English

PaX-i™

Installation Manual

Model : PCH-2500
Version : 3.08

vatech

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Notice

This manual covers the installation procedures for the **PaX-i™** dental X-Ray unit. An installation manual and user manual are shipped with each hardware unit.

Product name: PaX-i™ (Model: PCH-2500)

Manufactured by VATECH Co., Ltd.

In this manual, Equipment refers to the **PaX-i™**.

In abbreviated forms, **CEPH** and **PANO** denote **Cephalometric** and **Panoramic**, respectively.

The "**Optional**" in this manual means that the function or features are left to customer's or user's choice

A thorough review of this manual is recommended before installation to ensure the proper installation of this equipment. The **PaX-i** is in steady improvement. The information contained in this manual may be subject to change without notice, justification or notification of the persons concerned.

This Equipment is covered by one or more of the US patents:
US7995704, US8634515, and US9117301.

For further information not covered in this manual or in the accompanying documentation, please contact us with any method listed below:

Telephone: +82-1588-9510

E-Mail: gcs@vatech.co.kr

Website: http://www.vatech.com

Address: 13, Samsung 1-ro 2-gil, Hwaseong-si, Gyeonggi-do, Korea

Manual Name : PaX-i (Model : PCH-2500) Installation Manual

Document Number : VDH-IM-047

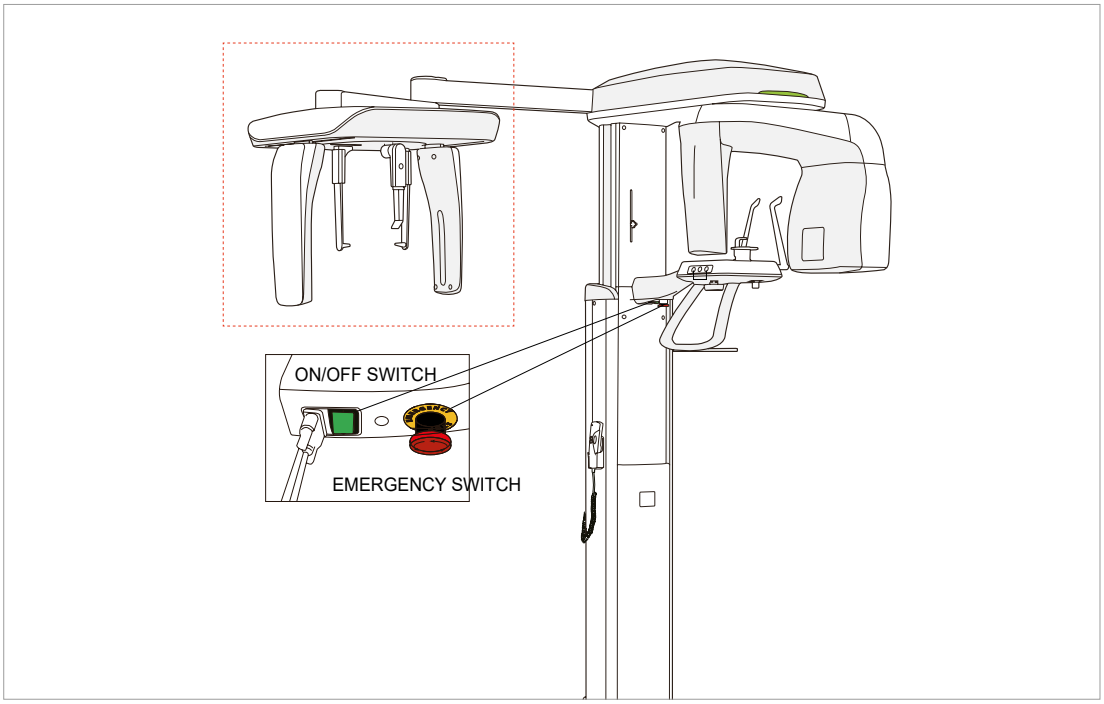
Version : 3.08

Publication Date : 2024-01

Important Information

⚠ CAUTION	**When installing the equipment under sudden temperature change inside and outside of the building, which could cause moisture condensation on it, allow at least an hour before turning ON the equipment**
	Failure to read and understand the information provided in this manual may result in physical injury, damage to the equipment or equipment failure. Please read each CHAPTER in its entirety and understand the information therein before attempting any of the installation procedures.
IMPORTANT	**1. To avoid improperly balanced equipment, install the device on a flat surface to maintain stability.** **2. If the equipment is not stable, property damage and/or personal injury may occur.** **3. Do not push or pull the equipment.** **4. Equipment should only be installed by an authorized technician, complying with proper installation procedures.**

Location of the power and emergency stop switches

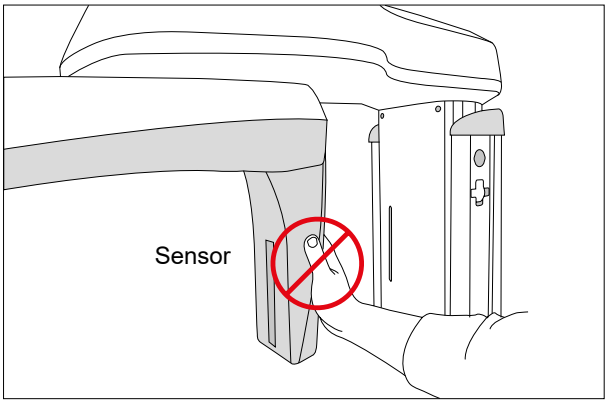


Conventions Used in this Guide

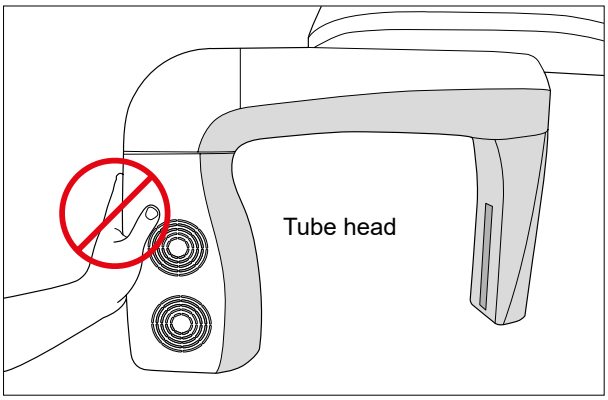
The following symbols are used throughout this manual to emphasize information or indicate a potential risk to the equipment or user. Make sure that you fully understand each symbol and obey the instructions which appear to the right of the symbol.

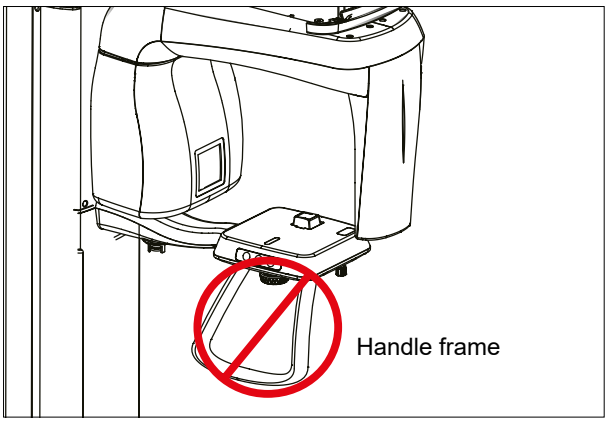
⚠WARNING	**Warnings** indicate information that should be followed with the utmost precision. Failure to comply with warnings may result in severe damage to the equipment and/or physical injuries to the patient or operator.
⚠ CAUTION	**Cautions** indicate a situation that demands prompt but careful action, remedy or emergency attention.
IMPORTANT	**Important symbols** indicate a compulsory action or instruction.
NOTICE	**Notes** help you optimize system performance. Carefully read each note to ensure that the equipment is used to its full potential.
	**Radiation symbols** indicate a possible danger from exposure to radiation.
	**ESD susceptibility symbols** indicate that an item is susceptible to damage from electrostatic discharges.

Never touch or hold the sensor or tube head areas while moving, installing or operating this equipment.



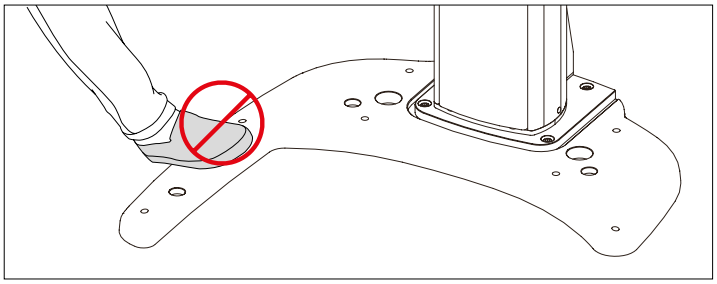
⚠WARNING





⚠WARNING

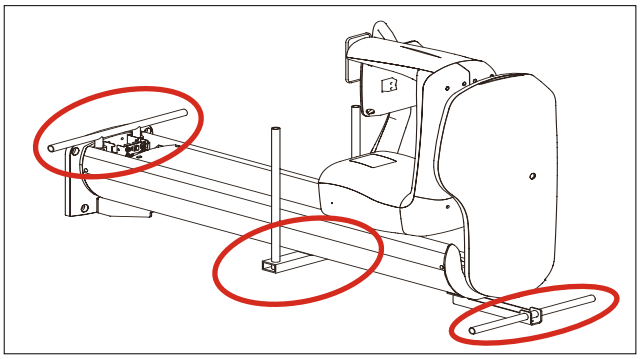
Do not step on the base of the unit while installing or operating the equipment.



Do not use an electric drill until the installation is over.

NOTICE

Recommended holding area during transportation(OK)



NOTICE

3 installers are required to install the equipment safely.

Cautions

1. It is critical that installers read and understand the installation instructions fully before installation.
2. The installer must confirm that the system is installed according to the instructions provided by this manual and perform the appropriate procedures therein.
3. If the equipment has been stored at temperatures of below 10℃ (50℉) for more than a couple of hours, allow the equipment to reach room temperature before applying the mains voltage.
4. Installation and related work must only be performed by people authorized by VATECH.
5. Do not connect any items or equipment to this system which are not part of the system: **IEC60601-1-1**

CAUTION

6. Any equipment not approved by VATECH must comply with the applicable standards: **IEC 60950-1** for IT equipment (Ex: PC) and **IEC 60601-1** for medical electrical equipment.
7. All operators of this equipment are responsible for ensuring that the requirements outlined in **IEC 60601-1-1**: Safety Requirements for Medical Electrical Equipment are fully met to ensure the safety of patients, operators and the environment.
8. Never touch-sensitive areas such as sensors during installation. These areas are indicated at the applicable stages during the installation procedures.
9. The use of wireless phones may interfere with the operation of this equipment.
10. Use an ESD (electrostatic sensitive device) wristband during installation and connect it to a ground wire.
11. Touch a ground point to discharge static electricity before handling PCB boards.

Installation Site

IMPORTANT

1. PC monitors, emergency shutdown switches, and X-ray exposure switches should be installed near the operator for emergency management.
2. Proper shielding of the room is essential: Since these requirements vary depending on the country, it is the installer's responsibility to verify that all applicable radiation safety requirements are met.
3. This equipment should not be installed in the immediate vicinity of other devices.
4. Do not install the equipment in an area that is exposed to strong electromagnetic fields.
5. Do not install this system in an area where there is the risk of an explosion.
6. The electrical installation of this system shall comply with all local code requirements for electro-medical systems: **IEC 60364-7-710**.
7. It is strongly recommended that a UPS be installed at the same time as the equipment.
8. The equipment, PC, and all peripheral devices must be well-grounded.

Warnings Regarding X-Ray Radiation

⚠WARNING

1. Failure to install this equipment in an approved location may be dangerous to the patient and operator.
2. Stationary radiation shielding must be installed to protect the operator from radiation.
3. The X-Ray system may cause injury to the patient if improperly used. Obey all federal and municipal standards regarding radiation safety.
4. When exposing the patient to the X-Ray, the operator must be behind a protective wall or take other protective actions. The operator should remain at least 2 m (7 feet) away from the X-Ray when pressing the exposure switch and observe the patient and capture-progression.
5. Operators must provide protective clothing to the patient before X-Ray capturing. Pregnant women must consult with a doctor prior to being exposed to an X-Ray.

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Introduction

1.1 Manufacturer's Liability

As the manufacturer, VATECH assumes liability for the safe and reliable installation and operation of this equipment only when:

- Equipment installation, including software installation, was carried out by an authorized agent in accordance with this installation manual.
- The electrical installation was carried out in accordance with the appropriate requirements specified in **IEC-60363**.
- Genuine original or approved replacement parts are used.
- Maintenance/repair service has been performed by a qualified technician(s) from one of our authorized agents.
- The equipment has been used under a normal condition in accordance with the user manual.
- PC Software has been properly used in accordance with the manufacturer's installation instructions and user manuals.

1.2 Customer's Responsibility

Site planning and preparation are the responsibility of the customer. The following points should be considered fundamentally important to all customers of this product:

- Install all required materials prior to delivery of the system.
- Complete the floor, ceiling, and walls of the room before installing the equipment.
- Install proper sized junction boxes, with covers, at the necessary locations.
- Install a mains power with the proper voltage output and an adequate kVA rating.
- Install the circuit breaker specified by this manual.
- Provide the installer(s) with the current dimensions of the room including the hallway and entry door sizes.
- The customer must have an electrician install more than two power outlets in the room.

1.3 Marks & Symbols

Symbols	Description	Location
	Dangerous voltage	**Powerboard**
	Protective earth (Ground)	**Powerboard**
	Off (power: disconnect from the main switch)	**Main switch**
	On (power: connect to the main switch)	**Main switch**
	This symbol warns the user to take precautions when dealing with electronic components which are sensitive to static charges	**MCU board packaging**

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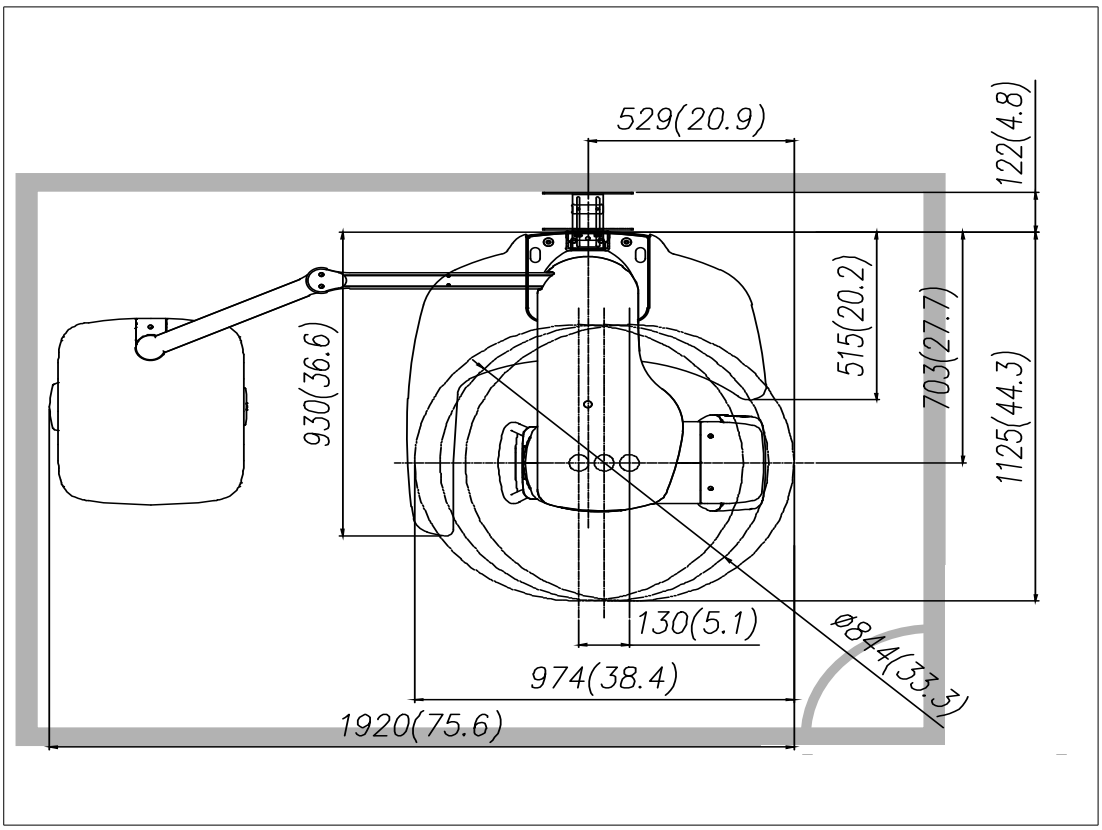
2

Choosing an Installation Site

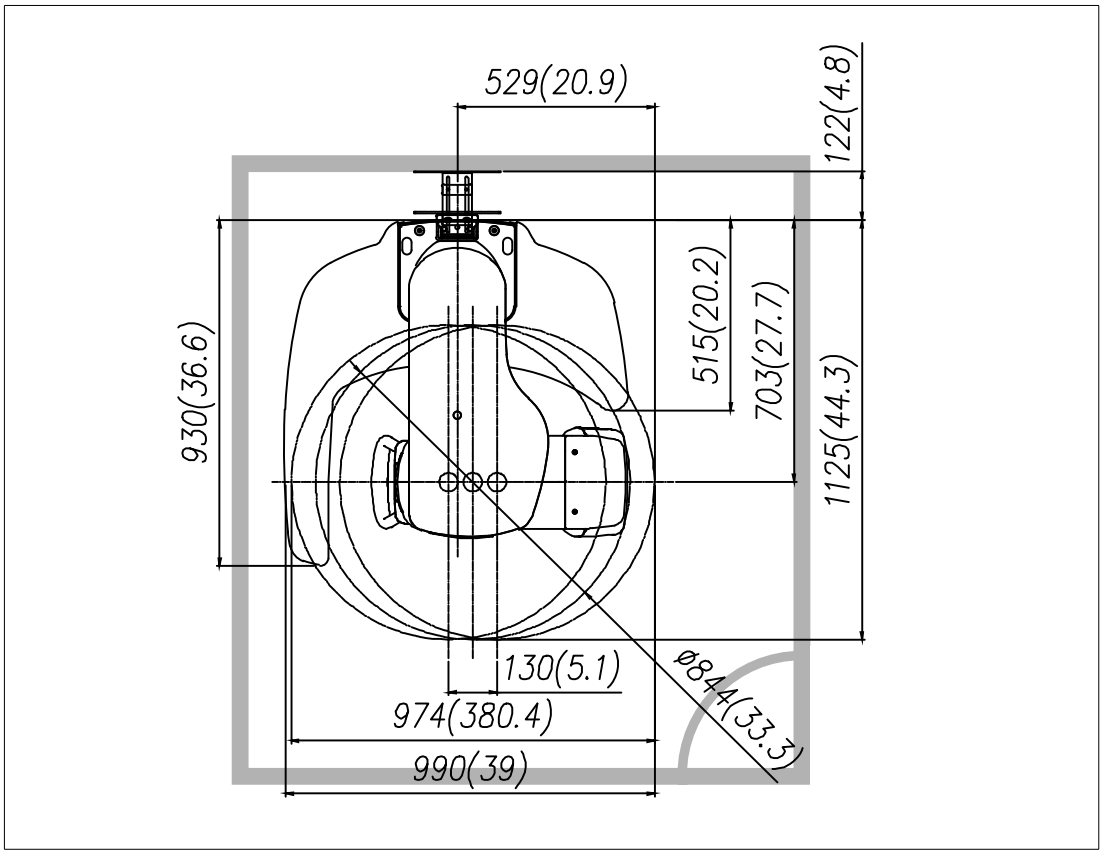
2.1 Room Requirements

IMPORTANT

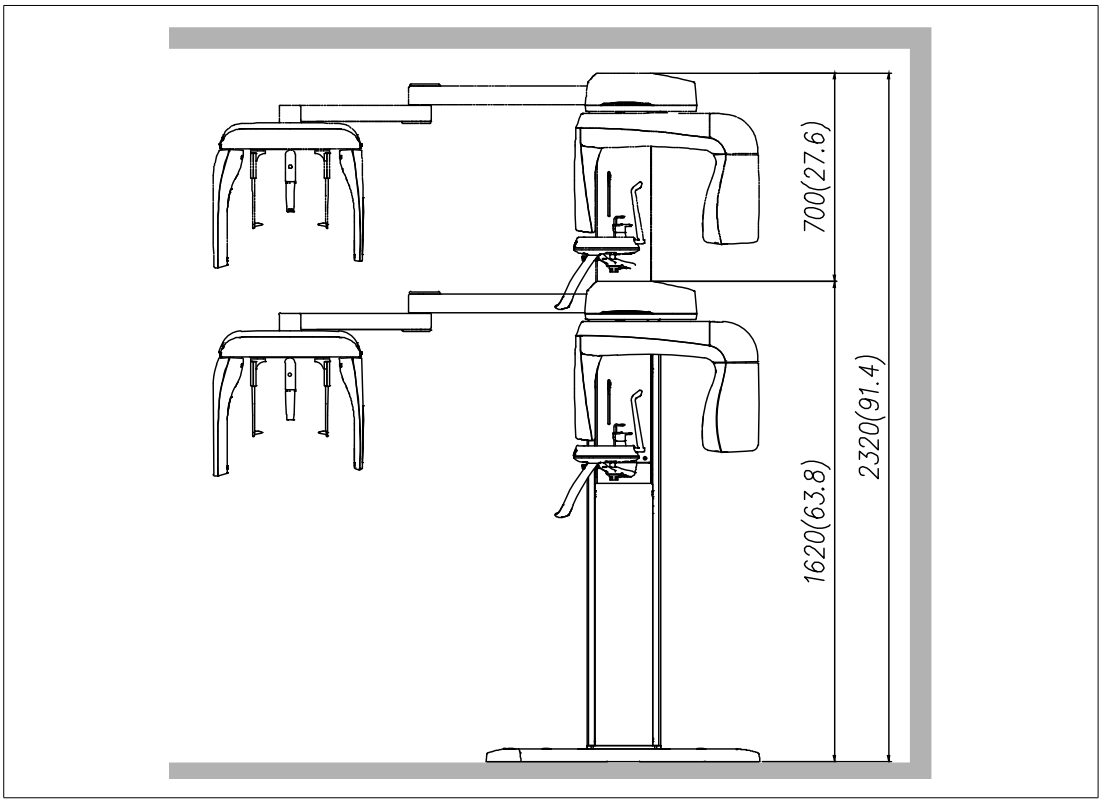
1. **The location of this equipment should allow for high visibility of the patient by the operator and the operator should be as near to the patient as possible.**
2. **This equipment should not be installed on thick carpets for stability reasons.**
3. **Anti-static floor materials should be used around the equipment.**
4. **PC monitors, emergency shutdown switches, and X-ray exposure switches should be installed near the operator for emergency management at the same time.**



With Cephalometric unit (optional): 2,820 mm x 2,147 mm / 111” x 85” or wider



Without Cephalometric unit: 1,890 mm x 2,147 mm / 75” x 85” or wider



Minimum space required:

- **With Cephalometric unit:** 2,820 mm(L) x 2,147 mm(W) x 2,320 mm(H) / 111”(L) x 85”(W) x 92”(H)
- **Without Cephalometric unit:** 1,890 mm x 2,147 mm x 2,320 mm(H) / 75”(L) x 85”(W) x 92”(H)

The system is normally installed beside a wall, and the operator uses the system on the left.

Lead thickness: ≥1 mm

The width of the entrance:

The door of the X-Ray room should have a clearance of more than 800 mm (31.5”) wide.

Floor area:

The floor of the X-Ray room must be stable and level for system balance.

The floor must be able to support a minimum weight of 500 kg/m^2 (110 lbs./$feet^2$).

Protection against radiation

- To protect against radiation hazards, follow all federal and municipal requirements.
- During exposure, the operator should follow applicable radiation shielding requirements and remain at least 2m (7’) from the source of the radiation.
- Maintain visible contact with the patient and a clear view of indicators such as the warning lamp and imaging status on the PC.

2.2 Specifications for Electrical Installation

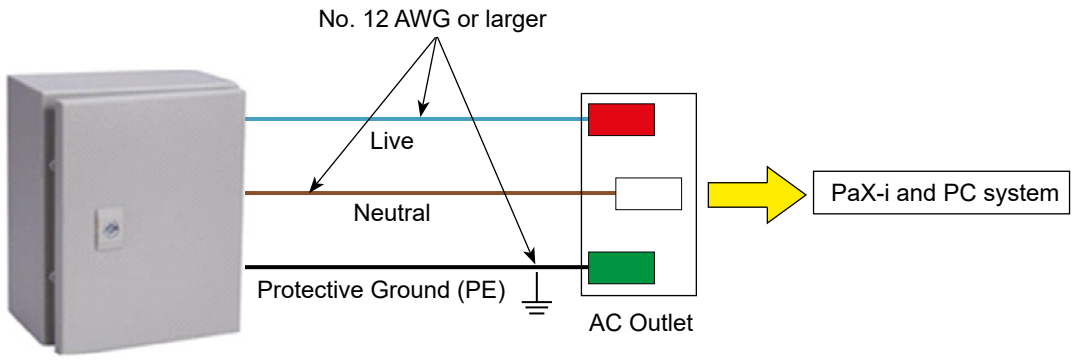
These specifications are based on the **MEIGaN** (Medical electrical installation guidance notes).

Consult the companion manual for further information.
Volume 3: Specification for Electrical Installation.

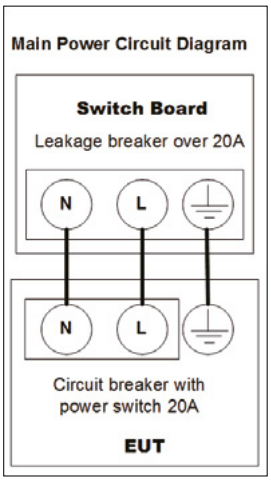
2.3 Electrical Requirements

IMPORTANT	**If connected to an MPSO, the PC and equipment must use the same power line.** **Whenever possible, use different power outlets for each device. If a multiple portable socket outlet (MPSO) must be used, ensure that the PC and equipment are connected to the same MPSO.**
	This equipment must be connected to a grounded outlet to fulfill the safety provisions specified in IEC 60364: the 2nd edition (2006).
	Use a dedicated power outlet for the power cord. Failure to do so may result in unstable system operation caused by power fluctuations.
NOTICE	**It is strongly recommended that you install an AVR. An AVR (automatic voltage regulator) maintains a constant voltage and allows for continuous operation in the event of power fluctuation.**

Power supply voltage	AC100-120 V / 200-240 V
● The input line voltage depends on the local electrical distribution system. ● Allowable input voltage fluctuation requirement: ± 10 %.	
Frequency	50/60 Hz
Phase	single
Power rating (maximum power consumption)	Max.2.0 kVA (during exposure)



Central distribution panel
w/a circuit breaker



1. To assure line voltage quality, a separate 3-core grounded power cable connected directly to the central distribution panel with an over-current circuit breaker rated for 20/15A must be used.
2. The mains resistance should not exceed 0.5 Ω.
3. This equipment should be connected to the earthed outlet.

2.4 Temperature and Humidity

During operation:

Ambient temperature	10 ~ 35 ℃ (50 ~ 95 ℉)
Relative humidity	30 ~ 75 %
Atmospheric pressure	860 ~ 1060 hPa

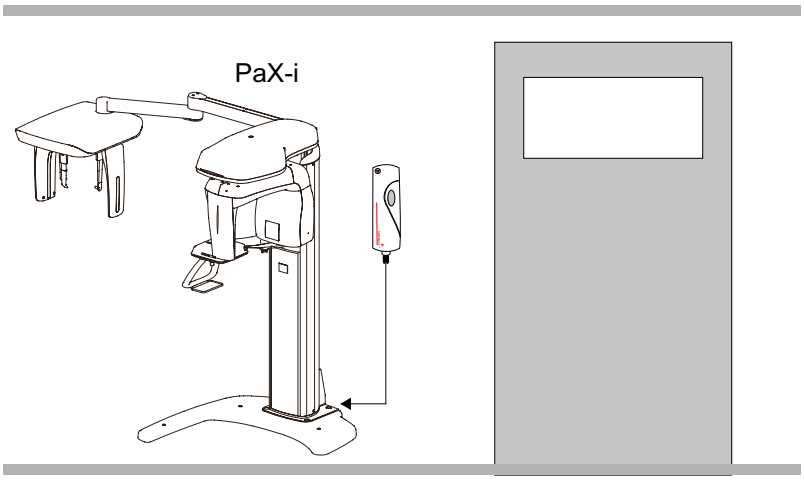
During transportation and storage:

Temperature	-10 ~ 60 ℃ (14 ~ 140 ℉)
Relative humidity	10 ~ 75 % non-condensing
Atmospheric pressure	860 ~ 1060 hPa

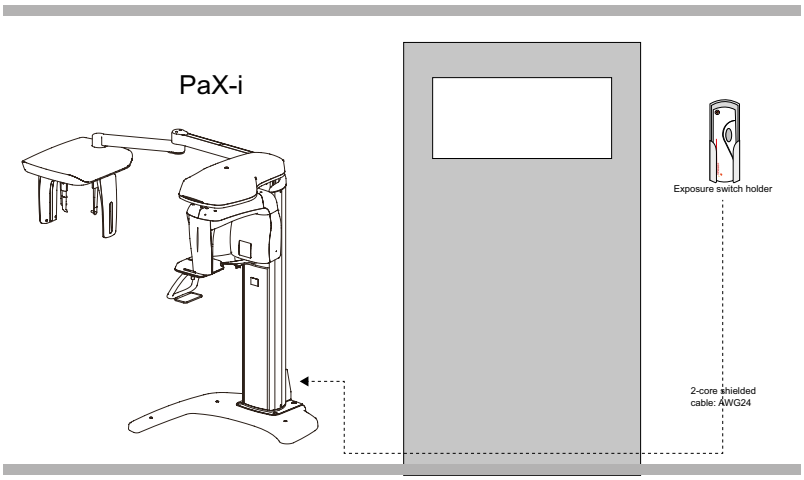
2.5 Exposure Switch Installation Options

There are three options for installation, depending on the configuration of the site. Nevertheless, the 2nd option is preferred.

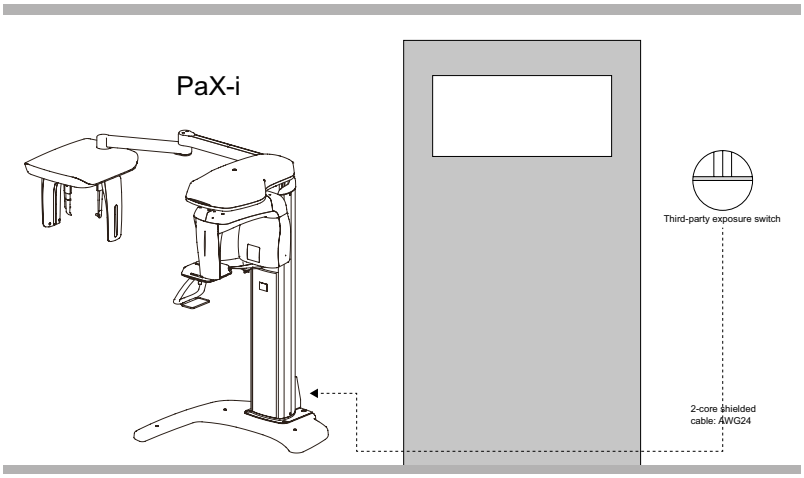
Option No. 1: The user operates the exposure switch from inside the X-Ray room.



Option No. 2: The user operates the exposure switch from outside the X-Ray room. The exposure switch holder is mounted on the wall.

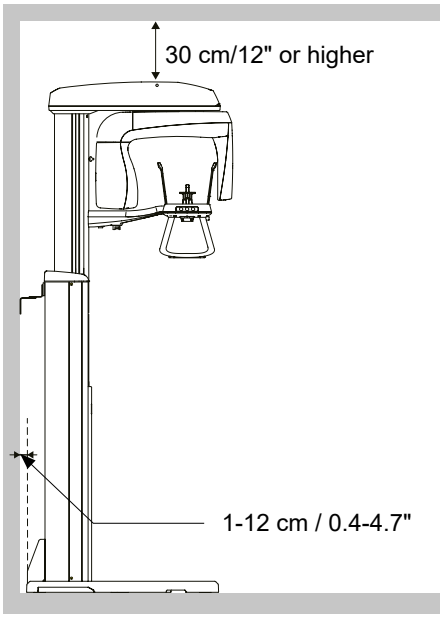


Option No. 3: The 3rd party exposure switch (not VATECH's) is used on the demand of the customers. For this scenario, see **Appendix D Connecting the 3rd party exposure switch** for details.

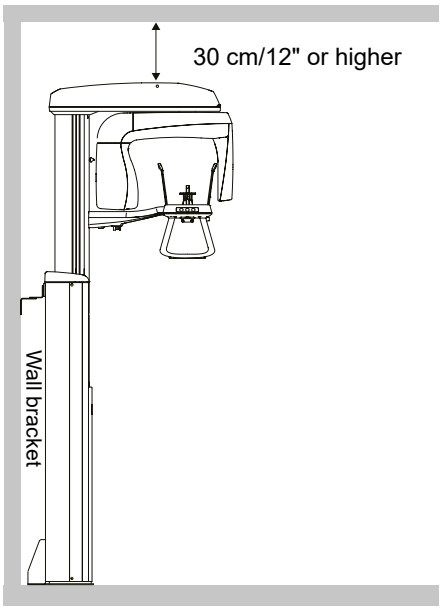


2.6 Installation Versions

Base unit and wall-mount bracket type



Wall-mount type



2.7 Installing the Warning Lamp and Door Interlock Switch

Refer to Appendix **A** for a complete installation guide.

- This system can be equipped with a warning lamp and the door interlock switch which are activated when the X-Ray is energized.
- The warning lamp and the door interlock switch are not included with the equipment.
- The warning lamp and the door interlock switch must be installed by a qualified technician.

2.8 Installing the Emergency Stop Switch

Refer to Appendix **B** for a complete installation guide.

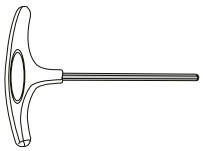
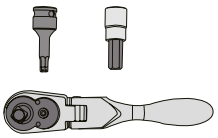
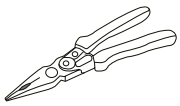
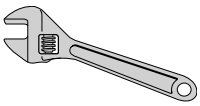
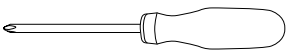
- Install the emergency stop switch along the main power cable in the central distribution panel.
- Install this switch so that it is within easy reach of the operator but cannot be accidentally pressed.
- The switch must be a fool-proof model.

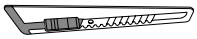
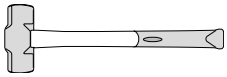
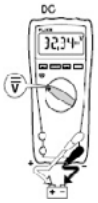
3

Before Installing the System

3.1 Required Tools

The following tools are necessary to install the **PaX-i.**

Item	Figure	Size
Wrench set	 Allen wrench set 1.5mm-10mm (0.05"-0.4")	1.5 mm-10 mm/0.05”-0.4”
T-shaped hex wrench		6 mm-10 mm/0.23”-0.4”
Ratchet wrench		Tips: 3 mm-8 mm/0.12”-0.3”
Needle-nose pliers		regular
Monkeywrench		
Philips screwdriver w/ magnetic tip		L=200 mm(7.9”)
Spirit level		

Item	Figure	Size
Anti-static glove		
Knife		
Tape ruler (Optional)		5 m: For wall-mounted type
Marker pen(thick tip)		For wall-mounted type
Hammer (optional)		For wall-mounted type
Multi-meter		
Hammer drill(Optional)		For wall-mounted type

3.2 Checking the ShockWatch and TiltWatch Indicators

This equipment is carefully inspected and packed prior to shipment. Nevertheless, the recipient of this equipment should carry out visual inspection of all packages before opening them to ensure that the equipment was not damaged during shipping.

IMPORTANT	**The installers and/or supervisor should check the status indicators on each package before opening the package.**
NOTICE	**The ShockWatch and TiltWatch indicators become red if the package has suffered any physical impacts during transportation. However, a red indicator does not necessarily mean that the unit has been damaged.**
	These indicators are affixed only to the main box, which contains the equipment very sensitive to external impacts

Check the followings before opening each package:

1. These indicators are affixed only to the main box, which contains the equipment very sensitive to external impacts

2. Check the packaging for signs of damage visually.

3. Locate the ShockWatch and TiltWatch indicators and check if they have been activated.

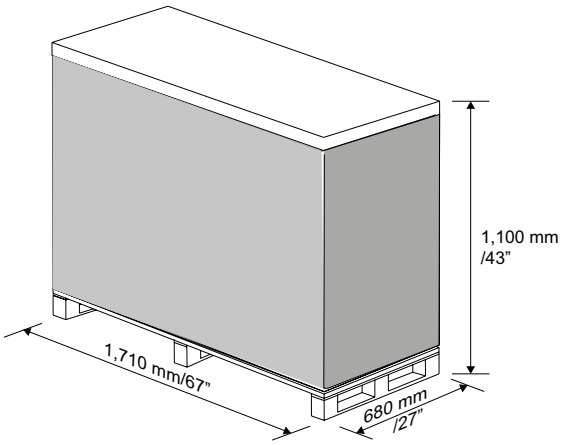
If either the packaging is damaged or the **ShockWatch** or **TiltWatch** indicators have been activated, please do not open the package and immediately contact the shipping company, agent or **VATECH**.

