SPACELABS HEALTHCARE

Service Manual

# DM4

91331

Software Version 4.1.x

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*Spacelabs Healthcare considers itself responsible for the effects on safety, reliability and performance of the equipment only if:*

- *assembly operations, re-adjustments, modifications or repairs are carried out by persons authorized by Spacelabs Healthcare, and*
- *the electrical installation of the relevant room complies with the requirements of the standard in force, and*
- *the equipment is used in accordance with the operations manual.*

*In the event of a serious incident, notify Spacelabs.*

*Spacelabs Healthcare will make available, on request, such circuit diagrams, component part lists, descriptions, calibration instructions or other information which will assist appropriately qualified technical personnel to repair those parts of the equipment which are classified by Spacelabs Healthcare as field repairable.*

*Spacelabs Healthcare is committed to providing comprehensive customer support beginning with your initial inquiry through purchase, training, and service for the life of your Spacelabs Healthcare equipment.*

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- **Rx Only** U.S. Federal law restricts the devices documented herein to sale by or on the order of a physician.
- **Before use, carefully read the instructions, including all warnings and cautions.**

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# Introduction

## Overview

The DM4 is a lightweight and compact dual-mode monitor with a 17.78-cm (7-inch) touchscreen display. Designed for bedside and portable usage, the DM4 monitors $SpO_2$, pulse rate, NIBP, and temperature. You can use the DM4 to take spot check measurements of these parameters or to provide continuous monitoring.

This service manual is a reference document containing recommendations for planned maintenance. Corrective services are available through the depot return service only. Corrective service is not supported to the level of field-replaceable parts. This manual provides troubleshooting, information, and instructions for functional testing and performance verification. It is intended for use only by technically qualified service personnel.

For customers in North America: For maintenance that requires assembly and disassembly of the DM4, contact Spacelabs Healthcare to return the monitor.

For customers outside of North America: For maintenance that requires assembly and disassembly of the monitor, refer to the *DM4 Service Manual Addendum*, P/N 071-1063-xx.

## Indications for use

The DM4 series of monitors is indicated for use as a portable, multi-parameter, variable acuity device for use by health care professionals, clinicians and medically qualified personnel, in a variety of clinical environments and hospital departments, for non-invasive spot checking, and/or continuous monitoring and recording of:

- Blood pressure and pulse rate of adult, pediatric and neonatal patients;
- Functional oxygen saturation of arterial hemoglobin (SpO2) and pulse rate of adult, pediatric and neonatal patients;
- Intermittent predictive body temperature (oral and axillary) of adult, pediatric, and neonatal patients; and
- Infrared (over the temporal artery) measurement of body temperature of people of all ages.
- Carbon Dioxide concentration of the expired and inspired breath and respiration rate including, with the Covidien Microstream MicroPod option, an Integrated Pulmonary Index (IPI);
- Electronic predictive and temporal artery temperature;
- ECG and heart rate derived from ECG;
- Impedance respiration to detect the rate or absence of respiratory effort with the ECG option for adult, adolescent, child and infant;

## Contraindications

- Do not use on an arm ipsilateral to a mastectomy.
- Do not use on an arm with a vascular shunt (e.g., hemodialysis shunt).
- Do not use in a hyperbaric chamber.
- Do not use near an MRI machine.
- Do not use near flammable anesthetics.
- Do not place SpO2 sensors or Temp Probe or scanner near electro-cauterization.
- Do not use on patients connected to a cardiopulmonary bypass device.
- Do not use on patients connected to intra-aortic balloon pump device.
- Do not use on patients with peripheral convulsions, tremors or seizures.
- Not intended for use with severe arrhythmia.

- For contraindications of SpO2 sensors or Temp Probes or scanner, consult the manufacturer's directions for use.
- Oral Temperature measurements are not intended for neonatal use.
- No other contraindications are known at this time.

# Conventions used in this manual

Spacelabs uses specific types of indications to draw your attention to how to use the monitor.

- Reference links are in blue. Place the mouse over the blue text and click the text, and the topic will be shown. The links are located throughout the manual and in the **Table of contents**.
- **Bold** lettering indicates words, buttons, keys, tabs, and titles that can be found on the touchscreen. For example: a **Home** key is located on the taskbar on the right of the touchscreen.
- Italicized words are references or links to other information. If it is a link to additional information in the manual, place your cursor over the reference and click once to bring up that information. It may also be a reference to other documents available on the CD-ROM.
- There are specific steps to accomplish a task that are presented in numbered steps, possibly followed by the results of the step.
- Quick Start sections are the steps that explain how to use the various features and parameters.
- Warnings, Cautions and Notes are listed in the priority of the information and formatted specifically as shown below. Warnings are of the highest priority and notes are not as serious as the warnings and cautions.

***Warnings indicate potentially harmful conditions that may lead to injury or death.***

**Cautions indicate conditions that may lead to damage to or malfunction of the device.**

*Note:*

*Notes alert the user to relevant facts and conditions.*

# Safety Measures

- *The monitor needs special precautions regarding EMC and needs to be installed and put to service according to the EMC information provided in the Electromagnetic Compatibility section of the DM4 Operations Manual. Be aware that strong electromagnetic fields may interfere with the operation of the monitor. Interference prevents the clear reception of signals by the monitor. If the hospital is close to a strong transmitter—such as a TV, AM or FM radio, police or fire station, HAM radio, airport, or cellular phone—their signals could be detected as signals by the monitor.*
- *Portable and mobile RF communications equipment may affect the monitor and should be used no closer to any part of the monitor, including cables, than the recommended separation distance calculated in the Electromagnetic Compatibility section of the DM4 Operations Manual.*
- *The monitor is intended only as an adjunct in patient assessment. It must be used in conjunction with clinical signs and symptoms.*
- *No modification of this equipment is allowed.*
- *The monitor alarm volume should be verified as suitable for the area in which the monitor is used.*
- *Do not use this instrument for any purpose other than specified in this manual. Doing so will invalidate the monitor warranty.*
- *Do not connect more than one patient to the monitor at the same time.*
- *To remove all power from the monitor, you must disconnect the AC plug from the wall outlet, or disconnect the power cord from the rear of the monitor and remove the battery pack.*
- *Do not plug the monitor into an outlet controlled by a wall switch.*
- *Before each use in Continuous (CONT) mode, verify that the alarm limits are appropriate for the patient being monitored.*
- *The position of the patient, the physiological condition, and other factors affect the readings.*
- *Occasionally, electrical signals at the heart do not produce a peripheral pulse. If a patient's beat-to-beat pulse amplitude varies significantly (for example, pulsus alternans, atrial fibrillation, rapid-cycling artificial ventilator), blood pressure and pulse rate readings can be erratic and an alternate method of measurement should be used for confirmation.*
- *When the integrity of the external protective conductor in the installation or its arrangement is in doubt, you must operate the equipment from its internal electrical power source.*
- *Do not use any other power supply other than the one supplied by Spacelabs Healthcare. Refer to* *Parts List on page 7-2* *for power supply part number information or https://spacelabshealthcare.com/products/supplies/ for other accessories.*
- *Electric shock hazard - Do not open the monitor cover except to replace the batteries. Only qualified personnel may perform maintenance procedures specifically described in this Manual. Contact Spacelabs for assistance.*
- *The monitor is NOT intended for use as an apnea monitor.*

- *Do not, under any circumstances, perform any testing or maintenance on the monitor, power supply or power cords while the DM4 is being used to monitor a patient. Unplug the power cords before cleaning or servicing the monitor. The user should not perform any servicing except as specifically stated in this manual.*
- *Do not touch non-medical electrical equipment in the patient environment after removal of covers, connectors, etc. without the use of a tool which operate at voltages not exceeding 25 VAC or 60 VDC and the patient at the same time.*
- *Do not use frayed or damaged power cords or accessories. If you notice any sign of damage. Contact Spacelabs Healthcare for assistance.*
- *This equipment is NOT suitable for use in the presence of flammable anesthetics.*
- *This equipment is NOT intended for use in oxygen enriched atmospheres.*
- *Do not gas sterilize or autoclave the monitor.*
- *The use of accessory equipment not complying with the equivalent safety requirements of this equipment may lead to a reduced level of safety of the resulting system. Consideration of using such equipment must include:*
  - *use of the accessory in the Patient Environment; and*
  - *evidence that the safety certification of the accessory has been performed in accordance with the appropriate IEC 60601-1 collateral and particular harmonized national standard.*

- *Do not use the monitor in the presence of Magnetic Resonance Imaging (MRI) equipment.*
- *Do not place liquids on top of the monitor. Do not immerse the monitor, power supply or power cords in water or any liquid. If the monitor accidentally gets wet, you should thoroughly dry it.*
- *ELECTRICAL SHOCK – To reduce the risk of electrical shock, do not remove the back cover.*
- *ACCURACY – If the accuracy of any measurement does not seem reasonable, first check the patient's vital signs by alternate means and then check the monitor for proper functioning.*
- *CABLES – Route all cables away from the patient's throat to avoid possible strangulation.*
- *Explosion hazard - Do not use the monitor in the presence of flammable anesthetics or other flammable substance in combination with air, oxygen-enriched environments, or nitrous oxide.*
- *Do not place the monitor or accessories in any position that might cause it to fall on the patient. Do not lift the monitor by the patient cable.*
- *The connection to the Nurse Call Interface should only be installed by qualified service personnel.*
- *Do not place the monitor where the controls can be changed by the patient.*
- *Do not place the monitor on electrical equipment that may affect the monitor, preventing it from working properly.*

- *To ensure patient electrical isolation, connect only to other equipment with electrically isolated circuits.*
- *Warning: Loss of pulse signal can occur when:*
  - *The sensor is too tight*
  - *The patient has hypotension, severe vasoconstriction, severe anemia, or hypothermia*
  - *There is arterial occlusion proximal to the sensor*
  - *The patient is in cardiac arrest or is in shock*
- *Failure to apply the sensor properly may cause incorrect measurements.*
- *Elevated levels of Carboxyhemoglobin (COHb) may lead to inaccurate SpO2 measurements.*
- *Elevated levels of Methemoglobin (MetHb) will lead to inaccurate SpO2 measurement.*
- *The monitor may not meet performance specifications if stored or used outside temperature and humidity ranges. When moving the monitor from a storage location, wait at least one-hour or more prior to use to allow the monitor to adjust to room temperature.*
- *ACCESSORIES – The use of accessories and cables other than those specified, except for the accessories and cables sold by Spacelabs Healthcare as replacement parts, may result in increased emissions or decreased immunity of the monitor. It is the responsibility of the organization and/or user to verify the compatibility of the monitor, probe, and cable before use; otherwise, patient injury can result.*
- *DEFIBRILLATION – Do not come in contact with patients during defibrillation. Serious injury or death could result.*
- *DISPOSAL – Dispose of the packaging material, observing the applicable waste control regulations.*
- *SITE REQUIREMENTS – For safety reasons, all connectors for patient cables and sensor leads are designed to prevent accidental disconnection. Do not route cables in a way that they may present a tripping hazard. For devices installed above the patient, you must take adequate precautions to prevent them from dropping on the patient.*

- *STACKING – If the DM4 is used adjacent to or stacked with other equipment, the monitor should be observed to verify normal operation in the configuration in which it will be used.*
- *An NIBP monitor does not operate effectively if a patient is having seizures, convulsions or tremors, or is connected to a heart/lung machine.*
- *When a patient is experiencing arrhythmias during an NIBP measurement, the accuracy of the pulse determination may be affected or the time needed to complete a measurement may be extended. The monitor will not make a determination beyond 120 seconds.*
- *Significant levels of dysfunctional hemoglobins such as carboxyhemoglobin or methemoglobin may affect the accuracy of the measurement.*
- *Cardiogreen and other intravascular dyes, depending on the concentration, may affect the accuracy of the oximeter measurement.*
- *Setting the upper alarm limit to the extreme high value can render the upper alarm limit detection ineffective.*
- *Setting the lower alarm limit to the extreme low value can render the lower alarm limit detection ineffective.*
- *Do not expose the monitor to excessive moisture such as direct exposure to rain. Excessive moisture can cause the monitor to perform inaccurately or fail.*
- *This equipment has been tested and found to comply with the limits for medical devices to the EN 60601-1-2, Medical Device Directive 93/42/EEC. These limits are designed to provide reasonable protection against harmful interference in a typical medical installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to other devices in the vicinity. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to other devices, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:*
  - *Reorient or relocate the receiving device*
  - *Increase the separation between the equipment*
  - *Consult the manufacturer for help*

- Pressing the touchscreen with a sharp or pointed instrument may permanently damage the touchscreen. Press the touchscreen using only your finger.
- Inspect the monitor, air hose, and sensors for any damage prior to operation. If any damage is noted, the monitor should not be used until it has been serviced. The monitor should be repaired only by authorized personnel.
- The oximeter is factory calibrated to determine the percentage of arterial oxygen saturation of functional hemoglobin.
- Some sensors may not be appropriate for a particular patient. If at least 10 seconds of adequate height pulse on the Plethysmograph waveform cannot be observed for a given sensor, change the sensor location or sensor type until this condition is achieved.
- If the monitor fails to respond (including the display and touchscreen), do not use it until the situation has been corrected by authorized personnel.
- Biting the temperature probe tip while taking a temperature may result in damage to the probe.
- ACCIDENTAL SPILLS – In the event that fluids are accidentally spilled on the monitor, take the monitor out of operation and inspect for damage.
- ELECTROSURGERY – Measurements may be affected in the presence of strong electromagnetic sources such as electrosurgery equipment.
- GROUNDING – Do not defeat the three-wire grounding feature of the AC power cord by means of adaptors, plug modifications, or other methods. Do not use extension cords of any type.
- INTERFACING OTHER EQUIPMENT – Monitoring equipment must be interfaced with other types of medical equipment by qualified biomedical engineering personnel. Be certain to consult manufacturers' specifications to maintain safe operation.
- The monitor may not meet performance specifications if stored or used outside temperature and humidity ranges. When moving a monitor from a storage location, wait at least one hour prior to use to allow it to adjust to room temperature.
- Remove the battery if the monitor is not likely to be used for some time.
- Under certain conditions, the monitor provides "DRIP-PROOF" level of protection from ingress to moisture. Do not expose the monitor to extreme moisture levels such as direct exposure to rain. Exposure to extreme moisture levels may cause incorrect or inaccurate performance or monitor failure during or after exposure.
- Do not operate the monitor unless it has been properly calibrated. Inaccurate blood pressure readings may result. A calibration check is recommended once every year. A pneumatic check is recommended once every year.

*Note:*

- *There are no known risks with common disposal of equipment or accessories; however, the disposing of accessories should follow in accordance with local hospital policies. The Li-Ion battery should not be incinerated. The user should ensure these policies do not conflict with any local, state or federal guidelines.*
- *The monitor is suitable to be connected to public AC mains power.*
- *The monitor is not Category AP or APG Equipment.*
- *The monitor is rated for Continuous Operation.*
- *The applied parts of the monitor are Type BF Defibrillation Proof.*

# Monitor Components

*Figure 1-1: Front panel view*

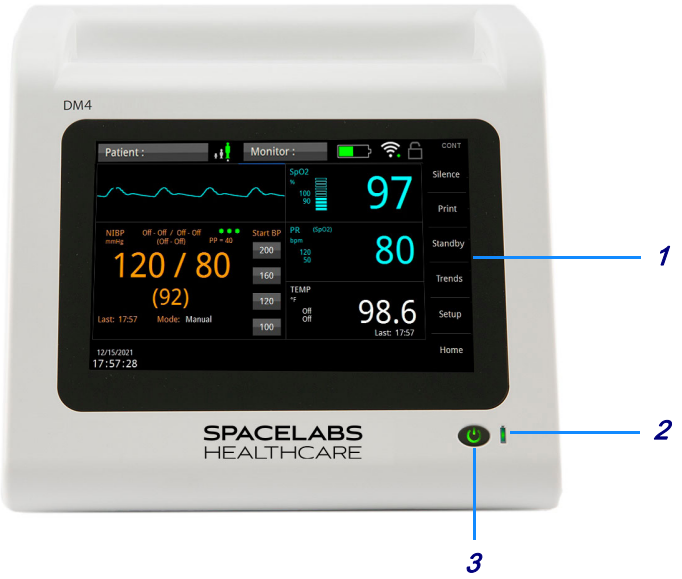



*Table 1-1: Front Panel Components*

| | Description | Symbol on panel |
|---|---|---|
| *1* | Touchscreen – Provides graphical user Interface (GUI) for controlling and configuring the monitor. | |
| *2* | Battery charging indicator – Indicates external power is connected and internal battery is charging. |  |
| *3* | Power On/Off button – Press once to turn the monitor ON. Press and hold for two seconds to turn the monitor Off. |  |

*Figure 1-2: Rear panel view*

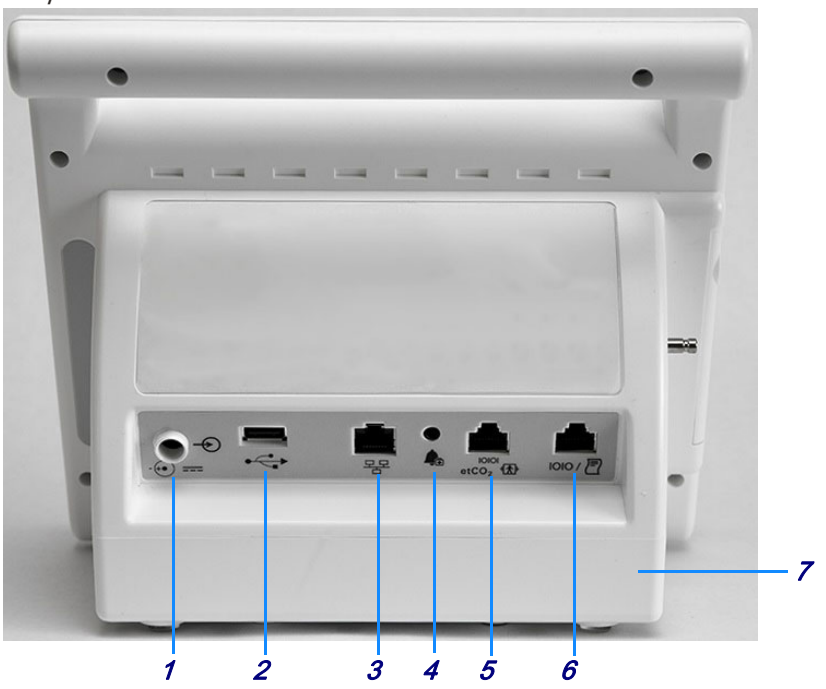



*Table 1-2: Back Panel Components*

| | Description | Symbol on panel |
|---|---|---|
| *1* | DC power input – connection for external power supply (P/N 010-2177-xx) | |
| *2* | USB port – connection for optional bar code scanner (P/N 010-2179-xx), Exergen Temporal Artery Thermometer (P/N 010-2157-xx), or USB flash drive (P/N 010-1950-xx) | |
| *3* | Ethernet port – connection for wired networking for transmission of patient data to Intesys Clinical Suite (ICS), or hospital EMR through ICS HL7 | |
| *4* | Nurse Call jack – connection to existing health care facility Nurse Call systems. **Alarm Out Relay** must be enabled in the **Setup Service** menu. | |
| *5* | $EtCO_2$ device interface (for future use) | IOIO $etCO_2$ |
| *6* | External printer interface – RJ45 serial communications output for optional external printer (P/N 010-1852-xx) | IOIOI / |
| *7* | Battery compartment – contains Li-ion (10.8 Volt, 7800 mAhr) battery pack that, when new and fully charged, is capable of taking 150 NIBP readings when the monitor is set in the 5 minute Automatic Mode (continuous $SpO_2$ and 15 minute Temp measurements) | |

