

# AutoCAT+

## User Manual V2.0



## **Version Information**

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AutoCAT+ Manual: Version 2.0

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- All installation operations, expansions, changes, modifications and repairs of this product are conducted by Thames Medical Ltd authorised personnel;
- The electrical installation of the relevant room complies with the applicable national and local requirements;
- This product is operated under strict observance of this manual.

### **Guarantee**

Thames Medical Ltd provides timely after-sales service for the AutoCAT+ in accordance with warranty regulations. The warranty period is as follows:

- The main machine is covered for one

year from the date of sale.

- Accessories are covered for six months from the date of sale.

## **Exemptions**

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- Any Thames Medical Ltd product from which the original serial number tag or product identification markings have been altered or removed.
- Any product manufactured by another company.

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The safety statements presented in this chapter provide essential safety information that the operator of the veterinary monitor must be aware of and follow.

Additional safety statements may appear in other chapters or sections. These may be similar to or the same as the statements below, or they may be specific to particular operations.

### **WARNING**

Indicates a potential hazard or unsafe practice that, if not avoided, could result in death or serious injury.

### **CAUTION**

Indicates a potential hazard or unsafe practice that, if not avoided, could result in minor personal injury or damage to the product or property.

### **NOTE**

Provides application tips or other useful information to help you get the most from your product.



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## 1.1 Warnings

### **WARNING**

- This is a monitoring device, not a treatment device.
- To ensure patient safety, verify that the device and accessories are functioning safely and properly before use.
- When used in conjunction with electrosurgical equipment, prioritizing the animal's safety is essential.
- Do not use this device in the presence of flammable anesthetics, explosive substances, vapors, or liquids.
- Do not open the monitor housing. All servicing and future upgrades must be performed by personnel trained and authorized by Thames Medical Ltd.
- Dispose of packaging materials in accordance with applicable waste control regulations and keep them out of the reach of children.

## 1.2 Cautions

### CAUTION

- Users must ensure that the monitor's surface remains dry and clean while preventing liquid from entering.
- Store or transport the veterinary monitor properly to avoid damage caused by drops, impacts, strong vibrations, or other mechanical forces.
- Maintenance and upgrades of the monitor should only be carried out by personnel authorized by Thames Medical Ltd.

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### **1.3 Notes**

#### **NOTE**

- The software was developed in accordance with IEC 601-1-4, minimizing the risk of hazards caused by software errors.
- This veterinary monitor complies with the requirements of CISPR 11 (EN 55011) Class A.
- Before using the monitor, please read this manual carefully.

### 2.1 Monitor Description

This monitor integrates parameter measurement and waveform monitoring functions. Its colour TFT liquid crystal display clearly shows patient parameters and waveforms.

The monitor is compact, lightweight, and easy to carry, with a built-in battery, making it portable for use in clinics, hospital wards, and even at home.

This monitor is capable of measuring the following parameters: ECG (electrocardiograph), HR (heart rate), NIBP (non-invasive blood pressure), SpO<sub>2</sub>, PR (pulse rate), and TEMP (body temperature).

The one-button design makes the monitor user-friendly, allowing for convenient operation. Additionally, it can be connected to other smart devices, such as Apple and Android Phones, PCs and tablets.

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## 2.2 Features

- Compact size, lightweight, easy-to-carry handle.
- Results and Waveform are shown on the TFT in real time.
- Low-power dissipation.
- Built-in battery.
- Supports BLE 5.0.

### 2.3 Appearance

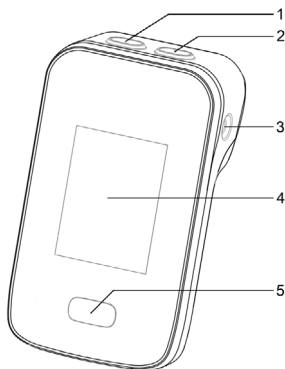


Figure 2.1: The Monitor

1. ECG & TEMP cable connector, Charging Connector.
2. SpO2 sensor connector.
3. NIBP cuff hose connector.
4. TFT LCD Screen.
5. Power and functions button.

