Air Sure User Manual

Alternating pressure mattress for prophylaxis and treatment of pressure sores

Indications for use

- **The Air Sure has been developed as a "state of the art" pressure relieving system for**

Very high-risk patients and for prevention and management of all grades of pressure sores.

Contra indications

- **As with all alternating mattress systems, the Air Sure is contra indicated for use where patients have unstable fractures or spinal injuries.**

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1. How the Product works

1.1. Introduction

The objective of the product is to relieve the pressure created under a patient when lying on a bed so that blood flow is maintained and tissue oxygenation achieved. It does this by intermittently removing the pressure from the patient by sequentially deflating the supporting air cells of the mattress. The Power Unit provides the source of energy to achieve this and also the necessary monitoring and control systems for efficient and safe operation.

In simple terms the air compressor delivers air to the solenoid valves controlling the flow of air into and out of the mattress air cells. The pressure of the air within the mattress is continuously monitored by the solid-state pressure sensor enabling the inflation pressure to be directly controlled and varied to achieve the desired comfort level.

The software based control system operates the solenoid valves to enable 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 air cells at the required level and controls the action of the alarm system in the event of mains supply failure or over or under inflation pressures occurring.

2. Installation

2.1. Installation of the Mattress

Remove the hospital mattress and make sure that the slatted base frame is free of pointed or sharp objects to avoid damaging the Mattress.

Place the Air Sure Mattress on the bed. Ensure that the removable cover is on top and that the umbilical hose is at the foot end of the bed. Fasten the Mattress to the bed frame using the straps on the base of the Mattress. The straps should not be too tight and should not interfere with the operation of the bed. They should be checked regularly.

Cover the Mattress with a loose fitting sheet.

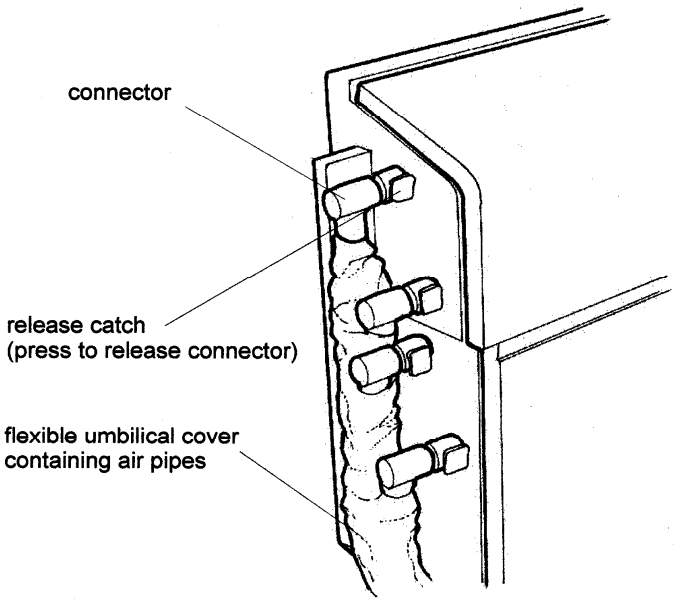
2.2. Installation of the Power Unit

Hang the Power Unit onto the footboard. The mounting hooks swivel to suit the thickness of the footboard or rail. The hooks also adjust vertically with click-stop locations at 20mm intervals. The Power Unit should be supported until the correct position has been achieved and the black clamping screws firmly tightened (for convenience the clamping screw orientation can be changed by depressing the orange button and freely rotating the clamp screw arms to an optimum position)

2.3. Connecting the Umbilical

Connect the Umbilical hose to the Power Unit by inserting the 4 male probes into the female quick-connect valves. The end probe is inserted into the top valve and the other three probes are then aligned with their corresponding valves. The Head Cell/Former supply probe is physically non-interchangeable with the other 3 probes to prevent cross coupling. When they are correctly connected an audible ‘click’ will be heard.

fig:1 assembly of umbilical to unit



2.4. Electrical Supply cable

Remove the mains cable from its storage housing in the base of the Power Unit by rotating the two retaining arms so that the cable is no longer restrained and plug into a suitable 230v mains socket. Any surplus cable can be rewound and stored within the Power Unit.

