ST-1200 & ST-1400

Pressure Relief Systems

Operating Instructions

Tridien Medical

Revision: AO-SM-ST-00

WARNING

Before operating this medical equipment, it is important to read this manual and to understand the operating instructions and safety precautions. Failure to do this could result in patient injury and/or damage to the product.

This equipment generates uses and radiates radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to other devices in the vicinity (See **Section 7.5**). 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.
- Connect the equipment into an outlet on a circuit different from that to which other device(s) are connected.
- Consult with Tridien for help.

If you have any questions, please contact Tridien Medical Customer Service at **800-474-4225** or **954-340-0500**.

Medical Electrical Equipment needs special precautions regarding Electromagnetic Compatibility (EMC) and needs to be installed and put into service according to the EMC information provided in this manual.

Portable and mobile RF communications equipment can affect Medical Electrical Equipment. The use of accessories, transducers, and cables other than those specified, with the exception of transducers and cables sold by the manufacturer of this device as replacement parts for internal components, may result in increased emissions or decreased immunity of the *ST SYSTEMS*.

The *ST SYSTEMS* should not be used adjacent to or stacked with other equipment. However, if adjacent or stacked use is necessary, the *ST SYSTEMS* should be monitored to verify the product is operating as intended in whichever configuration it is being used.

TABLE OF CONTENTS

REFERENCE FOR FIGURES:

1.0 SAFETY PRECAUTIONS

 **CAUTION!** The ST-1200 & 1400 Systems ("*ST SYSTEMS*") are contraindicated for use with certain medical conditions and treatments. **Always consult with the patient's physician before placing a patient on an alternating pressure system.**

 **CAUTION!** Bed frames used with the *ST SYSTEMS* can vary greatly depending on the specific health care setting, e.g., hospitals, nursing homes, home care. Therefore, it is the responsibility of the caregiver to take the necessary precautions to ensure the safety of the patient. This includes, but is not limited to, the appropriate use of side rails to prevent falls and/or patient entrapment.

Electronic Controller:

 **DANGER!**

- Do not use in the presence of flammable anesthetics. **Risk of explosion can result.**
- Exposure of the electronic controller to any liquid while it is plugged in could result in a severe electrical hazard.
- Only use fuses that have the same specified rating (See **Section 7.0 Product Specifications**). Using fuses with higher ratings could result in damage and/or injury.

 **CAUTION!**

- Risk of Electric Shock. Do not open or attempt to repair or service the electronic controller. Repairs and service should only be done by Tridien Medical. If the controller is not functioning properly, or has been damaged, unplug the unit and take it out of service immediately. Contact Customer Service at **800-474-4225** or **954-340-0500** for repair and service information.
- The electronic controller is a precision electronic product. Use care when handling or transporting. Dropping, or other sudden impacts, may result in damage to the controller.

 **CAUTION!** PE GND terminal in the appliance is only for functional earth. The unit is a Class II device with functional earth and used only for functional purposes.

IMPORTANT!

- Do not return a product for any reason without first contacting Customer Service to obtain authorization (See **Section 9.0**).
- Do not place any objects/items, such as blankets, on, or over, the electronic controller. Excessive weight placed on the *ST SYSTEM MATTRESS, i.e., greater than 500 pounds /226 kilograms* could result in damage to the electronic controller or mattress (See **Section 7.1**).
- After exposure to extreme high or low temperatures, allow electronic controller to reach room temperature before operating.
- The *ST SYSTEMS* circulate room air during operation. Exposure to smoke may cause the system to fail. Therefore, smoking by patients, or visitors, while using the *ST SYSTEMS* is strongly discouraged.
- The power cord to the electronic controller should be positioned to avoid a tripping hazard and/or damage to the cord. Tridien recommends placing the cord under the bed frame and plugging it into an electrical outlet by the head of the bed.

2.0 PRODUCT OVERVIEW

The *ST SYSTEMS* are microcontroller-based therapeutic Pressure Relief Mattress Systems for patient weights up to 500 pounds/226 kilograms.

The Alternating Pressure feature provides pressure relief by sequentially deflating and inflating alternate air cells on a timed interval. It is widely recognized that constant pressure to a bony prominence is the leading cause of skin breakdown. The movement of the air cells helps to alleviate these areas of constant pressure and enhances circulation.

The ST Mattress is equipped with side bolsters.

- ST-1200 – Integrated only
- ST-1400 – Integrated and Raised

The Low Air Loss (LAL) feature is available on all ST Systems; it delivers a flow of air to the patient to aid in maintaining a temperature environment that enhances pressure wound therapy.

- ST-1200 directs the flow through the mattress
- ST-1400 uses Micro-vent™ Technology to direct the flow through the cover to the patient's skin.

The electronic controller provides a real-time display of the air pressure for both the inflated and deflated air cells. The deflated air cells provide pressure relief, while the inflated air cells support the patient's weight. The amount of pressure needed to support a patient can be set automatically, based on the patient's weight, or can be set manually through custom configurations in Advanced Settings.

All settings are stored in memory. If the power is interrupted, the controller returns to the previous settings when the power returns, with the exception of the Alarm Mute and keypad Lock functions.

IMPORTANT! The ST-1200 & 1400 are all part of the same product line. However, due to specific design functions, the components are **not interchangeable**. Doing so may cause loss of functionality and/or unwanted alarm conditions. To aid in differentiating between the two models, each cover, mattress and controller has a label indicating the model. The zipper on the mattress and cover is also color coded. The ST-1400 zipper is blue and the ST-1200 is black.

3.0 INSTALLATION

NOTE - It is recommended that all shipping and packing material be saved in the event that the product has to be sent back to Tridien.

3.1 Unpacking and Inspection

Carefully remove the controller, mattress and all accessories from the shipping cartons. Inspect all items for any damage that may have occurred during shipping. Any damages, or missing components, should be reported to Tridien Customer Service as soon as possible.

Mattress Replacement – The box contains a completely assembled mattress replacement system. The mattress consists of:

- 1.5 Inch Foam Overlay
- Air Cell Assembly
- Top Coverlet
- CPR Hose Assembly
- LAL Hose
- Integrated Bolsters
- Raised Bolsters (ST-1400 Only)

Electronic Controller - The electronic controller is in a separate box containing:

- Electronic controller
- Power cord
- Operating Instructions

3.2 Installation

ST SYSTEMS are designed to operate in a controlled environment, which is free from extreme temperatures, high humidity and/or excessive amounts of airborne particulates, such as dust and smoke.

