

# **USER MANUAL**

## **Vet Fluid Warmer**

### **FW2-VET**

(Version: V1.0.0, Edit Date:2018.09.14)

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## 1. Product overview

### 1.1 Main Composition and Structure

Vet fluid warmer is mainly composed of microcomputer, heating system, temperature detection system, temperature control system, alarm system, man-machine interface etc, and equipped with one external drop sensor.

### 1.2 Applicable Range

Vet fluid warmer is an equipment heating liquids inside blood transfusion tube/ infusion tube based on thermal transfer principle, therefore, it is mainly used to heat liquid infused to human by transfusion tube/ infusion tube.

Users of this device must be well trained professional persons.

### 1.3 Product Performance

Power supply: AC 100V—240V 50Hz/60Hz.

Input power: ≤70W.

Temperature control accuracy:  $\leq \pm 1^{\circ}\text{C}/1.8^{\circ}\text{F}$ .

Temperature control range:  $30^{\circ}\text{C} \sim 50^{\circ}\text{C}/ (86^{\circ}\text{F} \sim 122^{\circ}\text{F})$  (The controlled temperature is  $10^{\circ}\text{C}/ 50^{\circ}\text{F}$  higher than surrounding temperature).

Safety measures: Visual and audible alarm for over-temperature and low-temperature.

Automatically power cut if the heater's temperature reaches  $56^{\circ}\text{C} \pm 3^{\circ}\text{C}$ .

Monitoring drip rate, bottle empty and giving alarm. (Optional).

Complete machine weight: <1kg.

Dimension: 172\*92\*55 mm.

### 1.4 Medical Electronic Device Safety Classification

Class I

### 1.5 Operational Environment

(1) Temperature:  $5^{\circ}\text{C} - 30^{\circ}\text{C}$ .

(2) Relative humidity: 10% - 93% (No frost).

(3) Atmosphere pressure:  $86.0 \text{ kPa} \sim 106.0 \text{ kPa}$ .

### 1.6 Effects to Environment and Energy Resource

The vet fluid warmer may have a certain amount of electromagnetic radiation, which may interfere other devices. If this situation occurs, please take appropriate measures to reduce the interference, such as adjust the device's location, or connect power supply from other sources. For further information, please refer to EMC Information (Chapter XI of this user manual).

### 1.7 Contraindication

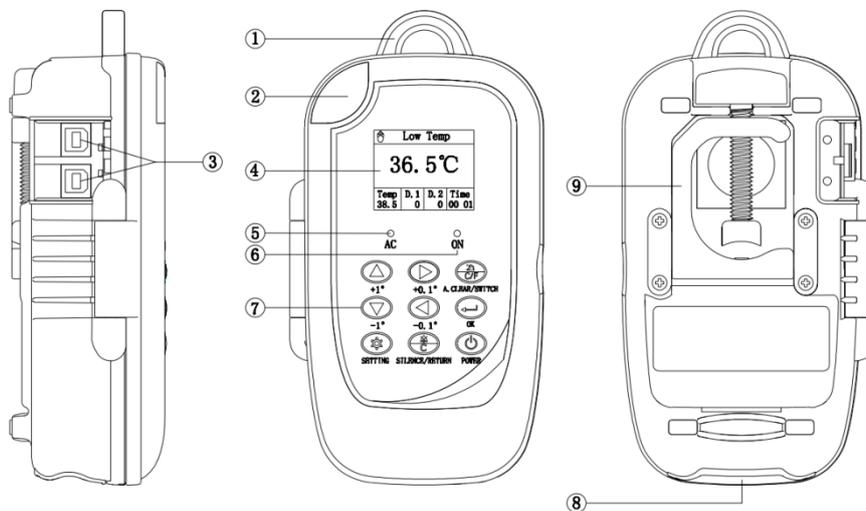
Not applicable to heat-sensitive drugs.

### 1.8 Attentions

- (1) This device is used to heat drugs(or blood) inside infusion tube/blood transfusion tube. Don't use it for other purposes.
- (2) Please follow doctor's instruction when using this device, ensure the drug can be heated, and check appropriate heating temperatures.
- (3) Prevent impact or knocking on the device, please pick up and lay down gently.
- (4) Please don't heat broken blood transfusion tube or infusion tube.
- (5) Read this user manual before installation and operation.
- (6) Don't wash this device.