3.3 Unpacking the Boxes

IMPORTANT	**All packaging and Styrofoam used to ship this equipment are recyclable. Return the packaging to VATECH representatives or dispose of it in compliance with the legal regulations of your country.**

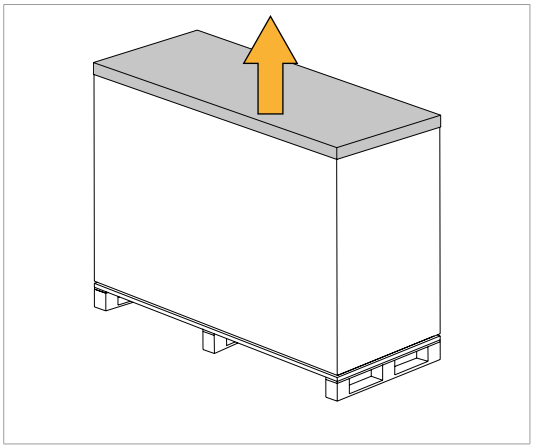
Box No.1: Main box

Components	• Column and Rotating unit assembly • Accessories and parts • PC system(optional)
Size(mm/inch)	1,710 (L) x 680 (W) x 1,100 (H)/67” (L) x 27” (W) x 43” (H)
Weight(kg/lbs)	145/320

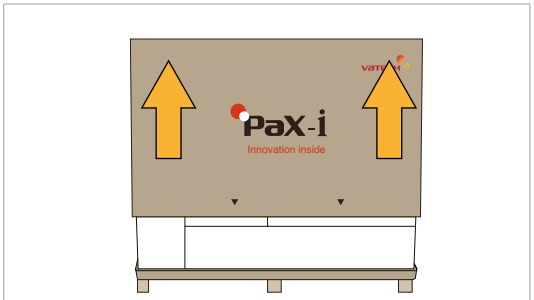


Main box

1. Move the main box to the installation location as close as possible.



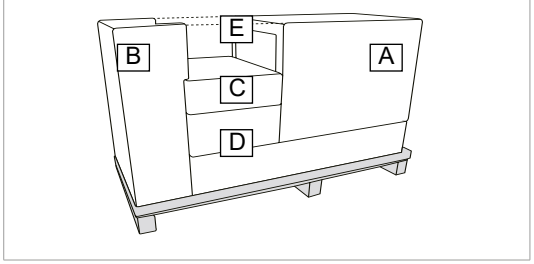
2. Remove the top cover.



3. Remove a single side cover.

NOTICE

In case of unable to lift up the side cover fully, due to ceiling height, cut the box in half using the utility knife instead.



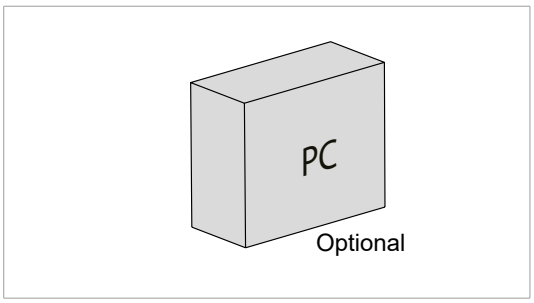
A: EPS

B: EPS

C: Accessory and part box 1

D: Accessory and part box 2

E: PC system (Optional)

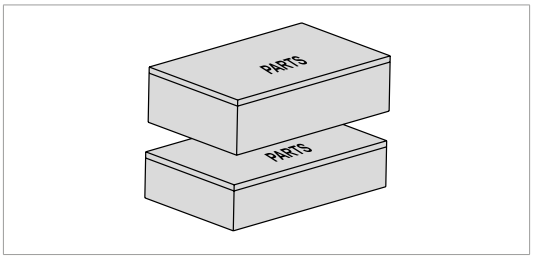


4. Put the PC system (Optional) down on the floor.

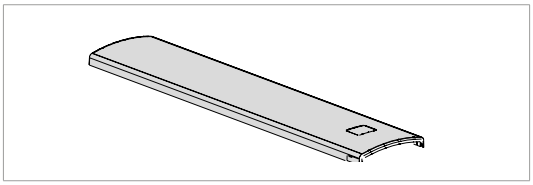
5. Separate two side EPS (A, B). The resulting view is as follows.

IMPORTANT

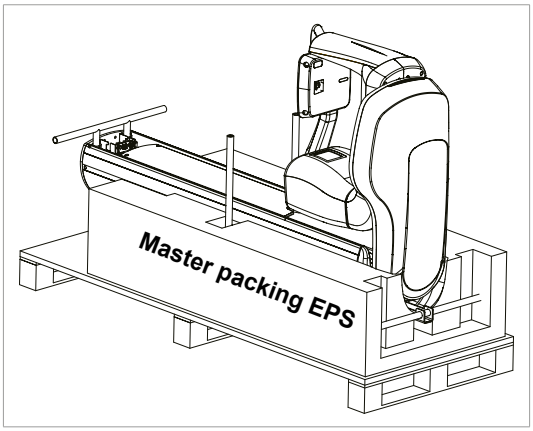
Do not discard these EPS(A, B), so that they are reused later when the CEPH unit is installed.



6. Remove 2 parts boxes (C, D).



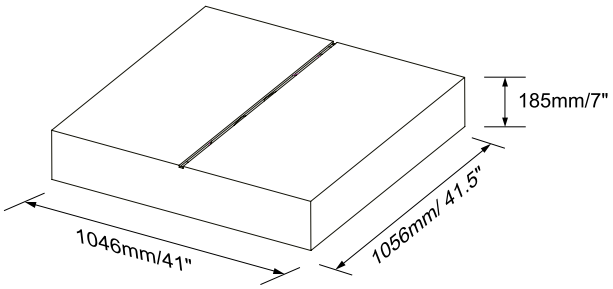
7. Remove the case column front cover.

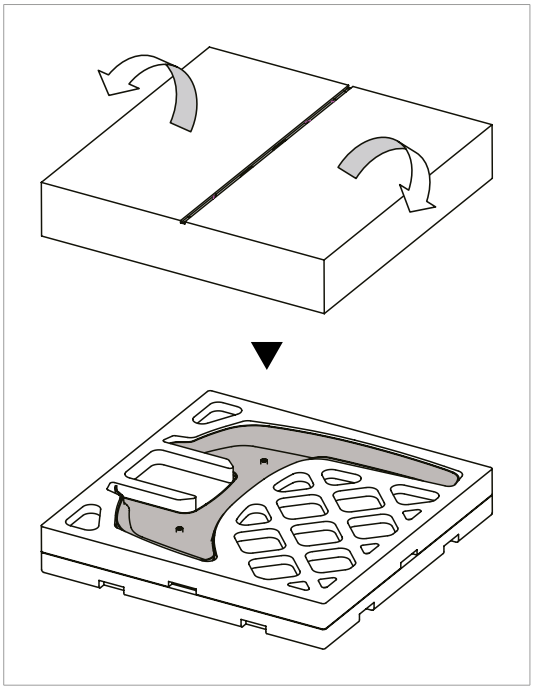


The view after removal of the EPS.

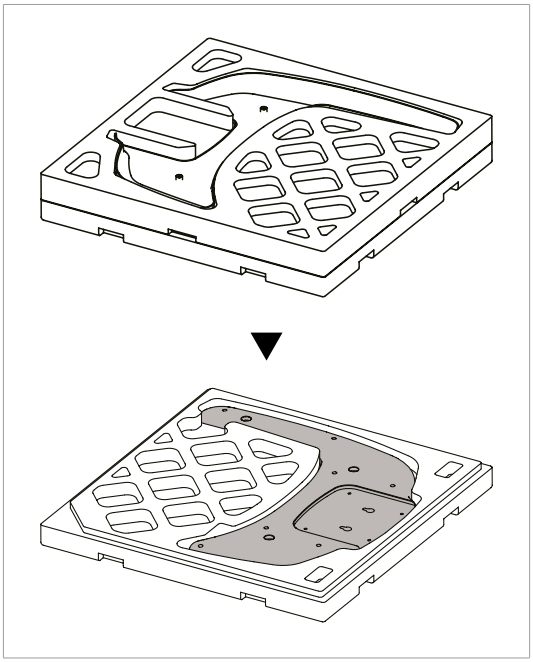
Box No. 2: Base unit

Component	Size(mm/inch)	Weight(kg/lbs)
Base	1046(l) x 1056(w) x 185(h) / 41"(l) x 41.5"(w) x 7"(h)	47/103





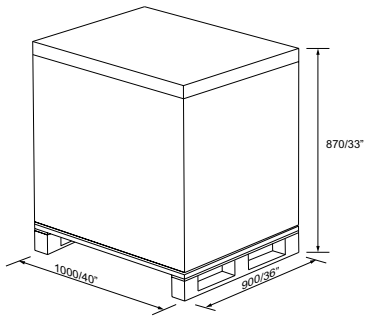
1. Open the box cover, the Base Cover appears



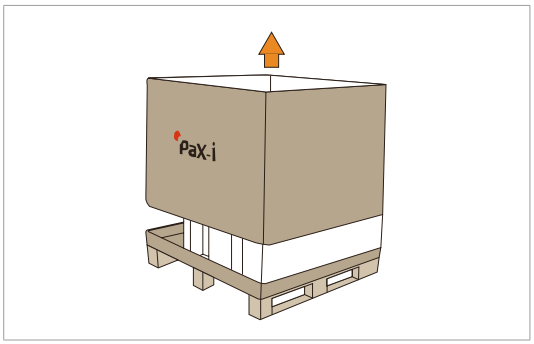
2. Remove the upper box, the Base Unit appears

Box No. 3: Cephalometric unit (Optional)

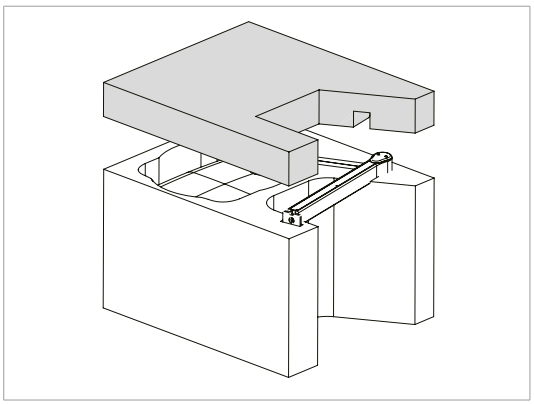
Component	Size(mm/inch)	Weight(kg/lbs)
Cephalometric unit	1000 x 840 x 820 / 40” x 33” x 32”	45/100



Removing the cover



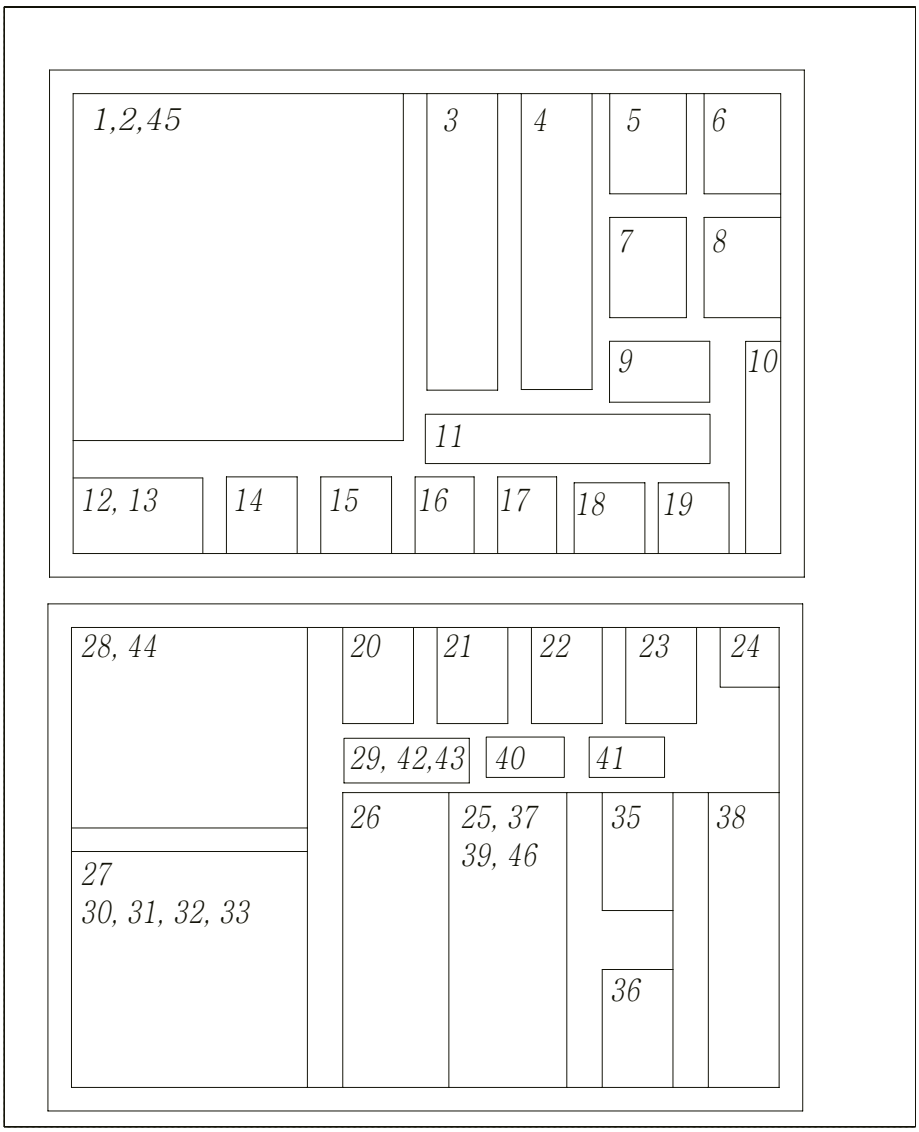
1. Open the box cover, starting with the top cover.



2. Remove the top EPS cover

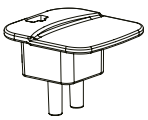
3.4 Checking the Parts

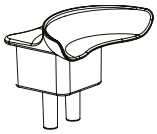
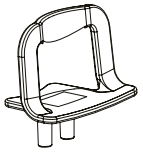
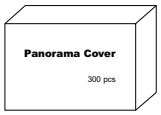
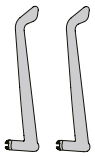
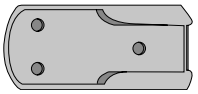
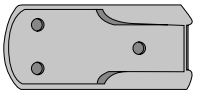
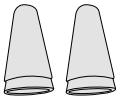
Location layout of the parts and accessories

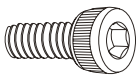
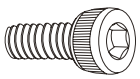
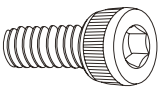


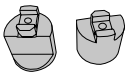
Parts list: In the accessory box

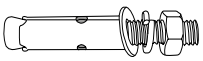
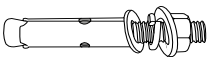
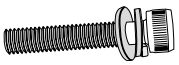
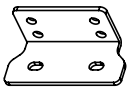
NOTICE **The images may be different from actual products.**

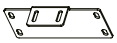
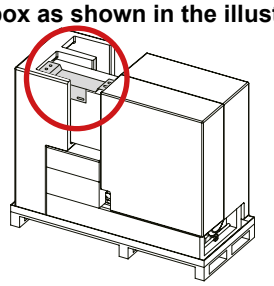
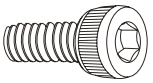
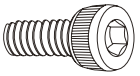
Part No.	Items	Specification	Figure	QTY	Comments	Confirmed (OK?)
1	MANUALS	User		1		Yes ☐ No ☐
		Installation		1		Yes ☐ No ☐
		EzDent-i		1		Yes ☐ No ☐
	Installation USB			1		Yes ☐ No ☐
	REMOTE EXPOSURE SWITCH (Doorbell type)			1	For USA only	Yes ☐ No ☐
	REMOTE EXPOSURE SWITCH CABLE (Doorbell type)			1	For USA only	Yes ☐ No ☐
2	EXPOSURE SWITCH			1 set		Yes ☐ No ☐
3	UP/DOWN SWITCH			1 set	Optional	Yes ☐ No ☐
4	CHIN SUPPORT	NORMAL		1		Yes ☐ No ☐
5	BITE BLOCK			1		Yes ☐ No ☐

Part No.	Items	Specification	Figure	QTY	Comments	Confirmed (OK?)
6			Blank			
7	CHIN SUPPORT	For the edentulous		1		Yes ☐ No ☐
8	CHIN SUPPORT	SINUS, TMJ		1		Yes ☐ No ☐
9	PANO COVER			1		Yes ☐ No ☐
10	CABLE TIE			10		Yes ☐ No ☐
11	TEMPLE SUPPORT	Right and Left		1 set		Yes ☐ No ☐
12	SWITCH HOLDER	Exposure S/W		1	w/sticker and 3 screws	Yes ☐ No ☐
13	Exposure S/W	Up/Down S/W		1	w/sticker	Yes ☐ No ☐
14	EAR ROD CAPS A			4	For CEPH	Yes ☐ No ☐
15	EAR ROD CAPS B			1 set		Yes ☐ No ☐

Part No.	Items	Specification	Figure	QTY	Comments	Confirmed (OK?)
16	SILICON CAPS	White		11	Some extra	Yes ☐ No ☐
17	SILICON CAPS	Gray		10	Some extra	Yes ☐ No ☐
18			Blank			
19	BASE CAP 2			4	Base	Yes ☐ No ☐
	BASE CAP 1			3	Base	Yes ☐ No ☐
20	WRENCH BOLTS	M10 x 20 w/spring washer		4		Yes ☐ No ☐
21		M10 x 30		2	Guiding base	Yes ☐ No ☐
22		M8 x 20		4		Yes ☐ No ☐
		M6 x 15 w/ spring washer		2		
23	TRUSS BOLTS	M5 x 8		3		Yes ☐ No ☐
24		M4 x 8		11		Yes ☐ No ☐

Part No.	Items	Specification	Figure	QTY	Comments	Confirmed (OK?)
25	RS-232 CABLE	10 m/32.8’		1	For LVDS Type Only	Yes ☐ No ☐
	CAT6 DIRECT ETHERNET CABLE	10m/32.8'		1	For Crong Board Type Only	Yes ☐ No ☐
26	LAN CABLE	10 m/32.8’		1	If one-shot CEPH installed	Yes ☐ No ☐
27	FRAME GRABBER BOARD	AnyGrabber board		1	For LVDS Type Only	Yes ☐ No ☐
	GIGABIT ETHERNET BOARD			1	For Crong Board Type Only	Yes ☐ No ☐
28	WARNING SYSTEM			1set	Optional	Yes ☐ No ☐
29	CEPH ARM COVER			1	CEPH	Yes ☐ No ☐
30	PLATE HAND REST CEPH			1	CEPH	Yes ☐ No ☐
	BLOCK ACRYL FIX BOLT			2	CEPH	Yes ☐ No ☐
	KNOBS			2	CEPH	Yes ☐ No ☐
	HANDREST STICKER			1	CEPH	Yes ☐ No ☐
31	Blank					
32	Blank					
33	Blank					
34	SUPPORT ARM SHAFT PIN			1	CEPH	Yes ☐ No ☐

Part No.	Items	Specification	Figure	QTY	Comments	Confirmed (OK?)
35	ANCHOR BOLTS	M8 w/1 flat and spring washers		8	Wall-mount	Yes ☐ No ☐
		M8 w/2 flat and spring washers		8	Wall-mount / Floor	Yes ☐ No ☐
	NUTS	M8		4		Yes ☐ No ☐
	FLAT WASHER	M8		4		Yes ☐ No ☐
	FLAT WASHER	M10		2		Yes ☐ No ☐
	WOOD SCREWS	8 X 60 w/flat and spring washer		4	Wall-mount (wood)	Yes ☐ No ☐
36	BOLTS	M8 x 20 w/ flat and spring washer		6		Yes ☐ No ☐
	NUTS	M8 size		2		
	WOOD SCREWS	12 X 70		2	For the Japanese market only	Yes ☐ No ☐
37	COLUMN BRACKET			1		Yes ☐ No ☐

Part No.	Items	Specification	Figure	QTY	Comments	Confirmed (OK?)	
				1		Yes ☐	No ☐
38	WALL BRACKET	**NOTICE**	**Part No. 38 WALL BRACKET for the USA is located on the PC system box as shown in the illustration.** 				
39	ALIGNMENT PLATE	Template		1	Wall-mount	Yes ☐	No ☐
40	Blank						
41		M8 x 45 M12 x 15		2 1	Wall-mount for leveling equipment	Yes ☐	No ☐
42		M6 x 15		4	Fixing CEPH arm	Yes ☐	No ☐
43	Blank						

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4

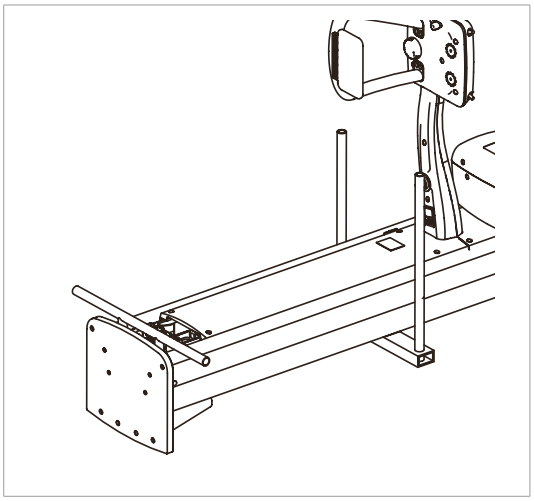
Installing the Equipment: Floor Standing (Optional)

4.1 Assembling the Base and Main Units

NOTICE

If the installation site is a concrete floor, go to section 4.3 Fixing the base (Optional) and do number 1 first, after that turn back 4.1 Assembling the Base and Main Units.

Unloading the main unit

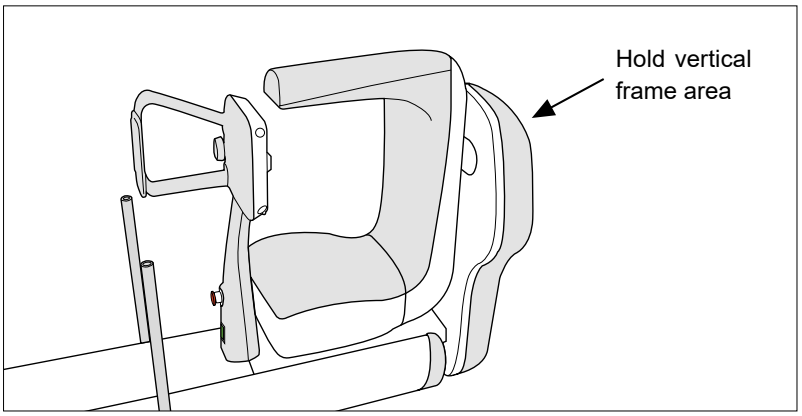


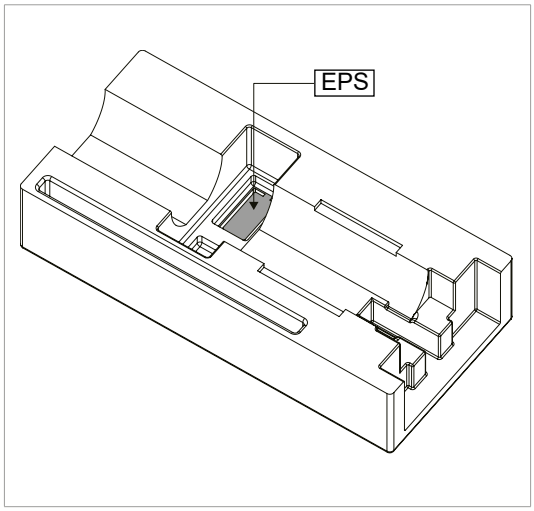
1. First, unload the main unit on the floor.

Place some protective stuff on the floor to avoid the scratches on the surface

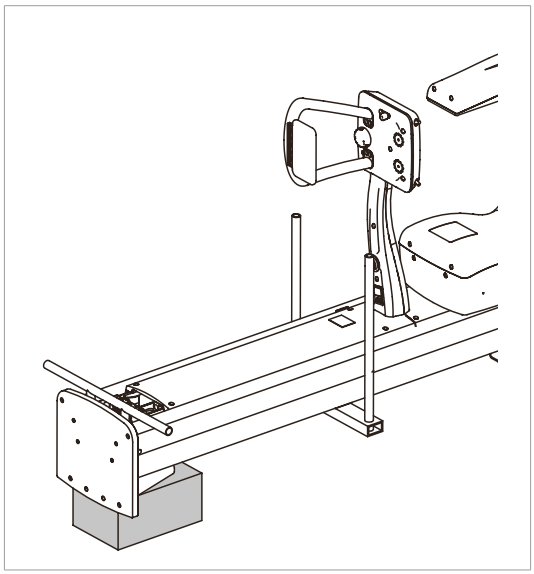
One installer should keep on holding the vertical frame area to keep the equipment stable after it is unloaded.

IMPORTANT

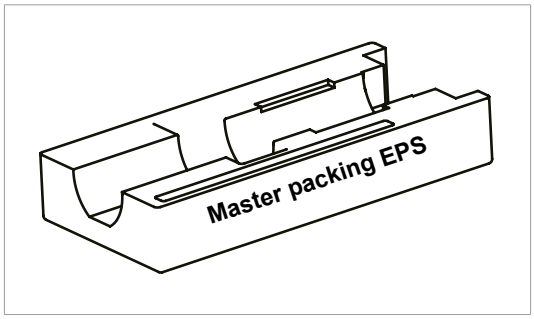




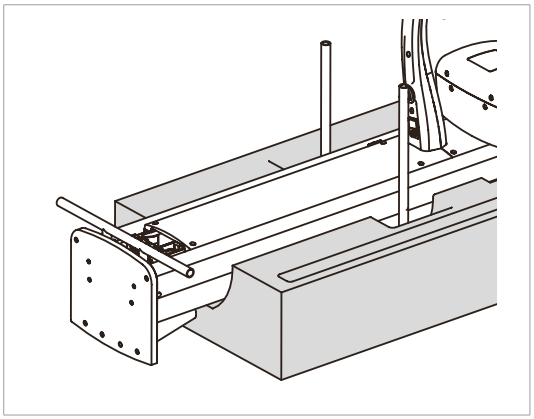
2. Take the EPS piece out from Styrofoam cover and put it down on the floor.



3. Slide the EPS piece under the bottom of the column unit.



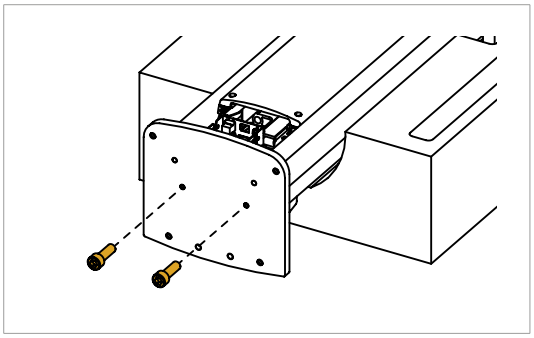
4. Place the master packing EPS on the floor.



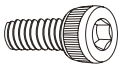
5. Put the main unit back on the master packing EPS and remove the protective plastic cover with a knife. Then put the cables down on the floor carefully.

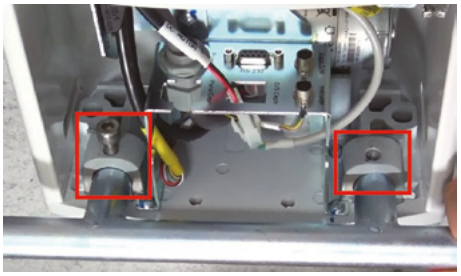
CAUTION

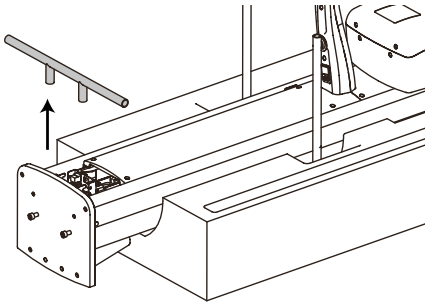
Be careful not to damage the cables and have the column surface scratched.



6. Assemble two wrench bolts as shown in the illustration.

Wrench Bolts		M10 x 30 Part No.21 Qty: 2

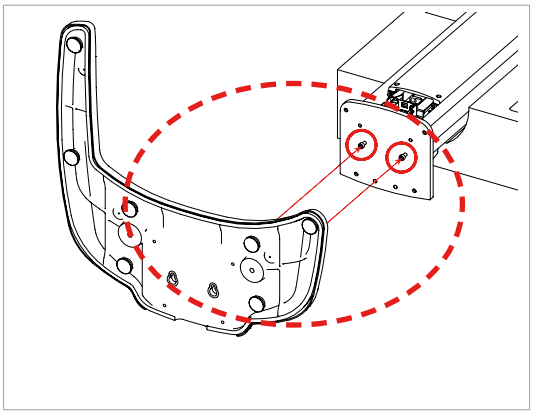




7. Remove the carrying handle at the bottom of the column unit.

Allen wrench		6 mm/0.23"

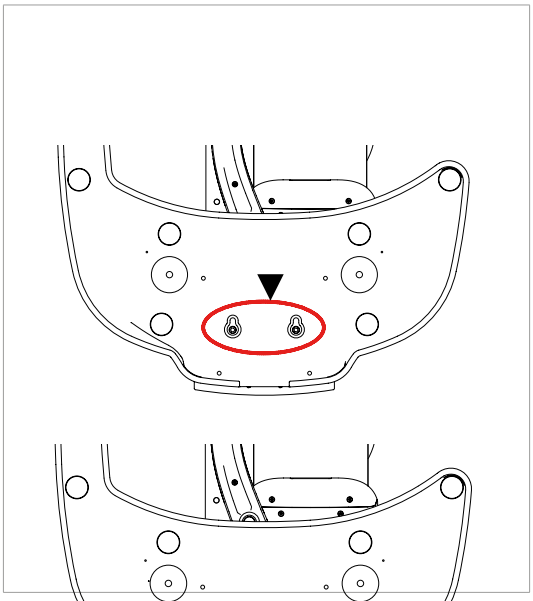
Assembling the base with column units

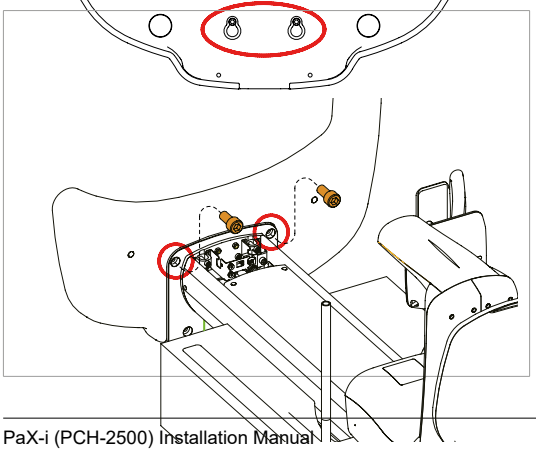


1. Hang the base unit onto 2 bolts temporarily as shown in the illustration.

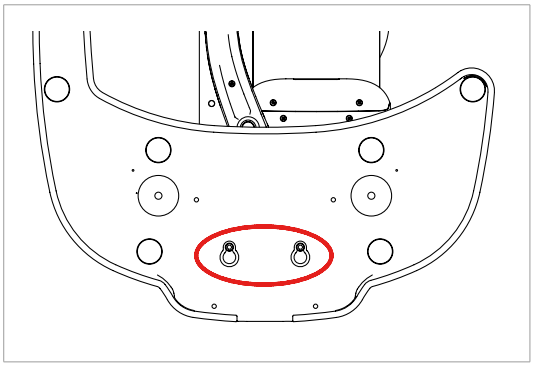
CAUTION

An installer should hold the base unit to keep it from falling down.

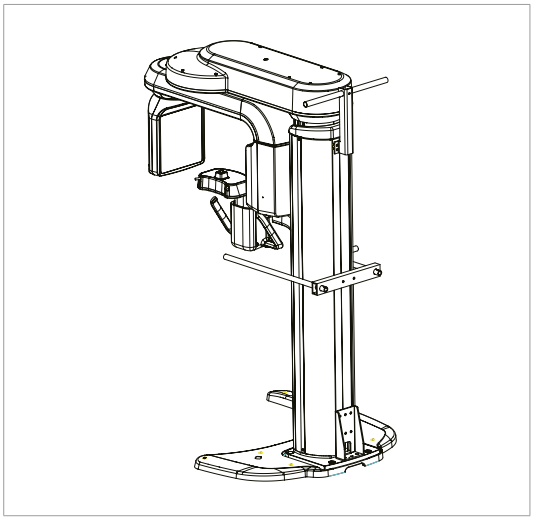




2. Fasten the base unit with two wrench bolts **(Part No.20, M10 x 20)**.



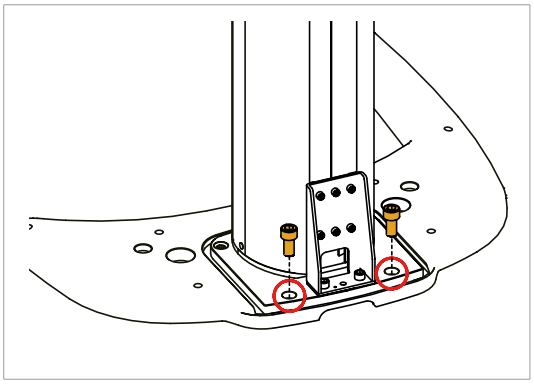
3. Tighten two wrench bolts firmly as shown in the illustration.



4. Erect the equipment in an upright position.

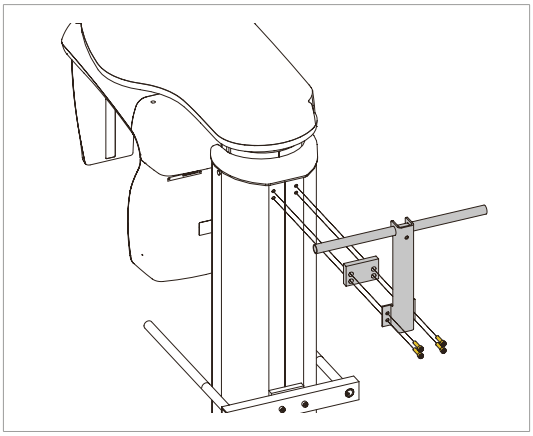
CAUTION

Be careful not to damage the cables. Before erecting the equipment, keep them clear of the equipment



5. Fasten the base unit with two wrench bolts **(Part No.20, M10 x 20).**

Removing the Transportation Handle (Without the CEPH unit)



1. Remove the upper carrying handles.

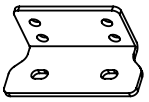
Allen wrench	6 mm/0.23"	

CAUTION

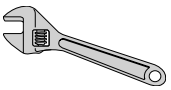
One installer should hold the handle, while the other is removing the bolts

4.2 Installing the Wall and Column Brackets

1. Prepare the column bracket.

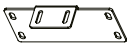
COLUMN BRACKET	Part No.37	

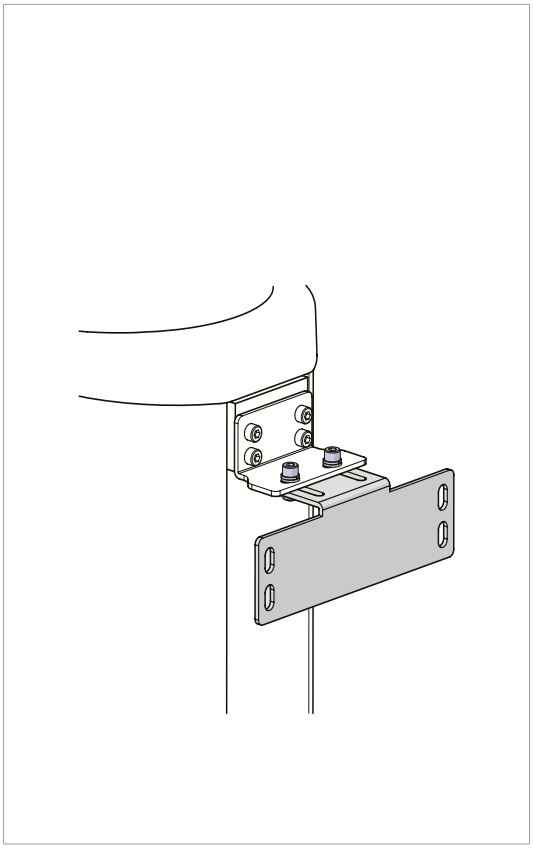
2. Attach the above bracket to the back of the column with the 4 bolts.

WRENCH BOLTS	M8 x 20 w/spring and flat washers Part No.36 4 PCS	
Allen wrench	6 mm/0.24”	
Monkeywrench		

Combining column and wall brackets

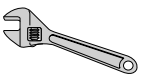
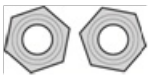
1. Prepare the wall bracket.

WALL BRACKET	Part No.38	



Marking 4 points on the wall

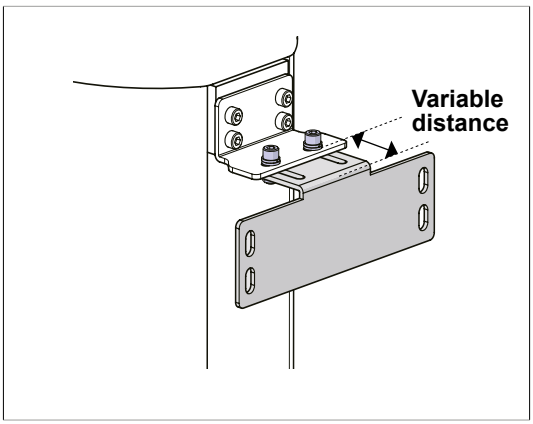
2. Combine the column and wall brackets in the following manner with the 2 wrench bolts.

Allen wrench	6 mm/0.24”	
Monkeywrench		
WRENCH BOLTS	M8 x 20 w/ spring and flat washers Part No.36 2 PCS	
NUTS	Part No.36 2 PCS	

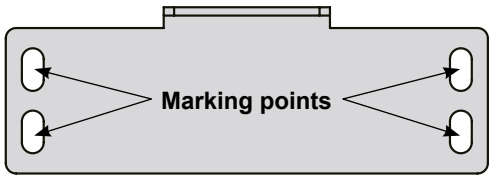
CAUTION

Do not tighten the bolts fully yet.

1. Move the equipment to the installation site as close as possible



2. Adjust the distance between the wall and equipment by moving it slightly, so that the wall bracket touches the wall.

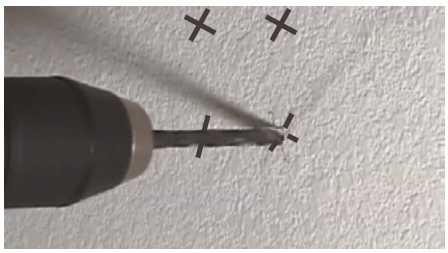


On the wall

Drilling on the wall

3. Mark 4 anchor bolts locations on the wall.

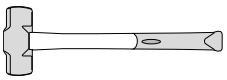
Marker	



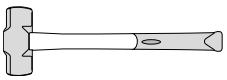
1. Drill the wall holes of size 10.5 mm x 30 mm (depth) using the concrete hammer drill.