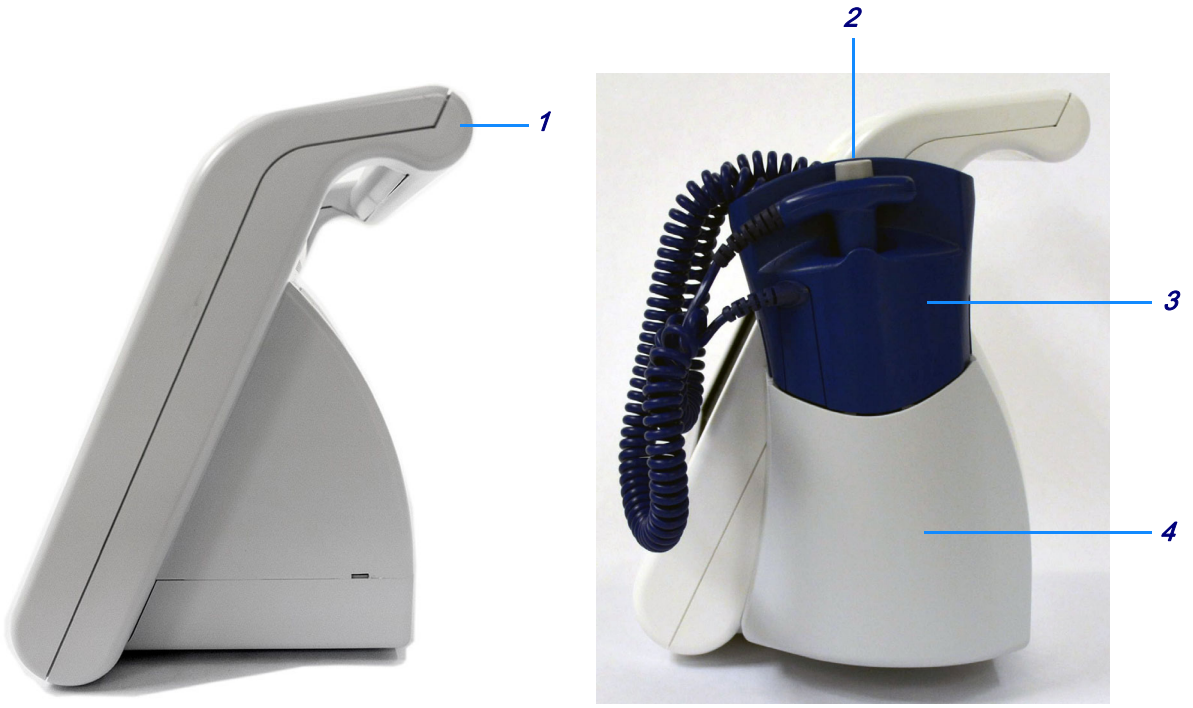
*Figure 1-3: Left panel view (with Masimo $SpO_2$)*


***Do not place the left panel speaker grill of the monitor against a solid surface. This will cause the alarm tones to be muffled.***

*Table 1-3: Left Panel Components*

| | Description | Symbol on panel |
|---|---|---|
| *1* | NIBP hose connector – MAXNIPB single tube, bayonet fitting | MAX NIBP |
| *2* | Speaker – internal speaker for alarm tones | |
| *3* | Masimo or Nellcor $SpO_2$ connector – $SpO_2$ adapter cable connection for Masimo or Nellcor technology (depending on pulse oximetry option) | MASIMO SET -or- COVIDIEN Nellcor $SpO_2$ |

*Figure 1-4: Right panel view*




*Without FILAC temperature option*

*With FILAC temperature option*

*Table 1-4: Right Panel Components*

| | Description |
|---|---|
| *1* | Transport handle |
| *2* | FILAC temperature probe |
| *3* | FILAC isolation chamber – provides holding wells for the temperature probe and box of probe covers |
| *4* | FILAC temperature module – provides quick connection and disconnection between the isolation chamber/temperature probe assembly and the monitor |

# Monitor Configurations

Table 1-5 shows the monitor configurations available for the DM4.

*Table 1-5: Monitor Configurations*

| Configuration | Installed Options |
|---|---|
| 91331-M | NIBP, Masimo $SpO_2$, and Exergen or no temperature |
| 91331-N | NIBP, Nellcor $SpO_2$, and Exergen or no temperature |
| 91331-MF | NIBP, Masimo $SpO_2$, and FILAC predictive temperature |
| 91331-NF | NIBP, Nellcor $SpO_2$, and FILAC predictive temperature |
| 91331-MW | NIBP, Masimo $SpO_2$, Exergen or no temperature, and Wi-Fi |
| 91331-NW | NIBP, Nellcor $SpO_2$, Exergen or no temperature, and Wi-Fi |
| 91331-MFW | NIBP, Masimo $SpO_2$, FILAC predictive temperature, and Wi-Fi |
| 91331-NFW | NIBP, Nellcor $SpO_2$, FILAC predictive temperature, and Wi-Fi |

# FILAC Isolation Chamber

If the FILAC 3000 thermometry option (91331-F) is installed, a temperature module and isolation chamber is connected to the side of the monitor. Store the FILAC temperature probe and probe covers in the designated isolation chamber locations when it is not in use.

*Figure 1-5: Placing FILAC temperature probe into isolation chamber*

*Note:*

- *Ensure that the FILAC temperature probe is secured in the isolation chamber well. FILAC temperature probes slide in and out of the isolation chamber well without any restrictions.*
- *The monitor offers a choice of thermometry: FILAC 3000 or Exergen non-invasive temporal artery thermometry.*

# Network Indicators

Icons at the top of the display indicate the network connectivity of the DM4 monitor. For information on network setup, refer to Communications Setup on page 2-24.

The icon shown on the right indicates wireless network connectivity with Intesys® Clinical Suite (ICS). The number of white bars is proportional to the signal strength.

The icon shown on the right indicates that Wi-Fi is enabled, but there is no wireless connectivity.

**Environmental factors can contribute to waveform gaps over the wireless network. If this issue continues, consult with a biomed technician or a Spacelabs Healthcare field service representative.**

The icon shown on the right indicates wired (Ethernet) connectivity with ICS.

The icon shown on the right indicates there is no wired network connectivity (and Wi-Fi is not enabled).

# Maintenance

- Check battery age, replace battery pack every two (2) years. For more details, see Battery Management on page 1-14, and Battery Maintenance on page 4-6.
- Perform a NIBP pneumatic check once per year. For more details, refer to the DM4 Operations Manual (070- 2916-01), in the NIBP chapter.
- Perform a NIBP transducer check once per year or when there is doubt about the validity of the blood pressure readings. For more details, refer to the DM4 Operations Manual (070- 2916-01), in the NIBP chapter.

# Battery Management

*Rechargeable lithium-ion batteries are widely used in technology today due to their high energy density and efficiency, but they do come with certain risks that require caution.*

- *Risk of overheating and fire: Lithium-ion batteries can overheat and catch fire if they are damaged, improperly charged, or used beyond their use life.*
- *Toxic and flammable gases: When lithium-ion batteries overheat, they can release toxic and flammable gases, which pose a risk of inhalation and combustion.*
- *Expired batteries have a fire hazard associated with them when they are used. Check battery age, replace battery pack every two (2) years.*
- *Replace batteries that no longer hold a charge.*
- *Do not short circuit, crush, or expose the battery to high temperature, incinerate or disassemble the battery.*
- *Do not use any damaged battery.*

• *Batteries, 2 years old and older, are not to be used and are considered expired.*

**This product contains a rechargeable Li-ion battery that is recyclable. Under various state and local laws, it may be illegal to dispose of this battery into the municipal waste stream. Check with your local authorities for instructions on recycling options in your area.**

*Note:*

- *Fully charge the battery before first use of the monitor.*
- *Dispose of the battery according to the manufacturer instructions.*

***Safety Tips:***

- *Purchase: Only buy batteries listed by a nationally recognized testing laboratory and the manufacturer.*
- *Charging: Use the correct charging equipment and avoid charging at extreme temperatures.*
- *Storage: Store batteries at room temperature, away from direct sunlight and anything that can burn.*
- *Handling: Be careful with batteries to prevent physical damage.*

The monitor has an internal rechargeable battery. The battery charges whenever the monitor is connected to an external power source. A green battery-charging indicator (located to the right of the On/Off button) on the front panel is lit when the battery is charging.

Batteries will self-discharge when they are not used. It is recommended that the battery be maintained at full charge by leaving the monitor connected to an external power source whenever possible.

The standard 10.8 Volt, 7800 mAhr battery pack, when new and fully charged, is capable of taking 150 NIBP readings when the monitor is set in the 5-minute automatic mode.

The battery icon  appears when the monitor is disconnected from the mains power. The icon provides an indication of relative battery change level remaining.

When the **Low Battery** message and 

icon show on the main screen, approximately 30 minutes of battery operation remain. Three audio “beeps” occur every 25 seconds.

***Upon the detection of a Low Battery condition and if the battery is not charged by the user, the monitor may no longer function as intended. You should connect the monitor to a power source as soon as possible and allow the battery to charge for eight hours.***

When the **Battery Nearly Depleted** message shows, the battery is no longer able to power a measurement. The **Battery Nearly Depleted** message shows on the main screen and a continuous audio tone occurs until the power is turned off.

***Upon the detection of a Battery Nearly Depleted condition and if the monitor is not turned off by the user, the monitor shuts down and turns off within sixty seconds of operations.***

When either of these messages appears, it is necessary to recharge the battery. A depleted battery may be fully recharged in eight hours. The monitor can obtain measurements while the battery is charging.

*Note:*

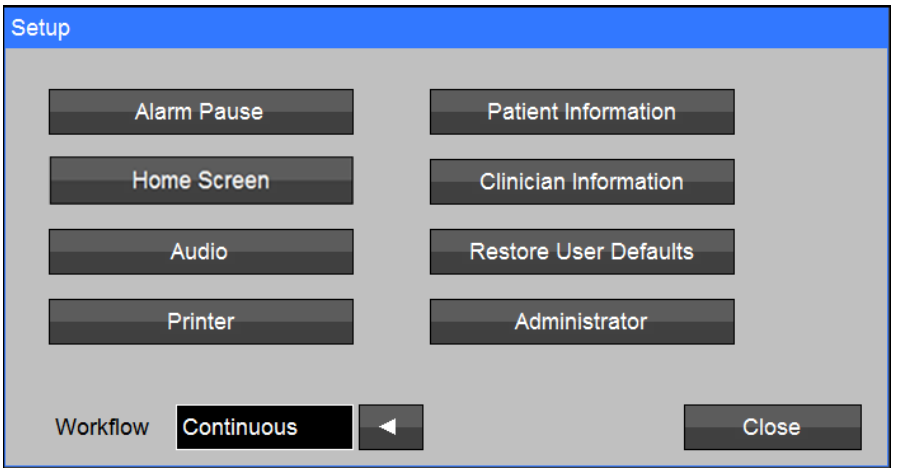
- *Use of the monitor while charging may lengthen the time to restore the battery power.*
- *While charging the battery, the monitor case may feel warm.*

# Monitor Setup

## Setup Menu

The **Setup** menu (refer to Figure 2-1) lets you review monitor information and configure the DM4 to meet patient and institutional requirements.

*Figure 2-1: Setup menu*




### To show the Setup menu

1 Touch the **Setup** key (on the right side of the screen).

## Workflow Setup

The **Workflow** setting in the **Setup** menu lets you configure the monitor for Continuous (**CONT**) or Spot Check (**SPOT**) mode. For more information, refer to the *DM4 Operations Manual*.

### To set the Workflow mode

1 Touch the **Setup** key (on the right side of the screen).
2 Touch the **Workflow** drop-down arrow and select **Continuous** or **Spot Check**.
3 Touch **Close** to apply the new setting.

The display goes momentarily goes blank, and then shows the new Workflow mode in the upper right corner of the screen.

## Alarm Pause

The **Alarm Pause** button in the **Setup** menu lets you pause all audio and visual alarm indications for a preset duration. For more information, refer to the *DM4 Operations Manual*.

## Home Screen Setup

The **Home Screen** button in the **Setup** menu lets you access the **Setup Home Screen** menu (refer to Figure 2-2). This menu lets you enable or disable display of the Pulse Blip (heart icon in the Pulse Rate zone) and $SpO_2$ waveform zone.

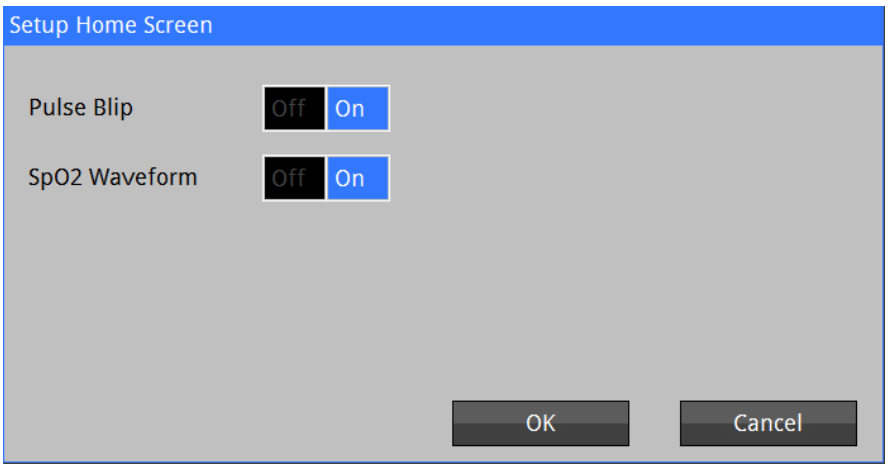
- *Inspect the pulse oximeter site every 2 to 4 hours or per hospital protocol. If there is any skin irritation caused by the sensor, remove the sensor and apply it to a different location*

- Inaccurate measurements may be caused by:
  - anemia or low hemoglobin concentrations
  - electrosurgical interference
  - excessive ambient light
  - excessive patient movement
  - incorrect sensor application or use
  - intravascular dyes such as indocyanine green or methylene blue
  - moisture in the sensor
  - placement of a sensor on an extremity with a blood pressure cuff, arterial catheter, or intravascular line
  - venous pulsations
- The loss of a pulse signal can occur in any of the following situations:
  - a blood pressure cuff is inflated on the same extremity as the one with the SpO2 sensor attached
  - excessive ambient light such as from a surgical lamp, a bilirubin lamp, or sunlight
  - the patient has hypotension, severe vasoconstriction, severe anemia, or hypothermia
  - the patient is in cardiac arrest or is in shock
  - the sensor is too tight
  - there is arterial occlusion proximal to the sensor

## To enable or disable the Pulse Blip and $SpO_2$ waveform zone

1 Touch the **Setup** key (on the right side of the screen).
2 In the **Setup** menu, touch the **Home Screen** Button.
3 In the **Setup Home Screen** menu, select **Off** to disable or **On** to enable display of the **Pulse Blip** and **SpO2 Waveform**.
4 Touch **OK** to apply or **Cancel** to cancel changes to settings.

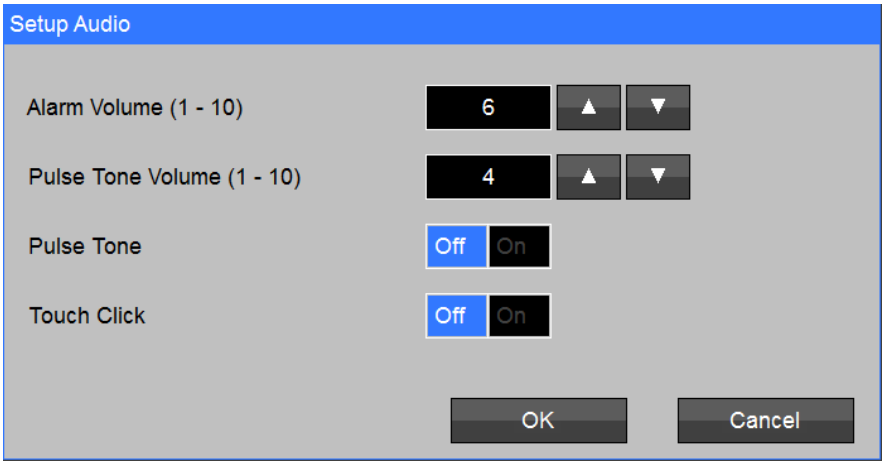
*Figure 2-2: Setup Home Screen menu*




# Audio Setup

The **Audio** button in the **Setup** menu lets you access the **Setup Audio** menu (refer to Figure 2-3). This menu lets you configure the audio for alarms, pulse tones, and touchscreen response.

*Figure 2-3: Setup Audio menu*



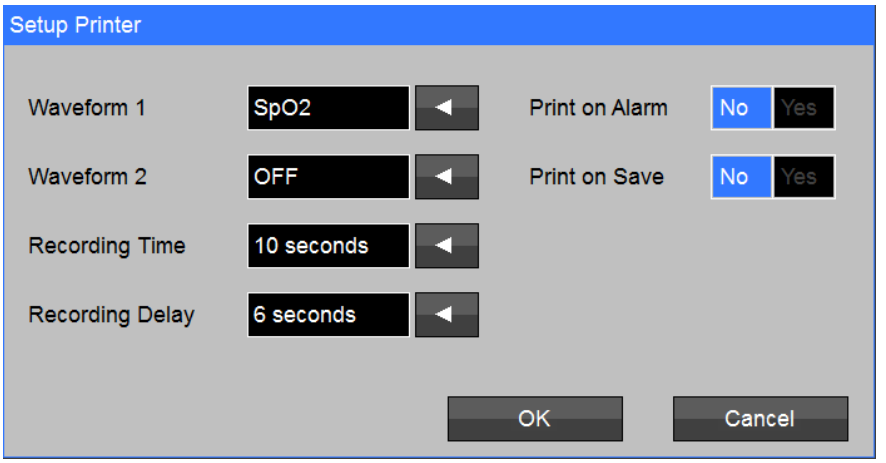

## To set up the monitor audio

1. Touch the **Setup** key (on the right side of the screen).
2. In the **Setup** menu, touch the **Audio** button.
3. In the **Setup Audio** menu:
   - Touch the up and down arrows to adjust the **Alarm Volume (1 - 10)** (default is **6**).
   - Touch the up and down arrows to adjust the **Pulse Tone Volume (1 - 10)** (default is **4**).
   - Select **Off** to disable or **On** to enable the **Pulse Tone.**
   - Select **Off** to disable or **On** to enable the **Touch Click**.
4. Touch **OK** to apply or **Cancel** to cancel changes to settings.

# Printer Setup

The **Printer** button in the **Setup** menu lets you access the **Setup Printer** menu (refer to Figure 2-4). This menu lets you configure strip chart recordings for the optional external printer.

*Figure 2-4: Setup Printer menu*




## To set up strip chart recordings

1. Touch the **Setup** key (on the right side of the screen).
2. In the **Setup** menu, touch the **Printer** button.
3. In the **Setup Printer** menu, touch the drop-down arrows to select:
   - **Waveform 1** – first parameter waveform to print: **SpO2** or **RRa** (future use)
   - **Waveform 2** (future use) – second parameter waveform to print: **SpO2**, **RRa**, or **OFF**
   - **Recording Time** – total amount of time shown on strip chart: **5**, **10**, or **16 seconds** (default is **10 seconds**)
   - **Recording Delay** – amount of time shown on strip chart before detection of alarm: **0**, **6**, and **10** seconds (default is **6 seconds**)

   For the **Print on Alarm** setting, select **No** to disable or **Yes** to enable automatic strip recordings when monitor alarms (default is **No**).

   For the **Print on Save** setting, select **No** to disable or **Yes** to enable strip recordings when you touch the **Save** key (default is **No**).
4. Touch **OK** to apply or **Cancel** to cancel changes to settings.

# Patient Information

The **Patient Information** button in the **Setup** menu lets you access the **Patient Information** screen, which you use to enter patient demographic information. For more information, refer to the *DM4 Operations Manual* (070-2916-01).