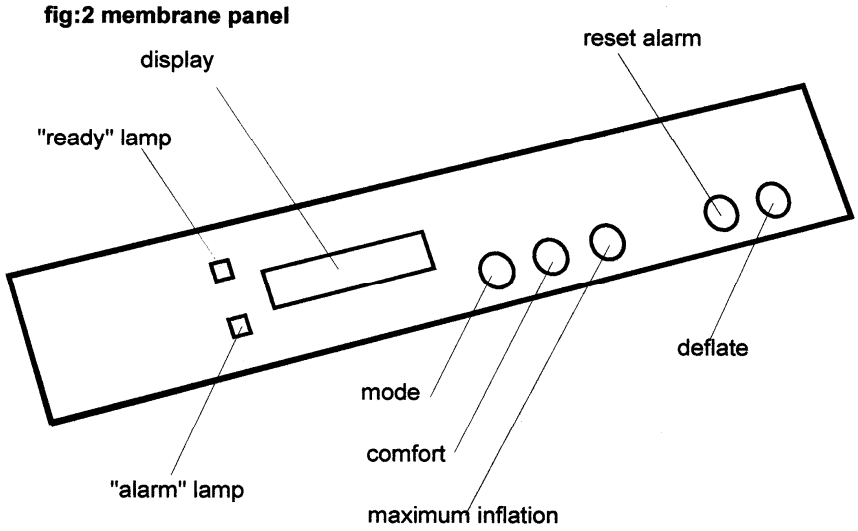
2.5. Switch On

Switch on the Power Unit using the mains on/off switch. The message 'Please Wait – Setting Pressure' appears on the display and remains until the Mattress is fully inflated. The green 'Ready' LED is illuminated showing that the System is now available for use.

3. Start Up

When the Power Unit is switched on the display shows the message 'Please wait – Adjusting Pressure'. The Pressure Sensor monitors the pressure in the Former/Head Cell supply line and when the inflation pressure reaches 50mmHg the system is switched into its operating mode and the green 'Ready' LED is illuminated.

fig:2 membrane panel



3.1. Dynamic Mode

This mode of operation and the 'Firm' comfort setting are automatically selected at the end of the initial inflation phase. The Display message shown is 'Dynamic – Comfort: Firm'.

3.2. Static Mode

This mode is selected by pressing the Mode switch on the membrane panel. The Display message shown is: Static – Comfort: Firm (or other setting selected, see 3.1.5). The Mode is automatically limited to a maximum time of 2 hours, after which, for reasons of clinical safety, the System switches into the Dynamic Mode.

3.3. Comfort Settings

The air pressure within the Cells can be varied to provide varying degrees of comfort to suit patient or clinical needs. Three settings; Firm, Medium and Soft are provided equating to nominal inflation pressures of 50,40 and 30mmHg. Pressing the 'Comfort' switch cycles the System through the three settings in turn. The setting selected is displayed on the message panel e.g. Comfort: Medium.

If the setting selected equates to a higher pressure than that already in the Cells the System switches into the inflation phase until the pressure selected is reached. If the existing pressure is too high the System switches into the deflation phase until the required pressure reduction is achieved. The Comfort setting is independent of the Dynamic and Static settings

3.4. Maximum Inflation

This is a variant of the Static mode in which the Cell pressure is increased to a nominal value of 60mmHg (65mmHg in High Pressure option) in order to provide a rigid, stable surface when physiotherapy and other nursing procedures are being carried out.

This mode is limited to a maximum of 20 minutes although it can be extended for a further 20 minutes by pressing the Maximum Inflation switch at any point during this period. The initial display message reads: Max. Pressure – 20 min. Remain. The time counts down 20, 19, 18, etc, until at the end of 20 minutes the System automatically

switches to Dynamic cycling at the previously selected Comfort setting. The Maximum Inflation mode can also be ended, at any time, by pressing the Mode switch.

