Midmark® Digital Vital Signs Device

Version 3.0

Operation Manual

003-10599-00 Rev AB1

Notice

The information in this manual is subject to change without notice.

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Part number for this Operation Manual: 003-10599-00 Rev AB1

Caution

Federal Law restricts this device to sale by or on order of a physician or properly licensed practitioner.

Table of Contents

I. Introduction

This operation manual is a comprehensive guide, designed to educate the user on the operation and functions of the Midmark® Digital Vital Signs Device. The information in this manual includes all options that currently are available with the device, such as SpO_2 and scale. The manual may contain information about functions that are not included with all models of the device.

II. Product Overview and General Information

Midmark® Digital Vital Signs Device automatically and noninvasively measures systolic and diastolic blood pressure, pulse rate, temperature and oxygen saturation (SpO_2) for adult and pediatric patients.

Note	*Federal Law restricts this device to sale by or on order of a physician or properly licensed practitioner.*

Note	*For accuracy and safety in pediatric blood pressure measurements, the smallest cuff approved for use on infants and small children is the Infant (#3-009-0068). It is important that the child's arm fits within the range markings on the cuff being used.*

All functions of the Midmark® Digital Vital Signs Device are performed via the touch screen display, with the exception of the on/off function which is a separate button on the front of the device.

This device has a rechargeable lithium-ion battery and four mounting options: mobile cart, countertop mount, wall mount, and equipment pole mount.

All vital signs parameters can be simultaneously measured and viewed on the touch screen display.

Temperature is measured at the temporal artery.

Note	*Midmark® Digital Vital Signs Device is not intended for continuous monitoring of patients or for use during patient* transport.

A. Intended Use

The Midmark® Digital Vital Signs Device is intended to be used by clinicians and other medically qualified personnel for measuring adult and pediatric patients for noninvasive blood pressure, pulse rate, noninvasive functional oxygen saturation of arterial hemoglobin (SpO_2), temperature and weight.

Patient information (e.g., name, age, height, pain score) can be entered manually.

B. Warnings

WARNING

Do not use this Midmark® Digital Vital Signs Device for any purpose other than its specified intended use.

WARNING

Midmark® Digital Vital Signs Device is not intended for continuous monitoring. Do not leave a patient unattended while taking measurements with this device.

WARNING

Midmark® Digital Vital Signs Device is not intended for use during patient transport.

WARNING

To ensure patient and operator safety, only use supplies and accessories that are supplied with the Midmark® Digital Vital Signs Device and recommended by Midmark. Using unapproved accessories can affect patient and/or operator safety.

WARNING

Regularly inspect the blood pressure cuff, SpO_2 cable and other accessories for damage. Replace accessories as needed.

WARNING

Midmark® Digital Vital Signs Device is not intended to be hand-held during operation.

WARNING

Do not connect more than one patient to the Midmark® Digital Vital Signs Device at the same time.

WARNING

Do not route the cables of the Midmark® Digital Vital Signs Device in a way that they may present a stumbling hazard.

WARNING

Midmark® Digital Vital Signs Device is not intended for use in the following cases:

- ***neonatal patients***
- ***apnea monitoring***
- ***in a magnetic resonance imaging (MRI) environment***
- ***in an electro-static unit (ESU) environment***
- ***applications requiring arrhythmia detection***

WARNING

FLAMMABLE ANESTHETICS: An explosion hazard exists if the Midmark® Digital Vital Signs Device is used in the presence of flammable anesthetics.

WARNING

BLOOD PRESSURE MEASUREMENT: Avoid frequent and prolonged blood pressure measurements, which can result in petechia, ischemia, purpura or neuropathy. In addition, be sure that the blood pressure hose does not become kinked during a measurement. If left unattended, this could result in sustained pressure in the blood pressure cuff.

WARNING

BATTERY HANDLING: Midmark® Digital Vital Signs Device contains a lithium-ion battery. The following precautions should be taken regarding these batteries:

- ***Do not immerse in water.***
- ***Do not heat or throw in fire.***
- ***Do not leave in conditions over 122° F (50° C) or in a heated car.***
- ***Do not attempt to crush or drop.***
- ***Only use the battery with the Midmark® Digital Vital Signs Device.***
- ***Follow the instructions in Section XV, Disposal when the Midmark® Digital Vital Signs Device is taken out of service.***

C. Cautions

Review the following information to avoid damage to the device and to support proper operation:

Caution

Familiarize yourself thoroughly with the operational procedures of the Midmark® Digital Vital Signs Device prior to use.

Caution

Substitution of components different from those supplied could result in measurement error.

Caution

Do not operate the Midmark® Digital Vital Signs Device near high frequency emissions (e.g. microwaves).

Caution

The Midmark® Digital Vital Signs Device is intended for indoor use only.

Caution

Midmark® Digital Vital Signs Device and accessories are not intended to be sterilized by any method. Attempts to do so may permanently damage the equipment.

Caution

Electronic devices can be damaged by exposure to liquids. Do not use or store the Midmark® Digital Vital Signs Device near any type of liquids.

Caution

In case of malfunction, contact Midmark Technical Service and be prepared to describe the problem.

Caution

To ensure proper operation, perform routine inspection and maintenance on the device. See Section XII, Maintenance, Storage and Battery Replacement.

Caution

Do not make any modifications to the device. Any modifications made will void the warranty and may negatively affect performance.

Caution

Refer servicing to qualified personnel.

Caution

ARRHYTHMIA PATIENTS: Midmark® Digital Vital Signs Device is designed to operate in the presence of cardiac arrhythmias. However, NIBP readings, and parameters derived from it, may be inaccurate for patients experiencing moderate to severe arrhythmia.

Caution

BLOOD PRESSURE MEASUREMENT

- *Do not allow the blood pressure cuff or hose to come into contact with fluids. If this occurs, see Section XI, Cleaning of Midmark® Digital Vital Signs Device and Accessories of this manual for drying instructions.*
- *Check the hose and cuff frequently for signs of damage or debris. An obstruction in the hose may interfere with inflation and deflation, resulting in inaccurate readings.*
- *To obtain accurate blood pressure readings, keep the limb and the cuff motionless.*
- *The blood pressure cuff, when applied to an arm, should be at the same level as the patient's heart.*
- *Blood pressure measurements may not be accurate if the patient is convulsive or experiencing tremors.*
- *Check for kinks in the blood pressure hose if the device reports a measurement problem.*

Caution

PULSE OXIMETRY MEASUREMENT (SpO_2)

- *Read instructions provided with the sensor to understand the best application technique and all relevant safety information.*
- *Do not apply the sensor on the same limb as the blood pressure cuff. During blood pressure measurements, the perfusion is temporarily reduced, which can result in inaccurate pulse oximetry readings.*
- *Refer to Section XVI, Accessories and Supplies for approved SpO_2 sensors.*
- *Elevated levels of carboxyhemoglobin or methemoglobin can result in inaccurate pulse oximetry readings.*
- *Bright light can create problems with the pulse oximetry measurements, resulting in inaccurate readings. If the sensor is in a place where it may be exposed to bright light, you should cover it with an opaque material.*
- *Pulse oximetry readings may be inaccurate in the presence of excessive motion artifact or tremors.*

D. System Specifications

General Performance	
Category	**Specifications**
Product Name	Midmark® Digital Vital Signs Device
Product Type	Non-invasive, multi-parameter digital vital signs device
Product Weight	4.0 lb (1.8 kg) without Exergen® TemporalScanner® 4.7 lb (2.1 kg) with Exergen TemporalScanner
Product Dimensions	12" L x 4" W x 7" H (0.30 x 0.10 x 0.18 m) without the Exergen TemporalScanner 12" L x 4" W x 8" H (0.30 x 0.10 x 0.20 m) with the Exergen TemporalScanner
Power Requirements	Input: 100 – 240 V / ~ 50 – 60 Hz / 700 mA Output: 15 V / 2 A
Battery Requirements	• Battery Type: Rechargeable, 10.8 V lithium ion • Low Power Indicator • Automatic Shutdown on low power • Operating Time: Approximately 8 hours • Leakage current: Meets AAMI/IEC/CSA 606011 requirements • Battery charge time: 4 hours to fully charge, 3 hours for 95% charge
Type of Protection (Electrical)	Class II
Degree of Protection (Water)	IPX1
Disinfecting Method	Per the instructions in the Cleaning of Midmark® Digital Vital Signs Device and Accessories section of this manual
Degree of Safety (Flammable Anesthetic Mixture)	Not suitable for use in the presence of a Flammable Anesthetic Mixture
EMC Standard	Per IEC 60601-1-2 and FCC Part 15 (Emissions Class B)

Device Connectivity	USB (Client)
Accessory Connectivity	USB 1.1 (Master)

Environmental	
Category	**Specifications**
Cooling	Convection (no fan)
Operating Temperature	32 to 104° F (0 to 40° C) Note: For Patient Temperature Measurement: 61 to 91° F (16 to 33° C)
Storage Temperature	-4 to 122° F (-20 to 50° C)
Operating Humidity	15 to 90% non-condensing
Storage Humidity	15 to 95% non-condensing
Operating Altitude	0 to 15,000 feet
Storage Altitude	0 to 40,000 feet
Non-Invasive Blood Pressure	
Category	**Specifications**
Method	Oscillometric
Cuff Sizes	Infant, Child, Small Adult, Adult, Adult Long, Large Adult, Large Adult Long, and Thigh
Derived Parameters	Systolic, Diastolic and Mean Arterial Pressure (MAP)
Measurement Range	Systolic: 30 to 250 mmHg MAP: 20 to 230 mmHg Diastolic: 10 to 210 mmHg
Measurement Accuracy	Systolic: ± 5 mmHg MAP: ± 5 mmHg Diastolic: ± 5 mmHg
Pulse Rate Range	30 to 240 beats per minute (BPM)
Pulse Rate Accuracy	± 5% or ± 2 BPM, whichever is greater

Initial Cuff Pressure	User-Selectable
Overpressure Cutoff	290 ± 3 mmHg (normal means), 300 ± 30 mmHg (back-up)
Measurement Time	Approximately 30 seconds

Temperature	
Category	**Specifications**
Probe Type	Exergen® TemporalScanner® TAT-5000S-RS232-QRMidmark
Scale	Fahrenheit (F) Celsius (C)
Measurement Type	Temporal
Measurement Range	15.5 to 43.3° C (60.0 to 110.0° F)
Measurement Accuracy	± 0.1° C or 0.2° F
Measurement Time	Approximately 0.04 seconds
Pulse Oximetry (SpO_2)	
Category	**Specifications**
Method	Absorption – Spectrophotometric (dual wavelength) Functional oxygen saturation of arterial hemoglobin
SpO_2/PR Resolution	SpO_2: 1 O2% PR: 1 BPM
Measurement Range	SpO_2: 20 to 100% PR: 30 to 240 BPM
Measurement Accuracy	SpO_2: from 70 to 100%, ± 2% (O2%); < 70%, unspecified PR: ± 5%
Report Interval	1 second

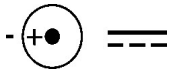
III. Minimum Computer Requirements

The versatility of the Midmark® Digital Vital Signs Device allows for it to be used with or without connection to a computer. When using the Midmark® Digital Vital Signs Device with a computer, refer to the *Minimum Computer Requirements* document at www.midmark.com, or contact Midmark Technical Service.

> ***Note*** *Midmark® Digital Vital Signs Device requires software when operating with a PC or a compatible EMR system. Please contact Midmark at 1.844.856.1230, option 2 to purchase the required software license.*

IV. Symbols

The following symbols are associated with Midmark® Digital Vital Signs Device.

Symbol	Description
	Follow instructions for use
	Do not dispose of this product as unsorted municipal waste. For proper disposal information, see Section XV, Disposal.
	Manufacturer
	Manufacture date
IPX1	Ingress protection against dripping water
	Patient connections are type BF and protected against defibrillation
Rx Only	Federal law (USA) restricts this device to sale by or on the order of a physician
	Blood pressure
	Exergen® TemporalScanner® connector
	Power Input: Use Midmark Power Supply (P/N 3-009-0010 or 01-02-0806)
	Power Input: DC connector and connector polarity
 B	USB B (For connection to computer)
	USB (For firmware updates only)
	Scale
REF	Catalog number
SN	Serial number

LOT	Lot code

	Not made with natural rubber latex
	Blood pressure cuff
	Caution
	Consult instructions for use
	Range of humidity to which the medical device can be safely exposed
	Keep dry
	Shipping direction
	Fragile

V. Device Unpacking and Initial Setup

Before unpacking Midmark® Digital Vital Signs Device, inspect the external package for obvious signs of damage. If there are any signs of damage, file a claim immediately with the shipping company.

Contact Midmark Technical Service immediately to report any product damage and to arrange for repair or replacement of damaged goods.

A. Contents Checklist

The Midmark® Digital Vital Signs Device shipping carton contains the items listed in the following table. Upon receipt, check the contents to confirm all items are present. Inspect all items for any signs of damage such as dents, cracks, tears, or scratches. If an item is missing or damaged, contact Midmark Technical Service for a replacement. Depending on the device configuration purchased, not all items listed will be in the shipping box.

Quantity Each	Description
1	Midmark® Digital Vital Signs Device
1	AC Power Supply and Cord
1	Adult Blood Pressure Cuff (26-35 cm)
1	Large Adult Blood Pressure Cuff (32-42 cm)
1	6.5 foot Blood Pressure Hose
1	Reusable, Adult SpO_2 Finger Sensor*
1	4 foot SpO_2 Extender Cable*
1	Exergen® TemporalScanner®
1	USB Cable
1	Quick Reference Guide
1	QR code sheet
1	Warranty Card

**Applicable only to devices with the SpO_2 feature (device part number 1-100-1645 / kit product number 4-000-0550).*

B. Initial Device Setup

This section will guide you through the following initial device set up steps:

- Attach accessories
- Charge the battery
- Connect to computer
- Attach scale
- Start the device

Attach Accessories

Attach all accessories to the device before attaching the power cord and turning the power on.

1. Place the Exergen® TemporalScanner® in the cradle on the right (see **Figure 1**).
2. Connect the Exergen TemporalScanner to its connector located on the back of the device (see **Figure 3**).

> ***Note*** *If the device was upgraded with Exergen TemporalScanner in the field, you will need to connect the Exergen Adapter to the connector port. Refer to Section XVIII, Field Upgraded Midmark Digital Vital Signs Device with Exergen TemporalScanner for more information.*

3. Attach the blood pressure hose to the connector located on the left side of the device (see **Figure 2**). Attach the appropriate size blood pressure cuff to the fitting at the end of the blood pressure hose.
4. Connect the SpO_2 sensor* to the left side of the device (see **Figure 2**). If desired, connect the included SpO_2 extender cable to the sensor and attach the SpO_2 extender cable to the SpO_2 connector on the left side of the device (see **Figure 2**).

**Applicable only to devices with the SpO_2 feature (refer to Section V-A, Contents Checklist.)*

Charge the battery

1. Attach the power cord to the device (see **Figure 3**). The power input is located on the back of the device. Plug the power cord into the AC wall outlet.
2. It is recommended that the internal battery be fully charged before using the device:
    - Allow approximately four (4) hours to fully charge the battery.
    - The Battery Charge Indicator will flash green when the unit is plugged into an AC power source and the battery is being charged.
    - The Battery Charge Indicator will be a solid green when the battery is fully charged.