- ***Prior to patient monitoring, ensure the monitor is configured to the appropriate patient mode – Adult, Pediatric, or Neonate. The current patient mode is displayed on the main screen.***

- **Restoring User Defaults does not automatically restore the default Alarm Volume. The Alarm Volume should be checked and set Manually after selecting Restore User Defaults.**
- **Restoring Factory Defaults does not automatically restore the default Alarm Volume. The Alarm Volume should be checked and set Manually after selecting Restore Factory Defaults.**
- **Before making a change to the date and time, clearing patient trends is recommended to avoid patient data appearing out of sequence. [Setup/Administrator/Clear Trends]**
- **Always follow hospital protocols when setting alarms**

# Clinician Information

The **Clinician Information** button in the **Setup** menu lets you access the **Clinician Information** screen, which you use to enter the clinician ID. For more information, refer to the *DM4 Operations Manual*.

# Restore User Defaults

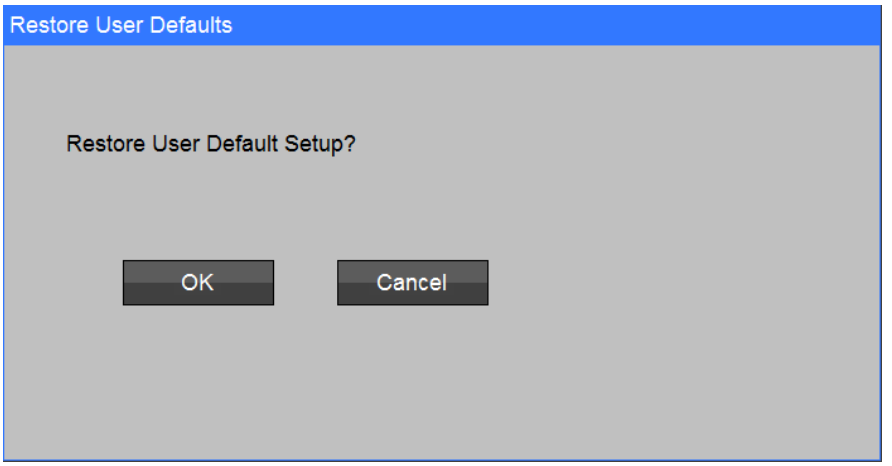
The **Restore User Defaults** button in the **Setup** menu lets you access the **Restore User Defaults** screen (refer to Figure 2-5). This screen lets you restore the monitor to its user default settings.

- **Restoring User Defaults does not automatically restore the default Alarm Volume. The Alarm Volume should be checked and set Manually after selecting Restore User Defaults.**
- **Restoring Factory Defaults does not automatically restore the default Alarm Volume. The Alarm Volume should be checked and set Manually after selecting Restore Factory Defaults.**

## To restore user defaults

1. Touch the **Setup** key (on the right side of the screen).
2. In the **Setup** menu, touch the **Restore User Defaults** button.
3. In the **Restore User Defaults** screen, touch **OK** to restore user defaults or **Cancel** to retain current monitor settings.

*Figure 2-5: Restore User Defaults screen*

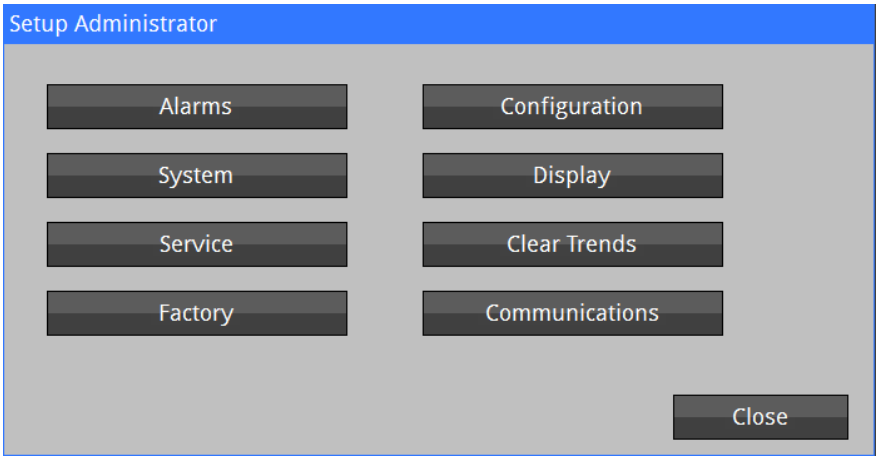


# Administrator Setup

The **Administrator** button in the **Setup** menu lets you access the **Setup Administrator** menu (refer to Figure 2-6). This menu provides buttons that let you access system administrator and service settings and functions.

- Access to the **Alarms**, **System**, and **Display** settings requires that you enter the password **986**.
- Access to the **Service** requires that you enter the password **314**.
- Access to the **Communications** settings requires that you enter the password **370**.
- The **Factory** settings are only accessible to personnel with special permissions.

*Figure 2-6: Setup Administrator menu*

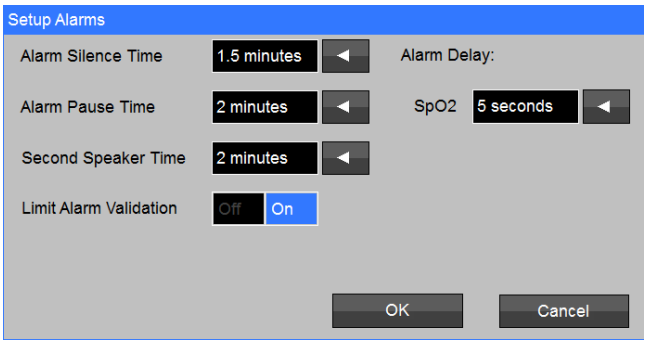



## Alarms Setup

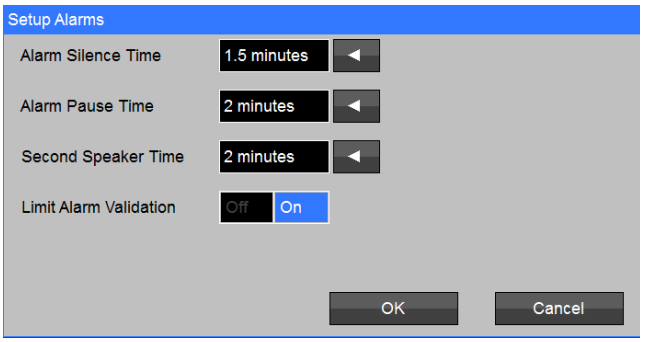
The **Alarms** button in the **Setup Administrator** menu lets you access the **Setup Alarms** menu (refer to Figure 2-7). This menu is password protected and lets you configure the global alarm settings.

- **Restoring User Defaults does not automatically restore the default Alarm Volume. The Alarm Volume should be checked and set Manually after selecting Restore User Defaults.**
- **Restoring Factory Defaults does not automatically restore the default Alarm Volume. The Alarm Volume should be checked and set Manually after selecting Restore Factory Defaults.**

*Figure 2-7: Setup Alarms menu*




*with Masimo $SpO_2$*




*with Nellcor $SpO_2$*

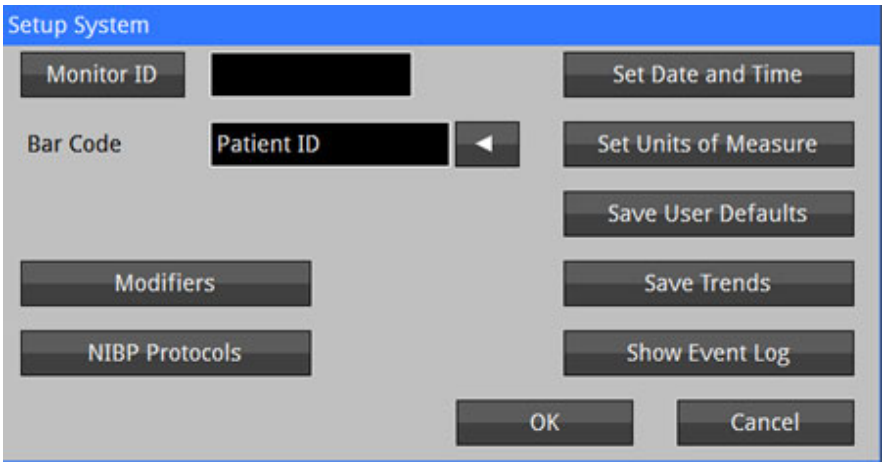
### To change global alarm settings

1. Touch the **Setup** key (on the right side of the screen).
2. In the **Setup** menu, touch the **Administrator** button.
3. In the **Setup Administrator** menu, touch the **Alarms** button.
4. In the **Enter Password** screen, use the on-screen numeric keypad to enter **986**, and then touch **OK**.
5. In the **Setup Alarms** menu, you can change the settings that follow:
   - **Alarm Silence Time** – Touch the drop-down arrow to select the amount of time to silence audio alerts when you touch the **Silence** key: **1**, **1.5** (default), **2**, or **3 minutes**.
   - **Alarm Pause Time** – Touch the drop-down arrow to select the amount of time to pause all audio and visual alarm indications when you touch the **Audio Pause** button in the **Setup** menu: **1**, **1.5**, **2** (default), or **3 minutes**.
   - **Second Speaker Time** – Touch the drop-down arrow to select the amount of time before the monitor generates a secondary audio alert for an unacknowledged alarm condition: **0**, **1**, **2** (default), or **3 minutes**.
   - **Limit Alarm Validation** – Select **Off** to disable or **On** (default) to enable a 3-second delay for PR (Pulse Rate) limit alarms (for reduction of nuisance alarms).
   - **Alarm Delay** (Masimo $SpO_2$ only) – For reduction of nuisance alarms, touch the drop-down arrow to select the amount of time to delay audio and visual indications after the start of an alarm condition: **Off**, **5** (default), **10**, or **15 seconds**.

## System Setup

The **System** button in the **Setup Administrator** menu lets you access the **Setup System** menu (refer to Figure 2-8). This menu is password protected and lets you configure system settings and perform certain monitor functions.

*Figure 2-8: Setup System menu*




### To access the Setup System menu

1. Touch the **Setup** key (on the right side of the screen).
2. In the **Setup** menu, touch the **Administrator** button.
3. In the **Setup Administrator** menu, touch the **System** button.
4. In the **Enter Password** screen, use the on-screen numeric keypad to enter **986**, and then touch **OK**.

## Set Monitor ID

If the Monitor button is configured to show the monitor ID, the information you enter in the **Monitor ID** field of the **Setup System** menu shows on the button label. For information on setting which ID (monitor or clinician) shows on the Monitor button, refer to Display Setup on page 2-23.

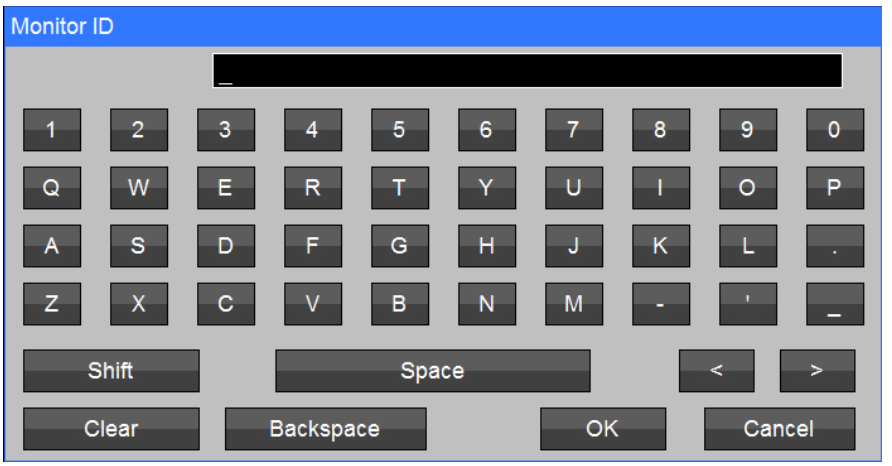
*Note:*

*A monitor ID is necessary for the monitor to connect to ICS.*

### To set the monitor ID

1. Access the **Setup System** menu (refer to To access the Setup System menu on page 2-7).
2. In the **Setup System** menu, touch the **Monitor ID** button.
   The **Monitor ID** screen shows (refer to Figure 2-9).

*Figure 2-9: Monitor ID screen*




3. Use the on-screen keyboard to enter the ID, and then touch **OK**.

## Configure Bar Code ID

The **Bar Code** setting in the **Setup System** menu lets you set the patient or clinician ID as the primary bar code entry.

### To set the bar code ID entry

1. Access the **Setup System** menu (refer to To access the Setup System menu on page 2-7).
2. In the **Setup System** menu, touch the **Bar Code** drop-down arrow and select **Patient ID** or **Clinician ID**.
3. Touch **OK** to apply or **Cancel** to cancel changes.

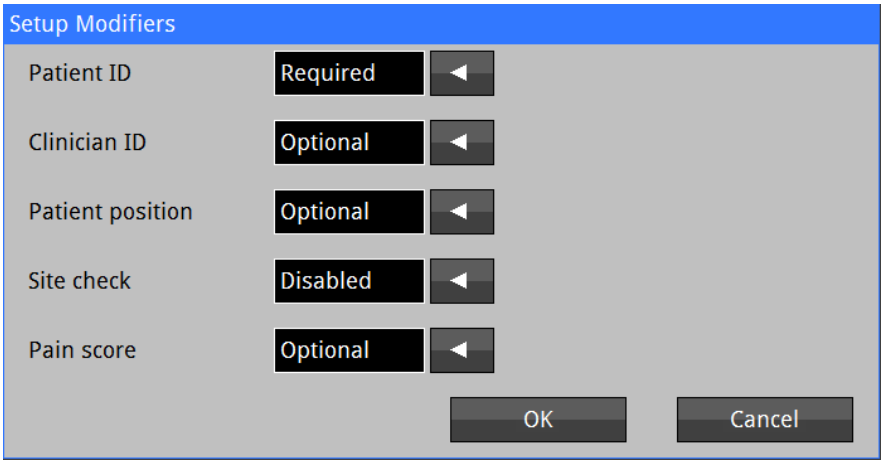
## Setup Modifiers

The **Modifiers** button in the **Setup System** menu lets you access settings that define which modifiers are required, optional, or disabled for Spot Check records sent to ICS.

### To set up modifiers for Spot Check records

1. Access the **Setup System** menu (refer to To access the Setup System menu on page 2-7).
2. In the **Setup System** menu, touch the **Modifiers** button.
   The **Setup Modifiers** menu shows (refer to Figure 2-10).

*Figure 2-10: Setup Modifiers menu*




3 In the **Setup Modifiers** menu, touch the drop-down arrows to select **Required**, **Optional**, or **Disabled** for any of the settings that follow:
   - **Patient ID**
   - **Clinician ID**
   - **Patient position**
   - **Site check**
   - **Pain Score**

4 Touch **OK** to apply or **Cancel** to cancel changes.

## Setup NIBP Protocols

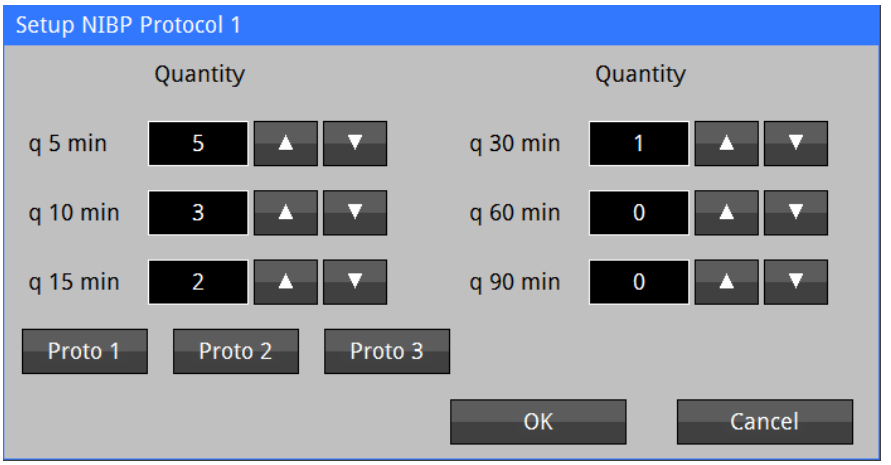
The **NIBP Protocols** button in the **Setup System** menu lets you access the **Setup NIBP Protocol** menu (refer to Figure 2-11). This menu lets you configure up to three Protocol modes: **Proto 1**, **Proto 2**, and **Proto 3**. Each Protocol mode defines a series of user-selected numbers of automatic NIBP measurements to take at specific time intervals. Protocol modes are useful for clinical situations such as blood administration, post-anesthesia recovery, and conscious sedation.

When you start NIBP measurements in a Protocol mode, the monitor takes an immediate measurement, followed by a second measurement at the nearest five-minute interval. The time of the second measurement serves as baseline for the protocol measurements.

Using Figure 2-11 as an example, if you start NIBP measurements in **Proto 1** mode at 13:02, the automatic measurements are as follows:

- first measurement at 13:02
- second measurement (baseline) at 13:05
- **5** measurements for **q 5 min** at 13:10, 13:15, 13:20, 13:25, and 13:30
- **3** measurements for **q 10 min** at 13:40, 13:50, and 14:00
- **2** measurements for **q 15 min** at 14:15 and 14:30
- **1** measurement for **q 30 min** at 15:00

*Figure 2-11: Setup NIBP Protocol menu*




## To set up an NIBP Protocol mode

1. Access the **Setup System** menu (refer to To access the Setup System menu on page 2-7).
2. In the **Setup System** menu, touch the **NIBP Protocols** button.
3. Touch the button for the Protocol mode you want to configure: **Proto1**, **Proto 2**, or **Proto 3**.
4. In the Setup **NIBP Protocol** menu, touch the up and down arrows to select the **Quantity** of measurements for each interval.
5. Touch **OK** to apply or **Cancel** to cancel changes.

- ***If the cuff should become contaminated with blood or other bodily fluids, it should be discarded.***
- ***If the hose should become grossly contaminated with blood or other bodily fluids, it should be discarded.***

## Set Date and Time

The **Set Date and Time** button in the **Setup System** menu lets you access the date and time settings, which are originally set at the factory. The date and time always show on the bottom left corner of the display.

**To avoid patient data showing out of sequence, clear patient trends before you change any date and time settings. For more information, refer to Clear Trends on page 2-24.**

- **Before making a change to the date and time, clearing patient trends is recommended to avoid patient data appearing out of sequence. [Setup/Administrator/Clear Trends]**

*Note:*

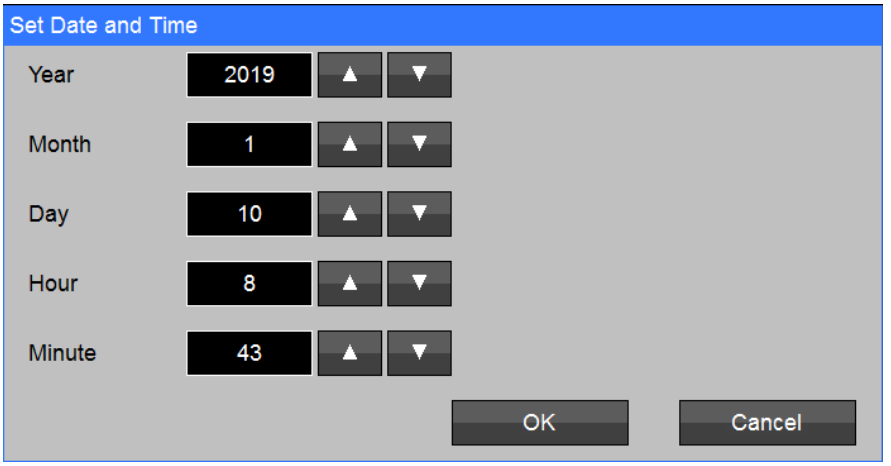
*Only set the date and time using the Set Date and Time menu if the monitor is not connected to ICS. If the monitor is connected to ICS (v4.2.2 or newer), the DM4 system clock is automatically synchronized to network time. To ensure proper synchronization, please refer to the Windows Time Settings section below.*

## To change the date and time

1 Access the **Setup System** menu (refer to To access the Setup System menu on page 2-7).

2 In the **Setup System** menu, touch the **Set Date and Time** button.
The **Set Date and Time** menu shows (refer to Figure 2-12).

