

# **LUMEX<sup>®</sup>**

## AltaDyne<sup>®</sup> 750000

### **ALTERNATING PRESSURE / LOW AIR LOSS MATTRESS SYSTEM**



## **USER MANUAL**

**Important: Do not operate the Mattress System without first reading and understanding this manual! Save this manual for future use.**

**Info: The most current version of this manual can be found online at [www.grahamfield.com](http://www.grahamfield.com).**

750000-INS-LAB-RevE14

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# INTRODUCTION

Use this manual for set-up and operation of the Lumex AltaDyne 750000 Alternating Pressure / Low Air Loss Mattress System. Read all instructions before using the mattress system. Save this manual for future reference.

## **INTENDED USE OF THIS DEVICE**

The intended use of the Lumex AltaDyne 750000 Alternating Pressure / Low Air Loss Mattress System is:

- The treatment of pressure ulcers while optimizing user comfort.
- Pain management as prescribed by a physician.
- As described above, in either a homecare or long term care setting.

## **Contraindication**

**⚠ WARNING: DO NOT use this product in the presence of flammable anesthesia. There is a possible fire hazard when this product is used with certain oxygen delivery equipment.**

**Use nasal cannula, face mask, or 1/2 length oxygen tent to deliver oxygen in the presence of this product. DO NOT use a full length oxygen tent that extends past the top surface of the mattress with this product.**

# IMPORTANT SAFETY PRECAUTIONS

The safety statements presented in this chapter refer to the basic safety information that should be observed by those using the Alternating Pressure / Low Air Loss Mattress System. There are additional safety statements in other chapters or sections, which may be the same as or similar to the following, or specific to the operations.

- ⚠ **DANGER:** Indicates an imminent hazard situation that, if not avoided, will result in death or serious injury.
- ⚠ **WARNING:** Indicates a potential hazard situation or unsafe practice that, if not avoided, could result in death or serious injury.
- ⚠ **CAUTION:** Indicates a potential hazard or unsafe practice that, if not avoided, could result in minor or moderate personal injury.
- ▲ **NOTICE:** Indicates a potential hazard or unsafe practice that, if not avoided, could result in product or property damage.

*Info: Provides application recommendations or other useful information to ensure that you get the most from your product.*

## **DANGER**

To reduce the risk of electrocution:

- ⚠ **DANGER:** Always unplug this product immediately after using.
- ⚠ **DANGER:** Do not use this product while bathing.
- ⚠ **DANGER:** Do not place or store this product where it can fall or be pulled into a tub or sink.
- ⚠ **DANGER:** Do not place this product in or drop into water or other liquid.
- ⚠ **DANGER:** Do not reach for a product that has fallen into water. Unplug it *immediately*.

## **WARNING**

To reduce the risk of burns, electrocution, fire, or personal injury:

- ⚠ **WARNING:** Do not leave this product unattended when plugged in.
  - ⚠ **WARNING:** Always use close supervision when this product is used by, on, or near children or those who require close supervision.
  - ⚠ **WARNING:** Use this product only as intended and described in this manual. Do not use attachments or accessories not recommended by GF Health Products, Inc.
  - ⚠ **WARNING:** Never operate this product if:
    - a) it has a damaged cord or plug,
    - b) it is not working properly,
    - c) it has been dropped or damaged, or
    - d) it has been dropped into water.
- Return the product to your Graham-Field authorized distributor.
- ⚠ **WARNING:** Keep the cord away from heated surfaces.
  - ⚠ **WARNING:** Never drop or insert any object into any opening or hose.
  - ⚠ **WARNING:** Never block the air openings of this product or place it on a soft surface, such as a bed or couch, where the openings may be blocked. Keep the air opening free of lint, hair, and other similar particles.
  - ⚠ **WARNING:** Connect this product *only* to a properly grounded power outlet.
  - ⚠ **WARNING:** Maximum patient weight capacity for this product is 350 lb (159 kg), **EVENLY DISTRIBUTED.**
  - ⚠ **WARNING:** Notice for California Customers- California Proposition 65 **WARNING:** This product contains a chemical known to the State of California to cause cancer and reproductive or developmental harm.

