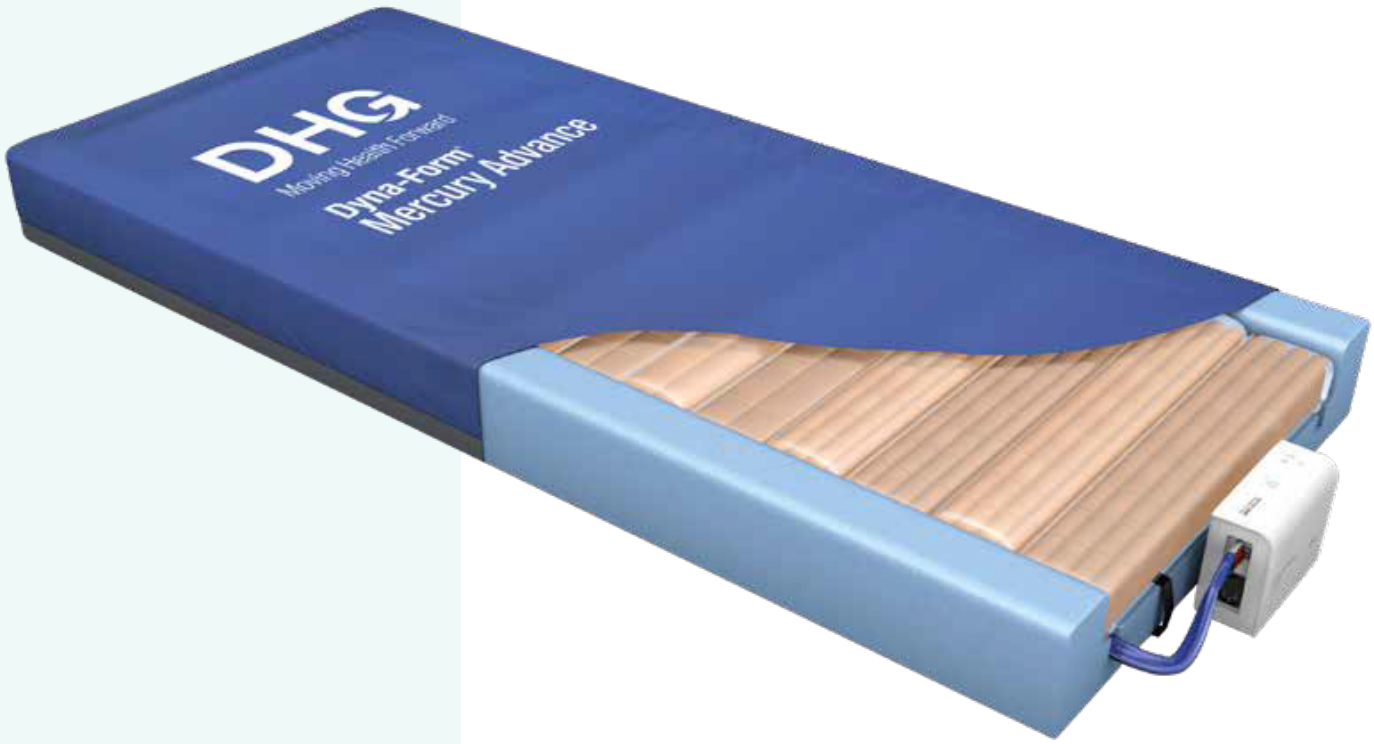
DHG

Moving Health Forward

Dyna-Form®
Mercury Advance

Service Manual



Dyna-Form®
Mercury Advance

The **Dyna-Form® Mercury Advance** 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

The Mattress consists of a foam head cell and series of 14 transverse air cells, each containing a unique foam profiled insert, which are in turn held within a foam U Core, all protected by a vapour permeable waterproof cover. The single head end cell and the formers consist of foam only. The transverse cells are arranged into alternate pairs of A and B cells which are filled and emptied in sequence.