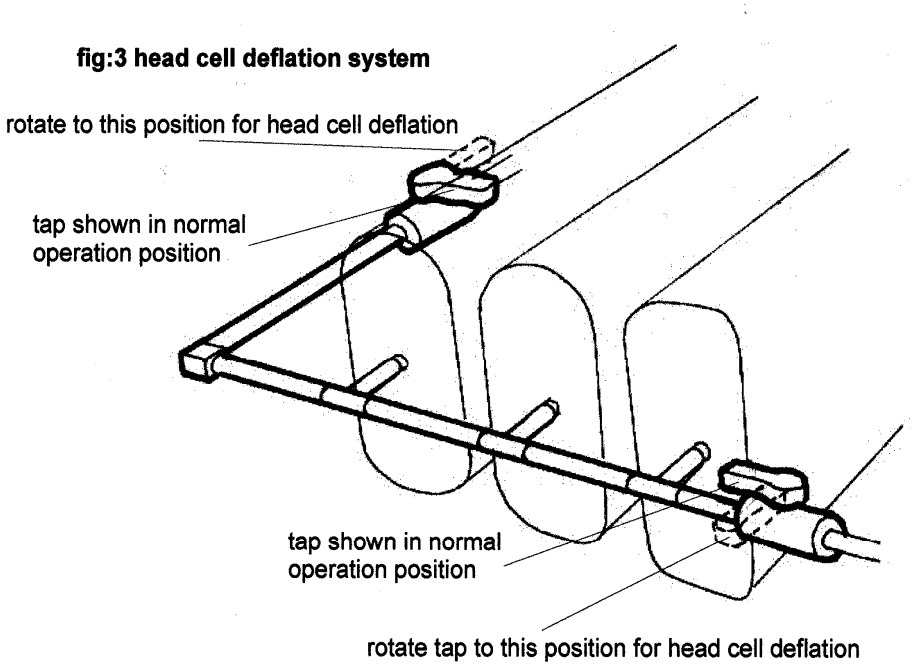
3.5. Deflation

In this mode, selected by pressing the Alarm Cancel and Deflate switches simultaneously, the Cells are emptied of air. The initial display message reads: Deflate – 20mins Remain. The time counts down 20, 19, 18, etc, until at the end of 20 minutes the System automatically switches off, the Valves are de-energised and the Compressor ceases to run. The display message changes to: Deflate Complete.

3.6. Head Cell Deflation

The Head Cells normally remain constantly inflated (together with the Formers) at the pressure selected by the Comfort switch.

fig:3 head cell deflation system



Clinically it may be necessary to nurse patients in a prone position i.e. face down. To facilitate this it is desirable to deflate the Head Cells to create a void in front of the patient's face. This is achieved by reversing the settings of the two On/Off taps fitted in the Head Cell tubing circuit. Access is gained via a small zip located at the left hand side of the head end.

To deflate the Head Cell first close the on/off tap fitted to the supply tube, which runs along the side of the mattress. This isolates the Head Cells from the Formers. Then open the on/off tap at the free end of the tubing (situated at the end of the mattress). This opens the Head Cells to the atmosphere and the Cells deflate.

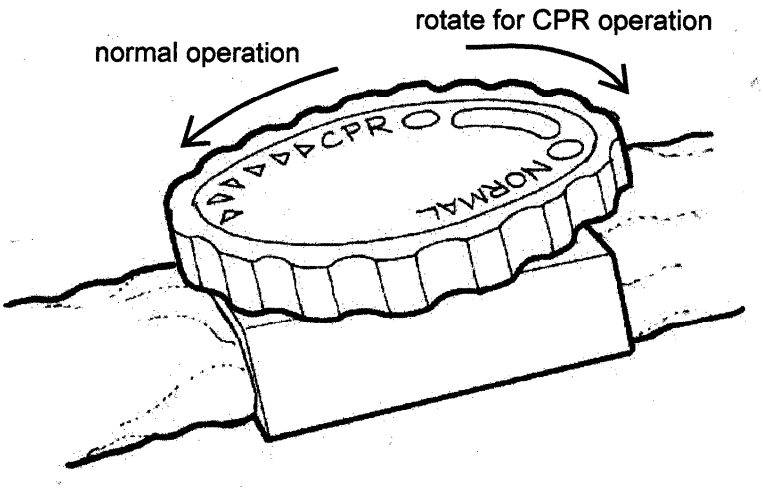
Note: The Formers must remain inflated at the Comfort setting selected as they now act as the sole reservoir monitored by the System's pressure sensor. If the pressure in the Formers is allowed to fall significantly as a result of opening the on/ff taps in the wrong sequence the 'Low Pressure' Alarm would be activated.

To re-inflate the Head Cells, first close the end on/off tap and then open the supply line tap.