**⚠ WARNING: Patient entrapment with bed side rails may cause injury or death. The bed frame and its components, including the mattress, bed side rails, head and foot board, bedding, and any accessories added to the bed, can all affect the risk of entrapment. Thorough patient assessment and monitoring are necessary to reduce the risk of entrapment, including establishing whether the use of a bed rail is in the best interest of the patient. Read and understand the User Manual before using this equipment. GF Health Products, Inc. product manuals are available online at [www.grahamfield.com](http://www.grahamfield.com).**






**Visit the FDA's Bed Safety page at [www.fda.gov](http://www.fda.gov) to learn more about the risks of entrapment. It is the responsibility of the facility and provider to be in compliance with these guidelines. Refer to user manuals for beds and rails for additional product safety information.**

**After any adjustment, repair or service, and before use, ensure all attaching hardware is securely tightened. Bed rails with dimensions different than the original equipment specified by the bed manufacturer may not be interchangeable and may result in entrapment or other injury.**


## **NOTICE**

**▲ NOTICE: The pump can be used only with the accompanying mattress. Do not use it for any other purpose.**

# EQUIPMENT SYMBOLS

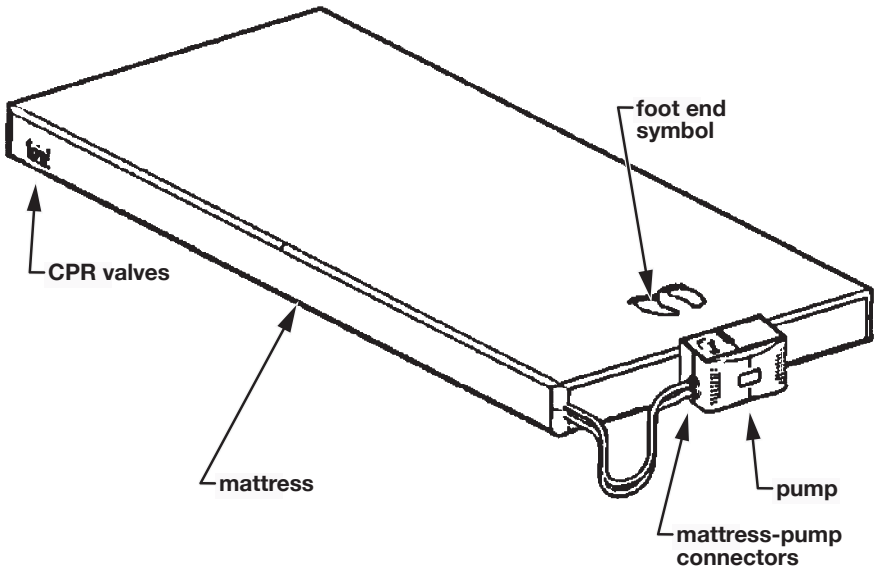
	<p>Attention! Consult accompanying documents (this manual)</p>
	<p>“BF” symbol: Indicates that this product is in accordance with the degree of protection against electric shock for type BF equipment</p>
	<p>Functional earth (for UL only)</p>
	<p>Class II (for UL only)</p>
	<p><b>Disposal of Electrical &amp; Electronic Equipment (WEEE):</b> Do not treat this product as household waste. For more detailed information with regard to returning and recycling this product, please consult your local city office, household waste disposal service, or Graham-Field authorized distributor.</p>

