

V800F

Projection Vein Finder
User Manual



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About

Prior to install and use the Projection Vein Finder V800F , read all instructions of this user manual. The V800F is intended for qualified or trained medical personnel only. Please follow our instructions to use the V800F .

Note that the V800F cannot substitute professional clinical judgements. It is only for assistance in the observation of veins or the demonstration in medical training. Should you have any query, feel free to contact us.

Product Name:

Projection Vein Finder

Product version:

V800F (Basic version)
(Professional version)

Date of Manufacture: See product label

Service Life: 5 years

Manufacturer:

Shenzhen Vivolight Medical Device & Technology Co.,Ltd.

Production address:2F-5F, GAOXINQIKEJI LOU building, Block 67, Xingdong community, Xin'an street, Bao'an District, Shenzhen, Guangdong Province, China. 518100.

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Shenzhen Vivolight Medical Device&Technology Co.,Ltd.

Customer Service Dept.

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Warnings and Cautions



PRECAUTIONS

- Read this User Manual before first use and strictly follow our instructions.
- Before the first use of the V800F or after transportation, check the projection accuracy by using the Accuracy Test Card. (See 1.5)
- Check if the V800F accessories are intact before using. If the accessories are damaged, do not use them and contact our customer service.
- Do not treat the V800F as a substitute for professional clinical judgements. V800F is only an assistance in locating and observing veins.
- Keep the V800F away from children.
- The V800F is Class I medical apparatus, which is safe and can be continuous operating.
- To locate and observe veins accurately, use the V800F for skin without scars, tattoos, hairs or skin diseases.
- Portable or mobile RF (Radio Frequency) equipment may affect the performance of the V800F. When using it, keep it away from intense EMI (Electromagnetic Interference), such as mobile phones, microwaves and other equipment.
- The V800F is used with a stand. You will not need to hold it for longer than 1 minute and the V800F will not touch patients.
- Place the adapter properly to make it easy to be plugged in and unplugged.



CAUTIONS

- The V800F will not perform accurately if the environmental conditions do not meet the requirements (See 4.2).
- Use only the accessories provided along with the V800F . Using non V800F accessories may damage the components and lead to hazards.
- The V800F contains a detachable battery. Please strictly follow our instructions on battery storage, transport and operation.
- The original battery provided is a lithium battery. If you will not use the V800F for long, please fully charge the battery and properly keep it in storage. The service life or the storage life of a battery is one year.
- Do not immerse any part of the V800F or the accessories into liquid, or splash liquid on the V800F or the accessories. If any liquid is splashed on the V800F when it is operating or being charged, stop using it and power it off immediately.
- Do not puncture, disassemble or modify any part of the V800F . We do not take any legal responsibility for the consequences resulting from unauthorized modifications.
- Do not randomly discard the V800F . As the V800F contains a battery, it must be disposed of professionally in accordance with Technical Policy for Discarded Batteries Pollution Prevention.
- Do not use the V800F in inflammable and explosive environments, or environments where there are inflammable and explosive goods.



WARNINGS

- Do not use the V800F in inflammable and explosive environment, or environments where there are inflammable and explosive goods.
- Do not keep the V800F close to or stack with other equipment. Intense EMI (Electromagnetic Interference) may result in malfunctions of V800F . If you have to, verify and insure that it performs accurately.
- The V800F is intended to be used in industrial environments. Due to the conducted disturbance and the radiation disturbance of the V800F , there are potential EMC (Electromagnetic Compatibility) hazards in other environments.
- To avoid the risk of electric shock, the V800F must only be connected to a supply main with protective earth.
- Under some SINGLE FAULT CONDITIONS, the temperature of: (indicate the surface of concern) could get hot and there is a possible RISK of a burn if touched.



CONTRAINDICATIONS

- The V800F is effective in the identification of veins. It can hardly identify arteries.
- Do not use the product as a diagnostic device or for any therapeutic purpose.
- We highly recommend you NOT to directly shed the infrared light on eyes, although the infrared light of V800F is safe for eyes according to “GB/T 20145-2006/CIE S 009/E:2002 Photobiological safety of lamps and lamp systems”.