2. Remove the debris and clean the holes using the dust pump.

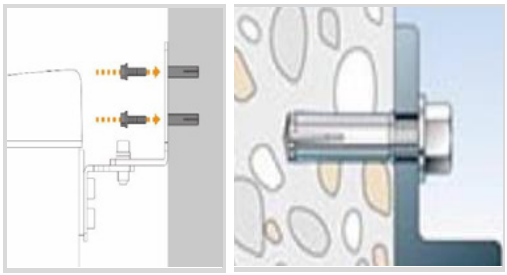
3. Using the hammer, insert a Ficher strong anchor into the hole.

Ficher strong anchor	M8 x 30	
Hammer		

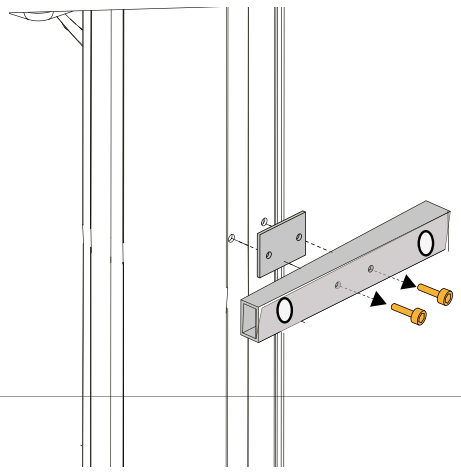
4. Using the hammer, insert a EHS tool into the inner bolt.

EHS tool	EAW H 8x30	
Hammer		

Combining the equipment with the anchor bolts



On the wall



1. Place the equipment on the alignment plate, while observing 4 Hex bolts are being inserted properly through each hole.

Installers required	3

Hex Bolt	M8 x 15	
Spring washer	M8	
Flat washer	M8	
Torque wrench	Spanner type	

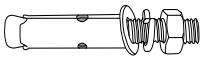
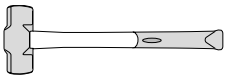
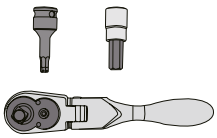
2. Remove the handle in the middle.

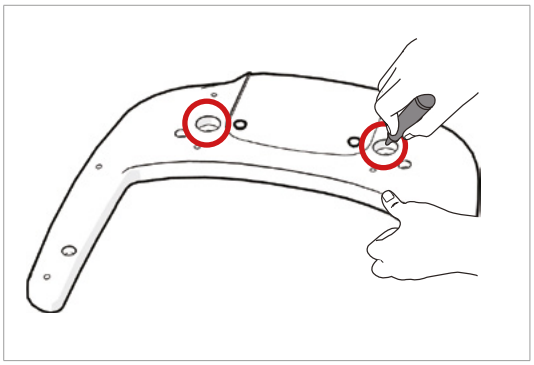
IMPORTANT

If the CEPH unit is to be installed, this is used as the carrying handle. Do not detach it until indicated later after the equipment is moved to the installation site

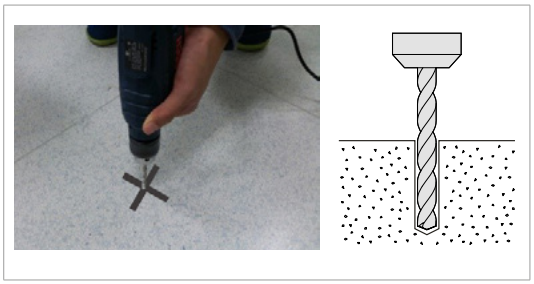
4.3 Fixing the base (Optional)

Concrete floor

Anchor Bolts	M8 Size Part No.35 2PCS	
Hammer Drill	L=200mm7.9	
Hammer		
Ratchet Wrench		

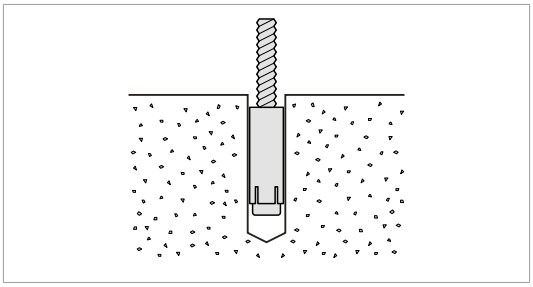


1. Before installing the equipment, place the base unit on the installation site and mark 2 locations on the floor.

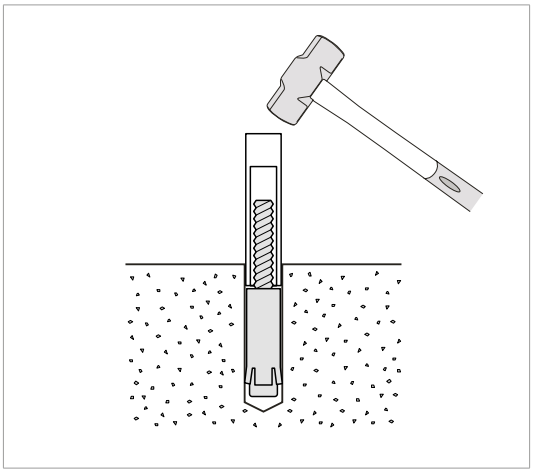


2. Drill the floor holes of size 12mm x 30mm (depth) using the concrete hammer drill.

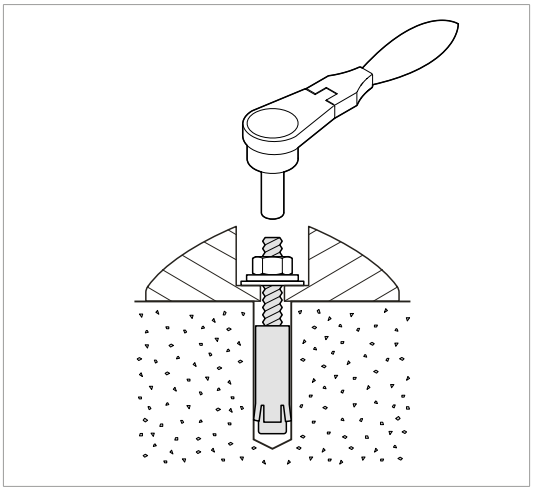
3. Remove the debris and clean the holes using the dust pump.



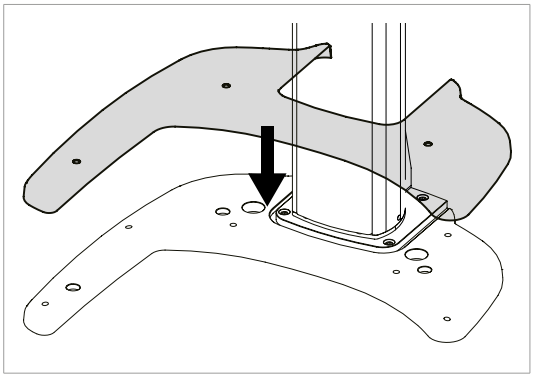
4. Remove nuts and washers, put the anchor bolts into the holes.



5. Secure the anchor bolts with the hammer.

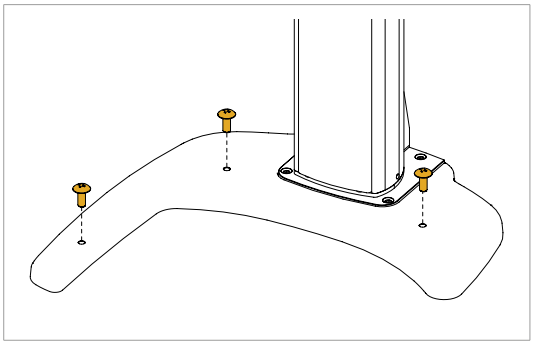


6. Place the base unit combined equipment in the proper position, lock the nuts and washers using ratchet wrench.

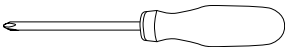


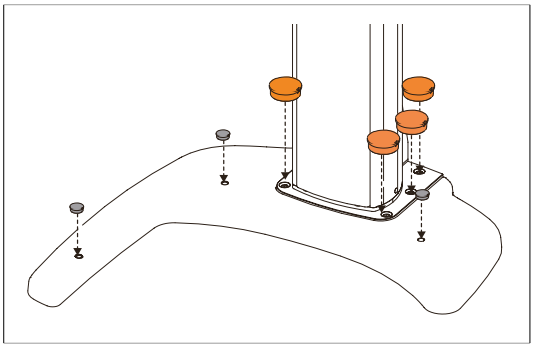
7. Assemble the base cover.

Base cover	



8. Fix the base cover with 3 truss bolts.

Truss bolts	M5 x 8 Part No.23 3PCS	
Philips screwdriver with magnetic tip		

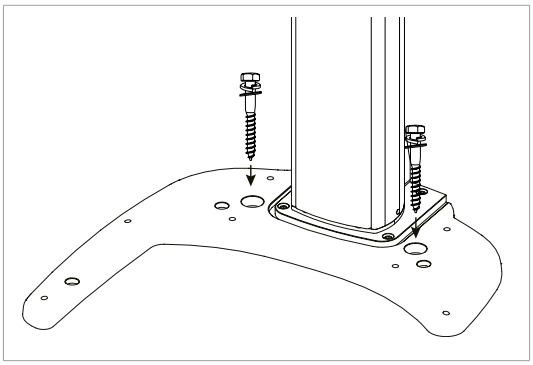


9. Cover the holes. (Cap1: 3, Cap2: 6)

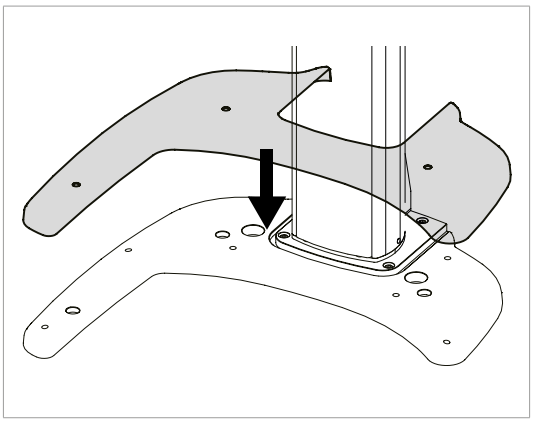
Base Caps 1, 2	Part No.19	
Silicon Caps (White)	Part No.16	

Wooden floor

Wood screws	M12 x 70 2PCS	
Hammer drill	L=200mm7.9	

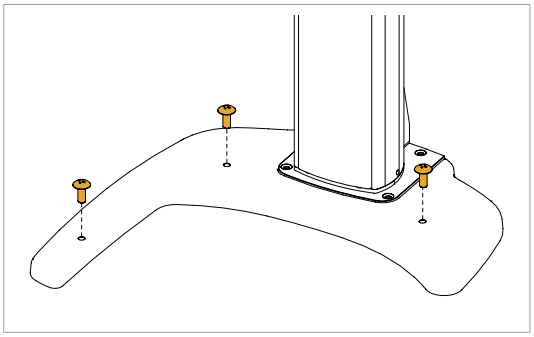


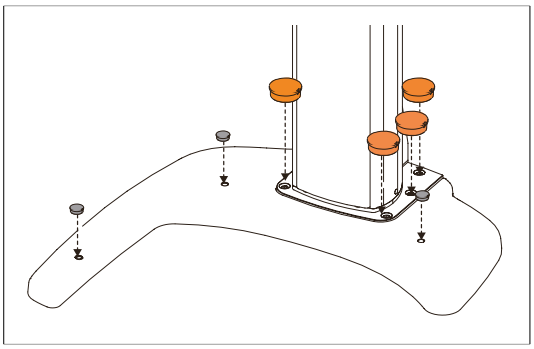
1. Secure the base unit using the wood screws.



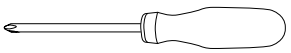
2. Assemble the base cover.

Base cover	





3. Fix the base cover with 3 truss bolts.

Truss bolts	M5 x 8 Part No.23 3PCS	
Philips screwdriver with magnetic tip		

4. Cover the holes. (Cap1: 3, Cap2: 6)

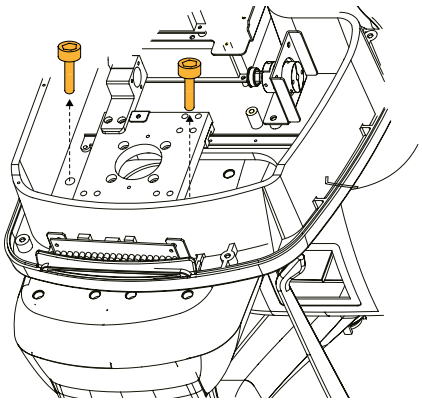
Base Caps 1, 2	Part No.19	
Silicon Caps (White)	Part No.16	

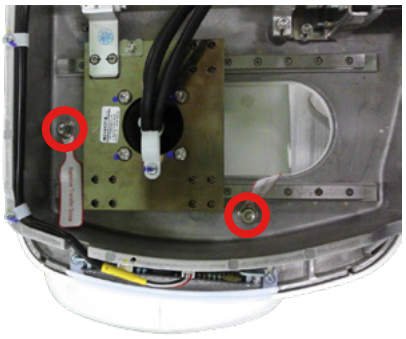
4.4 Removing the Transportation Safety Bolts

1. Remove the semi-clear tape on both sides and open the top cover.

NOTICE

Be careful not to scratch the cover.





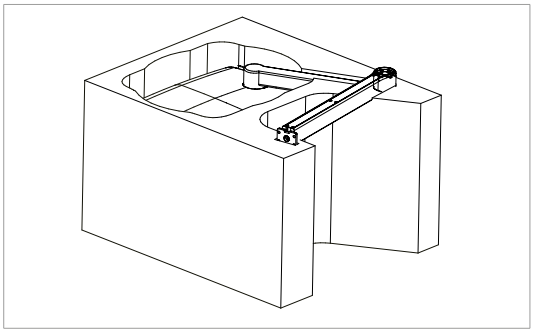
2. Remove the two safety bolts and the tags as shown in the figure.

Allen wrench	6 mm/0.23”	

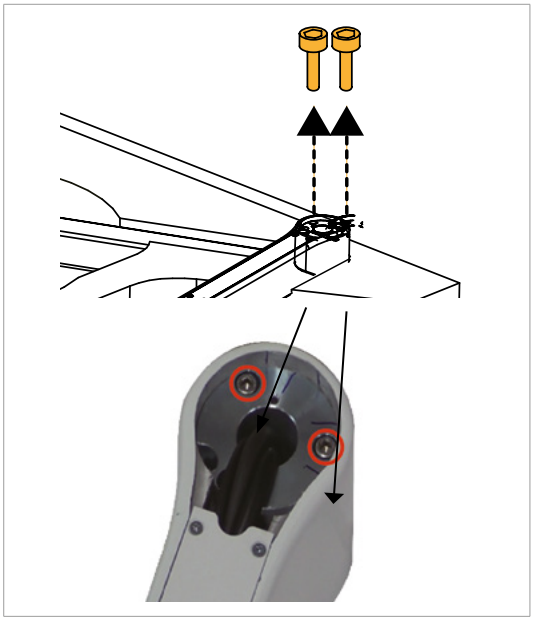
4.5 Installing the Cephalometric Unit (Optional)

⚠WARNING **Never hold the areas of the collimator, sensor and tube head.**

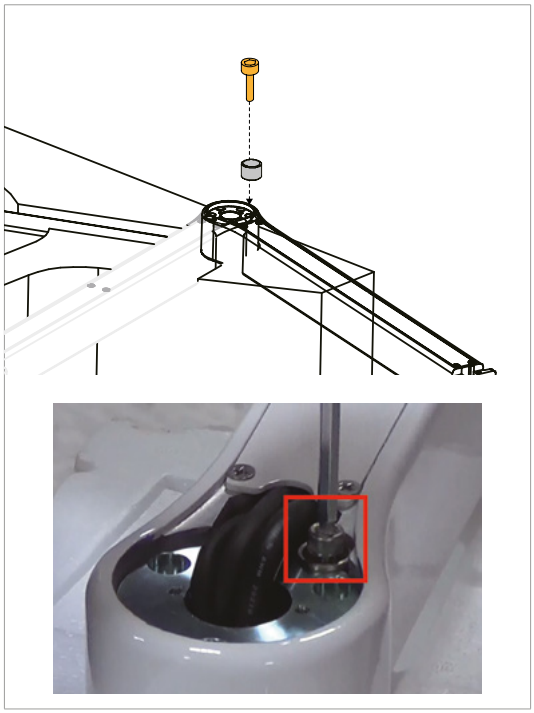
Preparing the Cephalometric unit



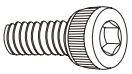
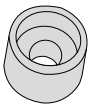
1. Now it is assumed that the 2nd box has already been opened

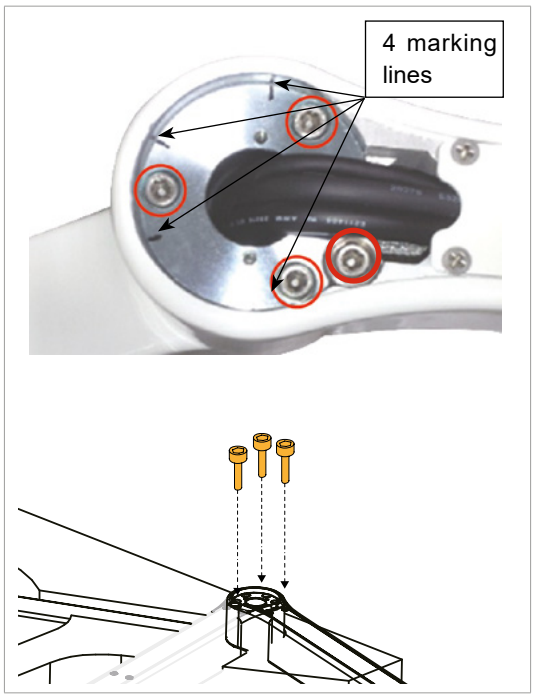


2. Remove 2 bolts from the Cephalometric arm's joint

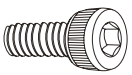


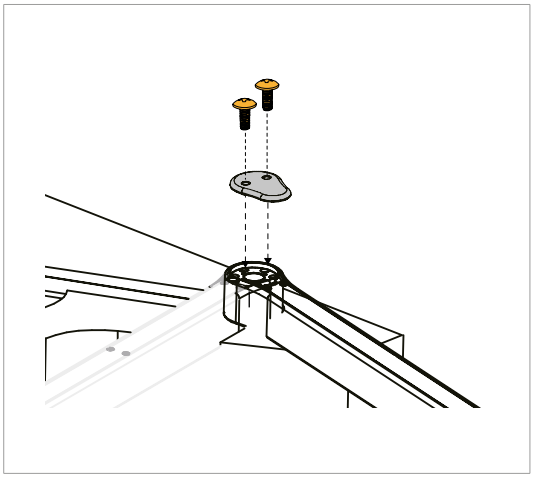
3. Stretch the arm and insert the support pin(Part No.34). Then secure them loosely with the wrench bolt(M6 x 15, Part No.42).

Wrench bolts	M6 x 15: Qty: 1 Part No.42	
Support Arm pin	Part No.34	
Tool	5 mm/0.23”	

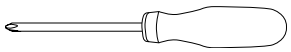


4. After inserting the other 3 bolts(M6 x 15, Part No.42) into the holes, align 4 marking lines and tighten 4 bolts firmly (red circle)

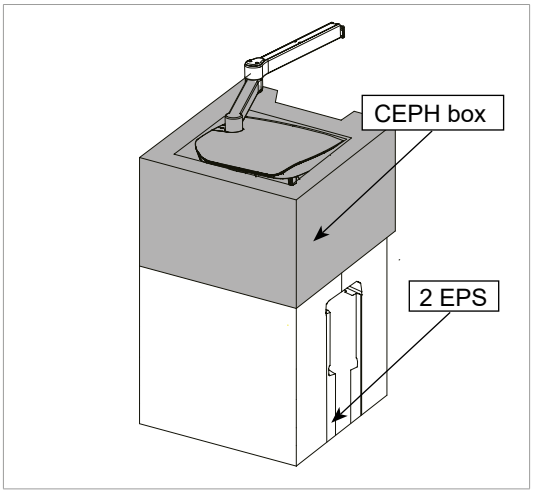
Wrench bolts	M6 x 15: Part No.42 Qty: 3	
Tool	5 mm/0.23”	



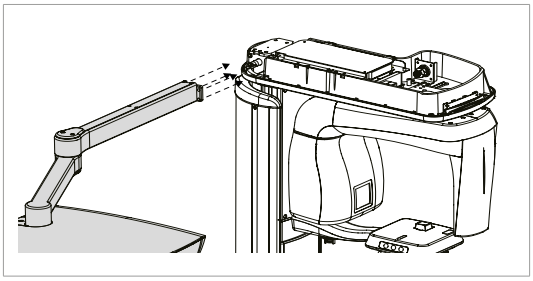
5. Fix the CEPH arm cover **(Part No. 29)** using 2 truss bolts **(Part No. 24)**.

Truss bolts	M4 x 8 Part No.24 Qty: 2	
CEPH arm cover	Part No.29	
Philips screwdriver w/ magnetic tip		

Mounting the Cephalometric unit



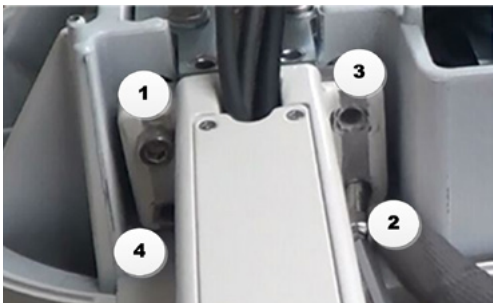
1. Stack the CEPH unit on the 2 EPS, as shown in the left figure. Note that these EPS are from step 5 in section 3.3



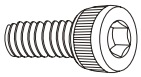
2. Mount the CEPH unit on the main unit carefully.

NOTICE

If the height of the column unit and the CEPH arm is different, adjust the difference by moving the column unit up or down using the UP/DOWN button.



3. Secure them loosely using 4 wrench bolts (Part No.22). Do not tighten them fully yet.

Wrench bolts	M8 x 20 Part No.22 Qty: 4	
Allen wrench	6 mm/0.24”	

CAUTION

Be careful not to scratch the surface while tightening the bolts.

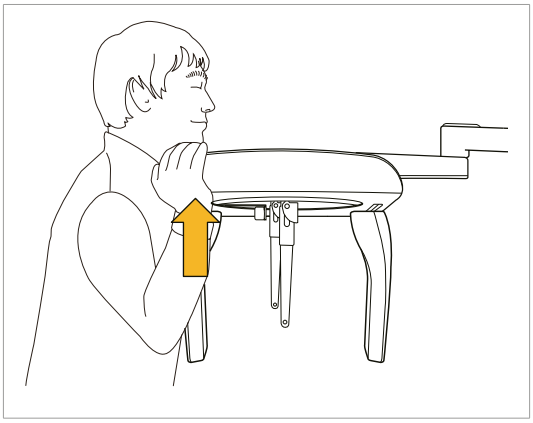
If necessary, one installer should try to level the CEPH unit with the column unit to facilitate screwing them.

4. Remove the EPS, starting with the lower one.

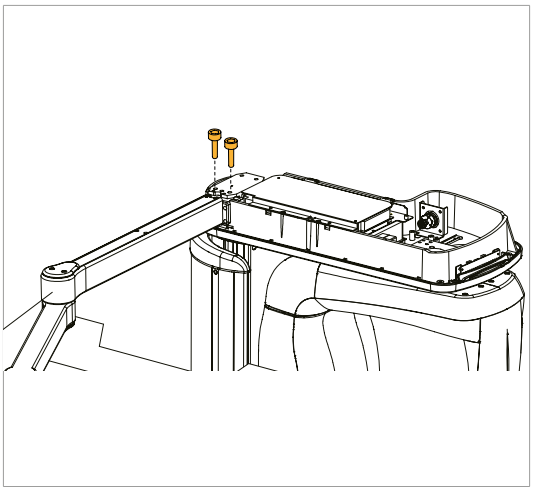
NOTICE

Raise the column up a little bit with the UP/ DOWN switch to make it easy to remove EPS

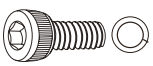
5. If the equipment turned ON, now turn it OFF.



6. Tighten 4 bolts firmly, while the other installer is pushing the CEPH unit up as hard as possible.



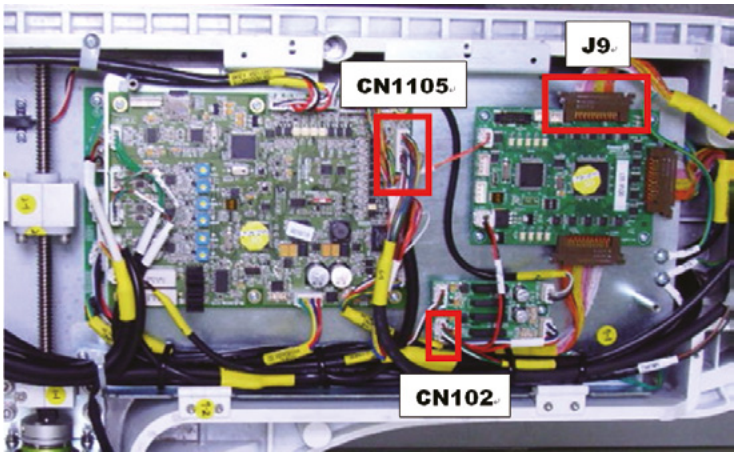
7. Tighten 2 wrench bolts (Part No.22) firmly at the following location. One installer should keep on lifting the CEPH unit up slightly.

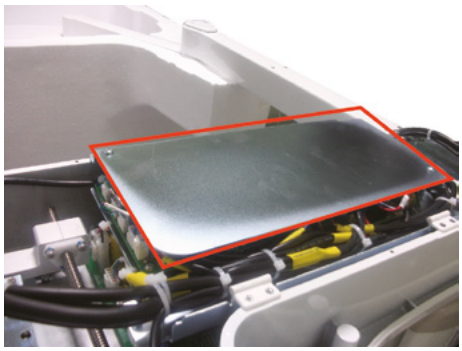
Wrench bolts	M6 x 15 w/ spring washer Part No.22 Qty: 2	
Allen wrench	5mm	

Cabling between the Cephalometric and main units

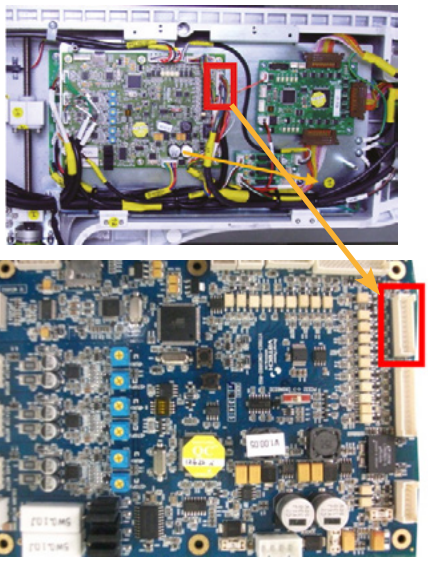
A. LVDS cable in use

Scan type:

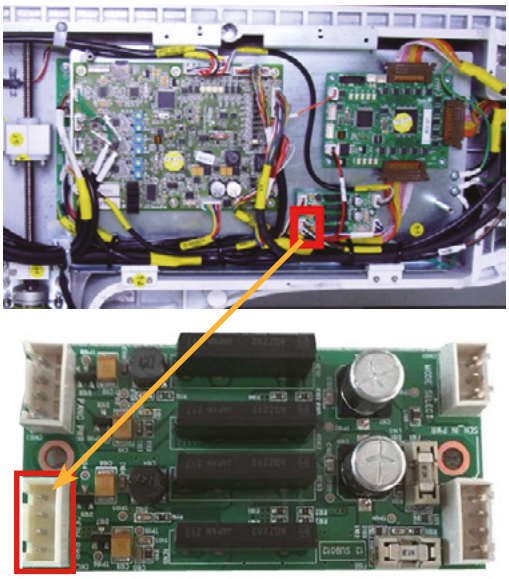




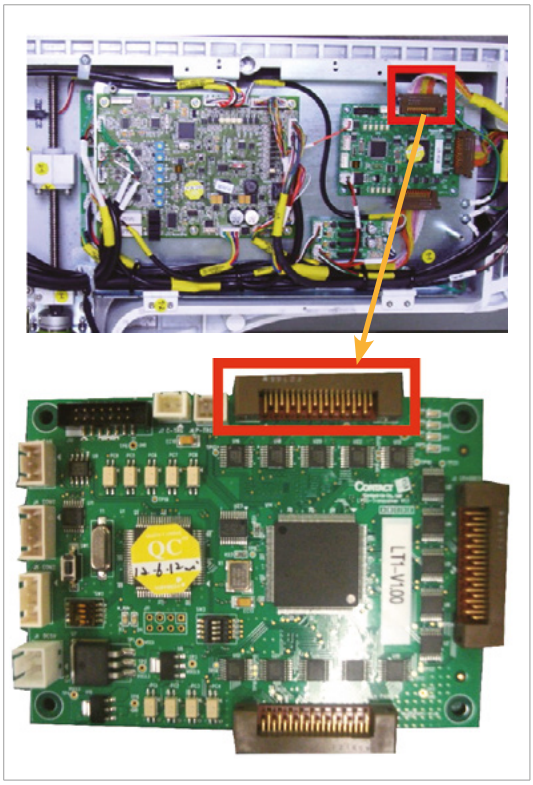
1. Remove the 4 screws to separate the top cover.



2. Connect the cable **H000921A(CN1105)** from the Cephalometric unit with the connector **CN1105** on the main CPU board



3. Connect the cable **H000924A** from the CEPH unit with the Connector **CN102** on the relay board.



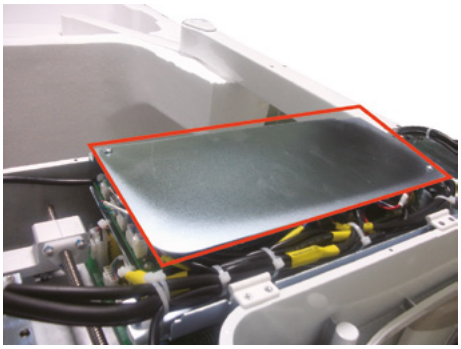
4. Connect the cable **H000047A** from the CEPH unit with the connector **J9** on the LTI board

5. Connect the ground cable (FG) to the frame.

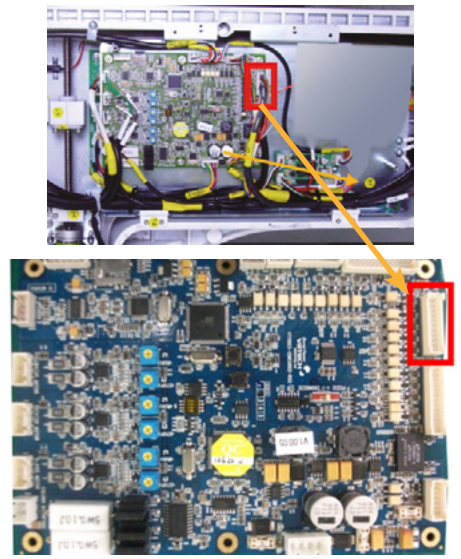
6. Arrange the cables and tie them with the cable tie (Part No.10)

7. Put the top cover back.

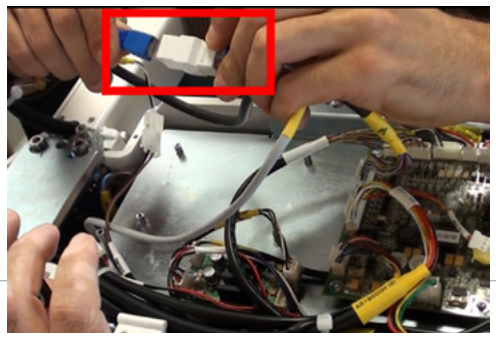
OS(one-shot) type:Optional



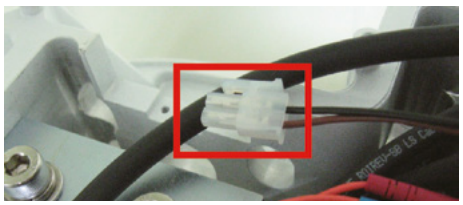
1. Remove the 4 screws to separate the top cover.



2. Connect the cable **H000921A(CN1105)** from the Cephalometric unit with the connector **CN1105** on the main CPU board



3. Connect the LAN cables.



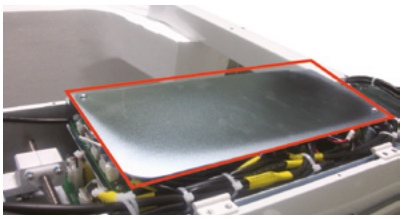
4. Connect the OS power cable H000927A with the cable from the connector CN3 on the power board.

5. Arrange the cables and tie them with the cable tie(Part No.10)

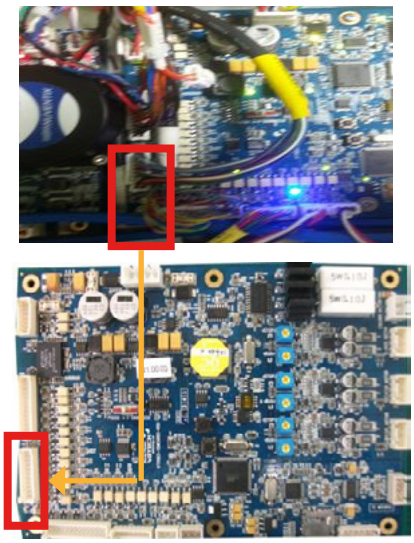
6. Put the top cover back.

B. The LAN cable in use: Crong board

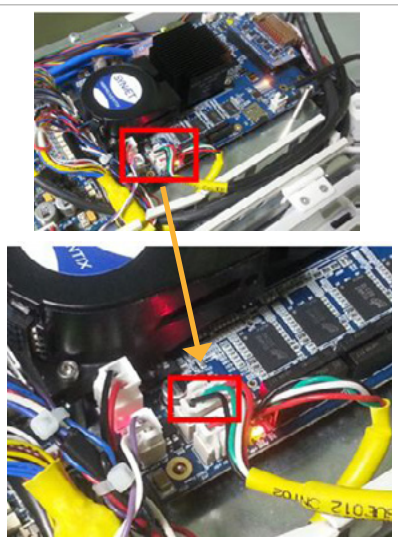
Scan type



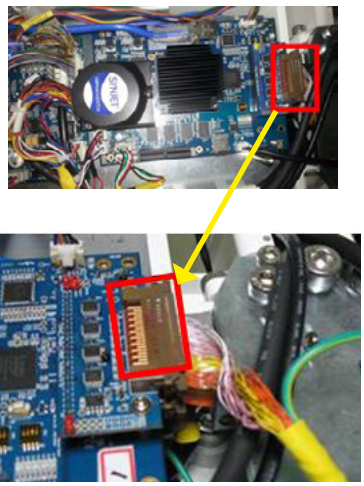
1. Remove the 4 screws to separate the top cover.



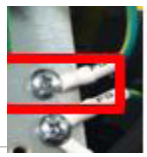
2. Connect the cable **H000921A(CN1105)** from the Cephalometric unit with the connector **CN1105** on the main CPU board.



3. Connect the cable **H000924A** from the CEPH unit with the Connector **CN102** on the **Crong board**.



4. Connect the cable **H000047A** from the CEPH unit with the connector **J9** on the PANO/ CEPH board.

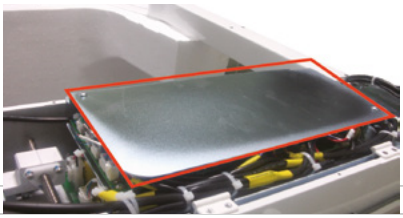


5. Connect the ground cable (FG) to the frame.

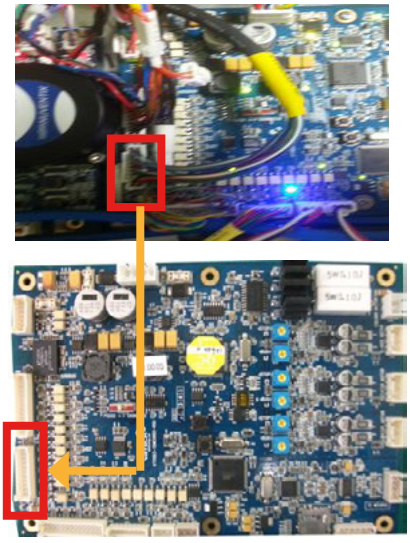
6. Arrange the cables and tie them with the cable tie(Part No.10)

7. Put the top cover back.

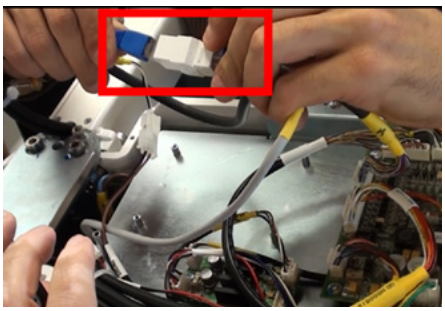
OS(one-shot) type:Optional



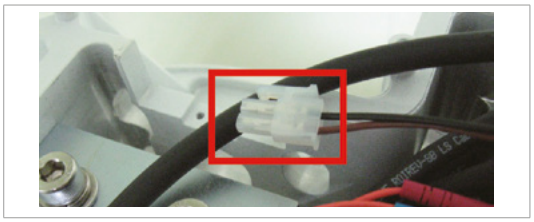
1. Remove 4 screws and separate the top cover.



2. Connect the cable **H000921A(CN1105)** from the Cephalometric unit with the connector **CN1105** on the main CPU board.



3. Connect the LAN cables.



4. Connect the OS power cable **H000927A** with the cable from the connector **CN3** on the power board.

5. Arrange the cables and tie them with the cable tie(Part No.10)

6. Put the top cover back.

Removing the carrying handle (When the CEPH unit is installed)

1. Move the equipment to the installation site near the wall.

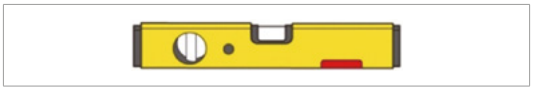
CAUTION

Two installers should hold the carrying handle firmly while moving the equipment.

