

40 is calibration data of tube current (40mA at 40 to 50kV)

-Select mA with mAs up/down switch (Refer to the OP sheet)

-Press the 'Store Key' longer than 1 second after application (Refer to the OP sheet)

-Exposure X-rays after saving the data

-If the measured data is not 4V(40mA), reset the calibration data. Set the mA values as this method.

-Table 1 represents calibration code and data of each tube current vales at 5kW.

C. Filament preheat calibration

-This is preheating filament for making tube current.

-The overshoot or the undershoot may occur from the tube current if the preheat calibration data or the VR2(preheat gain volume) is set by mistake.

-There are two methods to make preheat calibration setting. The calibration data is possible to be changed in accordance with the tube condition.

-The VR2(preheat gain volume) adjusts the whole range of tube current. Filament preheat calibration data adjusts each tube current.

-Turn on the power switch.

- Under normal mode, press ['S'+'L'+'kV_Down'] Key over 2 seconds.

-Press APR size selection Key ['S'] Key one time and it displays as below.

Preheat Calibration Code Preheat Calibration Data

P00 is filament preheat calibration code (preheat calibration code of 20mA)

28 is calibration data (preheat calibration code data of 20mA)

-Apply the data by mAs up/down switch. (Refer to the OP sheet)

-Press the 'Store' key longer than 1 second (Refer to the OP sheet)

-Reset the calibration data if any over-shoot or under-shoot is observed.

Press kV up switch. (Refer to the OP sheet) and it displays as below.

Preheat Calibration Code Preheat Calibration Data

-P01 is filament preheat calibration code (preheat calibration code of 40mA)

-30 is the calibration data (preheat calibration data of 40mA)

-Apply the data by mAs up/down switch. (Refer to the OP sheet)

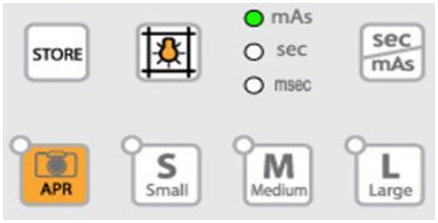
-Press the 'Store' Key longer than 1 second after application (Refer to the OP sheet)

-Exposure X-rays after saving the data.

-Reset the calibration data if any over-shoot or under-shoot is observed.

-Table 2 represents calibration code and data of each tube current vales at 5kW.

-Escape from calibration mode by press ['M'] Key one time.



D. kV calibration

-Turn on the power switch.

- Under normal mode, press ['S'+'L'+'kV_Down'] Key over 2 seconds.

-Press APR size selection Key ['S'] Key two times and it displays as below.

kV Calibration Code kV Calibration Data

C31 is kV calibration code (40kV ~ 50kV)

10 is calibration data (40kV ~ 50kV)

-Apply the data by mAs up/down switch. (Refer to the OP sheet)

- Press the ‘Store’ key longer than 1 second (Refer to the OP sheet)
- The basic value of kV calibration data is 10 and the increase and decrease is 1. It is corrected by the following formula.
  * kV output = set kV + kV(calibration data – 10)
- For example, When checking the output of 55kV, If the value of C31(51 ~ 60kV) is 8,
  * kV output = 55kV + (8-10) = 53kV

kV Calibration Code kV Calibration Data

C35 is kV calibration code (81kV ~ 90kV)

10 is calibration data (81kV ~ 90kV)

- Apply the data by mAs up/down switch. (Refer to the OP sheet)
-Press the ‘Store’ Key longer than 1 second after application (Refer to the OP sheet)
- For example, If the output of the 81 ~ 90kV section is 2kV low, Set the value of C35(810kV~90kV) to12 to correct.

Table 2 represents calibration code and data of each tube current vales at 3kW.

Escape from calibration mode by press [‘M’] Key one time.