Product Overview

Thank you for choosing V800F, the Projection Vein Finder manufactured by Shenzhen Vivolight Medical Device & Technology Co., Ltd. The V800F Projection Vein Finder is a hand-held, vein scanning and projection device that assists trained medical personnel to locate a suitable position for venipuncture and other medical procedures requiring the location of superficial veins. The V800F is equipped with Charge-coupled device (CCD/CMOS) module, a device that can convert light into digital images. As hemoglobin has a stronger absorption of near-infrared light than outer skin, CCD/CMOS can perceive the intensity of infrared light and display the outline of veins on patients' skin by a series of digital image processing. In this way, the V800F can help medical staffs to locate and observe the veins for intravenous injection and blood-drawing.

The Projection Vein Finder is to reduce the pain of repeated venipuncture by accurately locating the veins of patients, especially those of infants and the obese. As the veins of infants and the obese patients are hard to locate, it has been a challenge for medical staffs to puncture for them. Such a challenge not only puts pressure on the medical staffs, but also causes anxieties of patients. The V800F Projection Vein Finder can:

- Demonstrate the location of veins in medical training;
- Assist medical staffs in locating and observing veins of patients;
- Help medical staffs with the evaluation of veins;
- Help medical staffs to puncture and draw blood;
- Reduce patients' anxieties caused by repeated intravenous injection or blood-drawing.

The Projection Vein Finder only serves as an assistance in locating veins and training for medical personnel. Please note that it is NOT a substitute for the visual and tactile judgement which is based on professional medical knowledge. The Projection Vein Finder is suitable for veins \leq 10mm from the epidermis.

Version

V800F (Basic version of Projection Vein Finder)
(Professional version of Projection Vein Finder)

The main difference of these two versions is in the projection modes. For more information, see section 2.7.


























Intended Use

Projection Vein Finder is used for observing and locating the superficial veins, to assist medical personnel in performing venipuncture operations such as injection and blood-drawing.

1

Getting Started

1.1 Symbols

Symbol	Description	Symbol	Description
	Date of Manufacture		General Warning Sign
	Manufacturer		Caution
	Use-by date		Serial Number
	Refer to Instruction Manual/Booklet		Waste Electrical and Electronic Equipment
	Stacking Limit by Number		Keep Away from Rain
	This Way Up		Fragile Handle with Care
	Keep Away from Sunlight		Atmospheric Pressure Limitation
	Humidity Limitation		Temperature limit
	Authorized Representative in the European Community		Protective Earth (Ground)
	Unique device identifier		Medical device
	Model number		Consult Operator's Manual
IPX0	No Special Protection		Imported and distributed by
	Catalog Number		CE Mark