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## **2.4 Accessories**

- ECG & TEMP cable array.
- SpO2 sensor with two sizes of SpO2 Clip.
- Thames Medical CAT+ Cuffs, sizes 1-5.
- Slip luer tubing for blood pressure cuffs.
- USB Type-C charging cable.
- Wireless charger base.

### 3.1 Unpacking and checking

Before unpacking, carefully inspect the packaging for any signs of damage. If any damage is detected, contact the carrier or Thames Medical immediately.

If the packaging is intact, open the box and carefully remove the instrument and accessories.

Verify all items against the packing list and check for any mechanical damage. If you encounter any issues, please contact Thames Medical immediately. Our contact details can be found on the back of this manual.

#### **WARNING**

- Keep packaging materials out of the reach of children.
- Dispose of packaging materials in accordance with local regulations.



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## 3.2 Connecting animal Sensors and Probes

Connect the required sensors or probes to the monitor. The sensors and probes are shown in the following images:



Figure 3.1: ECG & Temperature Cable



Figure 3.2: SpO2 Sensor Cable



Figure 3.3: CAT+ Blood Pressure Cuffs

## 3.3 Power On

Short-press the button on the panel to power on the device.

## 4.1 Display

This monitor has a colour TFT LCD screen. It is able to display patient parameters and waveforms clearly when the monitor is operating normally.

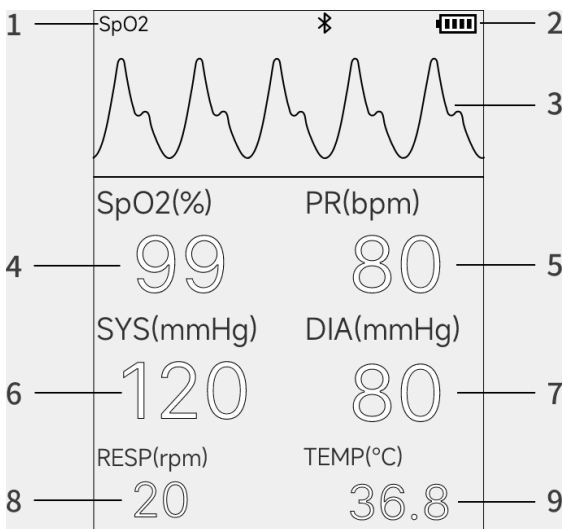


Figure 4.1: The Main Screen

1. **Wave type:** The type waveform displayed.
2. **Battery Indicator:** Indicate the Battery level.
3. **Waveform:** ECG waveform or SpO2 pleth.
4. **SpO2:** Oxyhemoglobin saturation.
5. **HR/PR:** Heart Rate or Pulse Rate.
6. **SYS:** Systolic blood pressure.
7. **DIA:** Diastolic blood pressure.
8. **RESP:** Respiration Rate
9. **TEMP:** Body Temperature.

### 4.2 Operations

With the one-button design, operating the monitor is simple and intuitive.

When the monitor is off, briefly press the button to power on the monitor.

When the monitor is on, briefly press the button to start the NIBP measurement. Press and hold the button will power off the monitor.

### 4.3 Charge

This monitor supports both wired and wireless charging. The wired charging interface uses a USB Type-C connection. For wireless charging, please use the compatible wireless charger manufactured and sold by us.

#### **WARNING**

- The battery may become damaged or malfunction if its operating time is significantly reduced after being fully charged.
- The operating time depends on the device's configuration and usage. For example, frequent NIBP measurements will shorten the battery life.

#### **NOTE**

The internal battery has a limited capacity. When the battery level is too low, the battery indicator will turn red. At this point, the monitor should be connected to a charger.

## 4.4 Bluetooth

The built-in Bluetooth supports BLE 5.0, allowing the monitor to connect with most smart devices, including PCs, Android phones, and Apple products.

The Figure 4.2 show a picture of an Android demo.