*Figure 2-12: Set Date and Time menu*




3 Touch the up and down arrows to change any of the settings that follow:
- **Year**
- **Month**
- **Day**
- **Hour**
- **Minute**

4 Touch **OK** to apply or **Cancel** to cancel changes.

# Set Units of Measure

The **Set Units and Measure** button in the **Setup System** menu lets you access settings for changing the units of measure for height, weight, and temperature.

*Note:*

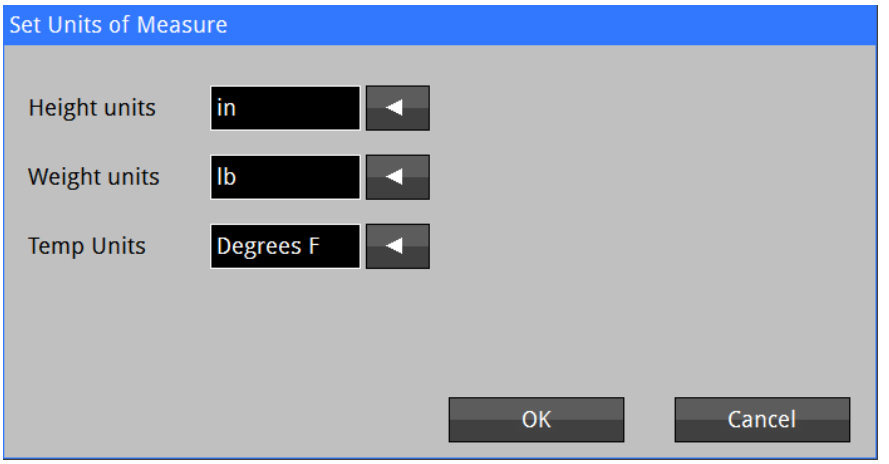
*Previously entered values for the height and weight of a patient are NOT adjusted when you change the units of measure.*

## To change units of measure

1 Access the **Setup System** menu (refer to To access the Setup System menu on page 2-7).

2 In the **Setup System** menu, touch the **Set Units of Measure** button.
The **Set Units of Measure** menu shows (refer to Figure 2-13).

*Figure 2-13: Set Date and Time menu*




3 Touch the drop-down arrow to change any of the settings that follow:
- **Height units** – **in** or **cm**
- **Weight units** – **lb** or **kg**
- **Temp units** – **Degrees F** or **Degrees C**

4 Touch **OK** to apply or **Cancel** to cancel changes.

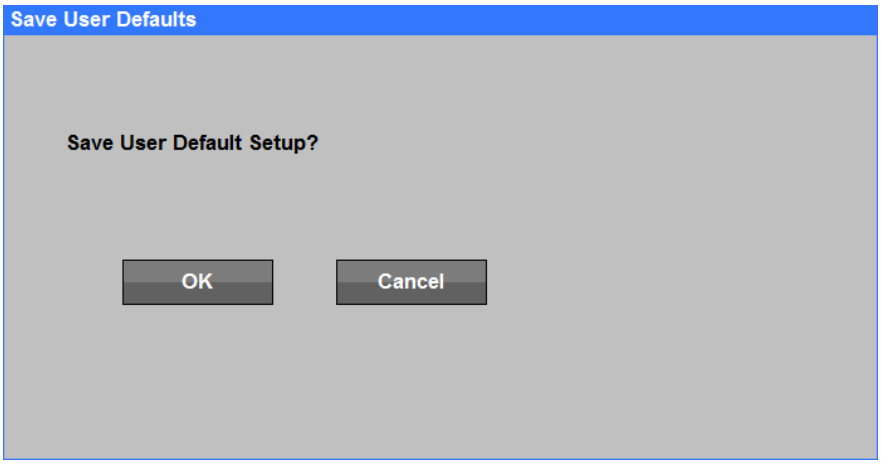
## Save User Defaults

The **Save User Defaults** button in the **Setup System** menu lets you save alarm limit and monitor settings as user defaults.

### To save user default settings

1 Access the **Setup System** menu (refer to To access the Setup System menu on page 2-7).
2 In the **Setup System** menu, touch the **Save User Defaults** button.
The **Save User Defaults** screen shows (refer to Figure 2-14).
3 Touch **OK** to proceed or **Cancel** to cancel.

*Figure 2-14: Save User Defaults screen*




## Save Trends

The **Save Trends** button in the **Setup System** menu lets you save trends to a USB storage device.

### To save trends to a USB storage device

1 Access the **Setup System** menu (refer to To access the Setup System menu on page 2-7).

2 Connect the storage device to the USB port on the back of the monitor.

3 In the **Setup System** menu, touch the **Save Trends** button.

The monitor creates a file on the USB storage device with the name **DM4TrendsRecords_YYYYMMDD_HHMMSS.cvs** (where **YYYYMMDD_HHMMSS** represents the current date and time). You can then remove the storage device and open the .cvs file with Excel or a similar application.

## Show Event Log

The **Show Event Log** button in the **Setup System** menu lets you show a record of clinical and technical events.

### To show the Event Log

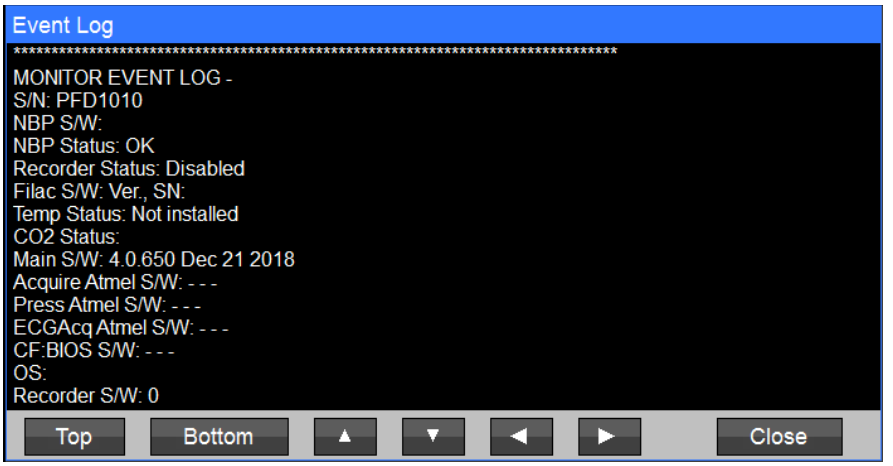
1 Access the **Setup System** menu (refer to To access the Setup System menu on page 2-7).

2 In the **Setup System** menu, touch the **Show Event Log** button.

The **Event Log** screen shows (refer to Figure 2-15).

- Touch the **Top**, **Bottom**, and arrow buttons to navigate the screen.
- Touch **Close** to close the **Event Log** screen.

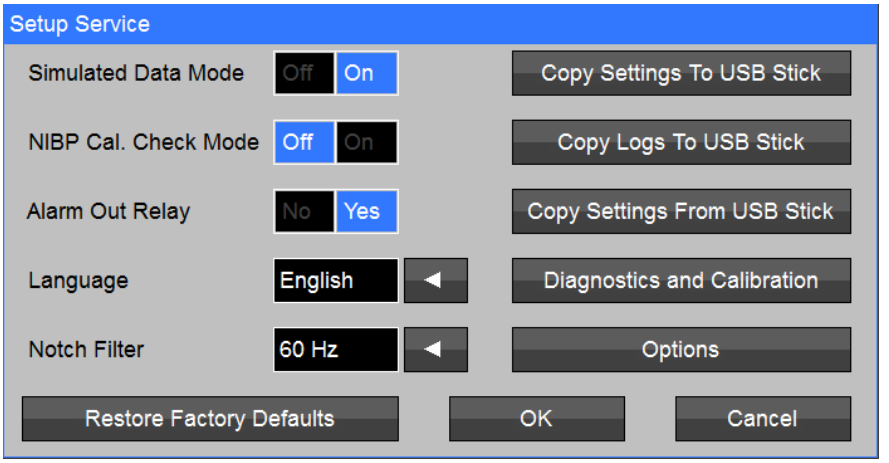
*Figure 2-15: Event Log screen*



# Service Setup

The **Service** button in the **Setup Administrator** menu lets you access the **Setup Service** menu (refer to Figure 2-16). This menu provides various settings and functions for servicing the monitor. Access to the **Setup Service** menu requires that you enter the password **314**.

*Figure 2-16: Setup Service menu*




## To access the Setup Service menu

1. Touch the **Setup** key (on the right side of the screen).
2. In the **Setup** menu, touch the **Administrator** button.
3. In the **Setup Administrator** menu, touch the **Service** button.
4. In the **Enter Password** screen, use the on-screen numeric keypad to enter **314**, and then touch **OK**.

## Simulated Data Mode

The **Simulated Data Mode** setting in the **Setup Service** menu lets you enable and disable the display of simulated patient data.

***Do not leave the monitor in Simulated Data Mode when you return it to clinical use.***

*Note:*

*You must restart the monitor to apply a change to the **Simulated Data Mode** setting.*

## To enable or disable Simulated Data Mode

1. Access the **Setup Service** menu (refer to To access the Setup Service menu on page 2-14).
2. Select **On** to enable or **Off** to disable the **Simulated Data Mode**.
3. Touch **OK**.
4. Turn the monitor OFF and then ON again.

## NIBP Cal. Check Mode

NIBP Cal. Check Mode configures the internal NIBP module to let you do a check of the NIBP system and pressure transducer calibration. For information on doing the NIBP system and calibration check, refer to NIBP Verification on page 4-1.

*Note:*

*The NIBP pressure transducer is factory calibrated; no adjustment can be done in the field.*

### To enable or disable NIBP Cal. Check Mode

1. Access the **Setup Service** menu (refer to To access the Setup Service menu on page 2-14).
2. Select **On** to enable or **Off** to disable **NIBP Cal. Check Mode**.

## Alarm Out Relay (Nurse Call)

The **Alarm Out Relay** setting in the **Setup Service** menu lets you enable or disable alarm output to the hospital Nurse Call system.

*Note:*

*You must restart the monitor to apply a change to the **Alarm Out Relay** setting.*

### To enable alarm output to the Nurse Call system

1. Access the **Setup Service** menu (refer to To access the Setup Service menu on page 2-14).
2. Select **Yes** for **Alarm Out Relay**.
3. Touch **OK**.
4. Turn the monitor OFF and then ON again.

### To disable alarm output to the Nurse Call system

1. Access the **Setup Service** menu (refer to To access the Setup Service menu on page 2-14).
2. Select **No** for **Alarm Out Relay**.
   The **Disable Alarm Out Relay** screen shows (refer to Figure 2-17).
3. Touch **OK** to proceed or **Cancel** to cancel.
4. Turn the monitor OFF and then ON again.

*Figure 2-17: Disable Alarm Out Relay screen*


## Language

The **Language** setting in the **Setup Service** menu lets you set the user interface (UI) language of the monitor.

### To set the user interface (UI) language

1. Access the **Setup Service** menu (refer to To access the Setup Service menu on page 2-14).
2. Touch the **Language** drop-down arrow to select the language.

## Notch Filter

The **Notch Filter** setting in the **Setup Service** menu lets you configure the notch filter for reduction of AC power noise.

### To configure the notch filter

1. Access the **Setup Service** menu (refer to To access the Setup Service menu on page 2-14).
2. Touch the **Notch Filter** drop-down arrow to select **OFF**, **50 Hz**, or **60 Hz**.

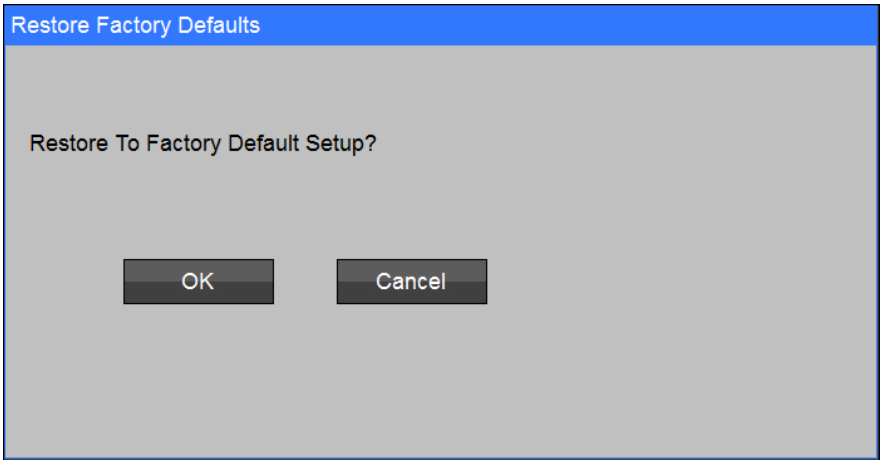
## Restore Factory Defaults

The **Restore Factory Defaults** button in the **Setup Service** menu lets you restore the monitor to the factory default settings.

### To restore the monitor to factory default settings

1. Access the **Setup Service** menu (refer to To access the Setup Service menu on page 2-14).
2. Touch the **Restore Factory Defaults** button.
   The **Restore Factory Defaults** screen shows (refer to Figure 2-18).
3. Touch **OK** to proceed or **Cancel** to cancel.
   The display shows the message **Please restart monitor for changes to take effect**.
4. Turn the monitor **OFF** and then **ON** again.

*Figure 2-18: Restore Factory Defaults screen*




## Copy Settings to USB Stick

The **Copy Settings to USB Stick** button in the **Setup Service** menu lets you save monitor settings (including alarm limits) to a USB flash drive, which you can then use to transfer to other DM4 monitors.

**Before you save monitor settings to a USB flash drive , delete ALL patient information (such as name, age, weight, height, and ID) from the monitor by doing the procedure To clear all trends stored in the monitor on page 2-24.**

*Note:*

*The DM4 does not support all USB flash drives. Use only USB flash drive 010-1950-xx.*

## To save monitor settings to a USB flash drive

1. Make sure there is no patient information on the monitor, and no files on the USB flash drive.
2. Insert the USB flash drive into the USB port on the back of the monitor.
3. Access the **Setup Service** menu (refer to To access the Setup Service menu on page 2-14).
4. Touch the **Copy Settings to USB Stick** button.
   The monitor generates an audio tone and shows the message **Settings file copied** when done.

## Copy Settings from USB Stick

The **Copy Settings from USB Stick** button in the **Setup Service** menu lets you quickly transfer monitor settings (including alarm limits) from a USB flash drive to any number of DM4 monitors.

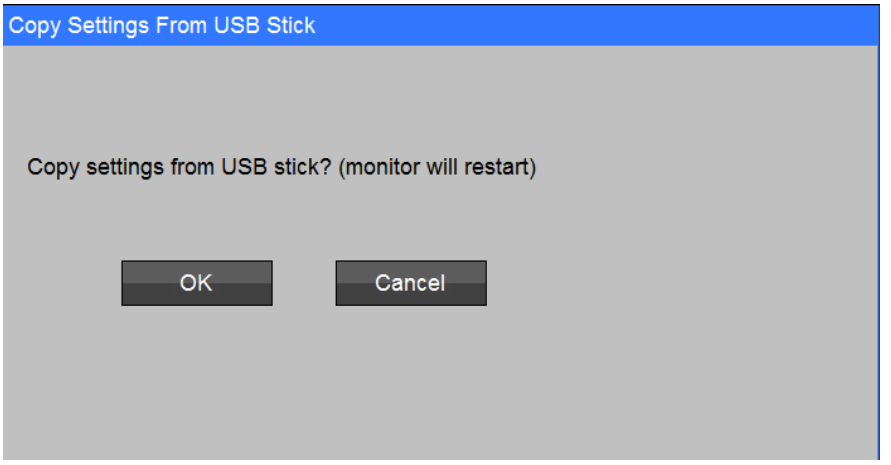
*Note:*

*The DM4 does not support all USB flash drives. Use only USB flash drive 010-1950-xx.*

## To transfer monitor settings from a USB flash drive

1. Insert the USB flash drive with the monitor setting files into the USB port on the back of the monitor.
2. Access the **Setup Service** menu (refer to To access the Setup Service menu on page 2-14).
3. Touch the **Copy Settings from USB Stick** button.
   The **Copy Settings From USB Stick** screen shows (refer to Figure 2-19).

*Figure 2-19: Copy Settings From USB Stick screen*




4. Touch **OK** to proceed or **Cancel** to cancel.
5. If **OK** is selected, the display shows the message **Please restart Monitor for changes to take effect**.
6. Turn the monitor **OFF** and then **ON** again.

-Or-

Wait for the monitor to automatically restart.

## Copy Logs To USB Stick

The **Copy Logs to USB Stick** button in the **Setup Service** menu lets you save the Event Log to a USB flash drive. If a problem occurs, you can email the Event Log file to Spacelabs Healthcare technical support for analysis.

*Note:*

- *The DM4 does not support all USB flash drives. Use only USB flash drive 010-1950-xx.*
- *You can open the files with a plain text editor, such as Notepad.*

### To save the Event Log to a USB flash Drive

1. Insert the USB flash drive into the back of the monitor.
2. Access the **Setup Service** menu (refer to To access the Setup Service menu on page 2-14).
3. Touch the **Copy Logs to USB Stick** button.

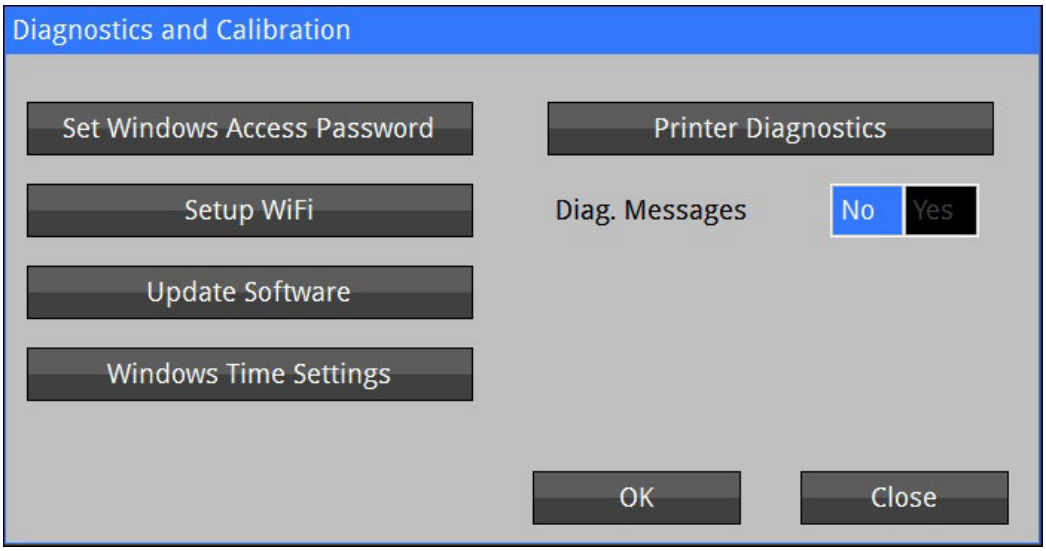
   After approximately one to two minutes (depending on the number of event files being saved), the monitor generates an audio tone and the display shows the message **Log files copied**.

## Diagnostics and Calibration

The **Diagnostics and Calibration** button in the **Setup Service** menu lets you access the **Diagnostics and Calibration** menu (refer to Figure 2-20). This menu lets you do the procedures that follow:

- Set the Windows Access Password (needed to access the Setup WiFi or Update Software functions)
- Connect to a WiFi network (refer to Setup WiFi on page 2-19).
- Update the monitor software (refer to Update Software on page 2-20).
- Access the Windows time settings (refer to Windows Time Settings on page 2-20)
- Printer diagnostics (refer to Printer Diagnostics on page 2-21).

*Figure 2-20: Diagnostics and Calibration menu*




## Set Windows Access Password

The Set Windows Access Password button in the Diagnostics and Calibration menu lets you create (one time) or change the Windows Access password. To change the Windows Access password, you first need to enter the current Windows Access password. If the Windows Access password is lost, you can request a "break glass" password by contacting Spacelabs Healthcare and supplying the monitor's Service ID (as shown on the Setup Options menu).