## 2. Exterior Diagram

### 2.1 Complete Machine Diagram



- ①hand ring
- ②light cover
- ③drop sensor port
- ④Display interface
- ⑤ AC indicator light
- ⑥switch on indicator light
- ⑦keypad
- ⑧Power cable interface
- ⑨Fixing clamp(Hidden status)

### 2.2 Accessory

- Suspension belt
- Power cable
- Drop sensor (Optional, shown as right-side picture)



Note: While using the drop sensor, the machine can give drip abnormal and empty bottle alarm.

## 3. Introduction of Operation Interface

### 3.1 Switch on, Operating and Standby Interfaces

<div style="display: flex; align-items: center; justify-content: center;"> <span style="font-size: 1.2em; margin-right: 5px;">👆</span> <span>Low Temp</span> </div>			
36.5°C			
Temp	D. 1	D. 2	Time
38.5	0	0	00 01

### 3.2 Introduction of Operation Interface

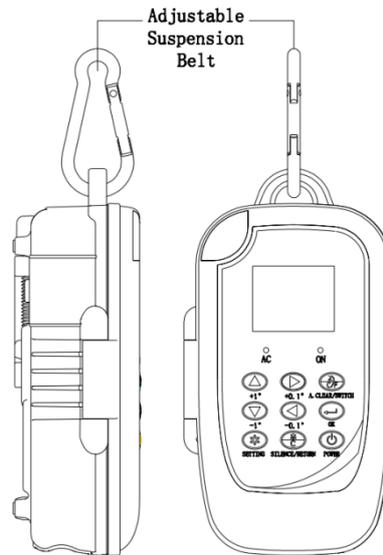
Please refer to section 4.2 of this user manual.

## 4. Installation & Operation Instructions

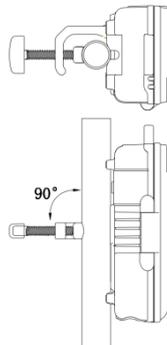
### 4.1 Installation

Two methods to install this device:

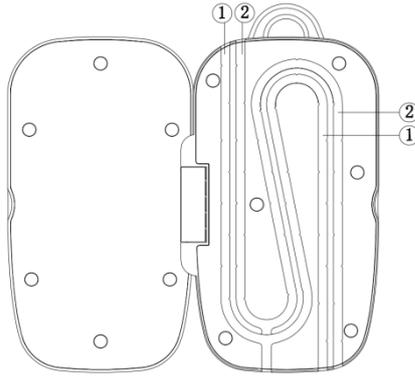
1. Use suspension belt to hang the device



2. Pole Clamp install illustration:(Open the hidden pole clamp and rotate 90 °, same as below second photo).



Note: This device has two Tube Channel Installation Slots for warming the fluid or blood, can be installed two Tube Channels or one Tube Channel. Illustration as below:

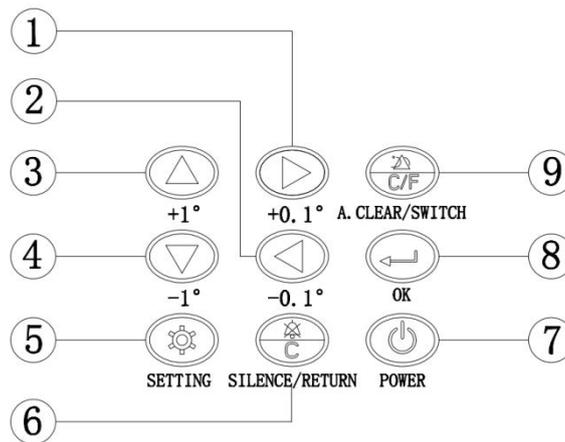


- ①: 1<sup>st</sup> Tube Channel Installation Slot
- ②: 2<sup>nd</sup> Tube Channel Installation Slot

## 4.2 Instructions for use

The product is mainly used for heating the fluid or blood in transfusion tube.  
In addition, it can detect the infusion drop rate and alarm when bottle is empty.