1.2 Package Items

1 * Projection Vein Finder V800F

1 * Power Adapter

1*AC Cable

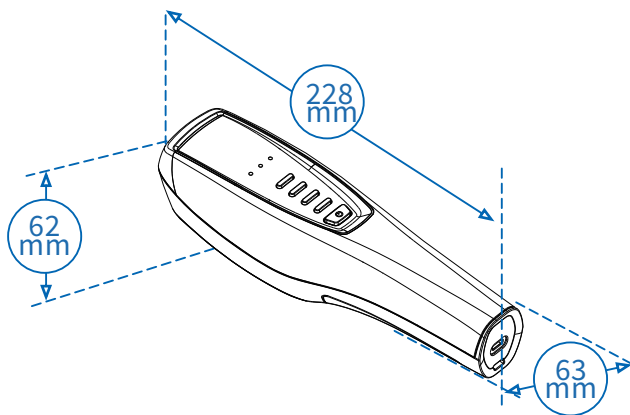
1* V800F User Manual

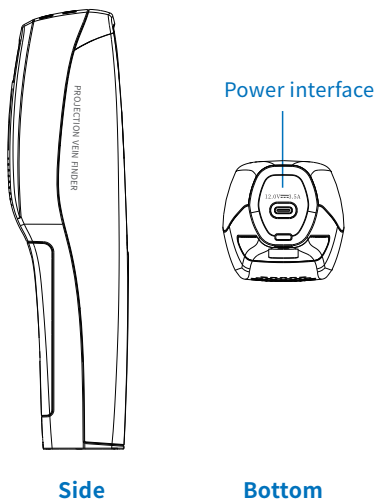
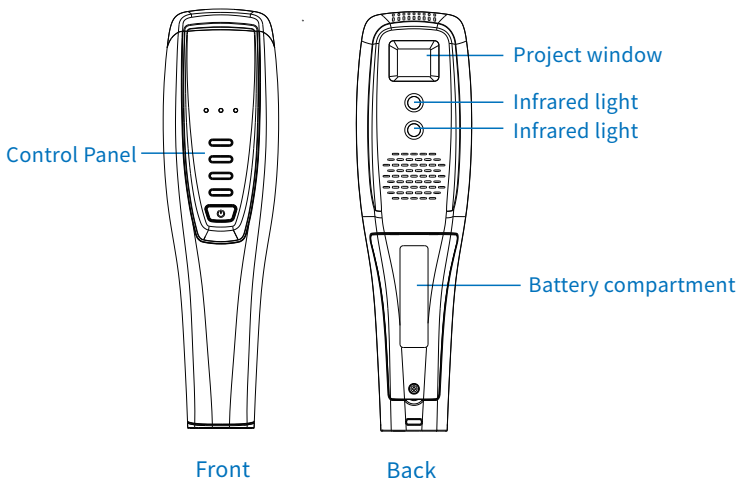
2* Accuracy Test Card

1* Qualification Certificate/ Warranty Card

1.3 Appearance and Components

Appearance





Components

The product is mainly composed of the main part and the support part. This product is composed of infrared light source, image sensor, image processing chip, projection module and internal optical path module. No contact with patients.

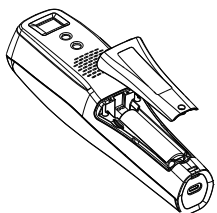
Two support stand options: floor stand and table stand.

About Battery

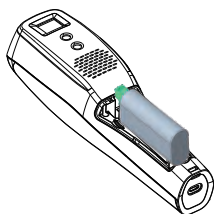
- The V800F uses 6800mAh rechargeable lithium battery with high performance.
- The service life and the storage life of the battery is one year. If there is any problem of the battery within 3 months after sales, contact the customer service for a replacement.
- As the battery ages, its endurance and performance will accordingly deteriorate.
- If you will not use the V800F for long, please fully charge the battery and properly keep it in storage.
- We highly recommend you to replace the battery every one year.
- To replace the battery with a new one:



Remove the screw of the battery compartment;

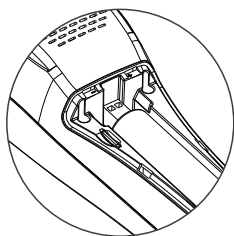


Remove the battery cover;



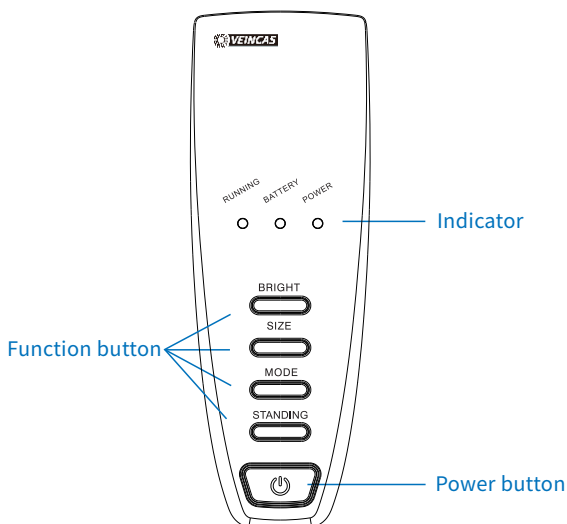
Hold the socket of the battery and pull out the battery;

Hold the socket of the new battery and insert it in.