In Static Mode, the mattress attains the pressure reducing properties of the Dyna-Form Mercury static foam mattress (details available on request), whilst in Alternating Mode the mattress is able to offer similar properties to a pressure relieving dynamic system.

The digital Control Unit controls a Control Unit that allows air to flow into, or out of the air cells as required according to the operating mode selected. It also maintains the air pressure within the mattress at the required level and controls the action of the audible/visual Audible Warning system in the event of mains supply failure or over or under inflation pressure. A CPR Valve located at the Control Unit end of the umbilical hose permits the rapid deflation of the Mattress in an emergency.

2. Indications/Contraindications for Use

2.1 Intended Use

Dyna-Form Mercury Advance is a mattress replacement system designed to offer pressure relief and prevention of pressure ulcers to patients spending the majority of their time in bed.

The intended patient population is for individuals aged between Paediatric - Geriatric with a body weight of >10kg.

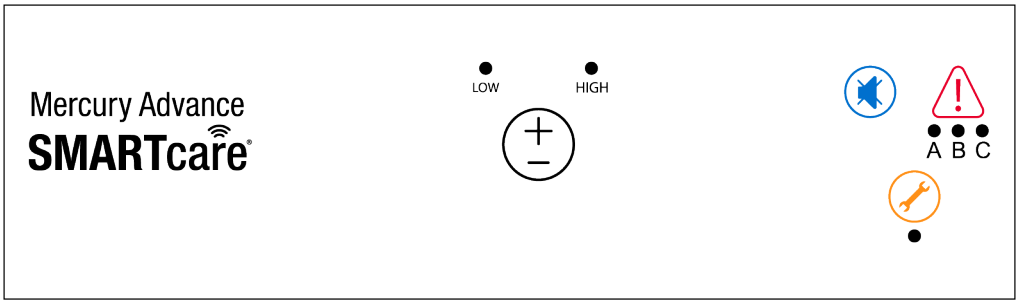
2.2 Contraindications

The Dyna-Form Mercury Advance should not t be used for patients with unstable fractures, gross oedema, burns or intolerance to motion.

3. Quick Reference Guide

This is a quick reference guide for the **Dyna-Form Mercury Advance** System

Product Code MAT1210001



A red indicator light signals a alert, notifying that an immediate response is required.

An orange indicator light signals that a particular mode has been selected or to notify of a necessary service that does not require immediate or prompt action.

Power Switch Audible Alert Reset

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

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

CPR Valve

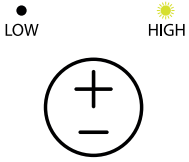
Please ensure that the CPR connector is always placed fully home, prior to inflating the mattress.
NB: The mattress will NOT inflate properly should this not be the case.

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

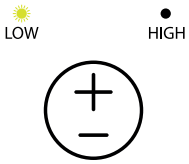
LED Mode Settings

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

This symbol indicates an “Audible Alert Failure”.

Please see troubleshooting guide below for how to re-set.

This symbol, when illuminated, indicates a Service is required.

DHG recommends an annual service. The service light will illuminate 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.