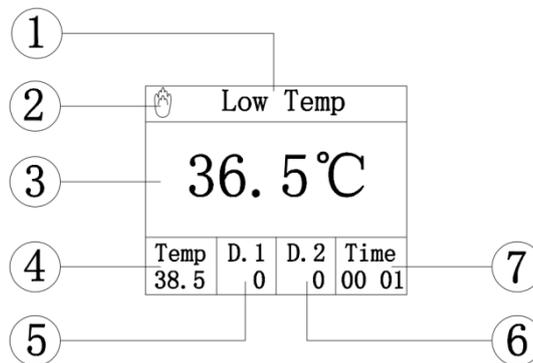
### 1. Instructions of keypad:



Serial number	Description	Function
①		In main interface or standby interface means +0.1° temperature value. In setting menu interface, it indicates "To Right" navigation key
②		In main interface or standby interface means -0.1° temperature value. In setting menu interface, it indicates "To Left" navigation key
③		In main interface or standby interface means +1° temperature value. In setting menu interface, it indicates "To UP" navigation key

④		In main interface or standby interface means -1° temperature value. In setting menu interface, it indicates "To Down" navigation key
⑤		Enter the setting menu
⑥		Return to the upper level menu; clear the alarm sound if there's alarm
⑦		Power key – Keep pressing Power for seconds to switch on/ switch off the device
⑧		In setting menu interface Enter is confirm key, No effect in the main menu
⑨		In the main menu, Switch to the unit of temperature. It can clear the alarm sound if there's alarm

## 2. Main Interface:



Serial number	Description	Function
①	Alarm Display Area	When alarm occurs, display the relevant alarm symbol
②	Heating Symbol	When the symbol is displayed, it indicates that the heating plate is warming up
③	Real-time Temperature	Display Heating Plate Real Time Temperature
④	Set the temperature	Display the setting temperature
⑤	Drop 1	Drop rate of 1 <sup>st</sup> Tube Channel
⑥	Drop 2	Drop rate of 2 <sup>nd</sup> Tube Channel

⑦	Operating Time	Total operating time of the device
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### 3.Setting interface:

After press "SETTING" Key, enter the following interface sequentially:

Interface	Description	Function
1 <sup>st</sup> Interface	Temperature setting	Set the target temperature and press "OK" key to save the settings
	Drop1 Setting	1. Set empty bottles alarm and abnormal accuracy alarm; 2.Set Drop rate of 1st tube channel; 3. set Drop 1 ON or OFF; 4.set the accuracy (Default: 100 drops/min, accuracy $\pm 10\%$ ; accuracy is adjustable during $\pm 5\% \sim 35\%$ ), press "OK" key to save the setting
	Drop2 Setting	1. Set empty bottles alarm and abnormal accuracy alarm; 2. Set Drop rate of 2nd tube channel; 3. set Drop 2 ON or OFF; 4.set the accuracy(Default: 100 drops/min, accuracy $\pm 10\%$ ; accuracy is adjustable during $\pm 5\% \sim 35\%$ ), press "OK" key to save the setting
	Backlight	Set the LCD screen backlight brightness Bright or Dark, and press the "OK" key to save the settings
2 <sup>nd</sup> Interface	Volume	Set the speaker volume, the speaker volume is 8 levels, and press the "OK" key to save the settings, High volume $>65\text{dB}$ , Low volume $\geq 45\text{dB}$
	Volume of Key	Set the key sound to ON or OFF, and press the "OK" to save the settings
	Restore to factory settings	Restore all the specifications to factory settings
	Language Settings	Set up language, choose English or Chinese, Press "OK" key to save settings
3 <sup>rd</sup> Interface	Device Information	Review the information of device, version, etc.

### 4.3 Power on / off

- 1.Keep pressing "Power" key until the LCD display is ON
- 2.Keep Pressing "Power" key about 2 seconds, the display will be off.

### 4.4 Operation Steps

1. Clean the surface of the Vet Fluid Warmer.
2. Fix the device per the install illustration, connect to power supply;
3. Install the fluid/blood transfusion tube to the corresponding heating plate slot, close the front cover, insert the drop sensor

into the corresponding socket (if required), Press "Power" key, the indicator of "ON" will be lighted, and the vet fluid warmer starts system self-test, if any abnormal the warmer will give audible and visual alarm.