※ **Notice※**

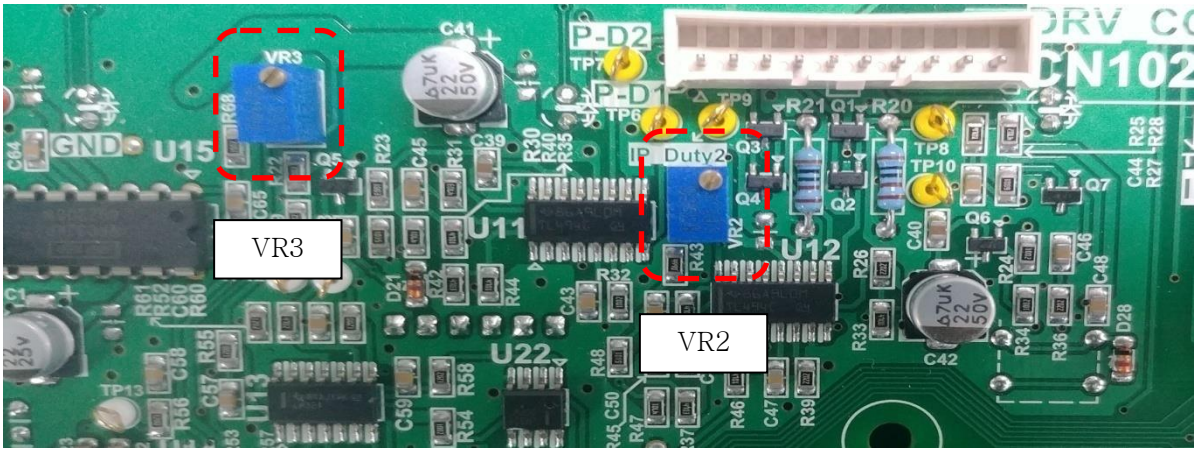
Calibration data can be changed by tube conditions.

※ **Notice※**

If you press [‘S’=‘Cat’] Key consecutively, it repeats C -> P -> C _ Mode.

[P: Preheat, C: Ma /kV]

E. VR info



VR Number	Adjusted Values	Direction		REMARK
		LEFT (Anticlockwise)	RIGHT (Clockwise)	
VR2	Preheat	Increase	Decrease	
VR3	mAs	Decrease	Increase	

5. Calibration code and data

[Table 1. mA calibration data]

Input voltage	Code	Data	Tube kV	Tube mA	mAs
220V	C00	20	40kV ~ 50kV	20mA	0.1
220V	C01	40	40kV ~ 50kV	40mA	0.2 ~ 0.3
220V	C02	100	40kV ~ 50kV	100mA	0.4 ~ 10
220V	C03	80	40kV ~ 50kV	80mA	12~32
220V	C04	60	40kV ~ 50kV	60mA	36 ~ 80
220V	C08	50	40kV ~ 50kV	50mA	100
220V	C05	20	51kV ~ 60kV	20mA	0.1
220V	C06	40	51kV ~ 60kV	40mA	0.2 ~ 0.3
220V	C07	80	51kV ~ 60kV	80mA	0.4 ~ 8.0
220V	C08	50	51kV ~ 60kV	50mA	9.0 ~ 80
220V	C09	40	51kV ~ 60kV	40mA	100
220V	C10	20	61kV ~ 70kV	20mA	0.1
220V	C11	40	61kV ~ 70kV	40mA	0.2 ~ 0.3
220V	C12	50	61kV ~ 70kV	50mA	0.4 ~ 8.0
220V	C13	40	61kV ~ 70kV	40mA	9.0 ~ 80
220V	C14	30	61kV ~ 70kV	30mA	100
220V	C15	20	71kV ~ 80kV	20mA	0.1
220V	C16	40	71kV ~ 80kV	40mA	0.2 ~ 0.3
220V	C17	50	71kV ~ 80kV	50mA	0.4 ~ 8.0
220V	C18	40	71kV ~ 80kV	40mA	9.0 ~ 21
220V	C19	30	71kV ~ 80kV	30mA	25 ~ 64
220V	C20	20	81kV ~ 100kV	20mA	0.1
220V	C21	40	81kV ~ 100kV	40mA	0.2 ~ 8.0
220V	C22	30	81kV ~ 100kV	30mA	9.0 ~ 30
220V	C23	20	81kV ~ 100kV	20mA	32 ~ 80
220V	C24	20	101kV ~ 110kV	20mA	0.1
220V	C25	40	101kV ~ 110kV	40mA	0.2 ~ 5.0
220V	C26	30	101kV ~ 110kV	30mA	6.4 ~ 12
220V	C27	20	101kV ~ 110kV	20mA	15 ~ 64

[Table2. Filament preheat calibration code and data]

Input voltage	**Code**	**Data**	**Tube Current**
220V	P00	28	20mA(40 ~ 80kV)
220V	P01	30	30mA
220V	P02	31	40mA
220V	P03	31	50mA
220V	P04	33	60mA
220V	P05	35	80mA
220V	P06	38	100mA
220V	P07	38	20mA(81 ~ 110kV)

[Table 3. kV calibration code and data]

Input voltage	**Code**	**Data**	**Tube kV**
220V	C30	10	40kV ~ 110kV
220V	C31	10	40kV ~ 50kV
220V	C32	10	51kV ~ 60kV
220V	C33	10	61kV ~ 70kV
220V	C34	10	71kV ~ 80kV
220V	C35	10	81kV ~ 90kV
220V	C36	10	91kV ~ 100kV
220V	C37	10	101kV~ 110kV

※ **Notice** ※

Do not use the machine in case of frequent errors. Please make contact to POSKOM service team or authorized dealers for trouble shootings.

