DHG

Moving Health Forward

QUATTRO® Acute

QUATTRO® Plus

Service Manual

Contents

1. Product Specification

QUATTRO Acute mattress system

QUATTRO Plus mattress system

1.1 Operating Requirements/Specification/Manufacturer's Guarantee

Transport and Storage

Handle with care. Please report instances of damage or impact to Direct Healthcare Group Service Department.
–25 °C without relative humidity control; and
+70 °C at a relative humidity up to 93 %, non-condensing.
An atmospheric pressure range of 700 hPa to 1,060 hPa.
Suitable for all standard modes of transport when in the correct packaging.

Operational Conditions

A temperature range of +5 °C to +40 °C;
A relative humidity range of 15% to 93%, non-condensing; and
Operational Atmospheric Pressure: 700 hPa to 1,060 hPa
Suitable for pollution degree 2
Operational altitude ≤ 2 000 m
IP Rating: IP21 power unit only

Specification of Alternating Air Pressure Power Units

CE 1639

(Medical Device Classification: Class IIa)

Model Ref.:	Type 19R
Construction:	ABS Plastic
Dimensions:	W346mm/13.6" x H258mm/10.1" x D156mm/6.1"
Weight:	4.0kg / 8.75 lbs
Mains Cable:	5 metres / 16.5'
	For the USA:- only a hospital grade attachment plug with a 15A NEMA 5-15P configuration and 18AWG hospital grade flexible cord is to be used, as supplied by Direct Healthcare Group.
Electricity Supply:	230V ~ 50Hz (CE marked) / 120V ~ 60Hz (cETLus listed) / 230V ~ 60Hz
Rated Input:	9.4 VA
Fuse Rating:	T500mA 250V HRC (ceramic) 5 x 20 mm
IP Rating:	IP21
Noise Level:	33.5 dBa
Cycle Time:	QUATTRO Acute Type 19R
	Fixed cycle duration: 240 seconds per channel (16 minute cycle), 1 in 4
	Deflation: 150 seconds, Equalise: 30 seconds, Inflation: 75 seconds
	QUATTRO Plus Type 19R
	Fixed cycle duration: 240 seconds per channel (16 minute cycle), 1 in 4
	Deflation: 75 seconds, Equalise: 15 seconds, Inflation: 150 seconds

Specification of Alternating Air Pressure Mattresses (ACCESSORY to Type 19R)

CE 1639

(Medical Device Classification: Class IIa)

Construction:	BASE: Woven nylon 940 DTEX PU coated both sides
	CELLS: PU film
	COVER [1]: PU coated stretch nylon 255g/m^2
Options:	QUATTRO ACUTE: 6 size variants (see below)
	QUATTRO PLUS: 6 size variants (see below)
Type:	Orthodifferential TISSUEgard™ pleated air cells operating in a 1-in-4 alternating air pressure cycle
Variants:	QUATTRO ACUTE: 27 Cell (3 width variants)
	28 Cell (3 width variants)
	QUATTRO PLUS: 30 Cell (3 width variants)
	32 Cell (3 width variants)
Weight:	QUATTRO ACUTE: 12.7kg (standard model)
	QUATTRO PLUS: 9.9kg (standard model)
Fire Retardancy:	BS 7177
	BS 7175 Crib 5 test method BS 6807

Specification of B.A.S.E. SEQUENTIAL Cushion (ACCESSORY to Type 19R)

CE 1639

(Medical Device Classification: Class IIa)

Construction:	BASE: Woven nylon 940 DTEX PU coated both sides
	INNER: PVC bellows within punched CMFR foam
	COVER [1]: PU coated stretch nylon 255g/m^2
Type:	8 rows of 6 bellow cell strips operating in a 1-in-4 alternating air pressure cycle
Dimensions [2]:	430mm x 430mm x 70mm
Weight:	1.9kg
Fire Retardancy:	BS 7177
	BS 7175 Crib 5 test method BS 6807

[1] Covers are anti-bacterial/microbial treated (active ingredient: zinc pyrithione).
[2] Approx.max. top surface, inflated +/- 15mm

EXPECTED SERVICE LIFE: The expected service life of the medical device and its ACCESSORIES is five years.

SPECIFIED SHELF LIFE: The product has no specified shelf life.

Products are free from TSE species derived materials, medicinal substances, human blood derivatives and phthalates.

Products are manufactured to comply with National and International safety standards and are certified to ISO13485, Medical Devices Directive 93/42/EEC and Medical Device Regulation 2017/745.

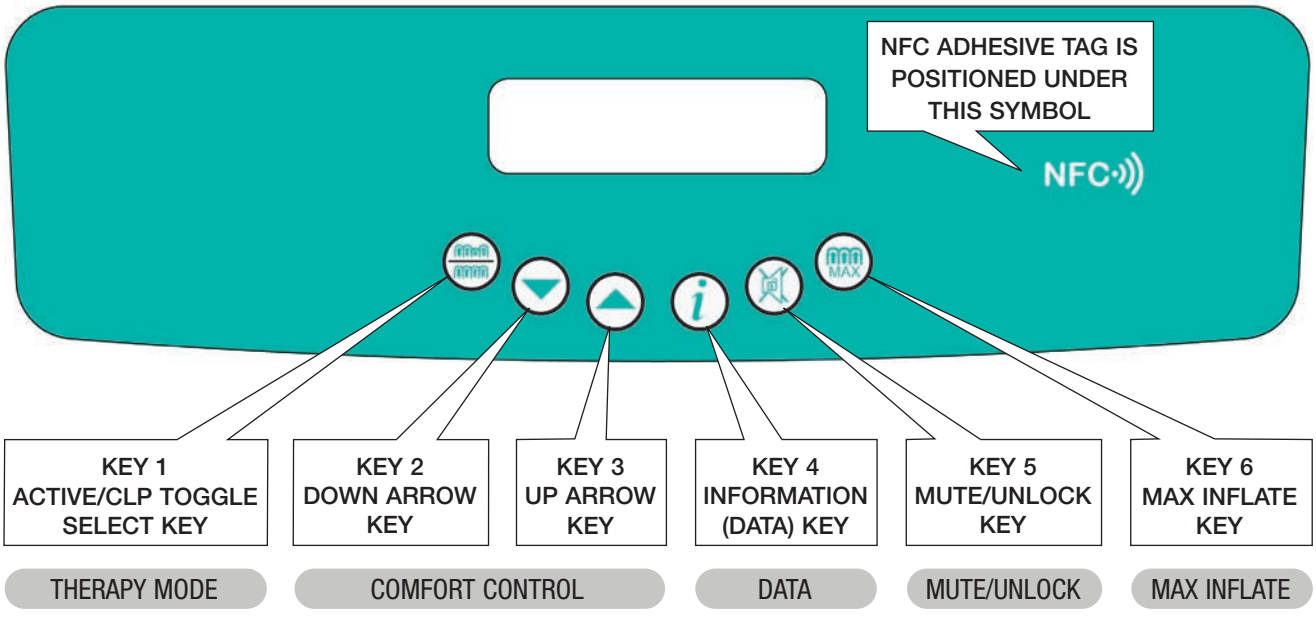
This medical device is compliant with:
IEC 60601.1 3rd edition Medical electrical equipment safety and essential performance
IEC 60601.1.11 Home healthcare environment

Manufacturer's Guarantee

All power units, mattresses and cushions are covered by a 24 month manufacturer's guarantee.

1.2 Power Units

Key Functions - T19R QUATTRO Acute and QUATTRO Plus



Product	Key 1	Key 2	Key 3	Key 4	Key 5	Key 6
QUATTRO Acute	Static (CLP) / dynamic toggle	Decrease comfort setting	Increase comfort setting	Information	Mute / Unlock	Transport mode (max inflate)
QUATTRO Plus	Static (CLP) / dynamic toggle	Decrease comfort setting	Increase comfort setting	Information	Mute / Unlock	Transport mode (max inflate)

(CLP: Continuous low pressure; alternative term for static mode)

THERAPY MODE (Key 1 - Static (CLP) / dynamic toggle)
Pressing the THERAPY MODE button will toggle between ACTIVE (1 in 4 alternating air pressure cycle) and CONTINUOUS LOW PRESSURE therapy modes. The selected therapy mode is shown on the display screen. The default mode is ACTIVE therapy. To switch to CONTINUOUS LOW PRESSURE mode (once unlocked*), press THERAPY MODE button for 2 seconds until an audible tone is heard. The system will then display 'PLEASE WAIT' and requires approximately 2 minutes to initialise.

COMFORT CONTROL (Key 2 - Decrease comfort setting / Key 3 - Increase comfort setting)
Air pressure is regulated within each of the cells throughout the cycle so that support, posture and therapy are constantly maintained at optimum levels, in response to patient weight, movement and position. Equalisation of cell pressure automatically takes place at each stage of the alternating air pressure cycle, again to ensure precise pressure and therapy is provided. The automatic default comfort setting is MEDIUM. However, if the patient prefers a firmer or softer mattress, increase or decrease the comfort control setting accordingly (once unlocked*) using the UP and DOWN arrow buttons (SOFT/MEDIUM/FIRM). The comfort setting is shown on the display screen. Check periodically to ensure patient support and comfort.

DATA (Key 4 - Information) (Used for accessing information only, does not affect mode of operation)
Pressing the DATA button at any time switches the display into DATA mode. Use the up and down arrow buttons to scroll through the product data and user information set. Pressing the DATA button again returns the display to the previous mode.

*MUTE/UNLOCK (Key 5)
Press to silence the sounder and to clear the message from the display screen. The power unit will automatically lock 2 minutes after the last button operation when running to prevent the inadvertent operation of button functions (except MUTE), as indicated by ' ' on the display screen. Press and hold the MUTE/UNLOCK button until the power unit beeps if further button operation is needed (i.e. comfort setting). The power unit will lock again 2 minutes after the last button operation.

NB. After power failure/switching the power off, pressing MUTE cancels the system's previous settings. When power returns the default setting of ACTIVE mode, MEDIUM comfort setting is invoked. (Note that previous settings are automatically cancelled if the duration between switch off and switch on is greater than 12 seconds. If power returns before a period of 12 seconds has passed and the MUTE button has not been pressed, the system will return to the previous mode of operation.)

MAX. INFLATE (Key 6 - Transport mode / max inflate)
Necessary for some nursing procedures, the MAX INFLATE mode inflates the mattress to maximum static pressure for a period of 15 minutes. After pressing the MAX INFLATE button (once unlocked*) to inflate mattress, the system displays 'PLEASE WAIT' followed by 'READY' and a 5 second audible tone when maximum pressure is achieved and 'MAX INFLATE' is shown on the display screen. After 15 minutes the system automatically returns to the ACTIVE mode of operation.

Language Selection

Language selection is available in the service engineers test mode. Languages available are including English, French, Dutch, Italian, German, Finish, Swedish, Norwegian, Turkish, Spanish, Danish, Polish and Czech, Estonian, Latvian, Croatian, Portuguese, Hungarian, Romanian, Slovenian, Lithuanian, Greek, Simpl. Chinese and Bulgarian.

Information Mode

To enter this mode to enable viewing of information, press information (data) key (4) while turning the power on. Use down and up arrow keys (2 and 3) to scroll through information display field. Press mute/unlock key (5) to exit.

Last 5 faults and the hours run at which each occurred
Software version
Part number
Bootloader identification
Hours run total
Hours to service
Hire time (optional)
Product code (optional)
Serial number (optional)
Last service date
Owner (optional)
Contact name (optional)
Telephone: (optional)
Hospital: (optional)
Ward (optional)
Patient (optional)
Reference (optional)

Information can be uploaded to the device utilising custom software on a PC. Some information is read only. Faults can be cleared, and service hours and last service date can be altered utilising the power unit keys in the information menu (see section 2.7).

Software ID/PCB part numbers

Product Name	Software ID	Current Issue Level as of 01/01/21	PCB Part Number	Area
QUATTRO Acute	96101932	V2.0	10888	230V 50Hz & 120V 60Hz
QUATTRO Acute	96101962	V2.0	12395	230V 60Hz
QUATTRO Plus	96101931	V2.0	12099	230V 50Hz & 120V 60Hz
QUATTRO Plus	96101961	V2.0	10891	230V 60Hz

1.3 AC Fail System

Switching the Unit Off

On switching the unit power off, the mains fail alarm will operate automatically indicated by 'AC Fail' on the display. Simply press the MUTE button to silence the alarm.

AC Fail System

The unit will give an AC Fail alarm whenever the mains power is removed for any reason which consists of a display 'AC Fail' and an audible sound. On reconnection of the mains power the unit will automatically continue its current operation without a full restart, as long as the power was interrupted for less than 10 seconds and the MUTE button had not been pressed during the AC Fail alarm. This enables the system to recover from short term mains power dropouts without intervention. A full restart with initialisation will occur whenever the AC Fail has been acknowledged with the MUTE button pressed, or if the mains power was off for longer than 10 seconds.

1.4 Pressures, Comfort and Cycle Settings

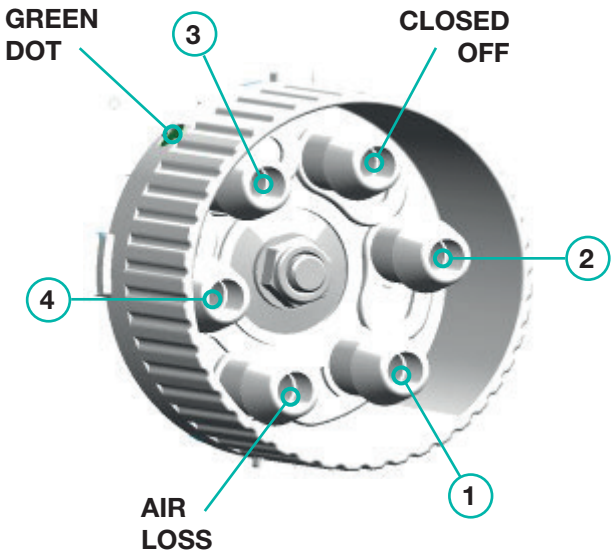
All pressure readings in table are in mmHg.