For U.S. and Canada only

<p>E305034 53DG</p>		<p><b>Medical Equipment: Air Pump</b> with respect to electrical shock, fire and mechanical hazards only in accordance with UL60601-1 and CAN/CSA C22.2 No. 601.1</p>
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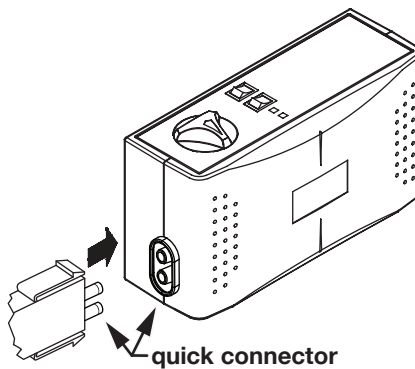
# PRODUCT DESCRIPTION

## PUMP AND MATTRESS SYSTEM



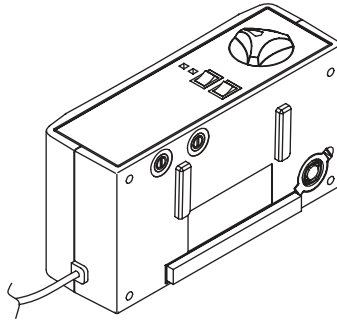
**pump and mattress system**

### Pump: front

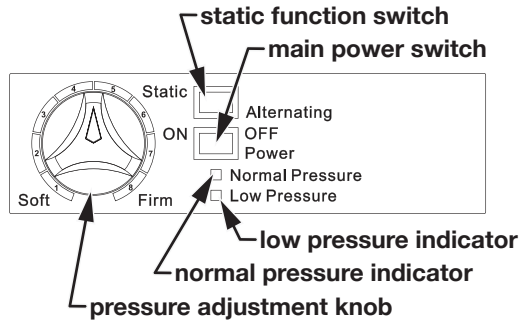




## Pump: rear



## Pump: top panel



**Pressure adjust knob:** The pressure adjust knob controls the air pressure output. Turn it clockwise to increase output pressure (firmer); turn it counter-clockwise to decrease air output pressure (softer). Higher pressure output will better support the heavier-weight user. The setting is measured in kilograms (kg). Please consult your physician for an appropriate setting.

**Normal pressure indicator:** The green **normal pressure LED** illuminates when the pressure inside the air mattress has reached the selected pressure setting.

**Low pressure indicator:** The yellow **low pressure LED** illuminates when the pressure inside the air mattress is below the selected setting.

**Static function switch:** Press the **static function switch** to suspend alternating function, if needed; the pressure inside the air tubes will then be adjusted to identical pressure. Press the static function switch again to change back to alternating mode. The static function switch toggles between static and alternating modes.

**Main power switch:** The main power switch toggles between ON and OFF. When power is ON, either the normal or low pressure indicator illuminates.

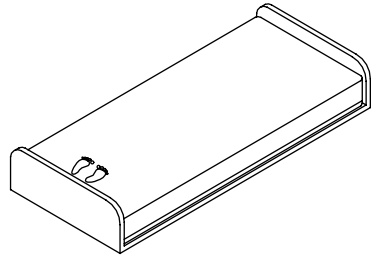
# INSTALLATION

## **UNPACKING**

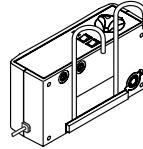
1. Before unpacking, check for obvious damage to the carton or its contents. If damage is evident, please notify the carrier and your Graham-Field authorized distributor.
2. Remove all loose packing from the carton.
3. Carefully remove all components from the carton.
4. Inspect all components. If damage is evident, please notify the carrier and your Graham-Field authorized distributor.

# **PUMP AND MATTRESS INSTALLATION**

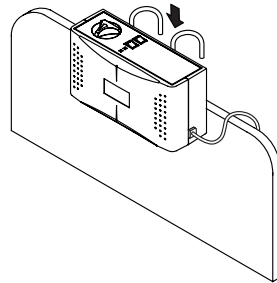
1. Place the mattress on top of the bed frame; ensure that the foot end symbol faces up at foot end as shown at right.



