






# Contents

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**Mattress Variator**

**Instruction Manual**



# INSTRUCTIONS FOR USE

## EQUIPMENT

To set up the equipment you will need the following:

Mattress Variator Frame, Control Unit and a Hose.

All of these are supplied by Centromed. The Control Unit could be a standard, quiet or dual output version. The Frame could be any of the three standard sizes available for beds. The Hose is supplied with the Control Unit.

## FITTING

The frames can be fitted to almost any bed by means of straps and buckles supplied with the frame. See diagrams for details. To fit the Mattress Variator to the bed it will be necessary to remove the mattress itself. Fit the main frame to the base of the bed at the head end. The frame should be placed with its base against the base of the bed (the base of the frame has the air connections on it). The two straps that are fitted to the lower frame should be looped underneath the bed and attached to the buckles on the other side, and pulled tight. Now the mattress should be replaced and the remaining strap (attached to the upper part of the frame), should be looped over the mattress, attached to the buckle on the other side and pulled tight. The frame is now fitted and the Hose will need connecting. A black cap is fitted to the lower rear part of the frame on one side and can be moved from side to side. This enables the Control Unit and Hose to be fitted to either side. Connect the Hose to the Frame and Control Unit, plug the Control Unit in to a mains outlet and switch on.



Example of a Mattress Variator fitted to a Divan bed (this bed has a slatted top which is not a common feature).

## USING YOUR MATTRESS VARIATOR

Control Unit Plus users should disregard this passage and read the instructions that came with your Control Unit Plus. The handset is a pneumatic device, which uses air to activate the main switches that are located inside the control unit. No electrical component whatsoever is connected to either the bed or the user. It has two buttons, one to raise the Mattress Variator and one to lower the Mattress Variator. When the Mattress Variator reaches 90° the valve plate will open stopping it from raising any further.

## APPLICATION

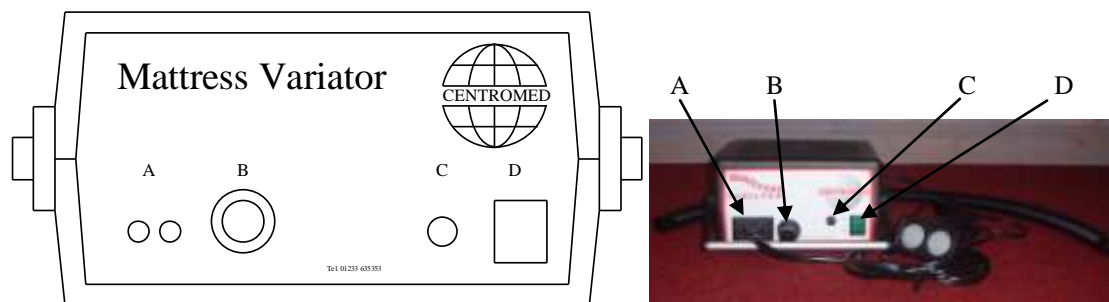
The Mattress Variator is a fully portable device for people who experience problems getting in and out of bed or getting to a sitting position. The Mattress Variator is easily fitted to beds, and can support a patient in variable positions for added comfort

## VARIANTS

The Mattress Variator is available in several variants these include different sizes of lifting frame and control unit options.

## CONTROL UNIT OPTIONS

The Mattress Variator comes with the standard pump unless a special version is requested. These special versions include the Hi/Low pump, which has a switch to slow down the air compressor, to reduce the speed and noise. Also available is a super quiet Qutee version with slow movement and very little noise. A dual unit called the Control Unit Plus is available to power both your Leg Lifter and your Mattress Variator. This unit is also available in a Qutee super quiet or Hi/Low version. Each of the above versions are available with an Environmental Control option for connection to Possum or Fox environmental control systems (ECS).



Front panel Showing: A) Handset Connections. B) Hose Connection.  
C) Fuse Holder. D) Mains Switch.

## FRAME OPTIONS

The Mattress Variator standard single bed size is 760 mm x 710 mm (30" x 28"), the standard three quarter bed size is 1120 mm x 710 mm (44" x 28") and the standard double bed size is 1270 mm x 710mm (50" x 28").