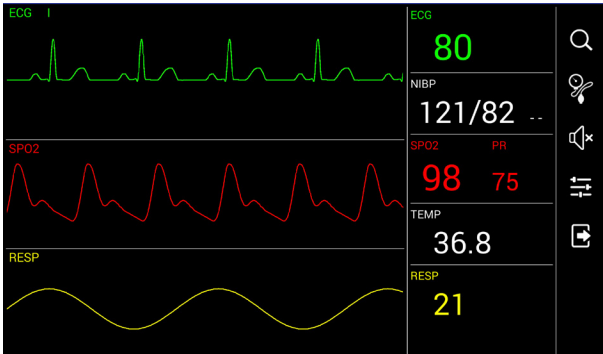


Figure 4.2: Android App Screen

### 5.1 ECG Monitoring

#### 5.1.1 Introduction

The electrocardiogram (ECG) is a graphical record of electric potentials generated by the heart muscle during each cardiac cycle. These potentials are detected on the surface of the body using electrodes attached to the extremities and chest wall, and are then amplified by the electrocardiograph machine and displayed on special graph paper.

#### 5.1.2 Monitoring Procedure

##### 5.1.2.1 Skin preparation

The quality of ECG information displayed on the monitor is a direct result of the quality of the electrical signal received at the electrode. Proper skin preparation is necessary for good signal quality at the electrode. A good signal at the electrode provides the monitor with valid information for processing the ECG data. Choose flat, non-muscular areas to place electrodes. Following is a suggested guideline for skin preparation:

- 
- Shave hair from skin at chosen sites.
  - Gently rub skin surfaces at sites to remove dead skin cells.
  - Thoroughly cleanse the site with a mild soap and water solution (do not use ether or pure alcohol because they will increase skin impedance).
  - Dry the skin completely before applying the electrodes.

### **5.1.2.2 Attaching the ECG Lead**

Attach the ECG lead wire to the electrodes prior to placement.

Place the electrodes on the animal. If the conductive ointment is not applied to the electrodes, apply it before the placement.

Connect the electrode lead to the animal cable.

Make sure the monitor is turned on and is ready for monitoring.

### 5.1.3 3-Lead wire Electrode Placement

The chart below shows the label used to identify each lead wire. Included also is its associated colour code per American (AHA) and European (IEC) standards.

AMERICAN STANDARD		EUROPEAN STANDARD	
Label	Colour	Label	Colour
RA	White	R	Red
LA	Black	L	Yellow
LL	Red	F	Green

Following is the configuration per American Standard when using three lead wires:

**RA (right arm) electrode:** The right front leg.

**LA (left arm) electrode:** The left front leg.

**LL (left leg) electrode:** The left hind leg.



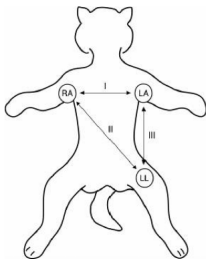


Figure 5.1: Positions of 3-lead wire electrode placement.

#### 5.1.4 Precautions

##### WARNING

- Use only the specified ECG cable for monitoring.
- When applying electrodes or connecting cables, make sure they are not connected to any conductive part or the ground. Verify that all ECG electrodes, including neutral electrodes, are securely attached to the animal.
- Interference from a non-grounded instrument near the animal and ESU interference can cause inaccuracy of the ECG waveform.

- Do not touch the animal, bed or instrument during de-fibrillation.
- Always dispose of, or recycle electrodes properly to prevent from environment contamination.

## **5.2 SpO2 Monitoring**

### **5.2.1 Introduction**

SpO2 monitoring is a non-invasive technique used to measure the amount of oxygenated haemoglobin and pulse rate by measuring the absorption of selected wavelengths of light.

The light generated in the probe passes through the tissue and is converted into electrical signals by the photo-detector in the probe.

The MCU processes the electrical signal and displays on the TFT LCD digital values for SpO2 and pulse rate.

The sensor measurement wavelengths are 666nm for the red LED and 905nm for infrared LED.