4. According to the actual need to set the parameters, and press the "OK" key to save the settings, after back to the main interface, the vet fluid Warmer will operate normally;

5. Switch off the device, and pull out the power plug from the AC socket after warming.

6. Clean the surface of the vet fluid Warmer and store it correctly.

#### 4.5 Alarms and solution

Description	Alarm	Reasons and Solutions
Door Open	The front cover is open or not cover well	Detect the front cover is opened or not cover well, show alarms in visual and audible, press "SILENCE/RETURN" key to clear the audible alarm
Temp Err	Temperature Error. The temperature is 1°C higher or lower than the setting temperature	Heating function is abnormal. Show visual and audible alarm, when the temperature goes back to the control range, the alarm will disappear automatically. Press "SILENCE/RETURN" key to clear the audible alarm. Try again, if the alarm still exists, please return to factory for repair.
HighTemp	Temperature is higher than 50°C	Detect High temperature. Show visual and audible alarm, when the temperature goes back to the control range, the alarm will disappear automatically. Press "SILENCE/RETURN" key to clear the audible alarm.
Low Temp	Temperature is lower than 29°C after heating stably	Detect Low temperature. Show visual and audible alarm, when the temperature goes back to the control range, the alarm will disappear automatically. Press "SILENCE/RETURN" key to clear the audible alarm.
Empty 1	Drop 1 Empty	Detect the infusion bottle of 1 <sup>st</sup> tube channel is empty. Show visual and audible alarm, press "A.CLEAR/SWITCH" key to clear the visual alarm, press "SILENCE/RETURN" key to clear the audible alarm.
Empty 2	Drop 2 Empty	Detect the infusion bottle of 2 <sup>st</sup> tube channel is empty. Show visual and audible alarm, press "A.CLEAR/SWITCH" key to clear the visual alarm, press "SILENCE/RETURN" key to clear the audible alarm.
Drop1Err	Drop 1 Error/ Abnormal	Detect drop rate of 1 <sup>st</sup> tube channel is abnormal. Show visual and audible alarm, when Drop rate goes back to the correct rate, then the alarm will disappear automatically. Press "SILENCE/RETURN" key to clear the audible alarm.

Drop2Err	Drop 2 Error/ Abnormal	Detect drop rate of 2 <sup>nd</sup> tube channel is abnormal. Show visual and audible alarm, when Drop rate goes back to the correct rate, then the alarm will disappear automatically. Press "SILENCE/RETURN" key to clear the audible alarm.
Error E3	System data error	Detect system data error/ abnormal. Show visual and audible alarm, the alarm will disappear after restoring factory settings

#### 4.6 Operation precautions

1. Before operating the device, please check with the pharmacist, make sure the medicine can be heated or not and what's the appropriate temperature.
2. Before operating the device, please check the device is damaged or not, any liquid or wet there; if the panel is damaged, please replace it in time, avoid the medicine leaking inside to damage the device.
3. Please refer to the illustration of user manual to install the device correctly and stably, avoid the device falling from infusion set. Please don't block the speaker.
4. Please operate the device per above operation steps. If there is alarm, must solve it, if necessary, contact the local distributor for repair and test it qualified then can continue to use it.
5. If using the drop sensor, make sure the drop sensor socket is corresponding to the right infusion tube slot.
6. The device must be operated by well-trained professionals only.

#### 4.7 Special instructions for the personal use

Do not recommend for personal use. If consumers have to use it individually, must check with pharmacist the medicine can be heated or not, and confirm the appropriate heating temperature too.

### 5. Product accessories, consumables

#### 5.1 Product accessories, consumables

1. Suspension belt
2. Power cord
3. Drop sensor (Optional)

#### 5.2 Instructions of product accessories, consumables

Please refer to 2.2 accessories illustration.

#### 5.3 Product accessories replacement cycle and replacement methods

Replace if damaged. Please refer to 4.1 illustration for replacement methods

#### 5.4 Product accessories, consumables precautions

Not yet found.