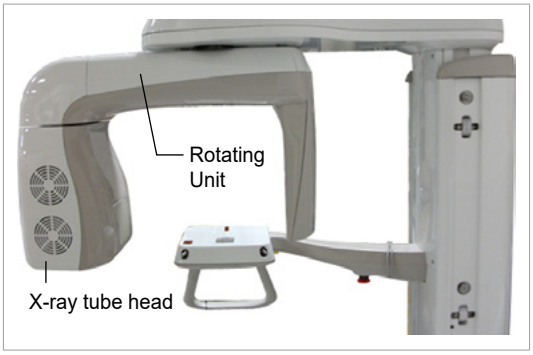
2. Remove the carrying handle in the middle.
3. Remove the plastic film.

4.6 Leveling the Equipment

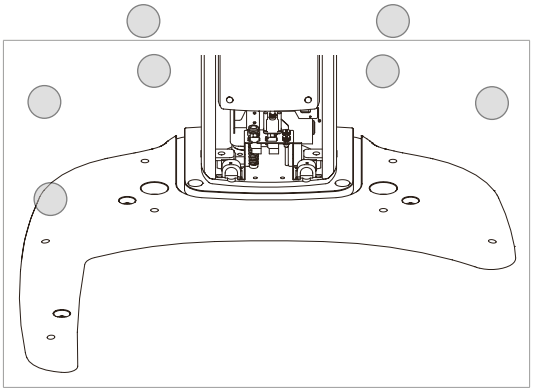
IMPORTANT	**Ensure to remove all plastic film before leveling the equipment.**
IMPORTANT	**Ensure that the spirit level should rest only on the locations indicated in the following figures to obtain the accurate center.**



1. Prepare the spirit level.



2. Turn the Rotating Unit manually until the X-ray tube head points forward as shown in the figure.

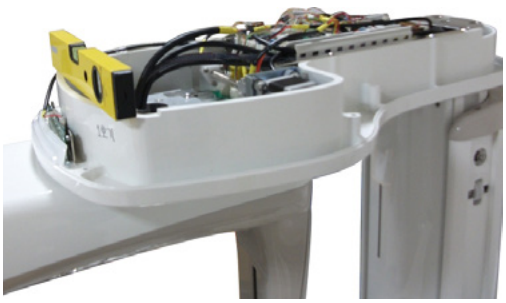


3. Turn the Level Foot on the Base Unit clockwise with the wrench until the equipment touches the ground as shown in the illustration.

Allen wrench	

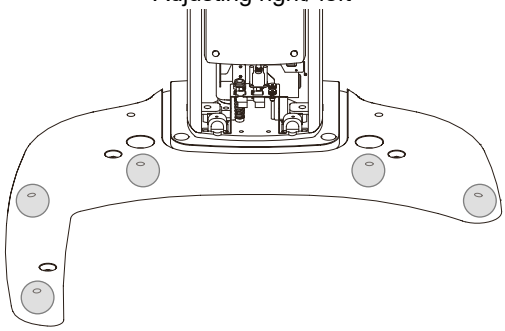
Leveling right and left of the equipment

Side view



4. Place the spirit level on the front of the Vertical Frame as shown in the illustration.

Adjusting right/ left

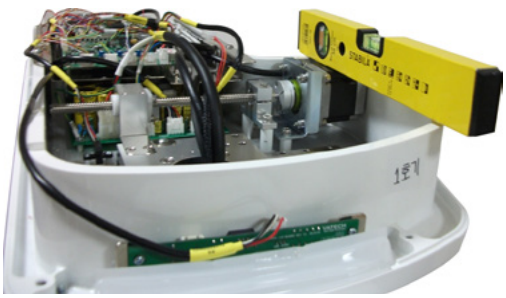


Front view

5. While checking the bubble on the spirit level, align the right/left level by adjusting the Level Foot as shown in the illustration.

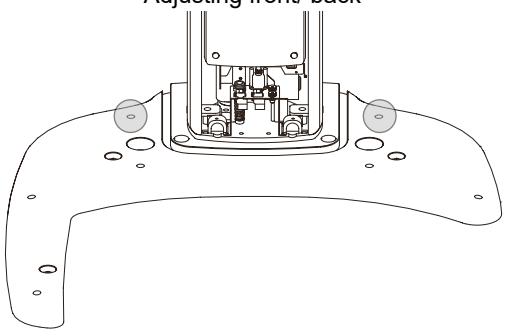
Leveling the front and back of the equipment

Front view

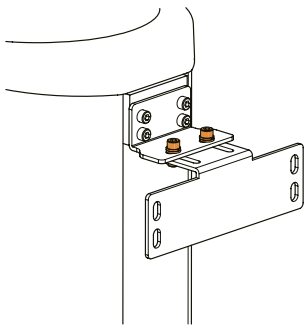


6. Place the spirit level on the side of the Vertical Frame as shown in the illustration.

Adjusting front/ back



7. While checking the bubble on the spirit level, align the front/back level by adjusting the Level Foot as shown in the illustration.



8. When the leveling is completed, tighten the two nuts at the joint of two brackets.

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5

Installing the Equipment: Wall-mount

5.1 Installing the Equipment

You are advised to plan and study the installation environment carefully in advance before proceeding since the installation involves drilling the wall and floor. Preinstallation planning is crucial to a successful installation.

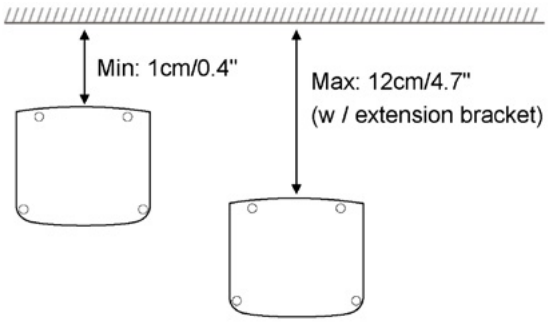
Accurate marking is of critical importance for a successful installation.

Two options are available depend on the customer's preference and the situation of the installation site.

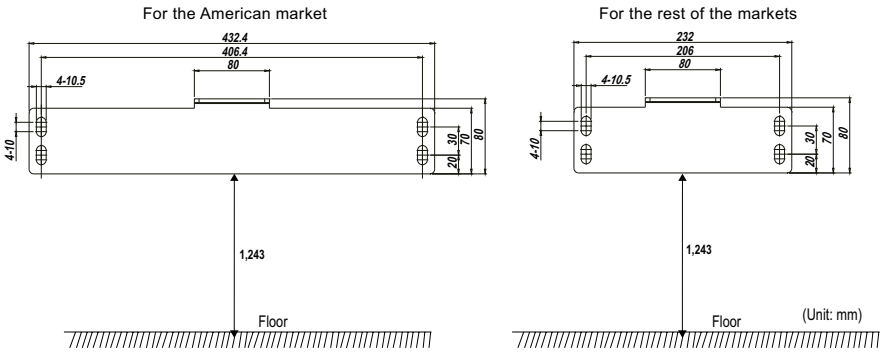
1. Marking in advance using the template provided

The distance between the wall and the template:

IMPORTANT



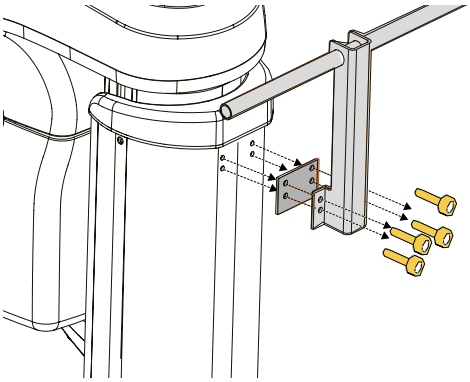
Height from the ground:



2. Marking after the equipment is moved to the wall, with two brackets combined (this method is explained in the manual).

5.2 Installing the Bracket and Combining the Equipment

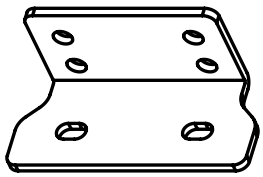
Installing the Column Bracket on the Back of the Equipment



1. Separate the carrying handle on the top.

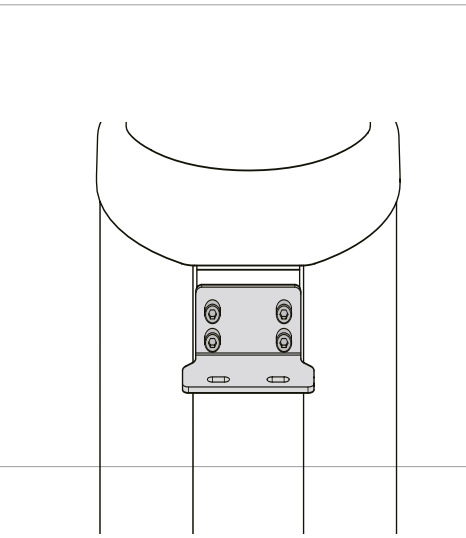
CAUTION

One installer should hold the front, while the other is separating the handle.

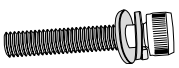


Part No.37

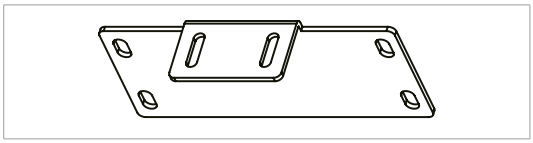
2. Prepare the column bracket(Part No.37).

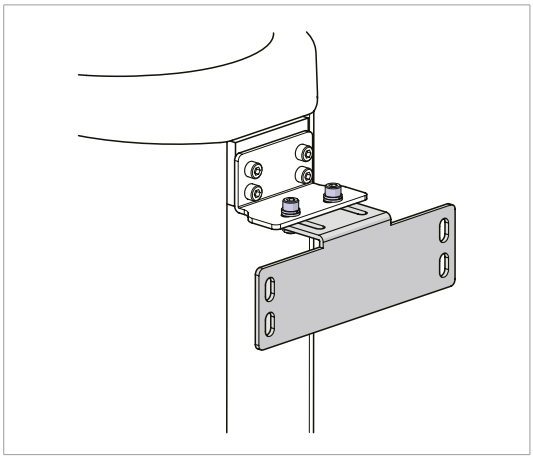


3. Attach the above bracket to the back of the column unit with the 4 bolts(Part No.36).

Wrench bolts w/2 SEMS	M8 x 20 Part No.36 Qty:4	

Combining column and wall brackets





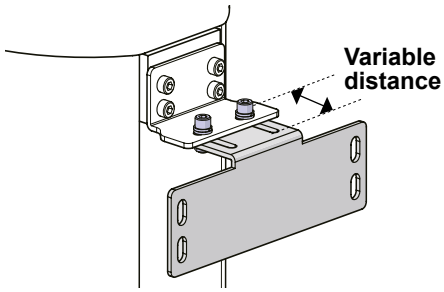
1. Prepare the wall bracket(Part No.38).

2. Combine the column and wall brackets in the following manner with the 2 wrench bolts(Part No.36)

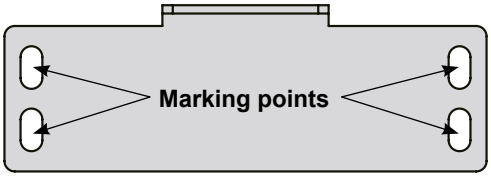
IMPORTANT

Do not tighten the bolts yet.

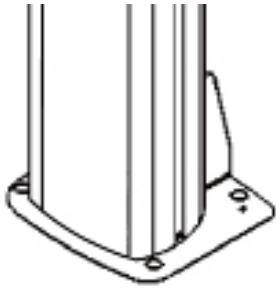
Marking 4 locations on the floor and 4 on the wall



1. Move the equipment to the installation site as close as possible.
2. Adjust the distance between the wall and equipment by moving it slightly, so that the wall bracket touches the wall.

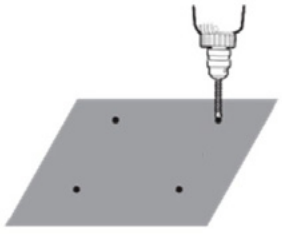


On the wall: 4 locations (right and left)



On the floor: 2 locations (rear)

3. Mark 4 anchor bolts locations on the wall and 2 (rear only) on the concrete floor.



On the floor: 2 locations (front)

4. Move the equipment aside to mark the other 2 locations on the floor(front).

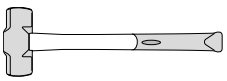
⚠ CAUTION

Move the equipment aside a little farther from the installer to make enough space to drill the floor.

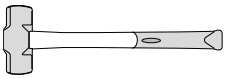
Drilling 8 locations on the floor and wall

1. Put the alignment plate (Part No.39) aside from the ground.
2. Drill the ground and wall holes of size 10 mm x 30 mm (depth) using the concrete hammer drill.

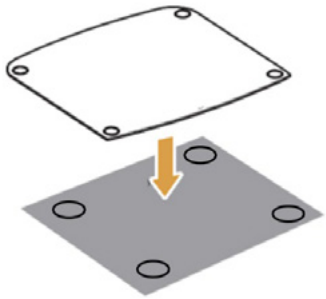
3. Remove the debris and clean the holes using the dust pump.
4. Using the hammer, insert a Ficher strong anchor into the hole.

Ficher strong anchor	M8 x 30	
Hammer		

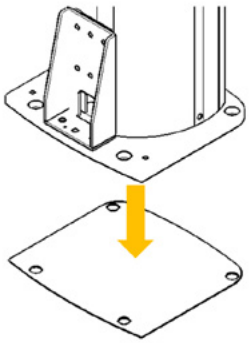
5. Using the hammer, insert an EHS tool into the inner bolt.

EHS tool	EAW H 8x30	
Hammer		

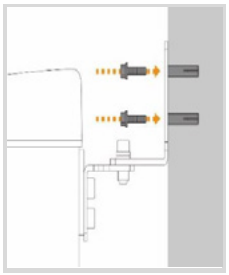
Combining the equipment with the anchor bolts



1. Place the alignment plate through 4 anchor bolts.



On the floor



On the wall

2. Place the equipment on the alignment plate, while observing 4 Hex bolts are being inserted properly through each hole.

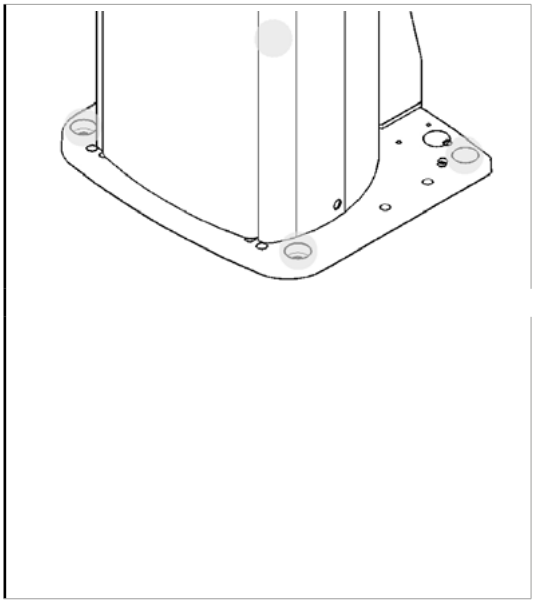
Installers required	3

Hex Bolt	M8 x 15	
Spring washer	M8	
Flat washer	M8	
Torque wrench	Spanner type	

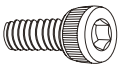
Securing the equipment (8 locations)

IMPORTANT

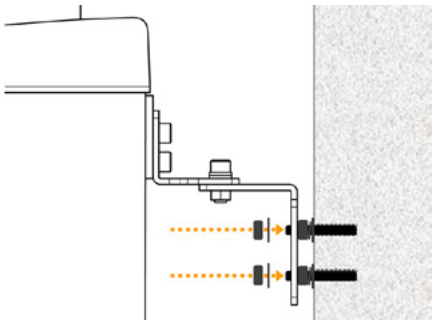
During the following procedures (1-3), do not tighten the nuts completely until you are asked to do so later when leveling the equipment



1. Put the washers and nuts into the six anchored bolts on the floor and tighten the nuts loosely. Make sure that you put the fasteners in the sequence as shown in the figure.

Allen Wrench	8 mm / 0.3”	
Wrench Bolt	M10 x 20 w/ Spring (Part No. 23)	

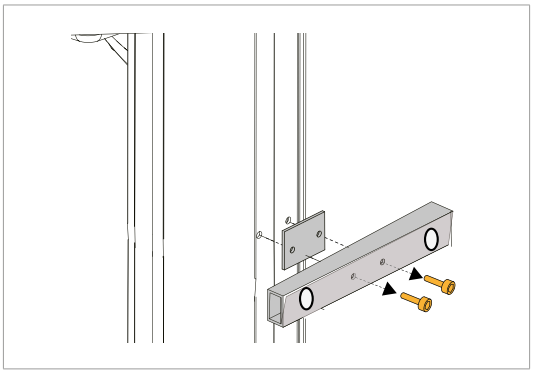
On the floor: 4 locations



On the wall

2. Fix the column bracket to the wall with 4 nuts and 4 flat washers(Part No.35).

On the wall: 4 locations



3. Remove the handle in the middle.

5.3 Removing the Security Bolt from Rotating Unit

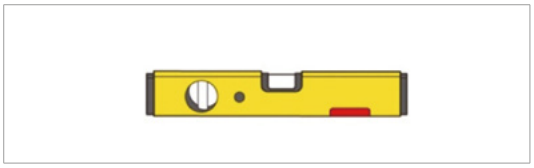
Refer to section **4.4 Removing the Transportation Safety Bolts**.

5.4 Installing the Cephalometric Unit (Optional)

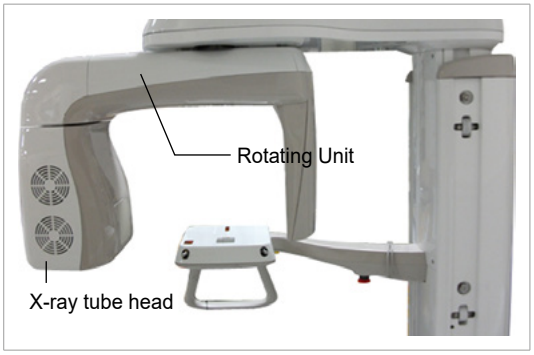
Refer to section **4.5 Installing the Cephalometric Unit (Optional).**

5.5 Leveling the Equipment

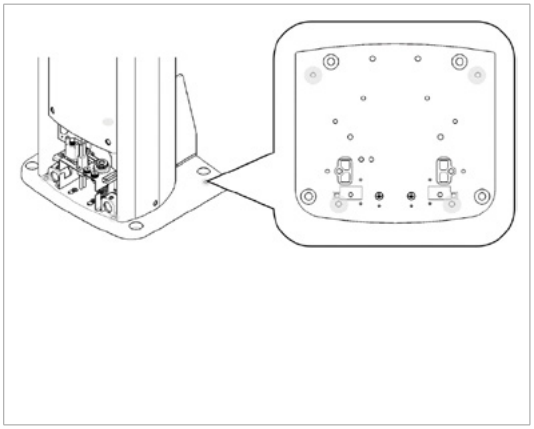
IMPORTANT	**Ensure to remove all plastic film before leveling the equipment.**
IMPORTANT	**Ensure that the spirit level should rest only on the locations indicated in the following figures to obtain the accurate center.**



1. Prepare the spirit level.



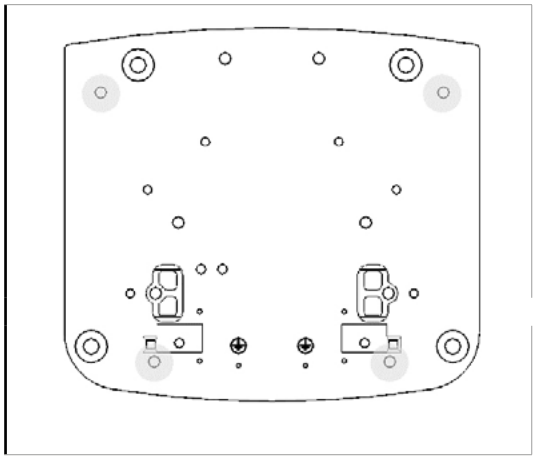
2. Turn the Rotating Unit manually until the X-ray tube head points forward as shown in the figure.



3. Put the set screws into the four holes and turn them clockwise with the hex wrench until they touch the aligning plate.

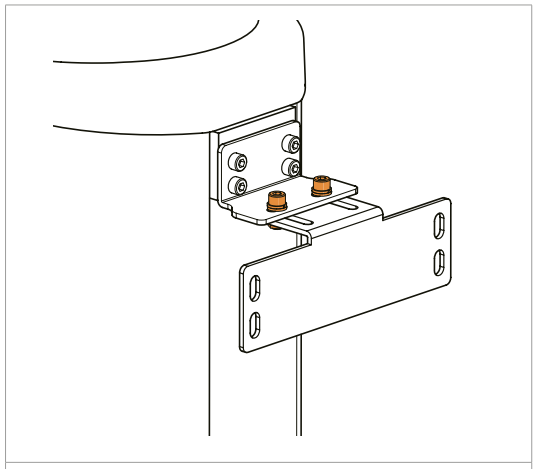
T-shaped Hex Wench	8 mm / 0.3”	
Set Screw	M10 x 20 (Part No. 30)	

5.6 Tightening the Nuts firmly after Leveling is Obtained



1. Tighten the 2 nuts at the bottom of the column unit.

2. Tighten the 2 nuts at the front bottom.



3. Tighten 2 nuts at the joint of 2 brackets.

4. Remove the plastic film.

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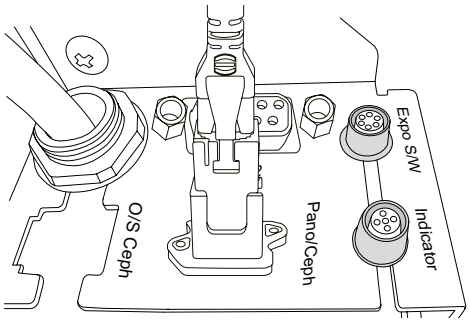
6

Completing Miscellaneous Works

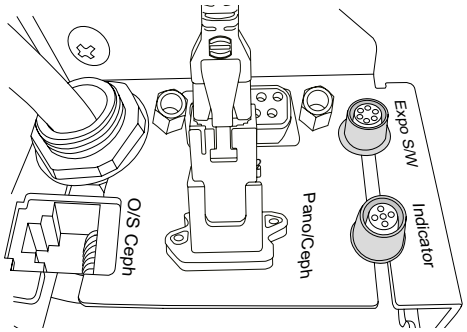
6.1 Connecting the Cables to the Equipment

A. The LVDS cable in use

Connector layout

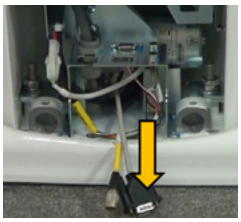


Scan type



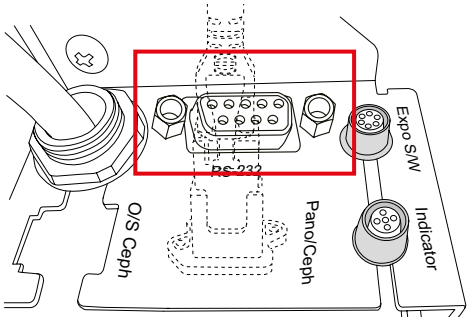
OS type

Rear

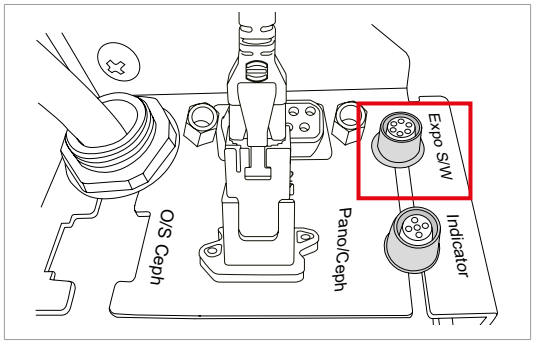


Front

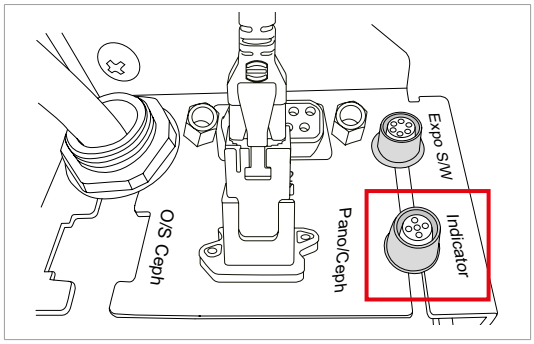
1. Insert the cables through the opening from the back. Then pull them out from the front side.



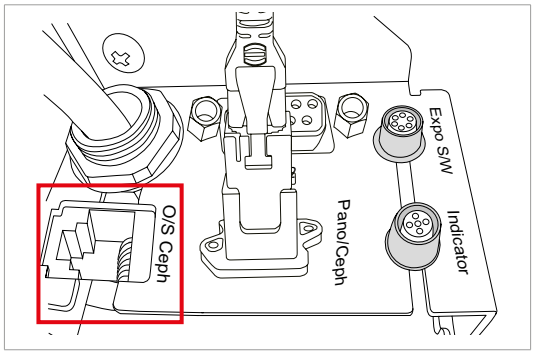
2. Connect the RS-232 cable (**Part No.25).**



3. Connect the exposure switch (**Part No.2**).



4. Connect the warning control system (Part No.28)

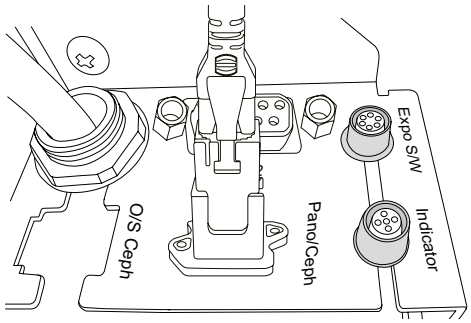


5. **(**Optional) Connect the LAN cable (Part No.26), if the one-shot sensor for the CEPH is installed

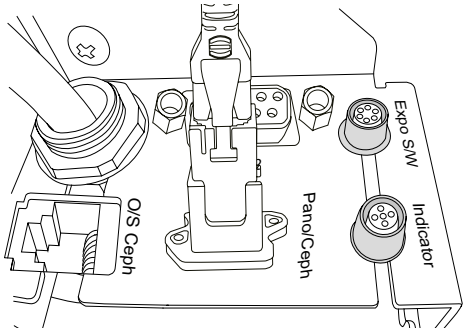
6. Arrange the cable carefully and if necessary, tie them with the cable tie (Part No.10)

B. The LAN cable in use: Crong board

Connector layout

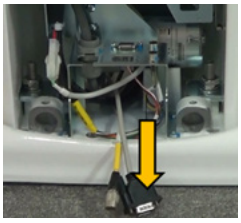


Scan type: 1 RJ-45 port



OS type: 2 RJ-45 ports

Rear

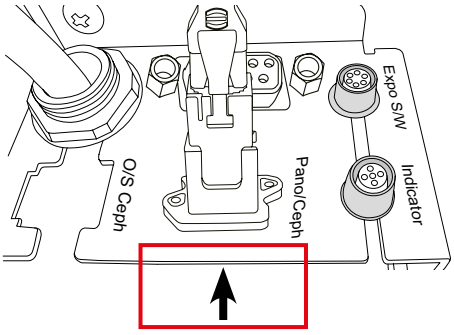


Front

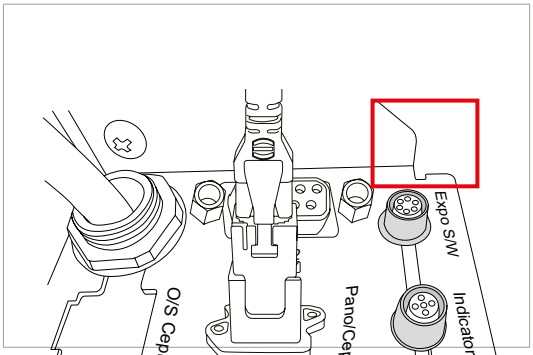
1. Insert the cables through the opening from the back. Then pull them out from the front side.

NOTICE

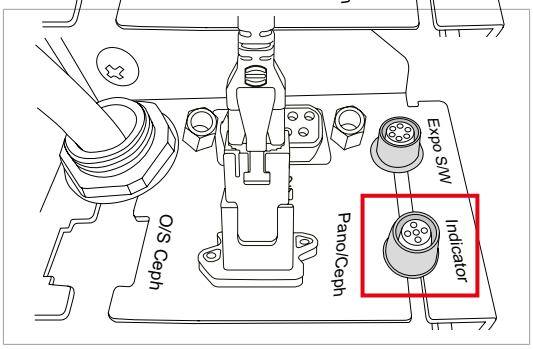
The image may be different from the actual product.



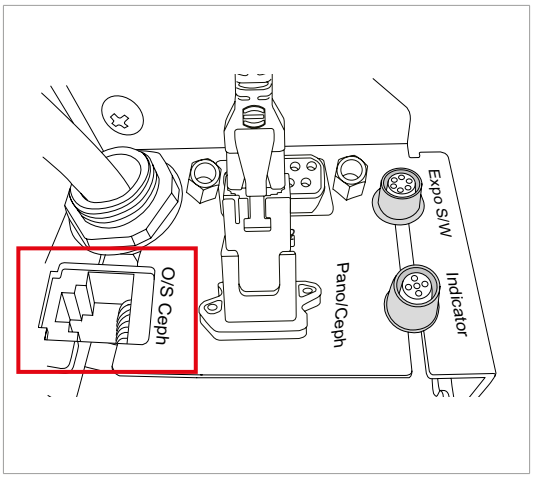
2. Connecting the ethernet cable (CAT6): **Part No.25.**



3. Connect the exposure switch (**Part No.2**).



4. Connect the warning control system **(Part No.28).**

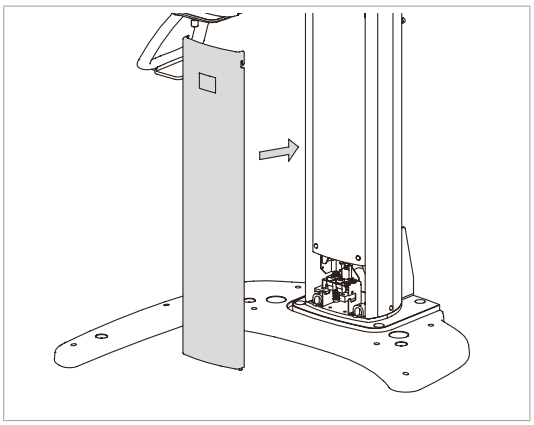


5. (Optional) Connect the LAN cable(Part No.26) if the one-shot sensor for the CEPH is installed.

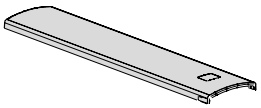
NOTICE

When the Crong board with the OS(one-shot) CEPH sensor is used, two RJ-45 connectors are required from the back of PC: one for PANO, one for OS sensor

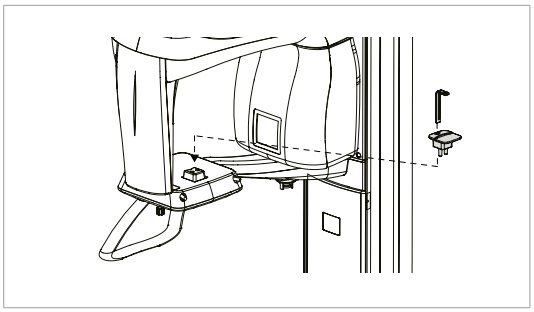
6.2 Assembling the Front Column Cover



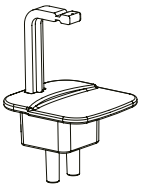
1. Assemble the front column cover.

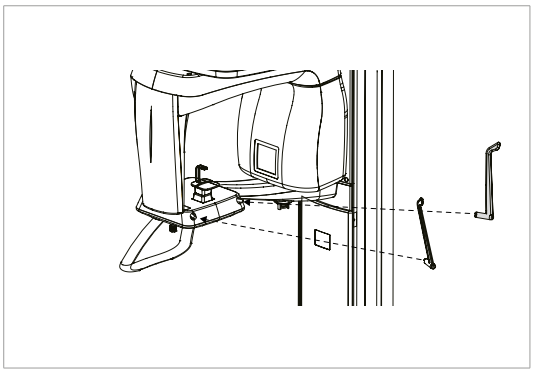
Case column Front	

6.3 Assembling Temple and Chin Supports

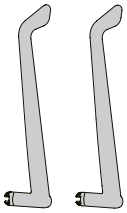


1. Insert the normal chin support and bite block (Normal) **(Part No.4** and **5).**





2. Insert 2 temple supports **(Part No.11)** and ear rod caps **(Part No.15).**



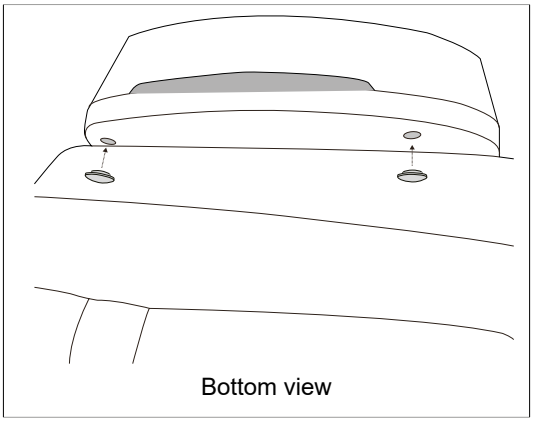
Left

Right

Caps

6.4 Covering the Holes

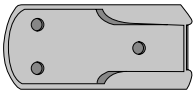
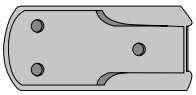
Item	Part No.	Figure
Silicone caps(A, B)	16,17	



Bottom view

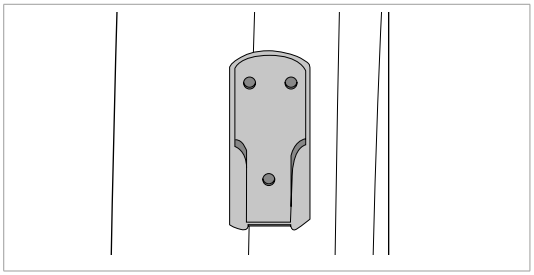
1. Cover the vertical frame holes with 2 white silicone caps (Part No.16).

6.5 Installing the Switch Holders

Item	Part No.	Figure	Qty	Comment
SWITCH HOLDER (Exposure switch)	12		1	w/sticker and 3 screws
SWITCH HOLDER (Up/Down switch: Optional)	13		1	w/sticker

UP/DOWN switch holder

1. Peel off the paper from both sides.



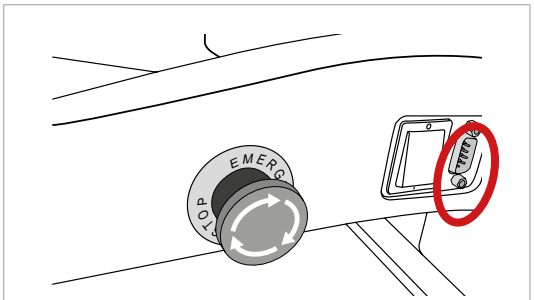
2. Attach the UP/DOWN switch holder on the left side of the column at the appropriate position.

Exposure switch holder

1. Locate the exposure switch holder (Part No.12) with a sticker and 3 screws.

2. Install the switch holder on the wall at the appropriate height using 3 screws.

Attaching the UP/DOWN switch (Optional)

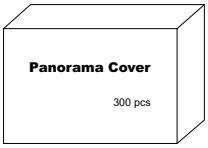
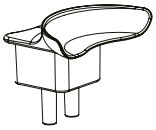


View from the bottom of the handle frame

If the Up/Down switch (Part No.3) is to be installed, connect it to the following connector.

6.6 The Remaining Components

The following list summarizes the remaining components after the hardware installation has been completed.

Item	Figure	Comments
Handrest set (if CEPH unit installed)		For CEPH unit
Bite cover		
Chin support: Edentulous		
Chin support: Sinus, TMJ		
Installation USB		
Manuals		
Carrying handle		Keep the handles in a safe place, so that they are reused when the equipment needs to be moved.