2. Fold open the wire hangers on the back of the pump as shown at right.

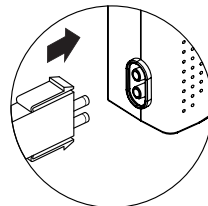


3. Either hang the pump on the bed's foot end as shown at right, or place the pump on a flat surface easily accessible to the user, caregiver, and/or doctor.



**▲ NOTICE: Place the device in a position where the user, caregiver, and/or doctor can access it easily.**

4. Connect the mattress-pump air hose quick connector; ensure that the connector has clicked securely into place before continuing.

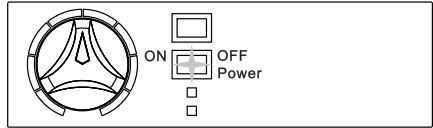


**▲ NOTICE: Ensure that the air hoses are not kinked or tucked under the mattress.**

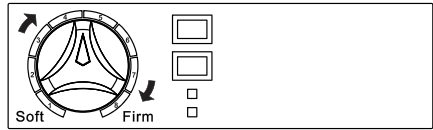
- ⚠ WARNING: Locate all cords so that they will not be stepped on, tripped over, or otherwise subjected to damage or stress.**
  - ⚠ WARNING: Do not use a household extension cord if the electrical cord does not reach the power outlet. Use of an improper extension cord could result in fire and electric shock. If an extension cord must be used, use a three conductor cord with ground, properly wired, in good electrical condition, and keep it as short as possible.**
  - ⚠ WARNING: Ensure that the local power voltage is appropriate for the pump unit.**
5. Plug the power cord into a properly grounded electrical outlet.

# OPERATION

1. Turn the power switch to the ON position.

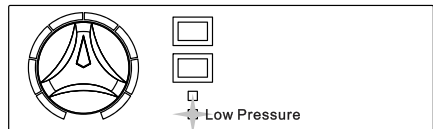


2. Adjust the pressure adjust knob to the maximum position.

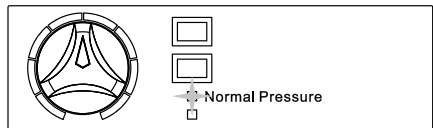


*Info: Set the pressure adjust knob to the maximum position for the quickest inflation at set-up; the mattress can then be adjusted to the desired pressure.*

3. The pump will begin delivering air into the mattress. While the mattress is filling, the low pressure indicator (yellow LED) will illuminate.



4. When the selected pressure level is reached, the low pressure indicator will de-illuminate, and the normal pressure indicator (green LED) will automatically illuminate.



5. Replace all sheets, blankets, and pillows on the bed.

## **PRESSURE ADJUSTMENT**

Generally, a lighter patient will need a lower (softer) setting while a heavier patient will need a higher (firmer) setting, but pressure adjustment must ultimately be based on the patient's *weight distribution*. A short, stocky person may be the same weight as a tall, thin person, but their settings will not be the same. The mattress should be firm enough to support the patient, yet soft enough so the patient will sink down to eliminate pressure points. Test the pressure by placing four fingers below the mattress

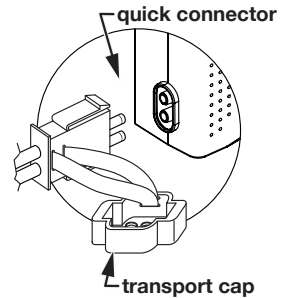
under the patient's buttock area; your fingers should just fit. If the fit is too loose, decrease the setting. If your fingers do not fit well, increase the setting two notches firmer. Wait ten minutes and then check again. You should only have to adjust this setting one time per patient. Please consult your physician for an appropriate setting.

## **QUICK DISCONNECT**

Pull the power plug from the wall connector to disconnect the device quickly.

## **TRANSPORT CAP**

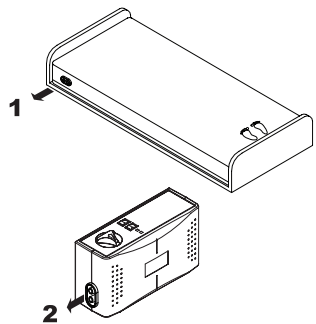
In case of power failure or transport: Disconnect the quick connector and cap the mattress with the transport cap to slow deflation.