### 6. Product maintenance and maintenance methods

#### 6.1 Routine maintenance

1. Should inspect the function of temperature controlling regularly (once every 2 months) as below steps:

Switch on the device in room temperature ( $20\pm 2$ )<sup>o</sup>C, set the device temperature to 36<sup>o</sup>C, when the device heating is stable (The heating symbol  disappear), check the display temperature on interface, and use the temperature measure equipment to test the temperature of the heating grooved plate, both should in the range of  $36\pm 1$  <sup>o</sup>C. (Note: The accuracy of

temperature measure equipment is  $\pm 1^{\circ}\text{C}$ ).

2. Keep surface of the device clean. Clean the surface with wet cloth adding cleaner, then wipe it with wet cloth, finally dry it with cloth and store it on clean shelf. Do not use solvents like xylene, acetone or similar solvents which leads to corrode the Vet fluid Warmer.

3. The heating surface should be cleaned thoroughly before and after use to avoid cross infection.

4. Keep the surface of the warmer away from sharp objects, otherwise the damages of the Vet fluid Warmer may lead to the tube channel broken, thus may cause patients' infection.

5. Keep the surface of the tube channel dry. Forbid any liquid immersing into the Vet fluid Warmer.

6. Inspect the pole clamp of Vet fluid Warmer before operation, prevent it falls during using and hurt people & damage device.

7. The lifetime of device is 5 years, it should be scrapped after using 5 years, please contact with manufacturer for more details.

## 6.2 Troubleshooting and solution

When the following situations appear, means the device is broken down, please solve it per the following methods.

Failure	Cause analysis	Solution
AC lights is not on	1. No AC power supply 2. Control circuit failure	1. Check the AC power supply 2. Contact the manufacturer/distributor
Not heated	1. Control circuit failure 2. Heating device failure 3. The heater failure	1. Contact the manufacturer/distributor 2. Contact the manufacturer/distributor 3. Contact the manufacturer/distributor
Message shows partially	LCD display abnormal	Contact with the manufacturer
Alarm Note Error E1	It means the internal temperature detector has failed.	The temperature detector is loose or damaged. Press the "SILENCE/RETURN" key to clear the sound prompt. Contact the manufacturer/distributor to deal with.
Alarm Note Error E3	It means incorrect parameter and need restore factory settings.	Parameter storage error, need to restore the factory settings. Press the "SILENCE/RETURN" key to clear the sound. Enter the settings interface, select "restore factory settings" to return to normal.
When appearing 4.5 alarm, the alarm cannot be eliminated even when the problem was solved.		1. Contact the manufacturer/distributor

## 7. Transport and Storage

Storage conditions: Temperature:  $-20^{\circ}\text{C} \sim +60^{\circ}\text{C}$ ;  
 Relative humidity: 10%~93%(no frosting);  
 Atmosphere pressure: 50.0 kPa~106.0 kPa;

Transport conditions:

Place the product as per No. of layers indicated on packing carton.  
 Temperature:  $-20^{\circ}\text{C} \sim +60^{\circ}\text{C}$ ;  
 Relative humidity: 10%~93% (no frosting);  
 Atmosphere pressure: 50.0 kPa~106.0 kPa;

## 8. Product life

### 8.1 Production date

See product label

### 8.2 Product life

The product life is 5 years.

## 9. Product labels explanation

### 9.1 Product labels ( on the back shell of Vet fluid warmer )

This label according to the relevant standards, displaying manufacturer, production date, batch No., equipment classification and other information.

### 9.2 Symbols and Significance

Symbols	Descriptions	Symbols	Descriptions
	Production batch No.		Protective Earthing
	Product serial No.	<b>IPX3</b>	Waterproof level: dripping water by slope angel $60^{\circ}$
	Caution, consult accompanying documents		AC power
	Type CF		DC power
	Date of production		Caution, consult instruction for use
	Manufacturer		Dispose in environmental-friendly way

## 10. After sales service

The free warranty for the vet fluid warmer is one year.

Note: The following situation is not within the range of free maintenance and repair.

- (1) Malfunctions resulting from improper operation, or modification / repair of the vet fluid warmer without supplier's knowledge and permission.
- (2) Bruise or damage caused by improper handling during transport.
- (3) Malfunction or damage caused by fire, salt, poisonous gas, earthquake, hurricane, flood, abnormal electric voltage or any other natural disaster.

