

VSP

Dental PSP Scanner

User Manual

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Rev. No.: 03



VSP

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Contact

vatech france

Vatech-france

Vatech Global France

Campus Aviso Bat B

13-15 rue Jean Jaures

92800 Puteaux

Tel: +33-1-64-11-43-30

Fax: +33-1-64-11-43-39

Website: www.vatech-france.fr

E-mail: info@vatech-france.fr



OBELIS S.A

Bd. Général Wahis 53, 1030 Brussels,
Belgium

Tel: 32-2-732-59-54

Fax: 32-2-732-60-03

Website: www.obelis.net

E-mail: mail@obelis.net

Electromagnetic Compatibility (EMC)

This equipment has been tested using a shielded network cable (STP) and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules.

This equipment has been tested using a shielded network cable (STP) and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

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1. Introduction

Congratulations on your purchase VSP. We appreciate your trust in our products and we will do our best to satisfy you.

VSP supports the twain interface, allowing it to combine with diagnostic software without requiring any additional work except driver installation, and with reusable phosphor storage plates(IP) it minimizes costs.

Saving image to storage and erasing IP are working at same time and a user can see preview of scanned image with LCD in the scanner. Thus, it can support rapid reusing scanner.

Images stored in the storage of scanner can be passed over the network to PCs with compatible software.

Carefully read and follow the 'User Manual' before use VSP. Also, please keep the manual for future reference.

After Installation of device, complete and submit 'Installation Report' (appendix 1) please.

2. Safety Warnings and Symbols

Any changes to the software and hardware provided by the manufacturer, for the safety of patients, employees and others, shall be made only under the approval of the manufacturer.

2.1. Symbols

The following symbols are used in this document.



DANGER

Incorrect operation or action may result in damage to the body or the functioning of the system.



Warning

Incorrect operation may limit the functionality of the system.



Notice

It does not affect the behavior of the system, but it represents important information.








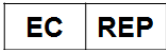










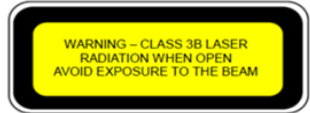
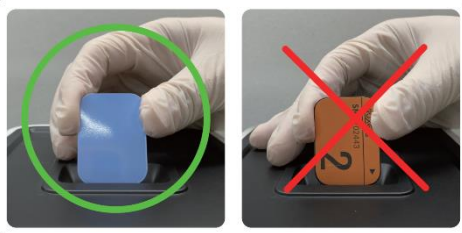
Important


Be sure to follow the instructions to use the system properly.

2.2. Labels

VSP uses following labels.

Symbol	Description
	Manufacturer
	Date of Manufacture
	Warning, Consult Accompanying Documents
	General mandatory action manual
	General prohibition indication
	User Manual Reference
	Directive on Waste Electrical and Electronic Equipment
	Authorized Representative in the European Community
	Keep Dry
	Fragile

	Handle with care
	This side up
	Non-ionizing electromagnetic radiation
	IEC60825 Warning, Laser beam
	CE Mark
	Caution Safety Label: Class 1 Laser Product notification
	Caution Safety Label: Class 3B Laser Radiation When Open Avoid Exposure To The Beam
	IP Insert Direction Caution Label

-  1. Do not insert any substances except the PSP provided by the manufacturer.
2. Do not insert another PSP until the previously inserted PSP is ejected.
3. Insert the PSP with the blue side facing forward.
4. Please refer to the enclosed VSP precautions for further details.

[Caution label of top cover]

2.3. Laser Safety Notice

VSP is certified with Class I (1) Laser Product conforming to the requirements of IEC 60825-1: 2014. There is no laser radiation from this product when operated and maintained as instructed. It may be exposed to the laser by the control, adjustment or operation of the device in accordance with the procedures not specified in this document.

- Wavelength: 638 nm (Typ.)
- Beam Divergence
 - Parallel: 8.5 degree (-3.5/+4.5)
 - Perpendicular: 18 degree (-5/+5)
- Maximum Power of Energy Output: 120 mW



DANGER

Equipment must be repaired and adjusted by technical service engineer from an authorized supplier.



DANGER

Do not remove the product cover while the machine is powered on.

2.4. Electrical Safety Notice



Important

The following instructions must be followed to ensure the safety of users and patients and to use the system correctly.

- Use only the line cord provided with the unit.
- Use only grounded electrical connections.
- To avoid risk of electric shock, fire, short-circuit or dangerous emissions, never insert any metallic object into the equipment.
- Only use connection cable(s) delivered with the device.
- Check the device cables for possible damage before switching on.
Damaged cables, plugs and sockets must be replaced before use.
- Never touch open supply outlets and patients simultaneously.
- Do not locate unit where it could be sprayed with water, or in a damp environment.



DANGER

Must not engage in anything that violates electrical safety during the use of the product.

3. System Description and Installation

3.1. Parts List

Open the packaging box and make sure that each component is present.