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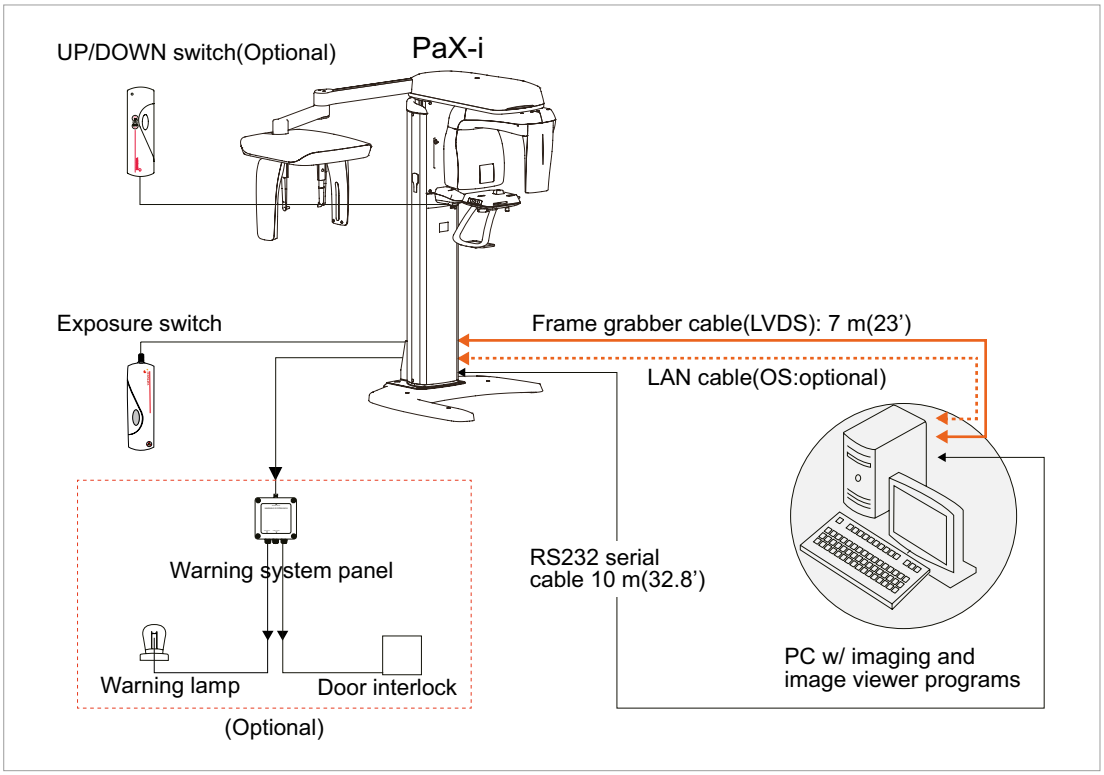
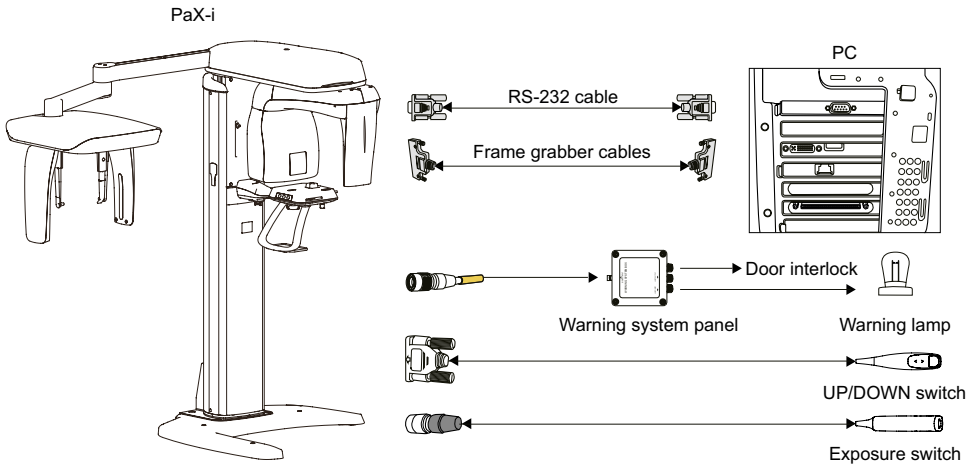
7

Setting up PC System

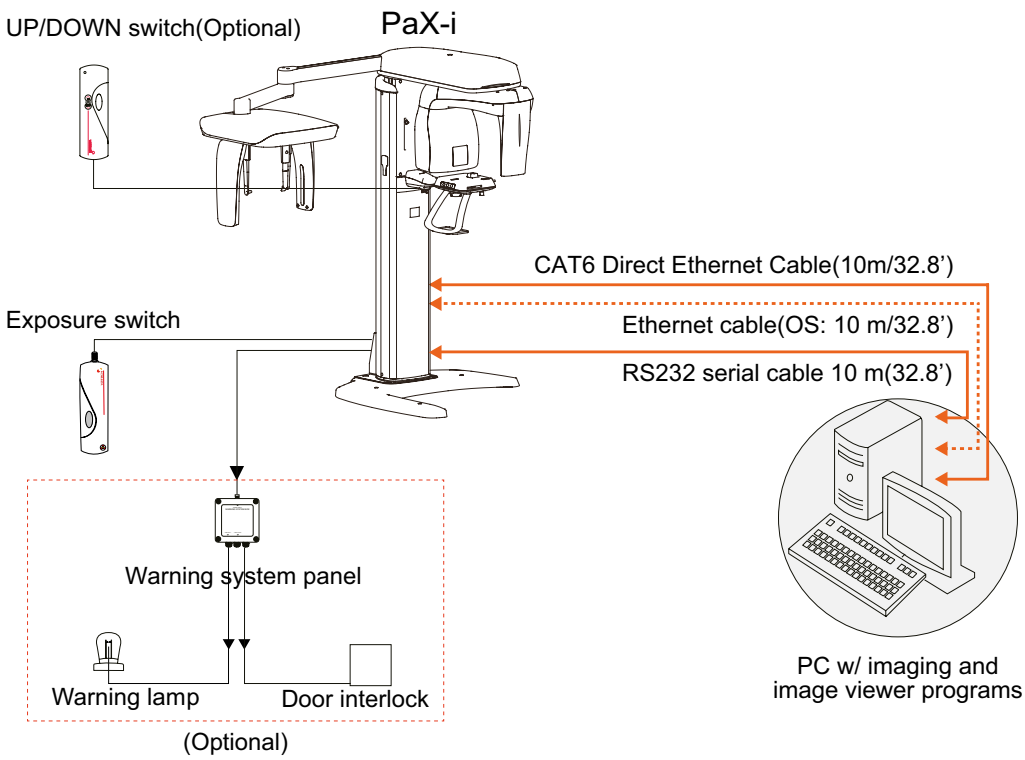
7.1 Direct Connection Diagram

A. LVDS cable in use





B. LAN cable in use: Crong board



RS232 cable: Used to command the unit and sometimes display the status of the unit like parameter settings on the HyperTerminal program.

Frame grabber cable & LAN cable: used to transfer image data to the PC.

Warning system panel: Used to provide a visible indicator: light when the equipment is irradiating X-Ray.

7.2 The Recommended PC Requirements

IMPORTANT

1. **Ensure that your PC meets the recommended PC specifications to run the image viewer software.**
2. **Since image quality may deteriorate from lack of resources, observe the requirement guideline specified in the following tables.**
3. **The PC components shall be approved by UL/CSA**
4. **The PC shall be grounded well protectively**
5. **The MPSO(Multiple Portable Socket-Outlets) shall not be placed on the floor**
6. **For countries where a stable power supply is not guaranteed, installing an AVR (Automatic Voltage Regulator) that is single-phase and with a capacity of 3 kVA or more is recommended to ensure a steady operation. Please consult a local electrician if you are located in an unstable area.**

An insufficient memory could cause image reconstruction failure in the UHD (ultra-high-definition) mode.

The PC system provided with the PaX-i undergoes the rigorous test for software compatibility before shipping. Any subsequent changes to the hardware and/or software may cause malfunction.

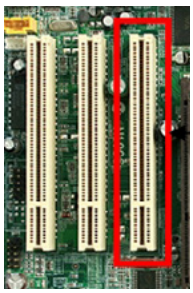
CAUTION

Prior to using the PC, ensure that Windows Defender Firewall is enabled to protect your PC and data from network security threats.

Item	PC System
CPU	Intel Core i3-9100 3.6 4C 65W
Chipset	Intel Q370
RAM	4GB (1x4GB) DDR4 2666 APJ
Hard disk drive	500GB SATA 7200 rpm
Graphics board	Integrated Intel Coffeelake GFX
Ethernet interface	Intel Ethernet I210-T1 PCIe x1 Gb NIC
Serial Port (RS232)	1 (On board)
Power supply	500W ESTR
Slots	2 PCI Express x 1 Slot 2 PCI Express x 16 Slot 1 PCI Slot (Option)
CD/DVD drive	DVD Writer 5.25"
Operating system	Windows 7 Professional 64-bit (available through downgrade rights from Windows 10 Pro)
Recommend PC	HP Z1 G5

7.3 Installing the Internal Peripherals

CAUTION	**Allow enough time to dissipate remnant energy after unplugging the power cord from the main outlet or PC.**
IMPORTANT	**Unplug the power cord from the main outlet or PC before starting the following works.** **It is strongly recommended to use the Ethernet card with slot type PCI Express x1 interface.**
	**Whenever handling the frame grabber board:** **1. Wear the anti-static gloves.**  **2. Do not wear the likes of a thick jacket.**



Universal PCI slot

Installing frame grabber board: LVDS type

1. Unplug the power cable from the back of the PC.
2. Open the PC cover.
3. Locate the empty universal PCI type slot inside the PC for the frame grabber card.

4. Insert the frame grabber board: AnyGrabber board (**Part No.27**) firmly into that slot.

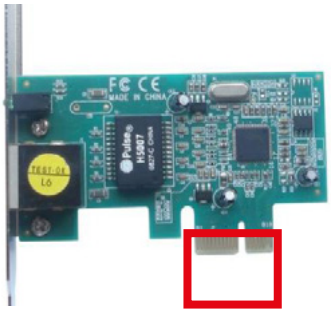
5. Tighten the cardholder firmly with the screw.

Installing the Ethernet card (LAN type: Crong board)

IMPORTANT

In case that the OS sensor is installed, two RJ-45 ports are required, in which case an additional LAN card needs to be installed.

Use the PCI Express x1 type LAN card.



PCI-E x1 type interface

PCI Express x1 type slot

1. Locate the PCI Express x1 type slot on the motherboard.

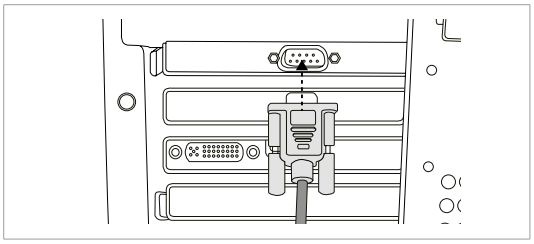
2. Insert the LAN card carefully into that slot.

3. Tighten the cardholder firmly with the screw.

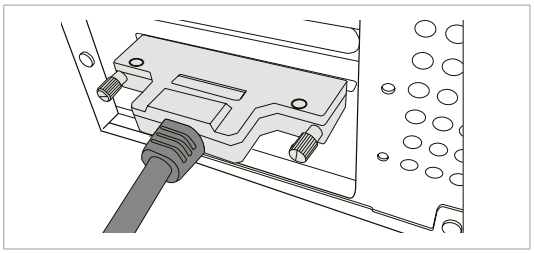
7.4 Connecting the Cables to PC

IMPORTANT	**Always check the cable condition visually. Surprisingly, unexpected errors affecting image acquisition arise from the bad cable or its bad contact condition.**
NOTICE	**Connect the regular cables for PC: keyboard, mouse, and video in advance.**

A. The LVDS cable in use



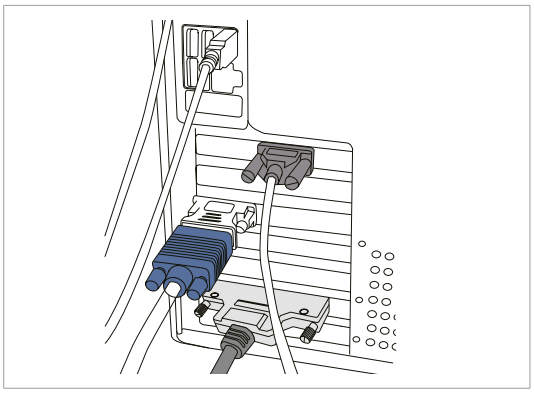
1. Connect the RS-232 cable.



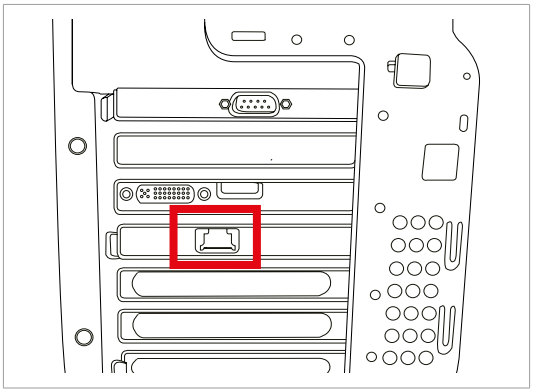
2. Connect frame grabber cable(LVDS type).

3. (Optional) Connect the LAN cable if the OS sensor is installed.

Rearview of the PC after all the cables attached



B. The LAN cable: Crong board



1. Connect the LAN cable.

2. (Optional) Connect another LAN cable if the OS sensor is installed.

NOTICE

When the Crong board with the OS(one-shot) CEPH sensor is used, two RJ-45 ports are required from the back of PC: one for PANO, one for OS sensor

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8

Setting up Windows Environment Variables

8.1 Before Beginning

The PC system supplied with the equipment is intended to be used as image acquisition and its view only. To the PC server for image management, the use of a different PC is strongly recommended.

The programs related to the acquisition, viewing, and manipulation of images should be installed on the formatted PC, where no other program(s) except the operating system (OS) is present

IMPORTANT

Do not install the programs irrelevant to image acquisition and view on the same PC. There may be subtle conflicts between them, leading to the malfunction

Ensure that the emergency stop switch is in the OFF position.

Before InstallShield installation, ensure that the video card driver installed on the PC is the most up-to-date version. To check this, go to the website of the Graphics card manufacturer.

8.2 Checking PC BIOS Settings

Check the BIOS settings of your PC before starting the next step. The BIOS settings must meet specifications in **Appendix E: Checking PC BIOS Settings**. If the BIOS hasn't been set up in your PC or the settings are different from Appendix E, take the steps below to configure the BIOS in your PC.

1. Reboot the PC and enter the BIOS setup utility.

2. Go to Appendix E and set the variables as specified on the page.

8.3 Setting up the Power Management Options

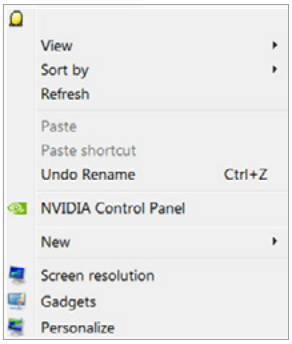
The following statements are based on the Windows 7 environment. Depending on the operating system employed, the figures on your system may appear different slightly.

To avoid disruptive and abnormal operation while acquiring an image, it is required to reconfigure some parameters on the Windows operating system.

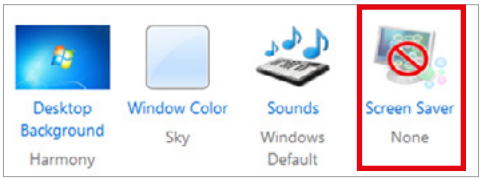
Disabling the screen saver

From the desktop,

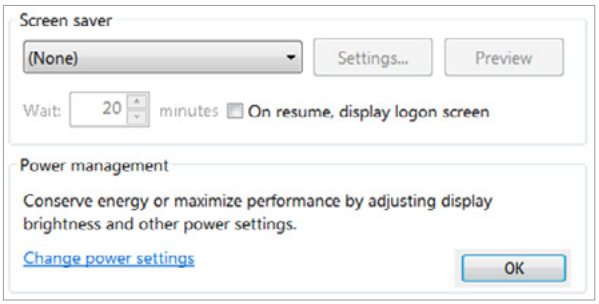
1. Click the right mouse button and select **Personalize**.



2. Locate and click the screen saver.



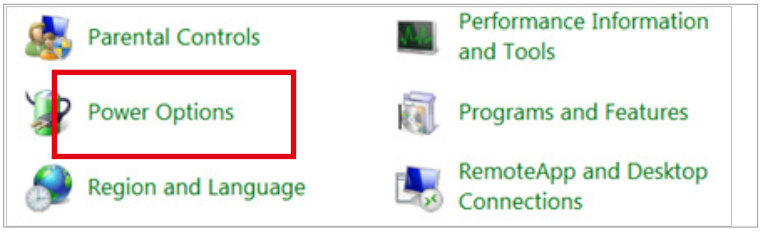
3. Select **None** in the pull-down menu.



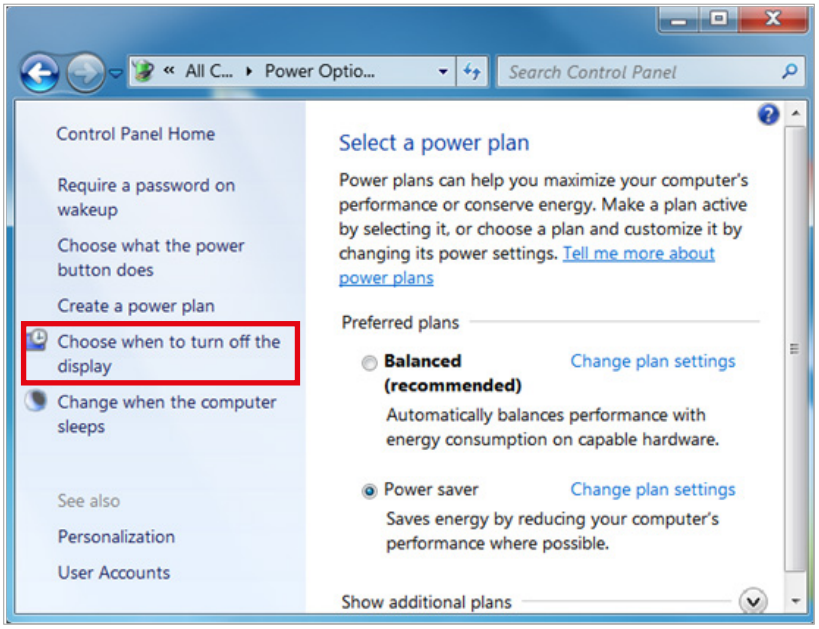
4. Click **OK**.

Selecting the power options: monitor and system

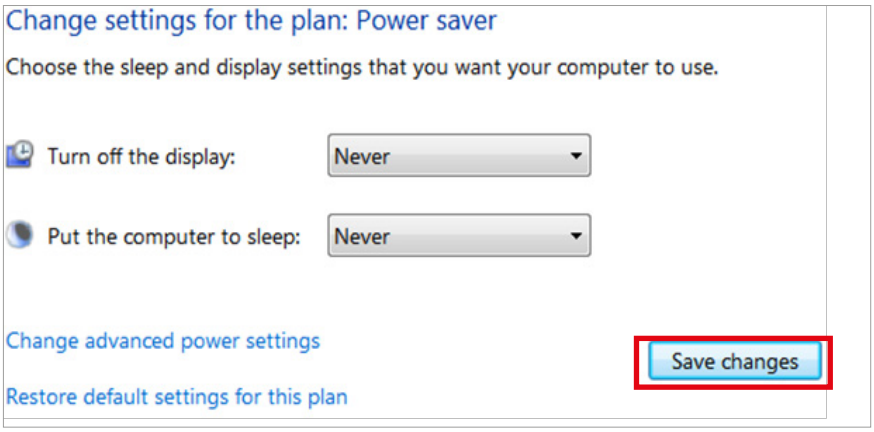
1. Go to the **Control Panel**.
2. Double click on the **Power Options** icon.



3. Select "**Choose when to turn off the display**".



4. Select “**Never**” for both fields.

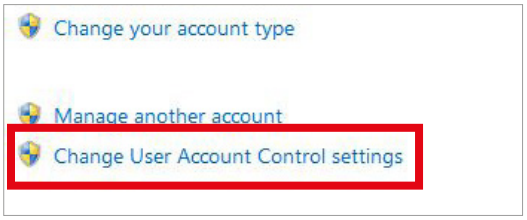


5. Click “**Save changes**”.

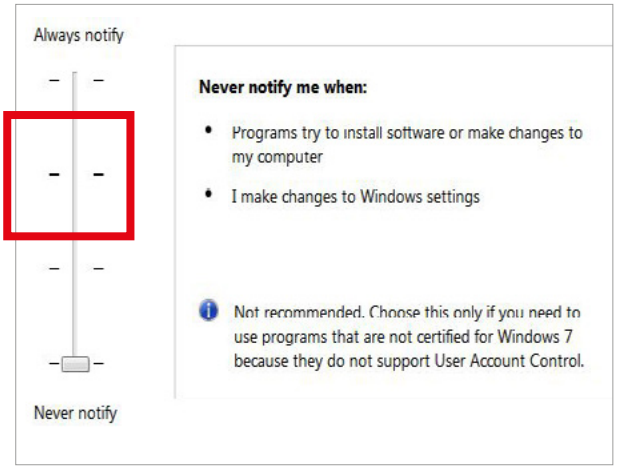
8.4 Turning off the User Account Control

1. Open the control panel of Windows.
2. Click the User Account icon.

3. Click on the ‘Change User Account Control settings’.



4. Disable the UAC by moving the slider bar down to the bottom, **Never notify.**



5. Click ‘OK’ and restart the PC.

8.5 Reallocating Memory Space (32-bit OS only)

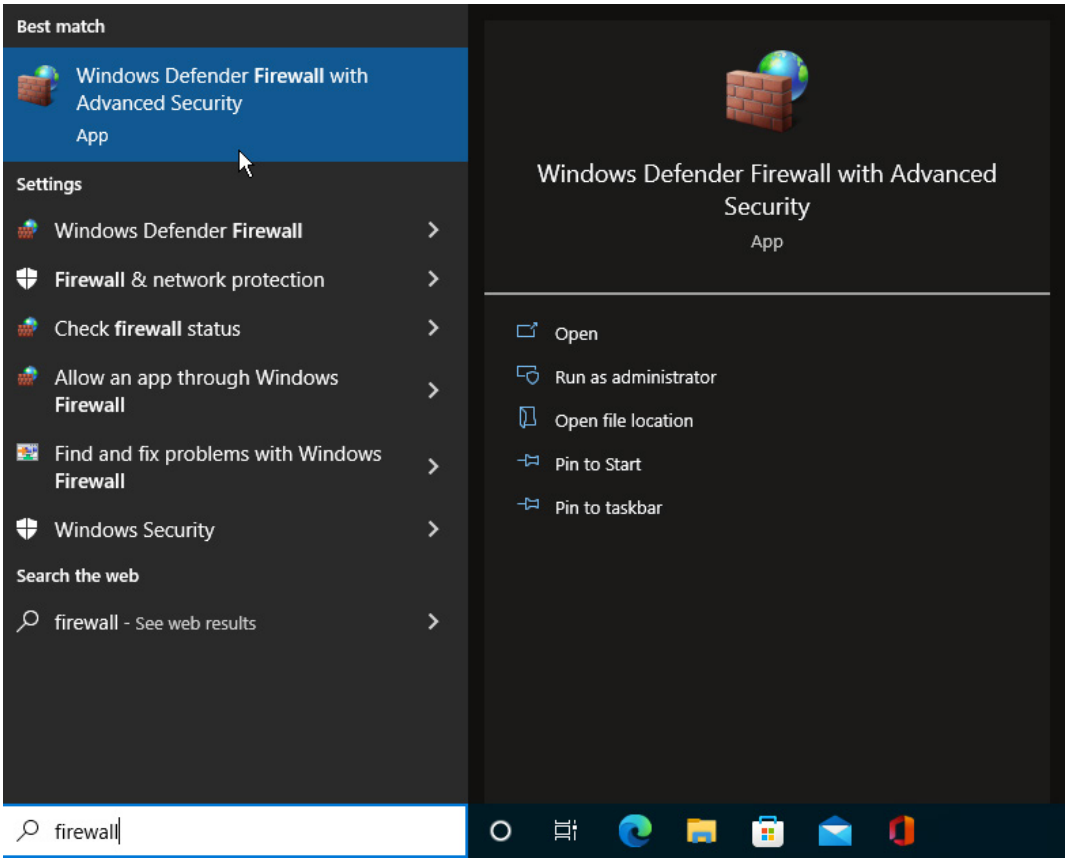
For the details on how to reconfigure the memory space, refer to the appendix **F: Reallocating Memory Space.**

8.6 Configuring Default Behavior for Windows Defender Firewall

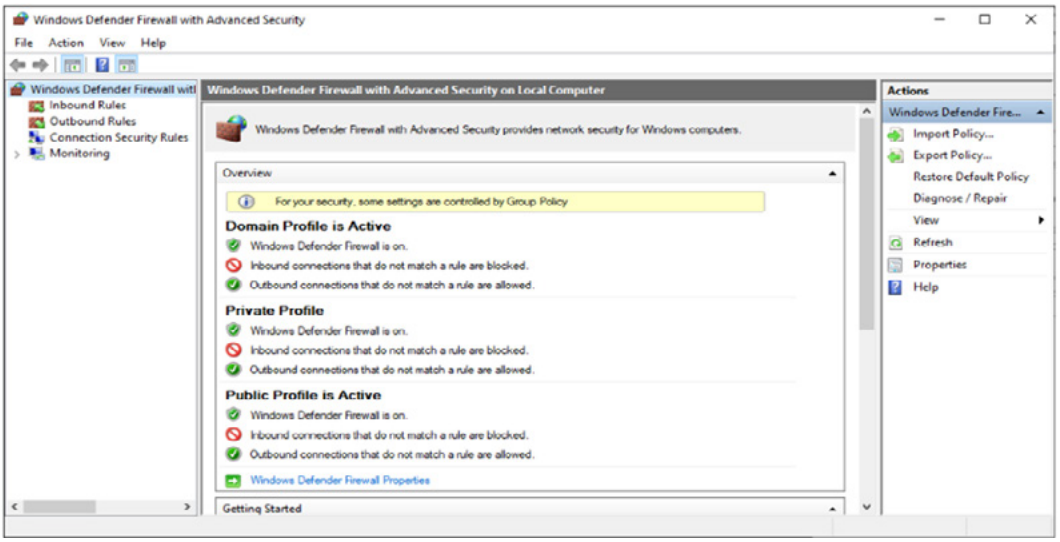
To enable Windows Defender Firewall with Advanced Security and configure its default behavior, follow the steps below:

IMPORTANT	**Administrative Credentials** **Before enabling Windows Defender Firewall, you must be a member of the Domain Administrative Group or have a permission to modify the GPO(Group Policy Objects).**

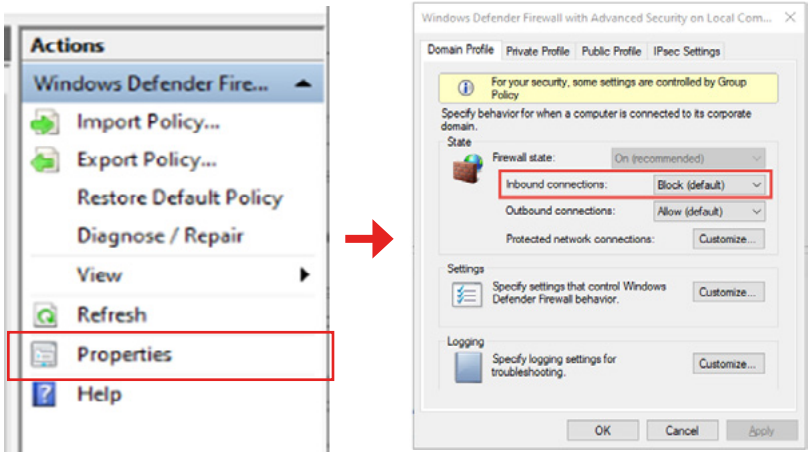
1. Enter 'Firewall' in the search window and select **Windows Defender Firewall with Advanced Security** to open the console.



2. Check if each location network is set as below.



3. If the settings are different, click Properties to open a pop-up window and follow the steps below to configure each network location type (Domain, Private, Public).



1) Click the tab that corresponds to the network location type.

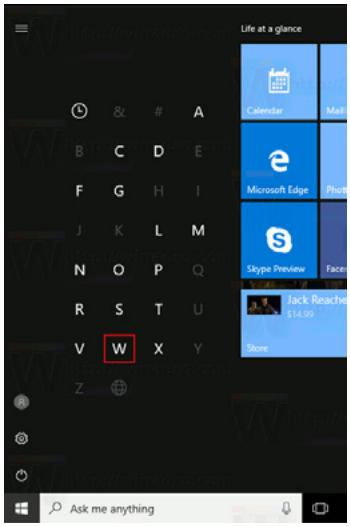
2) Change Firewall State to On.

3) Change Inbound connections to Block.

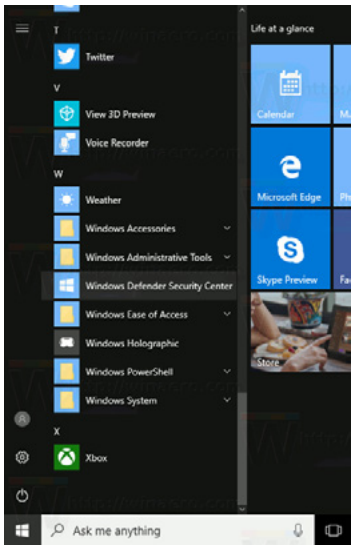
4) Change Outbound connections to Allow.

Adding an Exclusion to Windows Security

1. Open the Start screen, and type **W** in the search box.

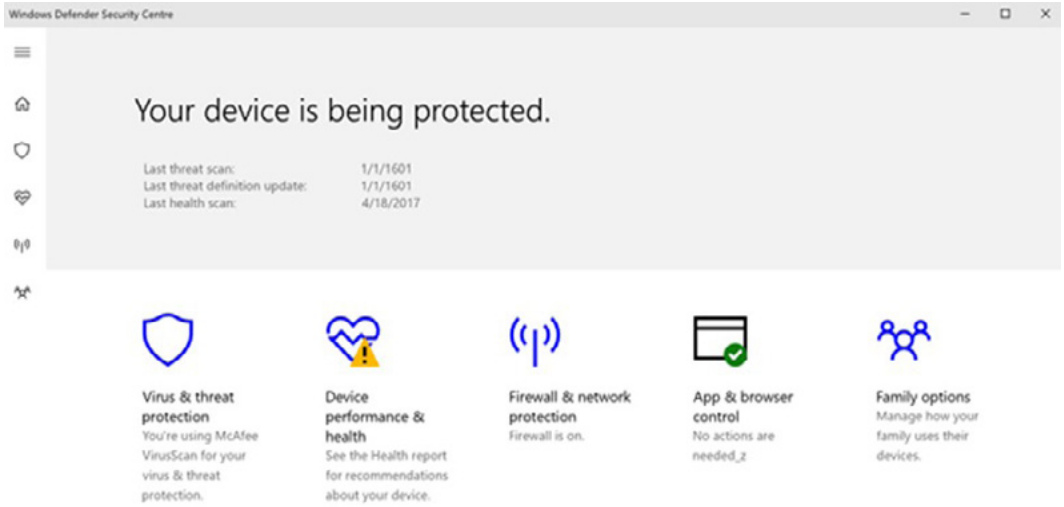


2. Click the Windows Defender Security Center icon to start Windows Defender Security Center on the search result.

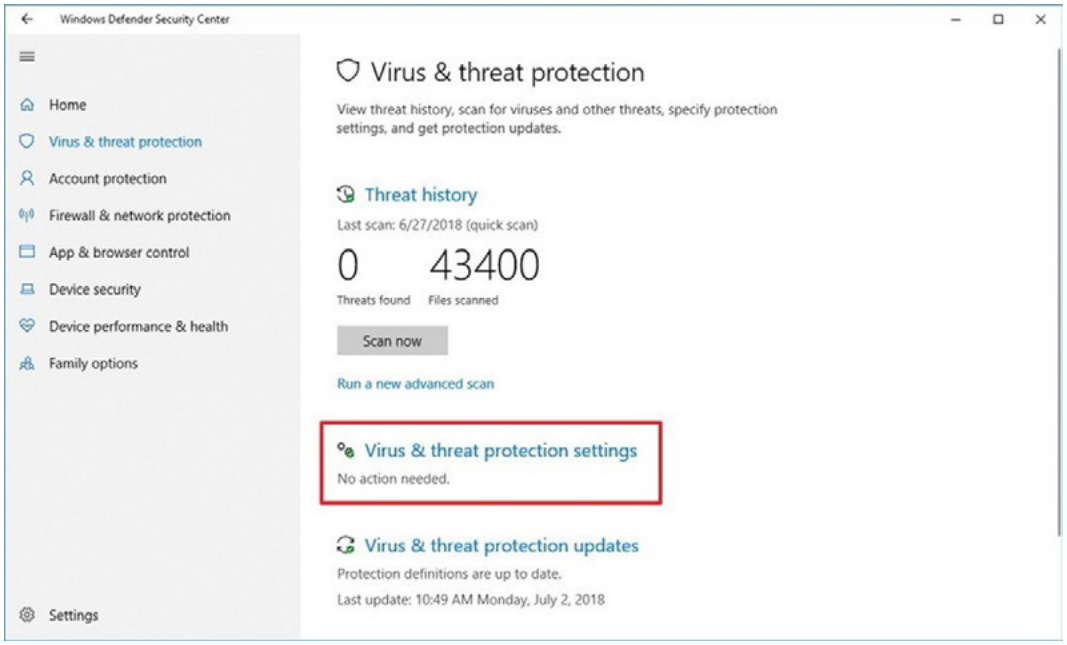


3. The start page comes with the following sections: Virus & threat protection, Device performance & health, Firewall & Network protection, and Family options.

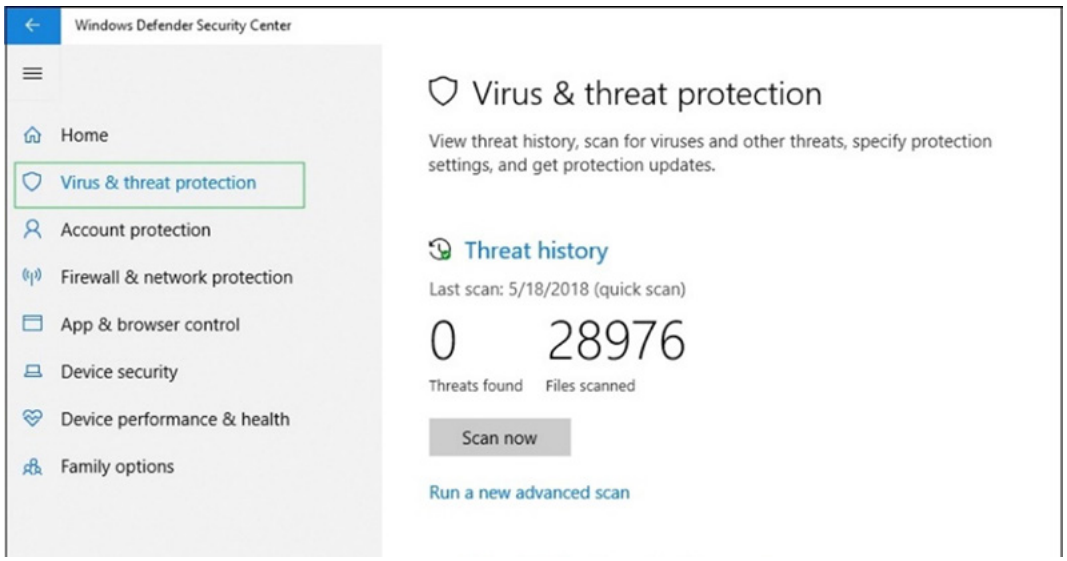
4. Click on the Virus & threat protection icon.



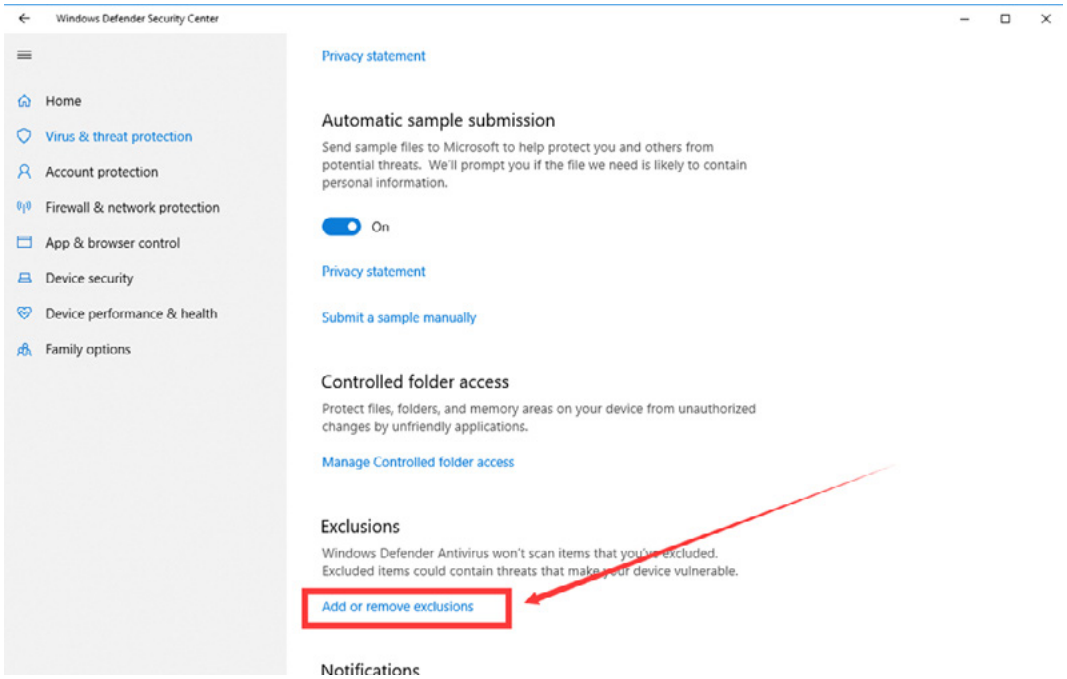
5.



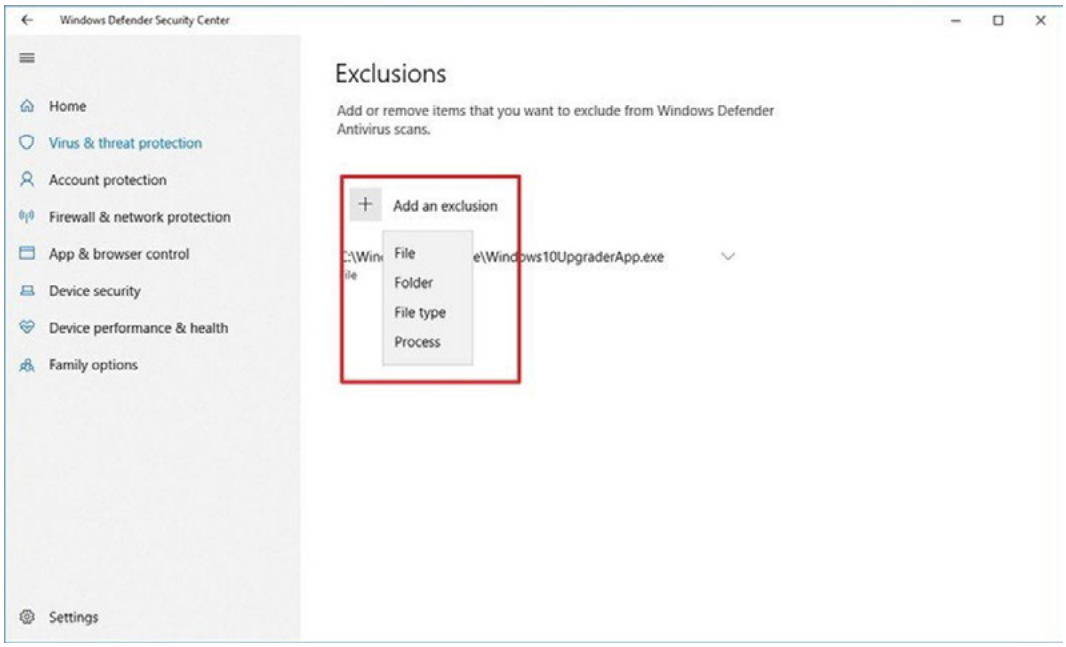
6. Scroll down to Exclusions.