To remove or insert the battery, do not drag the body of the battery. Please hold the socket and pull the battery out.

1.4 Indicators and Buttons



Indicators

The V800F has three green indicators:

Running

- The indicator Running is on when the V800F is powered on;
- The indicator Running is off when the V800F is powered off;
- The indicator Running flashes when the V800F is in stand-by state.

Battery

- When the V800F is supplied by the external power:
 - ▼ The indicator Battery is on and the battery is being charged;
Note: When the battery is being charged, the indicator Battery is on in any state.
 - ▼ The indicator Battery will be off after being fully charged.
- When the V800F is powered on by the battery or in stand-by state:
 - ▼ The indicator Battery flashes;
 - ▼ If the indicator Battery flashes slowly, there is sufficient power;
 - ▼ If the indicator Battery flashes quickly, the battery is low. Charge the battery timely.
- When the V800F is powered off, the indicator Battery is off.

Power

- The indicator Power is on when the V800F is connected to the outlet by the adapter;
- The indicator Power is off when the V800F is supplied by the battery.

Buttons

The V800F has five buttons:

Bright

Press the button Bright to switch the brightness of the projection. (See 2.4)

Size

Press the button Size to adjust the size of the projection. (See 2.5)

Mode

Press the button Mode to switch among different projection modes. (See 2.6)

Standing

Briefly press the button to set the automatic shutdown of the projection after 5 minutes, 10 minutes, or 20 minutes. At the same time, the projection screen will display the selected time.

Power on (⏻)

- ▼ Press and hold the button ⏻ for 3 seconds to power on the V800F ;
- ▼ Under standby state, shortly press the button ⏻ can wake up the V800F ;
- ▼ Press and hold the button ⏻ for 3 seconds to power off the V800F .

1.5 Unpacking and Checking


Installing the support stand

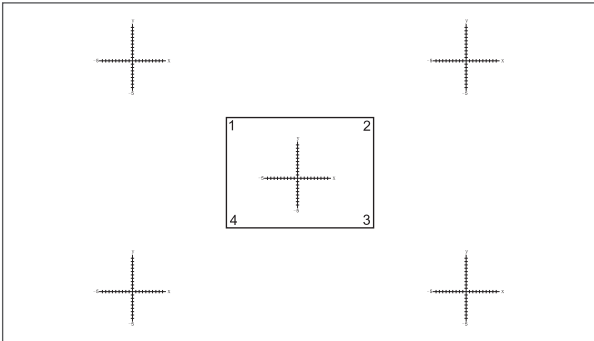
Please refer to the Stand Installation Instruction.

Checking Projection Accuracy

As the V800F is a medical apparatus, use the Accuracy Test Card to check the projection accuracy before the first use or after assembly or transportation.

To check the accuracy:

- Press the button  hold for 3 seconds to power on the V800F ;
- The V800F will start to project in 10 seconds;
- Project the output image to the Accuracy Test Card;
- Adjust the distance between the projection window and the Accuracy Test Card to an optimum (the words on the bottom bar are clear);
- Observe whether there is deviation between the projection and the card;
- If the deviation is less than 1mm ($\approx 0.04''$), the V800F is in good condition; if the deviation is greater than 1mm ($\approx 0.04''$), stop using the V800F and contact our customer service.



2 Operation Instructions

In this V800F User Manual, we will give instructions only on handheld use.

2.1 Charging the V800F

The power of the V800F can be supplied by the adapter or the battery.

Battery

- The battery inside the V800F is rechargeable.
- The battery status of the V800F can be indicated by the indicator Battery:
 - ▼ If the indicator Battery flashes slowly, there is sufficient power;
 - ▼ If the indicator Battery flashes quickly, the battery gets low. Charge the battery timely.

Adapter

The adapter can be used as the external power supply cable or used to charge the V800F .