4. Troubleshooting

Warning / Fault	Cause	Solution
Control Unit does not operate; no display lights illuminate	The Control Unit may not be attached to a power source or a fuse may need replacing.	1. Check the Control Unit is connected to mains power outlet with the correct voltage. 2. Check the Control Unit is switched on. Switch off and unplug the unit before restarting. 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. ⚠ Do not try to open the Control Unit. Opening the unit could cause personal injury or equipment damage. ⚠ Ensure the replacement of fuses is carried out accordance with local legislation.
Visual Indicator + Audible Alert 	Mains failure / Other See above, plus:	1. Check the Control Unit is connected to mains power outlet with the correct voltage. 2. Check the Control Unit is switched on. Switch off and unplug the unit before restarting. 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. 4. The warning could indicate pump or pressure sensor failure ⚠ Do not try to open the Control Unit. Opening the unit could cause personal injury or equipment damage. ⚠ Ensure the replacement of fuses is carried out accordance with local legislation.
Visual Indicator + Audible Alert 	Pressure too low	1. Reset the warning – turn off power and press the Audible Warning mute button. 2. Check that the CPR connector is firmly attached to 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 cell is securely attached to its connecting air pipe. 3. Check all cells, pipes and hoses for any air leakage. 4. Check that the air filter cover is correctly secured and the air filter is clean. 5. Switch on power.
Visual Indicator + Audible Alert 	Pressure too low / Air pipe kinked	1. Check Blue external umbilical air pipe that is between mattress and CPR connector is not kinked, twisted or damaged. 2. Check all air hoses along the inside of the mattress – each should be firmly connected. 3. Check each air cell is securely attached to its connecting air pipe.
Visual Indicator + Audible Alert 	Pressure too high	1. Reset the warning – turn off power and press the Audible Warning button. 2. Disconnect the air hoses to reduce pressure, reconnect when pressure has decreased. 3. Check for twists in the air hoses between Mattress and Control Unit.
Visual Indicator + Audible Alert 	Alternating Mode failure (no alternation)	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.
Visual Indicator + Audible Alert 	Initialising failure	1. Press the Audible Warning mute button to silence the Audible Warning. 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. 3. Check that the CPR connector is firmly attached to the Control Unit (located on left of control unit casing).

5. Installation

5.1 Mattress (This is the applied part type BF)

The device should only be installed and used by a clinician or a trained lay operator. A lay operator shall be considered trained once they have fully read this user manual.

The temperature of the Control Unit may have decreased or increased, whilst in storage or during transportation, beyond the limits of the allowable operating temperatures. Do not use the Control Unit until it has been at room temperature (c.20°C) for at least two (2) hours. This time is required for all components of the Control Unit to reach the normal, recommended operating temperature. Place the Dyna-Form Mercury Advance 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.

Typically, the mattress user will be placed in a supine position on the mattress.

Wipe the mattress down before covering the mattress with a loose-fitting sheet.

Static Mattress Use

The Dyna-Form Mercury Advance Mattress 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.

Alternating Mattress Use

If / When required, the Dyna-Form Mercury Advance Mattress can be used as an alternating mattress system by attaching the Dyna-Form Mercury Advance Control Unit system. **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 Dyna-Form Mercury Advance is a replacement mattress system and should NOT be placed on top of any existing mattress.

The startup time from static to dynamic mode is immediate.

5.2 Control Unit

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

(a) Open the zip located at the bottom left hand side of the mattress and pull out the Blue Umbilical hose

(b) Attach the Blue Umbilical Hose to the Control Unit by connecting the air connector at the end of the Umbilical Hose to the air inlet connector at the bottom left hand side of the Control Unit. Ensure that the Red CPR Release button is located on top of the Air Inlet connector after connection is complete.

(c) 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.

(d) Shut down is the reverse of items a, b & c above.

The expected operator position of the control unit is from the foot end of the bed. The expected position of the user, under normal use, is centrally placed on the mattress in the supine, side lying or prone position.

6. Operation

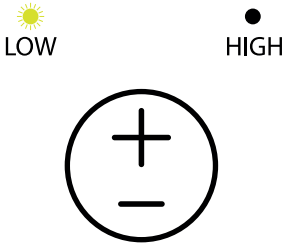
Attach the supplied mains cable to the Control Unit by inserting the “kettle” type connector into the recess located on the left-hand side of the Control Unit. The mains cable has been designed specifically as a removable part to aid in easy replacement should it become damaged in use.

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.

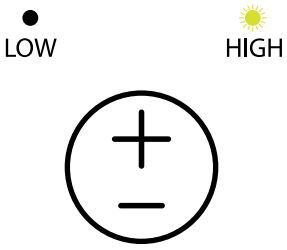
Plug the mains cable into a suitable 230v mains socket and switch on the Control Unit using the on/off switch.