1. Power adapter	2. Ethernet Cable
	
3. Power Cord	4. IP(Phosphor storage plate)
	
5. Hygienic Bag	6. Protective Cover
	

7. USB (includes VSP User Manual, Twain driver installer, etc.)	8. IP storage box
	

- Basic items
 - VSP
 - Power Adapter.
 - RJ45 CAT.5E FTP cable(Cross Type, 2m Length)
 - Power cord
 - IP(PSP)
 - Hygienic Bag, Protective Cover
 - USB
 - IP Storage Box
- Medical application items
 - Phosphor storage plate size0 x 3 EA
 - Phosphor storage plate size2 x 3 EA
 - Size0 Hygienic Bag x 500 pcs
 - Size2 Hygienic Bag x 500 pcs
 - Size0 Protective Cover x 50 pcs
 - Size2 Protective Cover x 50 pcs
- Optional items(MOQ)
 - Phosphor storage plate size0 x 4 EA
 - Phosphor storage plate size1 x 4 EA
 - Phosphor storage plate size2 x 4 EA
 - Phosphor storage plate size3 x 4 EA
 - Size0 Hygienic Bag x 100 pcs
 - Size1 Hygienic Bag x 100 pcs
 - Size2 Hygienic Bag x 100 pcs
 - Size3 Hygienic Bag x 100 pcs
 - Size 0 Protective Cover x 100 pcs

- Size 1 Protective Cover x 100 pcs
- Size 2 Protective Cover x 100 pcs
- Size 3 Protective Cover x 100 pcs

**Note**

Please keep the box and packing materials in the product box if VSP is sent to the manufacturer or the distributor.

**WARNING**

Use Power Cord.

Type SJT, min. No. 18 AWG, 3-conductor terminating in molded-on Listed "Hospital Grade", parallel blade, grounding type attachment plug rated minimum 15 A, 125 V, 5-15P. Maximum 5.0 m long. Making tag provided indicating "Grounding reliability can only be achieved when the EQUIPMENT is connected to an equivalent receptacle marked "Hospital Only" or "Hospital Grade".

**WARNING**

Improper disposal of this product may result in environmental contamination. When disposing of this equipment, contact the manufacturer. Do not dispose of any part of this equipment without consulting the manufacturer first.

The manufacturer shall not be held liable for any damage resulting from the disposal of this equipment without consulting the manufacturer.

3.2. System Description

3.2.1. Scanner Information

The front part of the VSP is shown in Figure 1 in the upper screen of the touchscreen. It consists of an IP outlet at the bottom.

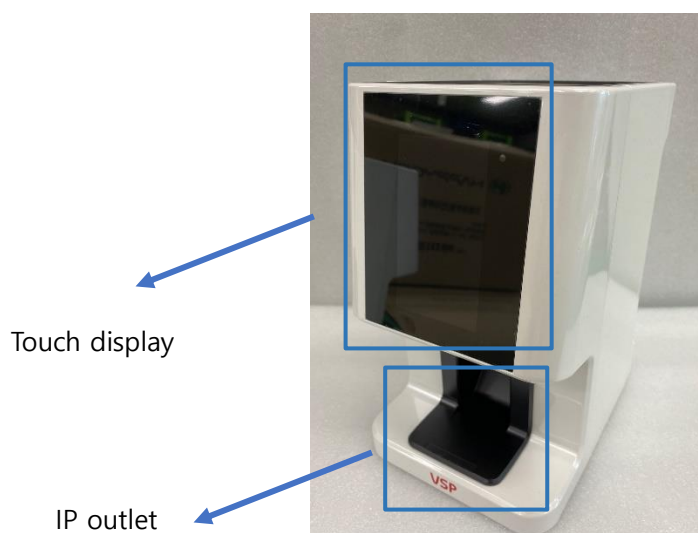


Figure 1. The front of scanner

The rear of the VSP consists of a 10/100 Mbps Ethernet port and a power adapter connection, as shown in Figure 2, with no separate power button present.

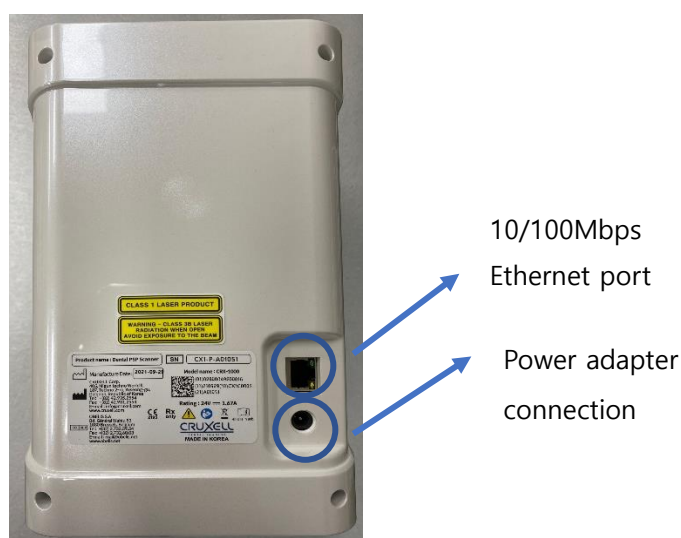


Figure 2. The back of scanner

The upper part of the VSP has an IP slot as shown in Figure 3.

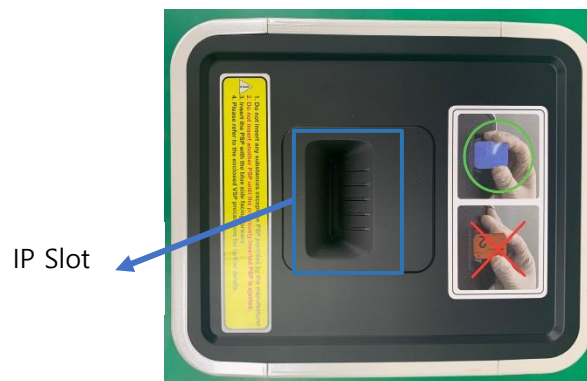


Figure 3. The top of scanner



Danger

VSP is designed to prevent laser exposure through the IP slot of the scanner. However, for your safety, do not look inside the slot.