## SERVICING

The mattress Variator should be serviced once a year. The unit should be cleaned and tested for electrical safety (P.A.T.).

# REPAIRS

*Note: If this equipment was supplied by Centromed, you may contact us on the details given towards the back of this manual. If the equipment was supplied to you by another company, please contact this supplying company with regards to repairs.*

## SAFETY WARNING

This control unit is mains powered. Ensure it is disconnected from the mains before opening the case. This unit is intended to be serviced by qualified personnel only.

## PARTS AVAILABLE FROM CENTROMED

Code	Part Description	Code	Part Description
100/S	Case	100/F	Front Panel
106	Air Switch	107	Twin Tubing per meter
107/A	Single Tubing per meter	108S	Fan Motor unit
109	Solenoid	110	Mains Switch
111	Fuse Holder and Fuse	112	Wiring Loom
119	Outlet Pipe	124	Single Frame Rod
125	Single Frame Bottom	126	Double Frame Top
127	Double Frame Bottom	129	Rubber End Stop
134	Fuse 5Amp 250V 20mm	140	Rod End Cap
146	½" BSP Plug	152	Mains Lead
160	Brass Screw M3 x 12mm	160A	Brass nut M3
183	Front Panel Overlay	902	Cable Tie Small White
903	Cable Tie Black	910	M3 Ring Terminals
913	Terminal 0.25 Blue	915	Terminal 0.187 Bare
925	Sealant	929	Screw No.8 x 19mm
942	Terminal 0.187 Red	943	Terminal 0.25 Red
969	Screw M3 x 16mm	B	Buckle
BL	Bellows	DR	Double Length Rod
DS	Double Length Strap	HB	Button Handset
H	Hose	LHB	Lever Style Handset
HE	Hose Extended	R	Single Length Rod
S	Seal for Bellows	SS	Single Length Strap
V	Valve Plate	DS	Double Length Strap

## CONTROL UNIT REPAIR FLOWCHART EXPLANATIONS

A Does the green switch in the Control unit light up when it is switched on?

B. Is the Control unit plugged in and switched on?

C. Ensure that the Control unit is plugged in to a wall socket and that the socket is switched on. Also, check the main switch on the front panel is switched on, i.e. pressed in at the top.

D. Is the fuse in the Control unit OK?

E. The fuse in the unit is intended to blow if there is an electrical fault inside the unit. If this fuse has blown, check for any faults before replacing the fuse. Ensure all wires are in place and not damaged. Look

for signs of heat damage to the solenoid, pump casing and air switches. If there is any signs of damage to the parts or wiring the parts or wiring must be replaced. As an additional check a normal solenoid has 0.9 to 1K resistance across it's terminals and the motor about 10 to 30 Ohm resistance. The air switches are detailed on their sides for their switching pattern, this can be checked with a multimeter. The fuse should only be replaced by one of the same type. The fuse fitted to this unit is a 5 Amp, 250 V, ceramic antisurge (T) type.

F. Is the fuse in the plug OK?

G. The fuse in the plug is intended to blow if the Mains Lead is damaged. If this fuse has blown check the mains lead for damage before replacing the fuse. If there is any damage to the mains lead it should be replaced. To replace the Mains lead it will be necessary to remove the lid of the machine, this is done by removing the six screws in the upper case. Remove the mains lead connections from the fuse holder and mains switch. Undo the two screws holding the mains lead at the back panel, cut the terminals from the end of the mains lead and pull the mains lead from the unit. Refitting is the reverse of removal ensuring the new terminals are fitted after the lead is pushed through the hole, and the blue wire is fitted to the switch and the brown to the fuse holder.

H. If the Unit is switched on and the light in the switch does not come on the fuses should be checked first. Then the Mains Lead should be tested with a continuity meter, (including the brown wire from the fuse holder to the mains switch), if a fault is found it should be replaced as above (2). If no fault is found the mains switch should be replaced. This is done by squeezing the switch top and bottom inside the unit, then pushing it out of the control unit. Ensure the wires are replaced in the same places they are removed.