Connect to computer

1. If using the Midmark® Digital Vital Signs Device with a computer, connect the mini-USB connector of the USB cable to the mini- USB port on the back of the device and route the cable through the USB cable guide (see **Figure 3**) on the battery door of the Midmark® Digital Vital Signs Device. The other end of the USB cable will be connected to an available USB port on the computer.

Attach scale

1. If using a Fairbanks® TeleWeigh™ scale with the Midmark® Digital Vital Signs Device, connect the scale cable to the back of the device (see **Figure 3-Scale Interface**). The

Midmark® Digital Vital Signs Device will automatically detect that the scale has been connected and is ready for use.

2. If using a Midmark Exam Chair and Integrated Scale with the Midmark® Digital Vital Signs Device, connect the scale cable on the chair to the back of the device (see **Figure 3-Scale Interface**). The Table Scale icon will appear to the right of the Clear button on the Main Testing screen when the Midmark® Digital Vital Signs Device is configured to the Integrated Scale. See Section XIII, Appendix A - Configuring an Midmark® Digital Vital Signs Device with the Midmark Integrated Scale for complete instructions on configuring the Midmark® Digital Vital Signs Device with the Integrated Scale.

Start the device

1. To start the Midmark® Digital Vital Signs Device, press the On/Off button located on the front of the device just below the touchscreen (see **Figure 4**).
    - The On/Off button will illuminate to indicate the device is on.
    - The Battery Charge Indicator will flash green when the unit is plugged into an AC power source and the battery is being charged.
    - The Battery Charge Indicator will be a solid green when the battery is fully charged.

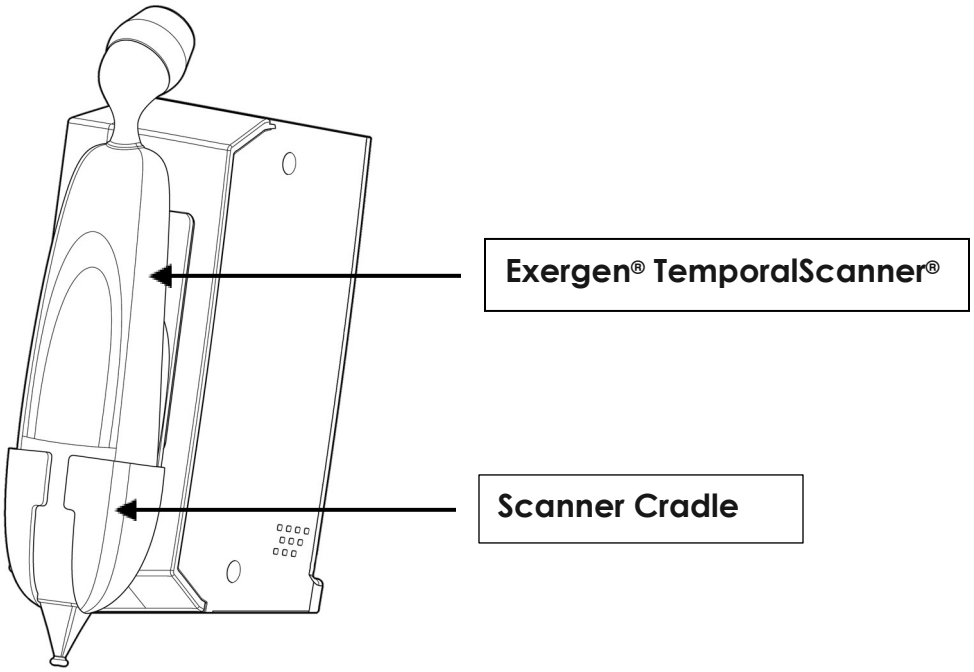


Figure 1 – Right View

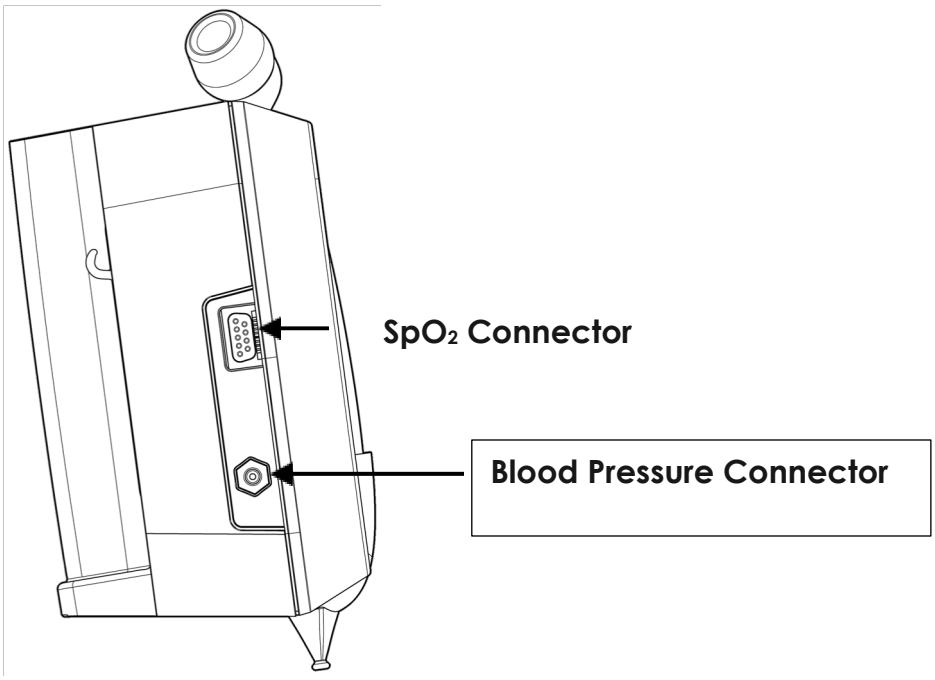


Figure 2 – Left View

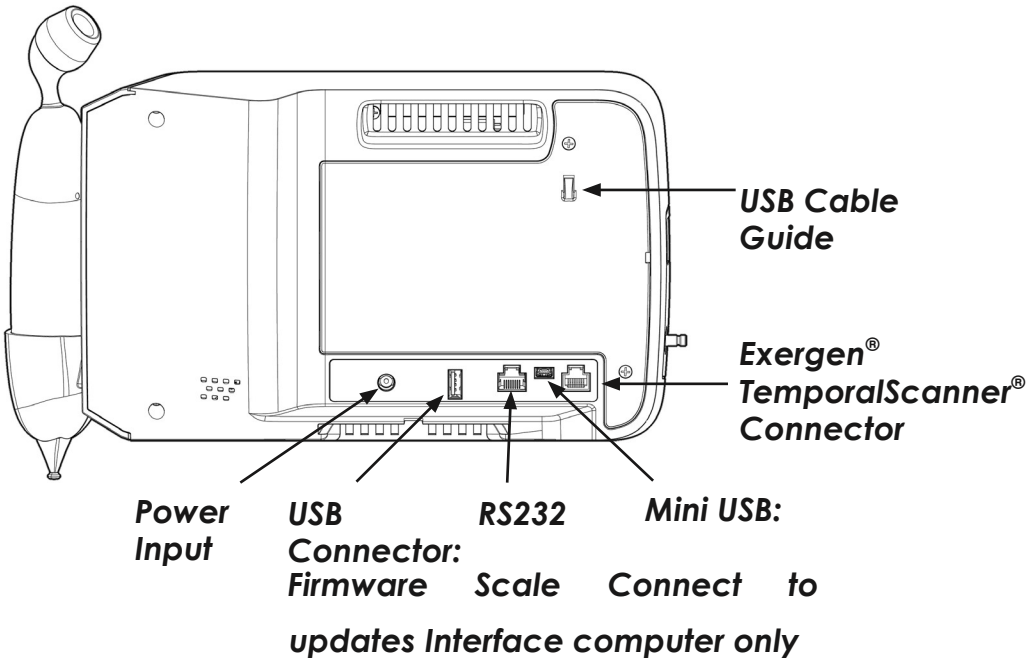


Figure 3 – Back View

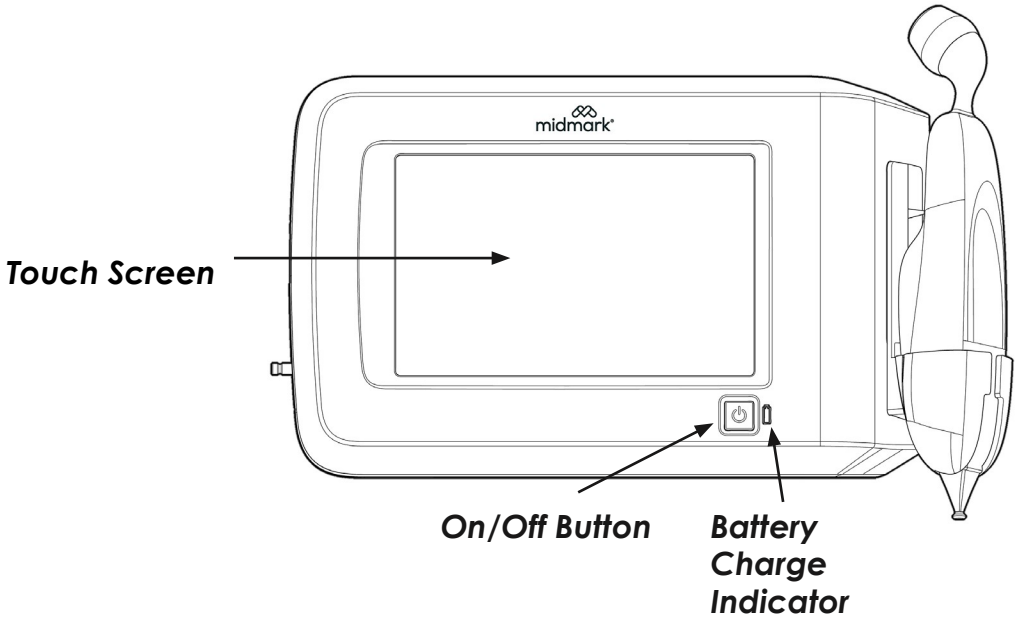


Figure 4 – Front View

VI. Power the Device

A. AC Power Transformer

Midmark® Digital Vital Signs Device can be run with AC or battery power once the battery has been charged.

- Attach the power cord to the device (see **Figure 3**). The power input is located on the back of the device. Plug the power cord into an AC wall outlet.

B. Battery

- Check the battery level when the device is turned on.
- The device can be operated when the battery is not fully charged.
- It takes approximately four (4) hours to fully charge the battery.
- For optimal battery life, charge the battery before it reaches 20 percent remaining battery power.
- When the battery level gets to approximately 40 percent power, the **Battery** icon on the touchscreen will turn from white to yellow.
- An initial warning message will appear that states "Battery Low."
- Connect the device to an AC wall outlet to recharge the battery.
- When the battery reaches approximately 20 percent power, the **Battery** icon on the touchscreen will change from yellow to red, indicating that the battery level is critically low.
- An initial warning message will appear that states "Battery Too Low."
- Connect the device to an AC wall outlet to recharge the battery.

- For information regarding battery replacement refer to Section XII-C, Battery Replacement.

C. Power-Up Screens

Midmark® Digital Vital Signs Device will display two screens before the Main Testing screen appears. The Midmark logo screen will appear first, followed by the Loading Program Settings notification screen. This screen states that program settings are loading. This screen will be displayed for approximately 25 seconds.

VII. Main Testing Screen

A. Buttons and Icons

a. Clear button

b. Table Scale button (see related Note in this section)

c. AC power indicator

d. Battery charge level

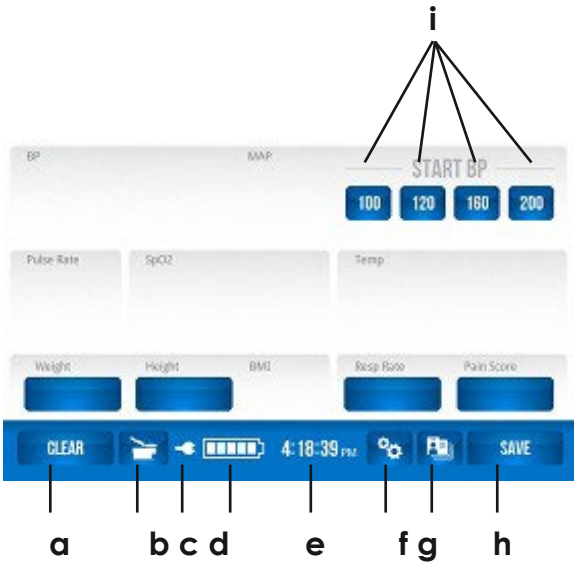
e. Time display

f. Settings button

g. Memory button

h. Save button

i. Four blood pressure inflation options



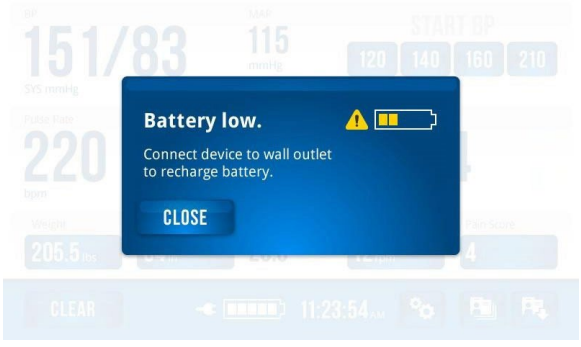
Midmark® Digital Vital Signs Device Main Testing screen.

Note	*The Table Scale icon (item b. in diagram above) will appear to the right of the Clear button when the Midmark® Digital Vital Signs Device is configured with the Integrated Scale. See Section XIII, Appendix A - Configuring a Midmark® Digital Vital Signs Device with the Midmark Integrated Scale for complete instructions on configuring the device with the Integrated Scale.*

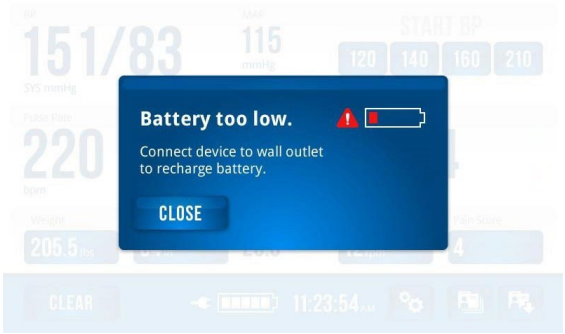
The **AC power** (plug) and **Battery** icons will be displayed when the unit is plugged in and the battery is charging.

If the unit is not plugged in, the **AC power** icon will not appear and the battery charge level will be indicated by the number of squares filling the **Battery** icon.

- When the device gets to approximately 40 percent power, a window will appear that reads, "Battery low. Connect device to wall outlet to recharge battery." (This will coincide with the squares in the **Battery** icon turning from white to yellow.)



- When the device gets to approximately 20 percent remaining power, a window will appear that reads, "Battery too low. Connect device to wall outlet to recharge battery." (This will coincide with the squares in the **Battery** icon turning from yellow to red.)
- The **Battery** icon outline will also continue to flash between red and white. If the device is not plugged in once the 20 percent warning appears, the device will have approximately 15 minutes before a final message appears that reads, "Battery critically low. Power down occurring; connect device to wall outlet to recharge battery."