3.2.2. Technical Specification

Sampling Pixel Pitch	High res	50um
	Super res	25um
Pixel Matrix (Size 0)	High res	440 x 640
	Super res	880 x 1240
Pixel Matrix (Size 1)	High res	480 x 800
	Super res	960 x 1600
Pixel Matrix (Size 2)	High res	620 x 820
	Super res	1240 x 1640
Pixel Matrix (Size 3)	High res	540 x 1080
	Super res	1080 x 2160
Accepted Phosphor storage plate Size		0, 1, 2, 3
Gray Scale Resolution		16 bit
Eraser		Embedded
Computer Interface		10 / 100Mbps Ethernet
Dimensions		233 (H) x 141 (W) x 192 (D) mm
		9.17 (H) x 5.56 (W) x 7.56 (D) inch
Weight		3.3 kg / 7.27 lbs
Power Requirement		AC/DC Adapter: 100 ~ 240V, 50 / 60Hz
		Scanner: DC24V, 1.67A
Image File Format		TIFF / RAW

**Note**

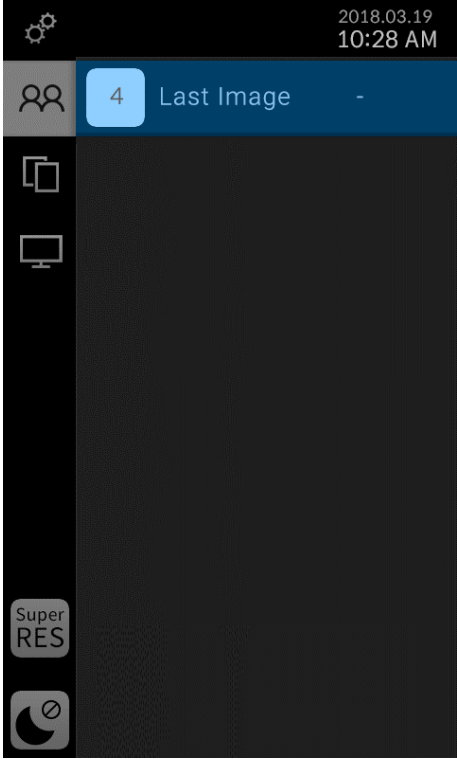







Specifications subject to change without notice.


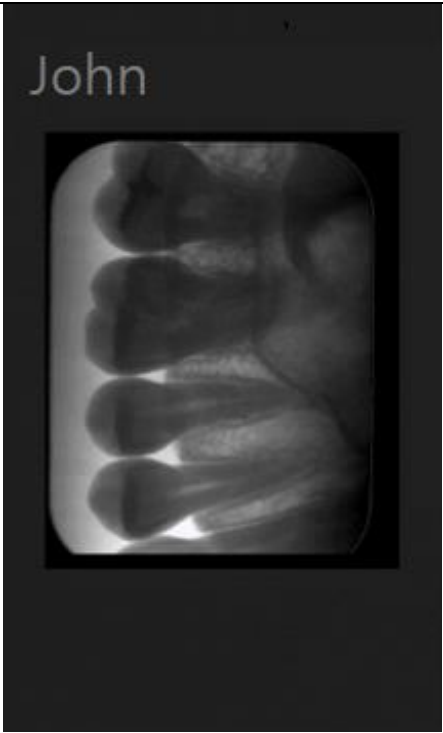
Specific results may vary since operating conditions fluctuate.

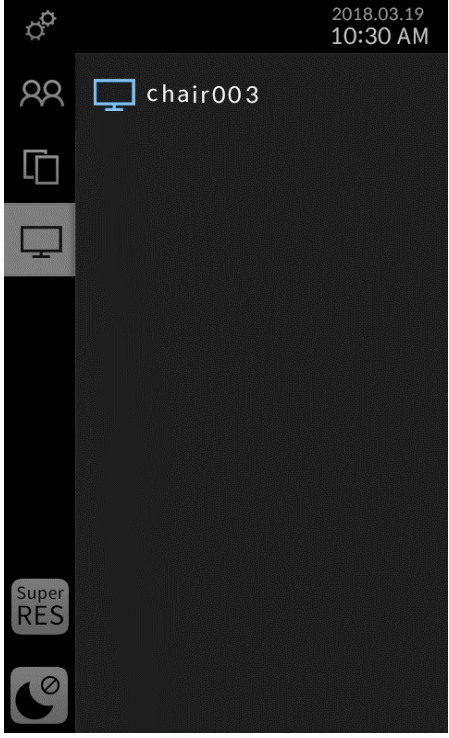
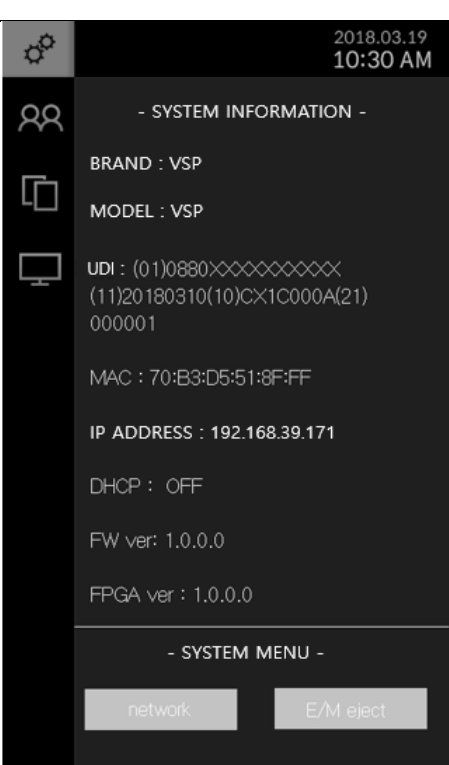