I. With the control unit switched off, press each button on the handset and listen for the quiet click produced inside the control unit by the handset.

J. Check which type of handset you have first. There are 4 types. 1) Green and white push buttons with integral twin tubing, 2) Yellow or grey large circular buttons without integral twin tubing, 3) Blue or Yellow topped lever style without integral twin tubing. 4) Black with grey push buttons that are able to rotate. Type 1 & 4 handsets disconnect from the control unit at the front panel and replacements are supplied with twin tubing. Type 2 & 3 handsets disconnect at the handset end and replacements are not supplied with twin tubing. The different types of handset are interchangeable. To change a type 1 handset, carefully pull the tubes from the barbs in the front panel, and reconnect the new handset. To change a type 2 or 3 handset, pull the tubing from the handset and reconnect the new handset. Both types of handset will require testing to check that the connections are the correct way round.

K. If the Control unit does not work after the handset has been changed, replace the air switch.

L. To change an Air Switch it is necessary to remove the lid of the equipment. CAUTION this equipment is mains powered and should be isolated from the mains before it is opened. To remove the lid undo the 6 (six) screws in the upper case, (2 in each side and back), squeeze the sides of the lid inward to release the lid from the handle moulding. The air switches are mounted on the inside of the front panel. The "up" air switch has only 2 (two) wires while the down air switch has 3 (three) wires. Pull each wire from the switch to be changed and attach it to the new switch in the corresponding position, then unscrew the old switch from the front panel and attach the new one. Refit the lid before testing the unit.

M. Test the unit operates correctly now the new switch has been fitted. If it does not the wiring should be checked.

N. To check that the wiring is in place it will be necessary to remove the lid of the equipment. CAUTION this equipment is mains powered and should be isolated from the mains before it is opened. To remove the

lid undo the 6 (six) screws in the upper case, (2 in each side and back), squeeze the sides of the lid inward to release the lid from the handle moulding. The wiring is based around the two air switches mounted on the front panel, but also included are the mains switch, solenoid valve and fan-motor. The blue wire from the top of the mains switch goes to the fan motor housing, and then continues to the solenoid valve. The brown wire goes from the top of the mains switch to the middle terminal on both of the air switches. The white wire goes from the terminal closest to the front panel (lower terminal) on the down air switch to the fan motor housing. The red wire goes from both air switches (top terminals) to the solenoid valve. If all of these wires are in place it is possible to check those from the fan motor to it's housing. See section R. to remove and reassemble the housing. Refit the lid before testing the unit.

