

# Direct Healthcare Group

Advancing Movement & Health®

# Mercury Advance **SMART**care<sup>®</sup>

A Step Change in Care Delivery

## Service Manual





The new generation hybrid support surface

# Mercury Advance SMARTcare®

A Step Change in Care Delivery

The **Mercury Advance SMARTcare** is a pressure relieving mattress suitable for use with patients at **VERY HIGH RISK** of pressure ulcer damage.

Offering high levels of patient comfort, this unique system has the facility to “step up” to that of a dynamic mattress when clinically required. Similarly, the mattress’s function can be downgraded as the patient’s condition improves.

These features make it particularly beneficial for use within the patient’s home or palliative care environment and help reduce logistic and decontamination costs. The clinical benefits of a single system are equally applicable to those of a modern hospital setting. A higher maximum weight capacity, up to 40 stone / 254kg, allows the product to meet the modern challenges of those heavier clients. All component parts are interchangeable and replaceable, maximising product life and reducing environmental impact.

## Contents

1. Introduction .....	4
2. Quick Reference Guide & Frequently Used Functions.....	4
3. Troubleshooting .....	6
4. Installation .....	7
5. Operation.....	7
6. Transportation.....	8
7. Warnings.....	8
8. Maintenance Procedures.....	9
9. Technical Specification .....	16
10. Technical Data.....	18
11. Optimum Conditions for Use.....	18
12. Symbols Guide & Contraindications for Use .....	18
13. Detachable / Removable Parts .....	19
14. Disposal .....	19

**Intelligent®  
Pressure Care  
Management**



## 1. Introduction

**Mercury Advance SMARTcare** is an innovative solution in the prevention and treatment of pressure ulcers. It offers effective dual therapy in a single surface by combining advanced, clinically proven technologies previously only available in separate hybrid surfaces. Advanced air displacement technology incorporated into a unique 4 zone configuration now provides more effective pressure redistribution.

When used in non-powered mode, clinically proven advanced air displacement technology continually optimises and improves pressure redistribution in response to patient body weight and movement. The unique 'air only' heel zone effectively offloads pressure on the vulnerable heel area.

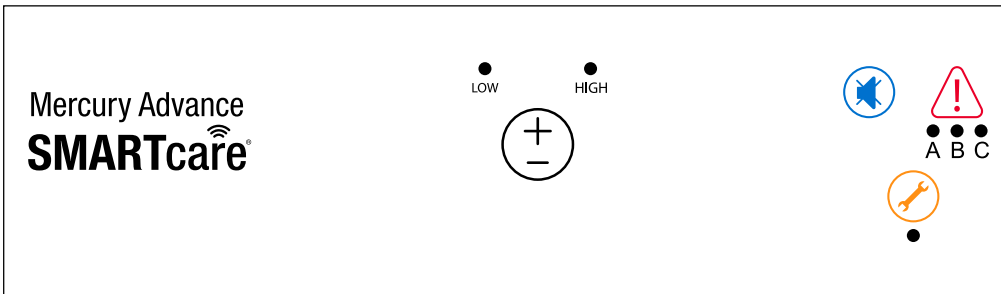
When used in powered/dynamic mode **Mercury Advance SMARTcare** delivers pressure relief via a series of connected alternating foam and air cells. Unencumbered by a top layer of foam on the mattress, the unique 'foam in air cell' construction ensures the delivery of effective pressure relieving therapy. Dependant on clinical judgement, the alternating function can be operated on either a Low or High Pressure

The digital Control Unit controls air flow into, or out of the air cells as required according to the selected operating mode. It also maintains the air pressure within the mattress at the required level and controls the action of the Audible/Visual Warning System in the event of mains supply failure or over or under inflation pressure.



## 2. Quick Reference Guide (Frequently used functions)

This is a quick reference guide for the **Mercury Advance SMARTcare System**  
**Product Code MAT1610001**



### Power Switch Audible Warning Reset

The power switch simply switches the mains power to the Control Unit on and off.

When the Control Unit detects an Audible Warning condition, this can be silenced (see page 5) and re-set by switching the Control Unit off and then back on again.



### CPR Tag and Dual Function Connector

Please ensure that both the CPR Tag located on the umbilical and the Dual Function Connector are always placed fully home, prior to inflating the mattress.

NB: The mattress will NOT inflate properly should this not be the case.

The CPR Tag is only to be used in the event of a clinical emergency for priority use. However, disconnecting this function will rapidly deflate air from the mattress in readiness for transport / static mode.



## LED Mode Settings

This symbol when illuminated (the green indicator light) is used to indicate that the equipment is on or ready for use.

When a patient requires more pressure in the cells, as they may be uncomfortable or feel as though the support surface is too soft or unstable, then please select a “High” setting (pressure 26mmHg). This must only be used by a trained clinician as often too high pressures can further agitate certain patient conditions.

When a patient requires less pressure in the cells, as they may be uncomfortable or indeed hyper sensitive to cell movement or if the patient is still reddening further, then please select a “Low” setting (pressure 18mmHg). This must only be used by a trained clinician.

This function is used to silence the Audible Warning. The LED will remain lit if the Audible Warning has been silenced previously, however a fault is still detected. Refer to the power switch in order to re-set fully. If the Audible Warning continues to sound repeatedly, along with an illuminated light, then an engineer must be called.

This symbol indicates an “Audible Warning Failure”. Please see troubleshooting guide below for how to re-set.