Product Name	Therapy Mode	Comfort Setting				Max. Inflate
		Soft	Medium	Firm	Seated	
QUATTRO Acute	Active	18	25	35	N/A	35
	CLP	14	21	31	N/A	35
QUATTRO Plus	Active	22	32	44	50	50
	CLP	20	29	41	46	50

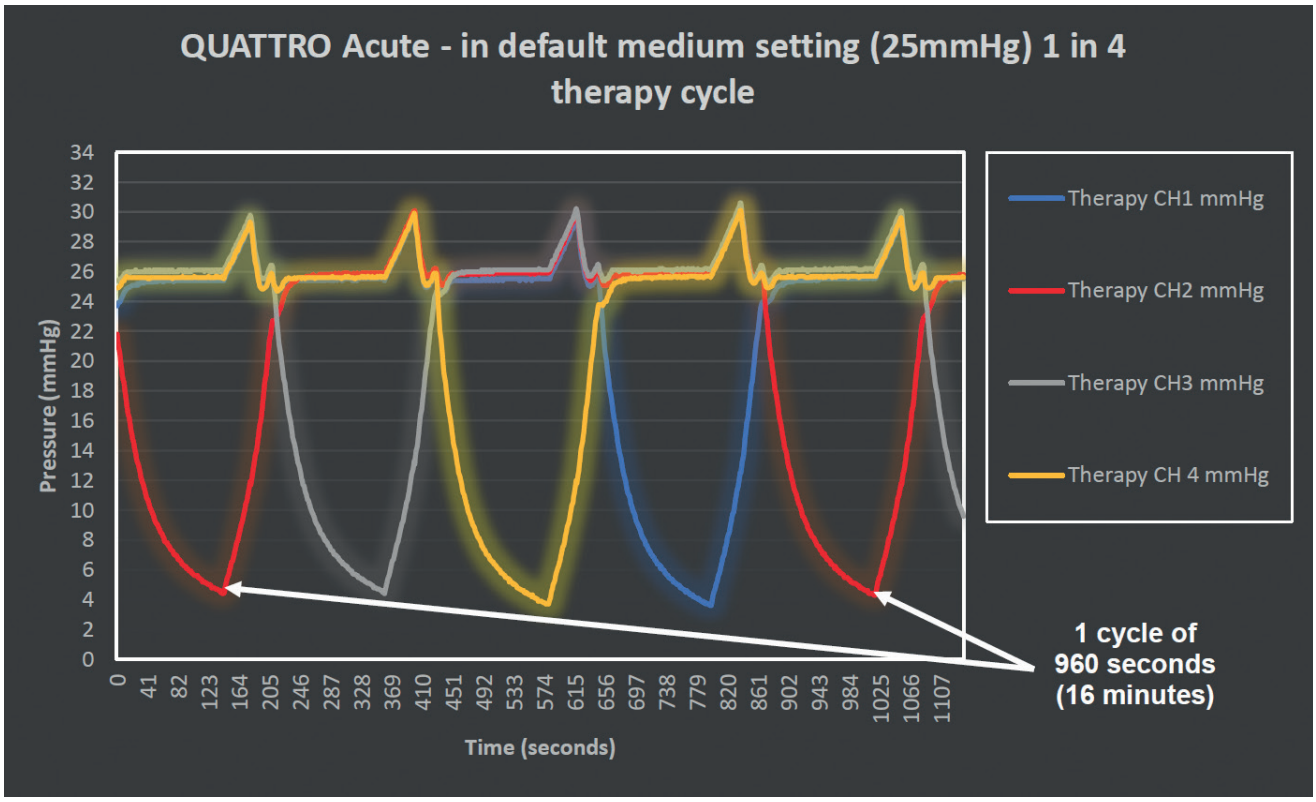
(CLP: Continuous low pressure; alternative term for static mode)

QUATTRO 1-in-4 Mattress Cycle

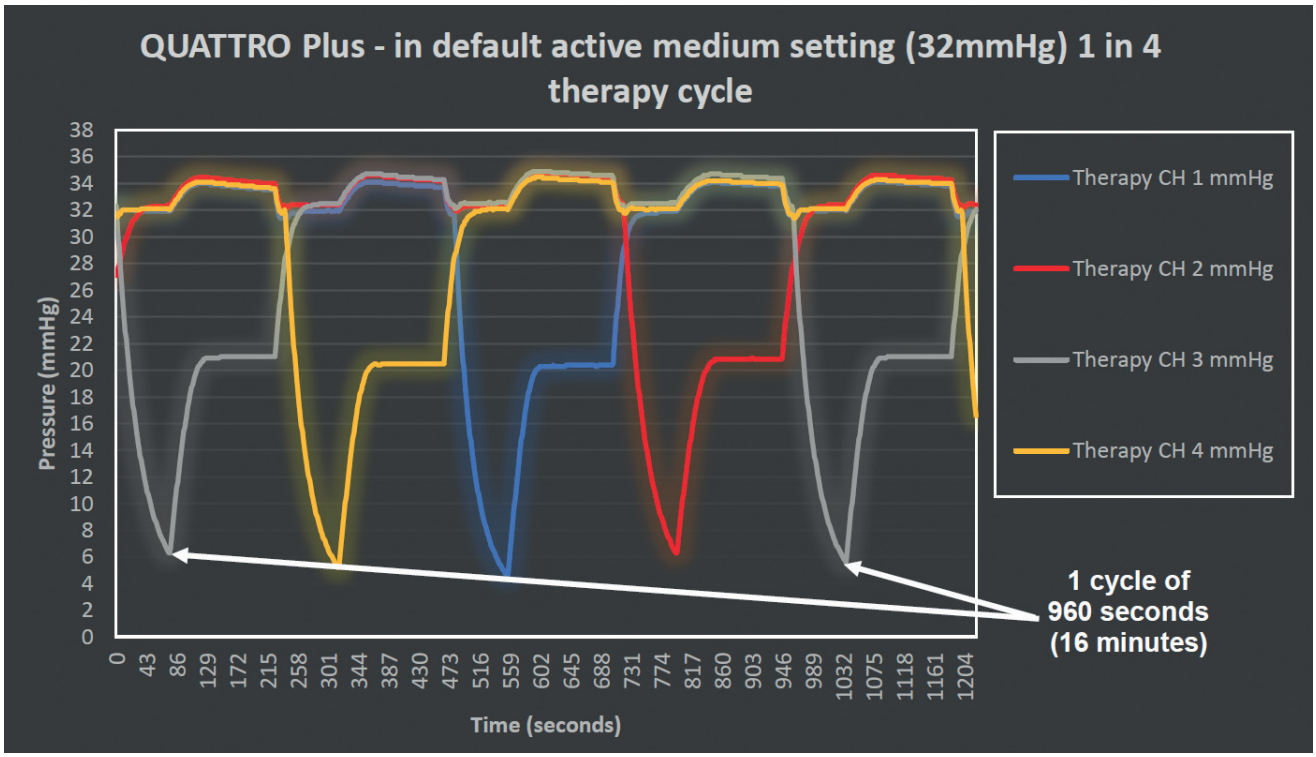
Angle	Channel	Function
0º	3	Equalise
30º	4	Deflate
60º	4	Inflate
90º	4	Equalise
120º	1	Deflate
150º	1	Inflate
180º	1	Equalise
210º	2	Deflate
240º	2	Inflate
270º	2	Equalise
300º	3	Deflate
330º	3	Inflate



QUATTRO Acute and QUATTRO Plus 1-in-4 Therapy Cycles



QUATTRO Acute: Inflate – 75 seconds / Deflate – 150 seconds / Equalise – 15 seconds for each therapy channel.

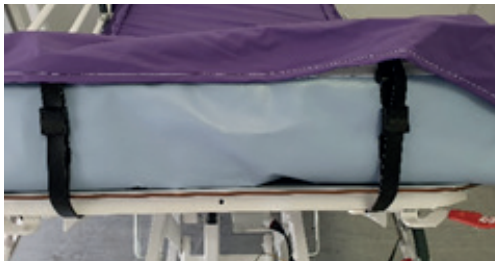


QUATTRO Plus: Inflate – 150 seconds / Deflate – 75 seconds / Equalise – 15 seconds for each therapy channel.

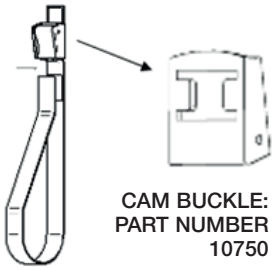
1.5 Mattresses/Cushions

Mattress Features

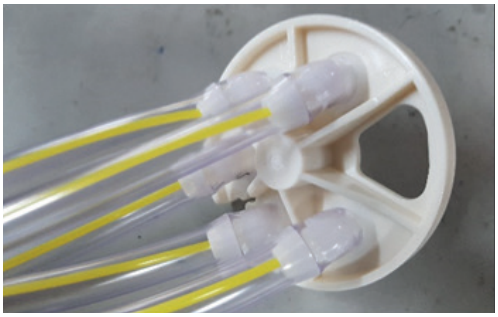
CABLE MANAGEMENT LOOPS
Looped cable carrier welded on the non-umbilical side to route the mains cable off the floor. The loops are designed so that if the cable is pulled tight because the head end is elevated, the loop easily opens.



STRAPS & DISMOUNTABLE BUCKLES
4 side and 2 head end attachment straps. Dismountable buckles prevent base tray damage when incorrectly fitted, and head end elevated). Additional straps available for divan type beds.



CAM BUCKLE:
PART NUMBER
10750

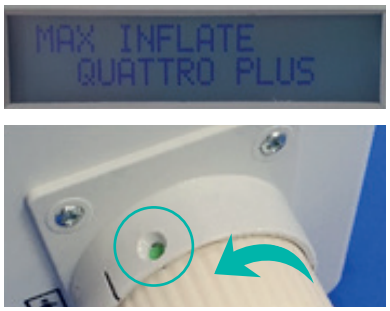


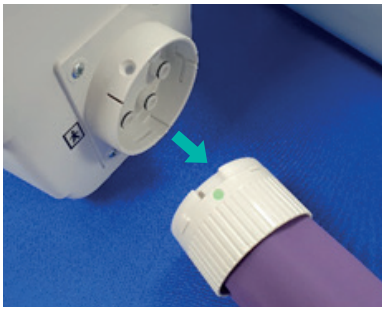
UMBILICAL
Introduction of anti-kink tubing. The other umbilical components are unchanged. 45 degree tube mounts incorporated at the umbilical / mattress interface to guide the umbilical in a downwards orientation and reduce the possibility of it being crushed by the bed frame side rails.

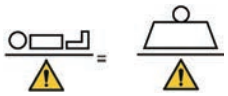
STORAGE STRAPS
Once the mattress is deflated, place umbilical on mattress then roll the mattress up starting from the umbilical end and then connect the two clips on the end and the underside of the mattress when mattress needs to be stored or for ease when moving and carrying.

CPR FACILITY
The CPR device is situated at the head end on the right-hand side of the mattress (viewed from foot end), as indicated by arrows on the mattress tag. For rapid deflation rotate the dial of the CPR device anti-clockwise to 'click' into the open position. If re-inflating the mattress, make sure the dial of the CPR device is rotated clockwise until it 'clicks' into the closed position.

PATIENT TRANSPORT FACILITY
Press the MAX INFLATE key to fully inflate the mattress. When maximum pressure is achieved the power unit will sound 3 times and display 'MAX INFLATE'. Detach the mattress umbilical from the power unit by rotating push and turn anti-clockwise until green indicator is no longer visible and pull umbilical away from power unit.



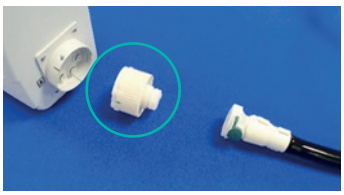




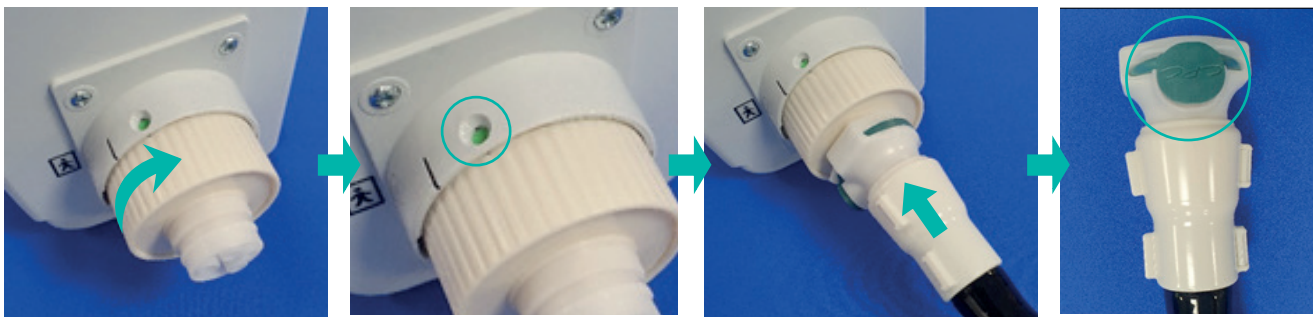
MIN. - MAX. PATIENT WEIGHT / MAX. LOAD GUIDELINES
QUATTRO Acute:- 0-250 kg (0-39 stone)
QUATTRO Plus:- 0-200 kg (0-31 stone)

Cushion Features

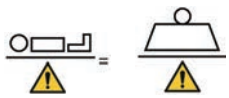
COMPATIBLE WITH QUATTRO PLUS POWER UNIT
The cushion can operate with the QUATTRO Plus power unit directly, by using the cushion adapter. Connect the cushion adaptor to the CCV assembly on the power unit by inserting and rotating clockwise until the green dot is fully visible in the locator aperture. Release the cushion adaptor with reverse procedure. Push fit the cushion CPC connector to the cushion adaptor by matching up the alignment markings there will be a click when correctly connected. To release the CPC connector from the cushion adaptor press the blue CPC button on the CPC and pull away.



ADAPTOR ASSEMBLY CUSHION: PART NUMBER 11485



SECURITY STRAPS
The cushion has two straps for securing to a suitable seat and a 750mm umbilical.



MIN. - MAX. PATIENT WEIGHT / MAX. LOAD GUIDELINES
B.A.S.E. SEQUENTIAL cushion:-
0-127 kg (0-20 stone)

CUSHION SHORT TUBE 43CM X 43CM X 7CM (750MM UMBILICAL): PART NUMBER 11714

1.6 Care and Maintenance

Mattress - Exterior Components

- Always keep the cover as clean as is practicable. The material is waterproof and vapour permeable.
- Inspect top cover for signs of damage or wear which could result in the contamination of the interior, e.g. tears, holes, damage to seams or zips, underside staining, etc. The frequency of these checks should be at each decontamination process, i.e. between patients or patient occupancy (or weekly for longer term patients).
- Care should be taken to avoid puncturing cover with objects such as needles, scalpels, pat slides, acrylic nails, etc.
- The cover may be removed and cleaned in accordance with The Revised Healthcare Cleaning Manual June 2009 subject to the following action: Following the use of a detergent and or disinfectant solution the cover should be rinsed with clean water using a clean cloth and allowed to dry.
- Frequent or prolonged exposure to high concentrations of aggressive disinfectant solutions will reduce the useful life of the cover.
- Where high concentration disinfectants e.g. $\geq$ 10,000ppm chlorine releasing agent (e.g. Haztab or bleach) or combined cleaning/chlorine releasing agent (e.g. Chlorclean, Actichlor) and detergent solutions are used to remove blood or other body fluids, covers should be thoroughly rinsed with clean water to remove any residues. This will help prevent any possible long term compatibility issues associated with disinfectant residues *.
- Alternatively disinfection may be achieved by laundering cover at temperatures not exceeding 65^0C for 10 minutes or 73^0C for 3 minutes which may include a chlorine rinse.
- Do not use abrasive cleaners, phenol disinfectants, solvents or alcohol-based cleansers, e.g. Dettol, Phenicol, Hibiscrub, Clearsol, Stericol, Hycoline, as these may destroy the cover materials *.
- Do not iron.
- Ensure that the cover is thoroughly dried before remaking the bed or placing in storage.

Mattress - Interior Components

- Check air cells and mattress/cushion interior for signs of damage or contamination, e.g. staining or evidence of fluid ingress. The frequency of these checks should be at each decontamination process, i.e. between patients or patient occupancy (or weekly for longer term patients).
- Care should be taken to avoid puncturing air cells with objects such as needles, scalpels, pat slides, acrylic nails, etc.
- The individual cells can also be wiped clean with a mild disinfectant solution *.
- All cells are replaceable and can be obtained easily from Direct Healthcare Group.
- The QUATTRO range of mattresses are fully launderable, but ensure the CPR device is fully closed (i.e. the dial of the CPR device is rotated clockwise until it 'clicks' into the closed position 🔒), prior to laundering to prevent water entering the air cells /tubing.

Cushion - Interior Components

- Carefully remove cover and foam (where applicable), wipe clean using TECcare CONTROL antimicrobial wipes and fluid. Dry thoroughly before reassembly.

Power Unit

Always disconnect the power unit from the electricity supply before carrying out maintenance, repairs, servicing or cleaning. To disconnect the power unit from the mains supply and thereby safely terminate operation of the device, remove the mains power cord from the mains outlet wall socket. Check all electrical connections and power cord for signs of excessive wear. The power unit can be wiped down with detergent or disinfectant solution or wipe*. Do not use solvents. Unsuitable for sterilisation. Disposal of the power unit / mattress / cushion in accordance with the local regulations including WEEE requirements.

* In line with the MHRA Medical Device Alert (MDA/2013/019), Direct Healthcare Group advises customers to use pH neutral, high level disinfectant cleaning products to sanitise reusable medical devices to prevent damage to materials and the degradation of plastic surfaces after prolonged use. The use of inappropriate cleaning and detergent materials on medical equipment could damage surfaces and may compromise the ability to decontaminate medical devices adequately or may interfere with device function. Direct Healthcare Group recommends the use of TECcare® CONTROL antimicrobial

wipes and fluid to clean and decontaminate all products it supplies to health and social care facilities. TECcare CONTROL products provide class leading broad spectrum, high level disinfection with an exceptional safety profile. Being pH neutral TECcare CONTROL can be universally used on all hard and soft surfaces without any detrimental effect. TECcare CONTROL is CE marked for cleaning medical equipment.

1.7 Start-up Procedure

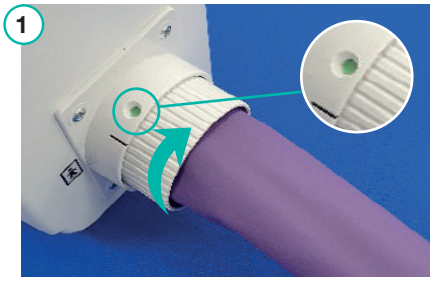
1. Connect the mattress umbilical to the CCV assembly on the power unit by inserting and rotating clockwise until the green dot is fully visible in the locator aperture. Release the mattress umbilical with reverse procedure.