For all the malfunctions and damage due to above reasons, the manufacturer can offer repair but charge for the cost.

## 11. Electromagnetic Compatibility (EMC) Information



### Attention:

- The vet fluid warmer meet YY0505 standard electromagnetic compatibility requirements;
- The user should install and use the electromagnetic compatibility information provided by the random document;
- Portable and mobile RF communication devices may affect the performance of the fluid warmer, use to avoid strong electromagnetic interference, such as near mobile phones, microwave ovens, etc.
- The guide and the manufacturer's statement are described in the annex.



### Warning:

- The vet fluid warmer should not be close to or stacked with other equipment, if you have to close or stacked use, you should observe the verification in the use of its configuration can be normal operation;
- Class A equipment is intended for use in industrial environments, and it may be difficult to ensure that electromagnetic compatibility is potentially difficult in other environments due to the vet fluid warmer conduct harassment and radiation harassment;
- Besides internal components provided by manufacturer of the vet fluid warmer, using the other brand accessories and cables may result in the vet fluid warmer increasing emitting or decreasing immunity.

### Enclosure :

Guidance and manufacturer's statement - Electromagnetic emission		
FW2-VET fluid warmer is expected to be used in the following specified electromagnetic environment, the purchaser or the user should ensure that it is used in this electromagnetic environment:		
Emission Test	Compliance	Electromagnetic Environment–Guidance
Radio-frequency emission GB 4824	Group 1	FW2-VET only uses its radio frequency for its internal functions. As a result, its RF emissions are low and there is little chance of interfering with nearby electronics.
Radio-frequency emission GB 4824	Class A	FW2-VET is applicable for use in all facilities that are non-domestic and not directly connected to a residential

Harmonic emission GB 17625.1	Not applicable	low-voltage residential network for home use.
Voltage fluctuation / scintillation emission GB 17625.2	Not applicable	

### Guidance and Manufacturer's Declaration-Electromagnetic Immunity

FW2-VET fluid warmer machine is expected to be used in the following electromagnetic environment. Purchasers and users should ensure that they will use the product in the following electromagnetic environment:

Immunity test	IEC 60601 test level	Conformance level	Electromagnetic environment – Guidance
Electrostatic discharge GB/T 17626.2	±8 kV contact discharge ±15 kV air discharge	±8 kV contact discharge ±15 kV air discharge	The floor should be covered with wood, concrete or tiles; if it is covered by composite materials, then the relative humidity should be at least 30%.
Electrical fast transient burst GB/T 17626.4	±2kV to power line ±1kV to input/output lin	±2kV to power line	Network power should have the quality that is typical for application in commercial environment or hospital.
Surge GB/T 17626.5	±1 kV line to line ±2 kV line to ground	±1 kV line to line ±2 kV line to ground	Network power should have the quality that is typical for application in commercial environment or hospital.

<p>Temporary voltage drop, short interruption and voltage variation on power input line</p> <p>GB/T 17626.11</p>	<p>&lt;5 % <math>U_T</math>, continuing for 2.5 cycle (On <math>U_T</math>, &gt;95% temporary drop)</p> <p>40 % <math>U_T</math>, continuous for 5 cycles (On <math>U_T</math>, 60% temporary drop)</p> <p>70 % <math>U_T</math>, continuous for 25 cycles (On <math>U_T</math>, 30% temporary drop)</p> <p>&lt;5 % <math>U_T</math>, continuous for 5s (On <math>U_T</math>, &gt;95% temporary drop)</p>	<p>&lt;5 % <math>U_T</math>, continuing for 2.5 cycle (On <math>U_T</math>, &gt;95% temporary drop)</p> <p>40 % <math>U_T</math>, continuous for 5 cycles (On <math>U_T</math>, 60% temporary drop)</p> <p>70 % <math>U_T</math>, continuous for 25 cycles (On <math>U_T</math>, 30% temporary drop)</p> <p>&lt;5 % <math>U_T</math>, continuous for 5s (On <math>U_T</math>, &gt;95% temporary drop)</p>	<p>Network power should have the quality that is typical for application in commercial environment or hospital. If users of the FW2-VET fluid warmer need to operate it continuously during power interruption, it is suggested to adopt UPS or battery for power supply.</p>
<p>PFMF (50/60Hz) GB/T 17626.8</p>	<p>400A/m</p>	<p>400A/m/50Hz/60Hz</p>	<p>PFMF should have the PFMF characteristics of typical places in commercial environment or hospital.</p>
<p>Note: <math>U_T</math> refers to the AC voltage before applying test voltage.</p>			