B. Display of Data

The main testing screen has a place to display the following patient data:

a. Blood pressure

b. SpO_2

c. Temperature

d. Weight

e. Respiration Rate

f. Pulse Rate

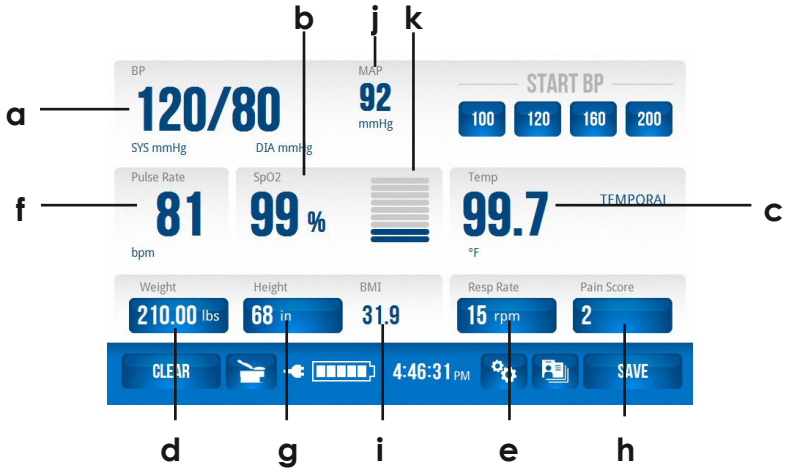
g. Height

h. Pain Score

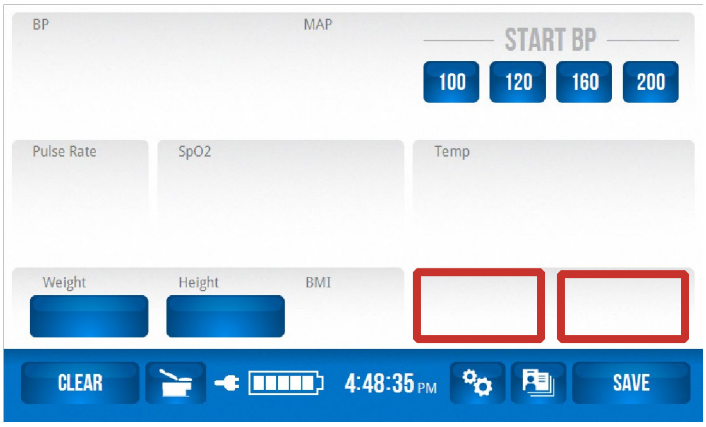
i. BMI

j. MAP

k. Pulse progress bar



Note	*The Respiration Rate and Pain Score parameters can be turned off so that they do not appear in the Main Testing screen. See Section IX-F - Additional Setting Changes and Options from the More Button in this manual for more details.*



C. Manual Entry of Data

Weight, respiration rate, height and pain score can be manually entered by pressing each corresponding button on the Main Testing screen.

A screen with a numerical keyboard will appear where the data can be manually entered. Once the data is entered, press Save to save the data, or press Cancel to delete the data entered. Once Save has been pressed, the Main Testing screen will appear, and the data will be visible.

D. BMI Calculation

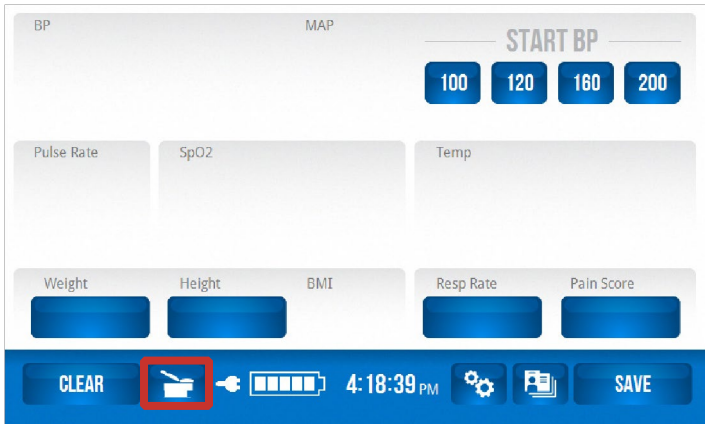
BMI is automatically calculated from the height and weight entered. Both data points must be present for the BMI value to be displayed.

E. Time

On the *Main Testing* screen, a digital clock is displayed in the bottom panel to the right of the **Battery** icon. This clock is updated every second.

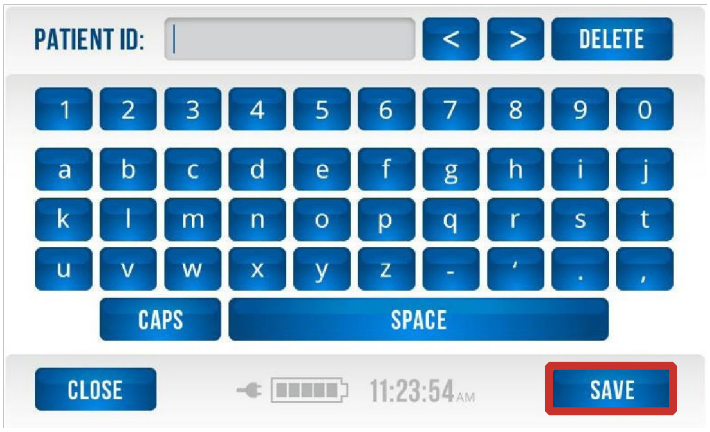
F. Table Scale

When the Midmark® Digital Vital Signs Device is configured with the Integrated Scale, the Table Scale icon will be present to the right of the Clear button. See Section VIII – D Scale Operation for obtaining a weight measurement via a Fairbanks® TeleWeigh™ scale or Integrated Scale. (See Section XIII Appendix A - Configuring an Midmark® Digital Vital Signs Device with the Midmark Integrated Scale for configuring the Midmark® Digital Vital Signs Device with the Midmark Exam Chair and Integrated Scale.)

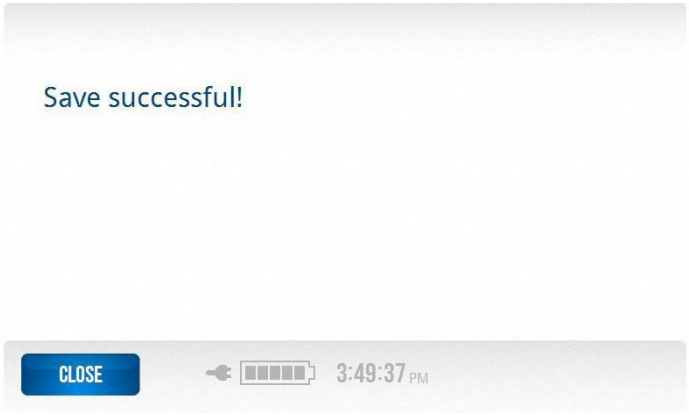


G. Save Button

1. To save vital sign data to memory, press the **Save** button.
2. Enter the patient's ID, and press **Save**.



3. Press **Close** to return to the *Main Testing* screen.



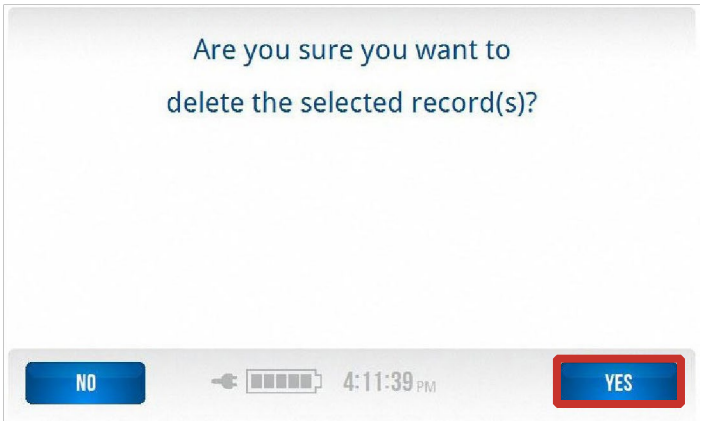
H. Using the Memory Button and Password

1. To access all patient data that is stored in the Midmark® Digital Vital Signs Device, press the **Memory** button.

   The patient data is password protected, and a password screen will appear when the Memory button is pressed. Enter the password, and press Enter. The password must be successfully entered in order to view the patient data stored in the memory screen. The factory set password is 1234. To set your own password, see Section IX-C, Memory Setting Button in this manual.

2. Midmark® Digital Vital Signs Device holds 100 patient measurements. When the memory is full and another patient test is saved, the first saved test will be deleted in order to save the current test.
3. To view all saved data, use the up and down arrows.
4. To view all saved parameters, press the right arrow.
5. To return *Home*, press the left arrow.
6. Press **Close** to return to the *Main Testing* screen.
7. To delete data for a single patient, touch the patient data on the screen to highlight it. The highlighted entry will be deleted once the **Delete** button is pressed.
8. To delete data for multiple patients, touch and highlight all entries to be deleted. The highlighted entries will be deleted once the **Delete** button is pressed.

After pressing the **Delete** button, a confirmation screen will appear.



9. Press **YES** or **NO**.
10. To return to the *Main Testing* screen, press the **Close** button at the bottom left corner of the screen.

VIII. Device Operation

A. Blood Pressure

Note	*Blood pressure measurements obtained using this device are similar to those obtained by a trained observer using the cuff/stethoscope auscultation method or other approved electronic/automated sphygmomanometers.*

Note	*There are four pressure setting buttons to choose from; these can be preset to pressure settings of the user's choice. See Section IX-B, Changing Blood Pressure Inflation Settings of this manual for detailed information on changing pressure settings.*

Blood Pressure Cuff Selection

Using the proper size blood pressure cuff is important for accurate blood pressure readings. Midmark recommends using Midmark or UltraCheck® reusable cuffs with the Midmark® Digital Vital Signs Device.

- Cuffs that are too small may result in erroneously high blood pressure readings, and cuffs that are too large may result in erroneously low blood pressure readings.
- To verify the proper cuff size for a patient, wrap the cuff around the patient's extremity. The index line (white arrow) should fall within the white range markings on the cuff. If a patient falls between two cuff sizes, always use the larger cuff.

Proper Application and Positioning of Blood Pressure Cuff

The preferred measurement site for adults and children is the upper arm. Other sites that can be used are the forearm, thigh, or calf at the ankle. Instructions in this manual are primarily for a cuff applied to an upper arm, but also apply to the other sites.

Do not wrap a cuff over a patient's clothing; inaccuracies can occur. Be aware that there may be a difference between readings taken on the left side versus the right side.

The cuff should be positioned level with the patient's heart. Measurements with a cuff placed above heart level can result in lower blood pressure readings, and measurements with a cuff placed below heart level can result in higher blood pressure readings.

Place the cuff brachial artery marker over or close to the brachial artery (when the cuff is applied to the upper arm). For best results, wrap the cuff snugly so that there is room for no more than two fingers under the cuff.

Initiating a Blood Pressure Measurement

Start the Midmark® Digital Vital Signs Device by pressing the grey On/Off button on the front of the device.

From the **Main Testing** screen:

1. Place the properly sized and positioned blood pressure cuff on the patient.

> ***Note*** *Keep the patient's arm relaxed and motion free during the measurement. The patient should not talk or move during the blood pressure measurement.*

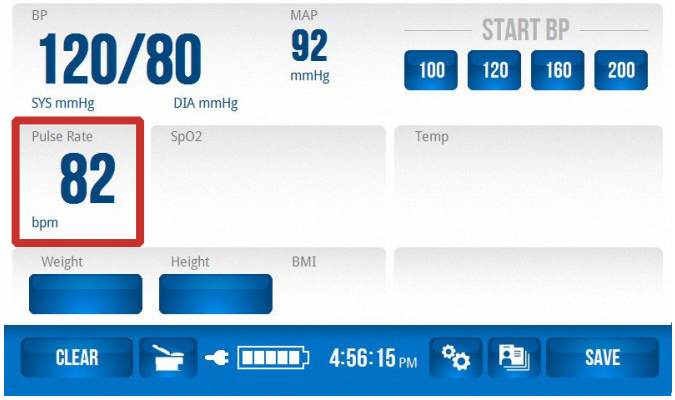
2. To start the blood pressure measurement, press the appropriate blood pressure inflation rate button on the Main Testing screen.
   a. Ideally, the initial inflation cuff pressure should be about 30 mmHg above the patient's systolic pressure. Using a higher inflation pressure may cause the patient unnecessary discomfort. Choosing an inflation pressure that is too low may cause the device to reinflate the cuff in order to obtain a systolic pressure reading.

> ***Note*** *There are four pressure setting buttons to choose from; these can be preset to pressure settings of the user's choice. See Section IX-B, Changing Blood Pressure Inflation Settings of this manual for detailed information on changing pressure settings.*

3. When a blood pressure measurement is started, the **Stop** button will be highlighted.
   a. To stop a blood pressure measurement at any time, press **Stop**. When the measurement is stopped, the cuff will deflate and all buttons will be enabled.

4. While the blood pressure measurement is running, the "in -progress wheel" will appear along with a message that reads, "*Please relax your arm. Blood pressure in progress.*"
5. During a blood pressure or any other measurement, the **Clear** button is disabled.

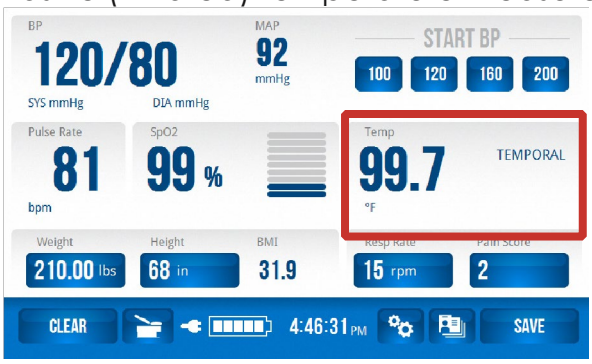
6. When the blood pressure measurement is complete, the systolic and diastolic values appear on the screen.
7. A pulse rate will be displayed when a blood pressure measurement is complete. The pulse rate will appear below "Pulse Rate" on the screen.



8. The **Clear** button will be enabled when the measurement is complete.

B. Temporal Temperature

The Midmark® Digital Vital Signs Device provides a connection to the Exergen TemporalScanner for non-invasive (infrared) temperature measurements.



EXERGEN® TemporalScanner®

The TemporalScanner is an infrared thermometer designed for accurate, completely noninvasive temperature assessment by scanning the temporal artery.

Temperature is measured by gently stroking the TemporalScanner across the forehead, and includes a momentary touch of the probe to the neck area behind the ear lobe, to account for any cooling of the forehead as a result of diaphoresis. The patented arterial heat balance technology (AHB™) automatically measures the temperature of the skin surface over the artery and the ambient temperature. It samples these readings approximately 1,000 times a second, ultimately recording the highest temperature measured (peak) during the course of the measurement. The TemporalScanner emits nothing - it only senses the natural thermal radiation emitted from the skin surface.

Temporal thermometry has been clinically proven in premier university hospitals to be more accurate than ear thermometry and better tolerated than rectal thermometry. This is supported by more than 50 peer-reviewed published studies covering all ages, from premature infants to geriatric patients, and in all clinical care areas.

A 40-page compendium on Temporal Artery Temperature Assessment is available at www.exergen.com/medical/PDFs/tempassess.pdf. A complete list of the published clinical studies are available at www.exergen.com/c. Complete multi-language information on clinical use, instruction manuals and training is available at www.exergen.com/s, which includes links to a specialized clinical site http://www.exergen.com/tathermometry/index.htm.