This symbol when illuminated indicates a Service is required. DHG recommends a service every 8760 hours of operation (one continuous year running).

Note: Please ensure (when available) that all securing straps on the base of the mattress are secured onto the MOVING PARTS of the bed frame.

For shut down procedure, see 4.2 Control Unit section.

● LOW      ● HIGH



Power On / Off  
Dynamic / Firmer Setting

● LOW      ● HIGH



Low / Comfort Pressure Setting



Silence Audible Warning









● ● ●  
A B C

Audible Warning Failure



Service Indicator

### 3. Troubleshooting

Warning / Fault	Cause	Solution
<b>Control Unit does not operate; no display lights illuminate</b>	The Control Unit may not be attached to a power source or a fuse may need replacing.	<ol style="list-style-type: none"> <li>1. Check the Control Unit is connected to mains power outlet with the correct voltage.</li> <li>2. Check the Control Unit is switched on. Switch off and unplug the unit before restarting.</li> <li>3. Check the mains plug fuse (5 AMP) then check both Control Unit fuses (1 AMP) – fuses can be released using a screwdriver to push and turn.</li> </ol> <p>⚠ Do not try to open the Control Unit. Opening the unit could cause personal injury or equipment damage.</p> <p>⚠ Ensure the replacement of fuses is carried out accordance with local legislation.</p>
<b>Warning LED C + Audible Warning</b> 	Mains failure / Other See above, plus:	<ol style="list-style-type: none"> <li>1. Check the Control Unit is connected to mains power outlet with the correct voltage.</li> <li>2. Check the Control Unit is switched on. Switch off and unplug the unit before restarting.</li> <li>3. Check the mains plug fuse (5 AMP) then check both Control Unit fuses (1 AMP) – fuses can be released using a screwdriver to push and turn.</li> </ol> <p>⚠ Do not try to open the Control Unit. Opening the unit could cause personal injury or equipment damage.</p> <p>⚠ Ensure the replacement of fuses is carried out accordance with local legislation.</p>
<b>Warning LED B + Audible Warning</b> 	Pressure too low	<ol style="list-style-type: none"> <li>1. Reset the warning – turn off power and press the Audible Warning mute button.</li> <li>2. Check that the Dual Function Connector is firmly attached the Control Unit (located on the left of the Control Unit case). Check all air hoses along the inside of the mattress – each should be firmly connected. Check each air cells is securely attached to its connecting pipe.</li> <li>3. Check all cells, pipes and hoses for any air leakage.</li> <li>4. Check that the air filter cover is correctly secured and the air filter is clean.</li> <li>5. Switch on power.</li> </ol>
<b>Warning LED B+C + Audible Warning</b> 	Pressure too low / Air pipe kinked	<ol style="list-style-type: none"> <li>1. Check the blue external umbilical air pipe that is between the mattress and the Dual Function Connector is not kinked, twisted or damaged and that the CPR Tag is firmly secured.</li> <li>2. Check all air hoses along the inside of the mattress – each should be firmly connected.</li> <li>3. Check each air cell is securely attached to its connecting air pipe.</li> </ol>
<b>Warning LED A + Audible Warning</b> 	Pressure too high	<ol style="list-style-type: none"> <li>1. Reset the warning – turn off power and press the Audible Warning button.</li> <li>2. Disconnect the air hoses to reduce pressure, reconnect when pressure has decreased.</li> <li>3. Check for twists in the air hoses between Mattress and Control Unit.</li> </ol>
<b>Warning LED A+B + Audible Warning</b> 	Alternating Mode Failure (no alternation)	<ol style="list-style-type: none"> <li>1. Reset the warning – turn off Power and press the Audible Warning mute button.</li> <li>2. Disconnect the air hoses to reduce pressure – reconnect when pressure has decreased.</li> </ol>
<b>Warning LED A,B+C + Audible Warning</b> 	Initialising Failure	<ol style="list-style-type: none"> <li>1. Press the Audible Warning mute button to silence the Audible Warning.</li> <li>2. Check all air hoses along the inside of the mattress – each should be firmly connected. Check each air cell is securely attached to its connecting air pipe.</li> <li>3. Check that the Dual Function Connector is firmly attached the Control Unit (located on the left of the Control Unit casing).</li> </ol>

## 4. Installation

### 4.1 Mattress (This is the applied part type BF)

Place the **Mercury Advance SMARTcare** Mattress directly on to the bed platform ensuring that the blue multi-stretch waterproof cover is on top and that the umbilical hose is located at the left-hand corner at the foot end of the bed. Note: The umbilical hose can be located inside the cover under the “Open Here for Air Inlet” printed in the bottom left hand corner of the mattress.

Cover the Mattress with a loose-fitting sheet.

#### Static Mattress Use

The **Mercury Advance SMARTcare** can be used as a pressure reducing mattress for patients at High Risk of pressure ulcer damage without the need to attach the Control Unit. In this mode, the **Mercury Advance SMARTcare** mattress will continuously offload pressures in vulnerable areas such as the heels.

#### Alternating Mattress Use

If / When required, the **Mercury Advance SMARTcare** Mattress can be used as an alternating mattress system by attaching the Dyna-Form Mercury Advance Control Unit.

**No other system should be attached to the mattress as the design settings and internal air pressure properties of the Dyna-Form Mercury Advance Control Unit are specific to this mattress only.**

The **Mercury Advance SMARTcare** is a replacement mattress system and should NOT be placed on top of any existing mattress.