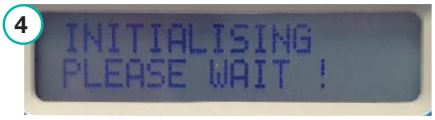
2. Plug in the mains power lead and switch the unit on.

3. ‘STARTING PLEASE WAIT !’ is displayed whilst optical sensor is moving to zero position.

4. ‘INITIALISING PLEASE WAIT !’ is displayed while mattress is reaching operating pressure.

5. ‘ACTIVE MEDIUM’ is displayed when the mattress has reached pressure and is ready for patient.





1.8 NFC Scanning and Functionality

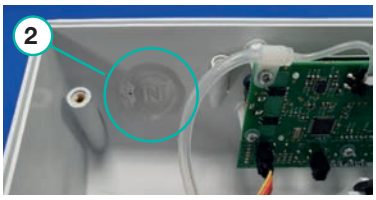
1. The NFC tag can be found inside the power unit under the top label where the NFC sign is located.

2. The NFC tag is a self-adhesive label which is applied to the inside of the unit in the position indicated.

3. The NFC tag can be scanned by any device that has NFC scanning functionality, by holding the chosen device about 10mm over the NFC sign on the top label.

4. The NFC tag contains information as shown in the example below.

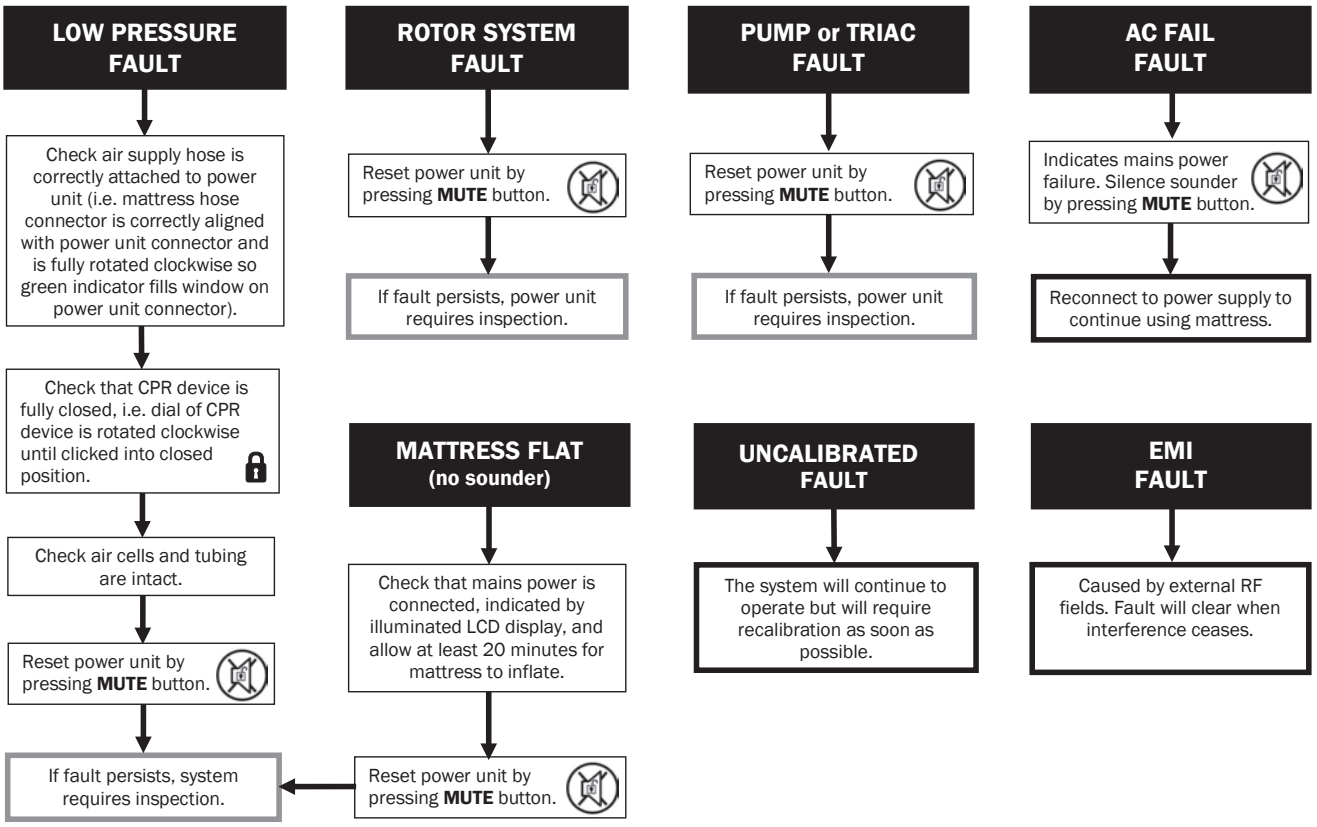
   Description: Quattro Plus 240v 50Hz power unit
   Part number: QPP02 C002
   Serial number: 1019214
   Customer Service Tel: (44) 01794503500



LABEL RFID NFC PART NUMBER: 11981

2. Faults and Warnings

Indication	Information	Check
Fault: Low pressure	System will alert if pressure falls below minimum allowable levels. System continues to operate. Press MUTE to clear alarm.	• Check CPR is not open. • Check O-rings on CCV assembly of unit for damage. • Press the mute button to clear the alarm. • Note: alarm will reoccur if fault persists. • Observe if warning is displayed again, and note if one particular cell set (e.g.: 1, 5, 9, 13 …, or 2, 6, 10, 14…) is not inflating. • Check cells for punctures or detached tube. Replace cells as necessary.
Fault: Rotor system	System will not operate. If this fault occurs, unit will require opening and assessment by a qualified service engineer.	• Electrical connections to cycle control valve. • Faces of rotor and stator. • Failed opto slot sensor PCB. • No mechanical damage to cycle control valve assembly. • Replace cycle control valve assembly.
Fault: Pump / Triac fail	System will not operate. If this fault occurs, unit will require opening and assessment by a qualified service engineer.	• Pump electrical connection not made. Reconnect. • Replace pump. • Replace control board.
Warning: Battery	On board back up battery not charging.	• Replace 3.6v mempac battery on control board. • Replace control board.
No power on switch on	Either the IEC module is damaged, or on board 500mA fuses on the control PBC are blown.	• Replace 500mA fuses on PCB. • Replace IEC module. • Replace control board.
Warning: Uncalibrated	Do not operate system.	• Pressure sensor on control board needs calibrating.
Fault: EMI fault	System will not operate if this fault occurs.	• Unit has detected that the pressure sensor amplifier is adversely affected by external RF fields. • Unit will require opening and assessment by a qualified service engineer.

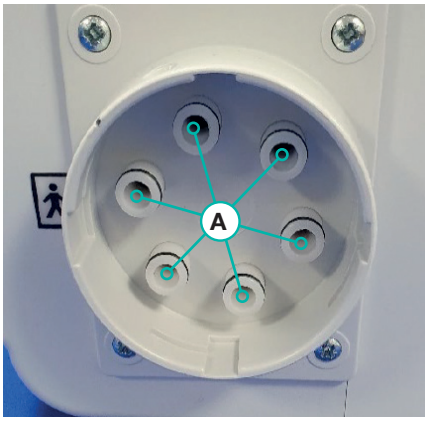


2.1 Service Requirements and Checks

QUATTRO systems should be service every 7500 hours.

1. Full inspection of all parts of mattress/cushion for damage, degradation, or contamination including:
   - Top cover and base sheet.
   - Zips, umbilical assembly.
   - CPR connector undamaged and lock button operates correctly.
   - All labels and print is present and legible.
   - All internal tubing and connectors are undamaged and no kinks.
   - All foam sections are undamaged (cushion only).
   - Air cells/bellows are undamaged.
2. Full inspection of all parts of power unit for damage, degradation, or contamination including:
   - Top case and bottom case for damage and all labels are present and legible and all case fixings are present.
   - Filter cap for ease of access to filter and inlet filter is clean and undamaged (filter must be changed annually).
   - Both hanging handles for damage and check for correct operation.
   - Both beige rubber feet are secured correctly and undamaged.
   - Rotor and the cycle control valve and the OPTO slot PCB assembly for damage and check connection of the mattress umbilical CPC connector to the power unit.
   - IEC power module assembly wires and socket for damage and main on/off switch functions correctly.
   - All internal wires and tubes are connected correctly and undamaged.
   - PCB for damage and that all the fixings and the P-clip securing the tube going to the pressure sensor are present, and tube is connected to pressure sensor.

- The tube connected to the pressure sensor is secured with a cable tie.
- Internal double pump for damage including the four anti-vibration mounts wires and connectors.
- Check main power cord for signs of damage, and correct connection to power unit and power/mains socket (and that fuse rating is correct where applicable).
- Check all 6 x O-rings (O-ring RM0080-10 Part number: 10697) on CCV assembly (A) for any cracks or deterioration.



3. Test LCD, keys, and battery in test menu (see **section 2.2**).
4. Test rotor and cycle control valve assembly (see **section 2.9**).
5. Test PReg pressure regulation (see **section 2.10**).
6. Test pump performance (see **section 2.11**).
7. Mattress pressure tests (see **section 2.12**).
8. Calibration of PCB should only be needed if unit displays warning Uncalibrated (see **section 2** for Faults and Warnings and **section 2.4 and 2.5** for Calibration Procedure).
9. Check and clear faults and set service hours to 7500 (see **section 2** for Faults and Warnings and **section 2.6 and 2.7** for Clearing Faults and Editing Information Procedure).
10. If any parts of the mattress need replacing due to damage (refer to **sections 3.10 to 3.14**).
11. If any parts of the power unit need replacing due to damage (refer to **sections 3.1 to 3.9**).
12. Fully wipe down power unit and mattress (see **section 1.7**).
13. Fill in service check sheet (see **section 4.2**).
14. Closing the power unit if the pump unit has been opened for repair or adjustment, it is extremely important that all tie-wraps have been reinstalled and any harnesses that may have been removed are placed into their original position.
15. Make sure that all the parts that are tested and checked meet the criteria stated in the sections that you are referred to if not consider changing parts (refer to replacement procedures **section 3**).

WARNING

Voltage is present on exposed electrical connectors and PCB Board when power is on. Take care when working close to connections.

CAUTION

Take extreme care when closing the unit not to crack the cover or trap cables and sensor tube inside when assembling the two sides of the enclosure.

2.2 Test Menu Options and Navigation

1. Apply the power lead to unit and switch the unit on, with the down arrow key depressed at the same time.

   Once the unit has started, release the down arrow key . This enables you to enter the test menu.

2. The unit will display 'TEST MODE CAL'. Test mode calibration is to recalibrate pressure sensor circuit on PCB.

   Use either the up or down arrow keys to scroll through the test menu. For the purpose of this document the down arrow key was used.

'TEST MODE Test LCD'
This test enables you to test functionality of all the segments of LCD and the unit's sounder.

'TEST MODE Test Keys'
This test enables you to test the functionality of all six keys. Enter "Test Keys" and press each key to check functionality.

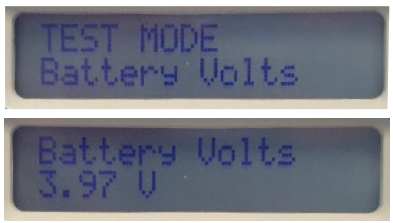
'TEST MODE Test Pump'
This test mode enables you to test functionality of pump.

'TEST MODE Rotor System'
This test enables you to check functionality of CCV assembly.

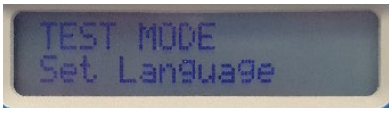
'TEST MODE Test PReg'
This test enables you to check the pressure regulation functionality of your QUATTRO.

'TEST MODE Battery Volts'
This test enables you to check that the on board battery is functioning correctly.

Enter 'Battery Volts test' and the unit will display battery volts value this voltage value must be rising showing that the battery is charging.



'TEST MODE Set Language'
This enables you to select the language that the unit displays.



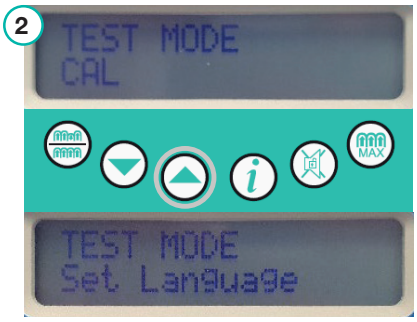
2.3 Changing and Setting Language

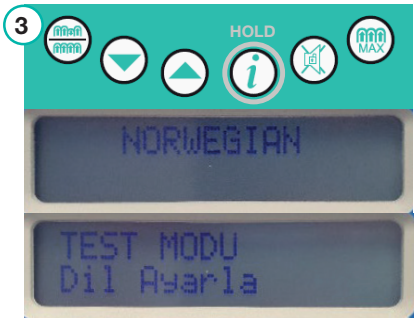
1. Apply the power lead to unit and switch the unit on, with the down arrow key depressed at the same time. Once the unit has started, release the down arrow key . This enables you to enter the test menu.

2. The unit will display 'TEST MODE CAL'. Press the up arrow key once and the unit will display "TEST MODE Set language".

3. Depress the information (data) key and keep depressed and the unit will display all languages available in a scrolling list. Release the information (data) key on language required.

   The unit will now be in the language you have selected. The language can be changed as many times as required.





2.4 Internal PCB Calibration

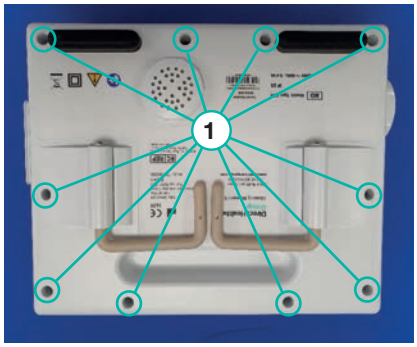
1. Loosen all the 10 screws connecting front and rear case on unit and remove the back case.

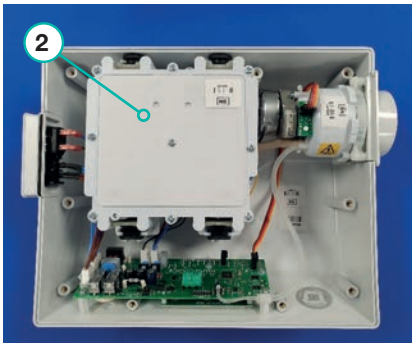
2. Gently lift the pump from the top case assembly, under the pump the pump is connected to PCB, this will need to be disconnected before the pump can be fully removed.

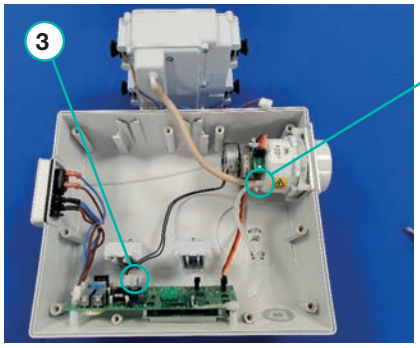
3. Disconnect the pump wire from PCB by pulling the white connector upwards, then lay the pump on surface by unit.

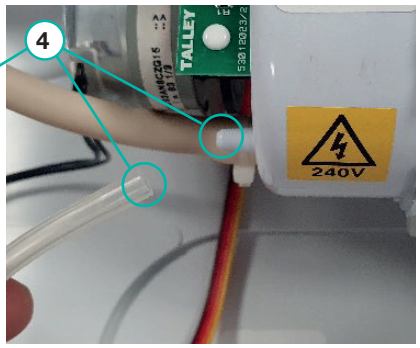
4. Detach the clear tube from the CCV assembly.

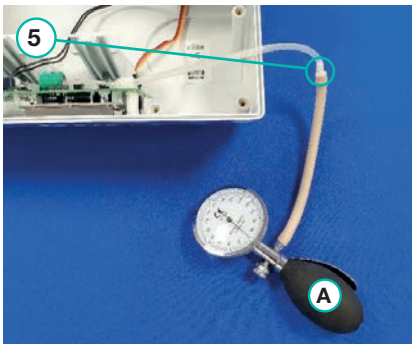
5. Attach the tube to the Sphyg. (A).