After the Control Unit has been turned on both the “High “and the “Low” lights will fl ash 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.



6.1 Low / High Settings

The Dyna-Form Mercury Advance 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.

6.2 CPR Deflation

The CPR system consists of a manually operated button located on the Air Inlet connector attached to the Control Unit. By pressing the Red Button, which will release the connector locking system, the user can remove the connector unit which will deflate the mattress air system back to that of a static foam mattress.

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

6.3 Terminating Operation

The active therapy can be terminated and returned to a static pressure redistributing mattress by switching off the On/Off switch.

6.4 Troubleshooting

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

5.4 Fire Evacuation System (If Applicable)

The Dyna-Form Mercury Advance can be fitted with an optional fire evacuation system. In the event of an evacuation occurring, the following steps should be taken to provide the safest possible transport of the user:

1. The Dyna-Form Mercury Advance Fire Evac system has clearly marked instructions on the foot and head for ease of use.

2. Open the zips at the shortest ends of the mattress (head end and foot end) to gain access to the Fire Evac harness system.

3. Pull out harnesses from the mattress and remove the patient securing straps.

4. Place patient securing straps around both the mattress and the patient, adjust the straps accordingly to ensure the patient is secure.

5. Drag both the mattress and the patient on the floor to an area of safety.

7. Transportation

To change the location of the mattress, remove the Umbilical Cord 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.

8. Alerts

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

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

8.1 High Pressure Alert

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

8.2 Low Pressure Alert

This condition could be caused, for example, by incorrect fitting of the air inlet connector, opening of the CPR Valve or a leak in the Mattress due to a cut or puncture.

8.3 Mains Failure Alert or Other

This condition may be caused, for example if mains power is lost or failure of the pressure sensor or pump.

8.4 Alternating Mode Failure (no alternation)

This will be indicated by a visual indicator LED on A and B and an Audible Alert.

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

8.5 Initialising Failure

This will be indicated by a visual indicator LED on A, B and C and an Audible Alert.

1. Press the Audible Alert mute button to silence the Audible Alert.
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.

9. Maintenance Procedures

9.1 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. Maintenance shall not be carried out when the equipment is in use with the patient.

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

9.1.1 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 9.1.

DHG will make available on request all manuals, component parts lists and other information necessary for any suitably qualified person (As in 9.1) to carry out repair or service the system. For service, maintenance and any questions regarding this please contact DHG.

9.2 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.

9.3 Warning – Cleaning the Mattress

1. Cleaning should take place before and after use, and 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 Hypochlorite solution or equivalent disinfectant.
4. Wash Mattress top using hot water (60 degrees C) containing detergent – dry with a paper towel.
5. Use a Hypochlorite solution 1,000 parts per million available chlorine. For heavy contamination use a Hypochlorite solution 10,000 parts per million available chlorine. Please ensure thorough rinsing after cleaning.
6. Using suitable brush, hot water, detergent or Hypochlorite solution, clean Umbilical Hose and CPR Valve. 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.

9.4 Warning – Cleaning the Control Unit

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

9.4.1 Warning

Ensure the Mercury Advance System is not exposed to:

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

9.5 Serial Number Identification

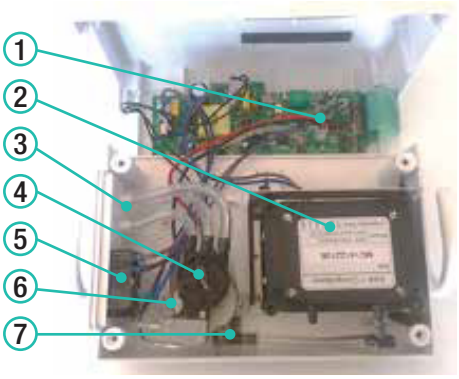
The Control Unit is identified by serial number and GS1 compliant barcoding using both 128 and 2D bar code identifiers.