3.2.1 Mattress Replacement:

1. Remove the current mattress from the bed frame.
2. Unroll the ST Mattress Replacement on the frame.
3. Position mattress and hoses so that the:
   - CPR hose assembly is to the LEFT of the controller
   - LAL hose is to the LEFT of the controller
4. There are two sets of straps with D-rings on each side of the mattress and one at the head of the mattress. Use these straps to secure the mattress replacement to the bed frame.

    **Caution!** Make sure that the attachment of the mattress does not interfere with the bed movement or operation. This could result in damage to the mattress.

5. Attach CPR pull to the ST controller (See **Section 4.5**)

3.2.2 Electronic Controller:

1. Hang the controller on the TOP edge of the footboard on the bed frame.
2. Attach the hose/CPR assembly to the LEFT side of the controller (See **Section 4.5**).
3. Attach the LAL hose to the single connector on the LEFT side of the controller.
4. Plug into a grounded 115 Vac 60 Hz electrical outlet. Controller will come on automatically and “beep” to alert caregiver that it is *active*.
5. To begin operation, press the POWER ON/OFF button (See **Section 4.2**)
6. Press Max button for rapid inflation of entire mattress.
7. Always place patient in center of mattress.
   NOTE - In the event of a power outage or turning the pump off, it will always come back on in the mode which was last selected.
8. Once full, you can begin patient setup.
9. During initial inflation, the integrated bolsters will fill first, followed by the alternating cells.

4.0 OPERATION

4.1 Control Panel

The ST-1400 control panel is shown in the diagram below. The control panels for the ST-1200 & ST-1400 controller are the same except as noted below:

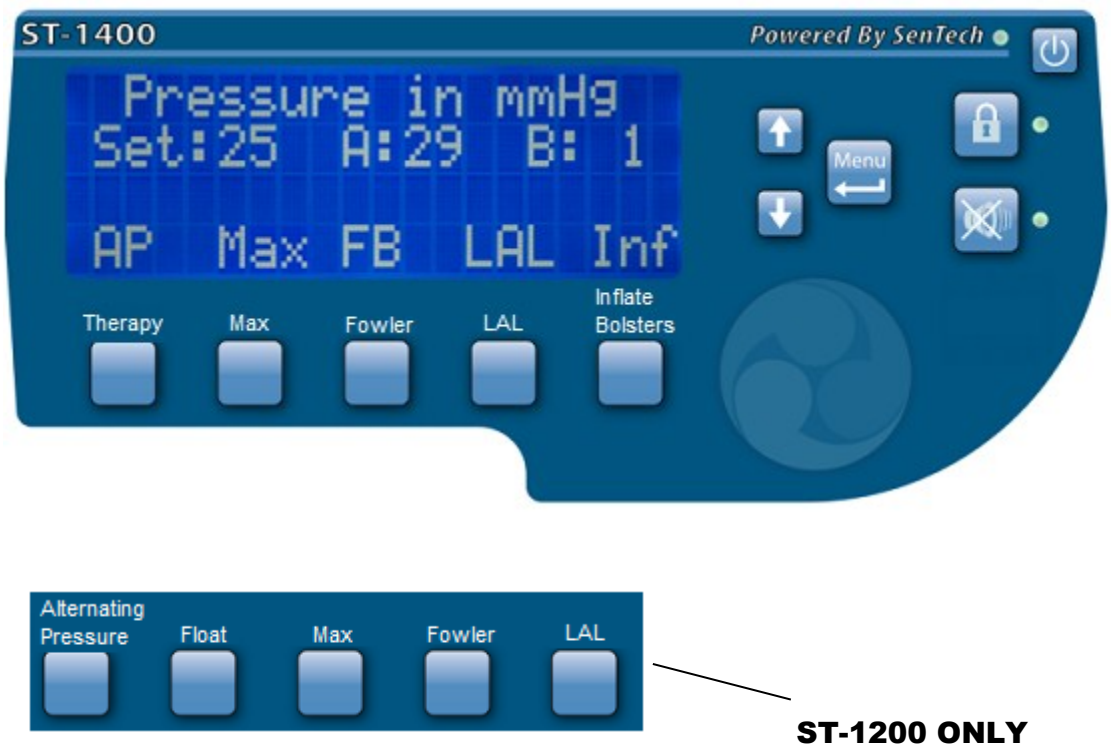

Figure 1: Control Panels

4.2 Key Functions

The keypad has three (3) types of touch keys:

1. **Function Keys:**
   - ST-1400: Therapy, Max, Fowler, LAL and Inflate Bolsters
   - ST-1200: Alternating Pressure, Float, Max, Fowler & LAL
2. **Settings Keys:**
   - Menu, Up and Down Keys
3. **Feature Keys:**
   - Power ON/OFF, Lock, Alarm Mute

POWER ON/OFF (All ST SYSTEMS)

When the power cord is first inserted in the AC socket on the back cover, the unit goes into Standby Mode and a green LED will blink every 3 seconds until the **POWER ON/OFF** button is pressed.

Press the **POWER ON/OFF** button to start system operation. The Main Screen shown in **Figure 2** will appear. However, the pressure reading will vary from the figure below.

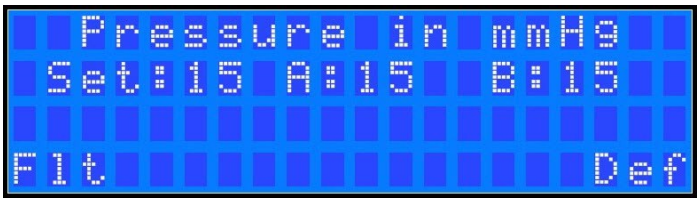

Figure 2: Main Screen

The second line shows three fields:

- The set pressure for Zones A and B
- The real-time pressure in Zone A
- The real-time pressure in Zone B.

Set pressure may be increased or decreased by pressing the Up or Down keys, respectively.

MAXIMUM INFLATE (All ST SYSTEMS)

This key activates or deactivates the **MAXIMUM INFLATE** mode. When activated, the screen displays Max and all mattress cells are inflated to 50 mmHg to provide a firm, flat surface. This mode will last for approximately 20 minutes, unless turned off by pressing the MAX key again. The system will then revert back to the previously set operating mode.