### 5.2.2 Monitoring Procedure

Sensor selection for SpO<sub>2</sub> measurement depends on the animal type. For an adult animal, choose a finger SpO<sub>2</sub> sensor; for an infant animal, choose a hand or toe sensor. Refer to the following procedure:

1. Power on the monitor.
2. Attach the sensor to the proper site on the animal, as Figure 5-2.
3. Plug the connector of the sensor extension cable into the SpO<sub>2</sub> connector on monitor.

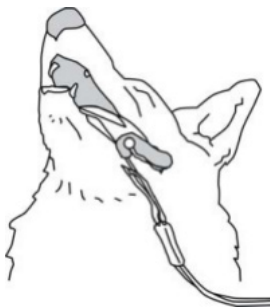


Figure 5-2 proper site to attach the sensor

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### 5.2.3 Measurement Limitations

If the accuracy of any measurement does not seem reasonable, first check the animal's vital signs by an alternate method. Then check the instrument for proper function. Inaccurate measurements may be caused by:

- Improper SpO<sub>2</sub> sensor;
- High-frequency electrical noise, including noise created by the host system, or noise from external sources, such as electro-surgical apparatus connected to the system;
- Oximeters and oximetry sensors used during magnetic resonance imaging (MRI) scanning. Induced current could potentially cause burns;
- Intra-vascular dye injections;
- Excessive animal motion;
- Excessive ambient light;

- Improper sensor installation or incorrect sensor placement on the animal;
- Concentration of dysfunctional haemoglobin, such as carboxyhemoglobin and methemoglobin;
- SpO<sub>2</sub> too low;
- Low circular perfusion of the applied part;
- Shock, anaemia, low temperature and application of vasomotor all reduce the arterial blood flow and may affect the pulse oximetry measurement.

### 5.2.4 Precautions

#### **WARNING**

- Do not use the supplied sterile SpO<sub>2</sub> sensors if the packaging or the sensor is damaged. Return them to the distributor or manufacturer.
- ES (Electro-surgery) equipment wire and SpO<sub>2</sub> cable must not be tangled up. Carefully route animal cabling to reduce the possibility

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of animal entanglement or strangulation.

- Do not put the SpO<sub>2</sub> sensor on the limb with arterial catheter or venous syringe.
- Prolonged and continuous monitoring may increase the risk of burns at the site of the sensor. It is especially important to check the sensor placement, and ensure proper attachment on neonates and animals of poor perfusion or skin sensitive to light. Check the sensor location every 2–3 hours and move to another location if the skin deteriorates. More frequent examinations may be required for different animals.
- Do not perform SpO<sub>2</sub> monitoring and NIBP measurements on the same arm simultaneously. Obstruction of blood flow during NIBP measurements may adversely affect the reading of the SpO<sub>2</sub> value.

### 5.3 NIBP Monitoring

#### 5.3.1 Introduction

The Non-Invasive Blood Pressure (NIBP) module measures blood pressure using the oscillometric method. This monitor can be applied to adult, paediatric, and neonatal animals.

#### 5.3.2 Monitoring Procedure

- To perform NIBP measurement on a animal, follow the procedure as below:
- Power on the monitor.
- Plug the air hose in the NIBP cuff connector of the monitor.
- Apply a cuff of proper size to the upper arm or the leg of the animal.
- Connect the cuff with the air hose.
- Press the button to start the measurement.



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### 5.3.3 Cuff Selection and Placement

1. Identify the animal limb circumference.
2. Select appropriate cuff; limb circumference is identified on each cuff.
3. Verify the cuff is completely deflated; place cuff around extremity being used and make sure the marking “ARTERIA” matches artery location.
4. Verify the cuff is not wrapped too tightly around the limb. Excessive tightness may cause discolouration or ischemia of the extremities.
5. Make sure that the cuff edge falls within the range of the <-> mark. If it does not, use a larger or smaller cuff that will fit better.

The limb chosen for taking the measurement should be placed at the same level as the animal's heart. If this is not possible, use the following method to correct the measurement result:

- If the cuff is placed higher than the heart level, add 0.9mmHg (0.10kPa) for each centimetre of difference.
- If the cuff is placed lower than the heart level, deduct 0.9mmHg (0.10kPa) for each centimetre of difference.