To use the adapter as an external power cable or to charge the V800F :

- Plug in the adapter to the power interface on the bottom;
- Connect the V800F to an outlet by the adapter;
- Verify all connectors are properly connected;
- The indicators Battery and Power will be on.





WARNINGS

Use only the accessories provided along with the V800F . Using non V800F accessories will damage the components and lead to hazards.


2.2 Power on/off

To power on the V800F , you can:

- Press and hold the button  for 3 seconds to power on the V800F. The indicator Running will be on with a start-up tone.
- The V800F will start to project in 10 seconds;
- Press and hold the button  for 3 seconds to power off the V800F.

2.3 Stand-by & Wake-up

In the running state, the V800F can switch between standby and wake-up states.

- In the running state, short press the standing setting button, the device switches to the standby countdown state.
- In the standby state, the operation indicator flashes.
- Short press the button  to wake up the device.

2.4 Projecting

Projection

To project the image of veins:

- Hold the V800F over the surface of the skin to an optimal distance (the words on the bottom bar are clear);
- Project the image on the area of interest;
- Adjust the distance or angle to the skin. When the words on the bottom bar are projected clearly, the view is optimal.



Status Bar



Battery

The remaining power is indicated by the battery icon of the status bar:

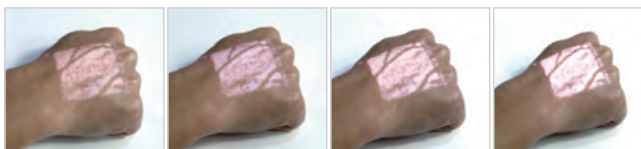
- When the battery icon shows 1-4 grids of power, it indicates the power is sufficient. The less the grids are, the lower the battery gets.
- When the battery icon is blank, use the adapter to charge the V800F

2.5 Switching Bright

There are four levels of projection bright for you to use in different operating environments.

To switch the brightness:

- Press the button Bright to switch among the four levels of bright.



2.6 Switching Size

There are three different sizes of the projection. Smaller sizes are for infants or children whose heads and hands are relatively small.

To adjust the size of the projection:

- Press the button Size to switch among the three sizes.



2.7 Switching Mode

The V800F has three modes, the Basic Mode and the Green Light Mode and the Reverse Mode.

To switch the mode of the V800F :

- Press the button Mode. The projection mode will be switched.
- Adjust the distance or angle to the skin still the words on the button bar are projected clearly.

The Basic Mode



The basic mode is the default mode of the V800F. It is applicable for most people.

The Green Light Mode



This mode weakens the background with green projection to highlight the veins.

The Reverse mode



Find vein boundaries and identify optimal puncture centers.

3 Troubleshooting

Problems	Possible Reason(s)	What to do
When the V800F is powered on by the adapter, it does not display any image.	1.Poor connection with the adapter; 2.No power comes into the adapter.	Verify the V800F is properly connected to an outlet by the adapter. If it is, the indicator Power will be on.
	Incompatible adapter damages the internal power board.	If the battery can power on the V800F but the adapter cannot, the internal power board is damaged.
The projected image is blurred or spotted	The projection window is dirty.	Clean the projection window according to the method specified in 4.1.
The V800F cannot be powered on by the battery.	1.The battery runs out of power. 2.Over-humid storage environment damages the battery.	To charge the V800F , connect it with the adapter. When the battery is full, the indicator Battery will be off; Or use the adapter to supply power. If the problem still exists, please contact our customer service.
Insufficient battery endurance	The battery is not full.	Charge the V800F with the adapter. If the indicator Battery is on, the battery is not full of power.
	The battery is aged because of increasing charge-discharge cycles.	Charge the V800F with the adapter. If the indicator Battery is off, the battery is aged.
	The battery is not replaced regularly	If you want to replace the battery, please consult our customer service.
The V800F occasionally stuck or crashed down.	The V800F inside is overheating due to running for too long.	Power off the V800F and wait until it cools down.

4 Cleaning and Maintenance

To keep the V800F in good condition and prolong its service life, regularly clean the V800F and preserve it according to the requirements.