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

9.6 Opening the Control Unit

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

9.7 System Layout

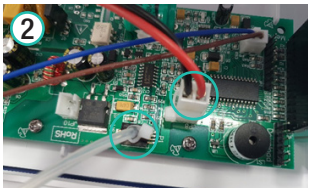


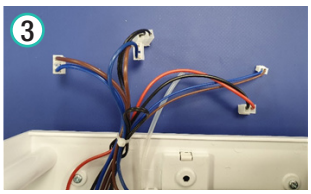
1. Control PCBA
2. Compressor
3. Air outlets
4. Rotor valve
5. IEC power inlet
6. Rotor valve motor
7. Micro switch

9.8 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 preset 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.

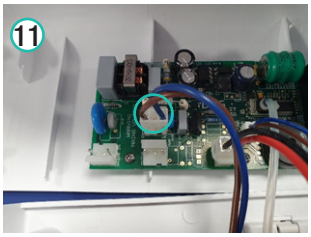
9.8.1 Checking LEDs, Buttons and Sounder





1. Disconnect the tube from Compressor. This will illuminate LED C. Reconnect the tube to the Compressor.
2. Disconnect the Mains Rotor Wire from the PCB. This will illuminate LED A and B after 5-10 minutes. Reconnect the Mains Rotor Wire to the PCB.
3. Press both buttons on top of the control unit and hold for 3 seconds. This will illuminate the Service Light LED and an audible sound will confirm both buttons are working. Press and hold both buttons again for 3 seconds to extinguish the Service Light LED.

9.9 PCBA Replacement

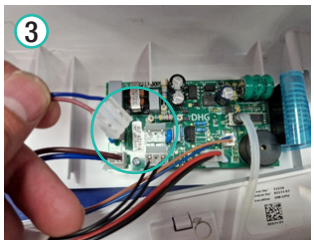


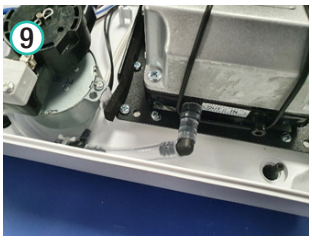
1. Release the four fixing screws from the rear of the unit connecting the case front and rear together. Retain screw for reassembly (see 9.6 Opening the Control Unit).
2. Pull sensor tube off pressure sensor and remove cable tie and cut cable tie off switch wire header and disconnect switch wire.
3. Disconnect the rest of the wire headers from the PCB.
4. Disconnect the Mercury Advance membrane 14 way single row header from the PCB.
5. Release the three fixings securing the faulty PCB to the front enclosure. Retain the fixings for reassembly. Remove the faulty PCB by sliding forwards towards the edge of the front enclosure away from the retaining posts.
6. Side new PCB into position so it is lined up with the two fixing holes and it is secured by its retaining posts.
7. Secure new PCB into front enclosure using two fixings retained from disassembly.
8. Connect pressure sensor tube to pressure sensor on PCB and apply cable tie.
9. Connect switch header from IEC to the PCB and apply cable tie.

10. Connect Mercury Advance membrane 14 way header to the PCB, make sure that all pins of the header are connected.
11. Connect compressor/pump header to the PCB.
12. Connect motor header to the PCB.
13. Finally connect mains in header to the PCB.

9.10 Compressor Replacement

1. Release the four fixing screws from the rear of the unit connecting the case front and rear together. Retain the fixings for reassembly
2. Carefully cut cable tie that is around the main wiring loom to release the pump wires and cut cable tie securing pump wires to the rear case.
3. Disconnect the pump wire connector from the PCB header by pulling upwards.
4. Disconnect tube from pump outlet spout.
5. Release the six screws that connects the pump bracket to the rear enclosure. There are three screws either side of the pump. Retain the fixings for reassembly.
6. Remove faulty pump from rear enclosure.
7. Fix pump bracket with new pump assembly in to rear enclosure using screws retained from removal of faulty pump. Be careful not to overtighten screws and damage the fixing point. If a torque driver is present when swapping pumps, the torque setting for the six fixings is 0.7Nm.
8. Connect the new pump wire connector into PCB and secure the main wiring loom with cable tie and secure pump wires to rear case.
9. Connect the tubing from t-piece to the pump spout marked as “OUT”.
10. Close power unit enclosures together making sure to not trap pressure sensor tube and fix enclosures together using fixings retained from disassembly. If a torque driver is present when swapping pumps, the torque setting for the six fixings is 1.2Nm.
    Attach the power unit to a mattress and ensure everything is functioning correctly.