<p><b>Guidance and Manufacturer's Declaration- Electromagnetic Immunity</b></p>			
<p>FW2-VET fluid warmer machine is expected to be used in the following electromagnetic environment. Purchasers and users should ensure that they will use the product in the following electromagnetic environment:</p>			
<p><b>Immunity test</b></p>	<p><b>IEC 60601 test level</b></p>	<p><b>Conformance level</b></p>	<p><b>Electromagnetic environment – Guidance</b></p>

<p>RF Conduct GB/T 17626.6</p> <p>RF radiation GB/T 17626.3</p>	<p>3 V (effective value) 150 kHz~80 MHz</p> <p>3 V/m 80 MHz~2.5 GHz</p>	<p>3 V (effective value)</p> <p>3 V/m</p>	<p>Portable and mobile RF communication device should not be closer to any part of FW2-VET fluid warmer than the recommended isolation distance while using, including cables. This isolation distance should be calculated with the formula corresponding to transmitter frequency.</p> <p><b>Recommended isolation distance</b></p> <p><math>d = 12\sqrt{P}</math></p> <p><math>d = 12\sqrt{P}</math> 80 MHz~800 MHz  <math>d = 23\sqrt{P}</math> 800 MHz~2.5 GHz</p> <p>Where:</p> <p><math>P</math> —the maximum rate output power of transmitter provided by transmitter manufacturer, in W;  <math>d</math>— recommended isolation distance, in m<sup>b</sup>.</p> <p>The field strength of fixed RF transmitter is determined by the survey<sup>c</sup> of electromagnetic field. <sup>d</sup> should be lower than conformance level in each frequency range.</p> <p>Confirm that <sup>d</sup> is lower than conformance level in each frequency range. There may be interference around</p> <p>the devices with the following symbol. </p>
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Note 1: Formula for high frequency ranges should be used between 80MHz and 800MHz.

Note 2: This guidance may not apply to all situations, since electromagnetic propagation may be affected by the absorption and reflection of buildings, objects and human bodies.

- a Fixed transmitter, such as the base stations of wireless (cell/cordless) phones and ground mobile radio, amateur radio, amplitude modulation, FM radio broadcast and TV broadcast, etc., its field strength cannot be forecasted accurately in theory. Survey of electromagnetic fields should be taken into consideration in order to evaluate the electromagnetic environment of fixed RF transmitter. If it is measured that the field strength of the location of the FW2-VET fluid warmer is higher than the applicable RF conformance level, fluid warmer should be observed to verify if it can operate normally. If abnormal performance is observed, then supplementary measures, for example, readjustment of the direction or location of the fluid warmer, might be necessary.
- b Strength field should be lower than 3 V/m within the whole frequency range of 150KHz~80MHz.

**Recommended Isolation Distance between Portable and Mobile RF Communication Device and FW2-VET fluid warmer**

FW2-VET fluid warmer machine is expected to use in the electromagnetic environment where RF radiated disturbance is under control. According to the maximum rated output power of communication device, purchasers or users can prevent electromagnetic interference by maintaining the minimum distance between portable and mobile RF communication device (transmitter) and FW2-VET fluid warmer

Maximum rated output power of transmitter W	Isolation Distance Corresponding to Different Frequencies 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 $d = 2.3\sqrt{P}$
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 the maximum rated output frequency of transmitter not listed in the table above, isolation distance, in m, is recommended. It can be determined with the formula in the frequency column of corresponding transmitter.  $P$  here is the maximum rated output power of transmitter, in W, provided by transmitter manufacturer.

Note 1: Formula for high frequency ranges should be used between 80MHz and 800MHz.

Note 2: This guidance may not apply to all situations, since electromagnetic propagation may be affected by the absorption and reflection of buildings, objects and human bodies.