The mattress MAX pressure value is not adjustable.

LOW AIR LOSS (All ST SYSTEMS)

This key activates or deactivates the **LAL** feature. When activated, **LAL** is shown on the display and a gentle diffused flow of air is delivered through the **LAL** coverlet (ST-1400), or the mattress (ST-1200). The air will begin to flow only after the mattress has reached the set pressure, either after initial installation or in any mode such as AP, Float, or MAX. The air flow will also be temporarily interrupted while the raised bolster is inflating.

THERAPY (ST-1400 System)

This key selects the **ALTERNATING PRESSURE RELIEF (AP)** or **AIR FLOTATION (FIt)** mode. The screen display toggles between **FIt** and **AP**.

NOTE! The ST-1200 has separate keys for these two therapies.

FOWLER BOOST (All ST Systems)

This key activates or deactivates the **FOWLER BOOST (FB)** mode. When activated, **FB** is shown on the display and the set pressure in the mattress is automatically increased by a set percentage. It is not available when the system is in Maximum Inflate mode. The percentage of increase may be modified by going to ADVANCED SETTINGS.

This feature helps prevent a patient from “bottoming out” when he or she is put into an inclined or “Fowler” position.

INFLATE BOLSTERS (ST-1400 System)

This key inflates or deflates only the raised side bolsters. When activated, **Inf** is shown on the display and the bolsters will take approximately (1) minute to inflate.

Inflating these bolsters increases bolster height on the sides of the mattress. Integrated bolsters and raised bolsters are inflated to 60 mmHg. This value is not adjustable.

4.3 Additional Functions

LOCK KEYPAD (All ST SYSTEMS)

This key locks all keys, including the Power ON/OFF key. Press and hold for 2 seconds to activate. The corresponding blue LED is lit. Press and hold for 2 seconds to unlock. In the event of a power outage or being unplugged, the Lock function will deactivate and must be reset when power is restored.

ALARM FUNCTION

The ST System is equipped with an audible alarm to alert the user that the actual pressure in the air cells is below or above the set pressure. An error message will also appear on the display instructing the user to “Check Air Cells”. This will happen in approximately 10 minutes. The alarm and error message will continue until the problem is resolved, unless in AP mode. See **NOTE** below.

NOTE: In AP mode, once the problem is resolved, it takes two cycles for the alarm to stop. The unit may also be turned off for 10 seconds and turned back on to reset the alarm more quickly.

Refer to Troubleshooting guide for further instructions.
See Section 6.0

AUDIBLE ALARM MUTE (All ST SYSTEMS)

This key mutes the AUDIBLE ALARM. When the ALARM MUTE key is pressed, the AUDIBLE ALARM cannot be heard, but an error message continues to flash on the display and a solid blue LED activates. If the alarm condition is not resolved within 15 minutes the audible alarm will re-activate. In the event of a power interruption, the Alarm Mute function will deactivate. (See Troubleshooting Guide in **Section 6.0**).

4.4 Settings and System Information *(All ST SYSTEMS)*

MENU

Press this key to enter the **MAIN MENU** options screen. Once in the Main Menu, use the **ARROW** keys to select the desired option and then press the MENU key a second time to save the selected option.

ARROWS

ARROW keys moves the selection arrow up or down one row at a time and are also used to increase/decrease numerical values.

4.4.1 Menu Configuration Map

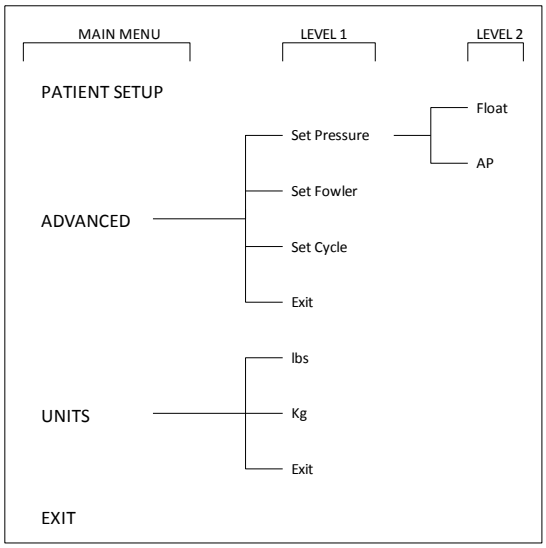

Figure 3: Menu Configuration Map

4.4.2 Main Menu

While the unit is showing the Main Screen (**Figure 2**) pressing the Enter/Menu key shows the Main Menu screen (See **Figure 4**).

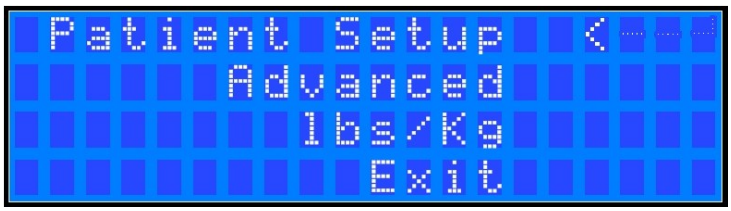

Figure 4: Main Menu Screen

1. **Patient Setup**

   This option is used to set the patient's weight. The Controller automatically adjusts the pressure values for Float and Alternating Pressure modes based on the patient's weight. Resetting the patient's weight at any time will override any user changes to AP and/or Float Pressures entered directly on the main screen or through the Advanced Settings. However, Fowler Boost and Cycle Time do not reset. They must be adjusted manually. By default, Fowler Boost is 20% and Cycle time is 6 minutes.

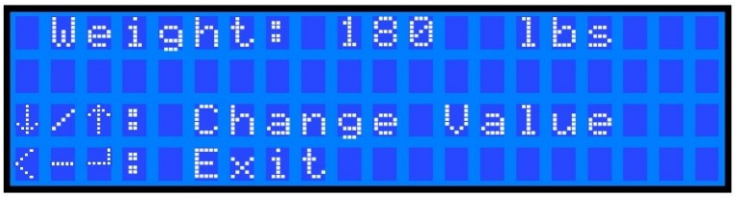

Figure 5: Patient's Weight

Use the Up and Down arrows to set the patient's weight. When done, press the Enter/Menu key to save and return to the main screen.