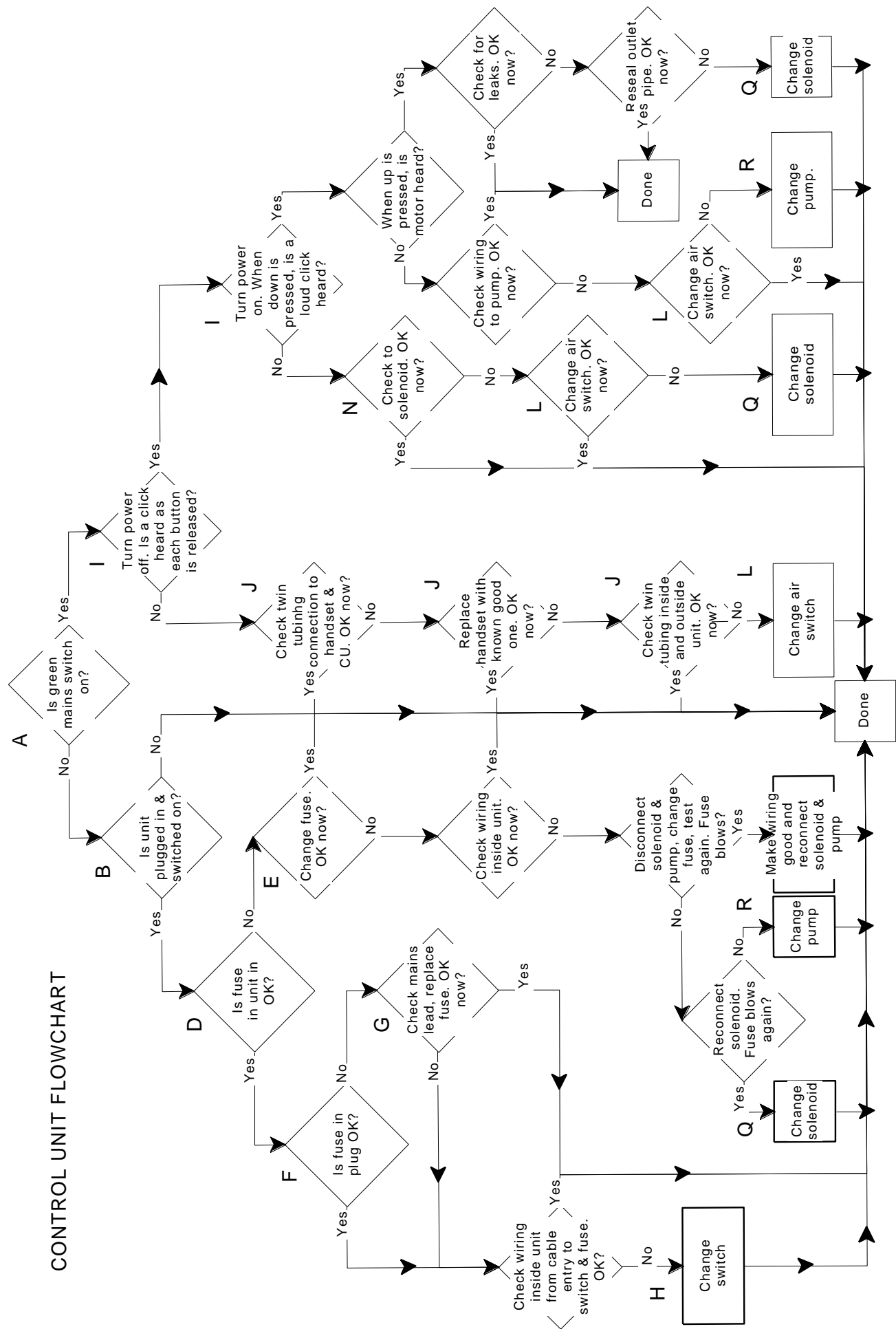
O. If everything checked so far is OK, the problem must be with the solenoid or the fan motor. With the unit plugged in and switched on, press the up button. If the unit only gives a loud click, replace the fan motor as described in section R. If the unit only gives a whining noise but blows out no air, replace the solenoid valve as described in section Q.

P. If there is a fault with the wiring it should be repaired to IEC60601-1 if you are unsure of the correct way to do this return the unit to Centromed for repair. Refer to section N for description of wiring circuit.

Q. See section R. and remove the fan motor. With the fan motor removed, it will be possible to access the internal fitting holding the solenoid valve to the lower fan motor housing. Remove this fitting and the fitting holding the solenoid valve to the front panel. Disconnect the wires from the solenoid valve and remove it from the control unit noting the position of any rubber seals. Refit the new valve with the seals. Refit the lid before testing the unit.

R. To replace the fan motor it will be necessary to remove the lid of the equipment. CAUTION this equipment is mains powered and should be isolated from the mains before it is opened. To remove the lid undo the 6 (six) screws in the upper case, (2 in each side and back), squeeze the sides of the lid inward to release the lid from the handle moulding. Remove the 10 (ten) screws from the fan motor housing and prise apart. Noting the orientation of the fan motor, pull it from the lower housing and disconnect the wires from the fan motor. All of the sealant should be removed from the housing so the new fan motor can be fitted. Reconnect the wires to the fan motor (it is unimportant as to the way round) and fit the fan motor to the lower housing. Sealant should be used between the upper and lower housings. The upper housing screwed back into position ensuring that the wires are not trapped between the housing flanges. Leave the sealant to dry for at least 1 hour. Refit the lid before testing the unit.