The link to www.exergen.com/s appears on the front label of the instrument as a scannable "QR" symbol for link directly to the site.

exergen.com/s

Important Safety Instructions

READ ALL INSTRUCTIONS BEFORE USING

If you have additional questions regarding the use or care of the Exergen TemporalScanner thermometer, please visit www.exergen.com or call Exergen customer service at 617.923.9900.

When using the product, basic safety precautions should always be followed, including the following:

⚠	***Caution*** *Use this product only for its intended use as described in this manual.*
⚠	***Caution*** *Do not take temperature over scar tissue, open sores or abrasions.*
⚠	***Caution*** *The operating environmental temperature range for this product is 60° F to 104° F (15.5° C to 40° C).*
⚠	***Caution*** *Always store this thermometer in a clean, dry place where it will not become excessively cold (-4° F/-20° C) or hot (122° F/50° C) or humid (max RH 93% non-condensing, at 50 - 106 kPa).*

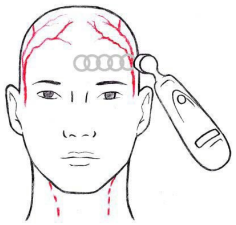
	***Caution*** *The thermometer is not shockproof. Do not drop it or expose it to electrical shocks.*
	***Caution*** *Do not autoclave. Please note cleaning and sterilizing procedures in this manual.*
	***Caution*** *Do do not use this thermometer if it is not working properly or if it has been exposed to temperature extremes, damaged, subjected to electrical shocks or immersed in water.*
	***Caution*** *There are no parts that you can service yourself except for the battery, which you should replace when low by following the instructions in this manual. For service, repair or adjustments, return your thermometer to Exergen®.*
	***Caution*** *Never drop the thermometer or insert any object into any opening of it, unless stated in this manual.*
	***Caution*** *If your thermometer is not used regularly, remove the battery to prevent possible damage due to chemical leakage.*
	***Caution*** *Follow the battery manufacturer's recommendations or your hospital policy for the disposal of used batteries.*
	***Caution*** *Not suitable for use in the presence of flammable anesthetic mixtures.*

WARNING

No modification of this equipment is allowed.

Introduction to Temporal Artery Thermometry

Temporal artery thermometry (TAT) is a recently developed method of temperature assessment using infrared technology to detect the heat naturally emitting from the skin surface. In addition, and of key importance, this method incorporates a patented AHB™ system to automatically account for the effects of ambient temperature on the skin.



This method of temperature assessment has been shown to improve results and reduce costs by non-invasively measuring body temperature with a degree of clinical accuracy unachievable with other thermometry methods(source).

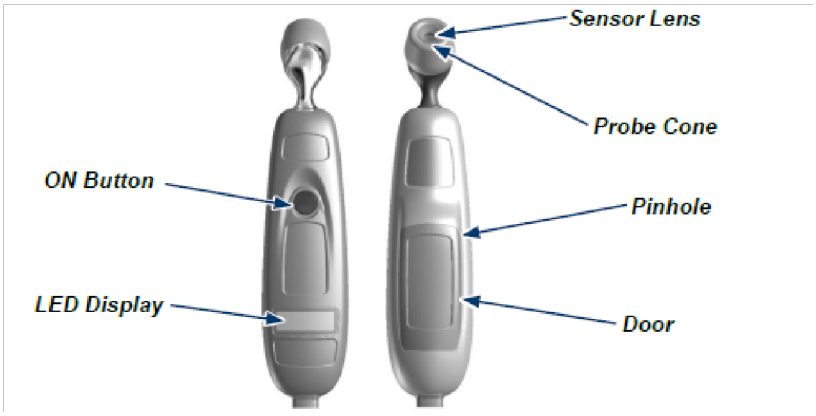
Before Use, Familiarize Yourself with the Instrument

1. **To Scan:** Depress the red button. The instrument will continually scan for the highest temperature (peak) as long as the button is depressed.
2. **Clicking:** Each fast click indicates a rise to a higher temperature, similar to a radar detector. Slow clicking indicates that the instrument is still scanning, but not finding any higher temperature.
3. **To Retain or Lock Reading:** The reading will remain on the display for 30 seconds after the button is released. If measuring room temperature, the temperature will remain on the display for only 5 seconds.
4. **To Restart:** Depress the button to restart. It is not necessary to wait until the display is clear, the thermometer will immediately begin a new scan each time the button is depressed.

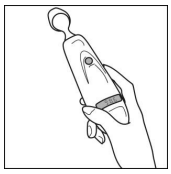
Alternate sites when temporal artery or behind ear are unavailable:

- Femoral artery: slowly slide the probe across groin.
- Lateral thoracic artery: slowly scan side-to-side in the area, midway between the axilla and the nipple.

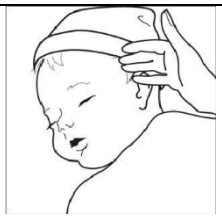
Note	*Let the instrument acclimatize for at least 10 minutes in the area in which it will be used.*



2-Step Infant Temperature Measurement

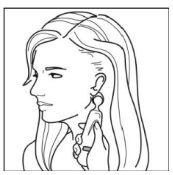
	Place probe flush on center of forehead and depress button. Keeping button depressed, slowly slide probe mid-line across forehead to the hair line while the button is depressed.
	Release the button, remove from head and read.

How to improve the accuracy of your measurement on infants

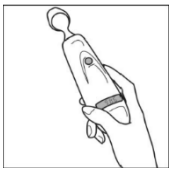
The preferred site is the temporal area. Unless visibly diaphoretic, one measurement here is typically all that is required.		If the temporal artery is covered, then the area behind the ear, if exposed, can be an alternate site.	
Measure straight across the forehead and not down the side of the face. At mid-line, the temporal artery is about 2 mm below the surface but can go deeply below the surface on the side of the face.		Brush the hair aside if it covers the area to be measured. Measurement site must be exposed.	

3-Step Adult Temperature Measurement

Slide across forehead. Place probe flush on center of forehead and depress button. Keeping button depressed, slowly slide probe mid-line across forehead to the hair line.



Place behind ear. Keeping button depressed, lift probe from forehead, touch behind ear halfway down the mastoid process and slide down to the soft depression behind the earlobe.



Release button, remove from head, and read.

How to improve the accuracy of your measurement on adults

Measure only the up-side on a patient in a lateral position. The down-side will be insulated, preventing the heat from dissipating and resulting in falsely high readings.

Think of a sweatband.

Measure straight across the forehead and not down the side of the face. At mid-line, the temporal artery is about 2 mm below the surface, but can be deeply below the surface on the side of the face.

Measure exposed skin.

Brush the hair and bangs aside if covering the area to be measured.

Minimum measuring time: 2 seconds.

Minimum time between successive measurements: 30 seconds.

Resposable/Disposable Covers:

Resposable/Disposable covers, meaning they can be used once and discarded or reused on the same patient, are cost effective and available for cross-contamination protection should they be preferred for certain patient populations. These options include resposable caps and full instrument sheaths, the sheaths being mainly used for isolation patients.

Using the Resposable/Disposable Caps:

1. Apply cap by pushing it onto the probe cone with fingers.
2. Remove cap by pushing the top edge of the cap forward with thumb.
3. Caps may be reused on the same patient.

FAQs

How does the temperature from a temporal scanner relate to core temperature?

Temporal artery temperature is considered a core temperature because it has been demonstrated to be as accurate as the temperature measured by a pulmonary artery or esophageal catheter, and as accurate as a rectal temperature on a stable patient. Note: Rectal temperature is about 1° F (0.5° C) higher than an oral temperature and 2° F (1° C) higher than an axillary temperature. Think of the temporal artery temperature as a rectal temperature and apply the same protocol you would use for a rectal temperature.

What should I do if I get an abnormally high or low reading, how do I confirm my reading?

- Repeat the reading with the same temporal scanner; a correct reading should be reproducible.
- Repeat the reading with another temporal scanner. Two temporal scanners with the same reading will confirm the reading.
- Sequential readings on the same patient in rapid succession will cool the skin; it is best to wait 30 seconds for the skin to recover from the cold probe.

Possible causes of abnormal readings:

Type of abnormal Temperature	Possible Cause	Helpful Hint
Abnormally Low Temperature	Dirty Lens	Clean lens of scanner every 2 weeks.
	Releasing the button before finished measuring	Release the button after finished measuring.
	Measuring when an ice pack or wet compress is on the forehead	Remove ice pack or wet compress, wait 2 minutes, and re-take temperature
	Measuring a completely diaphoretic patient	Complete diaphoresis includes diaphoresis of the area behind the ear and suggests the temperature is rapidly dropping. Use an alternative method of temperature measurement in these cases until the patient is dry and the temporal artery measurement can be repeated.

	Improperly scanning down the side of the face	Scan straight across forehead. The temporal artery is closest to the skin in that area.
Abnormally High Temperature	Anything covering the area to be measured would insulate and prevent heat from dissipating, resulting in false high readings.	Confirm measurement site has not recently been in contact with heat insulators such as hats, blankets or hair. Scan the area not covered or wait 30 seconds for the previously covered area to equilibrate to the environment.

DISPLAY DIAGNOSTICS CHART

The following chart summarizes the conditions that may occur while the Exergen® TemporalScanner® is in use and the associated indications:

Condition	Display	Range
High Target	HI	> 110° F (43° C)
Low Target	LO	< 61° F (16° C)
High Ambient	HI A	> 104° F (40° C)
Low Ambient	LO A	< 60° F (16° C)
Low Battery	bAtt	
Condition	**Display**	**Range**
No or Very Low Battery	Blank display	
Processing Error	Err	Restart. Return to Exergen for repair if error message persists.
Scanning (Normal Operation)		

Care and Maintenance

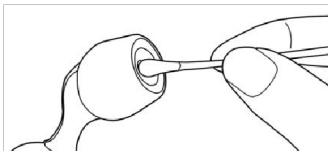
- **Handling:** The TemporalScanner is designed and built to industrial durability standards in order to provide long and trouble-free service. However, it is also a high precision optical instrument and should be accorded the same degree of care in handling as you would provide other precision optical instruments, such as cameras or otoscopes.
- **Cleaning the case:** The TemporalScanner case can be wiped down with a lint-free cloth, moistened with warm water (40°C/104°F maximum) and soap, a diluted non-caustic detergent or alcohol-based cleaning agent, followed by drying with a clean lint-free

cloth. Do not use strong solvents such as acetone. Avoid pouring any liquid on the thermometer while cleaning.

- **Cleaning the sensor lens:** With normal use, the only maintenance required is to keep the lens on the end of the probe clean. It is made of a special mirror-like, silicon infraredtransmitting material. Dirt, greasy films or moisture on the lens will interfere with the passage of infrared heat and affect the accuracy of the instrument. Regularly clean the lens with a cotton swab dipped in alcohol in accordance with the instruction label on the instrument (see below). Use only light force for cleaning, to avoid damaging the lens. Water can be used to remove any residual film left by the alcohol. Do not use bleach or other cleaning solutions on the sensor lens.

Dirty lens = low temps

Clean center lens every two weeks with cotton swab and alcohol.



Disinfection: Clean the TemporalScanner® before disinfecting. Recommended disinfecting agents are rubbing alcohol, Virex® and dilute bleach solutions (1:10 to 1:100).

Sterilization: Sterilization is not recommended for cabled versions of the TemporalScanner.

DO NOT SUBMERSE THE THERMOMETER IN ANY CLEANING SOLUTION.

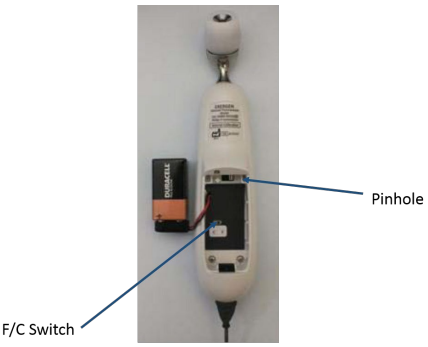
- **Calibration:** Factory calibration data is installed via a computer which communicates with the TemporalScanner's microprocessor. The instrument automatically self-calibrates each time it is turned on using this data and will never require recalibration. If the readings are not correct, the instrument should be returned for repair.
- **Battery:** A standard alkaline 9V battery provides approximately 15,000 readings. To replace the battery, insert the end of a bent paper clip into the pinhole on the side of the unit to release the battery compartment door. Disconnect the old battery and replace it with a new one in the same location. Replace the cover. Use only high-quality alkaline batteries.

Instructions for Fahrenheit or Celsius Conversion

The TemporalScanner can be used in either °F or °C. To convert from one scale to the other, the only tools necessary are a paper clip and the tip of a small screwdriver.

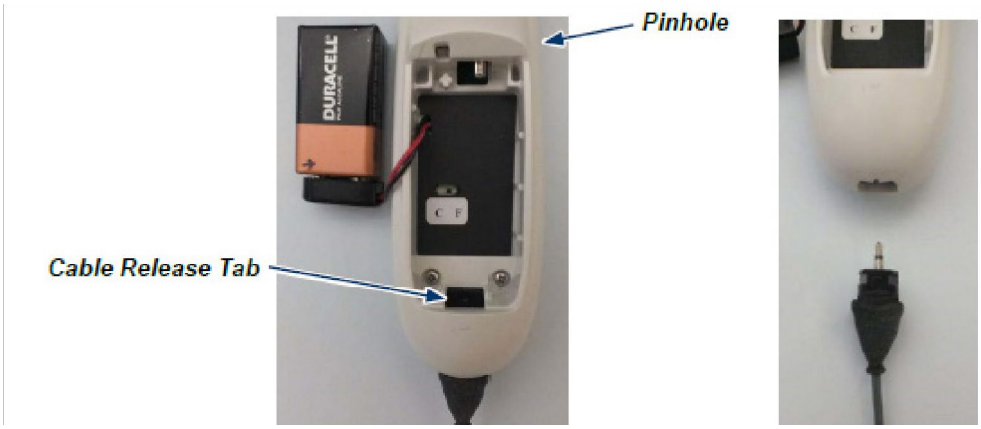
For °F/°C Conversion:

1. Insert the end of a bent paper clip into the pinhole on the side to release and remove the cover. Remove the battery from the compartment.
2. Locate the switch, and with the tip of a screwdriver, slide left or right to the opposite position.
3. Remove the screwdriver.
4. Replace cover.



Cable Replacement (TAT-5000S-RS232-QR only)

1. Disconnect the scanner cable from the monitor's communication port.
2. Insert the end of a bent paper clip into the pinhole on the side of the thermometer to release and remove the cover. Remove the battery from the compartment.
3. Locate the cable release tab, and with the tip of a screwdriver in the small round depression in the tab, push the tab down.
4. Pull the cable out.
5. Replace with new cable - push the cable in until it clicks.
6. Put the battery back into the compartment and replace the cover.
7. Reconnect the scanner cable to the monitor's communication port.



Repair

If repair is required, contact Exergen at 617.923.9900 or rma@exergen.com for a Return Materials Authorization (RMA) number.

- Mark the RMA number on the outside of your package and packing slips.
- Include a description of the fault if possible.
- Send the instrument freight/postage prepaid to:

Exergen Corporation

400 Pleasant Street

Watertown, MA 02472

- Include the address the instrument should be returned to. The instrument will be returned freight/postage prepaid.