4.1 Cleaning/sterilize

To clean the V800F :

- Power off the V800F ;
- Gently wipe the body of V800F with a washcloth moistened with 75% alcohol or Benzalkonium bromide;

To clean the projection window, use lens paper only;

- Apply a few drops of 100% ethanol on the lens paper;
- Gently wipe the surface of the projection window in one direction.



CAUTION

- The V800F must be powered off when being cleaned;
- Do not immerse any part of the V800F or the adapter into liquid, or splash liquid on the V800F or the adapter.

4.2 Maintenance

Storage

To keep the V800F in good condition and a longer service life, please store the V800F according to the environmental requirements below.

Environment parameter \ Condition	Operating	Storage	Transport
Temperature	5°C~40°C (41°Fto 104°F)	-20°C~55°C (-4°Fto 131°F)	-20°C~55°C (-4°Fto 131°F)
Humidity	≤80%RH Non-condensing	≤80%RH Non-condensing	≤80%RH Non-condensing
Atmospheric Pressure	70-106kPa	70-106kPa	70-106kPa



WARNING

- The V800F is a medical apparatus. To ensure its service life and its accuracy, please store and transport it properly.
- Note that high humidity will cause malfunctions of the V800F ;
- Excessive vibration will damage the components of the V800F and reduce its accuracy.

Battery Storage

- The service life and the storage life of the battery is one year. If there is any problem of the battery within 3 months after sales, contact the customer service for a replacement.
- If you will not use the V800F for long time, please fully charge the battery and properly keep it in storage.
- We highly recommend you to replace the battery every one year.

5

Warranty and Liability

5.1 Warranty

Please refer to the Warranty Card included in the package.

5.2 Limitation of Liability

We shall not be liable for any event in the following:

- Non-intended use of the V800F (intended use see product overview).
- The V800F has been operated by unqualified or untrained clinical staffs;
- You have failed to follow our instructions when operating the V800F ;
- Any dispute arisen from the lease of you to a third party;
- The V800F has been disassembled or modified without our authorized consent;
- Any malfunction that is resulted from misuse, abnormal storage or operating environments, or deliberate damage.

If we inspect any event above, you will be fully responsible for all the loss resulting from the return and replacement of the V800F .

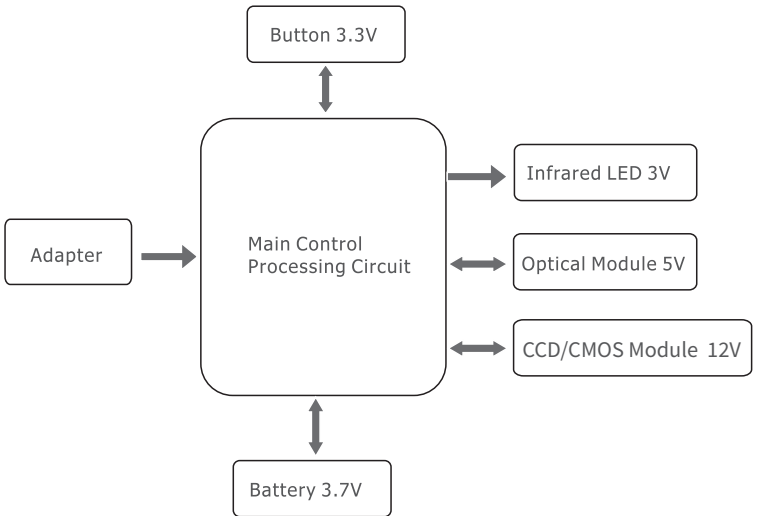
6

6. Product Specification

6.1 Technical Specification

Electric Shock Proof Classification	Class 1
Product Version	V800F
Net Weight	350g ($\approx 0.77\text{lb}$)
Size	228 x 63 x 62 mm ($\approx 9.00'' \times 2.50'' \times 2.40''$)
Power Adapter	Input: AC 100-240V 50/60Hz Output: DC 12V=3.5A
Battery	DC 3.7V 6800mAh
Battery Life on Full Charge	≤ 4.5 hours
Charge Time	≤ 3.5 hours
Water Ingress	IPX0 No water Ingress Protection
Optimal Projection Distance	$210 \pm 30\text{mm}$ ($\approx 8.30'' \pm 1.20''$)
Light Source	Near-infrared light
Infrared Wavelength	850nm
Infrared Radiation Energy	$\leq 0.6\text{mW/cm}^2$
Alignment accuracy	$\leq 0.5\text{mm}$