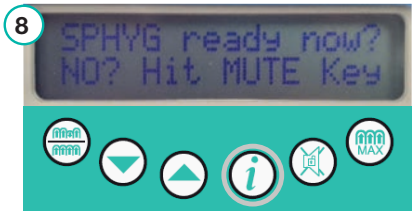


6. Plug the mains cable into the unit and press the down arrow key ⊖ at the same time you power the unit on.

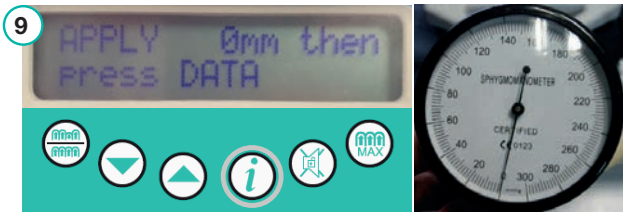
⚠ AT NO TIME WHEN THE UNIT HAS POWER ON PUT HAND INSIDE UNIT AS THERE ARE MAINS VOLTAGE PARTS ON PCB AND ON IEC SWITCH AND THERE WOULD BE RISK OF ELECTRIC SHOCK.

7. The unit's display will illuminate and display a start-up message and make an audible sound. The unit will now be in test mode and will display 'TEST MODE CAL'. Press the information (data) key ⓘ to continue.

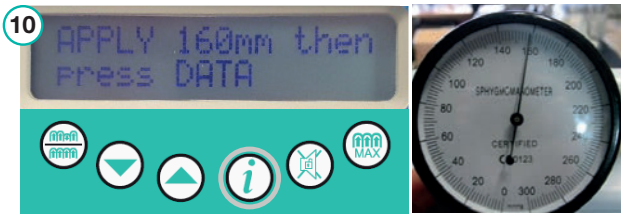
8. The unit will display 'SPHYG ready now? NO? Hit MUTE key'. Press the information (data) key ⓘ again to continue.



9. The unit will now display 'APPLY 0mm then press DATA'. Set the sphyg. at 0mmHg and press the information (data) key ⓘ on unit.



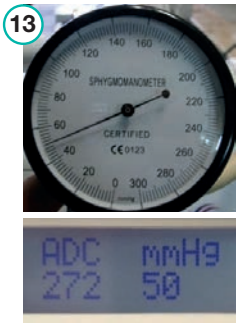
10. The unit will display 'APPLY 160mm then press DATA'. Set the sphyg. to 160mmHg and press the information (data) key ⓘ on unit.



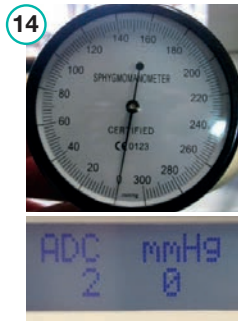
11. The unit will now display the actual pressure that the PCB is reading. Leave the unit in this mode and check pressures.

12. Set the sphyg. to 100mmHg and check that the unit displays 100mmHg. (+/-4mmHg).

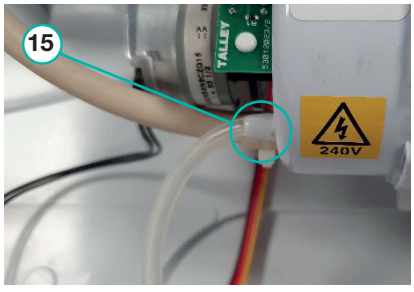
13. Then set the sphyg. to 50mmHg to check that the unit displays 50mmHg (+/-4mmHg).



14. Set the sphyg. to 0mmHg to check that the unit displays 0mmHg (+/-4mmHg). The unit is now fully calibrated; the power can be switched off and the mains cable disconnected.



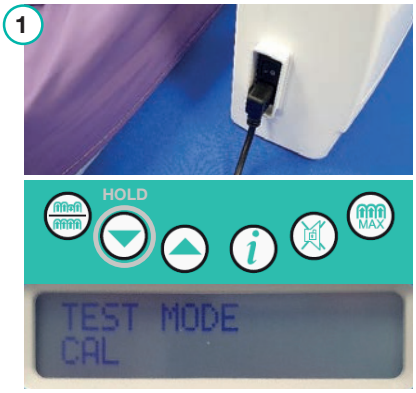
15. Make sure that the clear tube is reattached to the CCV assembly and that the pump lead is reconnected to PCB and that the pump sits properly into the unit before replacing the back panel (make sure all the 4 black rubber pump mounts sit in allocated slots).

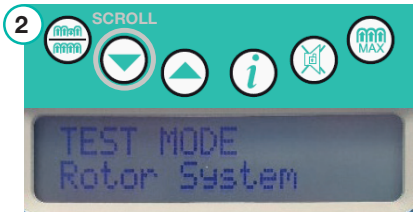


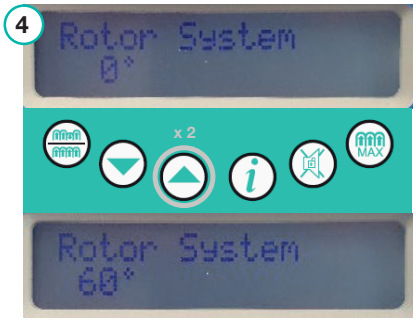
Calibration of the unit is now complete.

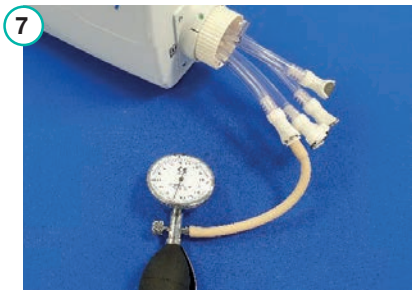
2.5 External PCB Calibration

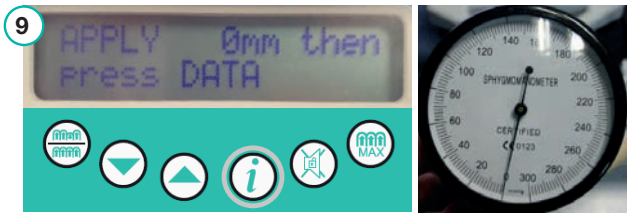
1. Plug the mains cable into the unit and press the down arrow key at the same time you power the unit on. The unit's display will illuminate and display a start-up message and make an audible sound. The unit will now be in test mode and will display 'TEST MODE CAL'.
2. Press the down arrow key to scroll through the test menu until 'TEST MODE Rotor System' is displayed.
3. Press the information (data) key and the unit will display 'Rotor System Finding Index' while the rotor finds its index point, which is at 0 deg. This will take 20 seconds.
4. Once the unit has found the rotor index point it will display 'Rotor System 0°'. Press the up arrow key twice and the unit will display 'Rotor system 60°'.
5. Now the rotor is aligned at the 60° point press the information (data) key to exit rotor test back to the test menu, the unit will display 'TEST MODE Rotor System'.
6. Now using the up arrow key scroll back through the test menu until the unit displays "TEST MODE CAL".
7. Connect the CCV push/turn connector interface with the pressure sphyg. attached to the CPC connector at the 60° mark.
8. Press the information (data) key and the unit will display 'SPHYG ready now? NO? Hit MUTE key'. Press the information (data) key again to continue.
9. The unit will now display 'APPLY 0mm then press DATA'. Set the sphyg. at 0mmHg and press the information (data) key on unit.





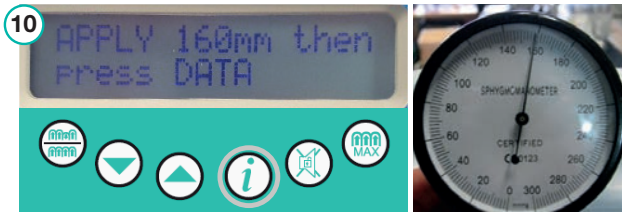






10. The unit will display ‘APPLY 160mm then press DATA’. Set the sphyg. to 160mmHg and press the information (data) key ⓘ on unit.

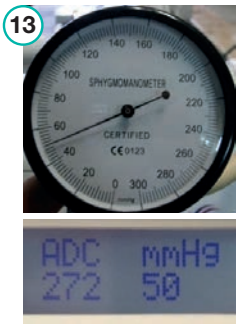
11. The unit will now display the actual pressure that the PCB is reading. Leave the unit in this mode and check pressures.

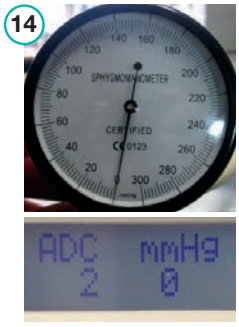


12. Set the sphyg. to 100mmHg and check that the unit displays 100mmHg. (+/-4mmHg).

13. Then set the sphyg. to 50mmHg to check that the unit displays 50mmHg (+/-4mmHg).

14. Set the sphyg. to 0mmHg to check that the unit displays 0mmHg (+/-4mmHg). The unit is now fully calibrated; the power can be switched off and the mains cable disconnected.



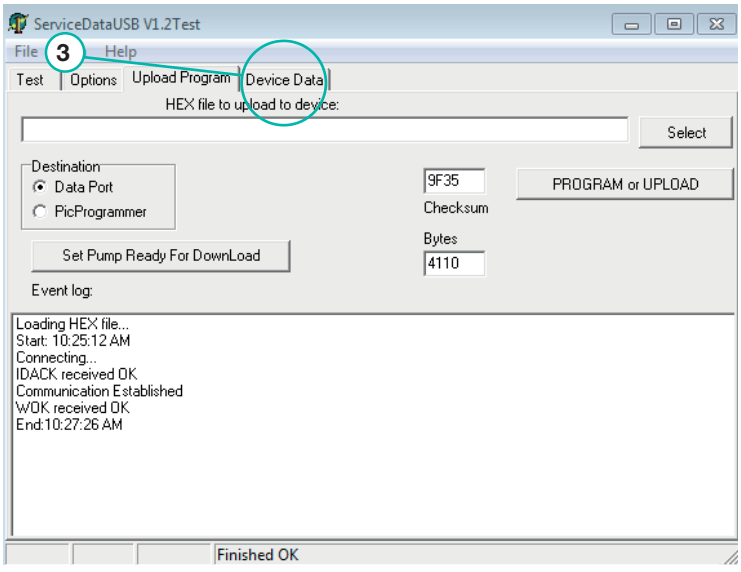


2.6 Clearing Faults and Editing Information

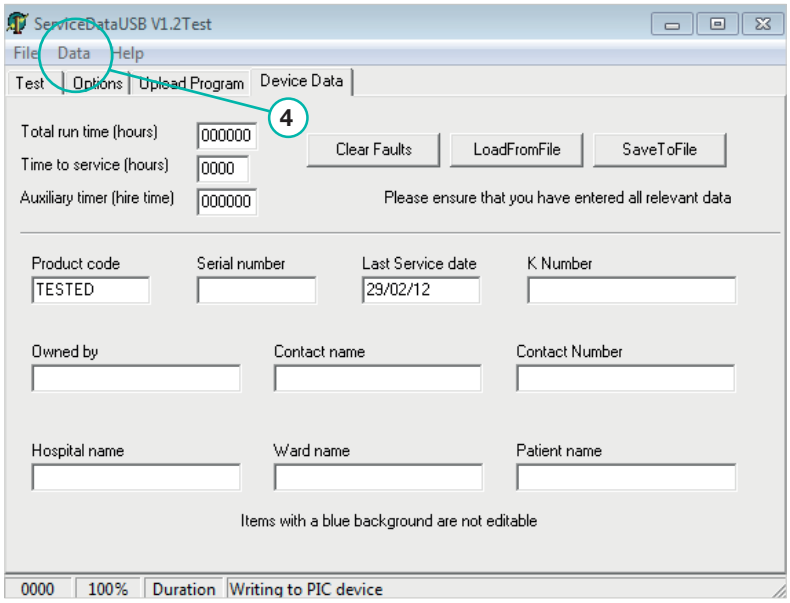
1. Connect the unit to power but do not switch on and connect the data lead coming from USB communication box to the unit and communication box to the computer as shown in pictures below. (LEAD COLOURS MIGHT BE DIFFERENT).

2. Switch the unit on with information (data) key ⓘ depressed simultaneously to enter information menu.

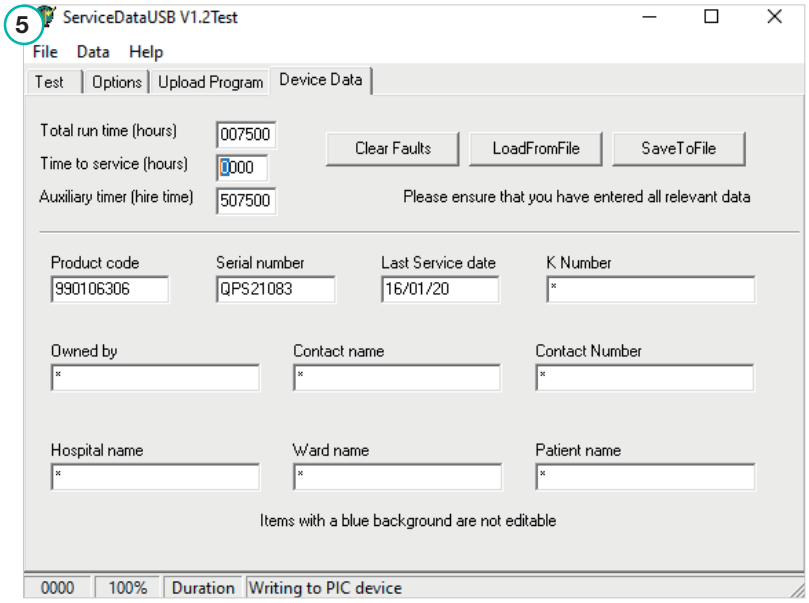
3. Now using the service data USB v1.2 program you can transfer information to and from unit. First select the “Device Data” tab.



4. Now select the “Data” tab and then select “Get” from drop down field - this will take a few seconds to get the information from the unit.

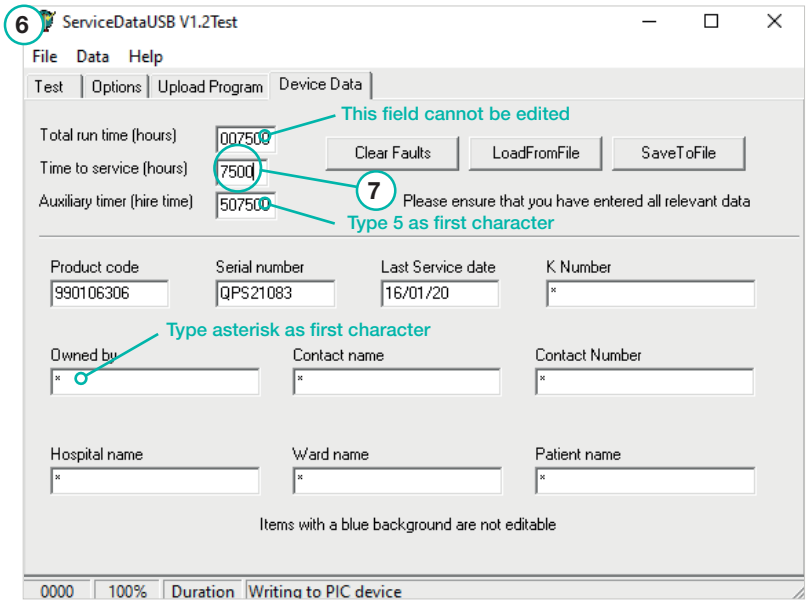


5. The service data program will retrieve the information from the unit, and it will be displayed in the information fields.

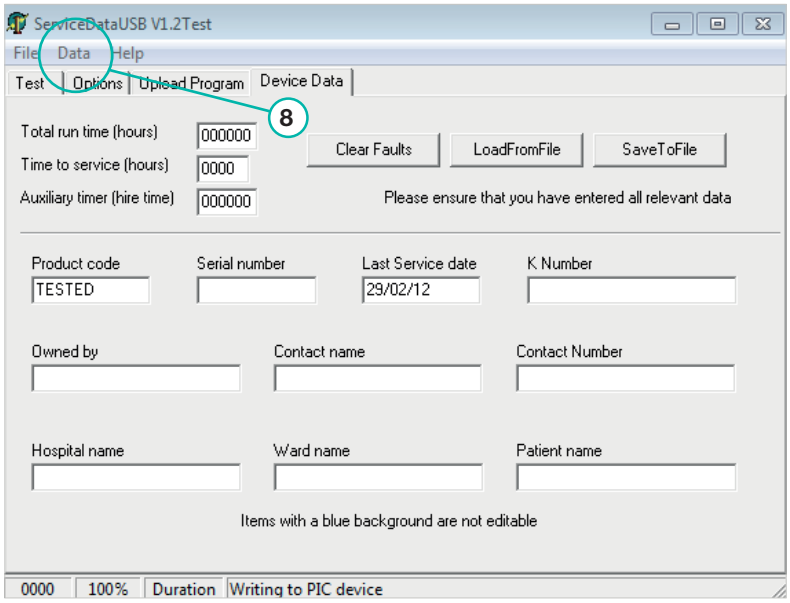


6. Any field can be edited with the exception of “Total run time (hours)”. If you require a field not to show on the display of the unit you type an asterisk in the first character of the field, also if you do not require the Auxiliary timer (hire hours) to display on the unit type 5 in the first character of this field.