You need a USB keyboard and mouse to set the Windows Access password.

## Setup WiFi

The **Setup WiFi** button in the **Diagnostics and Calibration** menu lets you setup and connect to a WiFi network.

You need a USB keyboard and mouse to select a WiFi network.

*Note:*

*To avoid having to use a USB hub, it is recommended that you use keyboard with a built-in USB connection for the mouse.*

### To connect to a WiFi network

1. Connect a keyboard and mouse to the USB port on the back of the monitor.Access the **Setup Service** menu (refer to To access the Setup Service menu on page 2-14).
2. Touch the **Diagnostic and Calibration** button.
3. Touch the **Setup WiFi** button.

   If you have never created a Windows Access password, you will be prompted to create one. The password must satisfy the characteristics described in the prompt.

   **Be careful to save this password in a secure place.**

   If you have created a Windows Access password, enter the password. If the Windows Access password is lost, you can request a "break glass" password by contacting Spacelabs Healthcare and supplying the monitor's Service ID (as shown on the Setup Options menu).

   Once you have entered the correct password, the DM4 application ends and the Windows login screen shows.
4. Select the **Field Service User** and login using the password **314**.
5. Use the Windows settings menus to setup the WiFi parameters as needed for the local network.

6 Power cycle the monitor.
7 When the home screen appears, confirm that the red X is removed from the WiFi connection icon and is replaced by the green dot.

*Note:*

*To facilitate re-connection, make sure to check the **Connect automatically** check box only for the preferred WiFi networks.*

## Update Software

The **Update Software** button in the **Diagnostics and Calibration** menu lets you update the monitor software.

For software updates, you need a USB flash drive with the latest monitor software files. Contact Spacelabs Healthcare Technical Support for more information.

### To update the monitor software

1 Access the **Setup Service** menu (refer to To access the Setup Service menu on page 2-14).
2 Touch the **Diagnostics and Calibration** button.
The **Diagnostics and Calibration** menu shows (refer to Figure 2-20).
3 Touch the **Update Software** button.
If you have never created a Windows Access password, you will be prompted to create a password. The password must satisfy the characteristics described in the prompt.
**Be careful to save this password in a secure place.**
If you have created a Windows Access password, enter the password. If the Windows Access password is lost, you can request a "break glass" password by contacting Spacelabs Healthcare and supplying the monitor's Service ID (as shown on the Setup Options menu).
Once you have entered the correct password, the DM4 application ends and the Windows login screen shows.
4 Select the Field Service user and login using the password 314.
5 Use Windows File Explorer to copy the file d:\ZoeApp.exe from the USB flash drive to the c:\Zoe Medical\App folder (overwriting the existing ZoeApp.exe file).
6 Power cycle the monitor.
7 Bring up the **Setup / Administrator / Configuration** menu and confirm that the MAIN field displays the new software version.

## Windows Time Settings

The Windows Time Settings button in the Diagnostics and Calibration menu lets you access the Windows time settings.

### To access Windows time settings

1 Access the **Setup Service** menu (refer to To access the Setup Service menu on page 2-14).
2 Touch the **Diagnostics and Calibration** button.
The Diagnostics and Calibration menu shows (refer to Figure 2-20).
3 Touch the **Windows Time Settings** button.
If you have never created a Windows Access password, you will be prompted to create one. The password must satisfy the characteristics described in the prompt.
**Be careful to save this password in a secure place.**
If you have created a Windows Access password, enter the password. If the Windows Access password is lost, you can request a "break glass" password by contacting Spacelabs Healthcare and supplying the monitor's Service ID (as shown on the Setup Options menu).

Once you have entered the correct password, the DM4 application ends and the Windows login screen shows.

4 Select the Field Service user and login using the password 314.
5 Use **Windows Settings** icon to open the Time & language settings.
6 Ensure that **Set time** automatically is set to **Off**.
7 Ensure that **Set time zone** automatically is set to **Off**.
8 Ensure that the time zone is set to the correct time zone.
9 If the monitor will be connected to ICS, ensure that **Adjust for daylight saving time** automatically is set to the same value as this setting is set to on the ICS - if it is set to On on the ICS, set it to On, and if it is set to Off on the ICS, set it to Off. If the monitor will not be connected to ICS, and if it is in a locale that observes daylight savings time, set this setting to On.
10 Power cycle the monitor.
11 Confirm that the correct time is shown. If the monitor is connected to ICS, confirm that the time matches the time shown on the ICS.

## Printer Diagnostics

The **Printer Diagnostics** button in the **Diagnostics and Calibration** menu lets you do a self-test of the optional external printer.

### To do printer diagnostics (self-test)

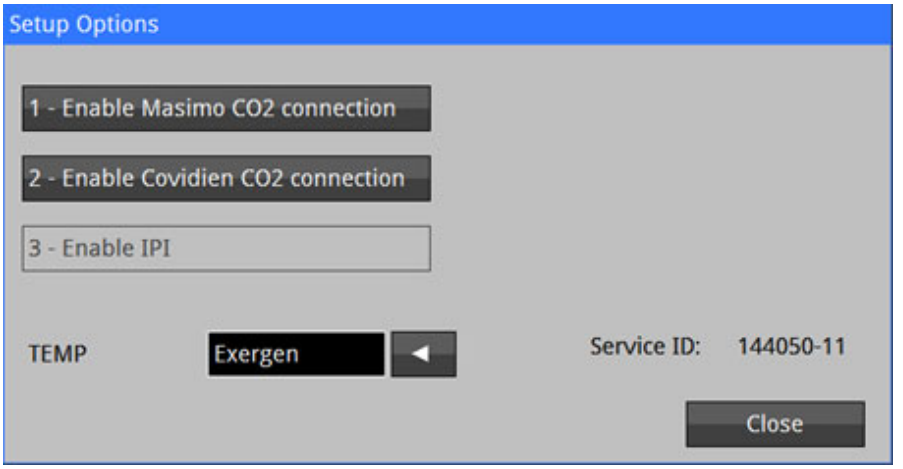
1 Access the **Setup Service** menu (refer to To access the Setup Service menu on page 2-14).
2 Touch the **Diagnostics and Calibration** button.
The **Diagnostics and Calibration** menu shows (refer to Figure 2-20).
3 Set the Diag. Messages selection to **Yes** to display diagnostic messages in the message area or **No** to display regular messages in the message area.
4 Touch the **Printer Diagnostics** button.
The printer does a self-test and prints a Printer Test Page.

## Options

The **Options** button in the **Setup Service** menu lets you access the **Setup Options** menu (refer to Figure 2-21). This menu lets you do the procedures that follow:

- Enable optional parameter connections
- Select the type of TEMP the monitor should use (None, Exergen, Filac, or Exergen USB)

*Figure 2-21: Setup Options menu*




## Setup Factory Menu

The **Factory** button in the **Setup Administrator** menu lets you access the **Setup Factory** menu. This a password-protected menu with factory settings that require special permission to access. For more information, contact Spacelabs Healthcare technical support.

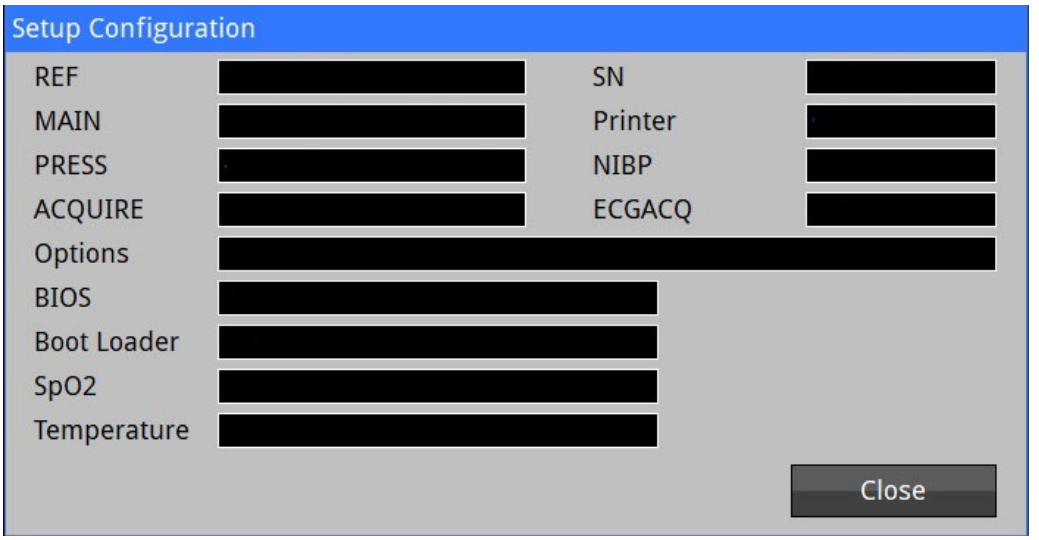
## Configuration (System Information)

The **Configuration** button in the **Setup Administrator** menu lets you review monitor system information, such as the model, serial number, software version, and installed options.

### To show monitor system information

1. Touch the **Setup** key (on the right side of the screen).
2. In the **Setup** menu, touch the **Administrator** button.
3. In the **Setup Administrator** menu, touch the **Configuration** button.
   The **Setup Configuration** screen shows (refer to Figure 2-22).
4. Touch **Close** to close the screen.

*Figure 2-22: Setup Configuration screen*




## Display Setup

The **Display** button in the **Setup Administrator** menu lets you access password-protected settings for the Patient and Monitor button labels (at the top of the display), as well as the auto dim feature.

### To set up Patient and Monitor buttons and auto dim

1. Touch the **Setup** key (on the right side of the screen).
2. In the **Setup** menu, touch the **Administrator** button.
3. In the **Setup Administrator** menu, touch the **Display** button.
4. In the **Enter Password** screen, use the on-screen numeric keypad to enter **986**, and then touch **OK**.
5. The **Setup Display** screen shows (refer to Figure 2-23).

*Figure 2-23: Setup Display menu*


6. Touch the arrows to change any of the settings that follow:
   - **Patient Button Label** – Select the patient information to show on the Patient button: **Patient ID**; **Last Name, First Initial**; **First Name, Last Initial**; or **Leave Blank**.
   - **Monitor Button Label** – Select the ID to show on the Monitor button: **Monitor ID** or **Clinician ID**.
   - **Backlight Brightness** - Select the brightness level of the screen backlight.

- **Auto Dim Timeout (minutes)** – Select **Off** (default) or the number of minutes (**1** to **10**) to dim the display if there is no touchscreen activity. The display turns bright again if you touch the screen or an alarm condition occurs.

7 Touch **OK** to apply or **Cancel** to cancel changes.

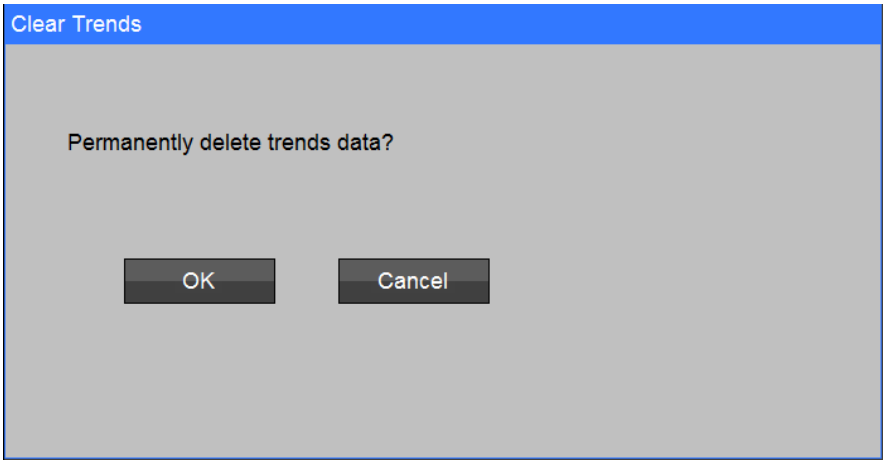
## Clear Trends

The **Clear Trends** button in the **Setup Administrator** menu lets you delete all trend data stored in the monitor.

### To clear all trends stored in the monitor

1 Touch the **Setup** key (on the right side of the screen).
2 In the **Setup** menu, touch the **Administrator** button.
3 In the **Setup Administrator** menu, touch the **Clear Trends** button.
The **Clear Trends** screen shows the **Permanently delete trends data?** message (refer to Figure ).
4 Touch **OK** to proceed or **Cancel** to cancel.

*Figure 2-24: Clear Trends screen*

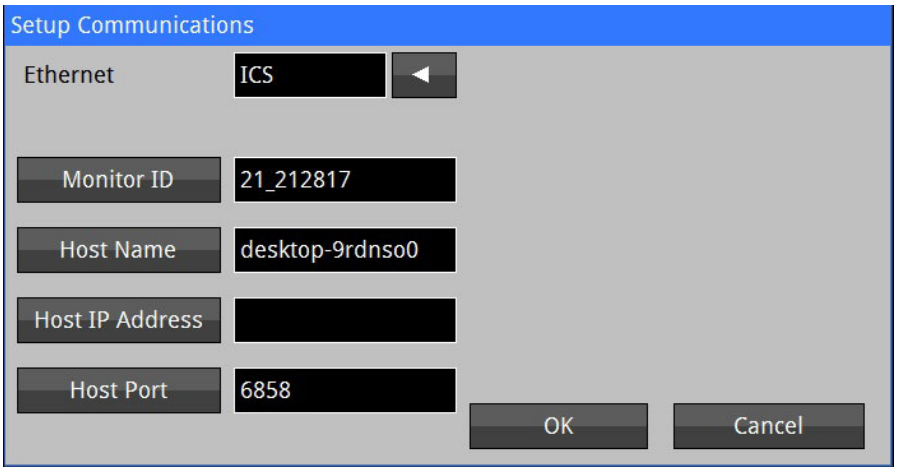



## Communications Setup

The **Communications** button in the **Setup Administrator** menu lets you access the **Setup Communications** menu (refer to Figure 2-25). This menu lets you set up network communications for sending clinical data to Intesys® Clinical Suite (ICS). To access this menu you must enter the password **370**.

If you set up the monitor for wireless communication, you need to also select a WiFi network for connectivity. For more information, refer to Setup WiFi on page 2-19.

*Figure 2-25: Setup Communications menu*




## To set up network communications with ICS

1. Touch the **Setup** key (on the right side of the screen).
2. In the **Setup** menu, touch the **Administrator** button.
3. In the **Setup Administrator** menu, touch the **Communications** button.
4. In the **Setup Communications** menu, touch the **Ethernet** drop-down arrow and select **ICS**.
   Additional settings for configuration of network communications show.
5. Enter the monitor ID in the **Monitor ID** field.
6. Enter the IP address of the ICS server in the **Host IP Address** field.
7. Enter the host port of the ICS server in the **Host Port** field.
8. Touch **OK**.
9. Turn the monitor **OFF** and then **ON** again.

# Theory

## Power Supply

The DM4 uses an external, medical-grade (4,000 VDC isolation), Class II power supply that meets IEC 60601-1 safety standards, and IEC 60601-1-2 EMC standards. In addition to providing power to the monitor when connected, the power supply also charges the internal battery.

## Battery

The monitor uses a rechargeable lithium-ion battery that lasts for 12+ hours and is capable of taking 150 NIBP readings when the monitor is set in the 5-minute automatic mode (continuous $SpO_2$ and 15-minute temperature measurements). The battery is UL-recognized and IEC 62133-certified. For more information on the battery, refer to Battery Management on page 1-14.

## Touchscreen Display

The DM4 has a 7-inch, 800 x 480 WVGA Active Color Matrix display with a touch panel overlay for user input.

## Processor Board

The processor board contains an Intel Celeron N2807 processor, on-board flash memory for the OS (operating system) and on-board RAM to run the main software program. The board directly drives the display, but not the backlight (which is driven by the main board).

The processor board contains 256 MBytes of RAM for program execution.

The processor board contains 512 MBytes of on-board flash memory, which is divided into a boot partition and a file system. The file system contains the operating system and related support files (e.g., start-up registry image). It also contains device-specific application data (e.g., serial number and hardware configuration options).

## Main Board

The main board contains the signal processing front-end circuit for the monitor. This circuit resides in two (4,000 VDC) patient-isolated sections of the board.

The main board contains an ATMega640 Atmel microcontroller (“PressF”) that manages the NIBP hardware, controls a second speaker and polls the On/Off button.

The processor board is mounted on the main board, which interfaces the Processor Board to the rest of the system.

The main board also provides an interface to the FILAC temperature module through a serial port.

# Second Speaker

A second speaker is directly connected to the “PressF” microcontroller and acts as a backup to the main speaker, should it fail. The second speaker provides a secondary alert that indicates an alarm condition has persisted beyond a pre-programmed time. For information on setting the amount of time before the monitor generates the secondary audio alert, refer to Alarms Setup on page 2-6.

# NIBP Board

The MaxIQ NIBP board provides the NIBP parameter set. The “PressF” microcontroller communicates with the NIBP board over a serial connection and relays data to the main program on the main board, where it is processed. This port does not contain electrical isolation, as the NIBP sensor is non-conductive.

# $SpO_2$ Board

The $SpO_2$ OEM board provides the $SpO_2$ parameter set. The “AcquireF” microcontroller communicates with the $SpO_2$ board over a serial connection and relays data to the main program on the main board, where it is processed.

Depending on the pulse oximetry option, the monitor contains either the Masimo MX or Nellcor OxiMax NELL 1 board. The board is electrically isolated with the “AcquireF” microcontroller from the rest of the system.

# Temperature Board

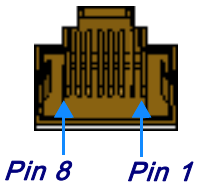
The Covidien temperature board provides the parameter set for the FILAC 3000 predictive thermometry option. The main program communicates with the temperature board over a serial connection. This port is electrically isolated from the rest of the system. The board resides in a dedicated temperature module (side car) outside the monitor.

# Strip Chart Printer and Print Head

The strip chart printer is external to the monitor and is optional. The printer consists of a printer controller board and a print head. The printer controller board is responsible for advancing the paper and for performing processor-intensive functions such as waveform printing.

The printer connects to the serial port on the back of the monitor (refer to Figure  on page 1-9). The printer cable uses an RJ45 connector to interface with the serial port (refer to Table 3-1).

*Table 3-1: RJ45 Connector Pinout*




| Pin Number | Signal Description | Pin Number | Signal Description |
|---|---|---|---|
| 1 | CTS – from printer | 5 | RX – to printer |
| 2 | DTR – to printer | 6 | Ground |
| 2 | Ground | 7 | No connection |
| 4 | TX – to printer | 8 | +14 V |

# USB Port

The USB port provides access to the operating system (OS) in order to update program software, copy service logs, and copy and retrieve monitor settings. The USB port also provides the connection for the bar code scanner, Exergen Temporal Artery Thermometer, and keyboard and mouse (for WiFi network connection).

*Note:*

*You can use a USB hub to connect the bar code scanner and Exergen Temporal Artery Thermometer to the monitor at the same time.*

# Alarm Out Relay (Nurse Call) Connection

- ***Connection of the monitor to the Nurse Call system should only be installed by authorized service personnel.***
- ***Although the Nurse Call system provides remote alarm indications, it does not replace appropriate bedside surveillance by trained clinicians.***

The Nurse Call stereo output on the back of the monitor (refer to Figure on page 1-9) provides an isolated relay switch closure between three of the connector pins. With no polarity to the connection, the output is compatible with most Nurse Call systems.

When properly connected, the Nurse Call interface activates the Nurse Call system each time an alarm is activated on the monitor. The delay time for activation of the Nurse Call interface is less than 0.5 seconds. The relay contacts of the Nurse Call interface are rated at 120 VAC at 0.3 A or 30 VDC at 1.0A.

The Nurse Call output is available as normally open (closed on alarm) or normally closed (open on alarm), depending on how it is wired. For normally open (NO) applications, you need to connect the Nurse Call system to pins 1 and 2 of the stereo output connector. For normally closed (NC) applications, you need to connect the Nurse Call system to pins 1 and 3. For connector information, refer to Figure and Table 3-2.