2. **Advanced settings**

   This option is used to customize settings such as Mattress Pressures, percentage of Fowler Boost increase and AP Cycle time. From the Main Menu screen (**Figure 4**) select Advanced. The Advanced Menu will appear. (**Figure 6**)

SET PRESSURE

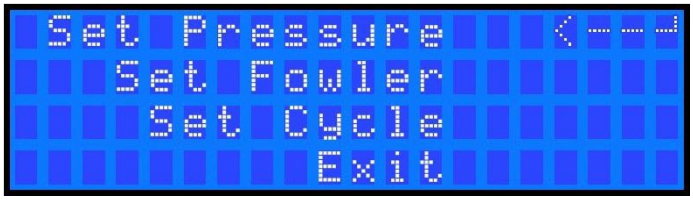

Figure 6: Advance Settings Menu

Use the Up and Down arrow keys to select the desired feature. Press the Enter/Menu key to select "Set Pressure" in order to adjust Float and AP pressures.

SET FLOAT

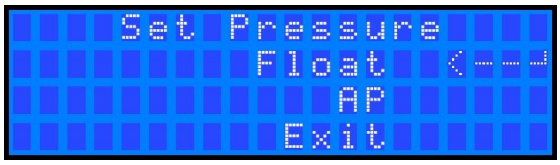

Figure 7: Set Pressure Menu

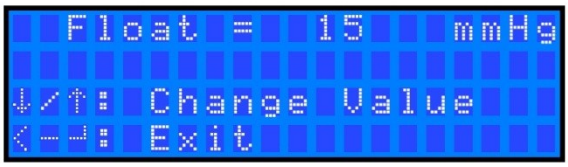

Figure 8: Float Pressure Adjustment

Use the Up and Down arrow keys to select Float. Press the Enter/Menu key. Once Float is selected, (**Figure 8**), use the Up and Down arrow keys to set the desired float pressure. When done, press the Enter/Menu key to save and return to the Main Screen.

SET AP

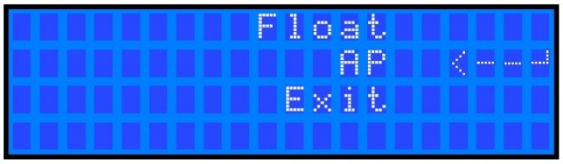

Figure 9: Set Pressure Menu

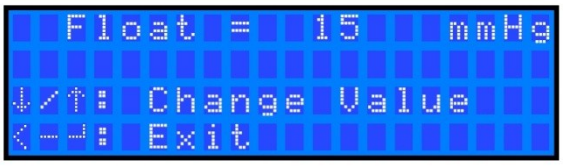

Figure 10: AP Pressure Adjustment

Use the Up and Down arrow keys to select AP. Press the Enter/Menu key. Once AP is selected, (**Figure 10**), use the Up and Down arrow keys to set the desired AP pressure. When done, press the Enter/Menu key to save and return to the Main Screen.

SET FOWLER

Use the Up and Down arrow keys to select Set Fowler. Press the Enter/Menu key.

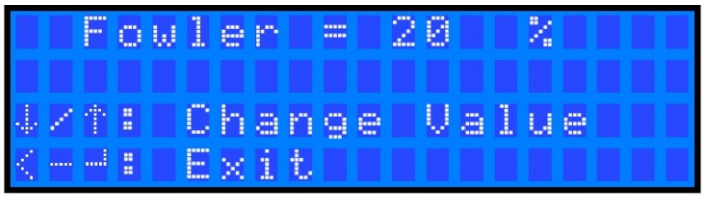

Figure 11: Fowler Boost Adjustment

Use the Up and Down Arrow keys to set the desired Fowler Boost percentage increase. When done, press the Enter/Menu key to save and return to the Main Screen.

SET CYCLE

Use the Up and Down arrow keys to select Set Cycle. Press the Enter/Menu key. The default cycle time is 6 minutes.

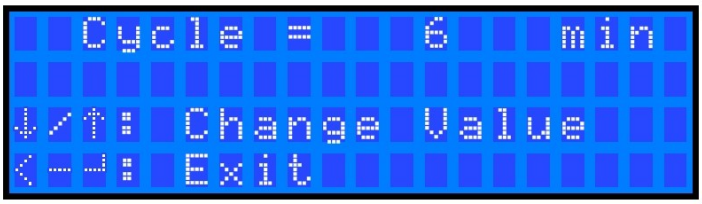

Figure 12: AP Cycle Time Adjustment

Use the Up and Down arrow keys to set the desired Cycle time. When done, press the Enter/Menu key to save and return to the Main Screen.

SET WEIGHT UNITS (Pounds/Kilograms)

From the main menu screen use the Up and Down arrow keys to select **Lbs/Kg**. Press the Enter/Menu key. Choose either English units (**Lbs = Pounds)**, or SI units (**Kg = Kilograms**) by using the up and down arrow keys.

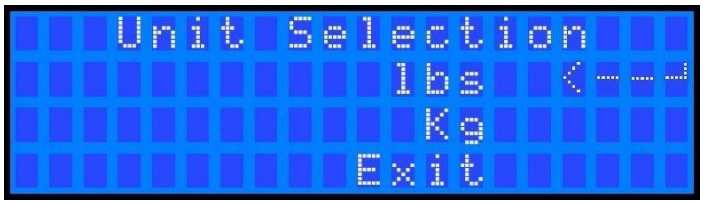

Figure 13: Selection of Weight Units

Press the Enter/Menu key to save and return to the Main Screen.

EXIT

Select this option to make no changes and return to the Main Screen.

4.5 CPR OPERATION

The CPR pull provides the caregiver with the ability to rapidly deflate the support surface in emergency situations.

4.5.1 **Figure 14A** shows the location of the CPR assembly on the left lower side of the controller during normal operation.

4.5.2 **Connecting the CPR**

IMPORTANT! The CPR pull is designed to attach to the controller with a specific orientation. Make sure you align the CPR pull key with the CPR receptacle on the controller and that the CPR label is visible from the front:

1. ALWAYS align the CPR "key" with the key on CPR receptacle.
2. Completely insert the CPR pull until a "click" is heard. (**See Figures 14A, 14B, 14C)**.

4.5.3 To release the CPR pull, place your thumb and opposing finger on the release tabs located on the TOP and BOTTOM of the CPR pull and completely depress both tabs simultaneously as shown in **Figure 14B**.

4.5.4 With both tabs depressed, pull the CPR pull away from the controller to deflate the mattress. The rate of deflation is dependent on the weight of the patient. (See **Figure 14C**).