7. When servicing the unit 7500 hours should be entered in “time to service” as circled.

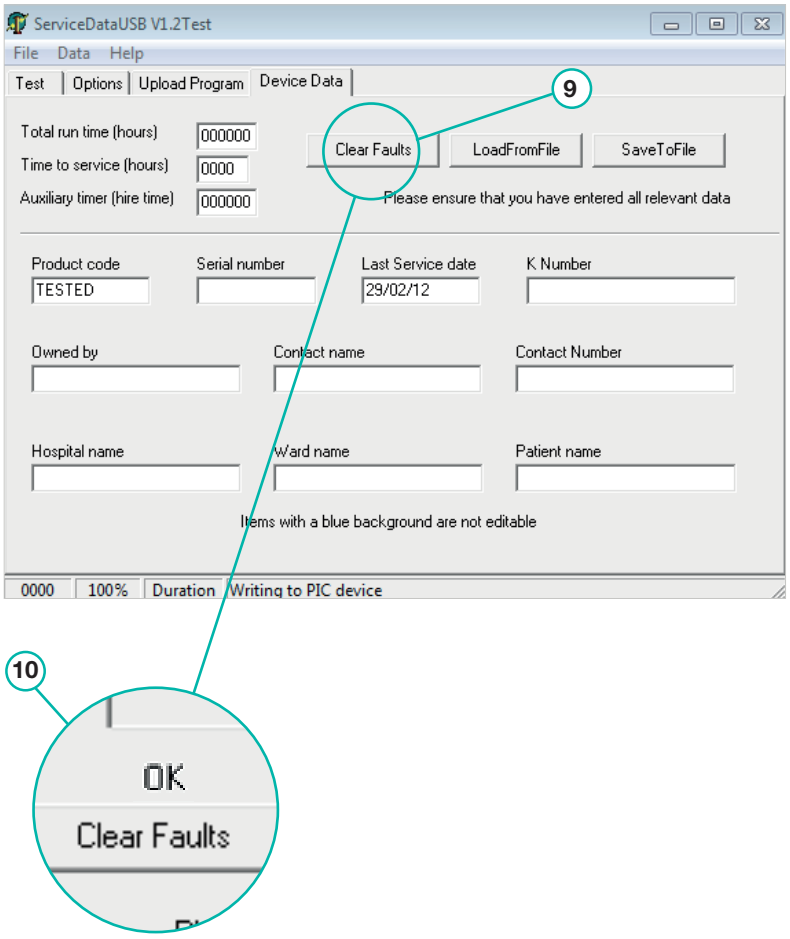


8. Now select the “Data” tab and then select “Set” from the drop down field, and the information will be sent to the unit, this will take a few seconds. Then using the up/down arrow keys on the unit you can now scroll through the information.



9. To clear any fault from the fault log on the information screen, select the “Clear faults” box, this will take a few seconds.

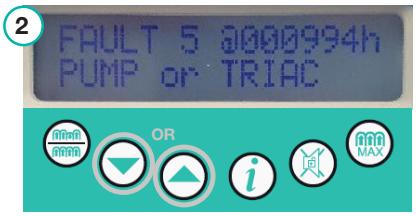
10. Once the faults are cleared “OK” will display above the “Clear faults” box. Using the up/down arrow keys on the unit scroll through the information menu to check all the faults have been cleared.

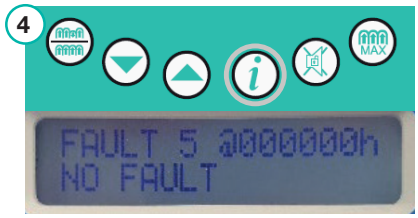


2.7 Clearing Faults, Renewing Hours to Service and Altering Service Date (no cable)

Clearing Faults

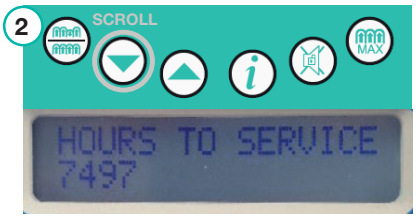
1. Switch the power unit on with information (data) key (i) depressed. The unit will display 'QUATTRO PLUS or ACUTE Information'. Press the down arrow key once to see the first fault.
2. The unit will display a fault and the hour the fault happened (press down and up arrow keys to scroll through the 5 fault logs).
3. Press the active/CLP toggle select key and keep it pressed for 5 seconds until a row of stars are displayed where the fault description was displayed (this function can be performed on any of the five fault displays and all five faults will be cleared simultaneously).
4. Once the stars have been displayed press the information (data) (i) key to clear the faults. All 5 fault logs will now have 'NO FAULT' displayed and the fault log hours will read 0 hours.





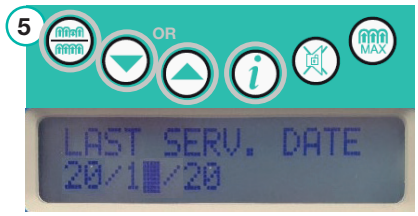
Renewing Hours to Service

1. Switch the power unit on with information (data) key (i) depressed. The unit will display 'QUATTRO PLUS or ACUTE Information'.
2. Press the down arrow key to scroll through the information menu until the unit displays 'HOURS TO SERVICE').
3. Press the active/CLP toggle select key and keep it pressed for 5 seconds until a row of stars are displayed where the hours to service were displayed.
4. Once the stars have been displayed press the information (data) key (i) to return the hours to service to 7500 hours. The unit will now display 'HOURS TO SERVICE 7500'.



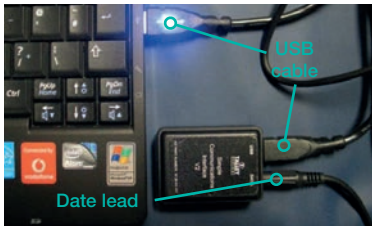
Altering Service Date

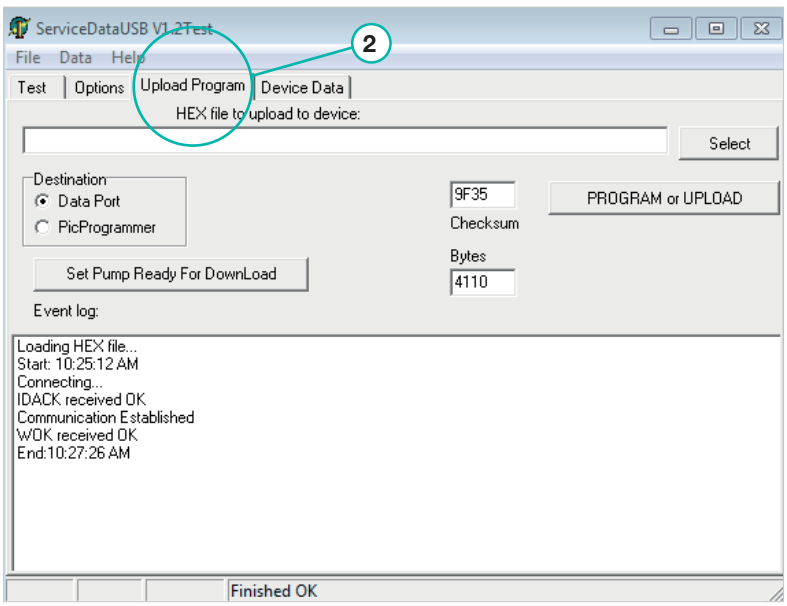
1. Switch the power unit on with information (data) key (i) depressed. The unit will display 'QUATTRO PLUS or ACUTE Information'.
2. Press the down arrow key to scroll through the information menu until the unit displays 'LAST SERV. DATE' and the current date.
3. Press the active/CLP toggle select key and keep it pressed for 5 seconds until a row of stars are displayed where the date was displayed.
4. Once the stars have been displayed press the information (data) key (i) and the unit will display the date with a cursor.
5. Use the active/CLP toggle select key to move the cursor to the parts of the date that need altering, and the down and up arrow keys to alter the date itself. Once the date is correct press information (data) key (i) to exit the menu and the cursor will no longer display.



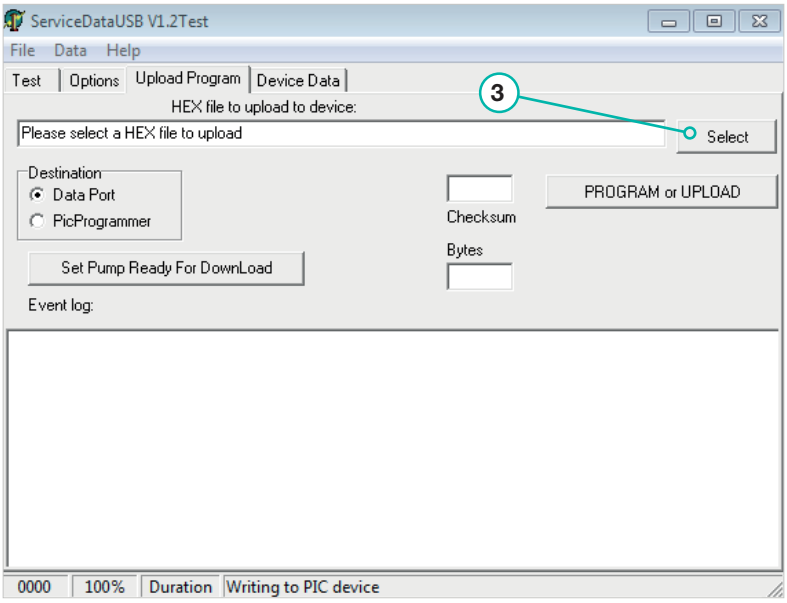
2.8 Uploading New Software with Service Data USB V1.2

1. Connect the unit to power but do not switch on and connect the data lead coming from USB communication box to the unit and communication box to the computer as shown in pictures below. (LEAD COLOURS MIGHT BE DIFFERENT).
2. Start-up the service data program, and on service data and select the "upload program" tab shown.

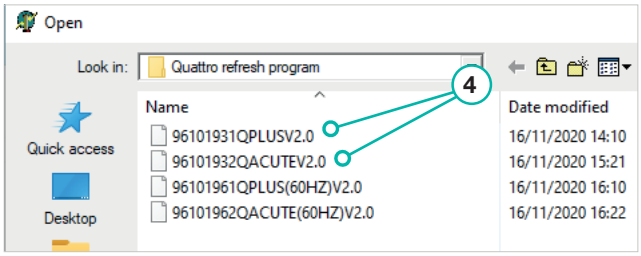




3. Now select the “select” box on service data as shown.



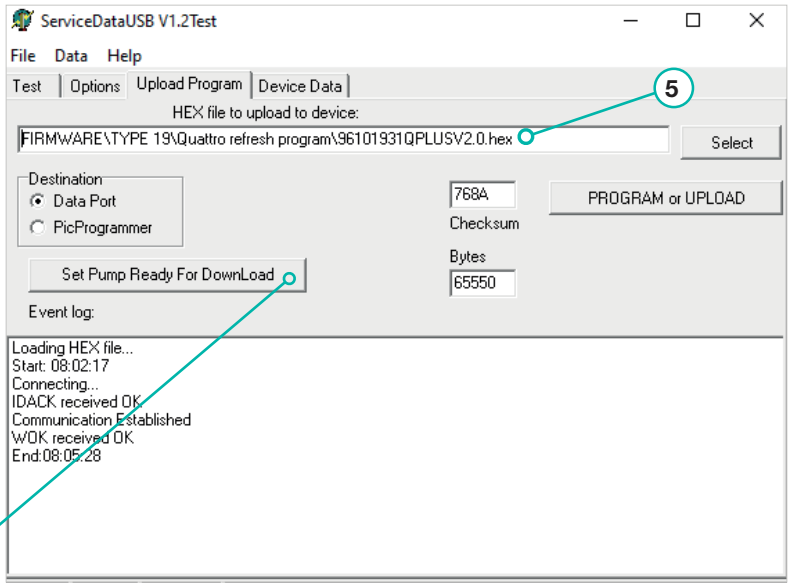
4. Now select the HEX file required:-
QUATTRO Plus:
96101931QPLUSV2.0
QUATTRO Acute:
96101932QACUTEV2.0

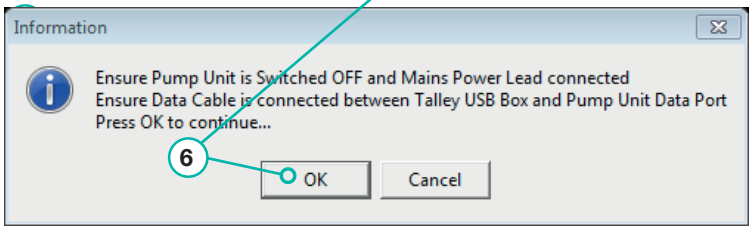


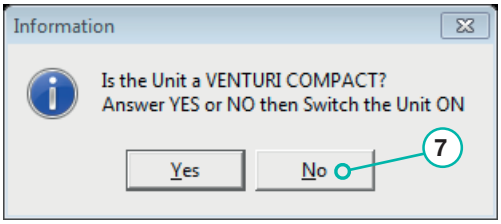
5. Once this is achieved the HEX file will appear in field indicated.

6. Now select the “Set pump ready for download” box then read the information screen and select the “OK” box as shown.

7. Now select the “NO” box as shown, and then within 5 seconds of selecting “NO” switch the unit on.



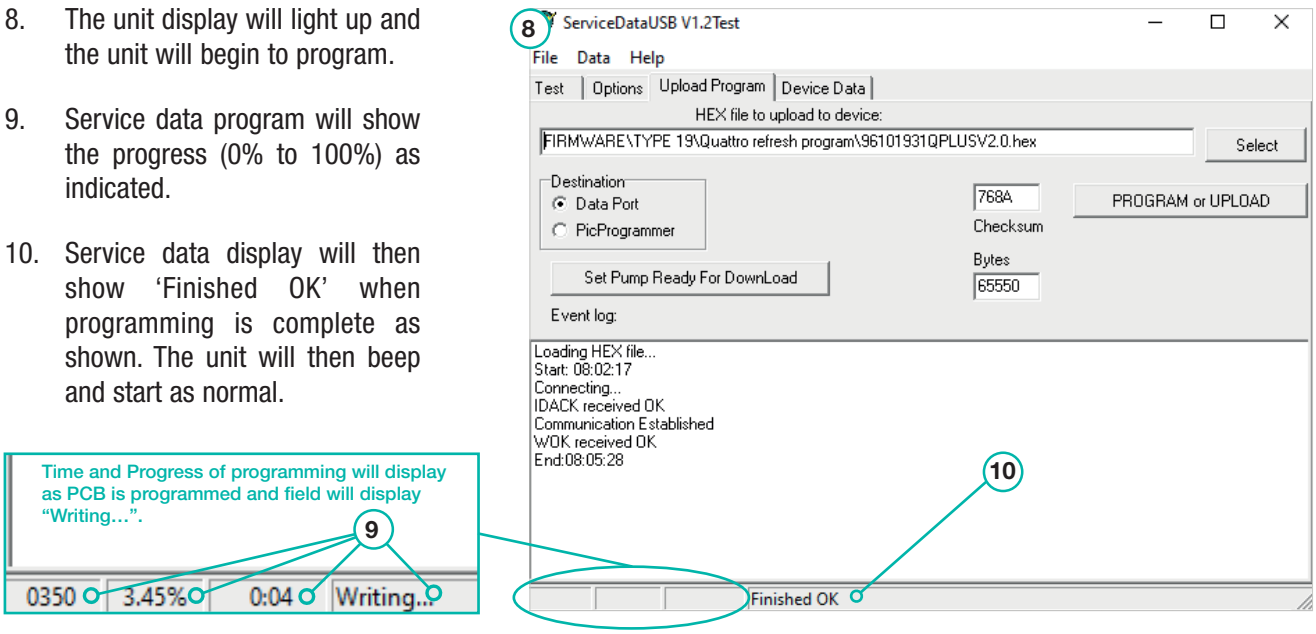




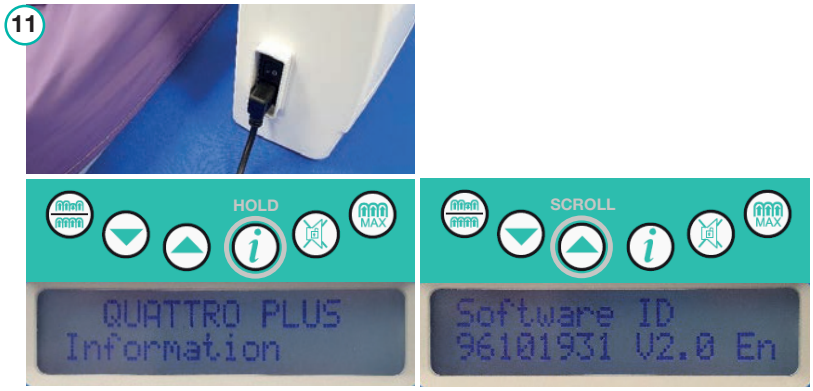
8. The unit display will light up and the unit will begin to program.