The start-up time from static to dynamic mode is immediate.

### 4.2 Control Unit

Hang the Control Unit onto the footboard. The mounting hooks swivel to suit the thickness of the footboard or rail. Connect the umbilical hose to the Control Unit, place the supplied 3-pin electrical plug into the wall outlet and switch on:

- Open the zip located at the bottom left hand side of the mattress and pull out the blue umbilical hose.
- Attach the blue umbilical hose to the Control Unit by connecting the Dual Function Connector at the end of the umbilical hose to the air inlet connector at the bottom left hand side of the Control Unit.
- Re-close the zip as far as possible without clamping the blue umbilical hose to ensure the mattress and air cells are sealed within the cover.
- Shut down is the reverse of items a, b & c above.

## 5. Operation

Attach the supplied mains cable to the Control Unit by inserting the “kettle” type connector into the recess located on the left-hand side of the Control Unit. The mains cable has been designed specifically as a removable part to aid in easy replacement should it become damaged in use.

Power cables not supplied by Direct Healthcare Group are not recommended for use with this Control Unit.

The mains plug should be turned off and removed from wall socket as a means of isolation.

Plug the mains cable into a suitable 230v mains socket and switch on the Control Unit using the on/off switch.

After the Control Unit has been turned on both the “High” and the “Low” lights will flash together intermittently until the Control Unit has attained its initial operating pressure. Once the Control Unit has attained its initial operating pressure the “Low” light will stay on constantly and the mattress is ready for use.

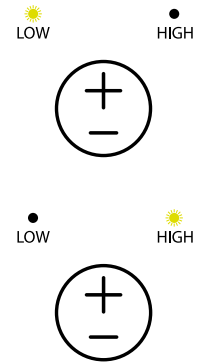




### 5.1 Low / High Settings

The **Mercury Advance SMARTcare** Mattress, in Alternating Mode, has two pressure settings. The initial setting that the control unit will revert to upon set up is “Low”. The “Low” comfort setting is ideal for the lighter patient or those who feel discomfort when on a normal alternating air type mattresses system. However, for patients with existing pressure damage or those at Very High Risk, it is recommended that dependant on the clinical judgement of the clinician, the “High” setting is activated by pressing the +/- button once, which is located on top of the Control Unit.

In “High” Mode the Control Unit attains more of the characteristics of an alternating air mattress system whilst still utilising the advantages of the static foam inserts. Repeatedly pressing the ‘mode’ button enables the Low & High modes to be selected in turn.



### 5.2 Static Hybrid Mode

Should a patient show signs of no longer needing dynamic therapy and depending on clinical judgement, the **Mercury Advance SMARTcare** System can be stepped down to a ‘foam in air’ static hybrid mattress.

To do this, turn off the Mercury Advance Mark II Control Unit and disconnect the Dual Function Connector by pressing the red pump release button.

### 5.3 CPR Deflation

The CPR system consists of a manually operated tag located on the blue umbilical attached to the Control Unit. Pulling the red CPR Tag will deflate the mattress air system back to that of a static foam mattress.

⚠ Warning: Removal of the Dual Function Connector alone will not expel air as quickly as the CPR Tag.

Do not rely on the Dual Function Connector for CPR, always use the CPR Tag to expel air from the mattress quickly.

Note: After a short period as the Mattress deflates the ‘Low Pressure’ Audible Warning is activated and can be cancelled by switching the Control Unit off.



### 5.4 Troubleshooting

For assistance (if needed) in setting up, using or maintaining the **Mercury Advance SMARTcare** system, or to report unexpected operation or events, please contact Direct Healthcare Group on the contact details on the reverse of this manual.

## 6. Transportation

To change the location of the mattress, press the pump release button on the Dual Function Connector and allow the mattress to return to its Static Mattress form. Switch off the Control Unit using the on/off switch and disconnect the electrical supply cable from the mains socket.

The mattress can now be moved to a new location where it must immediately be reconnected to the mains electrical supply and the Control Unit switched back on. Once the Mattress has been refilled, the ‘Alternating’ mode will automatically revert back to the Low setting and should be reselected to High should this be desired by the clinician.

Warning: The Mattress will not ‘alternate’ when disconnected from Control Unit and /or the mains electrical. Also, refer to environmental conditions section at rear of this manual.

## 7. Warnings

Warning conditions are indicated by a flashing red display accompanied by an Audible Warning.

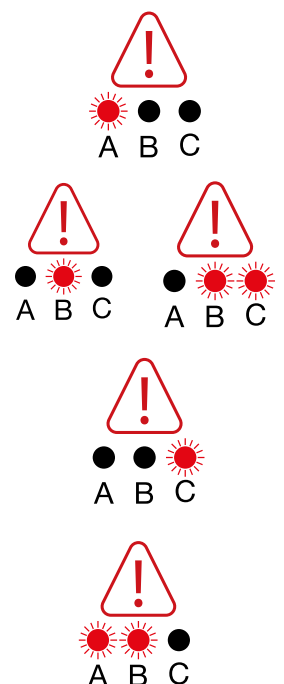
In each case the user should respond by turning the Control Unit’s switch off and investigating the cause.

### 7.1 High Pressure Warning

This condition could be caused, for example by a kinked umbilical hose or visitors, and others, sitting suddenly on the Mattress.