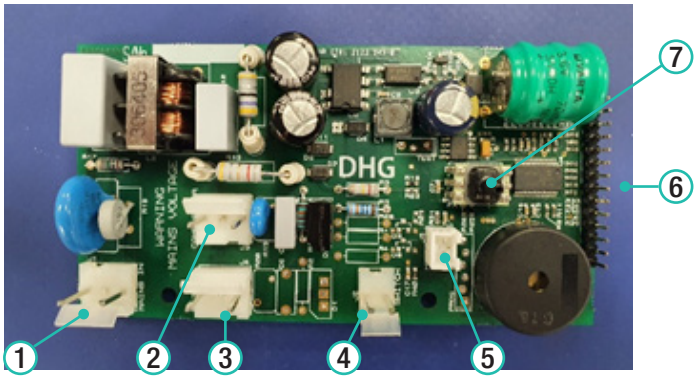
9.10.1 Servicing the Compressor

1. Connect Compressor Test Kit (12570) to the out port on Compressor.
2. Check minimum pressures and flow as outlined below:
   Pressure = 100mmHg
   Flow = 5L per minute

9.11 The Components

The main components in the Mercury Advance control unit:

9.11.1 PCBA



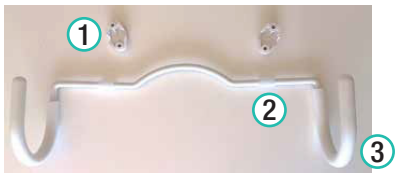
1. Mains in from IEC
2. Compressor
3. Motor
4. Switch in from IEC
5. Micro switch
6. Membrane ribbon cable
7. Pressure sensor tube

9.11.2 The Compressor

The compressor should be swapped out as a whole component.

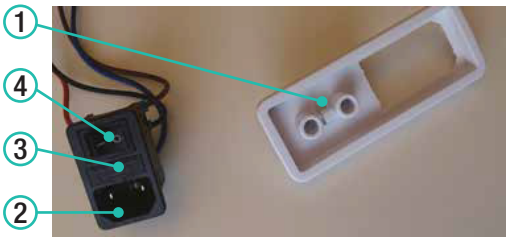
9.11.3 Rotor Valve with Motor

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



9.11.4 The Hooks

1. Hook attachment
2. Rubber suspension
3. Hook



9.11.5 Air Inlet / Power Outlet

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

9.12 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.

9.13 Fuse

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

9.14 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.

10. Technical Specification

Declaration - Electromagnetic Emissions - for all ME EQUIPMENT and ME SYSTEMS

Guidance and Manufacturer's Declaration – Electromagnetic Emission The MAT1210001 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.		
Emission Test	**Compliance**	**Electromagnetic Environment - Guidance**
RDF 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	

10. Technical Specification

Declaration - Electromagnetic Immunity

Guidance and Manufacturer's Declaration – Electromagnetic Emission
The MAT1210001 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	±8 kV contact ±2kV, ±4kV, ±8kV		±8 kV contact ±15 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) ±0.5kV, ±1kV, ±2kV Line to ground		±1 kV differential mode ±2kV Line to ground		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 $\%U_T$	Period (Cycles)	Voltage Dips $\%U_T$	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 $\%\ U_T$	Seconds	Voltage Interruption $\%\ U_T$	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_T is the a.c. mains voltage prior to application of the test level.					