9. Service data program will show the progress (0% to 100%) as indicated.

10. Service data display will then show 'Finished OK' when programming is complete as shown. The unit will then beep and start as normal.



11. Now turn the QUATTRO unit off. You can now check that the programming has been successful by switching the unit on with the information (data) key (i) depressed and scroll through the menu with the up arrow key ▲ until you reach Software ID; this will now display the program number that has been uploaded.

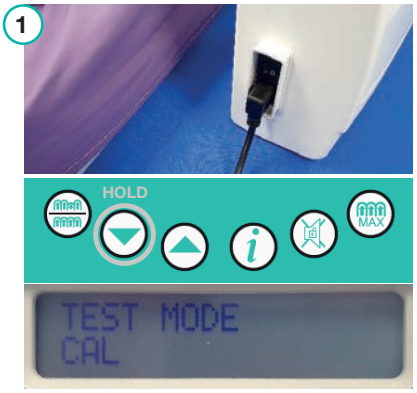


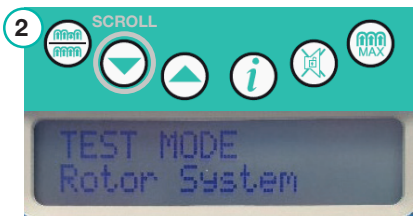
2.9 Testing Rotor and CCV Assembly

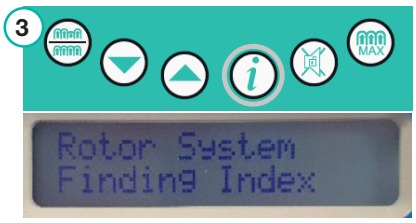
1. Apply the power lead to unit and switch the unit on, with the down arrow key ▼ depressed at the same time. Once the unit has started, release the down arrow key ▼. This enables you to enter the test menu. The unit will display 'TEST MODE CAL'.

2. Press the down arrow key ▼ to scroll through the test menu until 'TEST MODE Rotor System' is displayed.

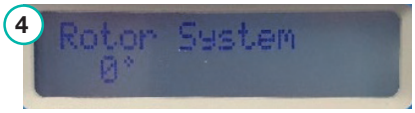
3. Press the information (data) key (i) and the unit will display 'Rotor System Finding Index' while the rotor finds its index point, which is at 0 deg. This will take 20 seconds.







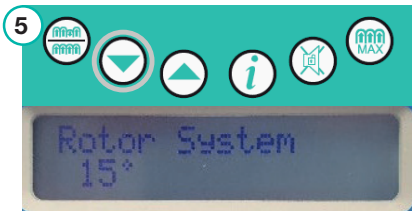
4. Once the unit has found the rotor index point it will display 'Rotor System 0°'.

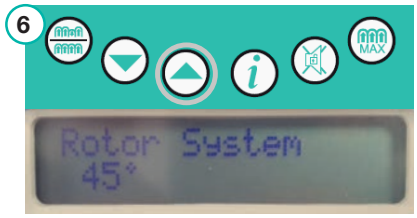


5. Using the down arrow key ⓓ you can move the rotor by 15 deg increments.

6. Using the up arrow key ⓤ you can move the rotor by 30 deg increments.

7. Either using the down or up arrow key ⓓ ⓤ scroll through all the rotor angles until the display is back at 0 deg. This test has shown that the CCV assembly is working correctly.





2.10 PReg Pressure Regulation Tests

1. Apply the power lead to unit and switch the unit on, with the down arrow key ⓓ depressed at the same time. Once the unit has started, release the down arrow key ⓓ. This enables you to enter the test menu. The unit will display 'TEST MODE CAL'.

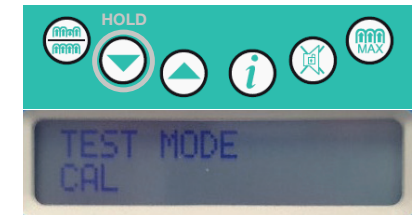
2. Press the down arrow key ⓓ to scroll through the test menu until 'TEST MODE Rotor System' is displayed.

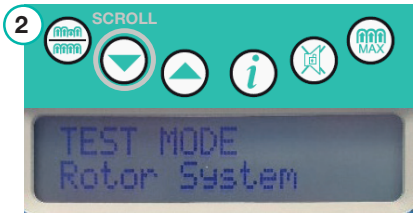
3. Press the information (data) key ⓘ and the unit will display 'Rotor System Finding Index' while the rotor finds its index point, which is at 0 deg. This will take 20 seconds.

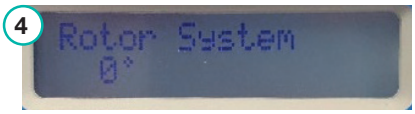
4. Once the unit has found the rotor index point it will display 'Rotor System 0°'.

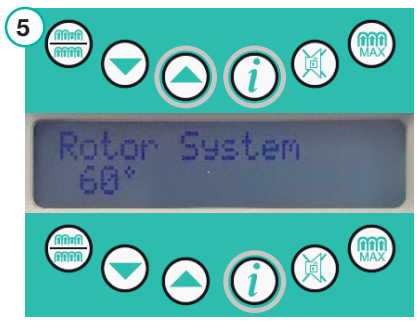
5. Using the up arrow key ⓤ set the rotor angle to 60 deg. Exit the rotor system test menu by pressing the information (data) ⓘ key (the rotor will remain at the 60 deg point).

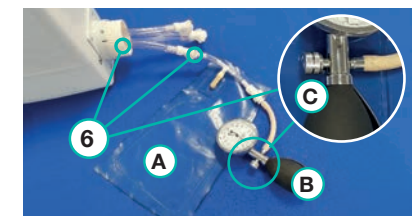
6. Connect the CCV push and turn interface to CCV on the unit and then connect the plenum chamber Ⓐ and pressure gauge Ⓑ to the tube at 60° on the interface, making sure that the valve Ⓒ on the gauge is fully closed.





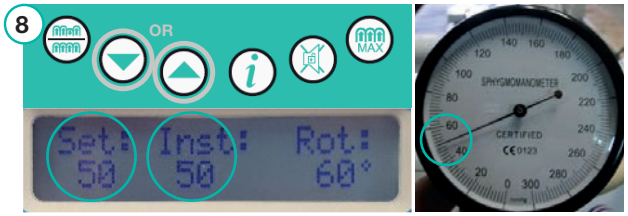






7. Now enter the test PReg test on unit by pressing information (data) key ⓘ - the pump will start.

8. Once in the tests PReg test the set pressure can be altered by pressing either the up or down arrow keys ▼ ▲ . The Inst pressure will track to whatever the set pressure is set to. To check that the pressure you have set is correct check display on connected pressure gauge and compare to the set and Inst pressure on display of unit. This test has shown that the internal calibration and pressure tracking of the Type 19R unit is correct.

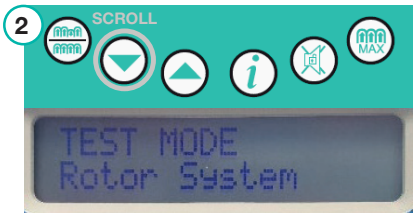


2.11 Pump Performance Tests

1. Apply the power lead to unit and switch the unit on, with the down arrow key ▼ depressed at the same time. Once the unit has started, release the down arrow key ▼ . This enables you to enter the test menu. The unit will display 'TEST MODE CAL'.

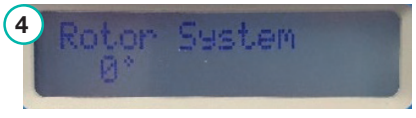
2. Press the down arrow key ▼ to scroll through the test menu until 'TEST MODE Rotor System' is displayed.

3. Press the information (data) key ⓘ and the unit will display 'Rotor System Finding Index' while the rotor finds its index point, which is at 0 deg. This will take 20 seconds.

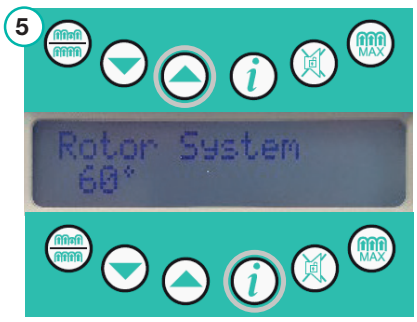


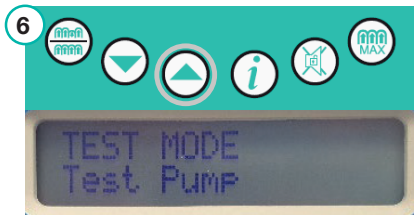
4. Once the unit has found the rotor index point it will display 'Rotor System 0°'.

5. Using the up arrow key ▲ set the rotor angle to 60 deg. Exit the rotor system test menu by pressing the information (data) key ⓘ (the rotor will remain at the 60 deg point).



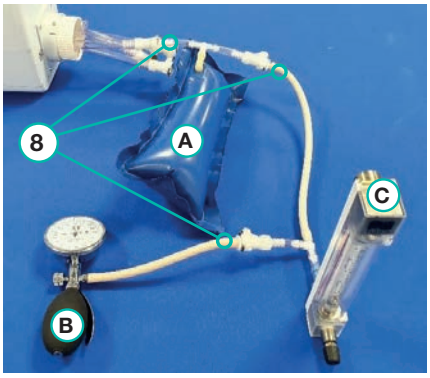
6. Press the up arrow key ▲ once, the unit will display 'TEST MODE Test Pump'.





7. Enter the pump test mode by pressing information (data) key ⓘ the pump will start, and the unit will display a default 'Pump Power: 5760'.

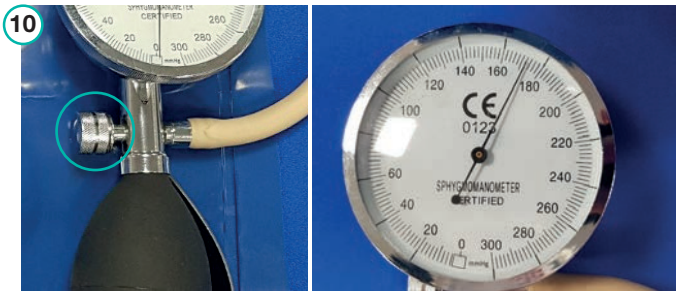
8. Connect the CCV push and turn interface to the CCV on unit and then connect the plenum chamber (A) and pressure gauge (B) to the tube at 60° on the interface. Then attach the flow meter (C) to the plenum chamber and the pressure gauge to the connector on the pipe to the flow meter.

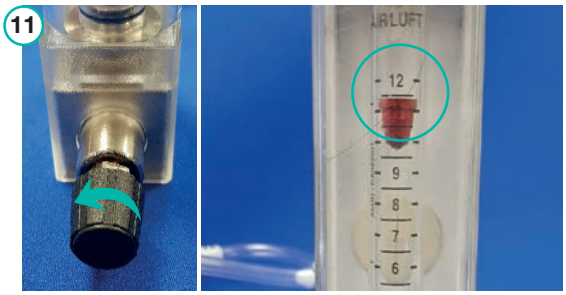


9. Pressing and holding the down arrow key to set pump to its maximum operating level, the unit will display 'Pump Power: 1700'. Make sure the valve on the flow meter is fully closed by turning the black knob fully clockwise.

10. Make sure the valve is closed on the pressure gauge and take the pressure reading from gauge. This reading should be no lower than 100mmHg for a Type 19R internal double pump.

11. Fully open the valve on the flow meter by turning the black knob fully anti-clockwise and take the reading from the flow meter. This reading should be no lower than 8 L/P/M for a Type 19R internal double pump.



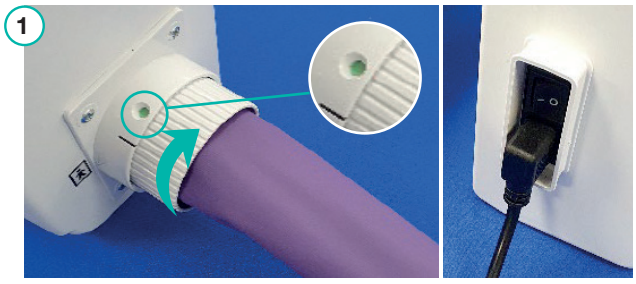


2.12 Mattress Pressure Tests

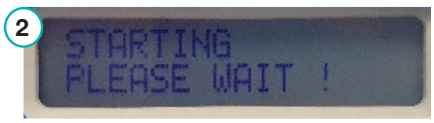
1. Connect the mattress umbilical to the CCV assembly on the power unit by inserting and rotating clockwise until the green dot is fully visible in the locator aperture. Plug in the mains power lead and switch the unit on.

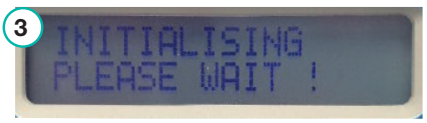
2. 'STARTING PLEASE WAIT !' is displayed whilst optical sensor is moving to zero position.

3. 'INITIALISING PLEASE WAIT !' is displayed while mattress is reaching operating pressure.



4. Once initialised the power unit will start to run in default mode Active Medium and the unit will display 'ACTIVE MEDIUM'.





5. Using the up arrow key set the QUATTRO Plus power unit to mode Active Seated, the power unit will display 'ACTIVE SEATED'.

   NB. On the QUATTRO Acute power unit this will be Active Firm as there is no seated setting.

6. Then using active/CLP toggle select key depress for 3 seconds for power unit to enter mode CLP Seated. The power unit will display 'ACTIVE PLEASE WAIT !' while the power unit is changing modes.

7. Once in mode CLP Seated the power unit will display 'CONT LOW PRESS SEATED' (on QUATTRO Acute power unit this will be CLP Firm as there is no seated setting). Allow the power unit to operate for at least 10 minutes to achieve pressure in mattress.

8. Now disconnect the push and turn connector from unit by rotating the connector a ¼ turn towards the black line on the CCV assembly (green dot will no longer be visible in locator spot).

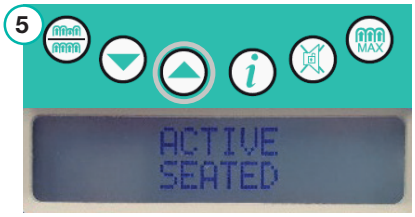
9. Then pull umbilical away from the power unit.

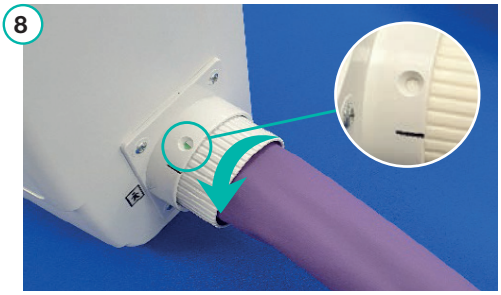
10. Connect the mattress test connector (A) to the sphyg. by push fitting male CPC into the female CPC until a click is heard.

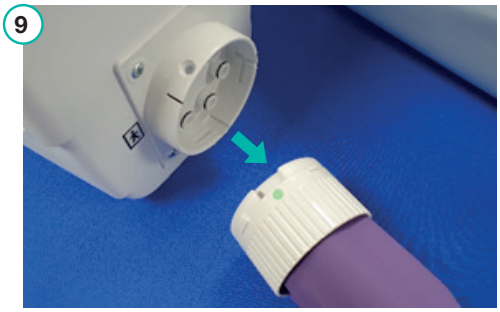
11. Connect the umbilical push and turn connector to the mattress test connector by inserting and rotating clockwise until the green dot is fully visible in the locator aperture.