3.2.3. Display Information

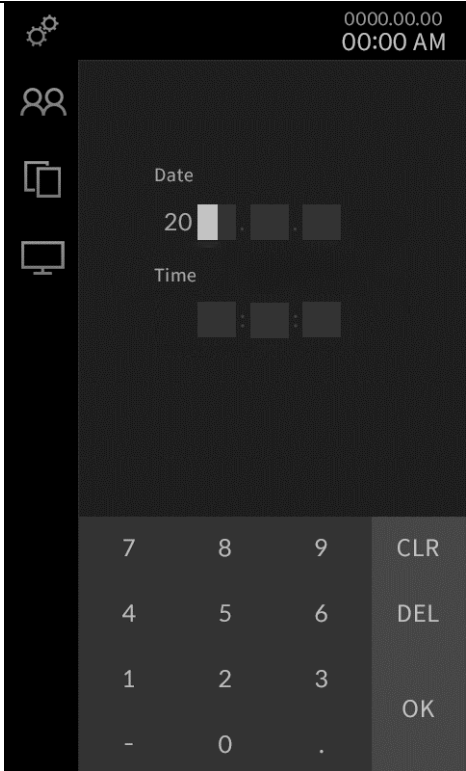
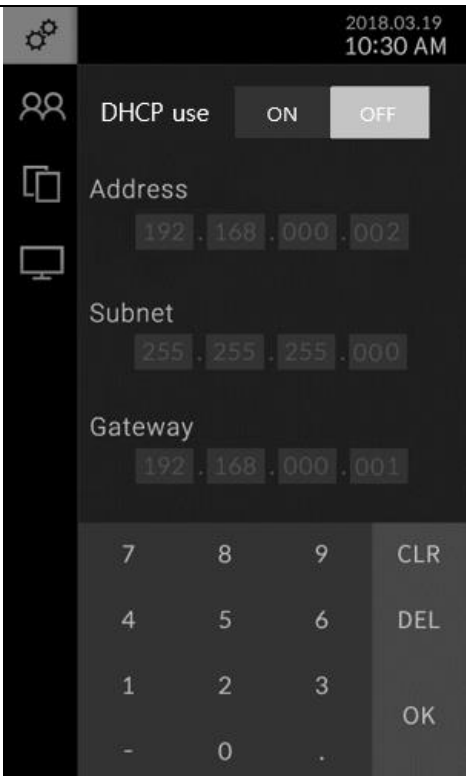
Size	4 inches
Resolution	480x820
Panel type	IPS
Color	RGB 16M px
Input type	Capacitive input

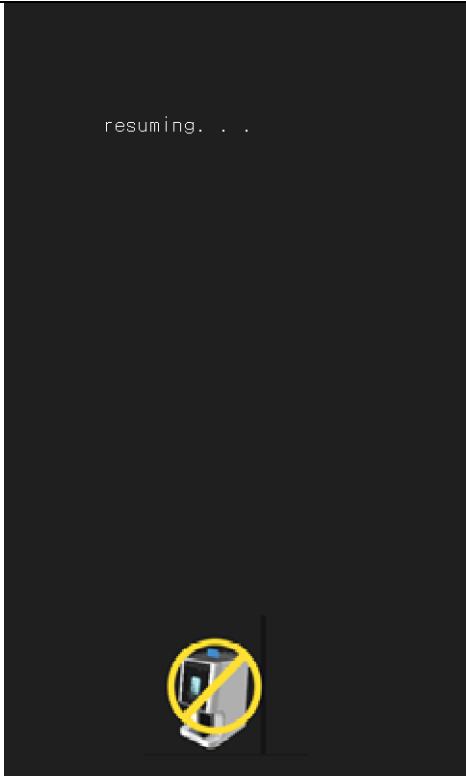
Display	Status	Description
	Booting screen	When the scanner is turned on, booting screen is displayed
	Initial screen	Initial screen is displayed during system initialization.

	<p>Description of icons</p>	<div>  setting button </div> <div>  patient list button </div> <div>  image list button </div> <div>  host list button </div> <div>  resolution icon </div> <div>  sleep button (Disabled, 10 min, 30 min) </div> <div>  send image to pc icon </div>
	<p>Ready for scan / patient list screen</p>	<p>After booting, patient list screen is displayed.</p> <p>When clicking 'patient list' button, it changes to the patient list screen.</p>

 <p>The scanning screen displays the name 'John' at the top. Below the name is a large rectangular area divided into a blue top half and a grey bottom half. At the bottom center, there is a small icon of a scanner with a yellow prohibition sign (a circle with a diagonal line) overlaid on it.</p>	<p>Scanning screen</p>	<p>When starting scanning IP, scanning screen is displayed automatically.</p> <p>This screen shows the progress of the scan.</p>
 <p>The preview screen displays the name 'John' at the top. Below the name is a large rectangular area showing a grayscale image of a hand with fingers spread, representing the scanned fingerprint.</p>	<p>Preview screen</p>	<p>After the scan is complete, the preview screen will be displayed.</p>

	<p>Host list screen</p>	<p>When clicking 'host list' button, host list screen is displayed.</p>
	<p>System information</p>	<p>When clicking setting button, system information screen is displayed.</p> <p> : network setting button</p> <p> : IP eject button</p>