10. Technical Specification

Declaration - Electromagnetic Immunity - for all ME EQUIPMENT and ME SYSTEMS that are not LIFE-SUPPORTING

Guidance and Manufacturer's Declaration – Electromagnetic Immunity
The MAT1210001 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
Conducted RF IEC 61000- 4-6 Radiated RF IEC 61000-4-3	3 V_{rms} 150 kHz to 80 MHz 3 V/m (Professional Healthcare Environment) 10 V/m (Home Healthcare Environment) 80 MHz at 2.7 GHz	3 V_{rms} 10 V/m	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. Recommended separation distance $d = 1.167\sqrt{P}$ $d = 1.167\sqrt{P}$ 80 MHz to 800 MHz $d = 2.333\sqrt{P}$ 800 MHz to 2.7 GHz Where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site 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:

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. 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.

b. Over the frequency range 150kHz to 80MHz, field strengths should be less than 3V/m.

10. 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 MAT1210001 Alternating Control Unit.

The MAT1210001 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.

Related 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.

11. Technical Data

11.1.1 Control Unit

Serial Number ..... As per label on rear of Control Unit

Electrical Supply ..... 220-240VAC, 50/60Hz or 100-120VAC, 50/60Hz

Power Rating 7.5-10VA (220-240VAC), 5.5-9VAC (100-120VAC)

Fuses TA1H 250V

Protection Against Shock ..... Class 2

Noise Level ..... Approx. 30 dB (A)

Dimensions ..... 245 x 160 x 95mm

Weight 1.7kg

Service Interval ..... 12 months / 8760 hours

Expected Life ..... 5 years

Shelf Life of Parts ..... 5 years

11.1.2 Mattress

Serial Number ..... Label on inside of mattress cover

Number of Air Cells ..... 14 Air Cells / 1 Static Foam Cell

Dimensions ..... 1980 x 880 x 150mm (Nominal)

Weight 13.3kg

Expected Life of Mattress ..... 5 years

Shelf Life of Mattress Parts ..... 5 years

12. Optimum Conditions

(Applies to mattress and Control Unit)

12.1 Environmental 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

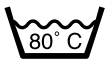
Operational Altitude ..... ≤2000m

12.2 Exposure

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

13. Symbols Guide

Mattress Symbols



WASH AT 80°C

TUMBLE DRY ON LOW

DO NOT DRY CLEAN

REFER TO USER MANUAL

TYPE BF APPLIED PART

DO NOT BLEACH

DO NOT IRON

NO SMOKING

MAXIMUM USER WEIGHT LIMIT 254KG / 40 STONE

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

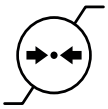
General Symbols

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

MEDICAL DEVICE

IP22

IP: INGRESS PROTECTION
2: PROTECTION AGAINST FINGERS OR OTHER OBJECTS NOT GREATER THAN 80MM IN LENGTH AND 12MM IN DIAMETER
2: PROTECTION AGAINST FALLING DROPS OF WATER, IF THE CASE IS DISPOSED UP TO 15° FROM VERTICAL

Contraindications For Use (Warning)

The Mercury Advance 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 (i.e. a radiator) as this excessive exposure to heat may weaken the cell material.
- 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.
- Products are free from TSE species derived materials, medicinal substances, human blood derivatives and phthalates.
- 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 'Hi' 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.

14. Detachable/Removable Parts

1. Mattress (Detached from the Control Unit by removing the CPR connector). Part No. MAT1210061 (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.

15. Disposal

All contaminated mattresses must be disposed of as clinical waste in accordance with regional and local regulation and guidelines.

Control units are electrical/electronic medical devices and must be disposed of in line with the Waste Electrical and Electronic Equipment Directive (WEEE).

Please refer to www.dhg-healthcare.com for recommendations and responsibilities for disposal with the UK WEEE guidelines.

Moving Health Forward

PRESSURE ULCER PREVENTION
SAFE MOVING & HANDLING
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