6.2 Electrical Structure



6.3 Electromagnetic Compatibility (EMC)



CAUTION

- The EMC of the V800F is complied with IEC 60601-1-2:2014/EN 60601-1-2:2015.
- Use the V800F according to EMC information provided in this user manual.
- Portable or mobile RF (Radio Frequency) equipment may affect the performance of the V800F . When using the V800F , keep it away from intense EMI (Electromagnetic Interference), such as mobile phones, microwave and other equipment.



WARNINGS

- Do not keep the V800F close to or stack with other equipment. If you have to, verify and insure that it performs accurately.
- The V800F is intended to be used in industrial environments. Due to the conducted disturbance and the radiation disturbance of the V800F , there are potential EMC (Electromagnetic Compatibility) hazards in other environments.
- Except the transducer and the cable sold as internal components by the manufacturer of the device or the system, using other transducers, cables or other accessories may result in increased electromagnetic emissions or decreased electromagnetic immunity of the device or the system.
- Using transducers, cables or other accessories unspecified in this user manual may result in increased electromagnetic emissions or decreased electromagnetic immunity of the device or the system.

Guidance and Manufacturer's Declaration - Electromagnetic Emissions

The Projection Vein Finder is intended for using in the electromagnetic environment specified below. Users should assure that it is used in such an environment.

Emissions test	Compliance	Electromagnetic Environment - Guidance
RF emissions CISPR11	Group 1	The Projection Vein Finder use RF energy only for its internal function. Therefore, its RF emissions are very low and not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR11	Class A	The Projection Vein Finder is suitable for applying in all establishments other than domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions IEC 61000-3-2	Class A	
Voltage fluctuations/flicker emissions IEC 61000-3-3	Complies	

Guidance and Manufacturer's Declaration - Electromagnetic Immunity


The Projection Vein Finder is intended for using in the electromagnetic environment specified below. The customer or the user of the device should assure that it is used in such an environment.

Immunity Test	IEC 60601 Test Level	Compliance Level	Electromagnetic
Electrostatic discharge (ESD) EC 61000-4-2	± 8 kV contact ± 15 kV air	± 8 kV contact ± 15 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient/burst IEC 61000-4-4	± 2 kV for power supply lines ± 1 kV for input/output lines	+2 kV for power supply lines ± 1 kV for input/output lines	Mains power quality should be that of a typical commercial or hospital environment.

Surge IEC 61000-4-5	±1 kV line(s) to line(s) ±2 kV line(s) to earth	+ 1 kV line(s) to line(s) ±2 kV line(s) to earth	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	0% U_T (100% dip in U_T), for 0.5 cycle, at 0°, 45°, 90°, 135°, 180°, 225°, 270° and 315° 0% U_T (100% dip in U_T), for 1 cycle, at 0° 70% U_T (30% dip in U_T), for 25 cycle, at 0° 0% U_T (100% dip in U_T), for 5 s	0% U_T (100% dip in U_T), for 0.5 cycle, at 0°, 45°, 90°, 135°, 180°, 225°, 270° and 315° 0% U_T (100% dip in U_T), for 1 cycle, at 0° 70% U_T (30% dip in U_T), for 25 cycle, at 0° 0% U_T (100% dip in U_T), for 5 s	Mains power quality should be that of a typical commercial or hospital environment. If the user of the Models S requires continued operation during power mains interruptions, it is recommended that the models S be powered from an uninterruptible power supply or a battery.
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.
NOTE: U_T is the A.C. mains voltage prior to application of the test level.			