## **CPR FUNCTION**

If CPR must be performed on the patient while the mattress is in use, to immediately deflate the mattress, either:

1. Pull the CPR valves from the mattress in the location of the arrow shown at right, or
2. Disconnect the quick connector from the pump in the location of the arrow shown at right.



# MAINTENANCE

## CLEANING

Perform the following cleaning procedures before use.

**Pump:** Wipe the pump with a clean, damp cloth and mild detergent, and keep it away from dust. Air dry.

▲ **NOTICE: Do not use phenolic products or corrosive or powdered cleansers to clean the pump.**

▲ **NOTICE: Do not immerse or soak the pump.**

**Mattress:** Wipe the mattress unit with a clean, damp cloth and mild detergent. The mattress may also be cleaned using a 10% solution of sodium hypochlorite (bleach) diluted in water. Air dry all parts thoroughly before use.

▲ **NOTICE: Do not use phenolic products to clean the mattress.**

▲ **NOTICE: After cleaning, air dry the mattress without direct exposure to sunlight.**

## GENERAL MAINTENANCE

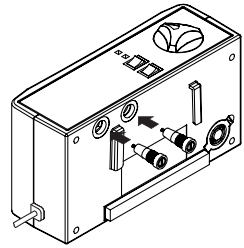
1. Check main power cord and plug for abrasion or excessive wear.
2. Check mattress cover for signs of wear or damage. Ensure mattress cover and tubes are connected correctly.
3. Check airflow from the air hose connector. The airflow should alternate between each connector every half-cycle time if it's in alternating mode.
4. Check the air hoses for any kink or break. For replacement, please contact your Graham-Field authorized distributor.



## **Fuse replacement**

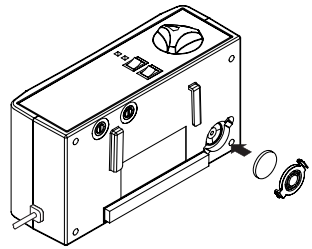
*tool needed: small screwdriver*

1. If you suspect a blown fuse, disconnect the plug from the wall outlet immediately.
2. Use a small screwdriver to remove the cover of the fuse holder (fuse locations are shown in picture at right).
3. Insert a new fuse of the correct rating (T1A/250V, VDE approved).
4. Replace the fuse holder cover.



## **Air filter replacement**

1. Remove the air filter plate located at rear of pump (filter location shown in picture at right).
2. Remove the filter. The filter is reusable, if not torn, and can be washed gently with a mild detergent and water. Dry the filter before use.
3. Replace the air filter regularly if it is gray, torn, or the environment is dirty.



## **STORAGE**

1. Lay the mattress out flat and upside down.
2. Roll from the head end toward the foot end.
3. Stretch the foot-end strap around the rolled mattress to prevent unrolling.
4. Store mattress and pump in a dust-free environment with no exposure to direct sunlight.

**▲ NOTICE: Do not fold, crease or stack the mattress.**

# TROUBLESHOOTING

<b>Problem</b>	<b>Solution</b>
Power is not ON	<ul style="list-style-type: none"> <li>• Ensure the plug is connected to a power source.</li> <li>• Check if fuse is blown.</li> </ul>
Alarm is on (Audible & visible)	<ul style="list-style-type: none"> <li>• Check if power has suddenly shut off.</li> <li>• Ensure the CPR is sealed.</li> <li>• Ensure connection between air tube connector and pump unit is secure.</li> <li>• Ensure all tubing connections along mattress are secure.</li> </ul>
Patient is bottoming out	<ul style="list-style-type: none"> <li>• Pressure setting might be inadequate for patient; adjust comfort range one to two levels higher and wait a few minutes for maximum comfort</li> </ul>
Mattress form is loose	<ul style="list-style-type: none"> <li>• Ensure all snap buttons and mattress straps are securely fastened.</li> <li>• Ensure mattress is fixed to bed frame by straps.</li> </ul>
No air produced from some air outlets of the air tube connector	<ul style="list-style-type: none"> <li>• This is normal since there is alternating mode. Air outlets take turns to produce air during their cycle time.</li> </ul>
<p><b>If the problem still occurs, contact your Graham-Field authorized distributor</b></p>	