Use Nurse Call cable 010-2184-xx (NC), 010-2185-xx (NO), or 010-2186-xx (tinned ends).

*Figure 3-1: 3.5 mm phone connector*

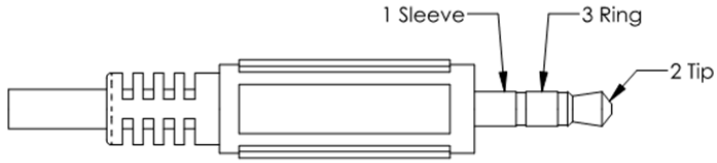



*Table 3-2: Nurse Call Pinout*

| Pin Number | Signal Description |
|---|---|
| 2 (tip) | Nurse Call (NO) |
| 3 (ring) | Nurse Call (NC) |
| 1 (sleeve) | Nurse Call (common) |

# Routine Maintenance

## Routine Maintenance Overview

This chapter provides information on routine maintenance of the DM4 monitor, including functional verification, electrical safety testing, and battery maintenance. For cleaning information, refer to Cleaning, Disinfecting, and Sterilization on page 5-1.

For customers in North America: For maintenance that requires assembly and disassembly of the DM4, contact Spacelabs Healthcare to return the monitor.

For customers outside of North America: For maintenance that requires assembly and disassembly of the monitor, refer to the *DM4 Service Manual Addendum*, P/N 071-1063-xx.

Check battery age, replace battery pack every two (2) years.

Perform a NIBP pneumatic check once per year.

Perform a NIBP transducer check once per year or when there is doubt about the validity of the blood pressure readings.

## Functional Verification

Use the procedures in this section to verify that the DM4 monitor functions correctly. An authorized service technician should check the monitor for acceptable performance once a year or at an interval determined to be appropriate by an effective risk-based equipment management program. You should also do the functional verification procedures after software upgrades and monitor repairs.

### NIBP Verification

*Note:*

- *The NIBP pressure transducer is factory calibrated; no adjustment can be done in the field. You can verify accuracy by doing the tests described in this section.*
- *If the DM4 fails the NIBP transducer or overpressure check, contact Spacelabs Healthcare to return the monitor for service.*

Required test equipment:

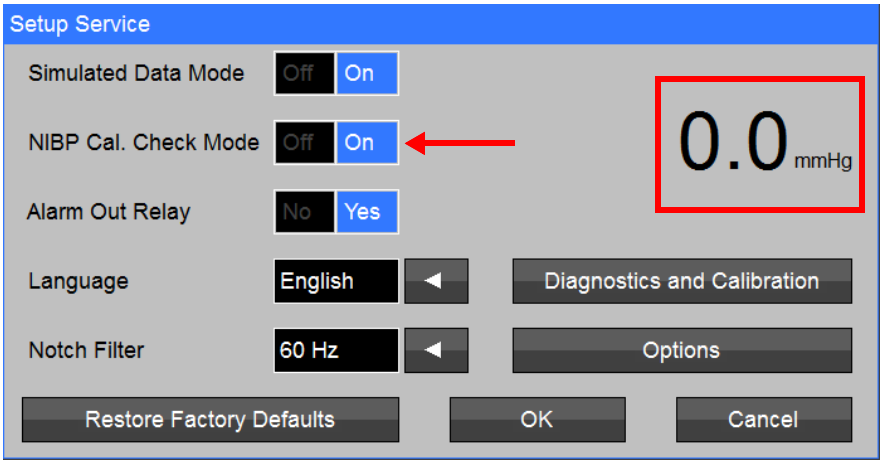
- NIBP test kit, P/N 010-2182-xx
- aneroid gauge or equivalent
- inflation valve and thumbwheel valve
- NIBP simulator

#### To check the NIBP transducer

1. Assemble the NIBP test kit:
   a. Connect the open-ended tubing of the “T” connector to the inflation bulb.
   b. Connect the open-ended tubing of the “T” connector to the gauge.
   c. Connect the male luer fitting to the female luer fitting of the adapter tubing.
2. Set the monitor to Adult or Pediatric mode.

3 Access the **Setup Service** menu and set **NIBP Cal. Check Mode** to **On** (refer to To enable or disable NIBP Cal. Check Mode on page 2-15).
The upper right section of the menu shows **0.0 mmHg** (refer to Figure 4-1).

*Figure 4-1: NIBP Cal. Check Mode set to On*




4 Use the inflation bulb and gauge to slowly inflate the system to the test point pressures shown in Table 4-1. Pause for 30 seconds at each test point to verify that the calibration meets the acceptance criteria.

*Note:*
*If the monitor does not show the test pressure for the 30-second period, deflate to zero and verify proper assembly of the calibration setup. Then reinflate the system.*

*Table 4-1: NIBP Transducer Calibration*

| Test Point | System Pressure (Digital Readout) | Acceptance Criteria |
|---|---|---|
| 1 | 0 mmHg | ±1 mmHg |
| 2 | 50 mmHg | ±4 mmHg |
| 3 | 100 mmHg | ±4 mmHg |
| 4 | 150 mmHg | ±4 mmHg |
| 5 | 200 mmHg | ±5 mmHg |

## To check the NIBP overpressure

1 Repeat Steps 1 to 4 in To check the NIBP transducer on page 4-1.
2 Adult/Pediatric overpressure check: Slowly Inflate the system pressure to 290 mmHg ±10 mmHg and verify that the **Setup Service** menu shows the maximum pressure (290 mmHg ±10 mmHg).
3 Set **NIBP Cal. Check Mode** to **Off**.
4 Close the **Setup Service** menu.
5 Set the monitor to Neonatal mode.
6 Access the **Setup Service** menu again.
7 Set **NIBP Cal. Check Mode** to **On**.
8 Neonatal overpressure check: Slowly Inflate the system pressure to 145 mmHg ±10 mmHg and verify that the **Setup Service** menu shows the maximum pressure (145 mmHg ±10 mmHg).

### To check NIBP measurement with a simulator

1. Set the monitor to Adult mode.
2. Access the **Setup Service** menu and set **NIBP Cal. Check Mode** to **Off** (refer to To enable or disable NIBP Cal. Check Mode on page 2-15).
3. Connect an NIBP simulator to the monitor.
4. Set the NIBP simulator to 120 / 80 mmHg, 40 BPM, 100% gain.
5. Start the simulator pressure and let the monitor take the NIBP measurement.
6. Take four NIBP readings:
   a. Record the NIBP and Pulse Rate (PR) values.
   b. Disregard the first set of NIBP and PR readings.
   c. Average the three remaining NIBP and PR readings.
7. Verify that the average NIBP value is within ±5 mmHg, and the PR is within ±2%.

*Note:*

*Results may vary depending on the NIBP simulator that you use.*

## $SpO_2$ Verification

*Note:*

*The oximeter is factory calibrated to determine the percentage of arterial oxygen saturation of functional hemoglobin. No user calibration is required.*

Required test equipment:

- OxSim OX-1 $SpO_2$ simulator or equivalent

### To check $SpO_2$ measurement with a simulator

1. Connect the $SpO_2$ simulator to the monitor.
2. Set $SpO_2$ and Pulse Rate (PR) values on the simulator.
3. Verify that $SpO_2$ and PR readings on the monitor are within the specifications of the simulator.

# FILAC Temperature Calibration Check

- **Do not open the monitor to clean or repair it. Contact Spacelabs for service needs. Refer to the copyright page (second page) for address and phone number information**
- **Disconnect all accessories from the monitor before cleaning. Do not immerse any part of the electrical connector of the cable or accessories in the cleaning or disinfection solution at any time. Do not use an abrasive cloth or cleaner on the accessories.**
- **Do not spray any water or cleaning solution directly onto the monitor.**
- **Use care when cleaning the display. Scratches may occur**
- **Do not soak or immerse the sensor or its cable in any liquid solution. Do not attempt to sterilize.**
- **Do not soak or immerse the Temp Probe or its cable in any liquid solution. Do not attempt to sterilize.**
- **Do not use hard or sharp objects to clean the Temp Probe. This could damage the Temp Probe and cause the unit to not function properly. Do not use steam, heat or gas sterilization on the Temp Probe. Do not autoclave the Temp Probe.**
- **Do not soak or immerse the Isolation Chamber in any liquid solution. Do not attempt to sterilize.**
- **Do not use hard or sharp objects to clean the Isolation Chamber. This could damage the Isolation Chamber and cause the unit to not function properly. Do not use steam, heat or gas sterilization on the Isolation Chamber. Do not autoclave the Isolation Chamber.**

*Note:*

*For information on calibrating the Exergen Temporal Artery Thermometer, refer to the documentation for that product.*

Required test equipment:

- FILAC 3000 calibration plug (P/N 010-2230-xx)

## To do a FILAC temperature calibration check

1. Turn the monitor OFF.
2. Remove the isolation chamber from the monitor (refer to Replace Isolation Chamber and Temperature Probe on page 4-10).
3. Remove the temperature probe from the isolation chamber (refer to Replace Isolation Chamber and Temperature Probe on page 4-10).
4. Install the calibration plug on the isolation chamber (in place of the temperature probe).
5. Install the isolation chamber with the calibration plug on the monitor.
6. Turn the monitor ON.
7. Remove the temperature probe from the isolation chamber well to activate a reading.
8. Verify that the temperature reading on the monitor is 37.0 ºC ±0.1 ºC (98.6 ºF ±0.2 ºF).

*Note:*

*The monitor will show the FILAC calibration key value using the current temperature units setting.*

9. Turn the monitor OFF.

10 Remove the isolation chamber from the monitor (refer to Replace Isolation Chamber and Temperature Probe on page 4-10).
11 Replace the calibration plug with the temperature probe.
12 Reinstall the isolation chamber on the monitor (refer to Replace Isolation Chamber and Temperature Probe on page 4-10).

## Time and Date Verification

The monitor continuously shows the date and time (in 24 hour format) in the lower left corner of the screen. If the time or date is not correct, refer to Set Date and Time on page 2-10.

## Alarm and Pulse Tone Volume Verification

*Note:*

*You cannot turn OFF the alarm volume.*

### To check the alarm and pulse tone volume

1 Touch the **Setup** key (on the right side of the screen).
2 Touch the **Audio** button.
3 Touch the **Alarm Volume** up and down arrows to verify that the volume level adjusts from **1** to **10**.
4 Set the desired alarm volume level.
5 Touch the **Pulse Tone Volume** up and down arrows to verify that the volume level adjusts from **1** to **10**.
6 Set the desired pulse tone volume level.
7 Touch **OK**.

# Electrical Safety Testing

***Ensure the device is not connected to a patient before conducting any maintenance or safety testing. If safety tests or maintenance must be performed on equipment currently monitoring a patient, obtain permission to disconnect the cables from the monitor and patient. Tests must be performed outside of the patient vicinity.***

To protect the patient from electrical shock, especially micro-shock, do the required safety tests. It has been determined experimentally that current values in the microampere (mA) range can cause fatal arrhythmias in electrically susceptible patients. A patient is deemed electrically susceptible when connected to monitoring equipment.

Perform these tests according to the hospital scheduling requirements, at least annually, or after repair or modification.

Required test equipment:

- electrical safety analyzer, Fluke model ESA615 or equivalent

*Note:*

*Perform all tests according to the operations manual for the safety analyzer and any local requirements.*

*Table 4-2: Summary of Standards for Medical Monitoring*

| International Mains to Chassis Leakage | US (120 V) Mains to Chassis Leakage | Mains Resistance |
|---|---|---|
| 100 µA – normal condition, ground attached (AC connector to chassis) | 300 µA – normal condition, ground attached (AC connector to chassis) | <200 milliohms* |
| 500 µA – single fault condition, open ground, or reverse polarity | 300 µA – single fault condition, open ground, or reverse polarity | <200 milliohms* |

* *Measured from the AC Power cord third wire ground to the equipment chassis*

### To test the ground resistance

1. Attach the power cord to the monitor under test.
2. Measure the resistance from the AC power cord third wire ground to a chassis location.
3. Check that the resistance is less than 200 milliohms (0.2 ohms).

### To test the chassis leakage current

1. Plug the leakage analyzers into mains power.
2. Plug the equipment into the analyzer AC receptacle.
3. Verify that the leakage current from the chassis to ground is less than the values in Table 4-3.

*Table 4-3: Enclosure Leakage Test Conditions and Limits*

| Neutral Condition | Ground Condition | Polarity | International Limit | U.S. Limit |
|---|---|---|---|---|
| Closed neutral | Closed ground | Normal polarity | 100 µA | 300 µA |
| Open neutral | Open ground | Normal polarity | 500 µA | 300 µA |
| Closed neutral | Open ground | Normal polarity | 500 µA | 300 µA |

# Battery Maintenance

If you store the monitor for six months or longer, remove the battery before storage. You should charge the battery if the monitor has been stored for more than 30 days (refer to Battery Management on page 1-14). A fully discharged battery takes approximately eight hours to fully charge.

## Battery Replacement

You must replace the monitor battery every three years, as well as if the battery fails to maintain a charge.

- ***Use only battery pack 010-2178-xx (Spacelabs part number).***

*Rechargeable lithium-ion batteries are widely used in technology today due to their high energy density and efficiency, but they do come with certain risks that require caution.*

- *Risk of overheating and fire: Lithium-ion batteries can overheat and catch fire if they are damaged, improperly charged, or used beyond their use life.*
- *Toxic and flammable gases: When lithium-ion batteries overheat, they can release toxic and flammable gases, which pose a risk of inhalation and combustion.*
- *Expired batteries have a fire hazard associated with them when they are used. Check battery age, replace battery pack every two (2) years.*
- *Replace batteries that no longer hold a charge.*
- *Do not short circuit, crush, or expose the battery to high temperature, incinerate or disassemble the battery.*
- *Do not use any damaged battery.*
- ***Batteries, 2 years old and older, are not to be used and are considered expired.***

**This product contains a rechargeable Li-ion battery that is recyclable. Under various state and local laws, it may be illegal to dispose of this battery into the municipal waste stream. Check with your local authorities for instructions on recycling options in your area.**

*Note:*

***Safety Tips:***

- *Purchase: Only buy batteries listed by a nationally recognized testing laboratory and the manufacturer.*
- *Charging: Use the correct charging equipment and avoid charging at extreme temperatures.*
- *Storage: Store batteries at room temperature, away from direct sunlight and anything that can burn.*
- *Handling: Be careful with batteries to prevent physical damage.*

Required tools:

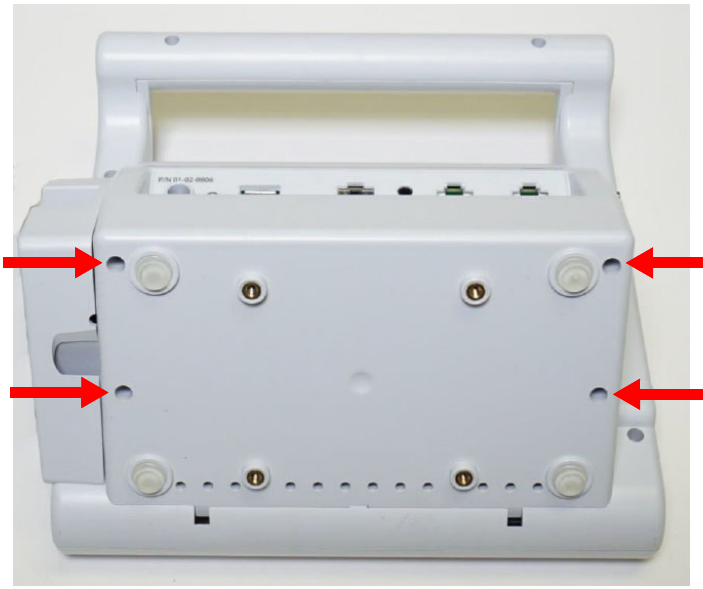
- Phillips screwdriver

## To replace the battery pack

1 Set the monitor down so that the rear panel and battery cover faces upward.

2 Remove the four battery cover screws from the bottom of the monitor (refer to Figure 4-2).

*Figure 4-2: Battery cover screws*



3 Gently pull the battery cover open (refer to Figure 4-3).

*Figure 4-3: Battery cover open*


4 Lift the tab end of the battery pack (opposite the connecter) and gently slide the battery away from the connector (refer to Figure 4-4).

*Note:*

*Do NOT remove the battery connector from the battery cover.*

*Figure 4-4: Battery removed (do not remove connector)*

5 Align the contacts of the new battery pack with the battery connector and gently slide the new battery pack into the battery connector (refer to Figure 4-5).

*Figure 4-5: Battery pack connected*


6 Gently seat the battery pack into the battery cover (refer to Figure 4-3).

7 Close and secure the battery cover to the bottom of the monitor with the four screws (refer to Figure 3).

8 Fully charge the new DM4 battery for eight hours prior to use.

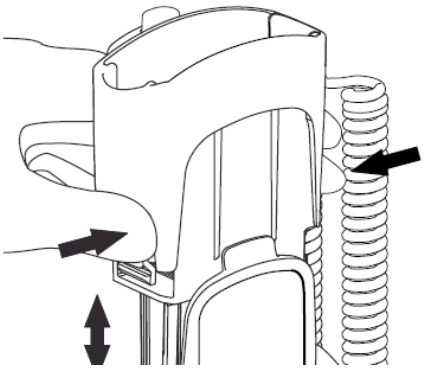
# Replace Isolation Chamber and Temperature Probe

***When you replace the FILAC temperature probe, you should also replace the isolation chamber. Failure to replace the isolation chamber with the temperature probe can result in patient cross-contamination.***

## To replace the isolation chamber

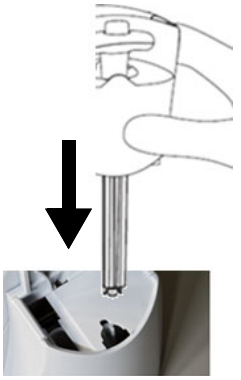
1 Squeeze the lock tabs on the sides of the isolation chamber and lift up the chamber from the temperature module (refer to Figure 4-6).

*Figure 4-6: Remove isolation chamber*



2 Align the well shaft of the new isolation chamber with the well hole on the top of the temperature module and slide the chamber down until the lock tabs “click” in place (refer to Figure 4-7).

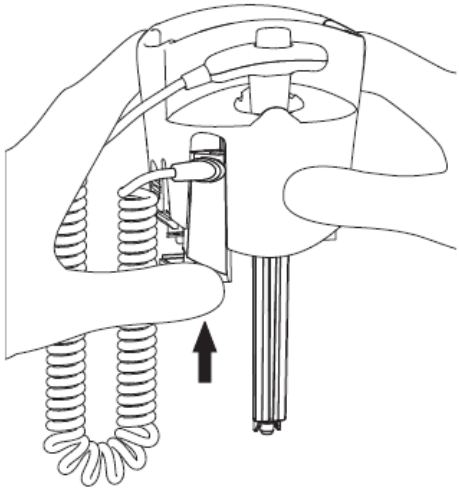
*Figure 4-7: Install isolation chamber*



## To replace the temperature probe

1 Remove the isolation chamber (refer to step 1 of To replace the isolation chamber).
2 Grab the sides of the L-shaped probe cable connector with hand, and pull open the connector latch with the other hand.
3 Slide out the L-shaped cable connector and remove the temperature probe from the isolation chamber.
4 Align the L-shaped cable connector of the new temperature probe with the connector slot on the isolation chamber.
5 Push up the L-shaped connector into the connector slot on the isolation chamber until it is fully seated (refer to Figure 4-8).

*Figure 4-8: Install temperature probe*



# Exergen Temperature

For Exergen Temperature setup, refer to the DM4 Operations Manual (070-2916-01).