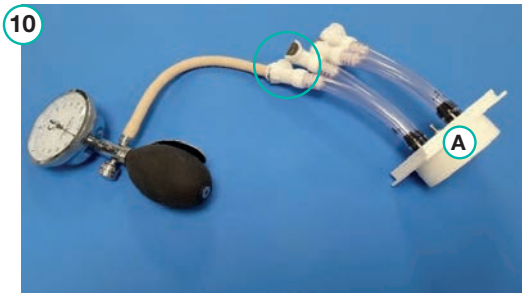
12. Take reading from sphyg. which, for the QUATTRO Plus mattress, should be **46mmHg** on all of the channels of the mattress test connector (46mmHg is the amount of pressure that should be in cells when the unit in seated mode). The sphyg. can be left on the channel to check for leaks.

    For the QUATTRO Acute the reading will be **31mmHg** in firm as there is no seated setting.





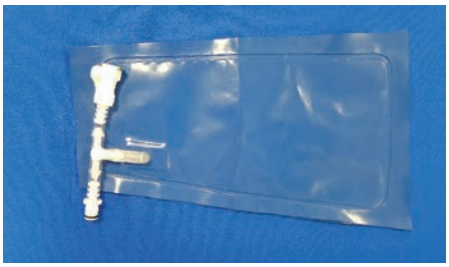




2.13 Test and Communication Kits

QUATTRO TEST KIT: PART NUMBER 11086

Contents:

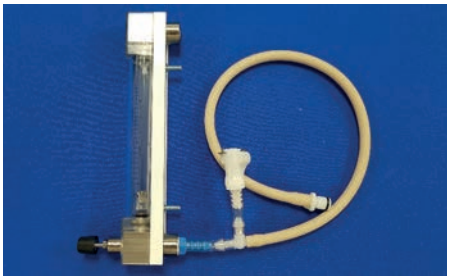


PLENUM CHAMBER
PART NUMBER 11082

HAND PUMP HP103 (Sphygmomanometer or Sphyg.)

PART NUMBER 11069

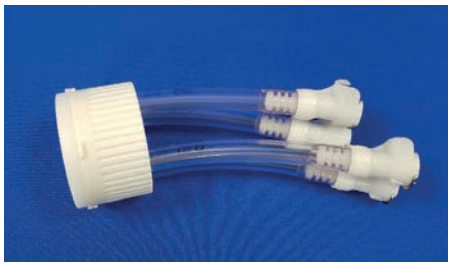
This measures pressure: range from 0 mmHg to 300mmHg.



FLOW METER ASSEMBLY

PART NUMBER 11083

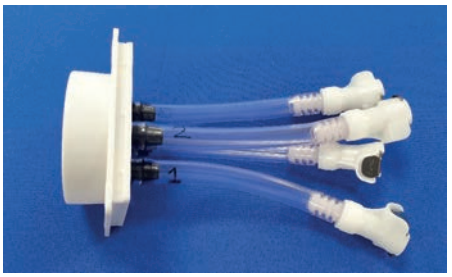
This measures flow: range from 1 to 25 litres per minute.



TEST EQUIPMENT PUMP QUATTRO

PART NUMBER 11079

This connector will connect to any QUATTRO Type 19R units.



TEST EQUIPMENT MATTRESS QUATTRO

PART NUMBER 11080

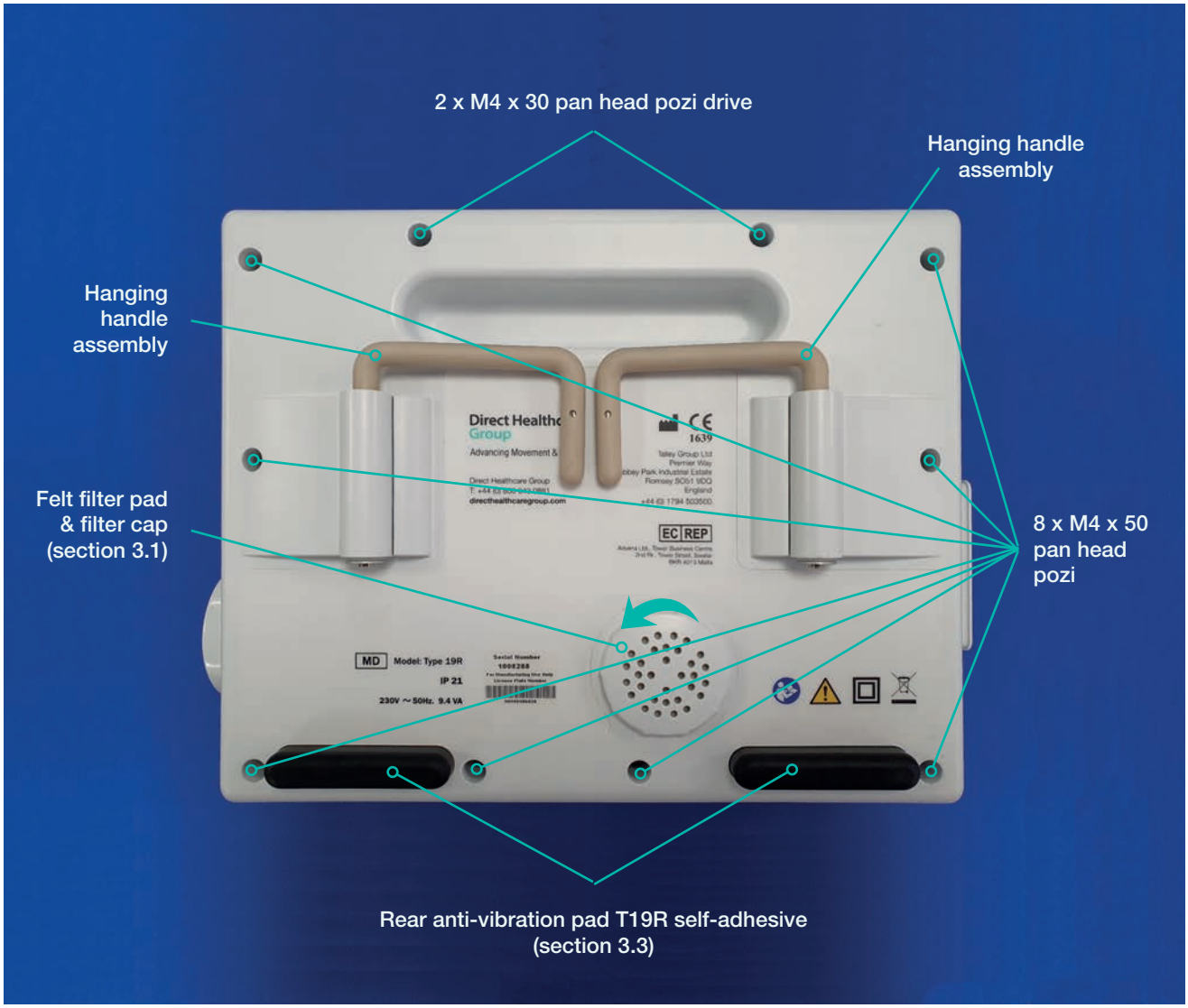
This connector will connect to any QUATTRO mattress.

SERVICE DATA V1.2 USB COMMUNICATION KIT:

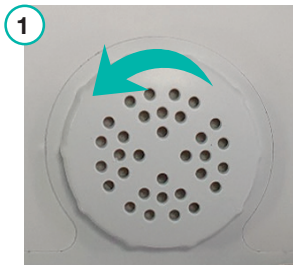
PART NUMBER 10951

This enables you to apply program updates, alter information and clear faults on the QUATTRO unit.

3. Replacement Procedures



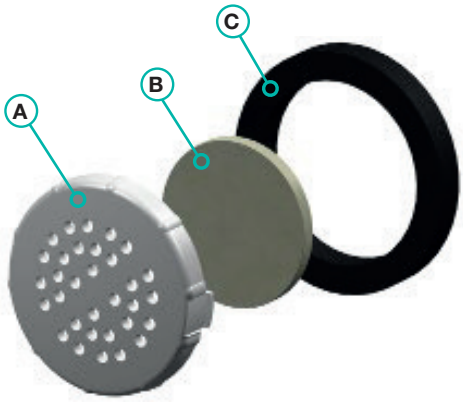
3.1 Filter Pad Replacement



1. The filter is accessed by turning the cap anti-clockwise.

Filter Inlet seal and cap set comprises:

- (A) Filter cap
- (B) Inlet filter
- (C) Inlet seal

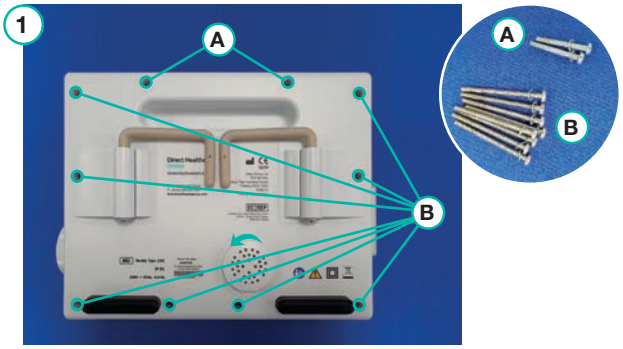


INLET FILTER FW12
50% WOOL CONTENT:
PART NUMBER 10716

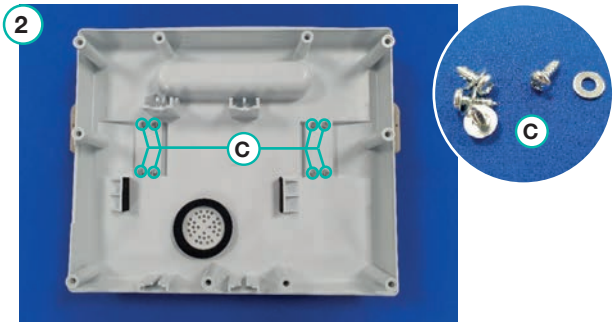
FILTER INLET SEAL
AND CAP SET:
PART NUMBER 10985

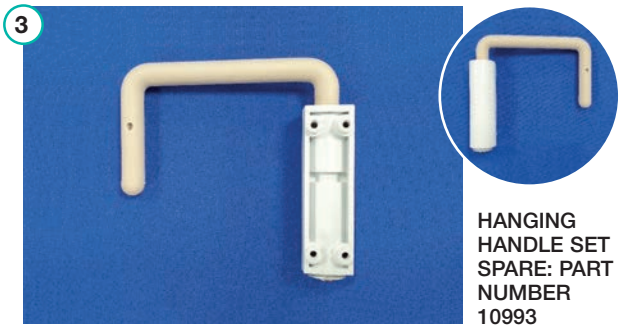
3.2 Handle Replacement

1. Unfasten all the 10 x screws of the rear case, comprising:
   - (A) 2 x M4 x 30 pan head pozi
   - (B) 8 x M4 x 50 pan head pozi
2. Remove the bottom case from unit. Then unfasten the 4 self-tapping screws (C) that are associated with the handle or each of the handles that needs replacing.



3. Replace the hanging handle assembly using the 4 existing screws and washers (C).

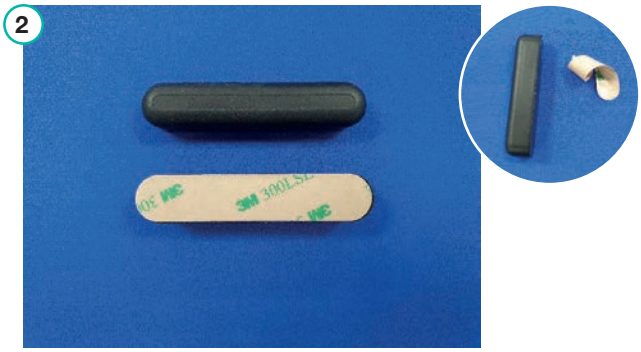




HANGING HANDLE SET SPARE: PART NUMBER 10993

3.3 Rear Anti-vibration Pad T19R Replacement

1. Turn the QUATTRO unit so that the rear case is facing up and clean the area where the old anti-vibration pad was with a TECcare CONTROL surface wipe (other wipes can be used) to clean off any excess adhesive from the old pad.
2. Take the new anti-vibration pad and peel the protector away from the adhesive side of the pad.
3. Position the new anti-vibration pad and apply to the rear case apply force for 30 seconds to get a good bond.



REAR ANTI-VIBRATION FEET SINGLE T19R: PART NUMBER 10181

3.4 Internal Pump and Upper Pump Post Replacement

1. Remove the rear case assembly via the 10 pozi-drive screws (see section 3.2). The felt filter should be changed during this procedure (section 3.1).

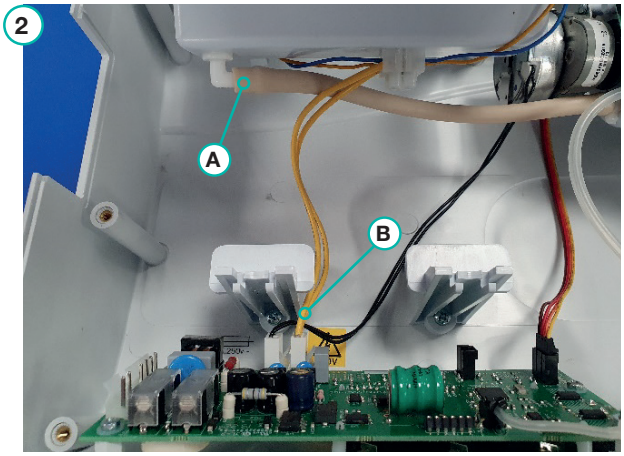
2. Withdraw the double pump unit, disconnecting the air hose to the cycle control valve (A) and the power connector on the PCB (B) . The pump is retained only by the 4 anti-vibration mounts, so it can be fully removed without the need for hand tools.

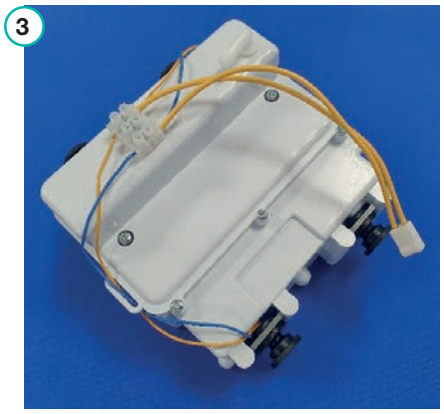
3. Fit the new internal double pump with reverse procedure.

4. If only the anti-vibration pump mount (C) is damaged, replace any of the 4 off anti-vibration mounts. The anti-vibration part simply pulls away from mount support and new part can be push fitted.

5. If one of the upper pump mounts (D) is damaged remove the damaged pump mount, unfasten the 2 x M4 x 12 pan head pozi screws and remove the pump mount.

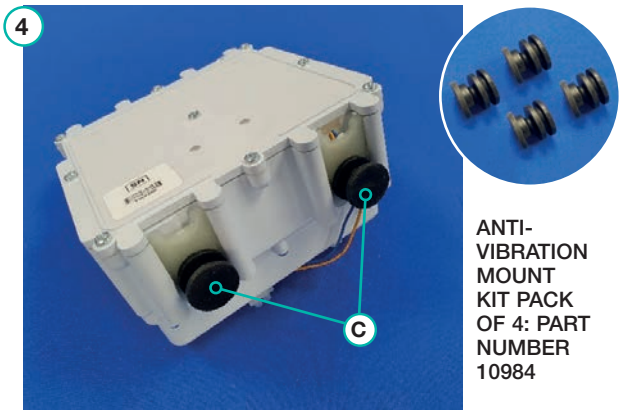
6. Fit the new upper pump mount using the existing screws.