### 7.2 Low Pressure Warning

This condition could be caused, for example, by incorrect fitting of the Dual Function Connector, opening of the CPR Tag or a leak in the Mattress due to a cut or puncture.





### 7.3 Mains Failure Warning

This condition may be caused, for example if Mains power is lost.

### 7.4 Alternating Mode Failure (no alternation)

This will be indicated by a warning LED on A and B and an Audible Warning.

1. Reset the warning – turn off Power and press the Audible Warning mute button.
2. Disconnect the air hoses to reduce pressure – reconnect when pressure has decreased.



### 7.5 Initialising Failure

This will be indicated by a warning LED on A, B and C and an Audible Warning after circa 45mins.

1. Press the Audible Warning mute button to silence the Audible Warning.
2. Check the power cable is firmly plugged into the mains outlet and the Control Unit; and check the mains power is switched on.
3. Check the Control Unit fuse (1 AMP) – fuses can be released using a screwdriver to push and turn.

## 8. Maintenance Procedures

### 8.1 Safety Warning

Only qualified technicians trained or formally approved by Direct Healthcare Group Ltd. in the operation and maintenance of Direct Healthcare Group products may carry out maintenance, modification or repair work on the equipment. Unqualified personnel attempting to work on Direct Healthcare Group Control Units risk serious injury to themselves and others and possibly death by electrocution. Inlet fuse NOT to be replaced by operator or patient, to be replaced by service personnel only.

**Warning – Do not modify this equipment without authorisation of Direct Healthcare Group.**

#### 8.1.1 Servicing

Direct Healthcare Group recommend that the control unit be serviced annually from installation. The service light will illuminate after 8760 hours of operation (one year of continuous operation). The unit contains no user serviceable parts and should only be carried out by persons as described in section 8.1. DHG will make available on request all manuals, component parts lists and other information necessary for any suitably qualified person (As in 8.1) to carry out repair or service the system. For Service, maintenance and any questions regarding this please contact DHG.

#### 8.2 Audit

Caution: It is recommended that an audit of all mattresses within a ward/department is carried out at least annually.

In the community setting, an audit should also be considered between each change of patient.

Please refer to the document Medical Device Alert: All types of bed mattresses (MDA/2010/002), and also the BHTA guidance on the care, cleaning and inspection of healthcare mattresses (BHTA Protect, Rinse and Dry). Details on how to audit your mattress are available from Direct Healthcare Group.

### 8.3 Cleaning Procedures

**Warning:** Before cleaning the System make sure that the Control Unit is disconnected from the mains electricity supply.

Do not immerse the Control Unit in water or other fluids.

Do not autoclave, nor use phenol for cleaning.

Do wash hands before commencing the cleaning process.

Wear appropriate protective clothing such as gloves, apron and a mask.

Ensure all work surfaces are cleaned before and after contact with the Mattress.

### 8.4 Warning – Cleaning the Mattress

1. Cleaning should take place after use or between patients.
2. With cover left on the Mattress disconnect the Mattress from the Control Unit.
3. Clean the surface of the wash down table with a Sodium Hypochlorite solution or an equivalent disinfectant.
4. Wash the Mattress top using hot water (60 degrees C) containing detergent – dry with a paper towel.
5. Use a Sodium Hypochlorite solution diluted to 1,000 parts per million available chlorine. For heavy contamination use a Sodium Hypochlorite solution diluted to 10,000 parts per million available chlorine. Please ensure thorough rinsing after cleaning.
6. Using suitable brush, hot water, detergent or Sodium Hypochlorite solution, clean the umbilical hose, CPR Tag and Dual Function Connector. Dry with paper towel.
7. If required, the Mattress Cover may be removed and machine-washed at a temperature of 80 degrees C, for not less than 10 minutes. The individual Air Cells can be wiped down with established disinfectants.

8. To avoid shrinkage of the cover, line dry in an indoor clean environment or tumble dry on a low heat setting not exceeding 40 degrees C and not for longer than 10 minutes. Covers must be thoroughly dried before re-fitting to the mattress.

**8.5 Warning – Cleaning the Control Unit**

The Control Unit can be cleaned by wiping with a cloth dampened with a detergent solution or a Sodium Hypochlorite solution. Also, refer to symbol chart.

**8.5.1 Warning**

Ensure the Mercury Advance Smartcare System is not exposed to:

1. Excessive heat sources e.g. fires, radiators etc.
2. Water, particularly immersion of the Control Unit.

**8.6 Serial Number Identification.**

The Control Unit is identified by serial number and GS1 compliant barcoding using both 128 and 2D bar code identifiers.

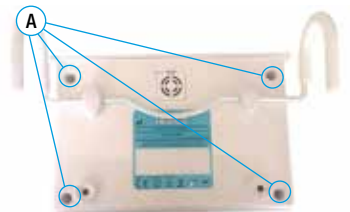
Both product code and manufacture date are shown on the identification label.

The above Control Unit serial number is MA15090002 and manufacture date is 02 day of 09 month of year 2015.



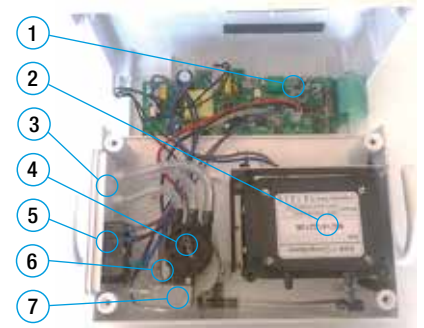
**8.7 Opening the Control Unit.**

To remove the front of the enclosure, first unscrew the four corner screws (Marked A).