## **SERVICE**

If a problem occurs with the Lumex AltaDyne 750000 Alternating Pressure / Low Air Loss Mattress System that you are unable to resolve, contact your Graham-Field authorized distributor for service.

# SPECIFICATIONS

<b>Pump</b>		<b>Specification</b>
<b>Power Supply</b>		120V System: AC 120V 60 Hz Info: see rating label on product
<b>Fuse Rating</b>		T1A, 250V
<b>Cycle time</b>		8 minutes
<b>Air input</b>		>4 LPM
<b>Dimensions (L x W x H)</b>		9.8" x 5.3" x 3.7" (25 x 13.5 x 9.5 cm)
<b>Weight</b>		4 lb (1.8 kg)
<b>Environment</b>	<b>Temperature</b>	Operation: 50°F to 104°F (10°C to 40°C) Storage: 5°F to 122°F ( -15°C to 50°C) Shipping: 5°F to 158°F ( -15°C to 70°C)
	<b>Humidity</b>	Operation: 10% to 90% non-condensing Storage: 10% to 90% non-condensing Shipping: 10% to 90% non-condensing
<b>Classification</b>		Class II, Type BF, IPX0 Applied Part: Air Mattress Not suitable for use in the presence of a flammable anesthetic mixture (No AP or APG protection)

<b>Mattress</b>		<b>Specification</b>
<b>Model</b>		8" mattress
<b>Dimensions (L x W x H)</b>		78.7" x 35.4" x 8" (200 x 90 x 20.3 cm)
<b>Weight</b>		22.1 lb (10.0 kg)
<b>Arrangement</b>		20 x 8" bladders
<b>Material</b>	<b>Cover</b>	Nylon/PU
	<b>Cells</b>	Nylon/PU
	<b>Base</b>	PVC Tarpaulin

# LIMITED WARRANTY

## SCOPE OF WARRANTY

GF Health Products, Inc. ("GF") warrants to the original purchaser only that it will replace or repair components, at GF's sole discretion, that are defective in material or workmanship under normal use and service. All warranties are conditioned upon the proper use of the products strictly in accordance with good commercial practice and applicable GF instructions and manuals, including proper use and maintenance. To the extent that a component is warranted by a third party, GF conveys all of its rights under that warranty to the original purchaser, to the extent permitted.

This limited warranty shall only apply to defects that are reported to GF's customer service team within the applicable warranty period and which, upon examination by GF or its authorized representative, prove to be a warranty item. This limited warranty is not transferable.

The warranted components and time period are set forth below:

Lumex AltaDyne 750000 Alternating Pressure / Low Air Loss Mattress System: twelve months  
The applicable warranty period shall commence from date of shipment to the original customer, unless there is an expiration date on the component in which case the warranty shall expire on the earlier of warranty period or the expiration date.

## OBTAINING WARRANTY SERVICE

A GF Customer Service Representative must authorize warranty service. Please contact the GF Customer Service department by calling 678-291-3207, sending a fax request to 770-368-2386 or by e-mailing a request to [cs@grahamfield.com](mailto:cs@grahamfield.com). Specific directions will be provided by the Customer Service Representative. Failure to abide by the specific directions will result in denial of the warranty claim.