Part Numbers

Exergen p/n	Midmark p/n	Description
1224264-AF-MD	3-200-0047	TAT-5000S-RS232-QR, Arterial, Deg F
134203	2-200-0115	Exergen Disposable Caps Covers

C. Pulse Oximetry Operation (SpO_2)

Applicable only to devices with the SpO_2 feature (device part number 1-100-1645 / kit product number 4-000-0550).

Each Midmark® Digital Vital Signs Device with SpO_2 is shipped with one reusable adult SpO_2 finger clip sensor. Carefully read the sensor directions before using.

Note	*Refer* to Section XVI, Accessories and Supplies for a*pproved SpO_2 sensors.*

1. To perform the SpO_2 measurement, insert the patient's finger (preferably the left or right index finger) completely into the sensor. Place the sensor with the LED light positioned on the fingernail.

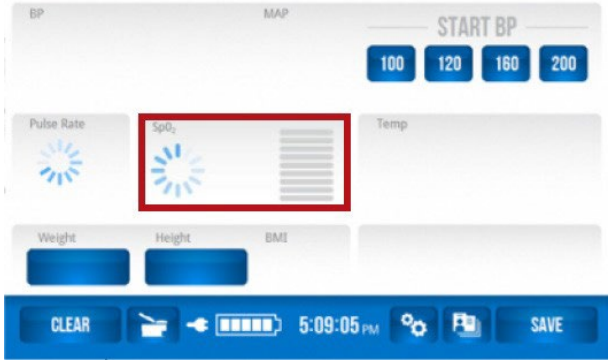
Note	*If patient movement is occurring or the finger size is inappropriate, select a different sensor that is appropriate for the patient.*

Note	*The thumb should not be used with the finger clip sensor.*

Note	*If the blood pressure measurement is occurring simultaneously, place the finger clip sensor on the limb opposite the one with the blood pressure cuff.*

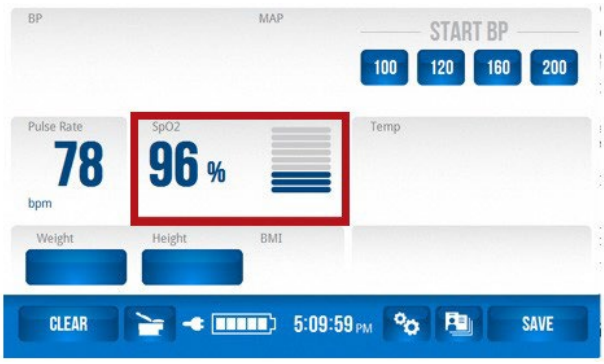
Note	*Avoid dark nail polish or direct sunlight on the probe, as these conditions may result in inaccurate readings.*

2. When the SpO_2 sensor is attached to a patient's finger, an audible tone will sound and the "in-progress wheel" will appear on the vital signs device screen.



3. When the SpO_2 measurement is complete, an audible tone will sound and the SpO_2 value will appear. The SpO_2 value continues to update as long as the sensor is on the patient's finger.

Note *If the sensor remains on the patient the pulse progress bar on the screen will become active. The SpO_2 value continues to update as long as the sensor is on the patient's finger. After the sensor is removed from the patient, the pulse progress bar will disappear, and the patient's last SpO_2 measurement will be displayed on the screen.*



4. Should a measurement time exceed 10 minutes for one patient, error code 312 will be displayed that alerts the user that the SpO_2 has exceeded the 10-minute time limit.

Note *The SpO_2 module is not intended for continuous monitoring of patients.*

D. Scale Operation

Digital Scale

A Fairbanks® TeleWeigh™ Digital Scale, can be used for collecting patient weight. When the scale is connected to Midmark® Digital Vital Signs Device the device will automatically detect the scale has been connected and is ready for use. The scale will automatically transfer the weight measurement to the Midmark® Digital Vital Signs Device.

For complete information regarding the Fairbanks® TeleWeigh™ Digital Scale, consult the user information provided with the scale or go to www.fairbanks.com.

Fairbanks® TeleWeigh™ Digital Scale	
Category	**Specifications**
Measurement Range	0 to 500 lb
Resolution	0.5 lb
Zeroing	Automatic
Power	12 VDC (from Midmark® Digital Vital Signs Device®)

Midmark Integrated Scale

A Midmark Exam Chair and Integrated Scale can be used for collecting patient weight. When configured with the Midmark® Digital Vital Signs Device the Integrated Scale can take the patient's weight measurement while the patient is seated on the exam chair.

For complete information regarding the operation of the Midmark Exam Chair and Integrated Scale, consult the user guide for the model of your Exam Chair at https://technicallibrary.midmark.com/WebSite/TablesChairsSeries.htm.

Midmark Integrated Scale	
Category	**Specifications**
Measurement Range	30 to 600 lb
Resolution	0.2 lb
Zeroing	Button Press
Power	115 ± 10% VAC, 60 Hz, 15A (Midmark Examination Chair)

Note *In order to connect the Midmark® Digital Vital Signs Device to the Integrated Scale one of the following cables will be required:*

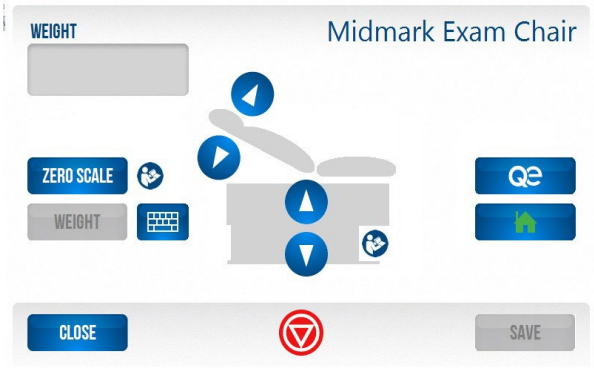
- Midmark® Digital Vital Signs Device Serial Cable, 6 foot length, coiled (9A478001)
- Midmark® Digital Vital Signs Device Serial Cable, 15 foot length, straight (9A478002)
- Midmark Digital Vital Signs Device Serial Cable, 30 foot length, straight (9A478003)
- Midmark Digital Vital Signs Device Serial Cable, 50 foot length, straight (9A478004)
- Midmark 626 Chair Connectivity Kit (002-10064-00)

Contact your local sales representative for ordering information.

See Section XIII, Appendix A - Configuring a Midmark® Digital Vital Signs Device with the Midmark Integrated Scale for complete instructions on how to configure the Midmark® Digital Vital Signs Device with the Integrated Scale.

When the Midmark® Digital Vital Signs Device is configured with the Integrated Scale, the Table Scale icon button will appear to the right of the **Clear** button on the Midmark® Digital Vital Signs Device *Main Testing* screen.

From the main testing screen, press either the **Weight** button or the **Table Scale** button. The *Midmark Exam Chair* screen will appear.



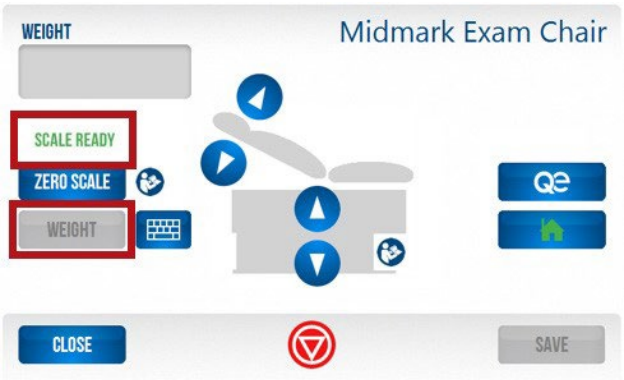
Note	*The **Save** button is grayed out since there is no weight recorded yet. Even if a weight was previously recorded, that record will not be transferred to this screen.*

Note	*The Weight button **will be grayed out if the table has not been zeroed**.*

- The arrow buttons control the table movement.
- The **Qe** (Quick exam) button sends the chair to a pre-configured height (the height can be configured using the hand control).
- The **Home** button sends the chair to a default height.
- The **STOP** button (red button circumscribing a white triangle) stops the movement of the chair.

When the **Zero Scale** button is pressed, the button will display the "in-progress wheel" until the scale is zeroed.

Once the scale is zeroed, a "Scale Ready" message will appear. (The Integrated Scale can be zeroed multiple times before acquiring the weight). Once the scale is zeroed, the **Weight** button becomes active indicating the option to take a weight measurement is available.



When the **Weight** button is pressed, the chair will move to ensure that the patient's feet are off the floor. The "in-progress wheel" will appear during the weight acquisition.

The weight data will appear on the screen once the weighing process is complete.

- Units are displayed based on the user settings in either kilograms or pounds, and two decimal points are shown for both kilograms and pounds.
- After weight acquisition, the **Save** button becomes active indicating the option to save the weight is available.

If the Integrated Scale returns a weight that is out of range (less than 30 lb or more than 600 lb), the screen will display a red flashing message that reads *"Out of Range"* and the weight will be displayed in red. The option to save the weight will NOT be available.

If the weight is out of range or unstable, otherwise determine the weight and enter it manually using the keypad on the display.

If the **Close** button is pressed after acquiring the weight, a warning message will appear that reads, *"Do you want to save the weight data?"* Press **Yes** or **No** to close the message and return to the *Main Testing* screen.

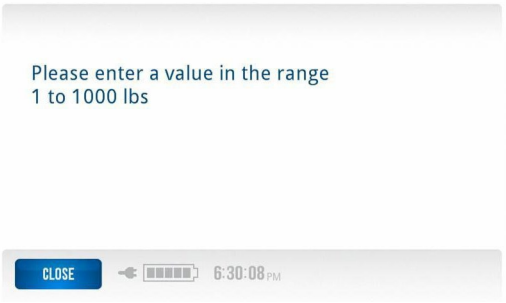
E. Manual Entry of Information

Weight, respiration rate, height and pain score can be entered manually by pressing each corresponding button on the *Main Testing* screen. The following table shows the allowable range for each.

Information	Allowable Range
Pain Score	0 – 10, and Wong Baker Pain Score
Respiration Rate	4 – 120 RPM
Height	10 – 100 inches (25.4 – 254 cm)

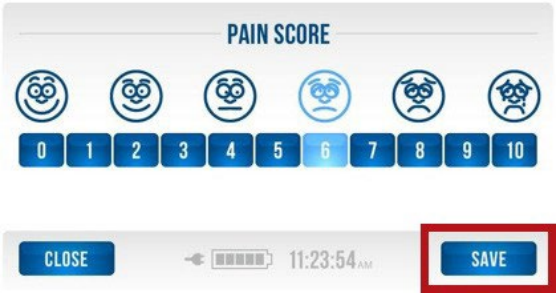
Weight	1 – 1,000 lb (1 – 500 kg)

Note *If a manual entry falls outside the range, an error message will appear prompting for entry of a score within the range.*



F. Pain Scale

When the button underneath the **Pain Score** label is selected, the following screen will appear.



If a pain score has already been selected, it will be highlighted. Otherwise, none of the pain scores will be highlighted.

1. Select the appropriate pain score by pressing the corresponding number on the screen.
2. Press **Save** to transfer the new pain score to the patient record and return to the *Main Testing* screen.
3. Press **Close** to disregard any changes and return to the *Main Testing* screen.

Note *Pain Score will only transfer to the patient record if the Save button is pressed. If a pain score is selected but the Close button is pressed the changes will be canceled and will not be transferred to the patient record.*

IX. Additional Functionality and Settings

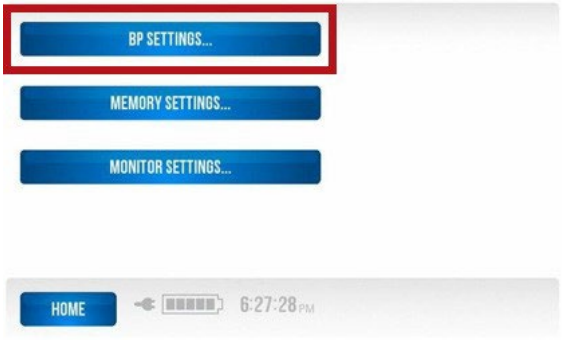
A. Settings Button and Password

In the *Main Testing* screen, press the **Settings**  button to access additional functions and settings. A password screen will appear. These additional screens are password protected to avoid unintended changes from taking place. **The factory password is set at 986 and cannot be changed.**

Enter the password **986** and press **OK**.

From this screen, select one of the following options:

- BP Settings • Memory Settings
- Monitor Settings.



To return to the *Main Testing* screen at any time, press the **Home** button.

B. Changing Blood Pressure Inflation Settings

There are pre-set, default blood pressure inflation settings for **Low**, **Medium**, **Medium High** and **High** pressure settings for the device. These values can be changed to accommodate specific preset blood pressure inflation settings.

BP Settings	Default (mmHg)
Low	100
Medium	120

MediumHigh	160
High	200

To change a blood pressure inflation setting from a default value:

1. Press the **BP Settings** button.

2. Press the appropriate button for the inflation setting to be changed.

3. A numeric keyboard will appear. To clear the current setting, press the **Delete** button on the screen.
4. Enter the desired pressure preset setting by pressing the numbers on the screen.
5. Press the **Save** button to save the setting and return to the previous screen. To return to the main testing screen, press **Close**.

Note *Each blood pressure setting has a maximum allowable range.*

BP Settings	Default (mmHg)	Allowable Range (mmHg)
Low	100	80-140
Medium	120	110-180
MediumHigh	160	130-210
High	200	160-270

If an entry falls outside the range or overlaps an adjacent BP setting, an error message will appear prompting for entry of a value within range. Blood pressure ranges displayed in an error message may vary, depending on the values of the adjacent blood pressure settings.

Example of error message for an out-of-range value entered for the Low BP setting if the Medium BP setting is at the 120 mmHg default value.

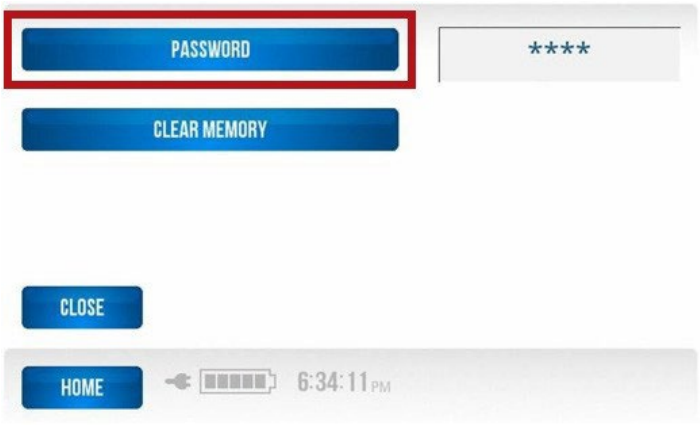
C. Memory Settings Button

Press the **Memory Settings** button to change the password for the *Memory* screen, for viewing saved patient data and to clear saved data from the device.

The password to enter the *Memory* screen to view saved patient data is factory set. **The factory set password is 1234.**

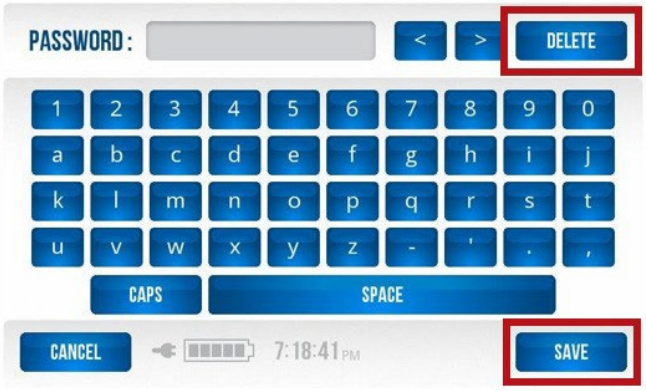
To reset the *Memory* screen user password:

1. Press the Memory password button.



2. Use the left or right arrow keys to move the cursor one space at a time. Use the **Delete** button to remove the current password.