# CONTROL UNIT FLOWCHART



## FRAME REPAIR FLOWCHART EXPLANATIONS

A. Test the frame with a spring gauge available from Centromed. If the frame inflates / deflates OK and can hold 20 lb. on the spring gauge for 10 minutes it should work properly in the field. Reasonable inflation time is 10 seconds, and deflation time of 20 to 30 seconds. To use the spring gauge have the frame inflated to about 30° on a bench then attach the spring gauge to the upper and lower frame at the opening end, inflate further until the gauge reads 20 lb. It may be difficult to set 20lb exactly, in this case set to 20 to 25lb and manually operate the valve plate.

B. If there are any problems with the frame, replace the seal as a matter of course.

C. To replace the seal lay the frame open and pull the bellows from the lower frame, clean all traces of the old seal from the frame and the bellows and fit a new seal to the frame. Before removing the seals upper paper cover, trial fit the bellows ensuring that the hole in the frame will align with the hole in the bellows. It may be necessary to pull the bellows quite taught to align the holes. Finally, remove the upper paper cover from the seal, and align the hole in the bellows with the hole in the frame, ensuring the bellows lay flat and completely without creases on the seal.

D. Re test the frame as in section A. If it leaks see section E. If it is slow to inflate / deflate see section O.

E. With the spring gauge fitted and the frame inflated to 20 lb. test the area around the valve plate with soapy water, if there is any bubbling around the valve plate replace with a new one ensuring the soft pad aligns correctly with the hole in the frame.

F. With the spring gauge fitted and the frame inflated to 20 lb. test the area around the bung on the end of the inflation tube with soapy water, if there is any bubbling around the bung replace with a new one.

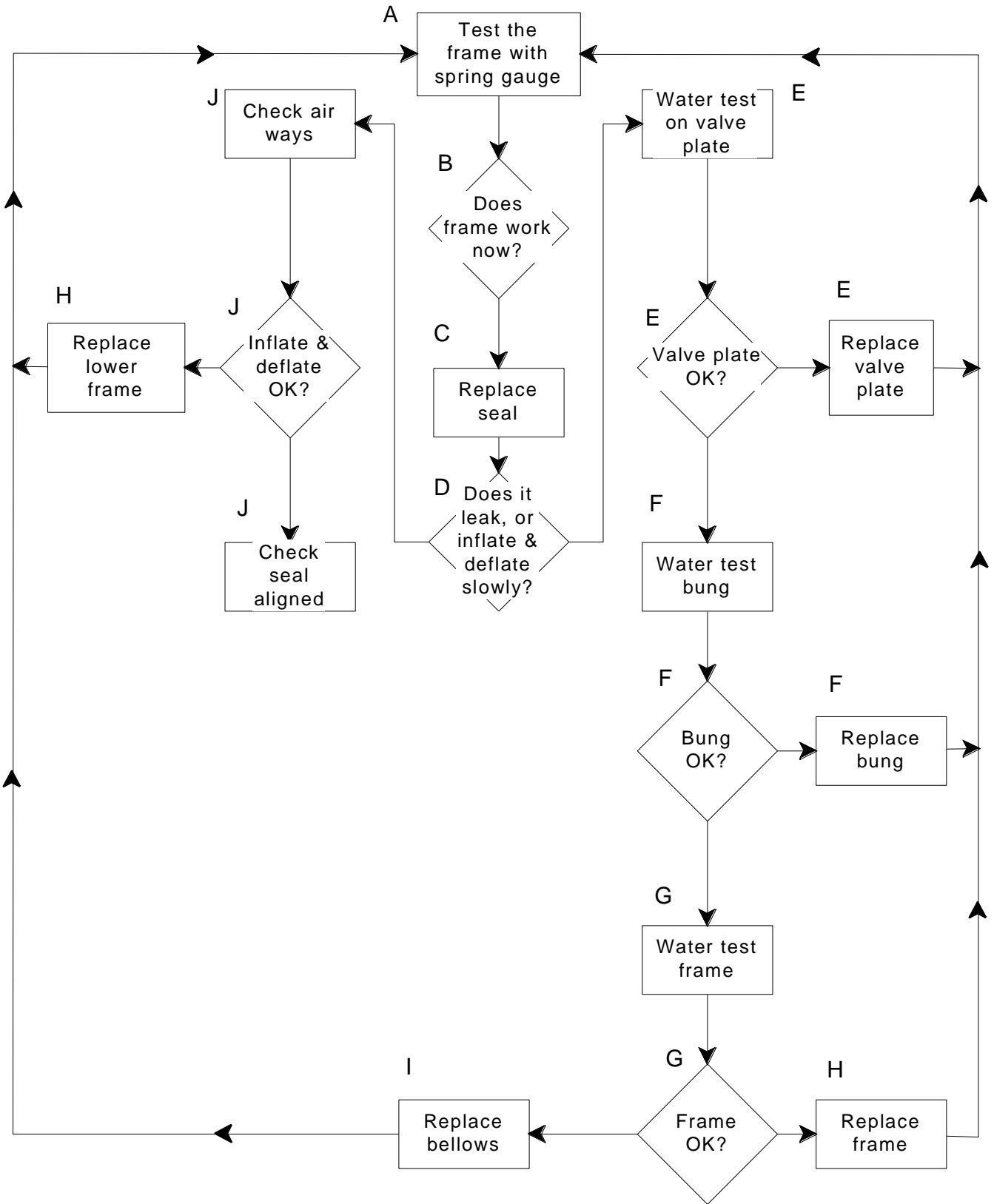
G. With the spring gauge fitted and the frame inflated to 20 lb. test the area around the frame concentrating on the area where the main air tube and the manifold are joined. If there is any bubbling, replace the lower frame with a new one, as described in section H.