	<p>Time setting screen</p>	<p>When clicking 'time/date' button, user can update current date/time manually.</p>
	<p>Network setting screen</p>	<p>When clicking 'network setting' button from system information screen, network setting screen is displayed</p>

	<p>Resuming screen</p>	<p>When returning normal mode, resuming screen displays while stabilizing device.</p>
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3.2.4. Operation Conditions

Indoor use only	
Operating Temperature	15°C ~ 30°C (59°F ~ 86°F)
Temperature Gradient	0.5°C / Min
Relative Humidity	15% ~ 95% (non-condensing)
Storage Temperature	- 10°C ~ 50°C (14°F ~ 122°F)
Storage Humidity	50% ~ 93% R.H
Storage Atmospheric Pressure	500 ~ 1,013 hPa
Transportation Temperature	23°C ~ 60°C (73.4°F ~ 140°F)
Transportation Humidity	30% ~ 85% R.H
Transportation Atmospheric Pressure	500 ~ 1,013 hPa
Protective Class	Class 1
Equipment Maintenance	No user maintenance is required and no user service is allowed. Please contact technical support if there is a problem.
Cleaning	Do not try to clean inside of the scanner. Wipe outside of the scanner for dust removing with soft and dry cloth.

3.2.4. Computer Requirements

VSP can scan the phosphor storage plate and save images independently without commands from the PC. It is recommended that the PC receiving the image has the following or more performance.

Operation System	Microsoft Windows 10 or higher (32 bit or 64 bit)
CPU	Core Duo / Core2 Processor
Memory	RAM 4GB or more
Hard Disk	100GB Free Hard Disk Space
Network	10/100Mbps Ethernet
Video	32 bit Color Display
Video Resolution	1280 x 720 or higher

4. Installation



Warning

Be sure to read the installation instructions carefully to avoid failures or degradation of the product.

4.1. Location Selection

To use the scanner, install the VSP in a place that meets the following conditions.

- It should be flat, free from vibration and shaking.
- Dry and less change in temperature
- No or little electromagnetic noise
- No or little dust
- Direct exposure to direct sunlight
- There is no risk of falling equipment or accessories.

Allow a minimum free space of 10 cm (4 inches) on the backside to allow the power switch, power cord and interface cable to be reached by hand at all times. In addition, allow a minimum free space of 10 cm (4 inches) on the front side for phosphor storage plate removal.



Figure 4. Space Requirement

This unit may be interconnecting with other electronic devices. Make sure that the scanner is at least 1.0 m away from the other device.



Figure 5. Correct location

4.2. Connecting power cord and ethernet cable

VSP supports a 1: 1 direct connection between the scanner and the computer via an Ethernet cable.

4.2.1. Connecting ethernet cable

VSP connects to PC with Ethernet cable (RJ45 CAT.5E FTP)

1. Connect the cable to the scanner's Ethernet port, located on the connection panel.
2. Connect the other end of the cable to the Ethernet port of the Ethernet-hub.
3. To connect the PC directly, use the supplied crossed cable.



Figure 6. Ethernet connection



Warning

Do not touch the patient while touching the ethernet port.

4.2.2. Connecting Power cord

For safety reasons, VSP must be connected to a connected power unit. If the plug does not fit in the outlet, contact a professional technician to replace it.

1. Connect the power cord to the scanner, located on the connection panel.
2. Connect the other end of the cord to a grounded power outlet.



Figure 7. Connecting power cord



DANGER

Do not connect this equipment to an ungrounded power supply.



DANGER

Do not use any power adapters or power cords that are not provided by manufacturer.

4.3. Installation of Diagnostics software

VSP can scan phosphor storage plates and store images on its own without the help or command of a PC. Please refer to the manual of the VSP twain driver and the manual of the image acquisition and diagnosis software using the twain driver to install the image transmission software.

4.4. Installation report

After installation and testing, complete and submit installation report (appendix 1) to Vatech-france by fax or e-mail.

- Fax: +33-1-64-11-43-39
- E-mail: info@vatech-france.fr

5. Using Scanner

5.1. Scanner Preparation

1. VSP does not have external power switch.
2. To turn on the scanner, connect the power cable at the back of the machine.
3. Connect the other end of the power cord to a grounded power outlet.
4. When the scanner is initialized, the standby screen is displayed on the front panel display.

5.2. Setting of Phosphor storage plate

Place the protective cover on the front of the phosphor storage plate as shown in Figure 8 and fold the tail of the protective cover onto the back of the phosphor storage plate.