7. Click on the link Add or remove exclusions.

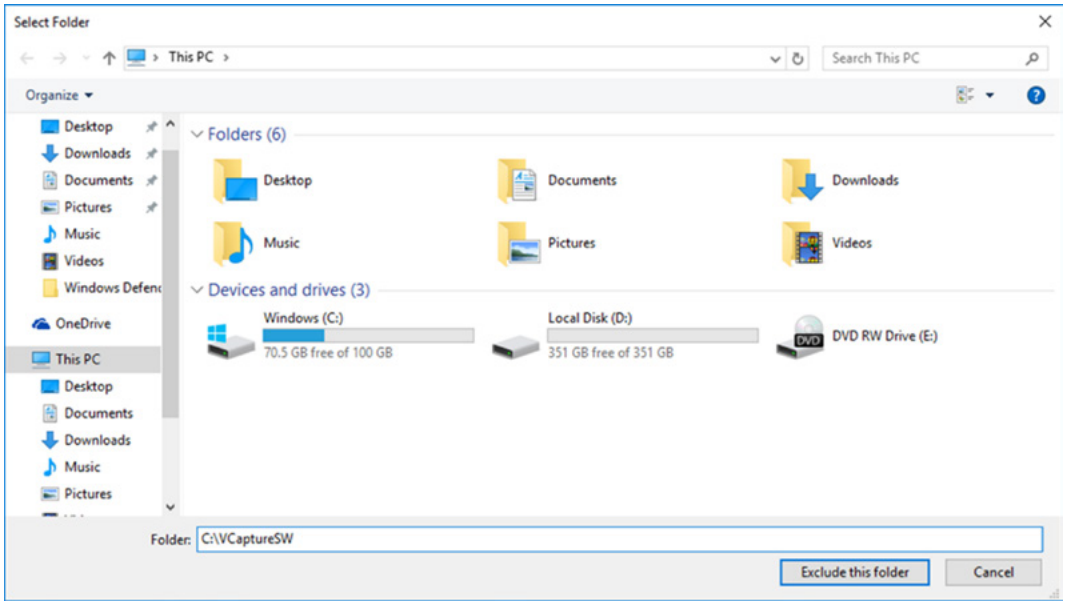


8. The following page will open.



9. Click on the Add an exclusion button.

10. On the Select Folder window, type C:\VCaptureSW in the Folder field and click Exclude this folder.



Setting an Exclusion to Antivirus Software

IMPORTANT

1. **Set the virus scan exception for the files and folder related to this equipment.**
2. **Do not run the memory-resident background programs unrelated to the equipment.**
3. **Running the virus scan is recommended to be performed only when equipment is idle.**
4. **Always use the blank USB drive, whenever possible.**

Some files used by the PaX-i are incorrectly recognized as a virus(es)/trojan(s) by anti-virus software. If you are using anti-virus software on your PC, you must exclude those files from all scans performed by the anti-virus software.

For the PaX-i, the following folder and files should be excluded from the virus scan.

Files	Path
C:\Program Files\Vatech	C:\VCaptureSW

NOTICE

Suppose the anti-virus program from McAfee is running in the background.

The procedure to set folder exclusions is similar to most anti-virus programs.

1. Open the McAfee Anti-Virus program, and select the "VirusScan".
2. Right-click on the "On-Access Scan" menu option, and left-click on the "Properties" tab.
3. Select the "**All Processes** → **Detection** → **Exclusions**" menu option, and choose the "**Add**" menu button.
4. Navigate to the folder or the files you want to designate an exclusion path for, and select the checkbox to "Also Exclude Subfolders". Click "OK" when complete, and exit McAfee for the path exclusion to be complete.

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9

Installing Software

9.1 Installing the InstallShield

Ensure that the emergency stop switch is in the OFF position prior to starting InstallShield installation.

The image viewer program such as EzDent-i or the one from the 3rd party should be installed in advance of the InstallShield installation.

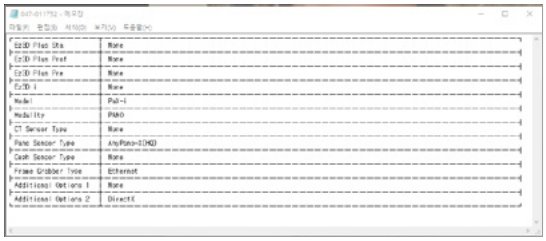
Before InstallShield installation, ensure that the video card driver installed on the PC is the most up-to-date version. To check this, go to the website of the Graphics card manufacturer.

Perform a virus scan for the PC and InstallShield program with the anti-virus program prior to proceeding with its installation.

IMPORTANT

Do not install the programs irrelevant to image acquisition and view together with imaging programs on the same PC. There may be subtle conflicts between them.

The InstallShield installation information is included in the USB drive provided as an accessory. Please check the serial number.txt (eg 047-011752. txt) file.



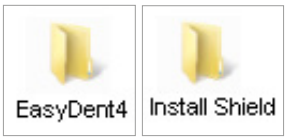
For the first-time installation

NOTICE	**The EzDent-i viewer program should be installed in advance before proceeding with the installation.**

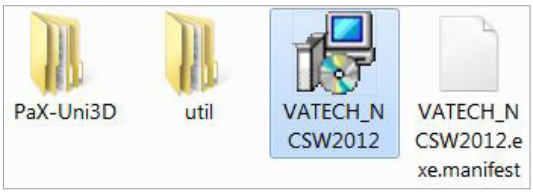
A. LVDS cable in use

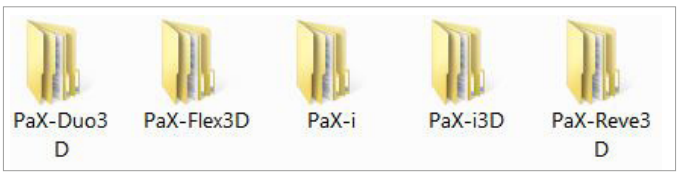
To install the imaging software and the other drivers for the first time, go to the folder where the following files are in.

1. Turn On the PC and Equipment.
2. Connect the USB memory to the USB connector and go to the folder: InstallShield.

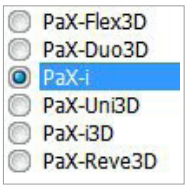


3. Double click on the **VATECH_NCSW2012**

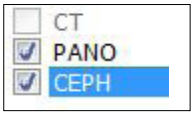




4. Select the equipment model: PaX-i and then click **Next.**



5. Select the modality and click **Next**. Note that if the CEPH feature comes with the equipment, also check the **CEPH**.



6. Select the **AnyPano(HQ)** for panorama and click Next.

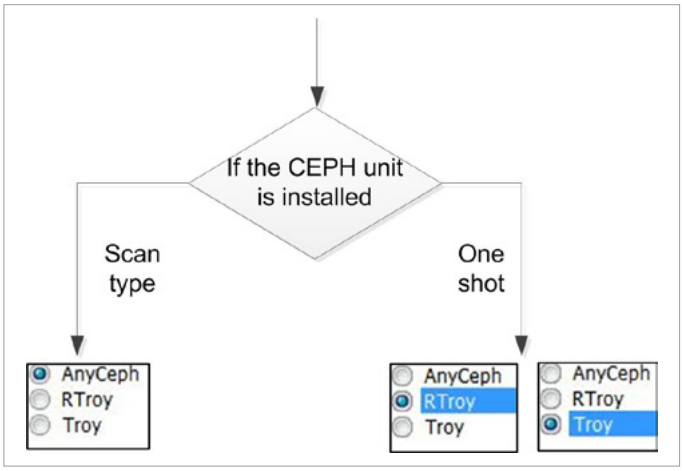
NOTICE

The AnyPano(HQ) should be selected. Otherwise, the erroneous image could be acquired. The AnyPano and AnyCeph are used for the other equipment.

7. Select the CEPH sensor, if it is installed.

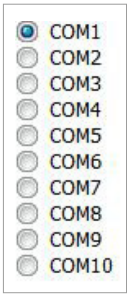
NOTICE

Select an AnyCeph for scan type, or RTroy/Troy for the one-shot type.



8. Select the default port number: **COM1.**

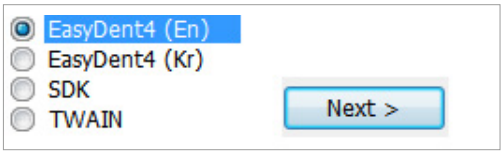
IMPORTANT	**Select the port No.COM1** **The same COM port No. should be used between the equipment and PC.**



And click **Next.**

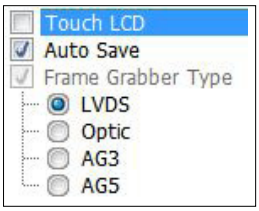
9. Select the language and click **Next**.

10. Select the image viewer program, where the EazyDent is the software developed by **VATECH**. If the third-party software is to be used, select the **SDK**.



Click **Next** to continue.

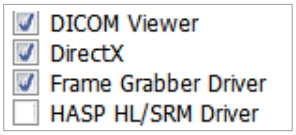
11. Uncheck the Touch LCD. Select Auto Save and LVDS. Note that, when the Auto Save is checked, the image data acquired is saved automatically.



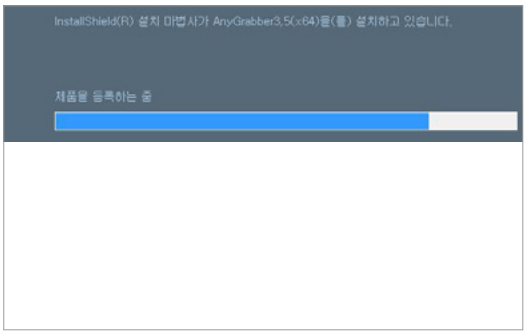
12. The following is a list of various software components that can be installed on an as-needed basis. For the first-time installation, select all.

NOTICE

1. **For the PaX-i installation, uncheck the HASP HL/SRM Driver.**
2. **If the Frame Grabber board driver for Windows 7 64-bit is to be installed, you should install it manually. For details, see section 10.2: Installing the frame grabber driver for Windows 7 64-bit. Uncheck the Frame Grabber Driver.**

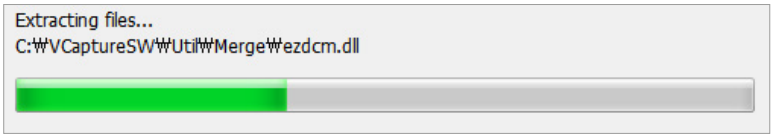


13. The following figure displays the information entered so far. If necessary, you can modify it by clicking the **Back** button.



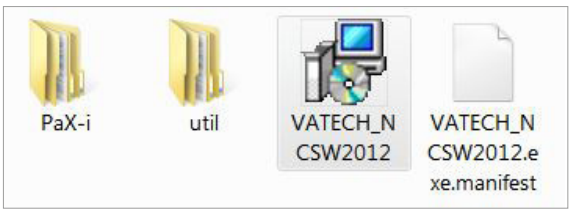
Click **Install** to continue.

Now extract the files in the folder **C:/VCaptureSW/**.



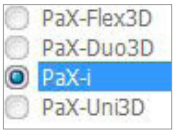
B. LAN cable in use: Crong board

1. Double click on the **VATECH_NCSW2012**.

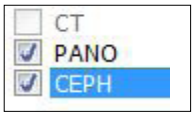


2. Click the **Next** from the following screen.

3. Select the **PaX-i**.



4. Select the modality and click Next. Note that if the CEPH feature comes with the equipment, check the CEPH.

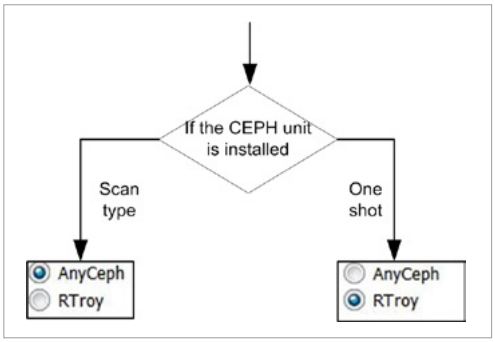


5. Select the PANO. Sensor type.

6. Select the CEPH sensor, if it is installed.

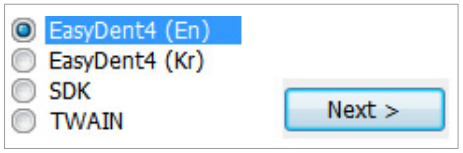
IMPORTANT

Select an AnyCeph for scan type, or RTroy for the one-shot type.



7. Select the language and click **Next**.

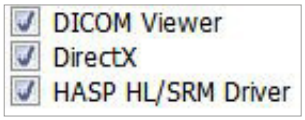
8. Select the image viewer program. The EazyDent is the software developed by **VATECH**. If the third-party software is to be used, select the **SDK.**



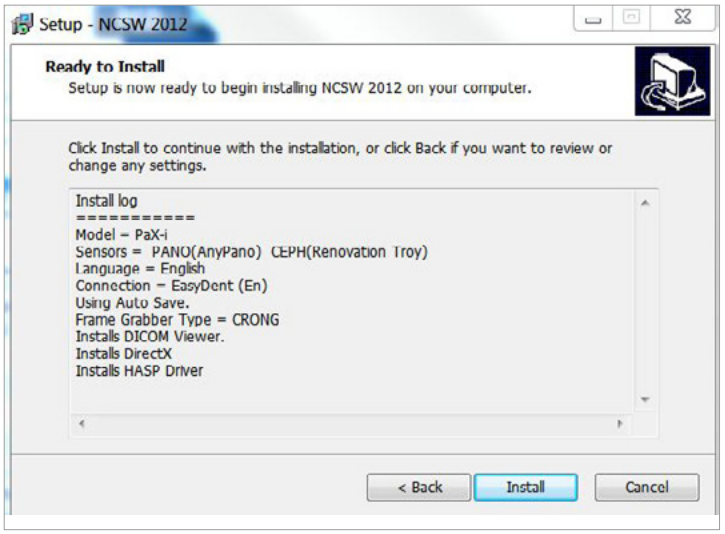
Click **Next** to continue.

9. Select Auto Save. Note that, when the Auto Save is checked, the image data acquired is saved automatically.

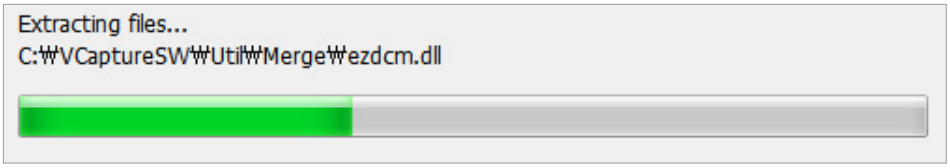
10. Select the device drivers. For the first-time installation, select all.



11. The components' information is displayed in the log file. Check that all are correct. Otherwise, go back and modify the related component(s) by clicking the Back button. If correct, click Install.



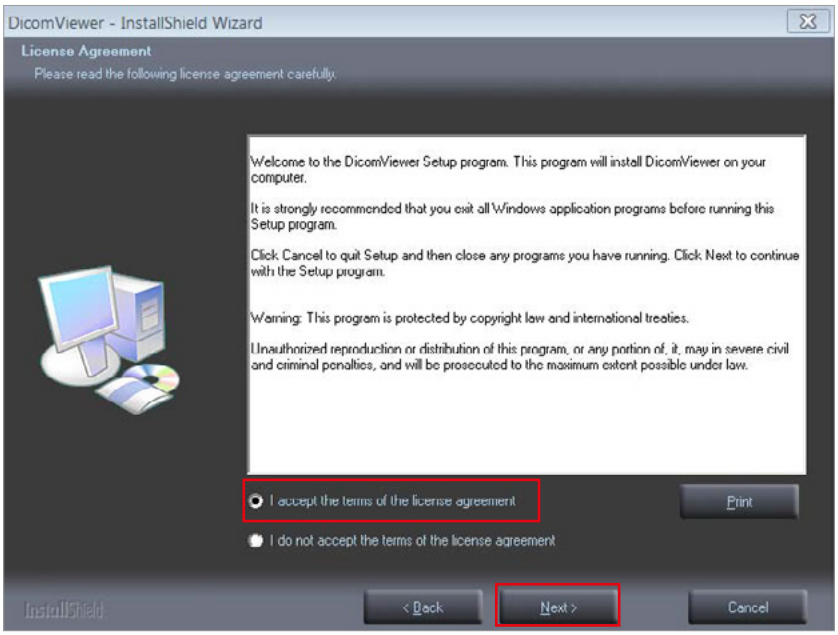
Now extracting the files: **C:/VCaptureSW/.**



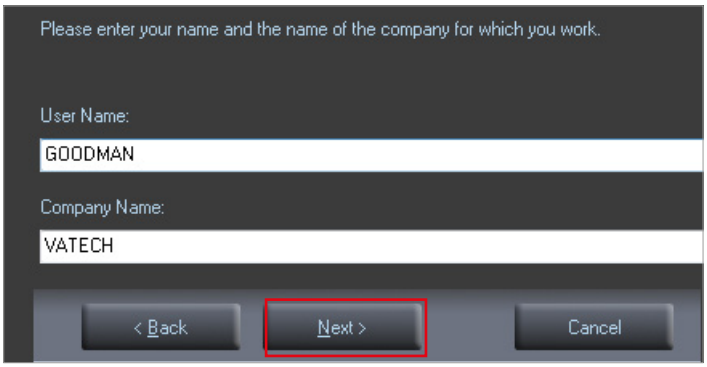
Installing the DICOM viewer

1. Click **Next** to install the DICOM viewer.

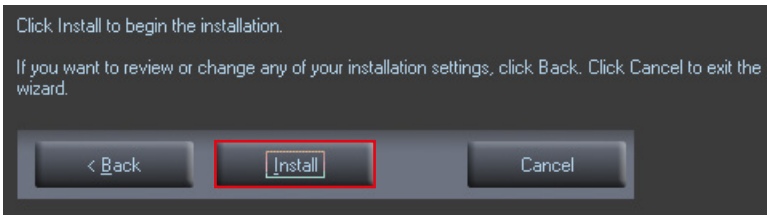
2. Select “I accept the terms of the license agreement” and click **Next**.

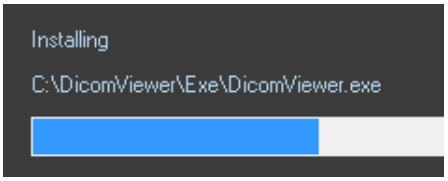


3. Enter the names of user and clinic and click **Next**.

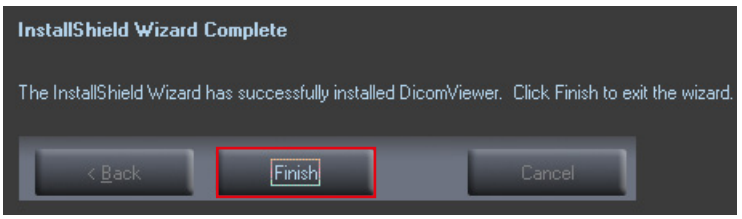


4. From the following screen, click **Install**.





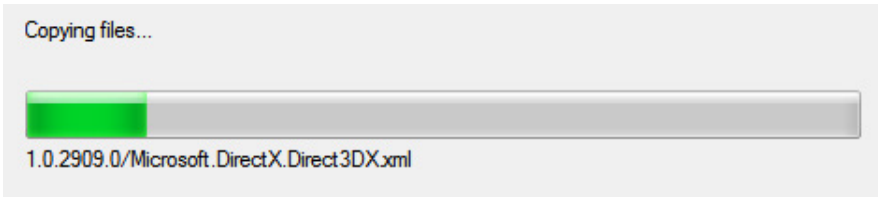
5. Click **Finish** to finish.



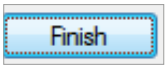
Installing the DirectX

1. Now installing the **DirectX**: select “I accept the agreement”.

2. Click **Next** to continue. Now installing…



3. Click **Finish**.



Installing frame grabber driver: LVDS 32-bit only

1. Click **Next** from the welcome screen.

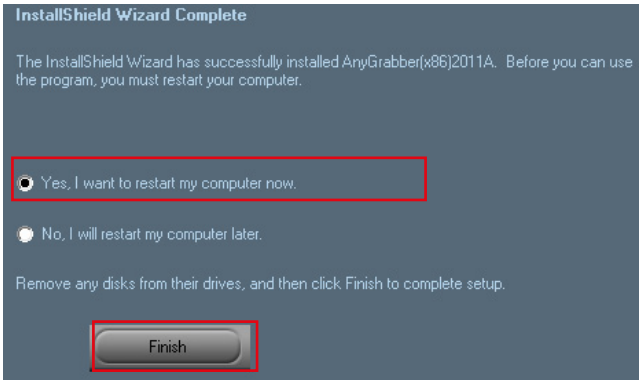
2. Select the folder in which the files are copied.

3. Click the **Install** button to continue.

4. The installation has been completed.

5. The InstallShield installation has been completed.

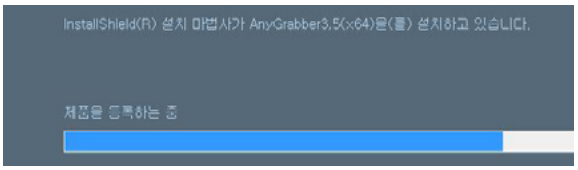
6. Restart the PC by clicking the **Finish** button.



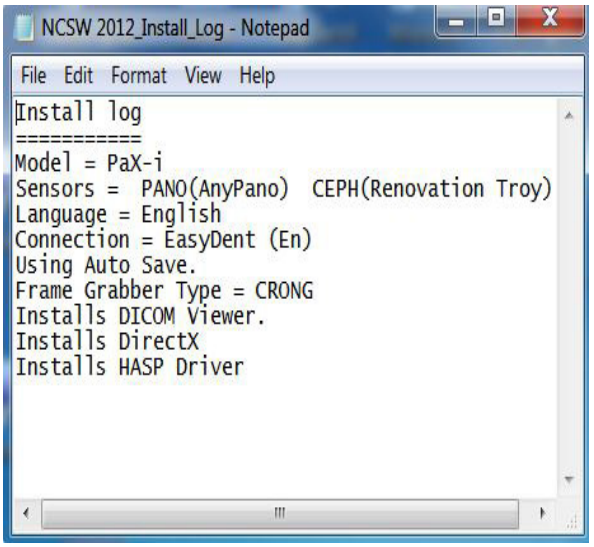
Verifying that all Components are Properly Installed

1. Locate the file: **NCSW 2012_Install_Log.txt** on the desktop.

2. Open it to check the file. You can find out that all components are installed.



LVDS

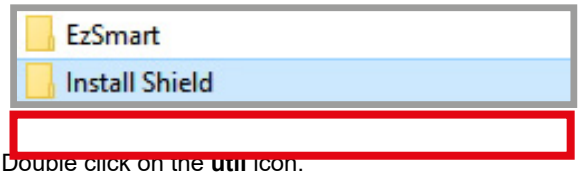


Crong board

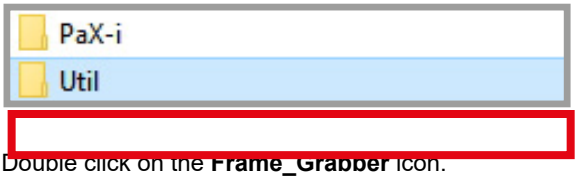
9.2 Installing the Frame Grabber Driver: V-Grabber LDS

NOTICE **This frame grabber driver for Windows 7 64-bit requires the 64-bit processor.**

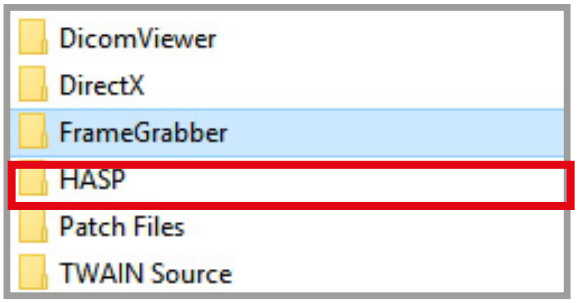
1. Connect the USB memory to the USB connector and go to the folder: InstallShield.
   Double click on the InstallShield.



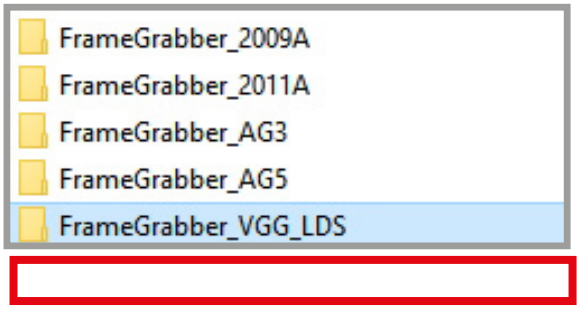
2. Double click on the **util** icon.



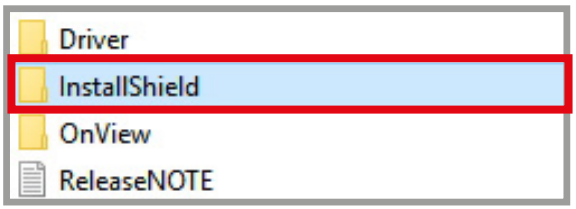
3. Double click on the **Frame_Grabber** icon.



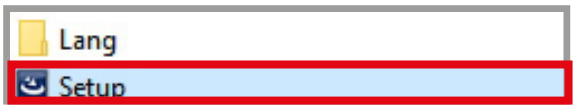
4. Select the **FrameGrabber_VGG_LDS** folder.



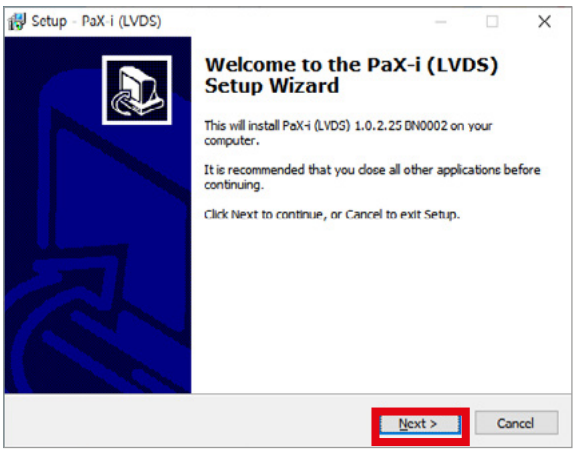
5. Select the **InstallShield** folder.



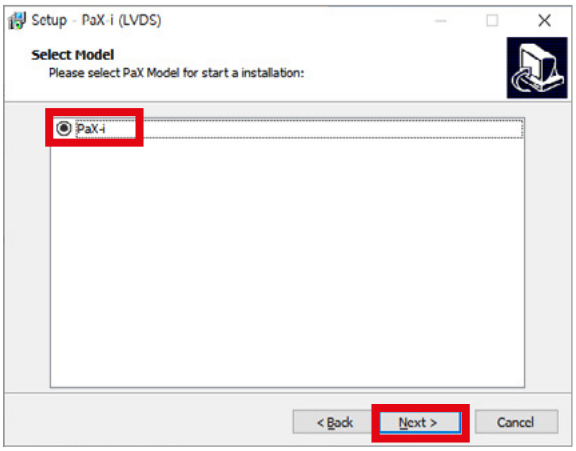
6. Double-click the **Setup.exe** file.



7. Click the **Next** button.

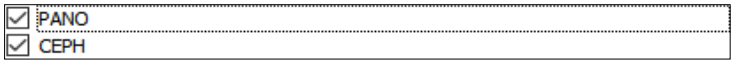


8. Select the equipment model: **PaX-i** and then click the **Next** button.

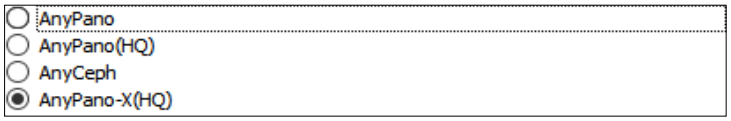


9. Select the modality and click the **Next** button.

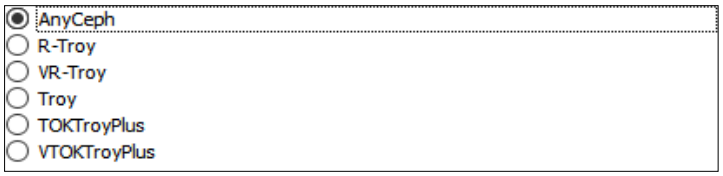
Note that if the CEPH feature comes with the equipment, check the CEPH.



10. Select the PANO. Sensor type and click the **Next** button.

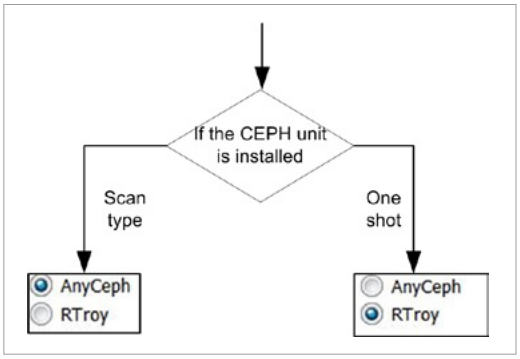


11. Select the CEPH sensor, if it is installed and click the **Next** button.

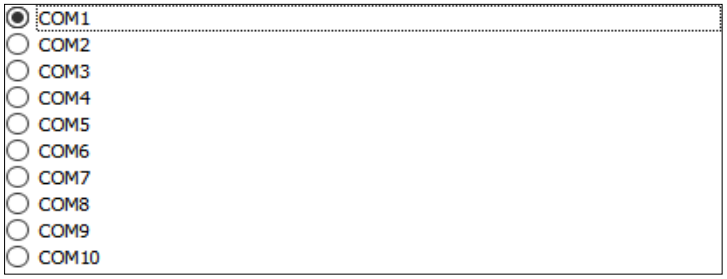


IMPORTANT

Select an AnyCeph for scan type, or RTroy for the one-shot type.



12. Select the COM port and click the **Next** button.



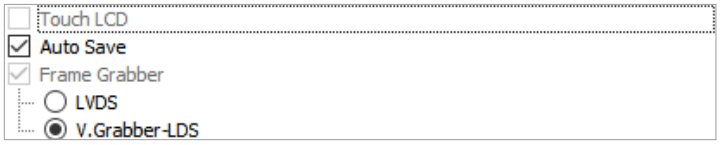
13. Select the language and click the **Next** button.

14. Select the image viewer program and click the **Next** button.

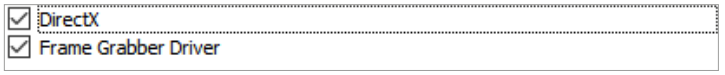
Select SDK if EzDent-i or third-party image viewer software is installed.

15. Check the Auto Save and select the **V.Grabber-LDS**. and click the **Next** button.

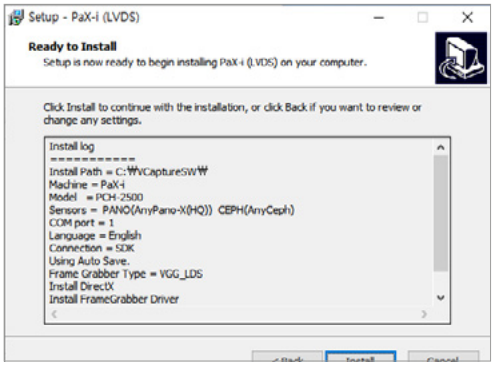
Note that, when the Auto Save is checked, the image data acquired is saved automatically.



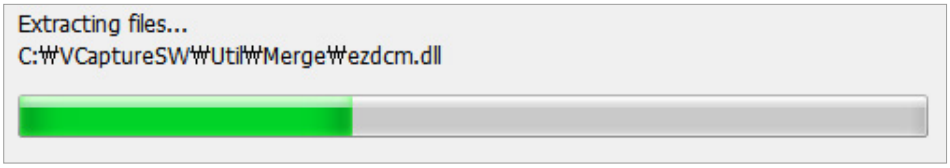
16. Check the additional options and click the **Next** button.



17. The components' information is displayed in the log file. Check that all are correct. Otherwise, go back and modify the related component(s) by clicking the **Back** button. If correct, click **Install** button.



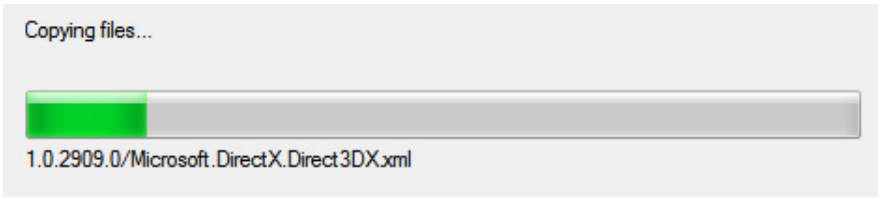
Now extracting the files: **C:/VCaptureSW/.**



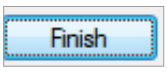
Installing the DirectX

1. Now installing the **DirectX**: select **I accept the agreement**.

2. Click **Next** button to continue. Now installing…

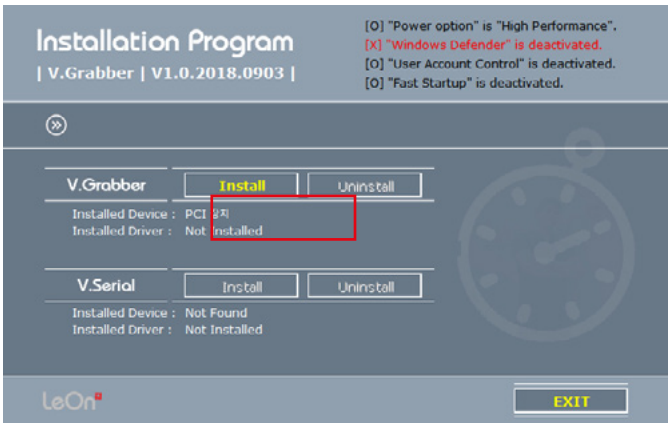


3. When the installation is completed, click the **Finish** button.

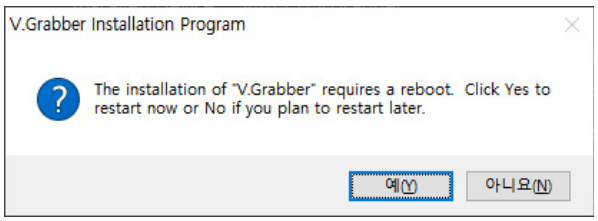


Installing frame grabber driver: LVDS 32-bit only

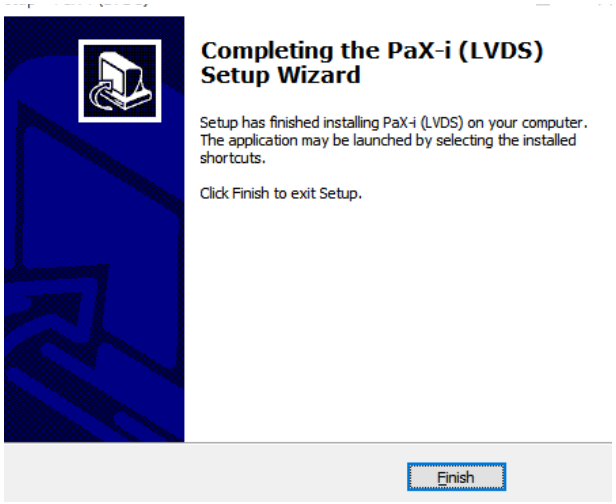
1. After completing the Direct X® installation, the installation program will be started. Select the language in the installer language select window and press the **OK** button.
2. Press the Install button.



2. The installation is completed and the Installation Program window appears. Click the **Yes** button to immediately reboot, or the **NO** button to reboot later.



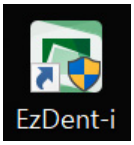
3. The installation has just been completed. Click **Finish** button and restart PC.

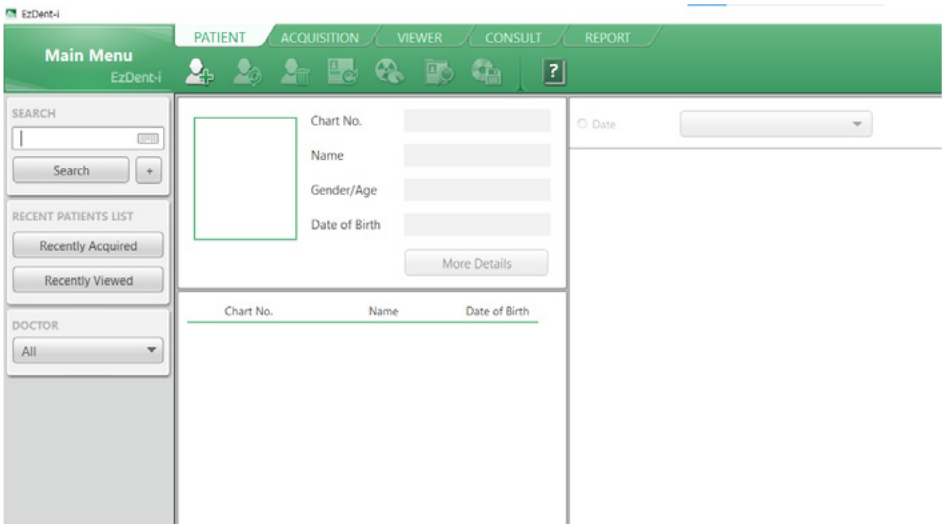


9.3 Setting up the User-specific Information

Running the image viewer

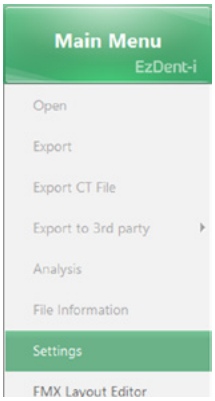
1. Run the image viewer. On your desktop, double-click the **EzDent-i** icon. Its main window will be displayed.