3. Enter a new password, and press **Save**.

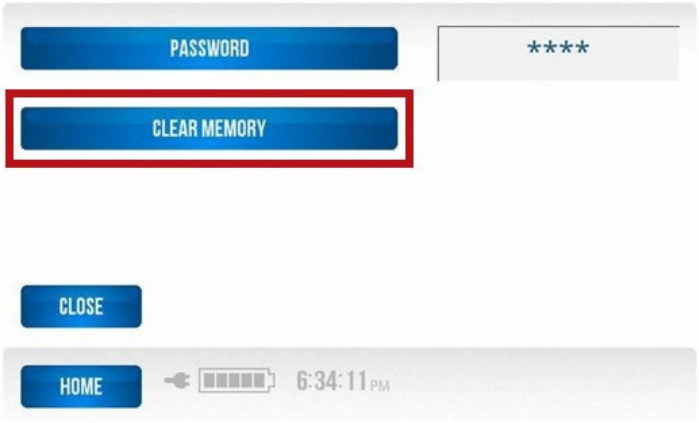


4. Once the data is saved, the password will be represented by an asterisk for each character.
5. Press **Close** to return to the previous screen.
6. Press **Home** to return to the *Main Testing* screen.

To clear all saved data in the *Memory* Screen:

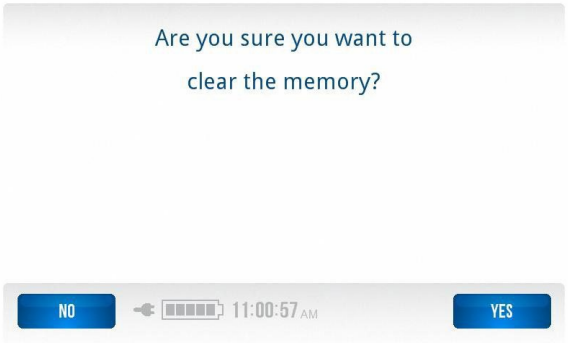
Note	*This will clear all patient data saved in the device memory.*

1. Press the **Clear Memory** button. This will clear all patient data saved in the device memory.



2. The system will display the following message and prompt for a confirmation. a.

   Press **YES** or **NO**.



D. Monitor Settings Button

To access this screen quickly:

1. Press the **SETTINGS** icon on the *Main Testing* screen.
2. Enter the default password of **986** on the touchscreen.
3. Press **OK**.

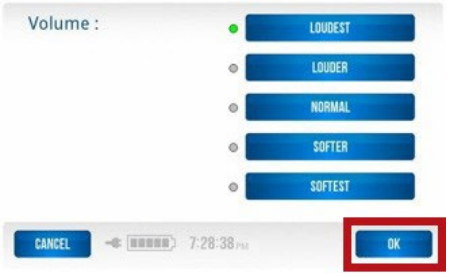
Press the **Monitor Settings** button to change the following settings for the Midmark® Digital Vital Signs Device.

- Volume
- Brightness
- Time

Volume

1. Press the **Volume** button to change the volume level.

2. There are five volume levels to choose from: Loudest, Louder, Normal, Softer and Softest.
3. Press **OK** to save the chosen volume level and return to the previous screen.



Brightness

1. Press the **Brightness** button to adjust the brightness on the touch screen display.

2. There are five brightness options to pick from: Brightest, Brighter, Dimmer, Dimmest, Normal.
3. Press **OK** to save the chosen brightness level and return to the previous screen.

Date and Time

1. To change the time for the Midmark® Digital Vital Signs Device, press the **Set Date and Time** button.

2. Use the up and down arrows for changes.
3. Press **OK** to save changes and return to the previous screen.
4. Press **Close** to return to the previous screen.
5. Press **Home** to return to the *Main Testing* creen.

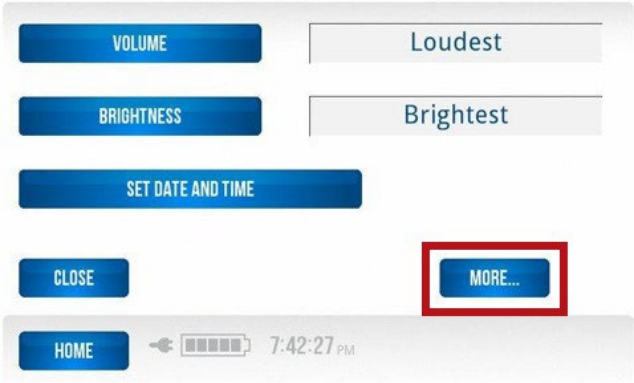
E. Setting Changes via the More Button

To access this screen quickly:

1. Press the **SETTINGS** icon on the *Main Testing* screen.
2. Enter the default password of **986** on the touchscreen.
3. Press **OK**.
4. Press **MONITOR SETTINGS**.

The following settings can be modified when pressing the **More** button from the "Volume, Brightness, Set Date and Time" screen:

- Temp Measurement
- Weight Measurement
- Height Measurement
- Table – Configure Midmark® Digital Vital Signs Device with Integrated Scale (applies only when the Midmark® Digital Vital Signs Device is used with the Midmark Exam Chair and Integrated Scale). See Section XIII - Appendix A - Configuring a Midmark® Digital Vital Signs Device with the Midmark Integrated Scale for detailed instructions.



Set Temp Measurement

1. Press the **Temp** button to select °C or °F for the temperature measurement.

2. Select the **°F** or **°C** button.

3. Press **OK** to save the setting and return to the previous screen.

Set Weight Measurement

1. Press the **Weight** button to set measurement units to pounds (lb) or kilograms (km).

2. Select the LBS or KG button.
3. Press **OK** to save the setting and return to the previous screen.

Set Height Measurement

1. Press the **Height** button to select height being measured in inches (in) or centimeters (cm).

2. Select the **IN** or **CM** button.
3. Press **OK** to save the setting and return to the previous screen.

Table - Configure Midmark® Digital Vital Signs Device with Integrated Scale

1. Press the **TABLE** button.

2. Select **YES** for connection to the Midmark Exam Chair and Integrated Scale.

3. Press **OK** to save the setting and return to the previous screen.

F. Additional Setting Changes and Options from the More Button

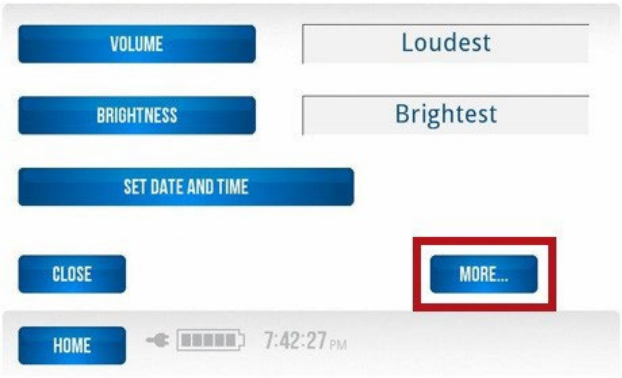
Additional settings and options can be modified when pressing the **More** button from the following screens:

- Date Format
- Time Format
- Standby Delay
- Show Respiratory Rate
- Show Pain Score
- Show MAP
- Find Midmark® Digital Vital Signs Device Software Version Number

To access this screen from the main screen:

1. Press the **Settings Button**  .
2. Enter the password, **986**.
3. Press the **Monitor Settings** button.

4. Press the **More** button.



5. Press the **More** button from this screen to access the remaining settings.

Set Date Format

1. Press the **Date Format** button to change the date format.

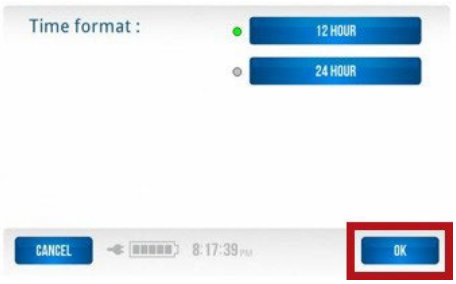
2. Select one of three formats (MMDDYYYY, DDMMYYYY or YYYYMMDD).
3. Press **OK** to save and return to the previous screen.

Set Time Format

1. Press the **Time Format** button to change the time format.

2. Select the 12- or 24-hour format.

3. Press **OK** to save and return to the previous screen.



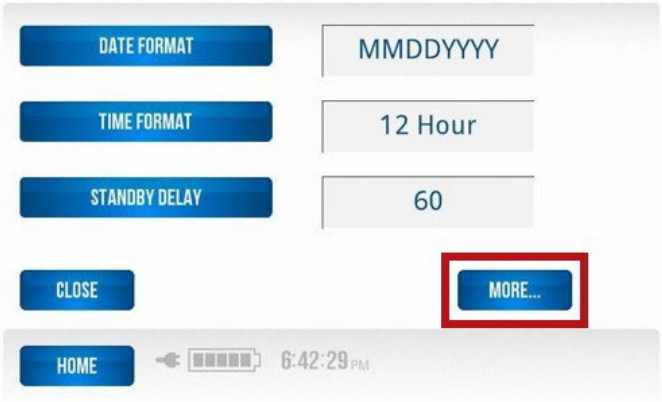
Set Standby Delay

1. Press the **Standby Delay** button to select how long the device will wait before going into standby mode.

2. Choose from 1 to 1,440 minutes.
3. When the **Standby Delay** button is pressed, a numerical keyboard will appear.
4. To clear the current setting, press the **Delete** key on the screen.
5. Enter the number of minutes wanted for the device to wait before entering standby.
6. Press **OK** to save and return to the previous screen.

Set Show Resp Rate

1. Press the **More** button from the following screen.



2. Press the **Show Resp Rate** button to select whether or not the respiration rate will appear in the *Main Testing* screen.

3. Select **Yes** or **No**.

4. Press **OK** to save the selection and return to the previous screen.

Set Show Pain Score

1. Press the **Show Pain Score** button to select whether or not the pain score will appear in the *Main Testing* screen.

2. Select **Yes** or **No**.
3. Press **OK** to save the selection and return to the previous screen.

Set Show MAP

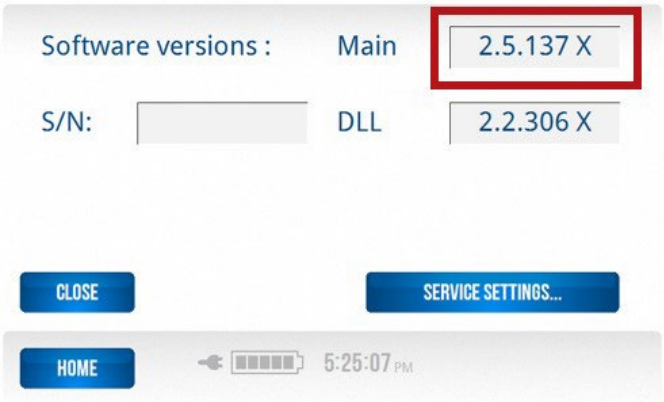
1. Press the **Show MAP** button to turn on the Mean Arterial Pressure. The device comes set with the MAP off. If this function is turned on, the MAP will now be displayed below the Blood Pressure reading in the *Main Testing* screen when a blood pressure measurement is completed.

2. Select **Yes** or **No**.
3. Press **OK** to save the selection and return to the previous screen.

Find Midmark® Digital Vital Signs Device Software Version Number

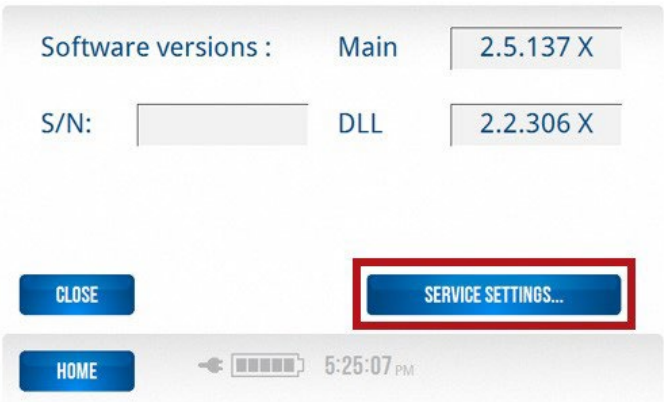
1. Press the **More** button from the following screen.

2. The software version number will be displayed at the top of the screen. **When contacting Technical Service, please have this version number available.**



3. **S/N** stands for "serial number." The serial number can be found here or on the bottom label on the device.

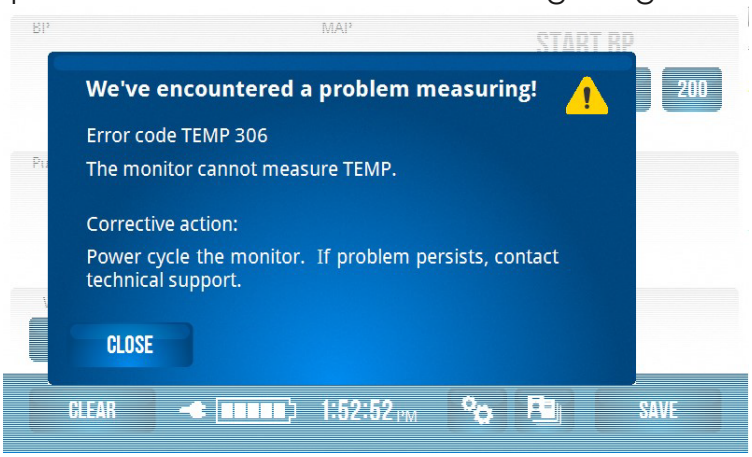
4. Service Settings are intended for manufacturer use only. For more information contact Midmark Technical Service.



X. Error Codes and Corrective Actions

The following table contains corrective actions for issues that may be encountered while operating the Midmark® Digital Vital Signs Device. If an issue persists after completing the

recommended actions provided in the table, contact Midmark Technical Service. All error codes will appear in separate boxes similar to the following image.



Code	Meaning	Displayed Description	Corrective action
NIBP 305	Artifact	The device was not able to measure blood pressure.	Request that the patient remain still. Retry the measurement.
NIBP 306	Hardware failure	The device cannot measure blood pressure.	Power cycle the device. (Power the unit off for a short time, and then power the unit on again.) If problem persists, contact Midmark Technical Service.
NIBP 309	Overpressure	The cuff pressure was too high.	Request that the patient remain still. Retry the measurement.
NIBP 310	Blocked line	The BP hose is constricted.	Straighten out the hose. Retry the measurement.
NIBP 311	Open line	The BP cuff is not inflating.	Check to make sure the NIBP hose and cuff are attached to the monitor. If problem persists, contact Midmark Technical Service.
NIBP 312	Measurement timeout	The blood pressure measurement was taking too long to complete.	Request that the patient remain still. Retry the measurement.