H. To change the lower frame remove the seal as described in section C. Remove the rod holding the two frame sections and the bellows together by taking one of the end caps off and sliding the rod out the other end. Fit the new lower frame to the upper frame and bellows, replace the rod, fitting a new end cap. Fit a new valve plate (section E), fit a new seal (section C) and test the frame.

I. To replace the bellows, remove the seal (section C), then remove an end cap from the rod, withdraw the rod about 150mm (6 inches) and slide the bellows off the rod. Slide a new bellows on to the rod ensuring the hole in the bellow will align with the hole in the frame. Refit the rod and end cap and the seal (section C). Test the frame as in section A.

J. Take the hose and the bung off the main air bar and visually check that it is clear from end to end. If any obstruction is found remove it and retest the frame. If it still does not inflate / deflate correctly, check the seal is aligned properly as described in section C. If the seal is OK, replace the lower frame as described in section H.





# TECHNICAL INFORMATION

## SPECIFICATIONS

Country of Origin . . . . .	England
Name of Equipment . . . . .	Mattress Variator
Description of Equipment . . . . .	Bed Raising Aid
Weight Of Equipment . . . . .	
Voltage . . . . .	230 V ~ (A.C.)
Power Supply Frequency . . . . .	50 Hz
Power Consumption . . . . .	2.9 A Peak
Power Consumption Stand-By . . . . .	1mA
Fuse in Control Unit . . . . .	T5A 250V
Fuse In Plug . . . . .	5A Mains Fuse
Class . . . . .	II
Type . . . . .	BF
Electrical Safety Standard . . . . .	BS EN 60601-1
EMC Standard. . . . .	BS EN 60601-1-2
Duty Cycle . . . . .	100%

## OTHER IMPORTANT INFORMATION

Class II means this equipment is double insulated.  
Type BF is the level of patient protection this equipment gives.  
This is ordinary equipment intended for indoor use only.  
Do not use this equipment near explosive gases, anaesthetics etc.  
Clean this frame with warm soapy water and allow to dry before use.  
Clean the control unit with a slightly damp cloth.

## INTERFERENCE

Interference should not occur between this and other equipment, such as televisions, radios and other electronic equipment. If you have any interference involving your Mattress Variator, try relocating the Mattress Variator and / or the other equipment, also try to connect them on different mains circuits.

## RECYCLING

There are no toxic components inside your Mattress Variator, so it can be disposed of quite safely in the normal manner. Alternatively, it can be returned to Centromed for recycling. The life expectancy of this equipment is about five years.

# CONTACT INFORMATION



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