**8.8 System Layout**

- 1 Control PCBA
- 2 Compressor
- 3 Air Outlets
- 4 Rotor valve
- 5 IEC Power Inlet
- 6 Rotor valve motor
- 7 Micro switch



**8.9 Checking the System**

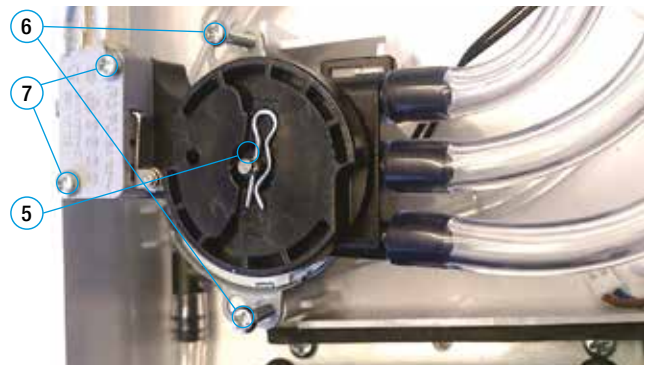
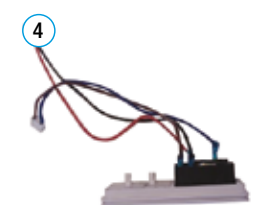
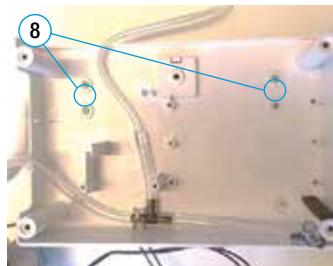
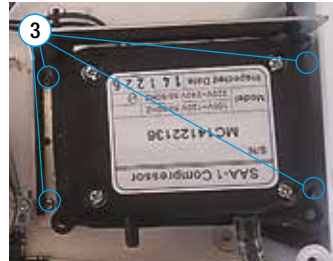
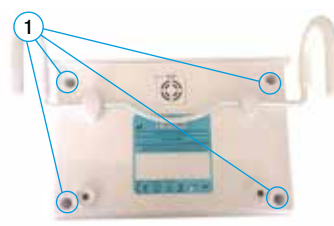
1. Plug in the mattress to the Control Unit.
2. Plug in the mains cable to the IEC inlet and switch on the power.
3. The LED indication LOW and HIGH pressure will flash during start up.
4. The Control Unit will run until the mattress is inflated to the pre-set pressure setting (LOW).
5. The LED indicating the setting (LOW) will be lit.
6. The system is ready to use.
7. The system is designed so the Control Unit sets the pressure as required and will run for short periods of time to maintain the required pressure or alter it when moving from LOW to HIGH.



### 8.10 Taking the System Apart

The Control Unit is designed so almost all components can be removed without disassembling other parts.

- ① Open the housing by removing the 4 screws from the bottom part.
- ② Remove PCBA by disconnecting the cables and unscrewing the 2 screws.
- ③ Remove the compressor by unscrewing the 4 screws and disconnect the power cable from the PCBA and the air tube on the compressor.
- ④ Remove the air out/power in part by disconnecting the air tubes and the cables from the PCBA.
- ⑤ Remove the rotor valve by pulling out the locking pin from the motor axes and removing the air tubes from the rotor valve.
- ⑥ Remove the rotor valve motor by unscrewing the 2 screws.
- ⑦ Remove the micro switch by unscrewing the 2 screws.
- ⑧ Removing the hooks requires the compressors to be removed first. Remove the four screws on the inside of the back part of the housing and then release the attachment part for the hooks from the outside of the housing.



### 8.11 Reassembling the System

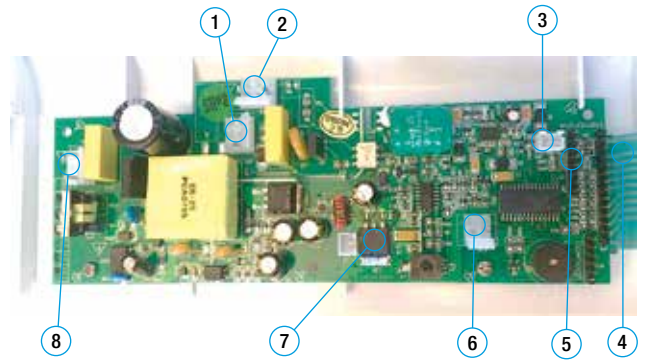
To reassemble the Control Unit, reverse the steps in 8.10 ensuring that the pressure sensor tubing runs underneath the compressor during reassembly.

### 8.11 The components

The main components in the Mercury Advance Control Unit.