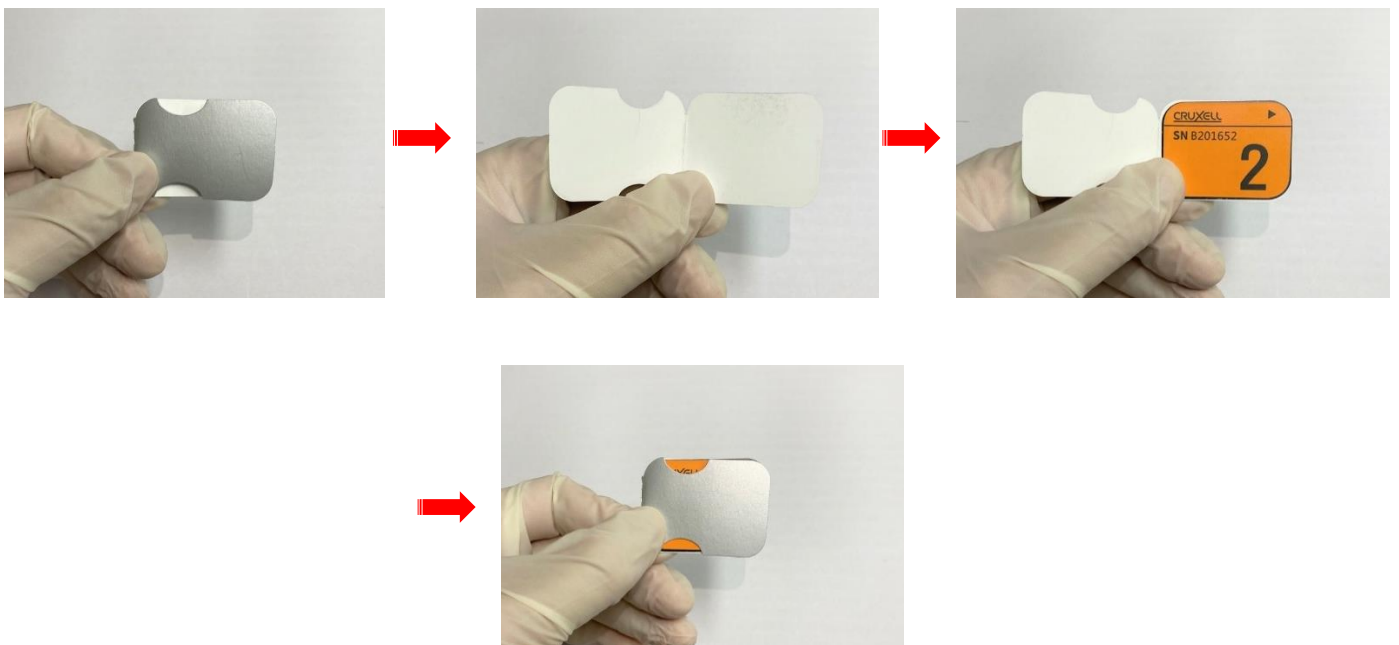


Figure 8. How to use the protective cover

Insert prepared phosphor storage plate with protective cover into hygienic bag. Please beware of correct side of phosphor storage plate as shown in Figure 9.

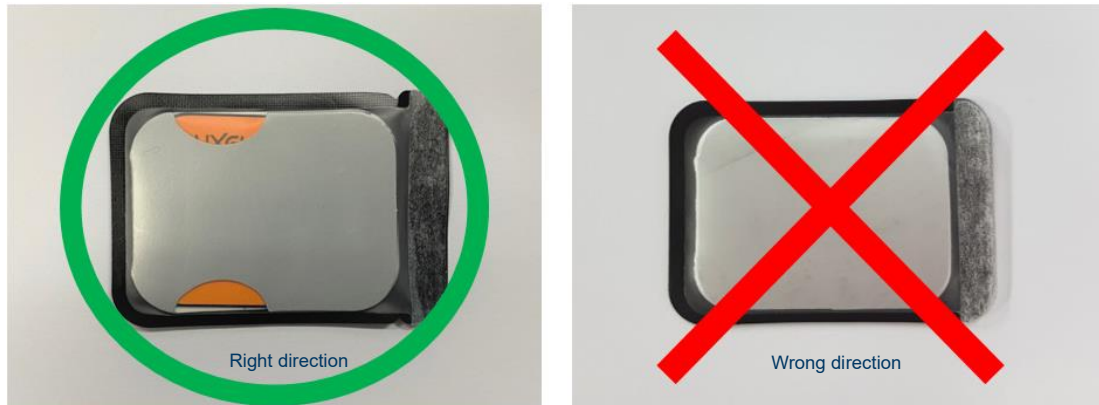


Figure 9. Hygienic Bag



WARNING

Be careful with the orientation when bonding the hygienic bag and phosphor storage plate.



WARNING

Hygienic bag and protective cover are single-use to preventing contamination.

Do not reuse them, they are disposable.



Important

The typical service life for a phosphor storage plate is several hundreds of cycles provided that the phosphor storage plate is handled with care.

In practice, mechanical wearing limits the service life of the plate.

The use of a protective cover will extend the service life of the phosphor storage plates.

5.3. Exposure Phosphor storage plate

Blank side of hygienic bag (active side of phosphor storage plate) must face the tooth and X-ray source.

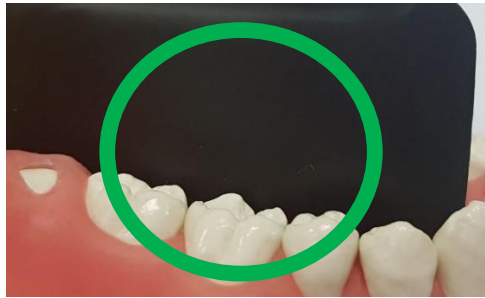


Figure 10. Correct direction of phosphor storage plate for X-ray exposure.



Figure 11. Incorrect direction of phosphor storage plate for X-ray exposure.



WARNING

Pay attention to the direction of the phosphor storage plate when exposing the X-ray.

5.4. Scan phosphor storage plate

Take phosphor storage plate out of the hygienic bag after tearing off the seal. Insert the phosphor storage plate to slot on the top of scanner, as shown in Figure 12.



Figure 12. How to insert the Phosphor Storage Plate

In order to scan, Insert phosphor storage plate to slot correctly. When the phosphor storage plate is inserted, scanner is automatically scanning the phosphor storage plate.



DANGER

1. Insert the blue side so that it is visible to the front position.
2. Do not insert another phosphor storage plate before scanner ejects scanned phosphor storage plate.



Important

To ensure proper use of the phosphor storage plate, please observe the following.