## EXCLUSIONS

The warranty does not cover and GF shall not be liable for the following:

- 1) Defects, damage, or other conditions caused, in whole or in part, by misuse, abuse, negligence, alteration, accident, freight damage, tampering or failure to seek and obtain repair or replacement in a timely manner;
- 2) Products which are not installed, used, or properly cleaned and maintained as required in the official manual for the applicable product;
- 3) Products considered to be of a non-durable nature including, but not limited to: casters, filters, fuses, gaskets, lubricants, and charts;
- 4) Accessories or parts not provided by GF;
- 5) Charges by anyone for adjustments, repairs, replacement parts, installation or other work performed upon or in connection with such products which are not expressly authorized in writing, in advance, by GF;
- 6) Any labor or shipping charges incurred in the replacement part installation or repair;
- 7) Costs and expenses of regular maintenance and cleaning; and
- 8) Representations and warranties made by any person or entity other than GF.

## ENTIRE WARRANTY, EXCLUSIVE REMEDY AND CONSEQUENTIAL DAMAGES DISCLAIMER

THIS WARRANTY IS GF'S ONLY WARRANTY AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED. GF MAKES NO IMPLIED WARRANTIES OF ANY KIND INCLUDING ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

IF ANY MODEL OR SAMPLE WAS SHOWN TO THE CUSTOMER, SUCH MODEL OR SAMPLE WAS USED MERELY TO ILLUSTRATE THE GENERAL TYPE AND QUALITY OF THE PRODUCT AND NOT TO REPRESENT THAT THE PRODUCT WOULD NECESSARILY CONFORM TO THE MODEL OR SAMPLE IN ALL RESPECTS.

THIS WARRANTY IS LIMITED TO THE REPAIR OR REPLACEMENT OF THE DEFECTIVE PARTS. GF SHALL NOT BE LIABLE FOR AND HEREBY DISCLAIMS ANY DIRECT, SPECIAL, INDIRECT, INCIDENTAL, EXEMPLARY OR CONSEQUENTIAL DAMAGES, INCLUDING, BUT NOT LIMITED TO: DAMAGES FOR LOSS OF PROFITS OR INCOME, LOSS OF USE, DOWNTIME, COVER, OR EMPLOYEE OR INDEPENDENT CONTRACTOR WAGES, PAYMENTS AND BENEFITS.

The warranties contained herein contain all the representations and warranties with respect to the subject matter of this document, and supersede all prior negotiations, agreements and understandings with respect thereto. The recipient of this document hereby acknowledges and represents that it has not relied on any representation, assertion, guarantee, warranty, collateral contract or other assurance, except those set out in this document.

For additional information on this product or this warranty, please contact a GF Customer Service Representative.

## NOTES:

- 1) Additional terms and conditions may apply.
- 2) Freight claims must be notated on the Bill of Lading and must be made with immediacy. The ICC regulations govern specific requirements for freight claims. Failure to abide by those regulations may result in a denial of the freight claim. GF will assist you in filing the freight claim.
- 3) Claims for any short shipment must be made within thirty (30) days of the invoice date.

GF Health Products, Inc.  
2935 Northeast Parkway  
Atlanta, GA 30360  
Tel 770-368-4700  
Fax 770-368-2386  
[www.grahamfield.com](http://www.grahamfield.com)

# APPENDIX A: EMC INFORMATION

## Guidance and Manufacturer's Declaration- Electromagnetic Emissions:

This device is intended for use in the electromagnetic environment specified below. The user of this device should make sure it is used in such an environment.

Emissions Test	Compliance	Electromagnetic Environment-Guidance
RF emissions CISPR 11	Group1	The device 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 B	The device is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network.
Harmonic emissions IEC61000-3-2	Class A	
Voltage fluctuations / Flicker emissions IEC61000-3-3	Complies	

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

This device is intended for use in the electromagnetic environment specified below. The user of this device should make sure it is used in such an environment.