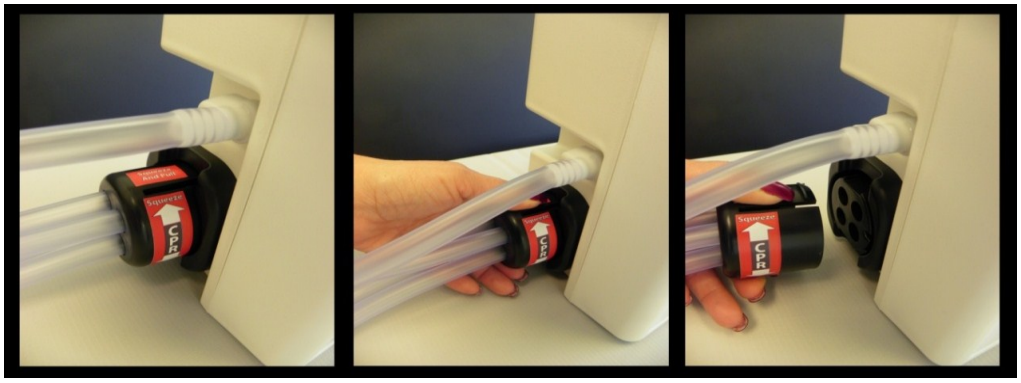

Figure 14A **Figure 14B** **Figure 14C**

4.5.5 CPR Hose Replacement/Repair

Follow the steps below for proper CPR hose replacement:

NOTE: The CPR hoses are color coded for ease of replacement. It is very important to reconnect the hoses in the proper location for the ST SYSTEM to function correctly.

1. Remove the CPR pull from the controller according to Step 4.5.3-4.5.4 above.
2. Hold the CPR in one hand and pull the hose needing replacement until the white connector and hose separate and come loose from the CPR. Retain connector to re-use in **Step 7**.
3. Remove the other end of the hose from the connector inside the mattress.
4. Remove tubing wrap and discard unwanted hose.

5. Obtain a new hose of the same length and apply appropriate color code label to one end of the hose (See **Figure 15A**). Labels and hoses can be purchased through Tridien.

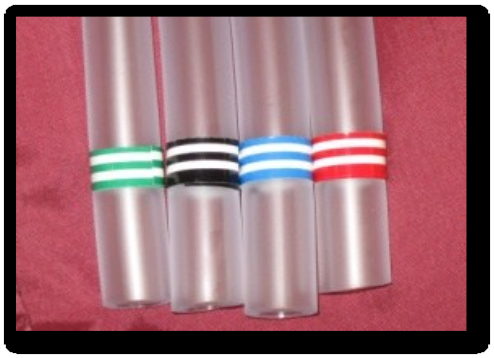

Figure 15A: Color-Coding of CPR Hoses

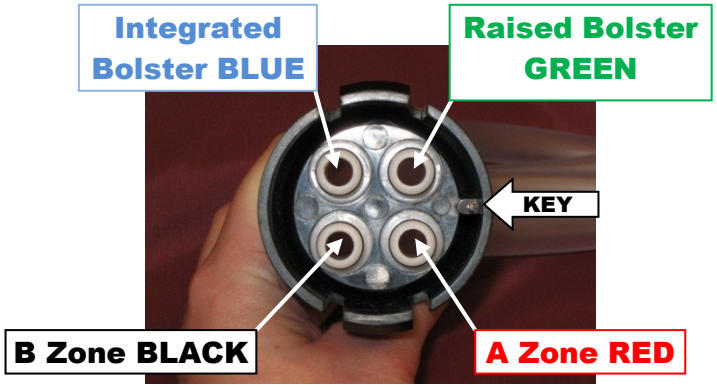

Figure 15B: Color-Coded Attachment Guide for CPR Assembly

IMPORTANT! Always maintain color coding convention when changing CPR hoses.

6. Connect hose to the appropriate color coded connector inside mattress.

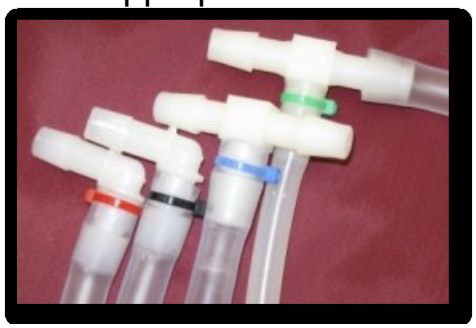

Figure 16: Color-Coding of CPR Hoses Inside Mattress

7. Feed opposite end of the hose through the CPR and completely insert connector that was removed during **Step 2**, leaving a slight gap approximately equal to 1/10''.
8. Holding the CPR in one hand, pull the hose slowly until the connector is fully inserted. Stop pulling when connector flange is flush with the plug base.

NOTE! CPR will not attach to the controller properly if connector is not flush. Do not push connector while trying to insert.

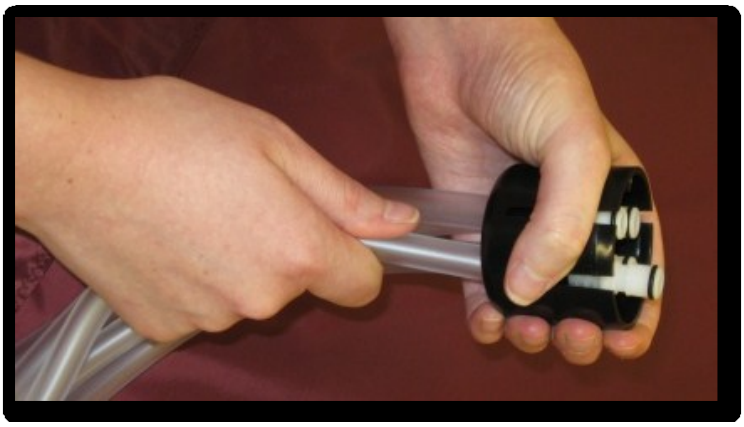

Figure 17: Replacement of CPR Hose

9. Repeat steps 2-8 if multiple hoses need replacement.
10. Re-apply tubing wrap.

5.0 MAINTENANCE AND CLEANING

IMPORTANT! All disinfection should be done using a “hospital-grade” disinfectant registered with the Environmental Protection Agency (EPA) and in accordance with the manufacturer’s specified instructions. Check manufacturer’s instructions before use.