NIBP 313	Cannot measure	The device was not able to measure blood pressure.	Request that the patient remain still. Retry the measurement.
NIBP 314	Weak signal	The monitor was not able to measure blood pressure.	Check to see that the cuff is reasonably tight or consider using a smaller cuff. Request that the patient remain still. Retry the measurement.
NIBP 314	Weak signal	The monitor was not able to measure blood pressure.	Check to see that the cuff is reasonably tight or consider using a smaller cuff. Request that the patient remain still. Retry the measurement.
SpO_2 302	Unplugged	The SpO_2 cable is disconnected from the monitor.	Connect the SpO_2 cable to the monitor. Retry the measurement.
SpO_2 305	Artifact	The monitor was not able to measure SpO_2.	Request that the patient remain still. Retry the measurement.
SpO_2 306	Hardware failure	The monitor cannot measure SpO_2.	Power cycle the monitor. If problem persists, contact Midmark Technical Service.
SpO_2 312	Time Out	The monitor was not able to obtain or finish a SpO_2 measurement in time.	Check the SpO_2 sensor placement. Check to see if the patient has cold hands. If the patient is moving, request they remain still. Retry the measurement.

SpO_2 314	Weak signal	The monitor was not able to measure SpO_2.	Check the SpO_2 sensor placement. Check to see if the patient has cold hands and warm. Retry the measurement.
SpO_2 315	Probe fault	There is a problem with the SpO_2 sensor.	Replace the SpO_2 sensor. If problem persists, contact Midmark Technical Service.
SpO_2 316	Check sensor	The SpO_2 sensor is misaligned or came off the patient.	Check the SpO_2 sensor placement. Retry the measurement.
TEMP 306	Hardware failure	The monitor cannot measure TEMP.	Power cycle the monitor. If problem persists, contact Midmark Technical Service.
TEMP 335	Temp too high	The monitor was not able to measure TEMP (too high).	Check for reasons the patient may be too warm, and retry the measurement.
TEMP 336	Temp too low	The monitor was not able to measure TEMP (too low).	Check for reasons the patient may be too cold, and retry the measurement.
TEMP 337	Ambient temp too high	The monitor was not able to measure TEMP (probe is too warm).	Allow the probe to cool down, and retry the measurement.
TEMP 338	Ambient temp too low	The monitor was not able to measure TEMP (probe is too cold).	Allow the probe to warm up, and retry the measurement.
BAT 325	Battery low	Battery low	Connect the monitor to a wall outlet to recharge battery.

Monitor			
MON 332	Monitor fault	The monitor detected an internal problem.	Power cycle the monitor. If problem persists, contact Midmark Technical Service.

Trouble Symptom	Possible Causes	Things to Try
The Midmark® Digital Vital Signs Device is plugged in, but it does not start up.	No power to outlet.	Verify that the power outlet is working. Verify that the green power LED on the Midmark® Digital Vital Signs Device front panel is illuminated.
	The Midmark® Digital Vital Signs Device Power Supply is not working.	Verify that the green charging LED on the Midmark® Digital Vital Signs Device front panel is illuminated. If possible, try using a different Midmark® Digital Vital Signs Device Power Supply.
	The Midmark® Digital Vital Signs Device is powered off.	Set the power switch to the On position.
	Internal system error.	Power cycle the Midmark® Digital Vital Signs Device. If the condition persists, stop using the device. Contact Midmark Technical Service
	Patient is moving.	Ask patient to remain still.
The Midmark® Digital Vital Signs Device touch screen is not working.	Touch screen failure	Power cycle the Midmark® Digital Vital Signs Device. If the condition persists, stop using the Midmark® Digital Vital Signs Device. Contact Midmark Technical Service.

The Midmark® Digital Vital Signs Device display is not working.	Display failure	Power cycle the Midmark® Digital Vital Signs Device. If the condition persists, stop using the Midmark® Digital Vital Signs Device. Contact Midmark Technical Service.
The Midmark® Digital Vital Signs Device speaker is not working.	Speaker failure	Power cycle the Midmark® Digital Vital Signs Device. If the condition persists, stop using the Midmark® Digital Vital Signs Device. Contact Midmark Technical Service.
The Midmark® Digital Vital Signs Device is not working and displays an error message.	Operating system failure	Power cycle the Midmark® Digital Vital Signs Device. If the condition persists, stop using the Midmark® Digital Vital Signs Device. Contact Midmark Technical Service.

XI. Cleaning of Midmark® Digital Vital Signs Device and Accessories

The following table provides instructions for cleaning the Midmark® Digital Vital Signs Device and its accessories. The Midmark® Digital Vital Signs Device should be cleaned monthly or as warranted. Before cleaning, refer to the listed Cautions.

Part	Recommended Cleaning Method
Midmark® Digital Vital Signs Device TemporalScanner Cable SpO_2 Cable NIBP Cuff NIBP Hose Power Supply Power Cord	Materials • Enzymatic detergent such as ENZOL® (US) or CIDEZYME® (outside the US) • Distilled water • Disinfectant solution, such as CIDEX® OPA or a 10% solution of household bleach (5.25% sodium hypochlorite) in distilled water • Soft cloths and/or soft-bristled brushes • Protective gloves and eyewear Procedure 1. Disconnect the unit from the wall outlet. 2. Put on gloves and protective eyewear. 3. Prepare the enzymatic detergent, or disinfectant solution, according to the manufacturer's instructions and in separate containers. 4. Apply detergent to product using a soft cloth. If material is dried on, allow to sit for one minute. 5. Wipe smooth surfaces with the cloth. 6. Use a soft-bristle brush on visibly soiled areas and irregular surfaces. 7. Remove detergent from product using cloth dampened in distilled water. 8. Repeat as necessary. 9. Apply disinfectant solution on affected area using a soft cloth. Allow product to sit for five minutes. 10. Wipe away excess solution, and clean product again with cloth dampened in distilled water. 11. Allow two hours for drying.

SpO_2 Sensor	Materials 70% isopropyl alcohol pad Procedure 1. Remove sensor from patient and disconnect sensor cable from the device. Wipe off with an alcohol pad. Allow sensor to dry before placing it on a patient.

Caution

Always disconnect the Midmark® Digital Vital Signs Device from AC power before cleaning.

Caution

Electronic devices can be damaged by exposure to liquids. Do not use or store the Midmark® Digital Vital Signs Device near any type of liquids.

Caution

Do not use harsh chemicals for cleaning, especially disinfectants that contain phenol, as they can spot plastics. Do not steam-autoclave, gas-sterilize, or irradiate the unit; subject the unit to intense vacuum; or immerse the unit in water or cleaning solution. Keep cleaning liquids out of the unit and connectors. If any liquid gets inside the unit, allow it to dry in warm air for two hours, and then check to make sure all monitoring functions are working properly.

Caution

Accessories that fall on the floor should be inspected for contamination and proper functionality. In case of contamination, follow the cleaning procedure detailed above.

Caution

Take particular care when cleaning the blood pressure cuff, blood pressure hose, and blood pressure connector on the Midmark® Digital Vital Signs Device to prevent fluid from entering the connectors. Fluid in the blood pressure airway may affect blood pressure determination accuracy and damage the monitor.

Caution

The user accepts responsibility for any deviations from the recommended method of cleaning and disinfection.

XII. Maintenance, Storage and Battery Replacement

A. Maintenance

The following table shows the recommended maintenance procedures for the Midmark® Digital Vital Signs Device and its accessories. Midmark® Digital Vital Signs Device requires periodic calibration checks. It is recommended to check that the device is in good working order, as described in the table. Calibration checks should be done every 12 months and can be performed by qualified service personnel.

Midmark® Digital Vital Signs Device Function	Procedure
Mechanical Integrity	Check for cracks, abrasive edges and other signs of damage.
Touch screen	Verify that screen is responsive to touch.
Power Supply LED	Verify that the green power LED is illuminated on the Midmark® Digital Vital Signs Device Power Supply when the power supply is plugged into AC power.
Power LED	Verify that the green power LED is illuminated on the Midmark® Digital Vital Signs Device when plugged into AC power.
On/Off LED	Verify that the green On/Off LED is illuminated on the back of the Midmark® Digital Vital Signs Device when the unit is on.
Speaker	Power-cycle the Midmark® Digital Vital Signs Device and verify that the power-up speaker test tones are generated.
SpO_2	Apply the pulse oximeter probe to your finger. Verify that the reported pulse rate matches your pulse rate as measured on your wrist and that the SpO_2 value seems reasonable (above 95% for a healthy nonsmoker).
NIBP	Apply an appropriately sized blood pressure cuff to your arm. Measure your blood pressure and verify that the reported blood pressure is reasonably close to your typical blood pressure.
Temperature	Refer to Section VIII-B, Care and Maintenance under Temporal Temperature of this manual.

If one of the checks results in a functional failure, please contact Midmark Technical Service. If a Midmark® Digital Vital Signs Device needs to be returned for repair or service, a Return Materials Authorization (RMA) number must first be obtained from Technical Service.

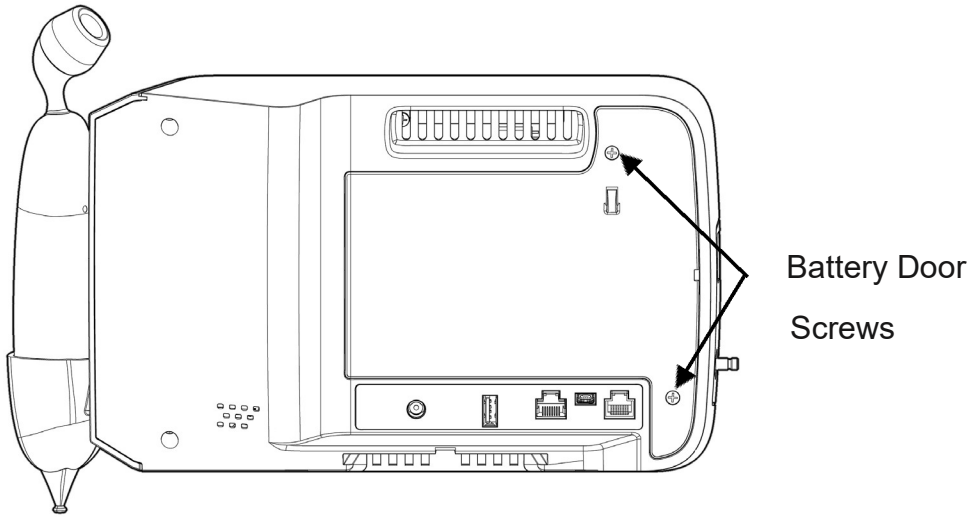
B. Storage

Storage Temperature	-4° F to 122° F (-20° C to 50° C)
Storage Humidity	15% to 95% non-condensing
Storage Altitude	0 to 40,000 feet

> ***Caution***
>
> *The Midmark® Digital Vital Signs Device may not conform to all of its performance specifications if stored outside these environmental specifications or used outside of the environmental specifications in Section II-D, System Specifications of this manual.*

C. Battery Replacement

> ***Caution***
>
> *Only use the lithium ion battery from Midmark. Using the incorrect battery will cause damage to the Midmark® Digital Vital Signs Device and void the warranty.*



> ***Note*** *A Phillips head screw driver will be needed to complete the following steps.*

1. Turn the device over to view the back of the device. There are two screws in the battery door. The battery door is located on the right, back side of the device. Remove the two screws and remove the battery door.

2. Hold a hand over the battery and tip the device so that the battery falls out of the device and into the hand.
3. Replace the battery with a new one, being careful to place the new battery in the device the same way the old battery came out of the device.
4. Replace the battery door and tighten the two screws. Do not over tighten the screws.
5. Connect the AC power transformer to the Midmark® Digital Vital Signs Device and allow the new battery to charge for approximately 4 hours.

Note	*The battery is a lithium ion battery and must be recycled or disposed of properly according to national or local regulations.*

XIII. Appendix A - Configuring a Midmark® Digital Vital Signs Device with the Midmark Integrated Scale

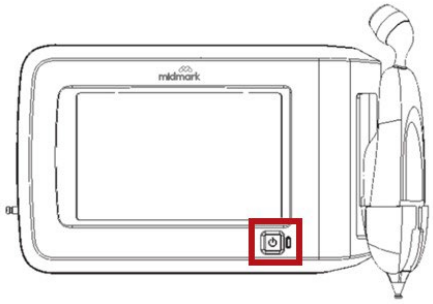
Note *In order to connect the Midmark® Digital Vital Signs Device to the Integrated Scale one of the following cables will be required:*

- Midmark® Digital Vital Signs Device Serial Cable, 6 foot length, coiled (9A478001) or
- Midmark® Digital Vital Signs Device Serial Cable, 15 foot length, straight (9A478002)
- Midmark® Digital Vital Signs Device Serial Cable, 30 foot length, straight (9A478003)
- Midmark® Digital Vital Signs Device Serial Cable, 50 foot length, straight (9A478004)
- Midmark 626 Chair Connectivity Kit (002-10064-00)

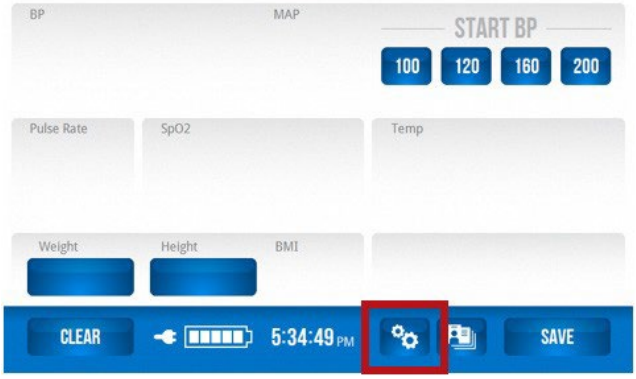
Contact your local sales representative for ordering information.

Follow the installation instructions that accompany the Serial Cable.

1. With the Serial Cable in place, power-on the Midmark® Digital Vital Signs Device.



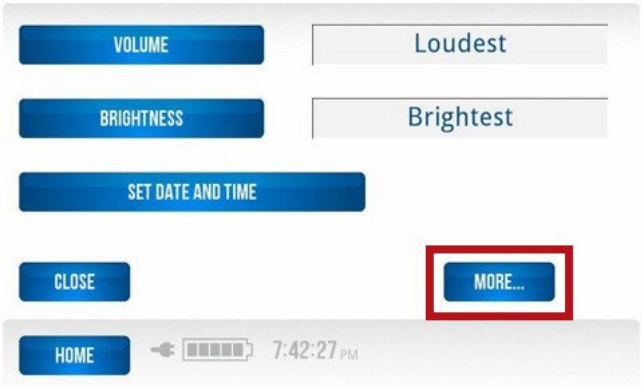
2. From the *Main Testing* screen, press the **Settings** button.



3. Enter the default password **986** and press **OK**.

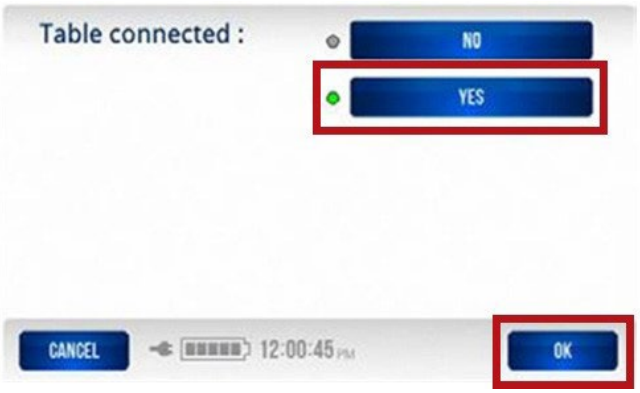
4. Press the **Monitor Settings** button.