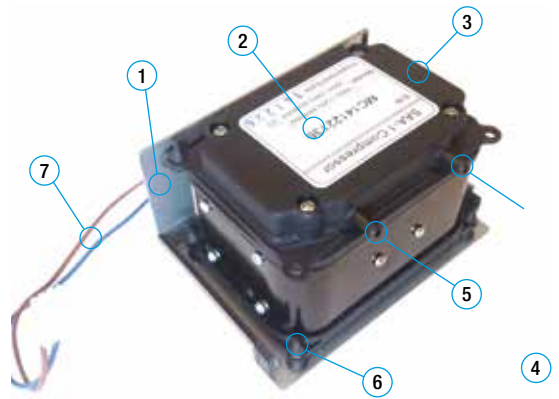
#### 8.11.1 PCBA

- ① Connector for Compressor
- ② Connector for Rotor valve motor
- ③ Connector for Micro switch (Brown/blue)
- ④ Connector for Membrane
- ⑤ Connector for Software download (for manufacturer only)
- ⑥ Connector for (red/black) from Power input
- ⑦ Pressure sensor
- ⑧ Connector for Power in (brown/blue)



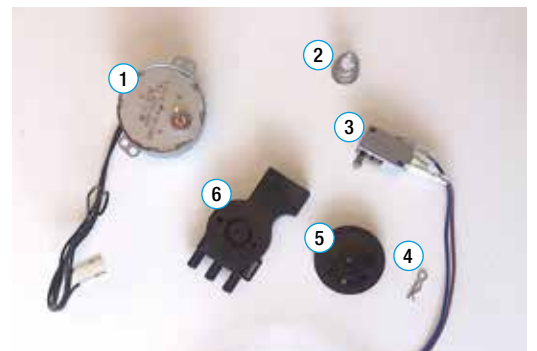
#### 8.11.2 The compressor

- ① Attachment plate
- ② Label
- ③ Silencer
- ④ Air outlet
- ⑤ Air inlet
- ⑥ Rubber suspension
- ⑦ Compressor power cable (Brown/blue)



#### 8.11.3 Rotor valve with motor

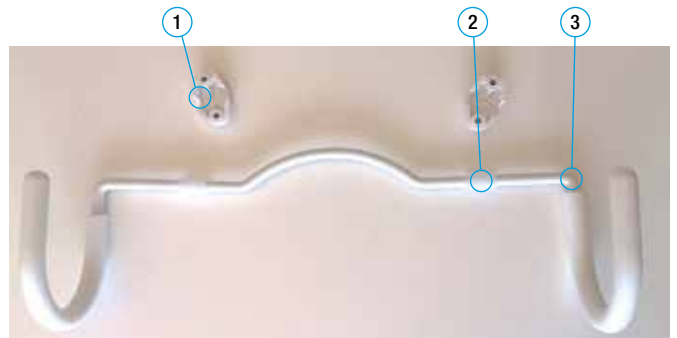
- ① Rotor valve motor
- ② Spring
- ③ Micro switch
- ④ Lock pin
- ⑤ Rotor valve cap
- ⑥ Rotor valve body





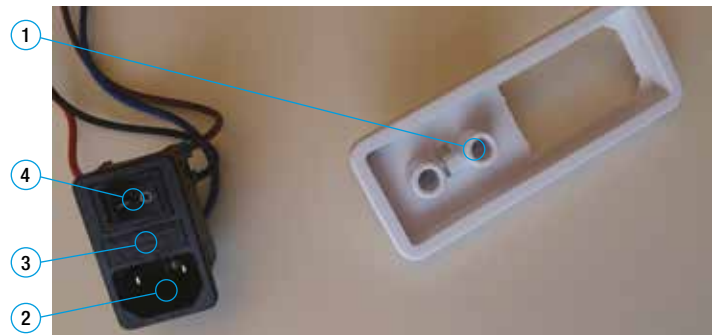
### 8.11.4 The hooks

- ① Hook attachment
- ② Rubber suspension
- ③ Hook



### 8.110.5 Air inlet/power outlet

- ① Air outlet
- ② Power inlet
- ③ Fuse holder
- ④ ON/OFF



### 8.12 Filter Maintenance

The Control Unit has a light that when illuminated indicates a Service is required.

1. **Change the air filter:** Remove air filter holder by pressing the plastic catch downwards and lifting the air filter holder up. Take out the filter and put in a new one and put the filter holder back.



### 8.13 Fuse

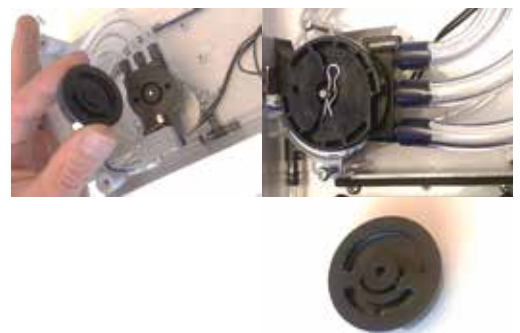
2. **Check the fuse:** Check the fuse and if required add a spare in the holder for the fuse in the fuse holder.



### 8.14 Rotor Valve Maintenance

The Control Unit has a light that when illuminated indicates a Service is required. Open the housing by remove the 4 screws from the bottom part.

3. **Grease the rotor valve:** Press down the cap of the rotor valve release the lock pin. Lift of the cap and put a thin layer of grease (Silicone grease dow Corning Molykote PG21, 613000103) on the bottom side of the cap. Assemble back again.



### 8.5 Warning – Cleaning the Control Unit

The Control Unit can be cleaned by wiping with a cloth dampened with a detergent solution or a Sodium Hypochlorite solution. Also, refer to symbol chart.