- Do not touch the sensitive surface.
Just touch the edge only.
- Do not scratch or stab.
- Do not fold or bend excessively.
- Do not sink in liquid and avoid moist/ water
- Avoid dust
- Avoid direct sunlight and UV radiation.



WARNING

Be careful of contamination and damage to the Phosphor storage plate.

5.5. Acquire Image

To acquire an image in the Diagnostics software, refer to Acquisition and Diagnostic Software manual.



Important

According to the self-test, the number of reuse of image plates is guaranteed at least 5000 times when the following conditions are satisfied.

- No physical damage like crack, folded, surface scratching, or permanent deformation
- No chemical damage
- An x-ray exposure that is strong enough to cause a bust
- The number of reuse may vary depending on the environment.

5.6. Sleep mode

VSP supports sleep mode which automatically switches to sleep mode after a user has not used it for a certain amount of time.

The current state of the sleep mode is indicated by the shape of the sleep icon in the lower left-hand corner of the LCD screen.



: Disable



: Switch to sleep mode after 10 minutes if user operation or scan is not in progress



: Switch to sleep mode after 30 minutes if user operation or scan is not in progress

Pressing the Sleep mode button briefly switches the Sleep setting to 'Disabled'-' 10 minutes'-'30 minutes.

Pressing and holding the Sleep mode icon for more than 2 seconds regardless of the Sleep mode setting immediately puts the scanner into Sleep mode

Even in the sleep mode, the scanner normally responds to the image request of the acquisition program.

Press and hold the LCD for more than 2 seconds to switch to the normal mode automatically.

When the user inserts an IP into a scanner that has been put into sleep mode, the scanner automatically wakes up and starts scanning when the scanner stabilizes.

It takes 10 ~ 20 seconds to switch from sleep mode to normal mode.

5.7. Cleaning the unit

VSP doesn't require periodic cleaning in using.

When external cleaning is required due to dust absorption or life pollution use a non-abrasive cloth moistened with either:

- lukewarm water,
- soapy water,
- mild detergent,
- butylalcohol,
- or ethanol (ethyl alcohol) 70 - 96%

After cleaning, wipe with dried non-abrasive cloth again.

6. After Service

6.1. Notice of limited liability

VSP is designed to acquire dental X-ray images, transfer them in the form of computer data and ensure storage. However, the manufacturer shall not be responsible for any improper use or data loss of this device.

6.2. Standard Warranty and Repair

The manufacturer warrants that the non-consumable equipment will be free from defects in materials and workmanship for a period of two years.

If the unit is damaged or malfunctions, it must be repaired by an authorized service representative authorized by the manufacturer.

Warranty includes the cost of repairing the product, and any product returned for repair must be properly packaged. Therefore, please keep the packing box and packing materials for later use.

To obtain warranty service, follow the procedure described in the repair service section.

Failure to do so may result in delays and additional costs that the customer may incur.

This warranty does not apply if the product is not valid for the intended use and the product has been modified without the permission of the manufacturer, or if the equipment is damaged due to accident or incompatibility.

This warranty supersedes any other express or implied warranty.

6.3. Out of Warranty Repair Service

Repair support for expired warranty periods varies by region.

Please contact your distributor for details.

7. Technical Support

VSP is designed and manufactured to a high standard.

It is easy to install and use and provides a high level of performance.

If you have some difficulty or question about installing and using this program, please contact the manufacture or distributor.

Distributor

Vatech-france

Vatech Global France

Campus Aviso Bat B

13-15 rue Jean Jaures

92800 Puteaux

TEL: +33-1-64-11-43-30

FAX: +33-1-64-11-43-39

Website: www.vatech-france.fr

E-mail: info@vatech-france.fr

Manufacturer

CRUXELL Corp.

405, Migun techno World II,

187, Techno 2-ro, Yuseong-gu, Daejeon

Republic of Korea

TEL: 82-42-935-2554

FAX: 82-42-931-2554

Website: www.cruxell.com

E-mail: info@cruxell.com

Appendix 1

Installation Report

After installation, please complete, sign and submit installation report to

- Fax: +33-1-64-11-43-39
- E-mail: info@vatech-france.fr

Customer Information

Hospital / Institute	
Name	
Address	
Tel	
Fax	
E-mail	

Installer Information

Company	
Name	
Address	
Tel	
Fax	
E-mail	

System Information

Brand(Model) name	VSP(CRX-1000)
System S/N	

Installer's Signature:

Date:

Customer's Signature:

Date:

Appendix 2

Information about EMC in accordance with EN 60601-1-2


This document contains excerpts from European standards for medical electronic devices. VSP must be adhered to when installing or connecting with other products. If you are unsure, please refer to the full standard.

Guidance and manufacturer's declaration – electromagnetic emissions		
VSP is intended for use in the electromagnetic environment specified below. The customer or the user of the VSP should assure that it is used in such an environment.		
Emission test	Compliance	Electromagnetic environment - guidance
RF emissions CISPR 11	Group 1	The VSP system uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment. VSP is suitable for use in all facilities, including facilities connected directly to public low-voltage power supplies used in residential and home use in residential buildings.
RF emissions CISPR 11	Class A	
Harmonics emission IEC 61000-3-2	A	
Voltage fluctuation IEC 61000-3-3	Complies	

Guidance and manufacturer's declaration – electromagnetic immunity			
VSP is intended for use in the electromagnetic environment specified below. The customer or the user of the VSP should assure that it is used in such an environment.			
Immunity test	IEC 60601 Test level	Compliance level	Electromagnetic Environment -guidance
Electrostatic discharge (ESD) IEC 61000-4-2	8 kV Contact 15 kV Air	8 kV Contact 15 kV Air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast Transient / burst IEC 61000-4-4	2kV for power supply lines 1kV for input/output lines	2kV for power supply lines 1kV for input/output lines	Main power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	1 kV differential mode 2 kV common mode	1 kV differential mode 2 kV common mode	Main power quality should be that of a typical commercial or hospital environment.
Power frequency (50/60Hz) Magnetic field IEC 61000-4-8	30 A/m	30 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.