5.1 Electrical Controller

The electronic controller is easy to maintain:

5.1.1 Fuse Replacement

CAUTION! Only use *UL/ETL-Approved* fuses that have the same rating as specified (See **Section 7.0**). Using fuses with higher ratings may result in damage and/or injury:

1. Remove the power cord from the electrical socket on the back of the controller.
2. Using the tip of your finger or a small sized flat-head screwdriver, push the small tab on the fuse drawer and slide it out of the socket.
3. Remove the “blown” fuse from the fuse holder receptacle and discard.
4. Insert the replacement fuse in the same fuse receptacle.
5. Push the fuse holder completely back into the electrical socket until it “snaps” into place.
6. Replace power cord and turn on the controller.

5.1.2 The exterior of the controller and CPR assembly should be periodically wiped down with a cloth dampened with disinfectant.

 **CAUTION!** DO NOT spray disinfectant directly on the electrical controller, or immerse the controller in any type of liquid. This could result in a severe electrical hazard.

5.1.3 Before plugging in the controller, check the power cord for electrical hazards, e.g., cuts, exposed wires, worn insulation, etc. If hazards are present, take the controller out of operation immediately and contact Tridien Customer Service at **800-474-4225** or **954-340-0500.**

5.1.4 To ensure optimal performance, calibration and Bio-Med testing of your ST System*,* should be performed at least annually. Contact Tridien Customer Service for calibration and Bio-Med information. Tridien will provide one free Bio-Med test.

5.1.5 The filter on the bottom of the controller should be checked periodically and cleaned as needed. A standard vacuum hose with a brush attachment should be used to clean the filter.

5.2 Coverlet

5.2.1 Washing and Disinfecting

If there are visible signs of body fluids and/or substances present, coverlets should be washed between patients. Coverlets can be machine-washed using chlorine bleach (50-150ppm) or an intermediate level disinfectant, such as ProTech[1]. Bleach and disinfectant should be used according to the manufacturer's instructions. To determine the amount of bleach or disinfectant to use, determine the amount of water in the washer and then follow the manufacturer's dilution instructions. Soak the coverlet in the disinfectant or bleach during the wash cycle. Rinse thoroughly in clean water and dry before use.

NOTE! 2.5 ounces of bleach per 10 gallons of water is approximately 100ppm of available chlorine.

CAUTION! Heat will severely damage the material. DO NOT dry the coverlet using the "*heat*" cycle. Air dry, or use a "*non-heat*" dry cycle, e.g., air fluff.

[1] *ProTech*® is a tuberculocidal disinfectant cleaner and a registered trademark of Central Solutions, Inc.

5.2.2 Washing Alternative

If there are no visible signs of body fluids and/or substances present, the coverlet can be sanitized between patients. To sanitize the coverlet:

1. Apply chlorine bleach, or an intermediate level disinfectant at the appropriate dilution (See **Section 5.2.1**) to the upper surface of the coverlet. Bleach/disinfectant may be applied either by spraying or by hand application.
2. Ensure surface is completely covered with the bleach/disinfectant.
3. Allow bleach/disinfectant to remain in contact with the surface according to the manufacturer's instructions.
4. Remove bleach/disinfectant and rinse.
5. Allow to air dry before use.

5.3 Outside Shell

Wipe down with disinfectant, ensuring that all surfaces come in contact with the disinfectant. Rinse off with a clean damp cloth and allow to air dry. Inspect straps and fasteners for signs of wear and tear and replace if needed.

5.4 Air Cell Assembly

 **CAUTION!** DO NOT machine wash or dry the air cells.

The air cell assembly does not routinely need to be cleaned or disinfected between patients. If cleaning/disinfection is required, follow instructions in **Section 5.2.2** above. All air cells, including the bolsters are fully accessible and easily replaced.

5.5 Foam Overlay

The foam mattress is fully enclosed in a urethane cover and should not require cleaning. However, if it does become “visibly” soiled, it may be wiped down with disinfectant, ensuring that all surfaces come in contact with the disinfectant. Wipe off with a clean damp cloth and allow to air dry.

 **CAUTION!** DO NOT machine wash or dry the Foam Overlay.

5.6 CPR

The exterior of the CPR can be periodically wiped using a cloth dampened with disinfectant. The CPR sleeve can be machine washed but must be re-attached to protect CPR and Hose Assembly. It will also ensure that in the event the CPR pull is released it will not fall to the floor and become a trip hazard in an emergency situation.

5.7 Spare Parts

A spare parts list can be found on page 25 or at Tridien.com. **NOTE!** You must be certified by Tridien to perform most controller repairs. Contact Customer Service for more information.

6.0 TROUBLESHOOTING GUIDE

6.1 Pressure Relief System

Problem	Cause	Solution
1. Alarm is on	The air cell alarm is activated any time the actual pressure in the air cells does not reach the programmed set pressure in approximately 10 minutes. The alarm will activate if the actual pressure is beyond the tolerance of 2mmHg greater or lower than the set pressure. Low pressure is usually an indication of an air leak in the system. High pressure is usually an indication of a kinked hose.	a) It can be muted temporarily by pressing the Alarm Mute button but, the condition must be resolved before it will turn off permanently. b) Check the CPR connections (**See Section 4.5**); make sure all male fittings have o-rings in place and are not worn/cut and all CPR fittings are set properly inside the CPR assembly (See **Section 4.5**). c) Check that all hoses are properly connected according to the corresponding color-coding on the controller & are not kinked or cut. d) Check all hoses for cuts, holes or kinks along the inside of the mattress. Each hose should also be tightly connected to their respective connector or air cell. e) Check each air cell for cuts or holes to ensure there are no leaks. (It will be easier to detect a possible leak if you place the system in the MAX INFLATE mode). f) Once the leak or kink has been resolved, the alarm will automatically turn off. To reset the system more quickly, turn the power off and then on again to reset.
2. The controller is clicking excessively	Hose may be kinked	Starting at the CPR, check all hoses inside and outside of the mattress for kinks.
3. Patient is sinking or "bottoming out"	The pressures may be set too low for the patient's weight.	a) Verify weight setting in **Patient Setup**. See **Section 4.4.2**. Adjust if set weight is not accurate to the patient's actual weight. b) Increase bed pressure by pressing the FOWLER button on the control panel. The amount of this increase can be modified in Advanced Settings and 3-5mmHg is usually sufficient. However, wait at least 10 minutes between adjustments to review patient support condition in order to prevent excessive pressure. c) Use the UP arrow key on the control panel to make small incremental changes in pressure. However, wait at least 10 minutes between adjustments to review patient support condition in order to prevent excessive pressure.