Guidance and Manufacturer's Declaration - Electromagnetic Immunity

The Projection Vein Finder is intended for using in the electromagnetic environment specified below. The customer or the user of the device should assure that it is used in such an environment.

Immunity	IEC 60601 Test	Complian	Electromagnetic Environment - Guidance
Conducted RF IEC 61000-4-6	3 Vrms 150 kHz to 80MHz outside ISM bands ^a 6 Vrms 150 kHz to 80MHz in ISM bands ^a	3 Vrms 150 kHz to 80 MHz outside ISM bands 6 Vrms 150 kHz to 80 MHz in ISM bands	Portable and mobile RF communications equipment should be used not closer to any part of the Models SV800P, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Recommended separation distance: $d = 1.2\sqrt{P}$ 150 kHz~80 MHz $d = 1.2\sqrt{P}$ 80 MHz to 800 MHz $d = 1.2\sqrt{P}$ 800 MHz to 2.5GHz 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 metres(m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey ^a , should be less than the compliance level in each frequency range ^b Interference may occur in the vicinity of equipment marked with the following symbol 
Conducted RF IEC 61000-4-6	3 V/m 80 MHz to 2.7GHz	3 V/m 80 MHz to 2.7 GHz	

NOTE1: At 80 MHz and 800 MHz, the higher frequency range applies.

NOTE2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and rejection from structures, objects and people.

- a.The ISM (industrial, scientific and medical) bands between 150 kHz and 80MHz are 6.765 MHz to 6.795 MHz; 13.553 MHz to 13.567 MHz; 26.957 MHz to 27.283 MHz; and 40.66 MHz to 40.70 MHz.
- b.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 of fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the Projection Vein Finder V800F is used exceeds the applicable RF compliance level above, the Projection Vein Finder V800F should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocating the Projection Vein Finder.
- c.Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.

Recommended separation distances between portable and mobile RF communications equipment and the Projection Vein Finder

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

Rated maximum output power of transmitter/W	Separation distance according to frequency of transmitter/m		
	150 kHz ~ 80 MHz $d = 1.2\sqrt{P}$	80 MHz ~ 800 MHz $d = 1.2\sqrt{P}$	800 MHz ~ 2,5 GHz $d = 1.2\sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

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

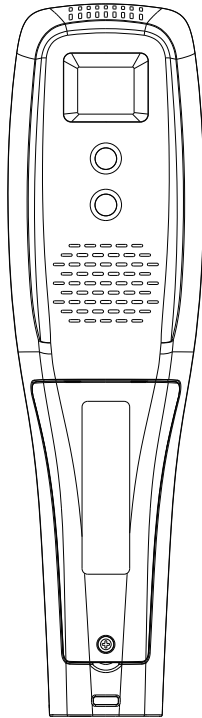
NOTE 1: At 80 MHz and 800 MHz, the higher frequency range applies.

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

Guidance and Manufacturers Declaration — Proximity fields

Immunity test	Test frequency	Modulation	Compliance level
Proximity fields IEC 61000-4-3	385 MHz	Pulse modulation 18 Hz	27 V/m, at 30 cm separation distance
	450 MHz	FM ± 5 kHz deviation 1 kHz sine	28 V/m, at 30 cm separation distance
	710 MHz, 745 MHz, 780 MHz	Pulse modulation 217 Hz	9 V/m, at 30 cm separation distance
	810 MHz, 870 MHz, 930 MHz	Pulse modulation 18 Hz	28 V/m, at 30 cm separation distance
	1720 MHz, 1845 MHz, 1970 MHz	Pulse modulation 217 Hz	28 V/m, at 30 cm separation distance
	2450 MHz	Pulse modulation 217 Hz	28 V/m, at 30 cm separation distance
	5240 MHz, 5500 MHz, 5785 MHz	Pulse modulation 217 Hz	9 V/m, at 30 cm separation distance

NOTE: The immunity test level is calculated using the equation: $E = \sqrt[6]{d \times \sqrt{P}}$ where P is the maximum power in W, d is the minimum separation distance in m, and E is the immunity test level.



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