#### 8.5.1 Warning

Ensure the Mercury Advance **SMARTcare** System is not exposed to:

1. Excessive heat sources e.g. fires, radiators etc.
2. Water, particularly immersion of the Control Unit.

## 9. Technical Specification

### Declaration – electromagnetic emissions - for all ME EQUIPMENT and ME SYSTEMS

<p>Guidance and manufacturer’s declaration – electromagnetic emission</p> <p>The MAT1610001 is intended for use in the electromagnetic environment specified below.</p> <p>The customer or the user of the system should ensure that it is used in such an environment.</p>		
Emission test	Compliance	Electromagnetic environment – guidance
RF emissions CISPR 11	Group 1	The 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 emission CISPR 11	Class B	The system is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions IEC 61000-3-2	Class A	
Voltage fluctuations/flicker emissions IEC 61000-3-3	Complies	

## 9. Technical Specification

### Declaration – electromagnetic immunity

Guidance and manufacturer's declaration – electromagnetic immunity

The MAT1610001 is intended for use in the electromagnetic environment specified below.

The customer or the user of the system should ensure that it is used in such an environment.


Immunity test	IEC 60601 test level		Compliance level		Electromagnetic environment – guidance
Electrostatic discharge (ESD) IEC 61000-4-2	±6 kV contact ±8 kV air		±6 kV contact ±8 kV air		Floors should be wood, concrete or ceramic tile. If floor 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 line(s)		±2 kV for power supply lines ±1 kV for input/output line(s)		Mains power quality should be that of a typical commercial or hospital environment.
Surge Immunity Test IEC 61000-4-5	± 1 kV line(s) to line(s)		±1 kV differential mode		Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	Voltage Dips %U <sub>T</sub>	Period (Cycles)	Voltage Dips %U <sub>T</sub>	Period (Cycles)	Mains power quality should be that of a typical commercial or hospital environment. If the user of the Span system requires continued operation during power mains interruptions, it is recommended that the system be powered from an uninterruptible power supply or a battery.
	30	25	30	25	
	60	5	60	5	
	>95	0.5	>95	0.5	
	Voltage Interruption % U <sub>T</sub>	Seconds	Voltage Interruption % U <sub>T</sub>	Seconds	
	>95	5	>95	5	
Power frequency (50Hz) 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 U<sub>T</sub> is the a.c. mains voltage prior to application of the test level.



## 9. Technical Specification

### Declaration – electromagnetic immunity – for ME EQUIPMENT and ME SYSTEMS that are not LIFE-SUPPORTING

<p>Guidance and manufacturer’s declaration – electromagnetic immunity</p> <p>The MAT1610001 is intended for use in the electromagnetic environment specified below.</p> <p>The customer or the user of the system should ensure that it is used in such an environment.</p>			
Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment – guidance
<p>Conducted RF IEC 61000- 4-6</p>	<p><math>3 V_{rms}</math> 150 kHz to 80 MHz</p>	<p><math>3 V_{rms}</math></p>	<p>Portable and mobile RF communications equipment should be used no closer to any part of the CT515, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter</p> <p>Recommended separation distance</p> <p><math>d = 1.167\sqrt{P}</math></p> <p><math>d = 1.167\sqrt{P}</math>      80 MHz to 800 MHz</p> <p><math>d = 2.333\sqrt{P}</math>      800 MHz to 2.5 GHz</p> <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).</p> <p>Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey, <sup>a</sup> should be less than the compliance level in each frequency range. <sup>b</sup></p> <p>Interference may occur in the vicinity of equipment marked with the following symbol: </p>
<p>Radiated RF IEC 61000-4-3</p>	<p>3 V/m (Professional Healthcare Environment)</p> <p>10 V/m (Home Healthcare Environment)</p> <p>80 MHz at 2.7 GHz</p>	<p>10 V/m</p>	
<p>NOTE 1    At 80 MHz and 800 MHz, the higher frequency range applies.</p> <p>NOTE 2    These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.</p>			
<p>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 Span system is used exceeds the applicable RF compliance level above, the system should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the system.</p> <p>b. Over the frequency range 150kHz to 80MHz, field strengths should be less than 3V/m.</p>			

## 9. Technical Specification

### Recommended separation distances between portable and mobile RF communications equipment and the EQUIPMENT or SYSTEM – for ME EQUIPMENT or ME SYSTEM that are not LIFE – SUPPORTING

Recommended separation distances between portable and mobile RF communications equipment and the MAT1610001 Alternating Control Unit			
The MAT1610001 is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the system can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the 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 $d = 1.167\sqrt{P}$	80 MHz to 800 MHz $d = 1.167\sqrt{P}$	800 MHz to 2.5 GHz $d = 2.333\sqrt{P}$
0.01	0.117	0.117	0.233
0.1	0.369	0.369	0.738
1	1.167	1.167	2.333
10	3.689	3.689	7.379
100	11.667	11.667	23.333
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.		

## 10. Technical Data

### 10.1 Control Unit

Serial Number .....	As per label on rear of Control Unit
Electrical Supply .....	220 – 240 volts, 50 Hz
Power Consumption .....	10 watts
Fuses .....	TA1H 250V
Protection against shock .....	Class 2
Noise Level .....	Approx. 30 dB (A)
Dimensions .....	245 x 160 x 95 mm
Weight.....	1.7 kg
Service Interval .....	12 months / 8760 hours
Expected life .....	5 years
Shelf life of parts .....	5 years

### 10.2 Mattress

Serial Number .....	Label on inside of mattress cover
Number of Air Cells.....	15 Air Cells / 1 Static Foam Cell
Dimensions .....	1980 x 880 x 150mm (Nominal)
Weight.....	13.4kg
Expected life of Mattress .....	5 years
Shelf life of Mattress parts .....	5 years

## 11. Optimum Conditions

(Applies to Mattress and Control Unit)

### 11.1 Environment Conditions for Use

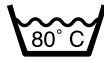











Transport.....	-25°C – +70°C
Storage .....	-25°C – +70°C
Usage .....	+5°C – +40°C
Humidity.....	10% – 93%
Atmospheric Pressure .....	700hPa – 1060hPa
Operational Altitude .....	≤ 2000m

### 11.2 Exposure

Exposure to direct sunlight, dust, lint and general debris is not considered to be an issue with the Mercury Advance System.