Immunity Test	IEC60601 Test Level	Compliance	Electromagnetic Environment-Guidance
Electrostatic Discharge (ESD) IEC61000-4-2	±6kV contact ±8kV air	±6kV contact ±8kV 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 IEC61000-4-4	±2kV for power supply line ±1kV for input/out line	±2kV for power supply line ±1kV for input/out line	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC61000-4-5	± 1 kV line(s) to line(s) ± 2 kV line(s) to earth	± 1 kV line(s) to line(s)	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 IEC61000-4-11	<5 % $U_T$ (>95 % dip in $U_T$ ) for 0,5 cycle 40 % $U_T$ (60 % dip in $U_T$ ) for 5 cycles 70 % $U_T$ (30 % dip in $U_T$ ) for 25 cycles <5 % $U_T$ (>95 % dip in $U_T$ ) for 5 sec	<5 % $U_T$ (>95 % dip in $U_T$ ) for 0,5 cycle 40 % $U_T$ (60 % dip in $U_T$ ) for 5 cycles 70 % $U_T$ (30 % dip in $U_T$ ) for 25 cycles <5 % $U_T$ (>95 % dip in $U_T$ ) for 5 sec	Mains power quality should be that of a typical commercial or hospital environment. If the user of this device requires continued operation during power mains interruptions, it is recommended that the device be powered from an uninterruptible power supply or a battery.

Power frequency (50/60Hz) magnetic field IEC61000-4-8	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.
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NOTE:  $U_T$  is the a.c. mains voltage prior to the application of the test level

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

This device is intended for use in the electromagnetic environment specified below. The user of this device should make sure it is used in such an environment.

Immunity Test	IEC60601 test level	Compliance	Electromagnetic Environment-Guidance
Conducted RF IEC 61000-4-6	3Vrms150 kHz to 80 MHz outside ISM bands <sup>a</sup>	3 Vrms	<p>Portable and mobile RF communications equipment should be used no closer to any part of this device, including cables, than there commended separation distance calculated from the equation applicable to the frequency of the transmitter.</p> <p>Recommended separation distance</p> $d = 1.2\sqrt{P} \quad 150\text{kHz to } 80\text{MHz}$ $d = 1.2\sqrt{P} \quad 150\text{kHz to } 80\text{MHz}$ $d = 2.3\sqrt{P} \quad 80 \text{ MHz to } 2.5\text{G MHz}$ <p>Where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters (m).<sup>b</sup></p> <p>Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey <sup>c</sup>, should be less than the compliance level in each frequency range<sup>d</sup>.</p>
Radiated RF IEC 61000-4-3	3 V/m 80 MHz to 2.5 GHz	3 V/m	<p>Interference may occur in the vicinity of equipment marked with the following symbol:</p> 

**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.

- a) The ISM (industrial, scientific and medical) bands between 150 kHz and 80 MHz are 6,765 MHz to 6,795 MHz; 13,553 MHz to 13,567 MHz; 26,957 MHz to 27,283 MHz; and 40,66 MHz to 40,70 MHz.
- b) The compliance levels in the ISM frequency bands between 150 kHz and 80 MHz and in the frequency range 80 MHz to 2.5 GHz are intended to decrease the likelihood that mobile/portable communications equipment could cause interference if it is inadvertently brought into patient areas. For this reason, an additional factor of 10/3 is used in calculating the recommended separation distance for transmitters in these frequency ranges.
- c) 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 device is used exceeds the applicable RF compliance level above, the device should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the device.
- d) Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.

## Recommended separation distances between portable and mobile RF communications equipment and this device:

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

Rated maximum output power of transmitter W	Separation distance according to frequency of transmitter m		
	150 kHz to 80 MHz $d=1.2\sqrt{P}$	80 MHz to 800 MHz $d=1.2\sqrt{P}$	800 MHz to 2,5 GHz $d=2.3\sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

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

**Note 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.

**Manufactured for:  
GF Health Products, Inc.  
2935 Northeast Parkway  
Atlanta, Georgia 30360**

**tel: 770-368-4700  
fax: 770-368-2386**



**GRAHAM-FIELD<sup>®</sup>**

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

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