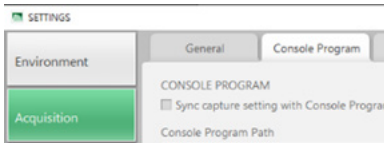


Interfacing EzDent-i with imaging program(one-time linking)

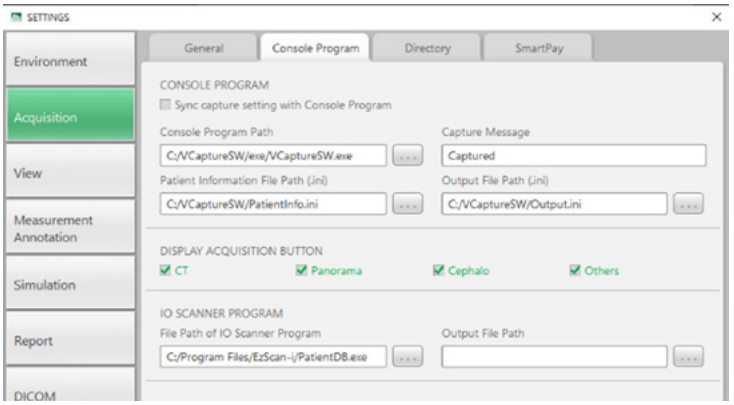
1. From the main screen of EzDent-i, click **Main Menu** > **Settings**.



2. Click **Acquisition** > **Console Program**.



3. Make sure that the console program settings are as follows:
   - Console Program Path: C:/VCaptureSW/exe/VCaptureSW.exe
   - Capture Message: Captured
   - Patient Information File Path: C:/VCaptureSW/PatientInfo.ini



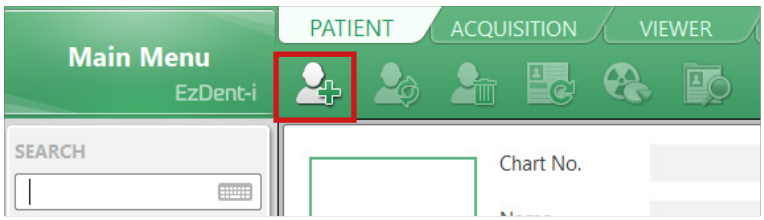
4. Click **OK** and restart the program to apply the settings

Creating a new patient record

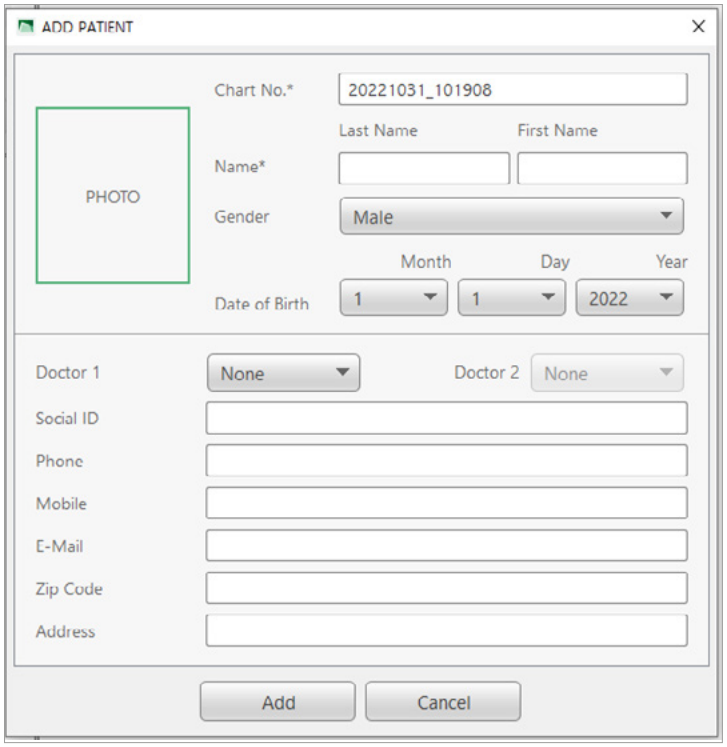
NOTICE

For further details on this subject, refer to the accompanying EzDent-i manual.

1. Click the **Add Patient** button on the **PATIENT** tab.



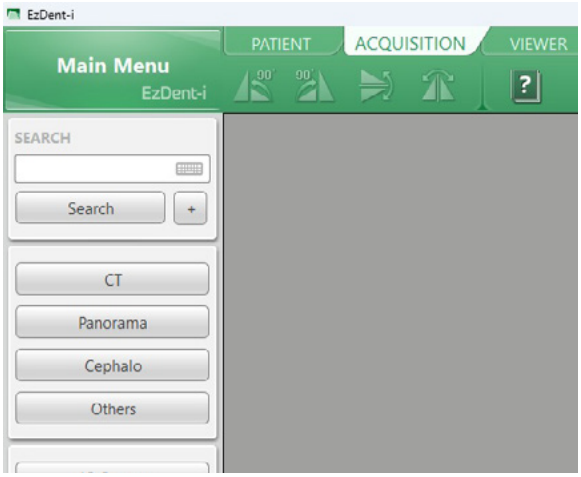
2. Enter the required patient information. Fill out the required field (*) in the dialog box: chart number and name. The rest of the fields are optional, but it is recommended to fill them.



3. Click **Add** to save the patient record.

Initiating the Imaging Program

1. Click the **ACQUISITION** tab. The imaging mode selection buttons appear.



NOTICE **The imaging mode selection buttons in the left pane may appear different, depending on the equipment's capacity to acquire an image.**

2. Select the imaging mode. Then the main GUI in the selected imaging mode appears.

NOTICE	**The error code E033 (red box in the figure above), indicating that the equipment is still in the packing mode, should disappear when the command of exiting the packing mode is executed. See the next 'Disabling the packing mode'**

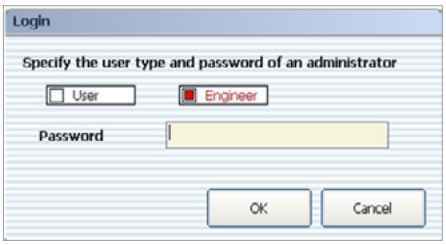
3. Proceed to the **Configuring the parameters** section.

Disabling the packing mode

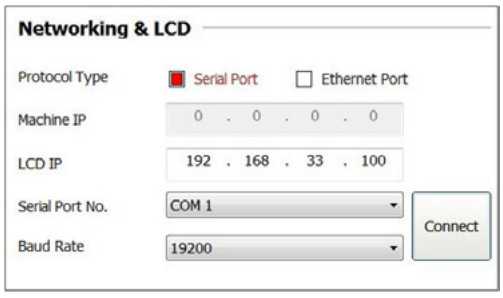
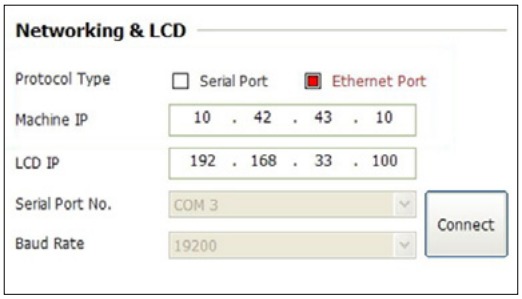
IMPORTANT	**PaX-i has a unique feature– packing mode– built into the system to prevent the unit from being damaged while shipping and transporting. Thus, it is in the packing mode by factory default. The unit is required to exit the packing mode at this step for a successful installation.**
⚠ CAUTION	**Unless the packing mode disabled, no operation will happen even after the equipment is turned on.**

1. From the main GUI window, click the setup icon highlighted by the red box in the figure below.

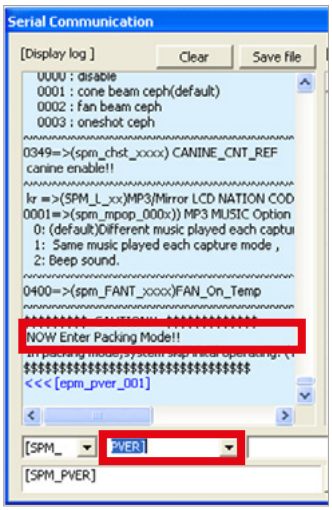
2. When the following screen appears, select Engineer. Then enter the password in the Password field. Password: vatech



3. Click **General tab → Connect**

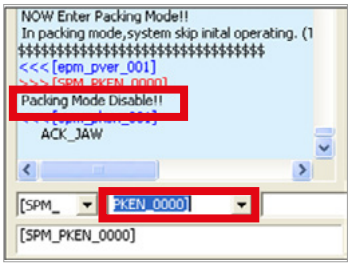
Serial interface type	Ethernet interface type
Serial Port: Checked Port: COM1 Baud rate: 19,200	Serial Port: Checked Port: COM1 Baud rate: 19,200
	

4. Enter the command **PVER**] to verify the current mode. Note that the equipment is now in packing mode.



5. Enter the command **PKEN_0000**] to exit the packing mode. Now note that the equipment is out of the packing mode.

   Note: to re-enter the packing mode, use the command: **PKEN_0001**].

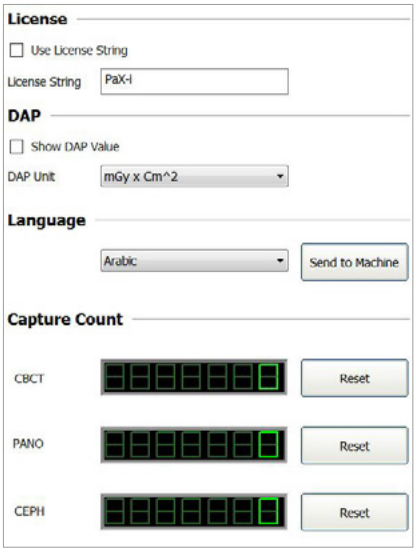


6. Click the **Exit** button and terminate the control panel.
7. Exit the imaging program (main GUI): important!
8. **Reset the equipment to take the changes into effect**

Configuring the parameters

IMPORTANT	**The following information should be entered, in accordance with the user requirements**

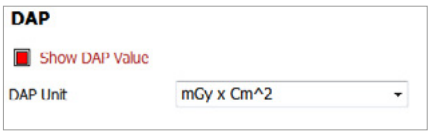
1. Run EzDent-i and call the imaging program.
2. Click the setup icon to enter the control panel.



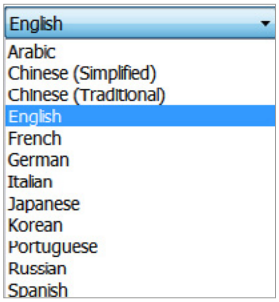
3. Click the **User** tab.

4. Set the Use License String option in the License field. When checked, the character string in the **License String** field is displayed on the left of the image. By default, the equipment name is displayed.

5. Set the unit for the DAP (Dose Area Product) value which is displayed on the screen. You can expand the menu to see more units.



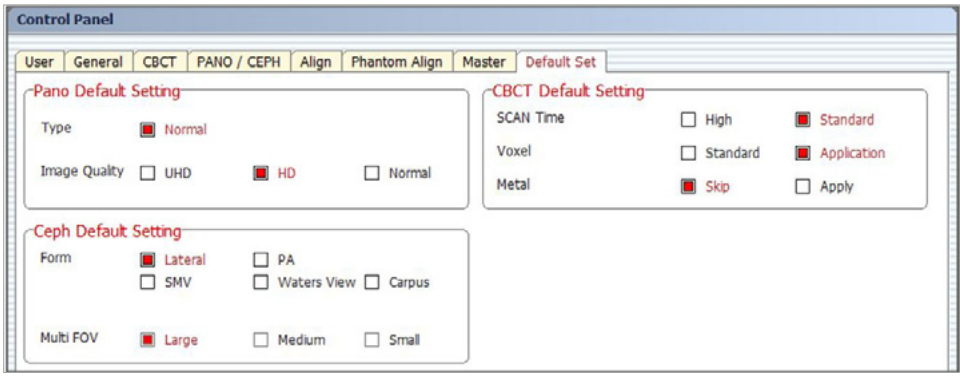
6. Select your language, followed by **Send to Machine**.



7. Click the **General** tab and enter the serial number of the equipment.

8. Click the Default Set button.

Imaging program: default	
PANO	Normal, HD
CEPH(Option)	Form: Lateral, Multi FOV: Large



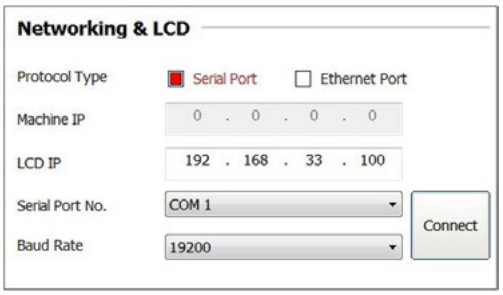
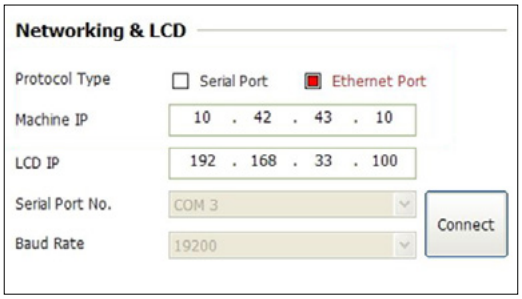
Selecting an Announcement Mode: Music or Beep (Optional)

When the need to select an announcement between music and beep arises, take the following procedures.

Commands specification:

Command format: [SPM_MPOP_XXXX]			
XXXX	**Imaging Modes**	**Announcement mode**	**Comments**
0000	PANO/CEPH	music	Different for each imaging mode
0001	PANO/CEPH	music	The same for both modes
0002 (Default)	PANO/CEPH	Beep	The same for both modes

1. Click the **General** tab.
2. After verifying the parameters below, click **Connect.**

Serial interface type	Ethernet interface type
Serial Port: Checked Port: COM1 Baud rate: 19,200	Serial Port: Checked Port: COM1 Baud rate: 19,200
	

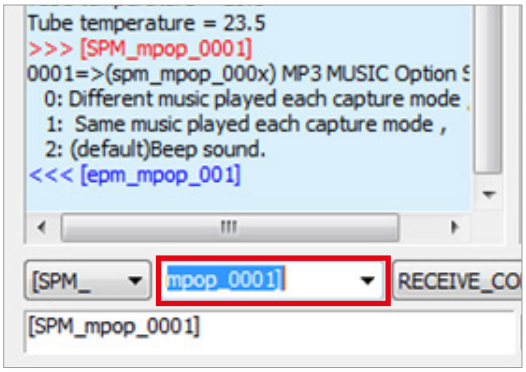
3. Send the command in accordance with the command specification, as specified in the table above.

   Here are some examples.

   Default mode: 0002(beep) for each imaging mode.

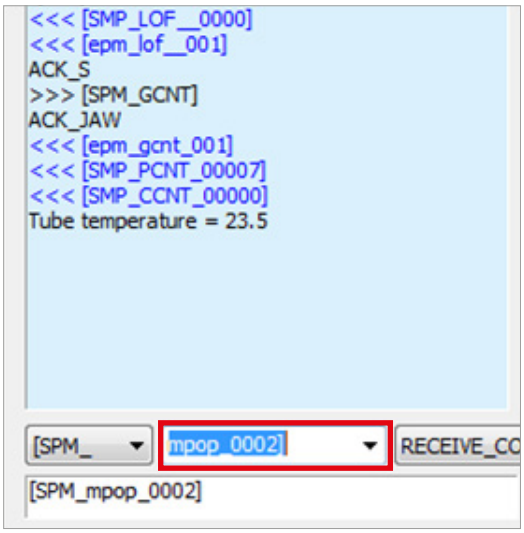
   When the same music announcement is desired for CEPH and PANO imaging modality

   Enter the command **[SPM_MPOP_0001]** in the command field, followed by **Send**.



   When the same beep announcement is desired for CEPH and PANO imaging modality

   Enter the command **[SPM_MPOP_0002]** in the command field, followed by **Send**.



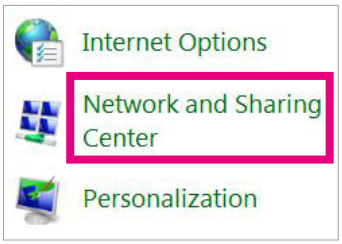
Finalizing the Parameters Settings

1. Click **Exit** → **Save->Close** button and terminate the control panel.
2. **Exit the imaging program (main GUI): important!**
3. **Reset the equipment to take the changes into effect**

9.4 Setting up the IP Address for the Crong Board

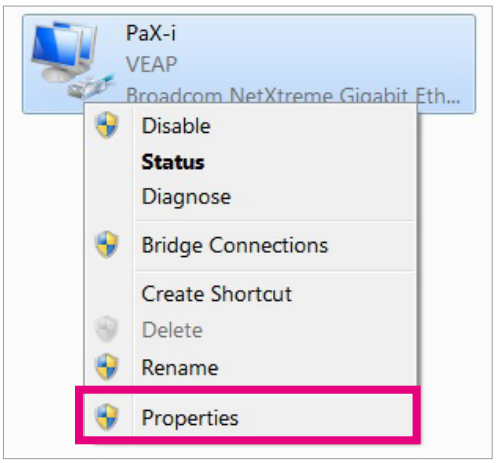
Changing adapter settings

1. Open Windows control panel.
2. Locate the **Network and Sharing Center.**

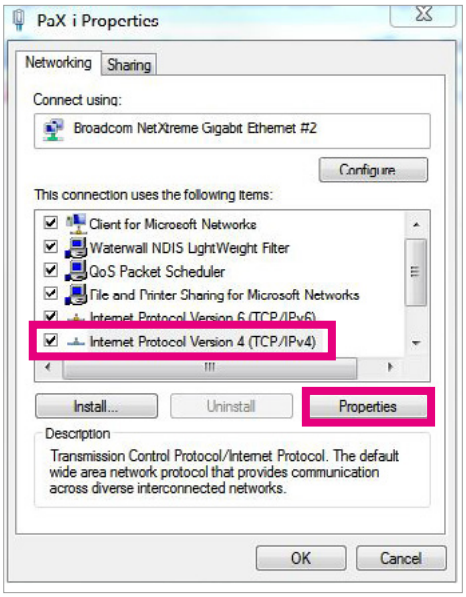


3. Click the **Change adaptor settings.**

4. Rename the Network, e.g. **PaX-i** and click on the mouse right button. Then select Properties.



5. **Select Internet Protocol Version 4. Then click Properties.**

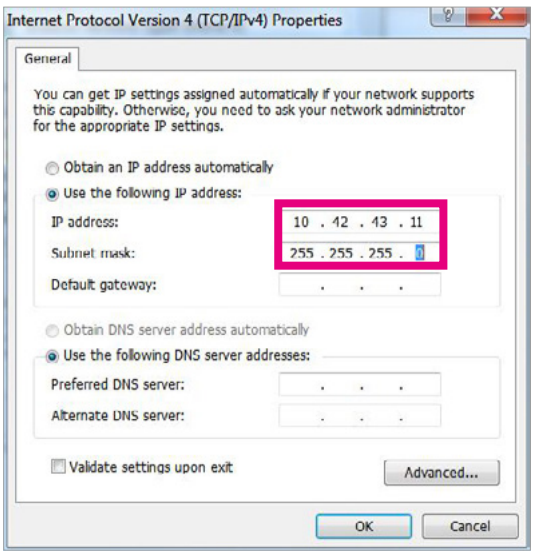


Entering new IP Address

1. From the following control box, enter the new IP address. Leave the other fields by default.

   IP address: 10.42.43.11(recommended)

   Subnet mask: 255.255.255.0



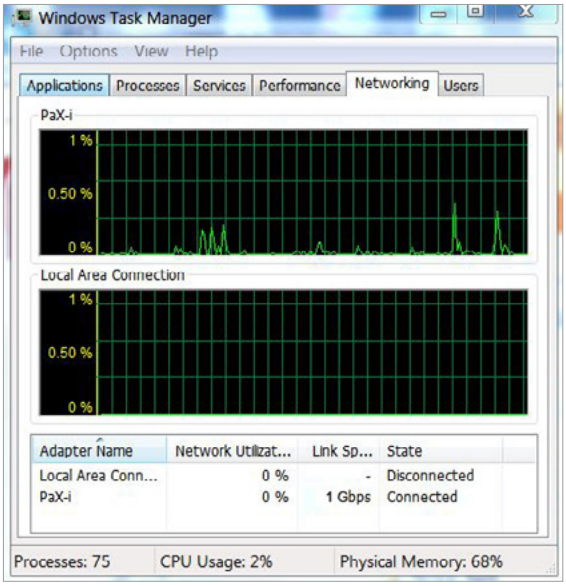
2. Click **OK.**

Verifying the status of the connection between the Crong board and PC

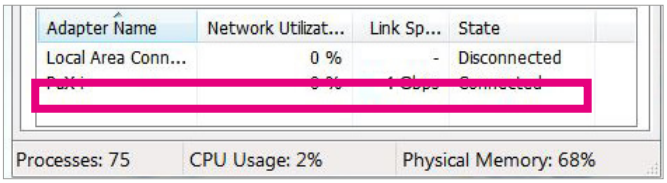
NOTICE

Note that it is perfectly normal to have the yellow exclamation mark on a LAN network icon, even when a communication connection is being established successfully.

1. Ensure PC and the equipment are connected through LAN cable.
2. Ensure the equipment is ON.
3. Start **Task Manager** from the desktop and click the **Networking** tab.



4. Check that the link speed is 1 Gbps.



5. If not, it indicates that the connection is not established correctly.

   To solve this problem, do take the following procedures.

   5-1 Turn OFF both PC and the equipment.

   5-2 Reboot PC system

   5-3 Turn On the equipment and wait for 1 minute. Then consider the connection status again.

6. If solved. OK. Otherwise. Check the following.

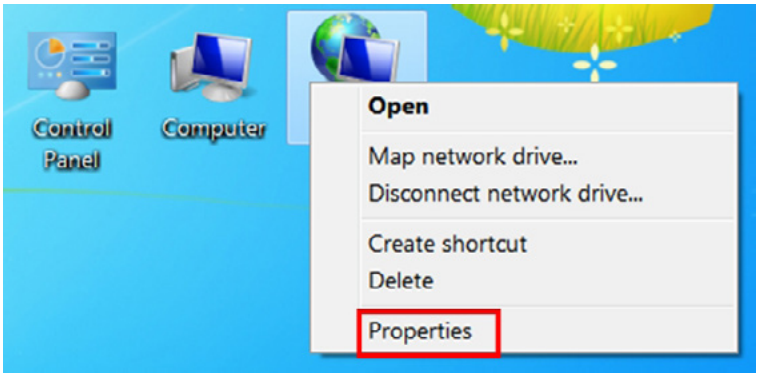
   6-1 Try with another LAN cable and check the connection points.

   6-2 Replace the LAN card with one that VATECH recommends.

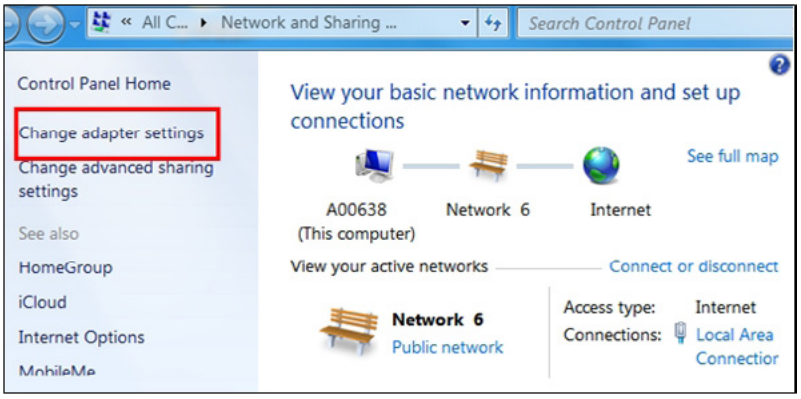
9.5 Setting up the IP Address for the OS CEPH Sensor(Optional)

For the **OS CEPH** sensor to communicate with the **PC**, the proper IP address should be set on the PC. The following screenshots are taken in Windows 7.

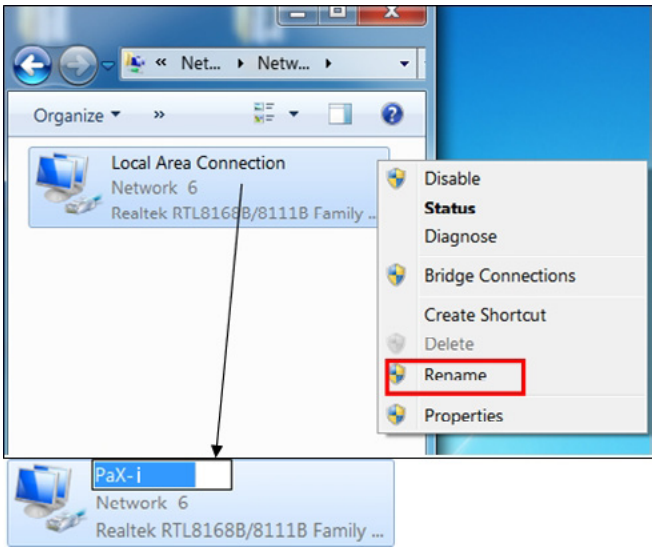
1. From the desktop, click the right button of the mouse on the **Network** icon.



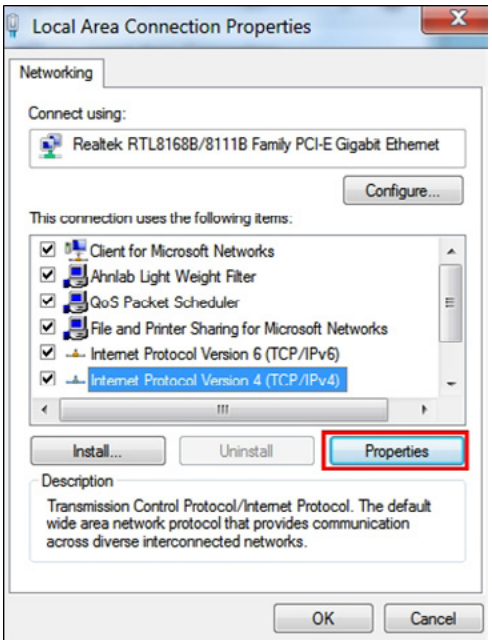
2. Double click the **Properties.**
3. Select **Change adapter settings.**



4. Click the right mouse button on the **Local Area Connection** and select the **Rename** to change its network name to **PaX-i.**



5. From the following figure, select the Internet Protocol Version 4 and click Properties.

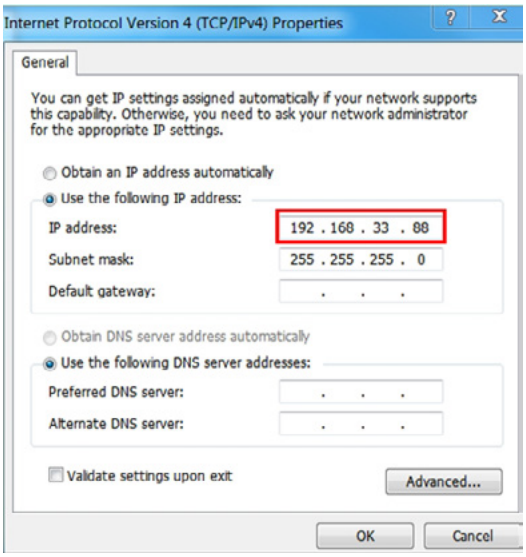


6. To set the new IP address.

6-1. Move to **Use the following IP address.**

6-2. Enter the IP address: **192.168.33.88** and leave the other fields at the default.

6-3. Click **OK.**



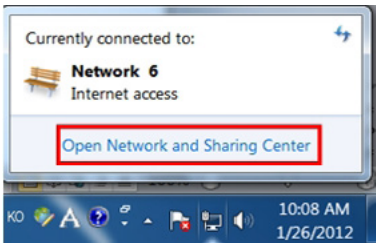
7. Reset the PC and equipment.

Checking connection status

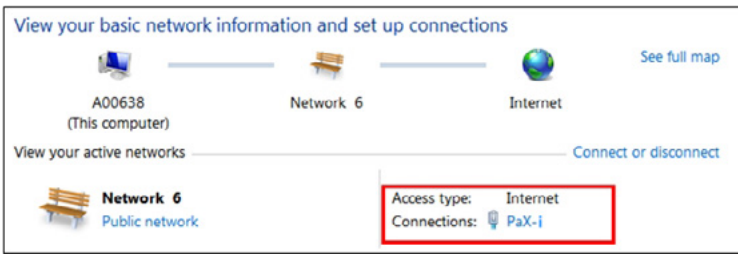
8. Check the connection status between the PC and the touchpad screen in the following manner.

8-1. Click the left button of the mouse on the network icon of the taskbar.

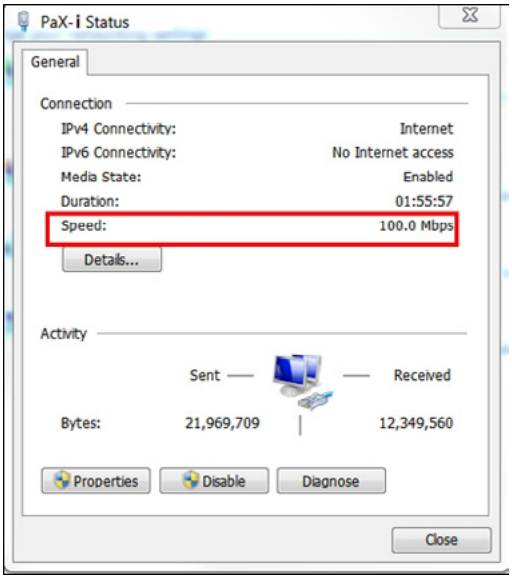
8-2. Select **Open Network.**



8-3. Click the **PaX-i** for the following figure.



8-4. Check the speed: 100.0 Mbps. If it is, a connection is successful.



9. Reset the equipment to take the changes into effect.

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10

Acquiring the Test Image

Acquiring the test image

1. Perform the test image acquisition after the software is installed.

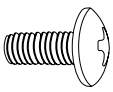
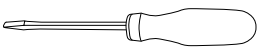
2. Ensure that the collimator is well aligned.

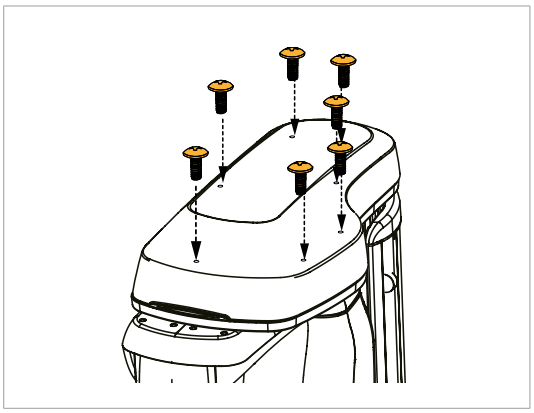
IMPORTANT	**When the collimator is misaligned, the correct test image can't be obtained, in which case the alignment correction must be performed first, according to the technical manual.**

3. Acquire the test image. For further details about the image acquisition, refer to the accompanying user manual.

IMPORTANT	**For the equipment with the Cephalometric unit, if the noisy image on the lower part appears, this is caused by the improper leveling between the CEPH and the column units. Level the CEPH unit again.**
	For other issues related to the image, refer to the section(s) regarding X-Ray alignment in the accompanying service manual.

Assembling the vertical frame cover

Truss bolts	M4 x 8 Part No.24 Qty: 9	
Philips screwdriver w/ magnetic tip	L=200 mm(7.9")	



1. Assemble the vertical top cover and fix it with 7 truss bolts**(Part No.24).**

11

Technical Specifications

11.1 Mechanical Specifications

Image Magnification

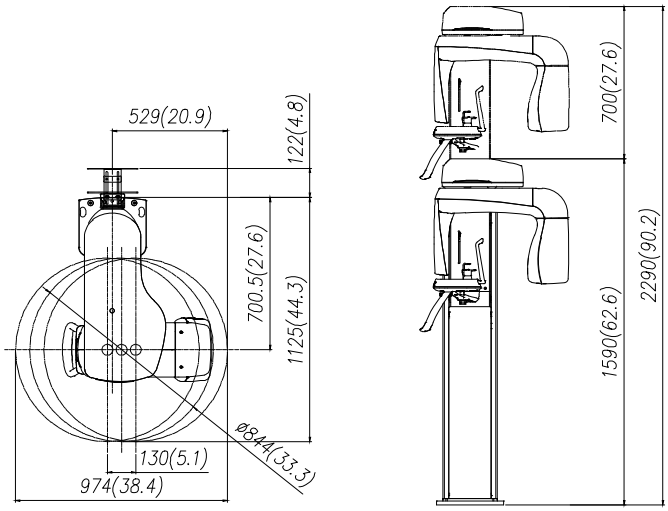
Mode	FDD (mm)	FOD (mm)	ODD (mm)	Magnification
PANO	490.3	375.5	114.8	1.3 constant
CEPH	1,745	1,524	221	1.14 constant

- **FDD:** Focal Spot to Detector Distance
- **FOD:** Focal Spot to object Distance
- **ODD:** Object to Detector Distance (ODD = FDD – FOD)
- **Magnification** = FDD / FOD

Dimension of the Equipment

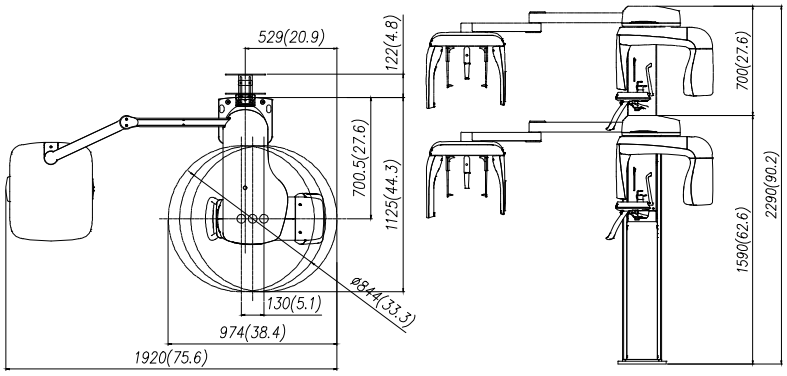
Item		Description
Weight	Without CEPH unit	90 kg (198.4 lbs.)
		With base: 137 kg (302 lbs.)
	With CEPH unit (Scan type)	120 kg (264.5 lbs.)
		With base: 167 kg (368.1 lbs.)
	With CEPH unit (One-shot type)	130 kg (286.6 lbs.)
		With base: 177 kg (390.2 lbs.)
Total height		Max. 2,320 mm (91.34 in.)
Vertical column movement		Max. 700 mm (Max. 27.56 in.)
Length x Width x Height	Without CEPH unit	990(L) x 1,247(W) x 2,320(H) mm (38.98(L) x 49.10(W) x 91.34(H) in.)
	With CEPH unit (Scan Type)	1,920(L) x 1,247(W) x 2,320(H) mm (75.19(L) x 49.10(W) x 91.34(H) in.)
	With CEPH unit (One-shot Type)	1,930(L) x 1,247(W) x 2,320(H) mm (75.98(L) x 49.10(W) x 91.34(H) in.)
Type of installation		Base Stand / Wall-mount

Without Cephalometric Unit & Non-Base type



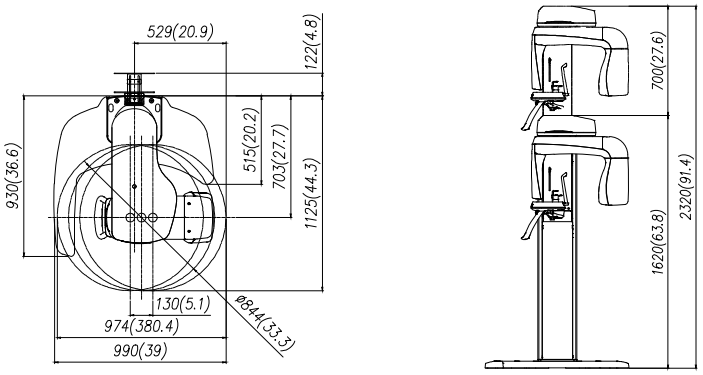
[Unit: mm (inch)]

With Cephalometric Unit & Non-Base type



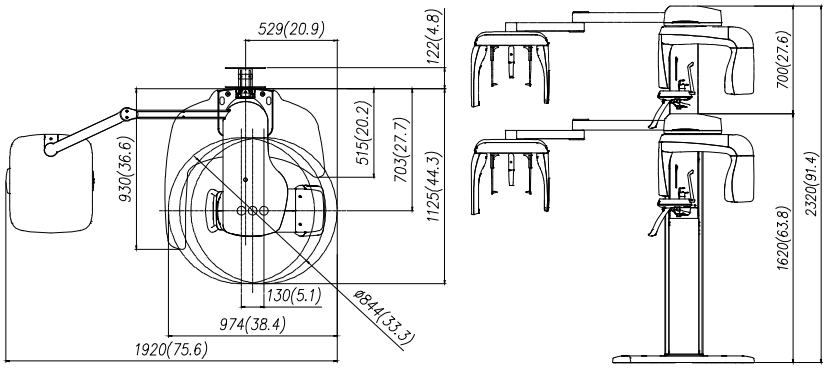
[Unit: mm (inch)]

Without Cephalometric Unit & Base type



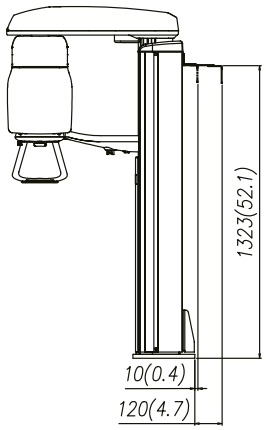
[Unit: mm (inch)]

With Cephalometric Unit & Base type



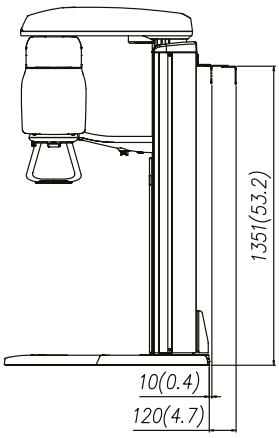
[Unit: mm (inch)]

Common Dimension(Non-Base type)



[Unit: mm (inch)]

Common Dimension(Base type)



[Unit: mm (inch)]

11.2 X-Ray Generator Specifications

Item			Description
Model			HDG-07B10T2
Rated output power			0.9 KW
High voltage Generator	Type		40 KHz Inverter Type
	Normal/ Pulse	kV	50 ~ 90
		mA	4 ~ 10
	Cooling		Automatically controlled / Protect ≥ 60℃ Option: Air Cooling
	Total filtration		2.8 mm Al eq.
X-Ray Tube	Manufacturer		Canon Electron Tubes & Devices
	Model		D- 052SB (Stationary Anode Type)
	Focal spot size		0.5 mm (IEC60336)
	Target angle		5 °
	Inherent filtration		At least 0.8 mm Al equivalent at 50 kV
	X- Ray coverage		95 x 380 mm at SID 550 mm
	Anode heat content		35 kJ
	Duty cycle		**1:60 or more (Exposure time : interval time)**

Serial No. notation

S/N	XXXX Size (mm)	XXX	XX	XX	XX	XXX	XXXX
	Model	Tube	Inverter ver.	F/W Ver.	Weekly code	Yearly code	serial

11.3 Electrical Specifications

Item	Description
Power supply voltage	AC100-120 V / 200-240 V
Frequency	50/ 60 Hz (Single)
Power rating	Max.2.0 kVA

- The input line voltage depends on the local electrical distribution system.
- Allowable input voltage fluctuation requirement: ± 10 %.