6. Error code

6.1 Error at power-on

Error occurs when Ready / X-ray button of Hand switch is recognized at power-on.

Error code	Contents	Measures
Err. 07	The ready contactor of the hand switch is closed even it is not pushed.	Change OP B/D.
Err. 08	The X-ray contactor of the hand switch is closed even it is not pushed.	Change OP B/D.

6.2 Error at stand-by

Without hand switch operation, if hardware is over than kV F/B=10kV, mA F/B=5mA, FIL=0.1V F/B Check, it is in error.

Error code	Contents	Measures
Err. 10	FILAMENT FEEDBACK OVER	Change OP B/D.
Err. 11	kV FEEDBACK OVER	Change OP B/D.
Err. 12	mA FEEDBACK OVER	Change OP B/D.

6.3 Error at ready

With ready switch on, check the filament conditions and if hardware is over than FIL=0.35V F/B Check, it is in error.

Error code	Contents	Measures
Err. 14	FILAMENT FEEDBACK LOW ERROR	Calibration or adjust VR2.

6.4 Error at exposures

Error code	Contents	Measures
Err. 15	kV FEEDBACK LOW DETECT ERROR AT EXPOSURE	Calibration or adjust VR.
Err. 16	mA FEEDBACK LOW DETECT ERROR AT EXPOSURE	Calibration or adjust VR.
Err. 17	kV FEEDBACK OVER DETECT ERROR AT EXPOSURE	Calibration or adjust VR.
Err. 18	mA FEEDBACK OVER DETECT ERROR AT EXPOSURE	Calibration or adjust VR.
Err. 19	-10kV kV FEEDBACK LOW DETECT ERROR AT EXPOSURE	Calibration or adjust VR.
Err. 20	+10kV kV FEEDBACK HIGH DETECT ERROR AT EXPOSURE	Calibration or adjust VR.
Err. 22	-10mA mA FEEDBACK LOW DETECT ERROR AT EXPOSURE	Calibration or adjust VR.

Err. 23	+10mA mA FEEDBACK HIGH DETECT ERROR AT EXPOSURE	Calibration or adjust VR.

6.5 Inter lock error

Error code	Contents	Measures
Err. 21	Tank Thermal S/W Check	Wait for the tank to cool.

6.6 Deadman check code

When the hand switch is turned off during X-ray exposure, Then it displays the msec of the exposured X-ray and informs the user of Deadman check by beep sound.

7. Service request form

This form must be completed fully and submitted with any POSKOM x-ray products returned for warranty considerations or repair services.

A. General Information

A. Product name :

B. Serial number :

C. Date received :

D. Date installed :

E. Date defective found :

F. At what stage did your device fail:

□ At the initial inspection upon receipt? or □ After storage?

□ During the course of an installation? or □ During actual service in the field?

B. Detailed Information

1) Symptoms in detail:

Highest condition used at: kV mAs

Most frequently used at: kV mAs

2) Describe any problems experienced:

Setting at time of failure: kV mA/mAs sec

Describe any unusual occurrences:

Abnormal symptoms prior to failure:

Abnormal symptoms at time of failure:

3) Please include any additional details or documentation (e.g., photos, purchase orders, receipts) that may assist in troubleshooting the problem.

Full Name Phone _____

Signature Fax

Company/Hospital Email

Website _____ Date _____

CE 0123

POSKOM
Imaging Innovation

POSKOM Co., Ltd.
POSKOM Tower, 227 Sowon-ro, Deogyang-gu, Goyang-si,
Gyeonggi-do, 10534, Republic of Korea
Tel: +82-31-906-9007 Fax: +82-31-908-4208
E-mail: sales@poskom.com

EC REP

Medical ECONET GmbH
Im Erlengrund 20
D-46149 Oberhausen, Germany

Tel: +49 (0) 208 377 890-0
Fax: +49 (0) 208 377 890-55