- *No modification of this equipment is allowed.*
- *Do not use this thermometer if it is not working properly, if it has been exposed to temperature extremes, damaged, been subject to electrical shocks or immersed in water.*
- *Not suitable for use in the presence of flammable anesthetic mixtures.*
- *Do not take temperature over scar tissue, open sores or abrasions.*
- *If readings are not correct, the instrument should be returned for repair.*
- *The monitor may not meet performance specifications if stored or used outside temperature and humidity ranges. When moving the monitor from a storage location, wait at least one-hour or more prior to use to allow the monitor to adjust to room temperature.*

- Use only Spacelabs approved accessories and sensors to preserve the integrity, accuracy and the electromagnetic compatibility of the monitor.
- Do not open the Monitor to repair it. Contact Spacelabs for service needs. Refer to the copyright (second page) for address and phone number information.
- Use this product only for its intended use as described in this manual.
- The operating environmental temperature range for this product is 60 to 104°F (15.5 to 40°C).
- 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 to 106 kPa).
- The thermometer is not shockproof. Do not drop it or expose it to electrical shocks.
- Do not Autoclave. Please note cleaning and sterilizing procedures in this manual.
- 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
- Never drop or insert any object into any opening, unless stated in this manual.

- If your thermometer is not used regularly, remove the battery to prevent possible damage due to chemical leakage.
- Disposal of used Exergen scanner must be performed in accordance with current medical practices or local regulations regarding disposal of infectious, biological medical waste.
- Follow the battery manufacturer's recommendations or your hospital policy for the disposal of used batteries.
- Switching modes from Adult, Pediatric or Neonate to any other patient mode, shall recall the last stored values for the patient alarm limits.
- Allow the temp scanner to acclimate for at least 30 minutes before using it if it is taken from a cold room into a hot room, or vice versa
- Do not open the Monitor to clean or repair it. Contact Spacelabs for service needs. Refer to the copyright (second page) for address and phone number information.
- Disconnect all accessories from the Monitor before cleaning. Do not immerse any part of the electrical connector of the cable or accessories in the cleaning or disinfection solution at any time. Do not use an abrasive cloth or cleaner on the accessories.
- Do not submerse the Exergen Temp scanner in any cleaning solution.
- If the battery leaks, remove it carefully.
- Do not allow bare skin to touch leaking fluids.
- Properly dispose of used batteries.
- Do not wrap them in metal or aluminum foil. Wrap them in paper before disposing of them, batteries may explode if overheated.

# Cleaning, Disinfecting, and Sterilization

## Cleaning the Monitor, Cables, and Printer

- *Use only recommended cleaning solutions, or you may void the manufacturer's warranty.*
- *Harsh chemical agents degrade plastics and compromise the safety of the device. Some germicidal and other harsh cleaning compounds are known to damage some plastics by weakening the structural integrity and compromising the electrical insulating properties.*
- *Disconnect the equipment from the patient and the electrical supply before cleaning.*
- *Do not allow liquid to enter the interior of the module or monitoring equipment.*
- *Do not immerse the equipment or cables in water or cleaning solutions.*
- *Do not autoclave.*
- *Accelerated Hydrogen Peroxide (AHP) and quaternary ammonia-based products ARE NOT RECOMMENDED for cleaning monitors and cables. These chemicals degrade plastics used in patient monitors and cables, and can cause serious safety hazards as the electrical insulating properties and structural integrity of the equipment break down.*
- *Cavicide, Virex, Virex 256, PDI Sani-Cloth Bleach Plus, Super Sani-Cloth, and Sani-Cloth AF3 are common quaternary ammonia germicidal products. The manufacturers of these solutions advertise that these germicidal products are safe for use on hard, non-porous surfaces, such as linoleum floors, formica countertops, and stainless steel. The manufacturers discourage the use of quaternary ammonia germicidal products on computer-grade plastics and on data, patient, and power cables, which are classified as porous materials.*

- Use caution when cleaning cable connectors so that liquid does not collect around the electrical contacts or seep inside the connector. Trapped liquids and surface residues provide an unintentional electrical path, which may cause noisy signals and false alarms.
- Questions and concerns about cleaning issues should be directed to Spacelabs Healthcare Technical Support.

*Note:*

*For cleaning instructions for an Original Equipment Manufacturer (OEM) device, refer to the user manual for that product.*

For the cables and printer, use only the following recommended cleaning solutions:

- Mild soap and water solution
- U.S. Pharmacopoeia (USP) green soap
- Sodium hypochlorite solution (1:10 dilution of household chlorine bleach in water)
- Phenolic germicidal detergent (1% aqueous solution)
- Glutaraldehyde (2.4%) (Cidex)
- Isopropyl alcohol (70% solution)
- PDI Sani-Cloth Bleach (sodium hypochlorite 0.63%)

For the monitor, use only the following recommended cleaning solutions:

- Mild soap and water solution
- U.S. Pharmacopoeia (USP) green soap
- Sodium hypochlorite solution (1:10 dilution of household chlorine bleach in water)
- Phenolic germicidal detergent (1% aqueous solution)
- Glutaraldehyde (2.4%) (Cidex)
- Isopropyl alcohol (70% solution)
- PDI Sani-Cloth Bleach (sodium hypochlorite 0.63%)
- Diversey Oxivir wipes (benzyl alcohol 1 to 5% and hydrogen peroxide 0.5 to 2%)
- Clorox Healthcare wipes (benzyl alcohol 1 to 5% and hydrogen peroxide 0.5 to 2%)

*Note:*

- *Accelerated Hydrogen Peroxide (AHP) contains hydrogen peroxide and low concentrations of phosphoric acid. AHP is different from cleaners containing hydrogen peroxide mixed with alcohols and specifically NOT recommended for cleaning Spacelabs Healthcare products.*
- *Over time, repeated use of a chlorine bleach solution may cause some colors to fade.*
- *Tape adhesive can be removed with Spacelabs Healthcare adhesive tape remover pads (P/N 392196-001).*

## To clean the monitor, cables, and printer

1. Prepare the cleaning solution according to the manufacturer's instructions.
2. Wet a clean cloth with the selected cleaning solution.
3. Remove excess liquid from the cloth and squeeze dry.
4. Wipe exposed surfaces of the equipment and cables.
5. Remove any soap residue by gently wiping with a clean damp cloth.
6. Wipe dry with a clean dry cloth.

*Note:*

- *Follow your hospital protocol for the handling of blood and body fluids.*
- *Do not allow liquid to enter the display.*

**Make sure to let the alcohol dry before re-assembly. If you do not let the alcohol dry, the monitor may not work correctly.**

# Accessories

- *Use only the manufacturers' approved accessories from Spacelabs Healthcare.*

- Where provided, follow the manufacturers' instructions concerning disposable and reusable supplies.
- As applicable, follow your hospital protocol concerning cleaning, disinfection, and/or sterilization of reusable supplies.
- Follow hospital protocols to dispose of used and contaminated single-use accessories.

## Noninvasive Blood Pressure Cuffs

### TruLink Reusable and Disposable Cuffs

The disposable cuff is packaged non-sterile and cannot be soaked, rinsed, or sterilized.

The reusable cuff is packaged non-sterile. It may be cleaned and disinfected with an enzymatic detergent and 10% solution of household bleach (5.25% sodium hypochlorite).

### Cuff Cleaning and Disinfection Materials

- Enzymatic detergent such as ENZOL (US) or CEDEZYME (UK)
- 10% solution of household bleach (5.25% sodium hypochlorite) in distilled water
- Soft cloths or bristle brushes
- Spray bottles

#### To clean and disinfect reusable cuffs

1. Prepare the enzymatic detergent and bleach solutions in separate bottles according to the manufacturer's instructions.
2. Spray detergent liberally on cuff, allowing it to sit for one minute.
3. Remove detergent with a soft cloth. For persistent contamination, scrub with a soft bristled brush.
4. Rinse the cuff thoroughly with distilled water.
5. Spray bleach solution on the affected area until saturated. Allow the cuff to sit for five minutes.

6 Remove any excess solution with a soft cloth and rinse again with distilled water. Allow two hours for air drying at ambient temperature.

*Note:*

*Make sure water does not enter the hose connector.*

# FILAC Temperature Probe and Isolation Chamber

- **Do not soak or immerse the isolation chamber or temperature probe or its cable in any liquid solution.**
- **Do not try to sterilize the isolation chamber or temperature probe.**
- **Do not use hard or sharp objects to clean the isolation chamber or temperature probe. This could damage the probe and cause the monitor to not function properly.**
- **Do not use steam, heat, or gas sterilization on the isolation chamber or temperature probe.**
- **Do not autoclave the isolation chamber or temperature probe.**
- **Use of abrasive pads may damage the isolation chamber and temperature probe.**
- **Water temperature should not exceed 130º F (55º C).**

*Note:*

- *Before you clean the temperature probe, you must remove it from the monitor. For more information on removal and installation of the temperature probe, refer to the DM4 Operations Manual.*
- *You can add a mild detergent to water.*
- *Use of a cloth or sponge is recommended for cleaning.*
- *Occasional use only of a 10:1 water and hypochlorite mixture or a damp isopropyl alcohol wipe is acceptable.*
- *Thoroughly dry all surfaces before reinstalling the isolation chamber and temperature probe.*

# Troubleshooting

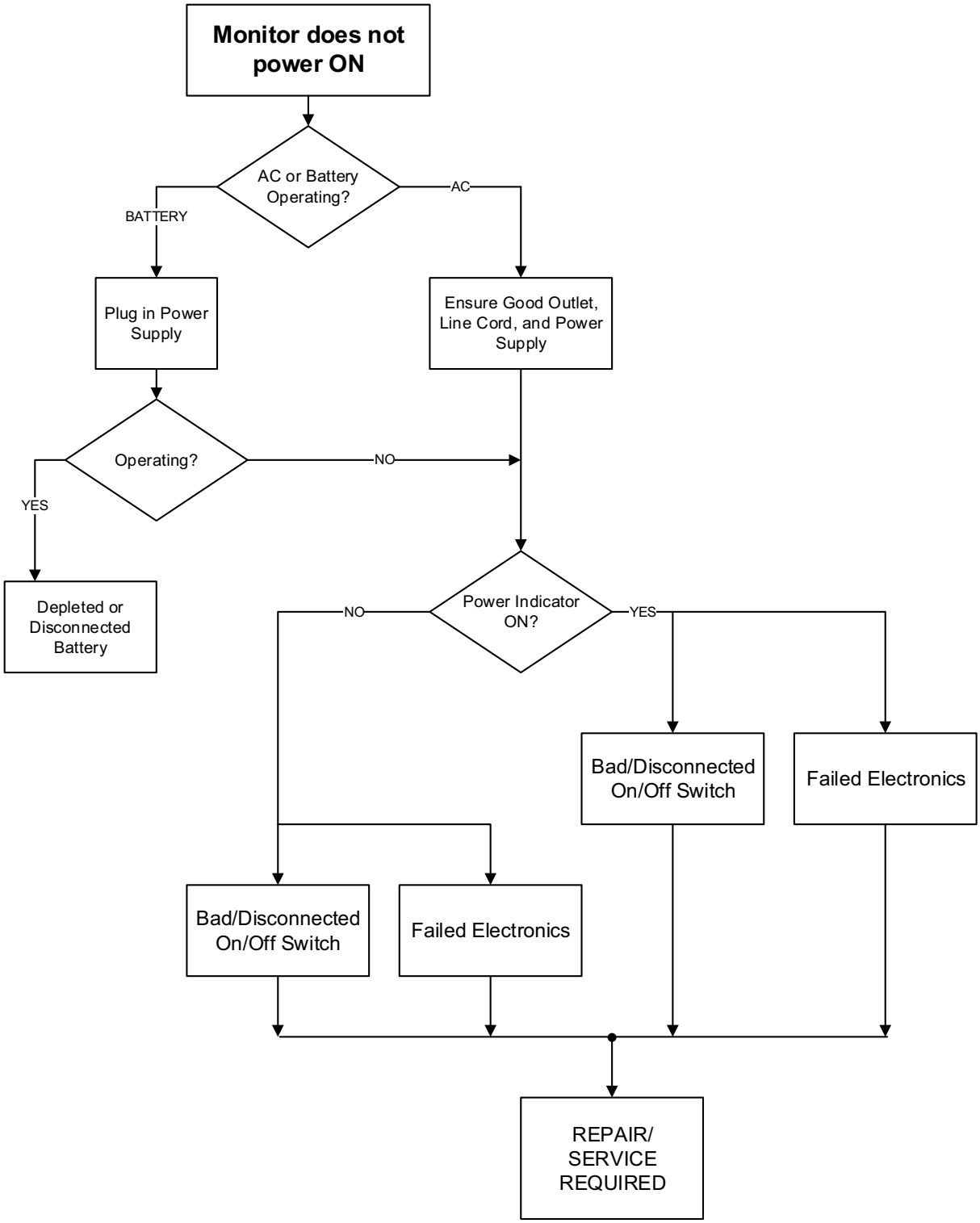
## Troubleshooting Overview

This chapter provides information for resolving basic technical and clinical issues with the DM4 monitor. For a comprehensive list of alarm and technical messages and suggested actions, refer to the *DM4 Operations Manual*.

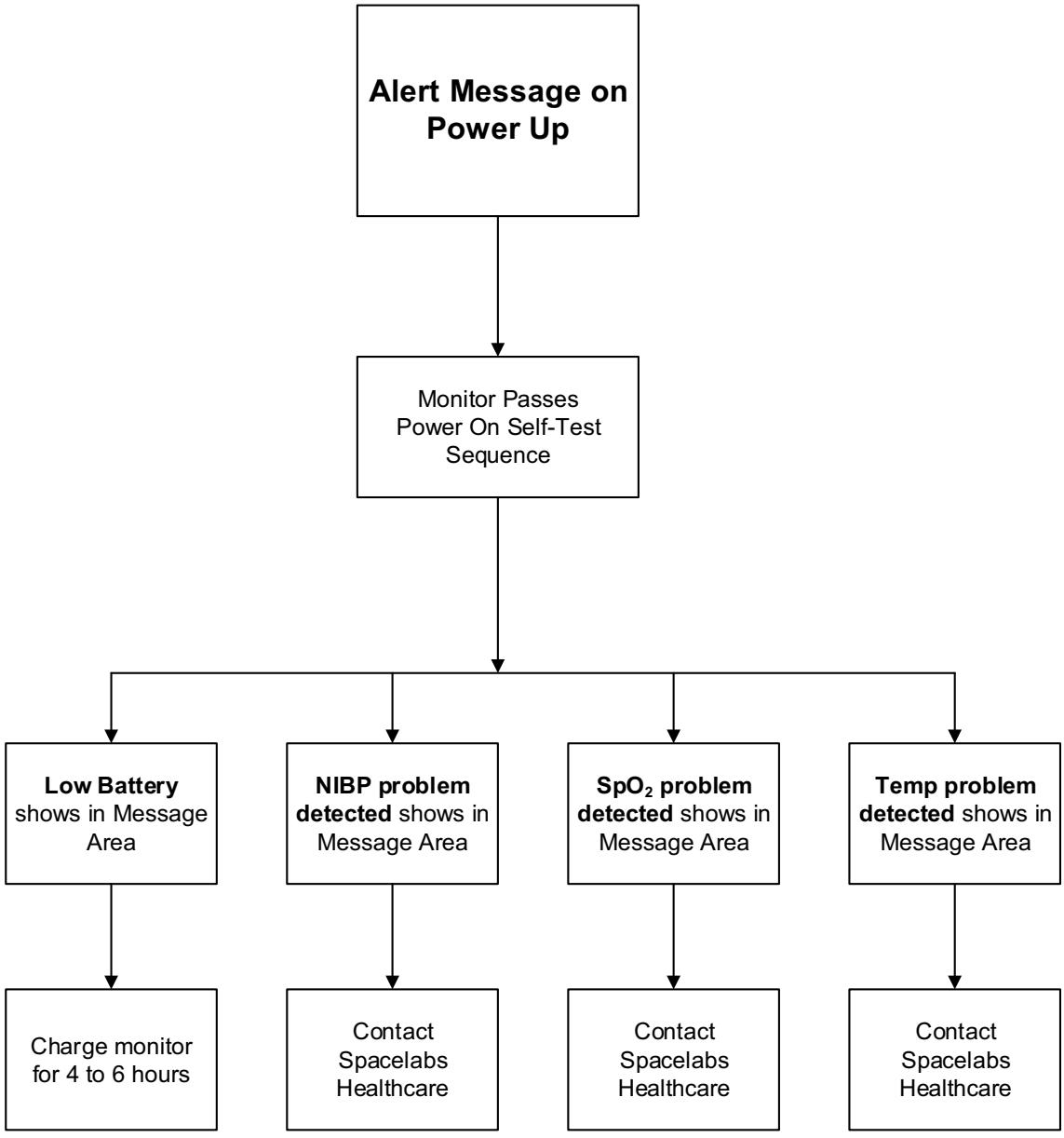
## Troubleshooting Issues

Follow the flowcharts in this section to resolve the issues described.