### 5.3.4 Measurement Limitations

Measurements are impossible with heart rate extremes of less than 40bpm or greater than 240bpm.

The measurement may be inaccurate/impossible:

- If a regular arterial pressure pulse is hard to detect.
- With excessive and continuous animal movement such as shivering or convulsions.
- With cardiac arrhythmias or rapid blood pressure changes.
- Severe shock or hypothermia that reduces

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blood flow to the peripheries .

- Obesity, where a thick layer of fat surrounding a limb dampens the oscillations coming from the artery.

### **5.3.5 Precautions**

#### **WARNING**

- The width of the cuff should be either 40% of the limb circumference or  $2/3$  of the upper arm length. The inflatable part of the cuff should be long enough to circle 50-80% of the limb. The wrong size cuff can cause erroneous readings. If the cuff size is in question, use a larger cuff.
- Do not apply the cuff to a limb that has an intravenous infusion or catheter in place. This could cause tissue damage around the catheter when infusion is slowed or blocked during cuff inflation.
- Make sure the air tubing connecting the blood pressure monitor is not blocked, twisted, or tangled.

### 5.4 TEMP Monitoring

#### 5.4.1 Introduction

This monitor uses thermal sensitive resistance to measure body temperature. The resistance of the thermistor probe changes with body temperature. The monitor then measures this resistance and calculates the corresponding temperature.

#### 5.4.2 Measurement Procedure

To measure an animal's body temperature:

1. Plug the ECG and temperature array into the ECG & TEMP connector.
2. Attach the temperature probe securely to the animal.
3. Power on the monitor.
4. Wait until the temperature reading stabilises

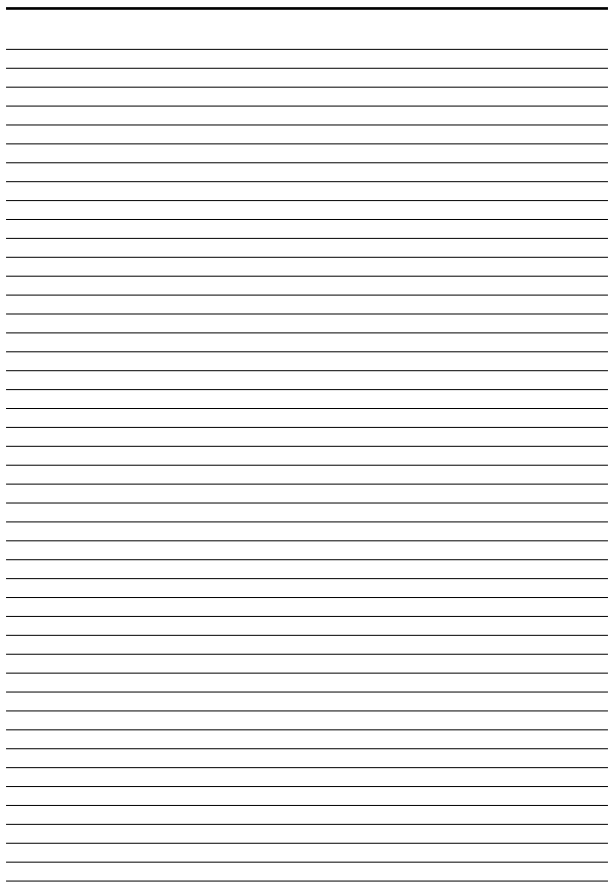
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### 5.4.3 Precautions

#### **WARNING**

- Be careful to avoid damaging the temperature probe and cable. When the temperature probe and cable are not in use, shape them into a loose round. If the cable is tangled too tightly or over-bent, mechanical damage may occur.
- If you are in doubt about the accuracy of any reading(s), check the animal's vital signs by an alternative method before checking the function of the monitor.
- Do not use the accessory if the packaging or the internal accessory is damaged. Return it to the manufacturer.





## Basic Specifications

Size: 140mm\*82mm\*46mm

Weight: 256g

LCD: 2.8 inch colour TFT LCD

Bluetooth: BLE 5.0.