3.7. CPR Deflation

The CPR Valve consists of a manually operated rotary action Valve incorporating 4 individual, large bore, spring loaded, dump valves which, when opened, connect all the Cells and Formers to atmosphere achieving rapid Mattress deflation. For convenience and accessibility the Valve is mounted in the umbilical between the Mattress and Power Unit.

fig:4 CPR valve operation



Turning the red operating knob clockwise to the 'CPR' position activates the Valve. As the Mattress deflates the 'Low Pressure' alarm will be activated and should be cancelled by pressing the 'Alarm Reset' button and switching the Power Unit off.

Warning: Close the CPR Valve by rotating the red knob anti-clockwise to the 'Normal' position before switching the Power Unit on again.

3.8. Transportation

To change the location of the bed, switch the system to 'Static' and allow all the cells to fully inflate. Switch off the Power Unit using the on/off switch and disconnect the electrical supply cable from the mains socket. The bed can now be moved to a new location where it must immediately be reconnected to the mains electrical supply and the system switched back on. Once the mattress has been refilled, the system will automatically switch into the 'Dynamic' mode at the 'Firm' comfort setting. Other settings may then be selected as required.

To move the patient and mattress, e.g. by trolley, switch the system to 'Static' and allow all the cells to fully inflate. Then switch off the Power Unit and disconnect the umbilical hose by depressing the metal actuator buttons on the four quick-connect valves at the side of the Power Unit and withdrawing the probes. The mattress can now be moved independently and will remain inflated for several hours. It should be reconnected with the power unit and mains electrical supply as soon as practicable.

Warning: The mattress will not 'alternate' when disconnected from the power unit and/or the mains electrical supply and hence not provide optimal pressure relief.

4. Maintenance Procedures

4.1. Safety

Only qualified electricians trained or formally approved by DHS Ltd. in the operation and maintenance of DHS products may carry out maintenance, modification or repair work on DHS Power Units.

Unqualified personnel attempting to work on DHS Power Units risk serious injury to themselves and others, and possibly death by electrocution.

4.2. Cleaning Procedures

WARNING: Before cleaning the System make sure that the Power Unit is disconnected from the mains electricity supply.

- Do not immerse the Power Unit in water or other fluids.
- Do not autoclave, nor use Phenol for cleaning.
- Do wash hands before commencing the cleaning process. Don appropriate protective clothing such as gloves, apron and a mask. Ensure all work surfaces are cleaned before and after contact with the mattress.

4.3. Cleaning the Mattress

1. With cover left on the Mattress disconnect the Mattress from the Power Unit.
2. Clean the surface of the wash down table with Hypochlorite solution or equivalent disinfectant.
3. Wash Mattress top using hot water (60 degrees C) containing detergent – dry with paper towel.
4. Fold Mattress in half, from head to foot end, clean table and the exposed bottom half of Mattress. Dry with paper towel
5. Invert folded mattress to top half of table, clean table and the exposed half of Mattress. Dry with paper towel.
6. Repeat 3 to 5 using Hypochlorite solution 1,000 parts per million available chlorine.
7. Using suitable brush, hot water, detergent and Hypochlorite solution, clean Umbilical and CPR Valve. Dry with paper towel.
8. If required, the Mattress Cover may be removed and machine-washed at a temperature of 90 degrees C, for not less than 10 minutes. The individual Air Cells can be wiped down with established disinfectants.
9. The Mattress Cover may be sterilised using ETO or Draeger processes.

4.4. Cleaning the Power Unit

The Power Unit can be cleaned by wiping with a cloth dampened with a detergent solution, Hypochlorite solution.

5. Technical Data

Air Sure complies with EN 60601-1: 1990 + A1: 1993

5.1. Power Unit

Serial Number	On rear Label
Electrical Supply	230 volt, 50 Hz
Power Consumption	Max – 100 watts
Fuses	2 x 1 amp (internal)
Compressor Rating	24 litres/minute at 0.01 MPa
Protection against shock	Class II
Class of Equipment	Class B
Noise Level	Approx. 30 dB (A)
Dimensions	480 x 225 x 130
Weight	6.8 kg
Service Interval	12 months

5.2. Mattress

Serial Number	Internal, at foot end
Number of Air Cells	18
Dimensions	1900 x 870 x 250 (Nominal)
Weight	8.2 kg

6. Supplier Address

Direct Healthcare Services Limited
Unit 8, Withey Court
Western Industrial Estate
CF83 1BF
United Kingdom
Tel: 0845 459 9831
Fax: 0845 459 9832

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Products undergo continuous further development. We therefore reserve the right to change the specifications of the product and the warranty conditions without prior notice.

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Manufactured in the UK