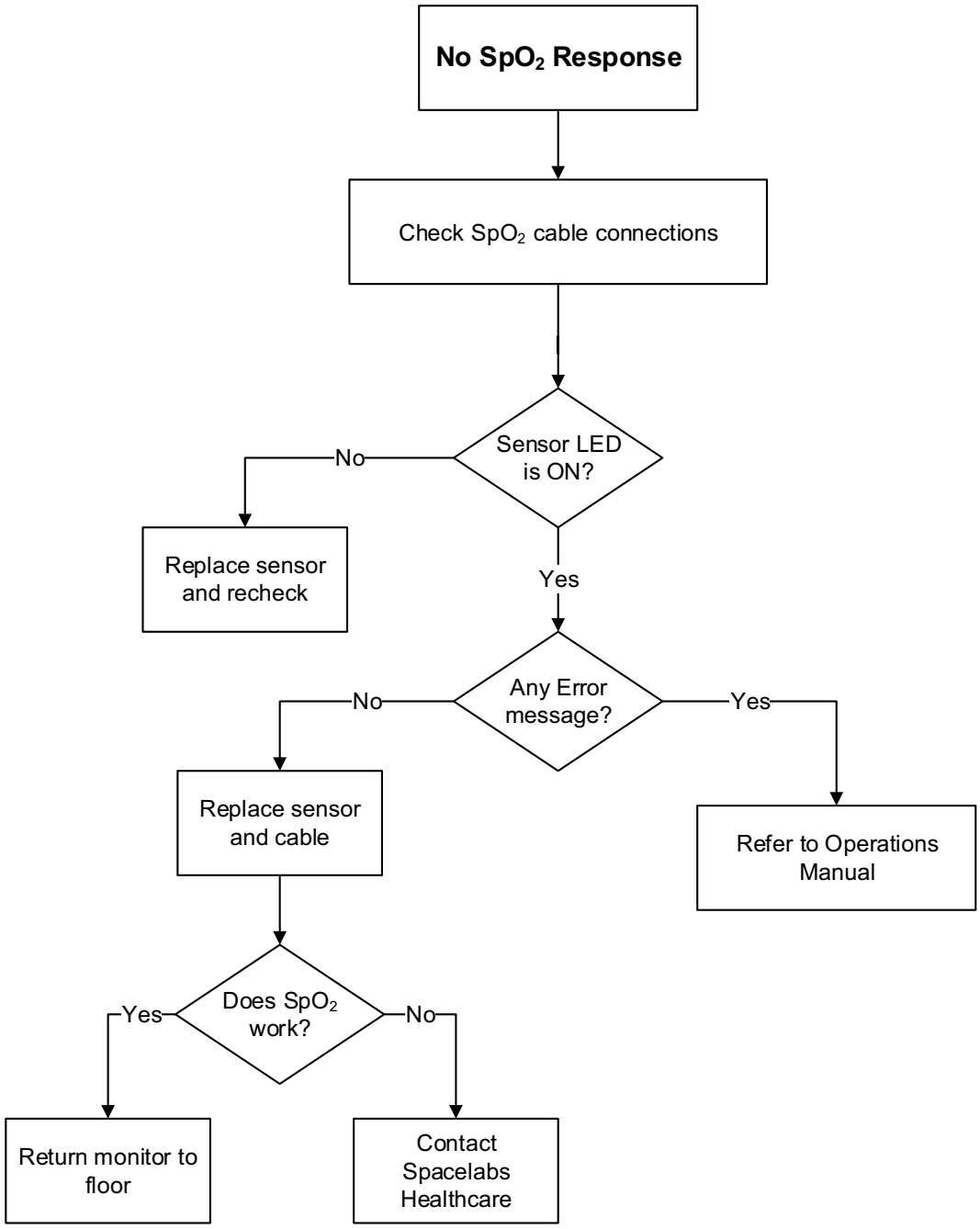
# Monitor Does Not Power ON



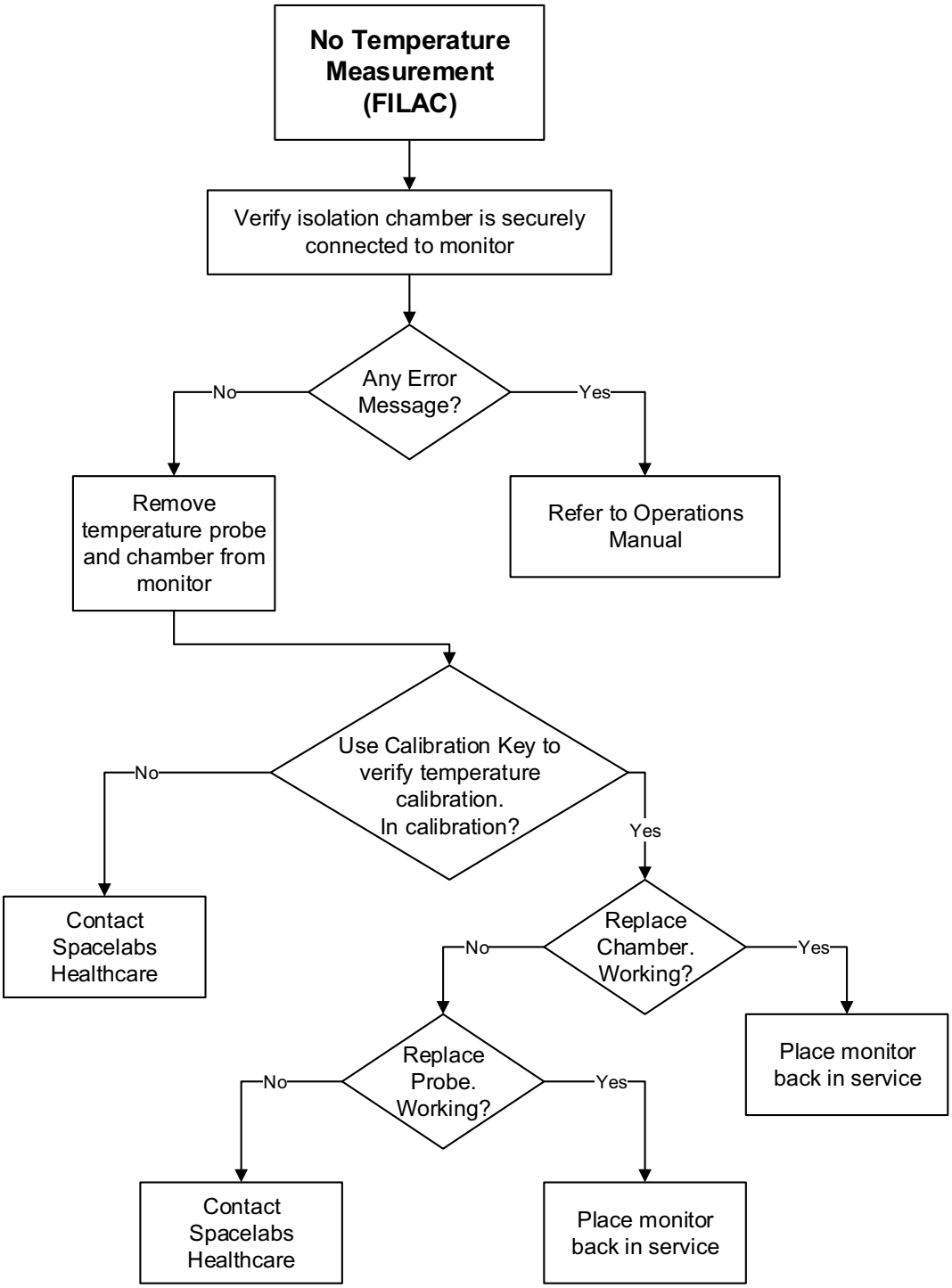
# Alert Message on Power Up



# No SpO2 Response



# No Temperature Measurement (FILAC)



# Parts

## Parts Overview

This chapter provides information for ordering service parts and accessories for the DM4 monitor.

For customers outside of North America only: For a list of internal field-replaceable parts, such as PCBAs, refer to the *DM4 Service Manual Addendum*, P/N 071-1063-xx.

# Parts List

*Table 7-1: Parts List*

| Part Number | Description |
|---|---|
| 010-1852-00 | RECORDER,50MM,EXTERNAL |
| 010-1950-00 | USB,FLASH DRIVE,BLANK,91331 DM4 |
| 010-2157-00 | TEMPORAL ARTERY THERMOMETER |
| 010-2174-00 | FILAC ISOLATION CHAMBER,91331 DM4 |
| 010-2175-00 | FILAC ORAL PROBE,91331 DM4 |
| 010-2176-00 | FILAC PROBE COVERS,91331 DM4 |
| 010-2177-00 | POWER SUPPLY,91331 DM4 |
| 010-2178-00 | RECHARGEABLE LI-ION BATTERY PACK: 10.8V,7800MAH |
| 010-2179-00 | BAR CODE SCANNER,HS-1M,W/14 FOOT USB CABLE,DM4 |
| 010-2180-00 | C-CLAMP FOR IVPOLE MOUNTING OF BAR CODE SCANNER |
| 010-2181-00 | C-CLAMP W/12" FLEX ARM FOR MOUNTING BAR CODE SCA |
| 010-2182-00 | NIBP TEST KIT: ICL. CONNECTOR W/TUBING&MALE LUER |
| 010-2184-00 | CLOSED,NURSE CALL CBL,3.5MM STEREO PLUG,12FT CBL |
| 010-2185-00 | OPEN,NURSE CALL CBL,3.5MM STEREO PLUG,12FT CBL |
| 010-2186-00 | NURSE CALL CBL,3.5MM STEREO PLUG,12FT CBL LENGTH |
| 010-2192-00 | CABLE,SPO2,NELLCOR,OXIMAX,91331 DM4 |
| 010-2193-00 | CABLE,SPO2,MASIMO,91331 DM4 |
| 010-2227-00 | CABLE,SPO2,MASIMO LNCS,91331 DM4 |
| 010-2230-00 | FILAC 3000 CALIBRATION PLUG,91331 DM4 |
| 016-0823-00 | MOUNT,ROLLSTAND |
| 016-0824-00 | ROLLSTAND MOUNT KIT,EXT REC (010-1852-00) |
| 016-0825-02 | ADAPTER PLATE,MOUNTING,91331 DM4 |
| 016-0841-00 | WALL MOUNT ARM, GCX |
| 016-0972-00 | ROLLSTAND MOUNT KIT, POWER SUPPLY HOLSTER |
| 016-0976-00 | WALL MOUNT, POWER SUPPLY HOLSTER, 91331 |
| 019-0553-00 | CABLE, RECORDER |
| 019-0555-00 | PLATTEN ASSY,RECORDER |
| 019-0556-00 | ENCLOSURE,RECORDER |
| 161-0032-00 | PWR CORD,DOM,120V,10A,18AWG,10',HOSP GRADE |
| 161-0035-00 | PWR CRD,BRITISH,DETACHABLE,10A,2.5M |
| 161-0037-00 | PWR CRD,EUROPE,10A,2.5M,HANKED, DETACH |

# Appendix A—Product Specifications

## Physical Specifications

| | |
|---|---|
| Dimensions (H x W x D) (with FILAC temperature option) | 19.4 x 27.9 x 14.6 cm (7.6 x 11.0 x 5.7 in) |
| Weight | 1.9 kg (4.3 lbs) |
| Display | Touchscreen LCD |
| Size | 17.8 cm (7.0 in) diagonal |
| Resolution | 800 x 480 pixels |
| Controls | Power On/Off (front panel)<br>Touchscreen user interface |
| **Indicators** | |
| Alarms | Audible tones, visual on display |
| Alarm levels | Medium, Low |
| Power | External power/battery charging indicator |
| **Connections** | |
| Measurement connections | MAXNIBP<br>Masimo SET or Nellcor OxiMax $SpO_2$<br>RJ45 serial port for $EtCO_2$ device (for future use) |
| USB port | USB port for flash drive, optional bar code reader, and optional Exergen Temporal Artery Thermometer |
| Network | LAN: Ethernet<br>WLAN: 802.11 a/b/g/n (optional) |
| Nurse Call interface | 3.5 mm stereo jack for Nurse Call system (Alarm Out Relay) |
| Printer/communications device interface | RJ45 serial port for optional external printer or communications device |
| Mounting interface | VESA |
| **Recorder (Optional)** | |
| Type | RJ45 serial connection |
| Paper width | 50 mm (2 in) |

# Parameter Specifications

| | |
|---|---|
| **Noninvasive Blood Pressure (NIBP)** | |
| Measurement method | Oscillometric |
| Measurement operation | Automatic interval, STAT, manual, protocol |
| Interval times | User selectable: 1, 2, 3, 4, 5, 10, 15, 30, 60, 90 minutes |
| Measurement read time | <30 seconds, typical |
| Pulse measurement range | Adult: 30 to 240 bpm<br>Pediatric: 30 to 240 bpm<br>Neonate: 40 to 240 bpm |
| Measurement range | |
| Systolic | Adult: 35 to 260 mmHg; Pediatric: 35 to 260 mmHg; Neonate: 35 to 135 mmHg |
| Diastolic | Adult: 15 to 215 mmHg; Pediatric: 15 to 215 mmHg; Neonate: 15 to 105 mmHg |
| Mean | Adult: 20 to 235 mmHg; Pediatric: 20 to 235 mmHg; Neonate: 20 to 115 mmHg |
| Resolution | 1 mmHg |
| Accuracy | ±5 mmHg with a standard deviation no greater than 8 mmHg |
| Initial cuff inflation | Adult: 160 mmHg<br>Pediatric: 120 mmHg<br>Neonate: 80 mmHg |
| Maximum cuff inflation | Adult: 290 mmHg<br>Pediatric: 290 mmHg<br>Neonate: 145 mmHg |
| Connector | MAXNIBP quick connect fitting |
| **Masimo SET Pulse Oximetry ($SpO_2$) Option** | |
| Measurement method | Functional saturation (oxygen saturation of functional hemoglobins) |
| Display parameters | %$SpO_2$, pulse rate |
| Measurement range | $SpO_2$: 1% to 100%<br>Pulse rate: 25 to 240 bpm |
| Resolution | $SpO_2$: 1%<br>Pulse rate: 1 bpm |
| Numeric update rate | Every 1 second |
| Pulse accuracy | No motion: ±3%<br>Motion: ±5%<br>Low perfusion: ±3% |

| | |
|---|---|
| **$SpO_2$ accuracy (70% to 100%) of Masimo sensors** | |
| LNCS DC-I, LNCS DC-IP, LNCS TF-I, LNCS Adtx, LNCS Pdtx, LNCS Inf | No motion: ±2%<br>Low perfusion: ±2% |
| LNCS TC-I | No motion: ±3.5%<br>Low perfusion: ±3.5% |
| LNCS Neo | No motion: <3 kg ±3%, >40 kg ±2%<br>Low perfusion: <3 kg ±3%, >40 kg ±2% |
| RD SET Adt, RD SET Pdt, RD SET Inf, RD SET DCI, RD SET DCI-P | No motion: ±2%<br>Low perfusion: ±2% |
| RD SET TC-I | No motion: ±3.5%<br>Low perfusion: ±3.5% |
| RD SET Neo | No motion: <3 kg ±3%, >40 kg ±2%<br>Low perfusion: <3 kg ±3%, >40 kg ±2% |
| RD SET NeoPt | No motion: ±3%<br>Low perfusion: ±3% |
| **Nellcor OxiMax Pulse Oximetry ($SpO_2$) Option** | |
| Measurement method | Functional saturation (oxygen saturation of functional hemoglobins) |
| Display parameters | %$SpO_2$, pulse rate |
| Measurement range | $SpO_2$: 1% to 100%<br>Pulse rate: 20 to 240 bpm |
| Resolution | $SpO_2$: 1%<br>Pulse rate: 1 bpm |
| Numeric update rate | Every 1 second |
| **$SpO_2$ accuracy (70% to 100%) of Nellcor sensors** | |
| DS-100A, OXI-P/I | ±3% |
| D-YS (Neonate), OXI-A/N | ±4% |
| Neonatal accuracy | When sensors are used on neonatal subjects as recommended, the specified accuracy range is increased by ±1 digit as compared to adult usage, to account for the theoretical effect on oximeter measurements of fetal hemoglobin in neonatal blood. For example, MAX-N accuracy on neonates is ±3 digits, rather than ±2 digits. |
| **FILAC 3000 Temperature Option** | |
| Measurement range | 30° to 43° C |
| Accuracy | ±0.1° C (35.5° to 42° C); ±0.2° C (<35.5° or >42° C) |

| | |
|---|---|
| Operating mode | Predictive monitoring |
| Measurement time | Standard mode: 6 to 10 seconds, oral; 10 to 15 seconds, axillary<br>Quick mode: 3 to 4 seconds, oral; 10 to 15 seconds, axillary<br>Cold mode: 12 to 15 seconds, oral; 15 to 20 seconds, axillary |

**Exergen Temperature Option**

For product specifications of the Exergen Temporal Artery Thermometer, model TAT-5000S-USB-GN, refer to the documentation for that product.

## Electrical Specifications

**Power Supply**

| | |
|---|---|
| Power source | Internal battery or external AC power supply, P/N 010-2177-00 |
| AC input | 100 to 240 VAC, 50 to 60 HZ, 1.2 to 0.5 A |
| Safety classification | Class II |

**Battery**

| | |
|---|---|
| Type | Rechargeable lithium-ion, P/N 010-2178-00 |
| Voltage | 10.8 V |
| Battery operation | Approximately 12 hours |
| Charge time | Approximately 8 hours (fully depleted battery) |

## Environmental Specifications

| | |
|---|---|
| Ambient temperature | Operating: 0° to 40° C (32° to 104° F)<br>Storage and transport: -20° to 60° C (-4° to 140° F) |
| Relative humidity | Operating: 15 to 90% (non-condensing)<br>Storage and transport: 15 to 95% (non-condensing) |
| Altitude | Operating: 0 to 4,572 meters (0 to 15,000 feet)<br>Storage and transport: 0 to 12,192 meters (0 to 40,000 feet) |
| Water ingress | IPX1 |

## Ordering Information

**Configurations**

| | |
|---|---|
| 91331-M | NIBP, Masimo pulse oximetry, Exergen Temporal Artery Thermometer or no temperature |
| 91331-N | NIBP, Nellcor pulse oximetry, Exergen Temporal Artery Thermometer or no temperature |
| 91331-MF | NIBP, Masimo pulse oximetry, FILAC 3000 predictive temperature |
| 91331-NF | NIBP, Nellcor pulse oximetry, FILAC 3000 predictive temperature |
| 91331-MW | NIBP, Masimo pulse oximetry, Exergen Temporal Artery Thermometer or no temperature, WiFi |

| | |
|---|---|
| 91331-NW | NIBP, Nellcor pulse oximetry, Exergen Temporal Artery Thermometer or no temperature, WiFi |
| 91331-MFW | NIBP, Masimo pulse oximetry, FILAC 3000 predictive temperature, WiFi |
| 91331-NFW | NIBP, Nellcor pulse oximetry, FILAC 3000 predictive temperature, WiFi |
| Accessories | Exergen Temporal Artery Thermometer (P/N 010-2157-00)<br>External printer (P/N 010-1852-00)<br>Bar code scanner (P/N 010-2179-00)<br>Roll stand (P/N 016-0823-00)<br>Nurse call cable (P/N 010-2184-00, 010-2185-00, or 010-2186-00)<br><br>For further ordering information and details on compatible accessories, please contact your Spacelabs Healthcare representative or refer to the product documentation.<br>This product may not be approved for market release in all countries. |

## Documentation

This product ships with a complete set of comprehensive documentation.

For a full list of available supplies and accessories, refer to the *Spacelabs Healthcare Supplies and Accessories Catalog* at https://www.spacelabshealthcare.com/supplies.

# Appendix C — Symbols

This appendix lists the symbols that apply to the Spacelabs Healthcare product or products described in this manual.

*Table B-1: Symbols used on DM4 (91331), accessories, and packaging*

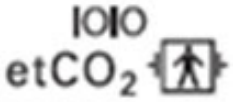
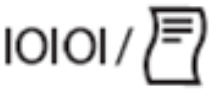
| Symbol | Description |
|---|---|
| MD | Medical Device |
|  | Follow Instructions For Use |
|  | eIFU Indicator |
|  www.spacelabshealthcare.com | eIFU (electronic Instructions for Use) indicator |
| **Rx Only** | Rx Only - Federal law restricts this device to sale by or on the order of a physician. |
|  | Caution—Potential damage to equipment (consult accompanying documents) |
|  | Universal Serial Bus (USB) |
|  | Serial data port |
|  | $EtCO_2$ device interface (for future use) |
|  | External printer interface |
|  | Power ON/OFF button |

*Table B-1: Symbols used on DM4 (91331), accessories, and packaging*

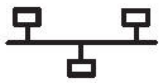
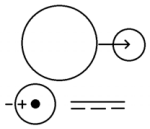
| Symbol | Description |
|---|---|
|  | Network connection |
|  | DC power input – connection for external power supply (P/N 01-02-0806) |
|  | Nurse Call Jack |
|  | Battery charging indicator<br>Replace only with the appropriate battery. |
|  | NRTL certified for electrical safety for Canada and the US by Intertek Testing Services; DM4 Product Listing Number: 2003191 |
|  | Radio transmitting device; elevated levels of non-ionizing radiation |
| REF | Catalog Number or Order Number |
| SN | Serial Number |
| # | Model number |
| UDI | Unique device identifier |
| EC REP | EC Representative |
| LOT | LOT |
| QTY | Quantity |

*Table B-1: Symbols used on DM4 (91331), accessories, and packaging*

| Symbol | Description |
|---|---|
|  | Date of manufacture |
|  | Manufacturer |
|  | This side up |
|  | Keep dry |
|  | Fragile, handle with care |
|  | Humidity limitation |
|  | Atmospheric pressure limitation |
|  | Filac isolation chamber - provides holding well for the Filac temperature probe and box of probe covers. |
|  | IEC 60601-1 Type BF equipment which is defibrillator-proof. The unit displaying this symbol is an F-type isolated (floating) patient-applied part which contains an adequate degree of protection against electric shock, and is defibrillator-proof. |
| **IPX1** | Ingress protection—Protected against vertical falling liquids |
|  | Masimo SET compatible |
|  | NIBP hose connector - MAXNIBP single tube, beyonet fitting |
|  | Nellcor OxiMax compatible |
|  | Temperature limitation |

*Table B-1: Symbols used on DM4 (91331), accessories, and packaging*

| Symbol | Description |
|---|---|
|  | No LATEX, ISO 15223 with warning |
|  | CE mark |
|  | Power supply meets EISA 2007, CEC Efficiency Level V |
|  | UL-recognized component |
|  | Indoor, dry location use only |
|  | This symbol indicates that the waste of electrical and electronic equipment must not be disposed as unsorted municipal waste and must be collected separately. Please contact an authorized representative of the manufacturer for information concerning the decommissioning of your equipment. |
|  | Symbol Set, Adult/Pediatric Cuff Sizes |
|  | Symbol Set, Neonatal Cuff Sizes |
|  | NIBP Cuff, Neonatal 1 |
|  | NIBP Cuff, Neonatal 2 |
|  | NIBP Cuff, Neonatal 3 |
|  | NIBP Cuff, Neonatal 4 |
|  | NIBP Cuff, Neonatal 5 |