Voltage dips, short Interruptions and Voltage variations on power supply input lines IEC 61000-4-11	<p><0% U_t – 0.5cycle (Phase : 0°,45°,90°,135°, 180°,225°,270°,315°)</p> <p><0% U_t – 1cycle (Phase : 0°)</p> <p><70% U_t – 25cycle (Phase : 0°)</p> <p><0% U_t – 250cycle (Phase : 0°)</p>	<p><0% U_t – 0.5cycle (Phase : 0°,45°,90°,135°, 180°,225°,270°,315°)</p> <p><0% U_t – 1cycle (Phase : 0°)</p> <p><70% U_t – 25cycle (Phase : 0°)</p> <p><0% U_t – 250cycle (Phase : 0°)</p>	<p>Main power quality should be that of a typical commercial or hospital environment. If the user of the BSVD-1000 system requires continued operation during power main interruptions, it is recommended that the VSP system be powered from an uninterruptible power supply or a battery.</p>
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Conducted RF IEC 61000-4-6	3 Vrms 150 kHz to 80 MHz	3 Vrms 150 kHz to 80 MHz	<p>Portable and mobile RF communications equipment should be used no closer to any part of the VSP system, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter.</p> <p>Recommended separation distance</p> $d = \left[\frac{3,5}{V_1} \right] \sqrt{P}$
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<p>Radiated RF</p> <p>IEC 61000-4-3</p>	<p>3 V/m</p> <p>80.0 MHz to 2.5 GHz</p>	<p>3 V/m</p> <p>80.0 MHz to 2.5 GHz</p>	<p>Recommended separation distance</p> $d = \left[\frac{3.5}{E_1} \right] \sqrt{P} \quad 80 \text{ MHz to } 800 \text{ MHz}$ $d = \left[\frac{7}{E_1} \right] \sqrt{P} \quad 800 \text{ MHz to } 2.5 \text{ GHz}$ <p>Where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters (m).</p> <p>Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey,</p> <p>(a) Should be less than the compliance level in each frequency range (b).</p> <p>Interference may occur in the vicinity of</p> <p>equipment marked with the following symbol:</p> 
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Note 1) U_t is the A.C. mains voltage prior to application of the test level.

Note 2) At 80 MHz and 800 MHz, the higher frequency range applies.

Note 3) These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

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

b Over the frequency range 150 kHz to 80 MHz, field strengths should be less than [V1] V / m.

Recommended Separation Distances Between Portable and Mobile RF Communications Equipment and the **VSP** system.


The **VSP** system is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The user of the **VSP** system can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the **VSP** system as recommended below, according to the maximum output power of the communications equipment.

Rated maximum output power (W) of transmitter	Separation distance (m) according to frequency of transmitter		
	150 kHz to 80 MHz	80 MHz to 800 MHz	800 MHz to 2.5 GHz
0.01	0.12	0.12	0.23
0.1	0.37	0.37	0.74
1	1.17	1.17	2.33
10	3.70	3.70	7.37

100	11.70	11.70	23.30
For transmitters rated at a maximum output power not listed above, the recommended separation distance (d) in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.			
<p>Note 1: At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.</p> <p>Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects, and people.</p>			

Immunity and Compliance Level			
Immunity test	IEC 60601 test level	Actual tolerance level	Compliance level
Conducted RF IEC 61000-4-6	3 Vrms, 150 kHz to 80 MHz	3 Vrms, 150 kHz to 80 MHz	3 Vrms, 150 kHz to 80 MHz
Radiated RF IEC 61000-4-3	3 V/m, 80 MHz to 2.5 GHz	3 V/m, 80 MHz to 2.5 GHz	3 V/m, 80 MHz to 2.5 GHz

Guidance and manufacturer's declaration – electromagnetic immunity			
VSP is intended for use in the electromagnetic environment specified below. The customer or the user of the VSP should assure that it is used in such an environment.			
Immunity test	IEC 60601 Test level	Compliance level	Electromagnetic environment - guidance

Conducted RF IEC 61000-4-6	3 Vrms 150 kHz to 80MHz	3 Vrms 150 kHz to 80 MHz	VSP system must be used only in a shielded location with the minimum RF shielding effectiveness and, each cable should have the minimum RF shielding effectiveness.
Radiated RF IEC 61000-4-3	3 V/m 80.0 MHz to 2.5GHz	3 V/m 80.0 MHz to 2.5GHz	<p>Field strengths outside the shielded location from fixed RF transmitters, as determined by an electromagnetic site survey, should be less than 3V/m.</p> <p>Interference may occur in the vicinity of equipment marked with the following symbol:</p> 
<p>Note 1) These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.</p> <p>Note 2) It is essential that the actual shielding effectiveness and filter attenuation of the shielded location be verified to assure that they meet the minimum specification.</p>			
<p>a- Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength outside the shielded location in which the EUT is used exceeds 3V/m, the EUT should be observed to verify normal operation.</p> <p>If abnormal performance is observed, additional measures may be necessary, such as relocating the EUT or using a shielded location with a higher RF shielding effectiveness and filter attenuation.</p>			