## Environmental Specifications

Temperature:

Operating: -10°C - +40°C

Storage: -25°C - +85°C

Relative humidity:

Operating: 30% to 85% (non condensing)

Storage: 30% to 95% (non condensing)

Atmosphere pressure:

Operating: 86kPa – 106kPa

Storage: 50kPa – 106kPa

## Battery and Charging

Built-in Battery: 3.7V, 1800mAh lithium battery.

Wired Charging: 5V - 1A

Wireless Charging: 5W



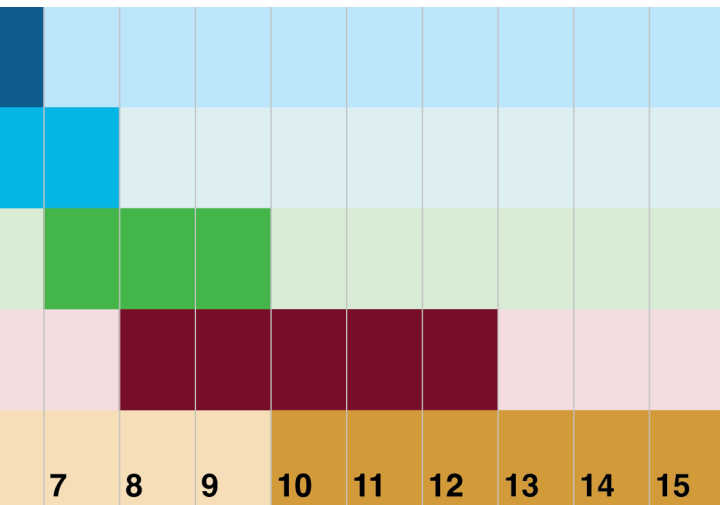
ECG	Waveform	Lead I	
	Bandwidth	0.05Hz - 100Hz (3dB)	Diagnose Mode
		1~40Hz	Monitor Mode
		0.1~25Hz	Operation Mode
HR	Scope	15bpm ~ 300bpm	
	Accuracy	$\pm 2$ bpm or 2% (whichever is greater).	
SpO2	Scope	35% ~ 100%	
	Accuracy	$\pm 2\%$ (80%~100%) $\pm 3\%$ (70%~79%) $\pm 3\%$ (35% ~ 69%)	
NIBP	Scope	4kPa ~ 34kPa(30mmHg ~ 255mmHg)	Systolic BP
		2kPa ~ 29.3kPa(15mmHg ~ 220mmHg)	Diastolic BP
		2.7kPa ~ 31.3kPa 20mmHg ~ 235mmHg	Mean Pressure
		Static pressure: $\pm 3$ mmHg	Detection Accuracy
RESP	Type	Chest Impedance Method	
	Scope	5 rpm ~ 100 rpm	
	Accuracy	$\pm 2$ rpm	
TEMP	Type	Vascular/Surface temperature	
	Scope	25°C ~ 45°C	
	Accuracy	$\pm 0.2^\circ\text{C}$	



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**NOTE**

- Where there is an overlap, use the cuff where the measurement falls closest to the centre of the band. For example, if measurement is 6cm, use Cuff Size 2 rather than Cuff Size 1.
- Where a measurement falls between bands, use the smaller size.
- Too wide a cuff will result in lower readings.
- Too narrow a cuff will result in inflated readings.



## Problems with your monitor?

We're here to help. Give us a call and we'll see what we can do to diagnose your issues over the phone or via email. If we can't immediately solve the issue, you can send us your kit for diagnostics.

## Our Service and Repairs Procedure

Before you send your kit to us, please decontaminate your equipment using our decontamination procedures. Please follow this procedure as it is vital to protect our staff.

We will also require you to fill out and include a returns form with your kit. This ensures we have a clear record of the issue and can get working on your repair as soon as possible.

You can find both the returns form and the full decontamination procedure online. Please scan the QR code below or contact us directly for more information.



**Scan Me**  
Repairs Procedures and Returns forms

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**[www.thamesmedical.com](http://www.thamesmedical.com)**