5. Press the **More** button.



6. Press the **Table** button.

7. Select **Yes** and press the **OK** button to accept the change and return to the previous screen.



8. Press the **Home** button to return to the *Main Testing* screen.

When the Midmark® Digital Vital Signs Device is configured with the Integrated Scale, the **Table Scale** icon will be present on the *Main Testing* screen to the right of the CLEAR button.

See Section VIII, D. Scale Operation for instructions on obtaining a weight measurement via the Integrated Scale.

XIV. Customer Support and Warranty Information

For help diagnosing problems by phone with this product, contact Midmark Technical Service.

Self-help knowledge base and live chat can be accessed at kb.midmark.com.

Warranty

Midmark warrants Midmark® Digital Vital Signs Device to be free from manufacturing and material defects for two (2) years from the original date of purchase. Warranty periods for accessories shipped at the time of original purchase are: one (1) year for blood pressure cuffs and SpO_2 sensor; 90 days for other accessories. Any misuse or abuse of a Midmark product or accessory voids all applicable warranties.

Please refer to midmark.com for the full and current Warranty Terms and Conditions.

Return Materials Authorization

To return any product for repair, a Return Materials Authorization (RMA) number must be obtained from Midmark Technical Service. This RMA number should be referenced on the package(s) containing the items to be returned and in any correspondence regarding the return.

Shipping

Before shipping any unit to Midmark, be certain that an RMA number has been issued and that all guidelines regarding this authorization are followed. We highly recommend that you follow all guidelines for the shipment of medical products set forth by the shipping company you choose to use. If a question should arise regarding the appropriate method of shipment, please feel free to ask when calling for your RMA number. It is ultimately the responsibility of the customer when shipping a product to ensure that all packages and their contents get to Midmark safely. Midmark will not assume responsibility for damage due to improper packaging, shipment or product use. Such actions will void all applicable warranties.

XV. Disposal

The disposal of Midmark Diagnostic Devices and their accessories should be carried out according to local medical waste disposal policies and procedures. Do not discard these items in unsorted municipal waste. Contact your local waste disposal agency for guidance on proper recycling or disposal.

Certain items contain electronic circuit boards or lithium-ion batteries that should not be incinerated, crushed, disassembled or exposed to extreme heat. Do not put the lithiumion battery in a refuse container. Lithium batteries and electronic components should be recycled appropriately.

XVI. Accessories and Supplies

The following table shows the accessories approved by Midmark for use with the Midmark® Digital Vital Signs Device.

WARNING

Use only approved accessories with the Midmark® Digital Vital Signs Device. Substitution of a component different from those suggested could result in measurement error.

Item	Part Number
AC Power Supply	3-009-0010
Fairbanks® TeleWeigh™ Digital Scale	1-100-1603
USB Cable 10'	3-009-0016
Adult Reusable SpO_2 Sensor (Nellcor Compatible)	3-009-0020
Small Reusable SpO_2 Sensor (Nellcor Compatible)	3-009-0021
SpO_2 Extender Cable 4' (Nellcor Compatible)	3-009-0026
Power Supply Adapter Kit, Friwo	3-009-0012
Blood Pressure Hose 6.5'	3-009-0022
Blood Pressure Hose 10'	3-009-0100
Reusable Blood Pressure Cuff, Infant, 1 each (8-14 cm)	3-009-0068
Reusable Blood Pressure Cuff, Child, 1 each (13-20 cm)	3-009-0070
Reusable Blood Pressure Cuff, Small Adult, 1 each (18-26 cm)	3-009-0062
Reusable Blood Pressure Cuff, Adult, Midmark, 1 each (26-35 cm)	3-009-0064
Reusable Blood Pressure Cuff, Large Adult, Midmark, 1 each (32-42 cm)	3-009-0066
Reusable Blood Pressure Cuff, Adult Long, 1 each (26-38 cm)	3-009-0072
Reusable Blood Pressure Cuff, Large Adult Long, 1 each (35-44 cm)	3-009-0074
Reusable Blood Pressure Cuff, Thigh, 1 each (42-50 cm)	3-009-0076
Midmark® Digital Vital Signs Device Lithium-Ion Battery	3-009-0014
Midmark® Digital Vital Signs Device Mobile Cart	3-004-2000
Midmark® Digital Vital Signs Device Wall Mount	3-009-0003
Midmark® Digital Vital Signs Device Countertop Mount	3-009-0001

Midmark® Digital Vital Signs Device Equipment Pole Mount	3-004-2008
Midmark® Digital Vital Signs Device Mobile Cart Scale Mount (for Fairbanks® TeleWeigh™ Scale)	3-004-2010
Midmark® Digital Vital Signs Device Quick Reference Guide	3-100-1057

XVII. Electromagnetic Compatibility (EMC) Information

Medical electrical equipment requires special precautions regarding electromagnetic compatibility (EMC). Portable and mobile radio frequency (RF) communications equipment can affect devices like the Midmark® Digital Vital Signs Device. As such, the Midmark® Digital Vital Signs Device should not be used adjacent to other such equipment. If the Midmark® Digital Vital Signs Device is used adjacent to such equipment, observe the Midmark® Digital Vital Signs Device to make sure it is operating properly after installation.

The use of accessories other than those recommended by Midmark may result in increased EMC emissions or decreased EMC immunity of the Midmark® Digital Vital Signs Device.

Note *This device meets the requirements of IEC 60601-1. Please refer to this standard regarding safety requirements for this device.*

Guidance and manufacturer's declaration: electromagnetic emissions		
The Midmark® Digital Vital Signs Device is intended for use in the electromagnetic environment as specified. The user of the Midmark® Digital Vital Signs Device should ensure that it is used in such an environment.		
Emissions test	**Compliance**	**Electromagnetic environment/ guidance**
RF emissions CISPR 11	Group 1	The Midmark® Digital Vital Signs Device uses RF energy only for its internal function. Therefore, its RF emissions are low and not likely to cause interference in nearby electronic equipment.
RF emissions CISPR 11	Class B	The Midmark® Digital Vital Signs Device is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings.
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 Midmark® Digital Vital Signs Device is intended for use in the electromagnetic environment as specified. The user of the Midmark® Digital Vital Signs Device should ensure 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	±6 kV contact ±8 kV air	±6 kV contact ±8 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 differential Mode ±2 kV common mode	±1 kV differential Mode ±2 kV common mode	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 61000-411	<5% UT (>95% dip in UT) for 0.5 cycle 40% UT (60% dip in UT) for 5 cycles 70% UT (30% dip in UT) for 25 cycles <5% UT (>95% dip in UT) for 5 s	<5% UT (>95% dip in UT) for 0.5 cycle 40% UT (60% dip in UT) for 5 cycles 70% UT (30% dip in UT) for 25 cycles <5% UT (>95% dip in UT) for 5 s	Mains power quality should be that of a typical commercial or hospital environment. If the user of the Midmark® Digital Vital Signs Device requires continued operation during power mains interruptions, it is recommended that the Midmark® Digital Vital Signs Device be powered from an uninterruptible power supply or a fully charged battery.
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.

Guidance and manufacturer's declaration: electromagnetic immunity			
The Midmark® Digital Vital Signs Device is intended for use in the electromagnetic environment as specified. The user of the Midmark® Digital Vital Signs Device should ensure 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 Radiated RF IEC 61000-4-3	3 Vrms 150 kHz to 80 Hz 3 V/m 80 MHz to 2.5 GHz	3 Vrms 3 V/m	Portable and mobile RF communications equipment should be used no closer to any part of the Midmark® Digital Vital Signs Device, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Recommended separation distance is $d = 1.2\sqrt{P}$ $d = 1.2\sqrt{P}$ 80 MHz to 800 MHz $d = 2.3\sqrt{P}$ 800 MHz to 2.5 GHz 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). Field strengths from fixed RF transmitters, as determined by an electromagnetic site surveya, should be less than the compliance level in each frequency rangeb.

			Interference may occur in the vicinity of equipment marked with the following symbol: 

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 broadcasts, 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 Midmark® Digital Vital Signs Device is used exceeds the applicable RF compliance level above, the Midmark® Digital Vital Signs Device should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re- orienting or relocating the Midmark® Digital Vital Signs Device.

b 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 Midmark® Digital Vital Signs Device

The Midmark® Digital Vital Signs Device is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The user of the Midmark® Digital Vital Signs Device can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the Midmark® Digital Vital Signs Device 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 to 80 MHz $d = 1.2 \sqrt{P}$	80 MHz to 800 MHz $d = 1.2 \sqrt{P}$	800 MHz to 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 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.

Note At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.

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

XVIII. Field Upgraded Midmark® Digital Vital Signs Device with Exergen® TemporalScanner®

If your device has a thermometer probe well on the top and it is fitted with an Exergen® TemporalScanner® as shown in **Fig. A**, you will have an Exergen Adapter on the back of the device. See **Fig. B**.

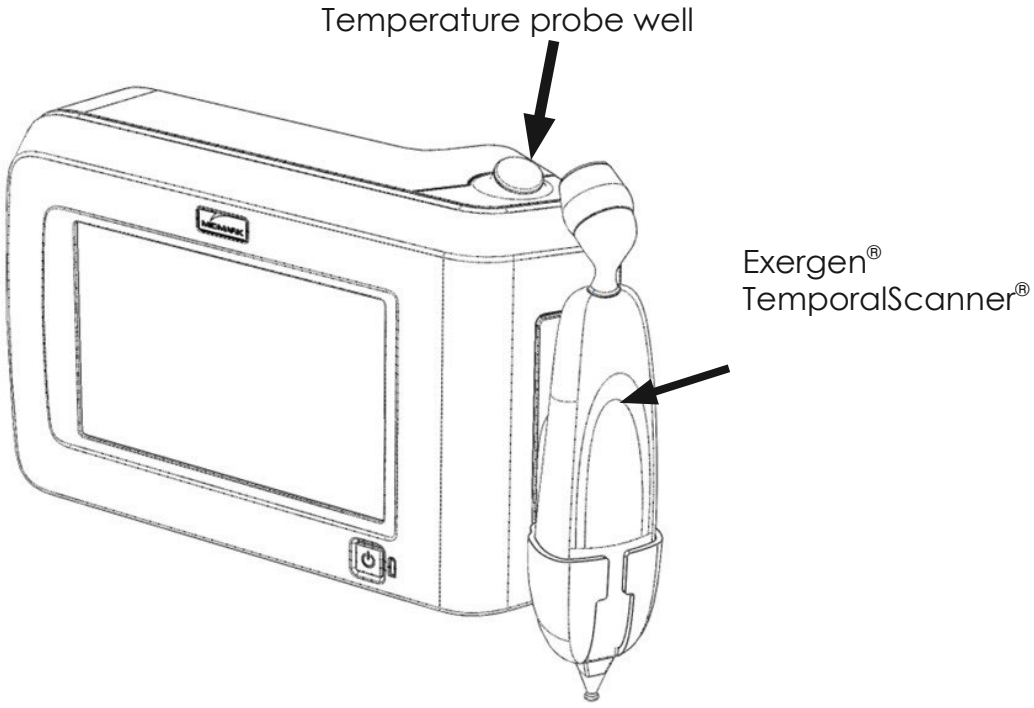


Fig. A.

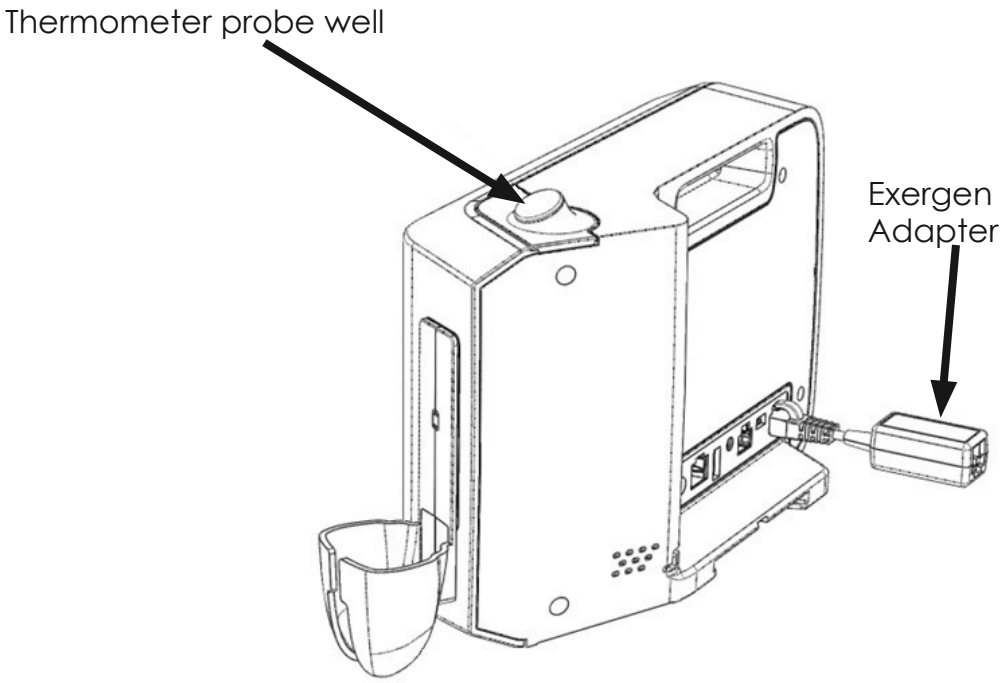
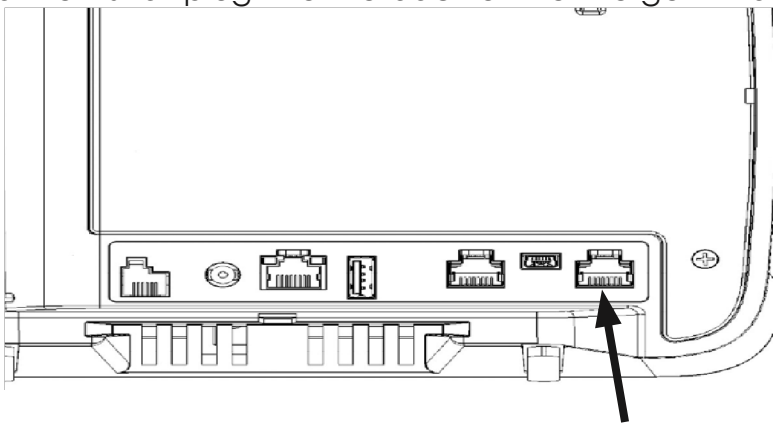


Fig. B

The Exergen® Adapter shall plug into the first port from the right as shown in Fig. C. The Exergen® TemporalScanner® shall plug into the back of the Exergen® Adapter.



Exergen Adapter plugs in here

Fig. C

Note	*The* Exergen® *TAT5000S Temporal Artery Scanner will not work if it is plugged into the unit without the DVSD-*Exergen® *Adapter.*

XIX. Contact Information

Technical Support is available Monday through Friday (except holidays), 6:00 AM to 4:00 PM Pacific Time.

Midmark Corporation

60 Vista Drive

Versailles, OH 45380 USA

Email: techsupport@midmark.com

T: 844.856.1230, option 2

Fax: 310.516.6517

midmark.com kb.midmark.com

(Knowledge Base)

Midmark Corporation
60 Vista Drive
Versailles, OH 45380 USA
T: 844.856.1230, option 2
Fax: 310.516.6517