11.4 Environmental Specifications

Item		Description
During operating	Temperature	10 ~ 35 ℃ (50 ~ 95 ℉)
	Relative humidity	30 ~75 %
	Atmospheric pressure	860 ~ 1060 hPa
Transport and storage	Temperature	-10 ~ +60 °C(14~ 140 ℉)
	Relative humidity	10 ~ 75% non-condensing
	Atmospheric pressure	860 ~ 1060 hPa

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Appendix

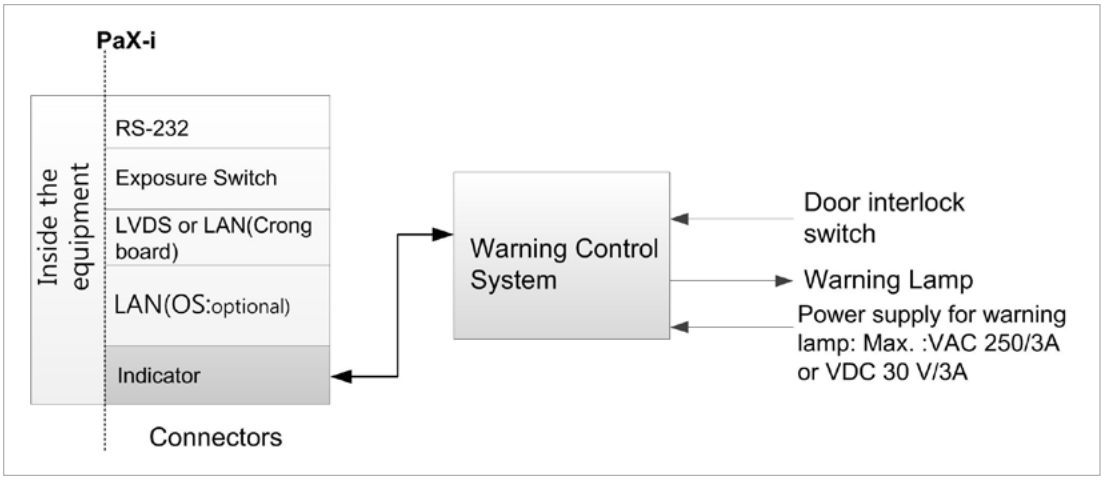
A. Installing the Warning Lamp and Door Interlock Switch

Requirements:

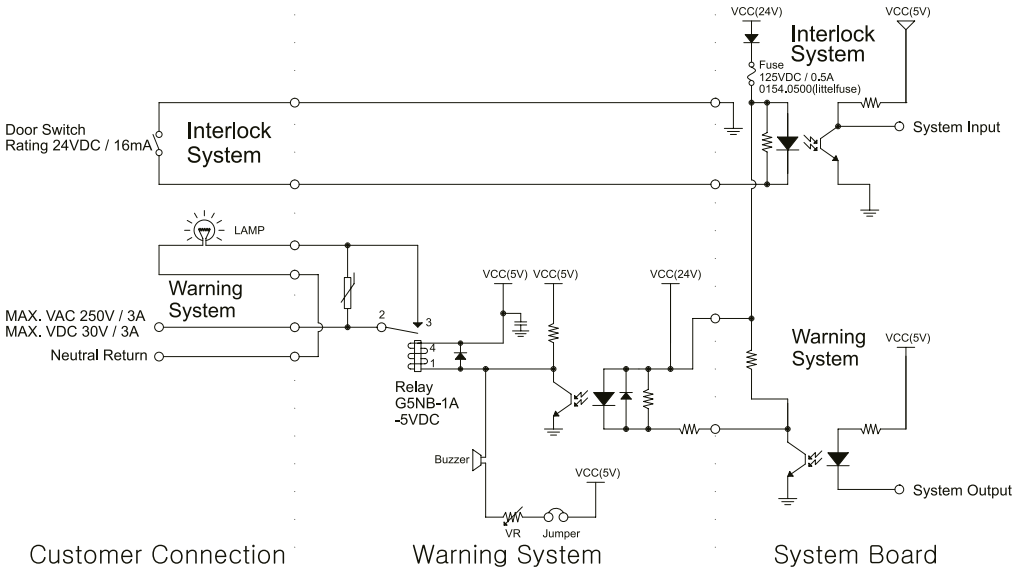
1. The warning control system shall be connected to the ERB (earth reference bar) of the room that it is associated with.
2. The switching arrangements, location, height, and a number of illuminated warning signs shall be agreed with the local radiation protection advisor (RPA). (customer)
3. A fluorescent lamp shall not be used in the 'X-rays on' sign.
4. The customer shall be responsible for the proper installations for the warning control system, including the lamp and door interlock switch, based on the MEIGaN guideline.

   MEIGaN: Medical Electrical Installation Guidance Notes
5. Pre-installation planning is crucial to the successful installation of these devices.
6. For further details, refer to the accompanying volume: Specification for Electrical Installation

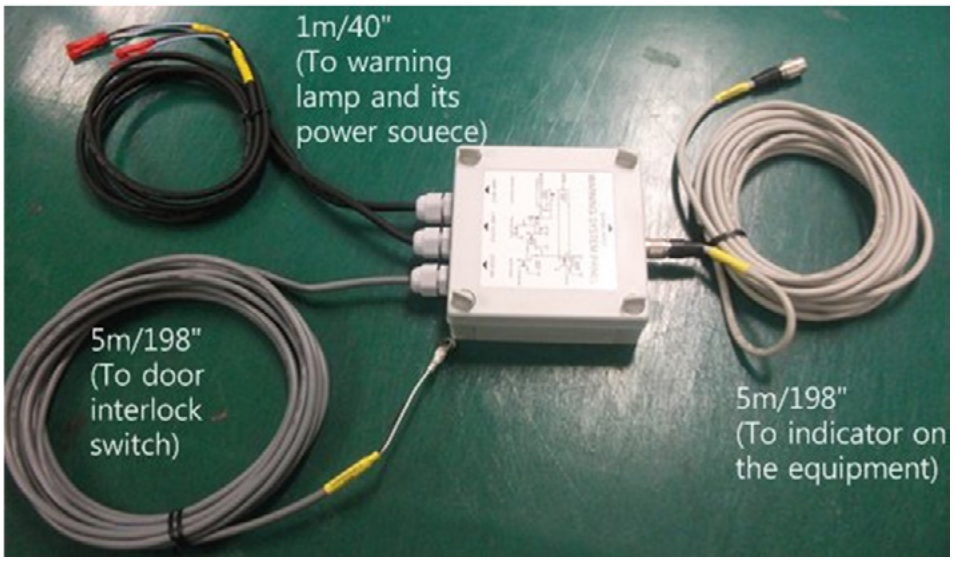
Block diagram:



Schematic diagram:



Components supplied:



Procedures:

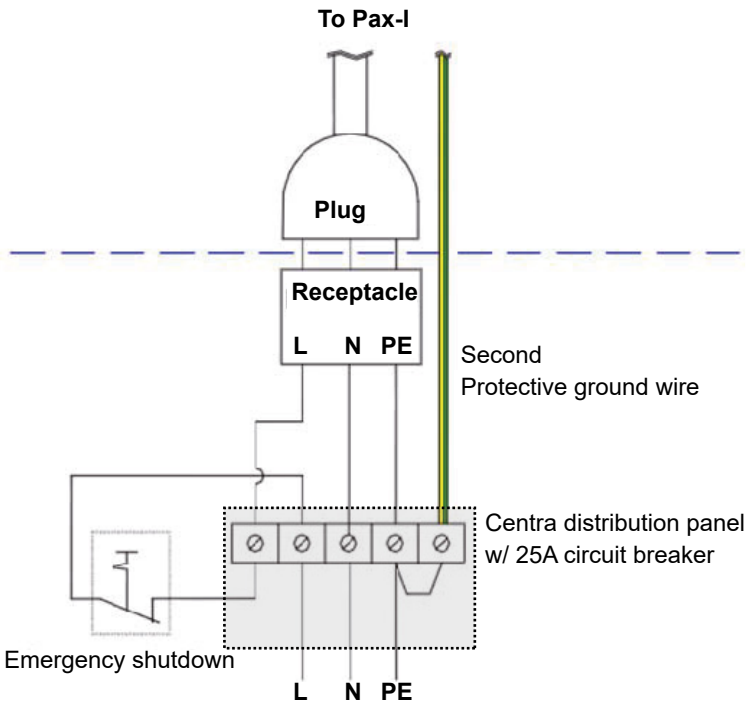
The individual cable length:

- Signal cable: 5m/198”
- Door interlock cable: 5m/198”
- Warning lamp: 1m/40”
- Power source cable: 1m/40”

1. Prepare the Warning System Panel (Part No.28).
2. Install the Warning System Panel at the proper height after taking each cable length into account.
3. Connect the warning lamp(not provided)
4. Connect the door interlock switch (not provided).
5. Connect the power source for the warning lamp.

B. Installing the Emergency Switch

- Install the emergency switch stop switch on the power cable line.
- Install this switch so that it is easy to reach in the emergency case but can't be pushed by mistake.
- The switch shall be a type of mistake-proof.
- The switch is not supplied.
- The switch shall be installed at a height of 1.2 to 1.5 meters(47 to 60").



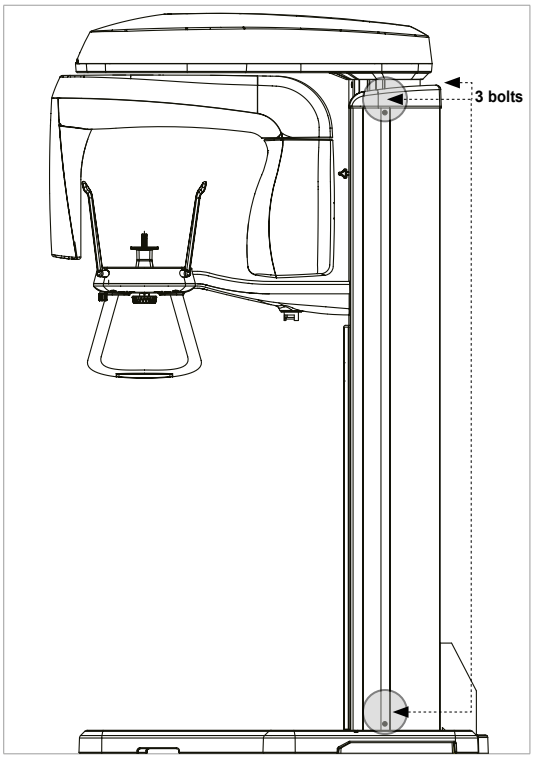
1. The cable sizes: N, L and PE≥ 12 AWG(3 x 4 mm^2).
2. The cable to the emergency switch shall be the same size as the power cable itself.
3. Install the socket connector terminal for the 2nd protective ground wire.

C. Limiting the Column Height

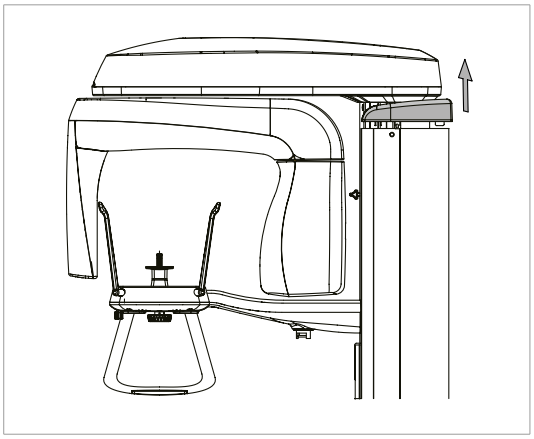
This section explains how to limit the column height within the permissible range.

1. Measure the ceiling height in the X-Ray shield room: $H_{ceiling}$

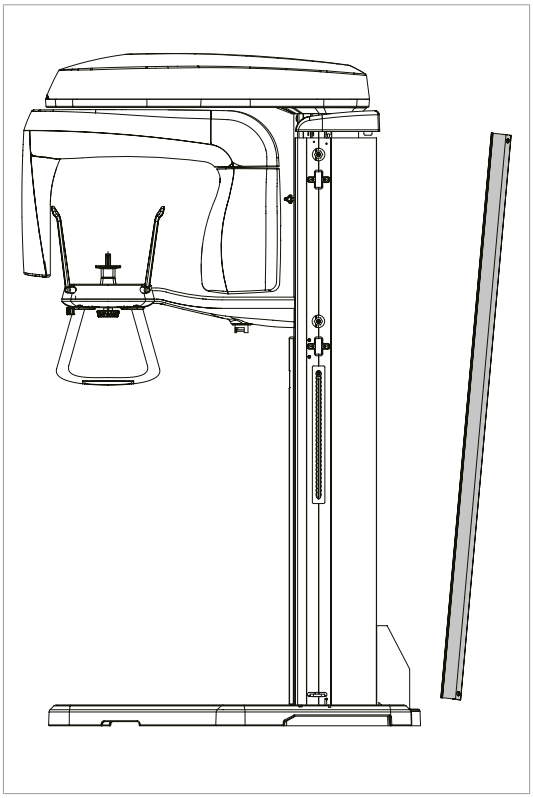
Removing the side cover



2. Remove 3 bolts at the following locations.



3. Lift up the cover and remove it.



4. Separate the side cover.

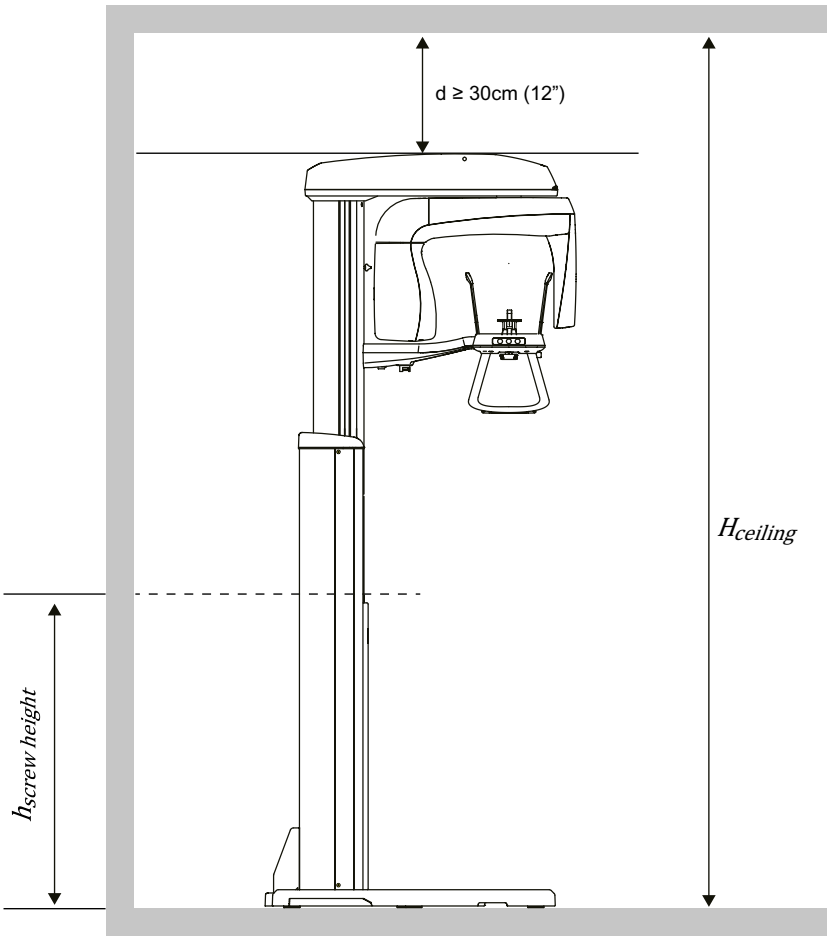
Determining the height

1. Determine the screw height using the following formula.

$h_{screw\ height}=H_{ceiling}-d$

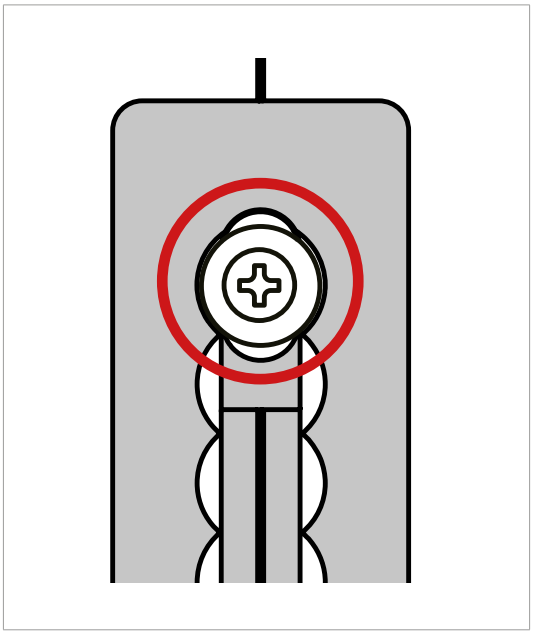
, where d is the distance between the ceiling and the top of the equipment when the column is fully extended (at least 30 cm (12”) is desired).

Ex): Let d=30 cm, $H_{ceiling}$=250 cm (99”), then $h_{screw\ height}=H_{ceiling}-d$=250-30=220 cm, which means that the screw should be installed at this height.



Adjusting the screw height

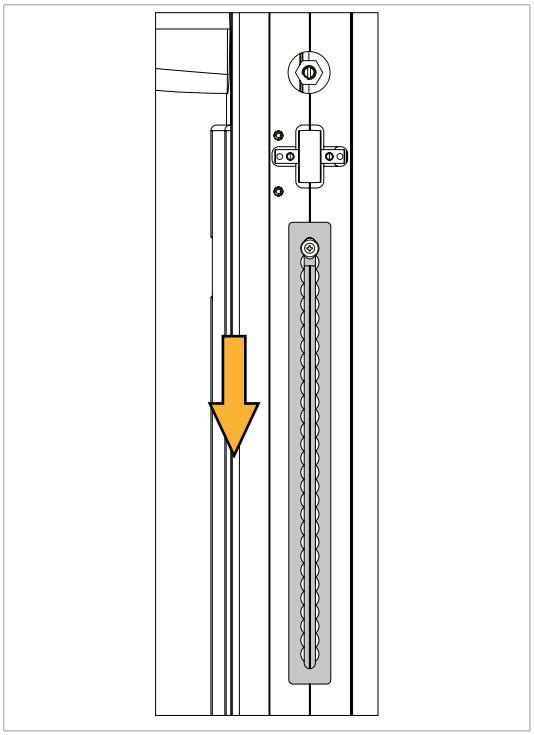
We know the screw height is 220 cm from the previous example. So, we will move the screw from the default (current) position to the new one.

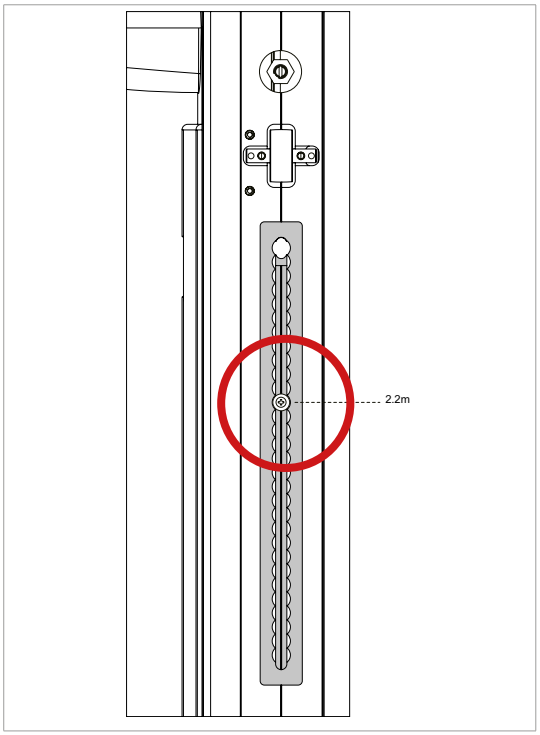


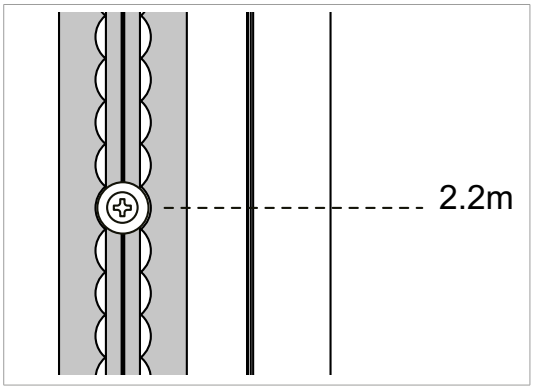
1. Loosen the bolt halfway **(important!).**

IMPORTANT

Do not unscrew completely the bolt or it could drop into the column, causing big trouble to retrieve it out.







2. Looking up the scale (shaded area), slide the screw down to a new location (220 cm) and fix it back.

Putting the cover back

3. Put the covers back in reverse order.

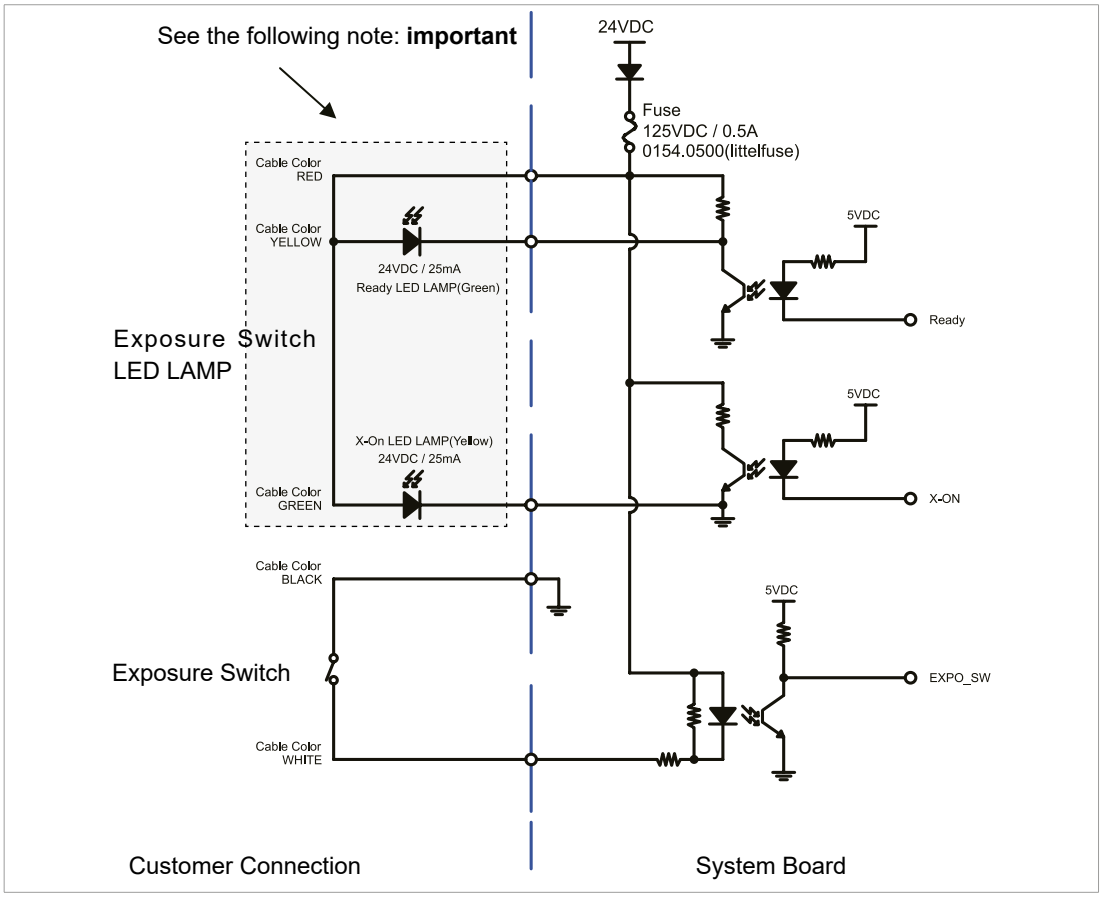
4. Fix them with 3 bolts.

D. Connecting the Third-party Exposure Switch(Optional)

This section explains how to connect the third-party exposure switch with the equipment from VATECH.

How-to:

1. Cut the exposure switch cable provided with the equipment.
2. According to the following schematic diagram, rewire the cables.
3. Double-check the wiring before use.



Note: tape the end of each unused wire to prevent the wires from causing an inadvertent short circuit

E. Checking PC BIOS Settings

Lenovo PC BIOS Setup

PC Model: Lenovo M82

PC BIOS default			
Main Menu	**Sub1 Menu**	**Sub2 Menu**	**Setup Value**
Devices	Network Setup	Boot Agent	[Disable]
Power	Enable Power Saving		[Disable]
Power	Automatic Power On	Wake on LAN	[Disable]
Advanced	CPU Setup	Hyper-Threading Technology	[Disable]

HP PC BIOS Setup

PC Model: HP Z420

PC BIOS default			
Main Menu	**Sub1 Menu**	**Sub2 Menu**	**Setup Value**
Security	Network Service Boot		Disable
Power	OS Power Management	Run Time Power management	Disable
Power	Automatic Power On	Idle Power Saving	Normal
Power	Automatic Power On	USB Wake on Device	Disable
Advanced	Device Option	S5 Wake on LAN	Disable

F. Reallocating Memory Space

Background:

The 32-bit memory space of the Microsoft Windows operating system based on the virtual memory Scheme is divided into two regions: **User space** and **Kernel space**, each having 2GB.

These spaces are adjustable within the 4 GB limit. Thus, for the applications handling heavy data the expanded memory space sometimes needs to be allocated beyond the 2 GB limit.

Problem:

For the case of reconstructing the acquired image in the CT mode, which manages with the huge, voluminous data generated by the PaX-Reve3D, PaX-Zenith3D or PaX-Duo3D Plus, it is necessary to expand the user space to have 3 GB of virtual memory.

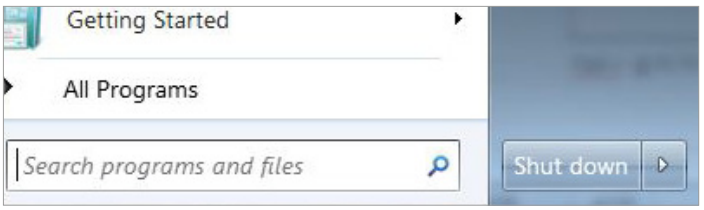
In this scenario, the problem would arise when the graphics card with more than 512 MB memory on board is used in this circumstance(less than 1GB memory for the OS).

Solution:

For the Windows Vista or 7 users:

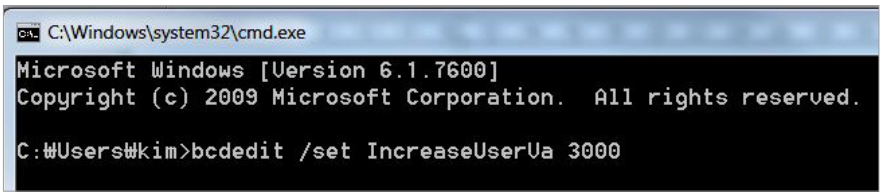
1. Click **Start**.

2. In the command line window, press the **CMD** and **Enter**.



3. From the console window, enter the following line of commands followed by pressing **Enter.**

bcdedit /set IncreaseUserVa 3000

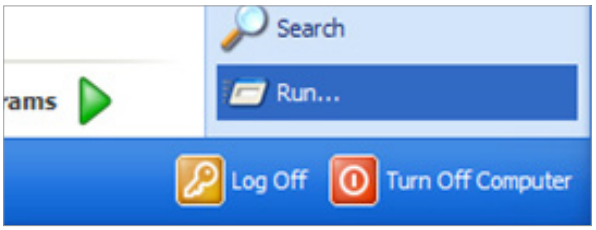


4. Reboot the system.

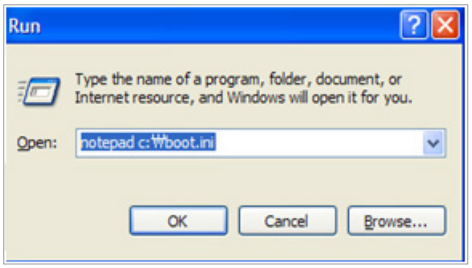
For the Windows XP user.

We need to edit the boot.ini, which is the hidden system file in the folder of Windows in C: drive. To edit this file, do the following.

1. From the desktop, click **Start**.
2. Click **Run**.

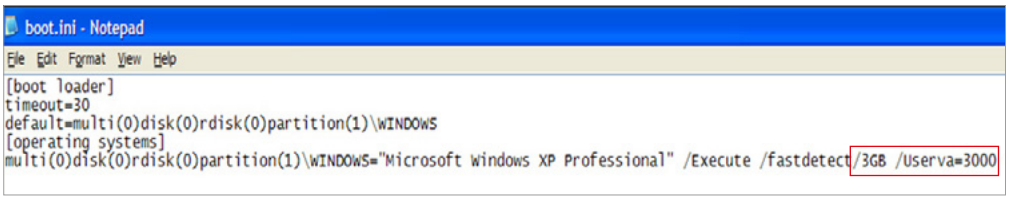


3. Enter "**notepad c:/boot.ini"** and click **OK**.



Then the current configuration on the PC is shown.

4. Add the "**/3GB /USERVA=3000**".



5. Save it by clicking the **file**.
6. Reboot the system.

G. Installation checklist

1. General information:

Customer

Information about the equipment purchaser	
Name of Clinic or Hospital	
Address	
Phone	
E-Mail	
Website	

Dealer

Information about the equipment seller	
Name of dealer	
Address	
Phone	
E-Mail	
Website	

2. Installation information:

Address of Installation site	
Names of installers	
The scheduled date for installation	
Date of installation	
Model	
Serial No.	

3. System delivery to site:

	Yes	No
Did you review and identify the delivery route and method for equipment in advance?	☐	☐
Is the freight elevator available?	☐	☐
Is the security guard, if any, notified of the installation in advance?	☐	☐
Are two installers, including the helpers, available to move and unload the equipment?	☐	☐

4. Before installation:

Site checklist

	Yes	No
Is the room large enough? At minimum, • with CEPH unit: 2,820 mm(L) x 2,147 mm(W) x 2,320 mm(H) / 111”(L) x 85”(W) x 92”(H) • without CEPH unit: 1,890 mm x 2,147 mm x 2,320 mm(H) / 75”(L) x 85”(W) x 92”(H)	☐	☐
Is the door entrance wider than 800mm (32”)?	☐	☐
Is a radiation protection plan in place?	☐	☐
Do equipment and PC use same dedicated circuit?	☐	☐
Do the electrical input conditions to the installation site meet the MEIGaN requirements?	☐	☐
Is the local Network IP address of clinic 192.168.33.xx?	☐	☐
Is a compressor or air conditioner suction located right next to X-ray Room?	☐	☐
Is the floor flat and level?	☐	☐
Is the carpet on the floor? If so, remove it	☐	☐

Before opening Boxes

	Yes	No
Did the delivery company carry and handle with caution?	☐	☐
Did the installers take pictures of boxes before opening?	☐	☐
Did the installer make sure there are not any suspicious holes or scratches on the box?	☐	☐
Is the ShockWatch indicator red?	☐	☐
Is the TiltWatch indicator red?	☐	☐

After opening Boxes

	Yes	No
Did the installers make sure there are not any scratches or broken surface equipment?	☐	☐
Are all accessories and cases included in the box?	☐	☐
Have you read the installation manual out in its entirety before starting the installation?	☐	☐
Did the installer take pictures after opening the boxes?	☐	☐
Did the installer make sure there are not any suspicious holes or scratches on the box after opening?	☐	☐

5. While installing equipment

	Yes	No
Are installers careful with any sensitive parts while carrying equipment?	☐	☐
Did the installers make sure that various cables, especially optic cables, are not coiled too much?	☐	☐
Did the installers perform installations, according to the manual?	☐	☐
Did the installers not touch or place pressure on sensors while installing?	☐	☐
Did tje installers make sure harness and equipment are well connected and not damaged?	☐	☐
Did the installers check if the emergency button (switch) is working properly?	☐	☐
Did the equipment be well balanced?	☐	☐

6. After installation

	Yes	No
Does the chin rest successfully initialize after turning on the system?	☐	☐
Are the cables organized well?	☐	☐
Is it OK after checking visually the equipment?	☐	☐
Is the normal voice message audible during system initialization after turning on the system?	☐	☐
Does the LED on the front of the equipment turn green?	☐	☐
Do the equipment Up/Down switch works properly?	☐	☐

7. Software compatibility

	Yes	No
Anti-virus software installed?	☐	☐
A firewall installed? If yes, indicate software or hardware	☐	☐
	Type:	
Is the third-party software installed? If yes, indicate the name(s) and versions	☐	☐
Are they compatible with software from VATECH? If No, indicate the name(s) and versions	Version:	

8. Eletrical requirements:

	Yes	No
Is the circuit breaker installed and tested in the distribution panel for over-current protection w/ 20A?	☐	☐
Is internal line impedance checked? $Z_{input} \leq 0.5\Omega$	☐	☐
Does equipment and PC use same dedicated circuit?	☐	☐

9. Network Configuration:

	Yes	No
Is a network configured with 1 Gbit/s of CAT5?	☐	☐
Is the equipment connected to the network?	☐	☐
Is the network installation company identified?	☐	☐
What is the TCP/IP address assigned?	Address:	
What is the subnet masking address?	Address:	
Is there a DHCP server?	☐	☐

Installation Report

vatech

Date of Installation		Reporter		Company	

A. Installation Site Information

Name of a clinic		Name of a doctor	
Address		E-mail of a doctor	
City		State & Zipcode	
Contact Info.		Country	

B. Equipment Information

Model & System SN.		2D / 3D	2D□ 3D□

C. Electrical Requirements

*Voltage(V)	V	* Ground Connection Status	YES□ NO□

D. Checklists(Installers)

NO.	Confirmation	Installer	Customer
1	Informed of the installation procedures before the installation	YES□	YES□ NO□
2	Product has been delivered safely to the customer	YES□	YES□ NO□
3	Power grounding status has been checked and the customer was informed of the necessity of it	YES□	YES□ NO□
4	The normal image has been acquired during test image acquisition	YES□	YES□ NO□
5	Informed the usage of a product and software after the installation	YES□	YES□ NO□
6	Arranged the working environment after the installation. (PC Cable arrangement/Cleaning)	YES□	YES□ NO□
7	The customer has been informed of C/S contact information.	YES□	YES□ NO□

E. Checklists(Customers)

NO.	Confirmation	Customer rating
	Please rate your satisfaction with each of the following: 5 very satisfied, 1 very dissatisfied	
1	**Product design**	**1 ------ 2 ------ 3------ 4 ------ 5**
2	**Training for the usage of the product**	**1 ------ 2 ------ 3------ 4 ------ 5**
3	**Training for the usage of the software**	**1 ------ 2 ------ 3------ 4 ------ 5**
4	**Captured image of PANO(CEPH/CT)**	**1 ------ 2 ------ 3------ 4 ------ 5**
5	**Usability of the product**	**1 ------ 2 ------ 3------ 4 ------ 5**
6	**Usability of the software**	**1 ------ 2 ------ 3------ 4 ------ 5**
7	**Comprehensibility of the User manual**	**1 ------ 2 ------ 3------ 4 ------ 5**

F. Customer Agreement for Collection and Use of Personal Information

Collection of Personal Information:

We, Vatech, collect personal information when installing equipment as essential data to improve our services as well as communication with the customers. (Name of a clinic, name of a doctor, address of a clinic, contact information and e-mail address).

Purpose of Collection and Use of Personal Information:

1. Develop new services and offer customized services.
2. Resolve the customer claims and provide information about promotion and events and opportunities to participate.
3. Survey customer satisfaction with equipment to understand the customers' needs.

Signature for Agreement

1. I agree with the collection of personal information for the supply of customized service and customer service. YES□ NO□
2. I agree to receive emails about the customer satisfaction survey and common information YES□ NO□

Name **Signature**

G. Signature for Installation Completion Confirmation

***Name of Installer (Signature)**		***Name of Customer (Signature)**	

***Please send installation completion report to the subsidiaries (agent offices) and the headquarters, with the images captured during installation.**

E-mail: gcs@vatech.co.kr / FAX: +82-02-576-2210

Manufactured by VATECH Co., Ltd.

Tel: +82-1588-9510
Email: gcs@vatech.co.kr
Website: www.vatech.com

Headquarters: 13, Samsung 1-ro 2-gil, Hwaseong-si, Gyeonggi-do, Korea
Factory: 13, Samsung 1-ro 2-gil, Hwaseong-si, Gyeonggi-do, Korea

Australia Sponsor; VATECH Medical Pty Ltd.
ABN: 78 155 258 923
Address: Suite 5.04 Gateway Business Park 63-79 Parramatta Road, Silverwater, NSW 2128
Tel : 1300 789 454 (+61 2 9644 4866)
E-mail: info@vatechanz.com.au

English

PaX-i™

13, Samsung 1-ro 2-gil, Hwaseong-si, Gyeonggi-do, Republic of Korea
ZIP Code : 18449
www.vatech.com