6.0 TROUBLESHOOTING GUIDE (CONTINUED)

6.1 Pressure Relief System

Problem	Cause	Solution
4. Air is not constantly flowing into the Low Air Loss Coverlet or inside the mattress	The internal pump gives priority to the air cells in the mattress. Once the air cells are inflated to the set pressure, air will then be directed to the coverlet or mattress.	Allow air cells to reach set pressure.
5. Display readings appear scrambled	Power surges can cause the controller to temporarily malfunction.	Disconnect power cord for 10 seconds, then on again to reset. If unsuccessful, call Tridien Customer Service **at 800-474-4225**.
6. Every other air cell is deflated	Controller is in AP mode	This is the normal function while in this mode.
7. Power loss	Facility power outage, blown fuse, or possible internal damage.	Our unique design will close each valve, preventing air loss for a short period of time. a) See **Section 5.1.1** Fuse Replacement b) Call Tridien at **800-474-4225**.
8. Patient is uncomfortable or mattress feels lumpy	Excess or insufficient pressure.	a) Make sure controller is plugged in and turned on, i.e.: LED is on and solid green. b) Verify weight setting in **Patient Setup**. See **Section 4.4.2**. Adjust if set weight is not accurate to the patient's actual weight. c) Activate Fowler mode on Control Panel **(See Section 4.2 or 4.2.2 & Figure 11)** d) Incline head of the bed frame slightly.
9. Controller is inoperable	May be caused by a power surge substantial enough to overload the internal circuitry. May be caused by other internal damage/failure.	a) Check fuse on power cord socket by opening the fuse compartment on side of controller. b) See **Section 5.1.1** Fuse Replacement c) Call Tridien at 800-474-4225.
10. CPR hoses become disconnected from exterior CPR block	Excessive force applied to hose connections.	Reconnect in correct orientation. **See Section 4.5.**

7.0 PRODUCT SPECIFICATIONS

7.1 Electronic Controller

Electrical Specifications:

Input Voltage AC	115V
Input Frequency	60 Hz
Current	1.75A
Consumption	<60W
Circuit Protection	Double Fused, 250V, 3.15A
Mode of Operation	Continuous
Protection Against Electric Shock	Class II, Type BF applied part 

Performance Specifications:

Zones	2 for Alternating Pressure
Max Flow	25 ~ 40lpm
Max Inflate Pressure	50 ± 2mmHg
Max Inflate Timer	20 minutes
Float Mode Pressure	15 - 30 ± 2 mmHg
Integrated and Extended Side Bolsters	60 ± 2 mmHg
Support Surface Inflation Time	5~10 minutes
Alternate Pressure Cycle Range	4 –15 minutes
Patient Weight Range	50-350 pounds (28-158 kilograms)

Mechanical Specifications:

Dimensions, L x W x H	5.5 x 9.4 x10.5 inches
Weight	10.5 lbs
Power Cord	13’ (396 cm) Long 16~18 AWG Hospital Grade
Connection	¼” flow quick couplings
Packaging	1 Piece per Box
Air Filter	1.5 x 1.5 in Polyester Filtering Felt

Environmental Specifications:

Operating Conditions:	
Ambient Temperature	40 °F to 104 °F 10 °C to 40 °C
Relative Humidity	30% to 75% Non-Condensing
Atmospheric Pressure	700 hPa to 1060 hPa
Storage and Shipping Conditions:	
Ambient Temperature	-40 °F to 158 °F 40 °C to 70 °C
Relative Humidity	10% ≥ 100%
Atmospheric Pressure	500 hPa to 1060 hPa
Liquid Ingress Protection	IPX0

7.2 Support Surface Specifications (Continued):

Height (Inches)	6.5
Length (Inches)	80
Width (Inches):	36
Weight (Pounds)	30

7.3 Safety Agency Approvals:

- ETL Listed to standard for safety of Medical Electrical Equipment
- Conforms to UL 60601-1, First Edition with respect to Electrical Shock, Fire and Mechanical Hazards
- Certified to *CAN/CSA* STD C22.2 No. 601.1

7.4 Parts and Accessories

DESCRIPTION	ST MODEL	PART NUMBER
Support Surface Controller	1200	12-SM-00
	1400	14-SM-00
Support Surface	1200	44-SM0003
	1400	44-SM0002
Coverlet	1200	44A-0004
	1400	44A-0003
Shell	1200	44A-0005
	1400	44A-0023
Raised Bolster, Patient Left	1400	44A-0011
Raised Bolster, Patient Right		44A-0010
CPR Assembly	1200	44A-0025
	1400	44A-0024
CPR – Pull	All	DP-P10604
CPR – Connector	All	CQ-MB4
CPR – Hoses	All	CH-V3
CPR – Color Code Labels	All	GTMC-14
CPR Hose Sleeve	All	44A-0022
Snaps	All	HF-9
Main Air Cell	All	44A-0009
Integrated Bolster, Head, Patient Left	All	44A-0012
Integrated Bolster, Head, Patient Right		44A-0013
Integrated Bolster, Foot, Patient Left		44A-0014
Integrated Bolster, Foot, Patient Right		44A-0015
LAL Hose Fitting	All	CQ-FB2
Power Cord	All	EH-CO1
AC Inlet Fuse (2)	All	ES-F-3

7.5 Product Compliance Declarations

7.5.1 Guidance and Manufacturer's Declaration – Electromagnetic Emissions

Guidance and Manufacturer's Declaration – Electromagnetic Emissions		
The ST System is intended for use in the electromagnetic environment specified below. The customer or the user of the ST System should assure that it is used in such an environment.		
Emissions test	**Compliance**	**Electromagnetic environment – guidance**
RF emissions CISPR 11	Group 1	The ST System uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR 11	Class A	The ST System is suitable for use in all establishments other than domestic and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions IEC 61000-3-2	Not Applicable	
Voltage fluctuations / flicker emissions IEC 61000-3-3	Not Applicable	