## 12. Symbols Guide

### Mattress Symbols

 WASH AT 80°	 TUMBLE DRY ON LOW	 DO NOT DRY CLEAN
 REFER TO USER MANUAL	 1434	 TYPE BF APPLIED PART
 DO NOT BLEACH	 DO NOT IRON	 NO SMOKING
 MAXIMUM USER WEIGHT LIMIT 254 KG / 40 STONES	 DO NOT USE SHARP INSTRUMENTS	 DO NOT USE PHENOL





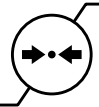
#### WARNING

THIS IS A STATEMENT THAT ALERTS THE USER TO THE POSSIBILITY OF SERIOUS INJURY OR OTHERWISE ADVERSE REACTIONS WITH THE USE OR MISUSE OF THE DEVICE






#### CAUTION

THIS IS A STATEMENT THAT ALERTS THE USER TO THE POSSIBILITY OF A PROBLEM WITH THE SYSTEM ASSOCIATED WITH ITS USE OR MISUSE

### General Symbols

 CAUTION	 PROTECT FROM HEAT AND RADIOACTIVE SOURCES	 TEMPERATURE LIMITATION
 HUMIDITY LIMITATION	 ATMOSPHERIC PRESSURE LIMITATION	

### Control Unit Symbols

 SERVICE REQUIRED	 REFER TO USER MANUAL	 DO NOT DISPOSE OF WITH HOUSEHOLD WASTE. PLEASE REFER TO DHG WEBSITE
 DOUBLE INSULATED CLASS II	 1434	

## IP21

IP: INGRESS PROTECTION  
2: PROTECTION AGAINST FINGERS OR OTHER OBJECT NOT GREATER THAN 80MM IN LENGTH AND 12MM IN DIAMETER  
1: PROTECTION FROM VERTICALLY DRIPPING WATER

**Contraindications For Use (Warning)**

The **Mercury Advance SMARTcare** System should not be used for patients with unstable fractures, gross oedema, burns, or intolerance to motion.

**General Information (Caution) (Warning)**

- There are no special skills required to operate the system.
- The Medical Professional is responsible for applying his/her best medical judgment when using the system.
- The electricity supply is of the type indicated on the Control Unit.
- Check the mains lead is free from damage and is positioned so as not to cause an obstruction, or injury. E.g. Strangulation of a child or trip hazard.
- Ensure the mains lead cannot become trapped or crushed, e.g. by raising or lowering of the bed or bed rails or any other moving object.
- The Control Unit must only be used with a suitably approved power cord and plug set as supplied by DHG.
- The system is not to be used in the presence of flammable anaesthetics.
- Suitable for continuous use.
- Not suitable for sterilisation.
- Do not position the Control Unit to make it difficult to disconnect the power supply or plug.
- Do not place the System on or close to a source of heat.
- Do not use with hot water bottles or electric blankets.
- DHG strongly advise against smoking whilst the Control Unit is in use. This is to prevent accidental secondary ignition of items which may be flammable e.g. bed linen. The materials used in the manufacture of the Mercury Advance System comply with the required fire safety regulations.
- Do not use sharp objects on or near the mattress system as this will cause damage.
- Do not store in damp conditions.
- Do not use in an oxygen enriched environment.
- Not suitable for use in an Outdoor Environment.
- Intended for both Home Healthcare and Professional Healthcare environments.

- Do not connect to any other medical device or equipment.
- Correct fuse rating **MUST** be used. Failure to do so could result in the risk of a fire.
- The System should be cleaned after use or between patients. Refer to Cleaning section.
- All internal and external hoses must be free of twists, kinks. The external hose should also be properly connected and positioned so that the risk of obstruction or injury is eliminated.
- Do not use bleach, phenols. Chlorine based products which exceed 1000ppm. Solvents or alcohol based cleaners.
- All the above warnings and cautions together with safety considerations should be observed at ALL times during its use.
- Select correct setting 'High' or 'Low' as required. Care should be taken not to accidentally change settings once set. This may affect the desired requirement of the therapy. This could also be caused by pets, pests or children.
- This device does not emit radiation.

**13. Detachable/Removable Parts**

1. Mattress (Detached from the Control Unit by disconnecting the Dual Function Connector). Part No. MAT1610003 (or variants of for the size)
2. Electric power cable. (Removed from the Control Unit by pulling the cable away from the mains inlet on the side of the Control Unit). Part No. SP021016

N.B. The battery is an integral part of the PCB and is not removable or changeable.

**Caution**

**Use of detachable parts not listed is not recommended by Direct Healthcare Group.**

**14. Disposal**

Please refer to DHG website for recommendations and responsibilities for disposal within the UK WEEE guidelines.

# Direct Healthcare Group

Advancing Movement & Health®

Intelligent Pressure Care  
Specialist Seating  
Rental & Service Solutions

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