7.5.2 Guidance and Manufacturer's Declaration – Electromagnetic Immunity

Guidance and Manufacturer's Declaration – Electromagnetic Immunity			
The ST System is intended for use in the electromagnetic environment specified below. The customer or the user of the ST System should assure that it is used in such an environment.			
Immunity test	**IEC 60601 test level**	**Compliance level**	**Electromagnetic environment – guidance**
Electrostatic discharge (ESD) IEC 61000-4-2	±6 kV contact ±8 kV air	±6 kV contact ±8 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30 %.
Electrical fast transient/burst IEC 61000-4-4	±2 kV for power supply lines ±1 kV for input/output lines	±2 kV for power supply lines Not Applicable	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	±1 kV line(s) to line(s) ±2 kV line(s) to earth	±1 kV line(s) to line(s) ±2 kV line(s) to earth	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	<5 % *UT* (>95 % dip in *UT*) for 0,5 cycle 40 % *UT* (60 % dip in *UT*) for 5 cycles 70 % *UT* (30 % dip in *UT*) for 25 cycles <5 % *UT* (>95 % dip in *UT*) for 5 sec	<5 % *UT* (>95 % dip in *UT*) for 0,5 cycle 40 % *UT* (60 % dip in *UT*) for 5 cycles 70 % *UT* (30 % dip in *UT*) for 25 cycles <5 % *UT* (>95 % dip in *UT*) for 5 sec	Mains power quality should be that of a typical commercial or hospital environment. If the user of the ST System requires continued operation during power mains interruptions, it is recommended that the ST-1200/1400 be powered from an uninterruptible power supply or a battery.
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	3 A / m	3 A / m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.
NOTE: *UT* is the a.c. mains voltage prior to application of the test level.			

7.5.3 Guidance and Manufacturer's Declaration – Electromagnetic Immunity - Non Life Supporting

<table>
<tr><th colspan="4">Guidance and Manufacturer's Declaration – Electromagnetic Immunity</th></tr>
<tr><td colspan="4">The ST System is intended for use in the electromagnetic environment specified below. The customer or the user of the ST System should assure that it is used in such an environment.</td></tr>
<tr><th>Immunity test</th><th>IEC 60601 test level</th><th>Compliance level</th><th>Electromagnetic environment – guidance</th></tr>
<tr><td>Conducted RF
IEC 61000-4-6

Radiated RF
IEC 61000-4-3</td><td>3 Vrms
150 kHz to 80 MHz

3 V/m
80 MHz to 2,5 GHz</td><td>3 Vrms

3 V/m</td><td>Portable and mobile RF communications equipment should be used no closer to any part of the ST System, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter.
Recommended separation distance
$d = 1.2\sqrt{P}$
$d = 1.2\sqrt{P}$ 80 MHz to 800 MHz
$d = 2.3\sqrt{P}$ 800 MHz to 2,5 GHz
Where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in metres (m).
Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey, [a] should be less than the compliance level in each frequency range. [b]
Interference may occur in the vicinity of equipment marked with the following symbol:
  </td></tr>
<tr><td colspan="4">NOTE 1: At 80 MHz and 800 MHz, the higher frequency range applies.
NOTE 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.</td></tr>
<tr><td colspan="4">[a] Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the ST System is used exceeds the applicable RF compliance level above, the ST System should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocating the ST System.
[b] Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.</td></tr>
</table>

7.5.4 Recommended Separation Distances

Recommended Separation Distances
Between Portable And Mobile RF Communications Equipment And The ST-1200/1400

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

Rated maximum output power of transmitter W	**Separation distance according to frequency of transmitter** M		
	150 kHz to 80 MHz	**80 MHz to 800 MHz**	**800 MHz to 2,5 GHz**
	$d = 1.2\sqrt{P}$	$d = 1.2\sqrt{P}$	$d = 2.3\sqrt{P}$
0,01	0.12	0.12	0.23
0,1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

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

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

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

8.0 WARRANTY INFORMATION

LIMITED WARRANTY

Tridien Medical ("Tridien") warrants each of its products to perform in accordance with established specifications for the following time periods, starting from date the product was shipped from the Tridien facility.

Stage IV & Millennium Systems
Compressor Pump: 3 Years
Electronic Controller: 2 Years
Soft Goods: 1 Year

ST-1200/1400, Primary Care, Sentry & Air Chair Systems
Compressor Pump: 2 Years
Electronic Controller: 1 Year
Soft Goods: 1 Year
Battery: 6 Months
Recliner Chair: 2 Years

During the warranty period, Tridien will (at Tridien's discretion) repair or replace at no charge any products that are not performing in accordance with established specifications, unless the problem/failure is due to customer damage, negligence and/or misuse or unauthorized repairs. Items not covered under warranty include, but are not limited to: stains, punctures, cuts, damages to electrical cords, rips or tears, dents and/or lost/missing parts.

All products returned for warranty repairs must be assigned a return authorization number, prior to return. Returns should include information describing the problem and/or requested repair and be sent to Tridien by prepaid transportation. Tridien will return the repaired/replaced product at no charge. Warranty repairs do not extend the length of the warranty period. During the warranty period, Tridien will provide one Bio-Med test at no charge, excluding shipping/handling. If sending unit in solely for the free Bio-Med test, please state this when calling.

Neither Tridien, its officers, directors, employees nor its agents shall be liable for consequential or other damages, including but not limited to personal injury, loss, or any other expense, directly or indirectly arising from the use of its products. The sole remedy for breach of the limited warranty granted herein shall be repair or replacement of the Tridien products.

All product specifications are subject to change without notice.

9.0 PRODUCT RETURN

The *ST SYSTEMS* have been designed to provide you with years of trouble-free service. However, in the event that the product needs to be returned for any reason, such as calibration or repair, the following return procedure must be followed. Failure to follow this procedure may result in unnecessary delays.

Return Procedure

Before returning a product to Tridien:

1. Contact Customer Service at 800-474-4225 or 954-340-0500 and obtain a **Return Material Authorization (RMA)** number.
2. Package the product in its “approved” packaging.
3. Reference RMA number on the shipping container and shipping documents.
4. Ship product to the attention of Customer Service at the following address:

Tridien Medical

4200 NW 120th Avenue

Coral Springs, FL 33065

Attention: Customer Service / RMA < # >

Notes

Notes

Notes

Tridien Medical
4200 NW 120th Avenue
Coral Springs, FL 33065

Phone: 954-340-0500
FAX: 954-340-0511
Web Site: tridien.com