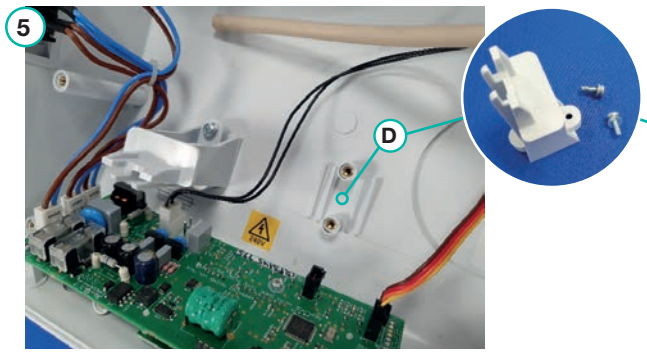


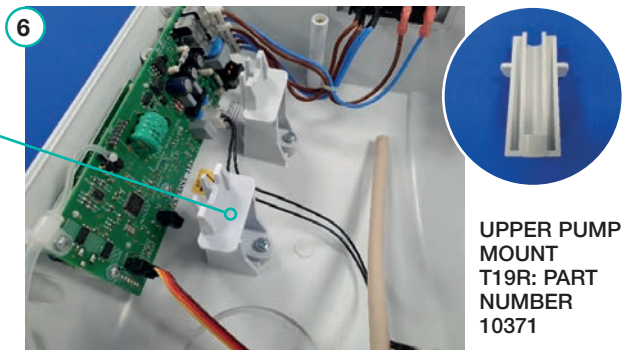
PUMP UNIT INTERNAL DOUBLE 230:50 T19R: PART NUMBER 12163

PUMP UNIT INTERNAL DOUBLE 230:60 T19R: PART NUMBER 12175



ANTI-VIBRATION MOUNT KIT PACK OF 4: PART NUMBER 10984





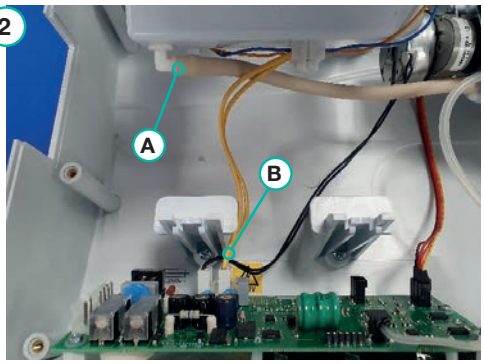
UPPER PUMP MOUNT T19R: PART NUMBER 10371

3.5 Cycle Control Valve (CCV) Replacement

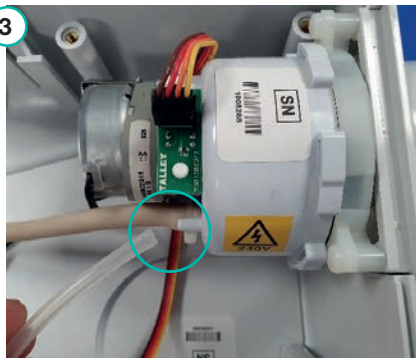
1. Remove the rear case assembly via the 10 pozi-drive screws (see section 3.2).
2. Withdraw the double pump unit, disconnecting the air hose to the cycle control valve (A) and the power connector on the PCB (B).
3. Disconnect the clear sensor tube from the CCV (not the PCB).
4. Disconnect the crimp housing for the mains power (C) from the control PCB header (this will pull away from the PCB). Disconnect the ribbon cable (D) - note this is a locking 4 way header, press in on the locking mechanism release tab and pull away from the PCB.
5. The CCV assembly can now be lifted from the enclosure and replaced with new T19R CCV assembly.
6. When replacing the pump or cycle control valve assembly it is important to ensure they are reconnected to the correct header. Both headers are marked on PCB “PUMP” and “MOTOR”.

1

2



3



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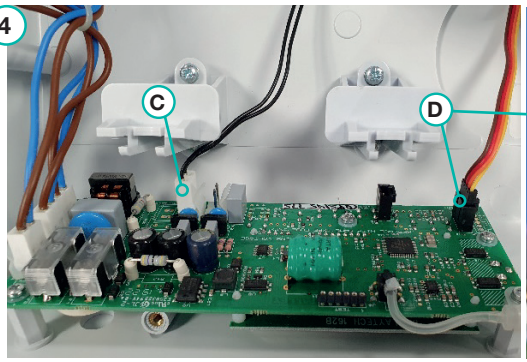
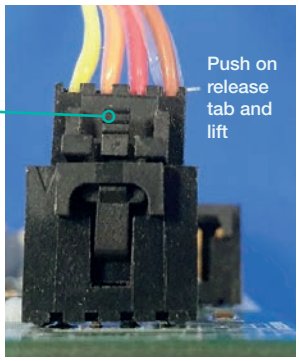
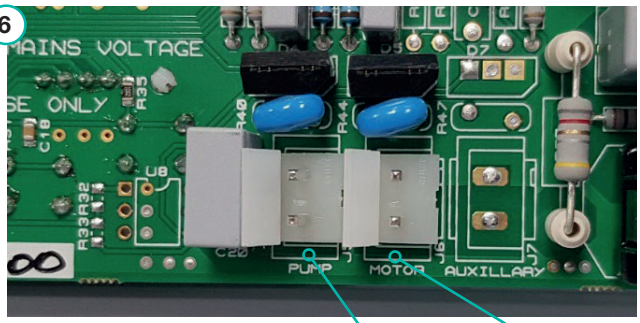
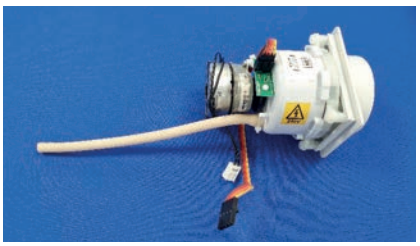




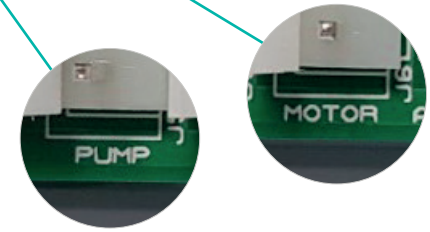
5

6



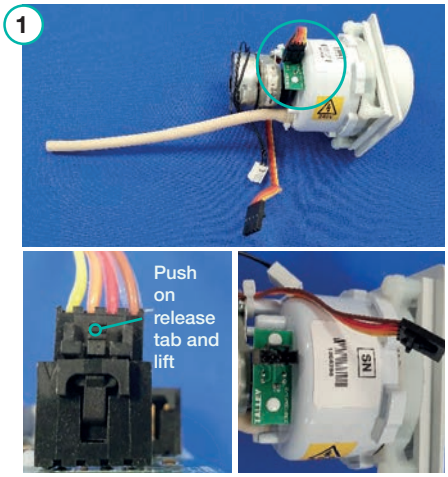


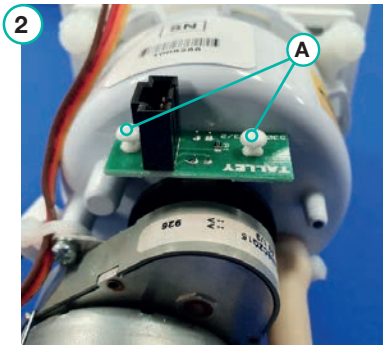
CCV ASSEMBLY 230:50 T19R: PART NUMBER 10944

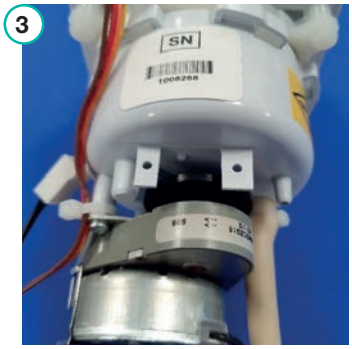


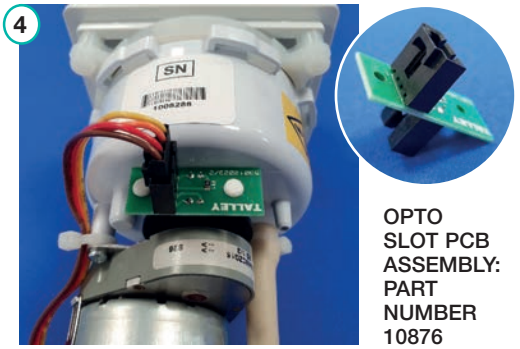
3.6 OPTO Slot PCB Replacement

1. Disconnect the locking crimp housing from the header on the OPTO slot PCB.
2. Carefully release both of the plastic snap rivets (A) from the OPTO slot PCB and bracket on cycle control valve assembly (keep snap rivets for reconnection).
3. Remove the OPTO slot PCB from the cycle control valve assembly.
4. Place the new OPTO slot PCB on the cycle control valve and push fit the existing plastic snap rivets and then reconnect the locking crimp header.





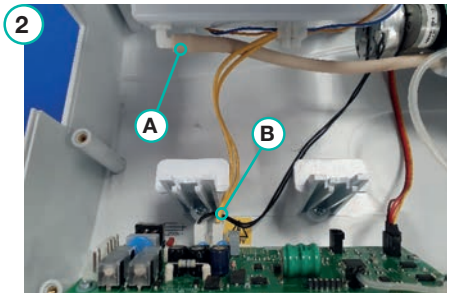


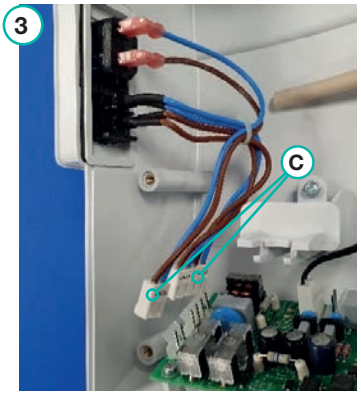


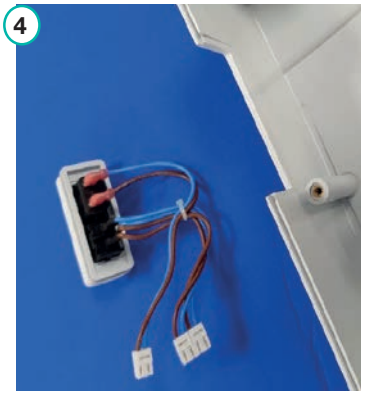
OPTO SLOT PCB ASSEMBLY: PART NUMBER 10876

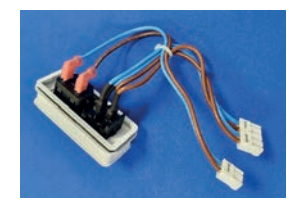
3.7 IEC Module Replacement

1. Remove the rear case assembly via the 10 pozi-drive screws (see section 3.2).
2. Withdraw the double pump unit, disconnecting the air hose to the cycle control valve (A) and the power connector on the PCB (B).
3. Disconnect the 4 way and the 2 way mains headers from the PCB (C).
4. Lift the IEC switch out of the top case and replace with the new Type 19R 230V IEC power module assembly.







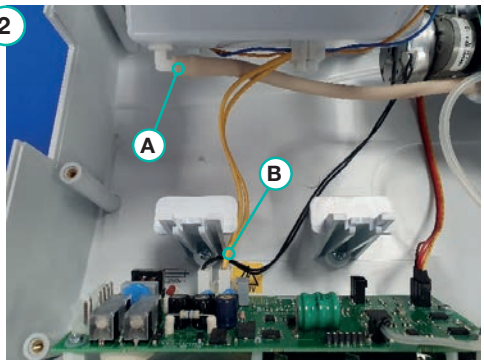


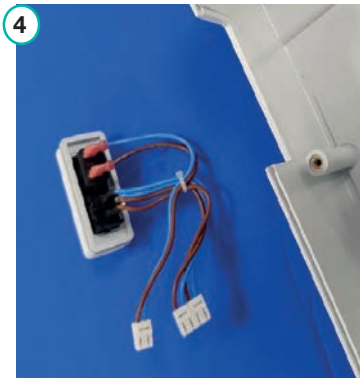
IEC & SHROUD ASSEMBLY T19R: PART NUMBER 12193

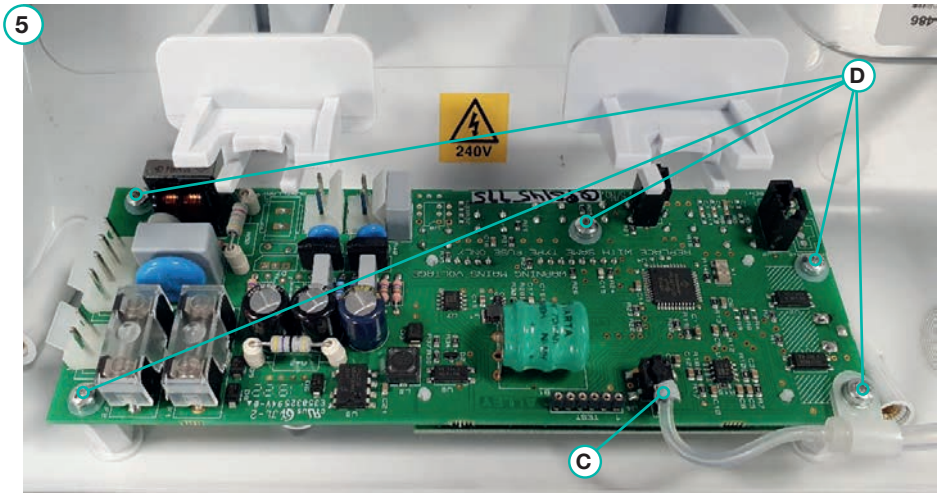
3.8 Control PCB Replacement

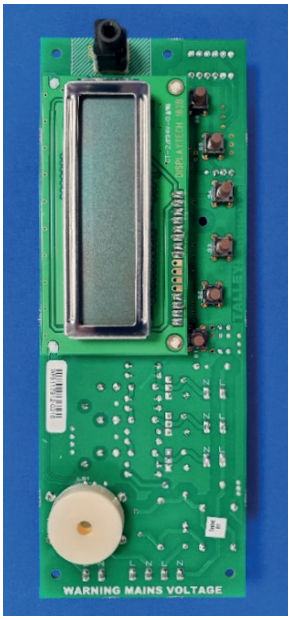
The control board is replaced as a complete module, note that the PCB must have the required programme uploaded, and product code / serial number information entered. It is assumed that the PCB is pre-programmed for this instruction. Observe anti-static precautions before removing and handling the control PCB.

1. Remove the rear case assembly via the 10 pozi-drive screws (see section 3.2).
2. Withdraw the double pump unit, disconnecting the air hose to the cycle control valve (A) and the power connector on the PCB (B).
3. Remove the CCV assembly as detailed in section 3.5.
4. Remove the IEC module as detailed in section 3.7.
5. Remove the sensor tube (C) taking care not to strain the sensor itself. Unfasten 5 x M3 x 8 pan head pozi screws (D) and remove the PCB. Install the replacement Type 19R QUATTRO PCB using the reverse procedure.









PCB PROGRAMMED 230:50
QUATTRO ACUTE T19R:
PART NUMBER 10888

PCB PROGRAMMED 230:50
QUATTRO PLUS T19R:
PART NUMBER 10887

PCB PROGRAMMED 230:60
QUATTRO ACUTE T19R:
PART NUMBER 12395

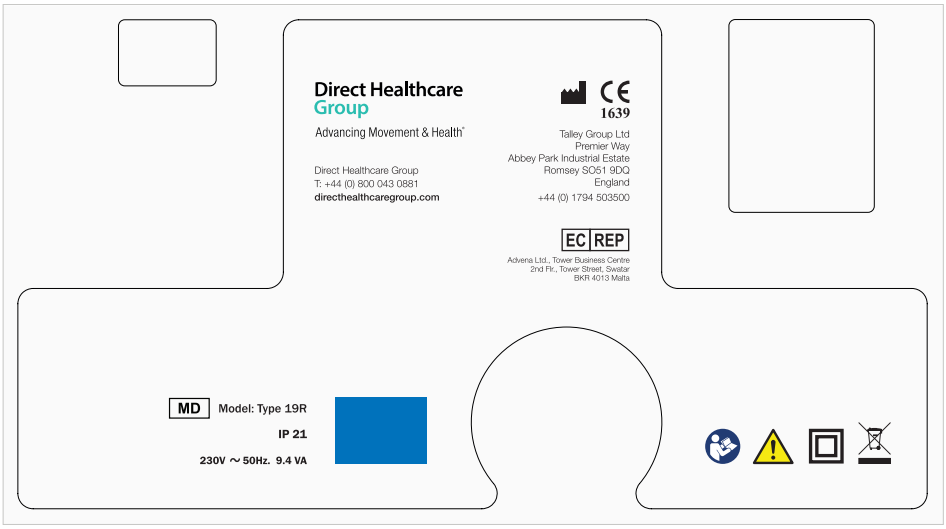
PCB PROGRAMMED 230:60
QUATTRO PLUS T19R:
PART NUMBER 10891

3.9 Label Kits and Buttons

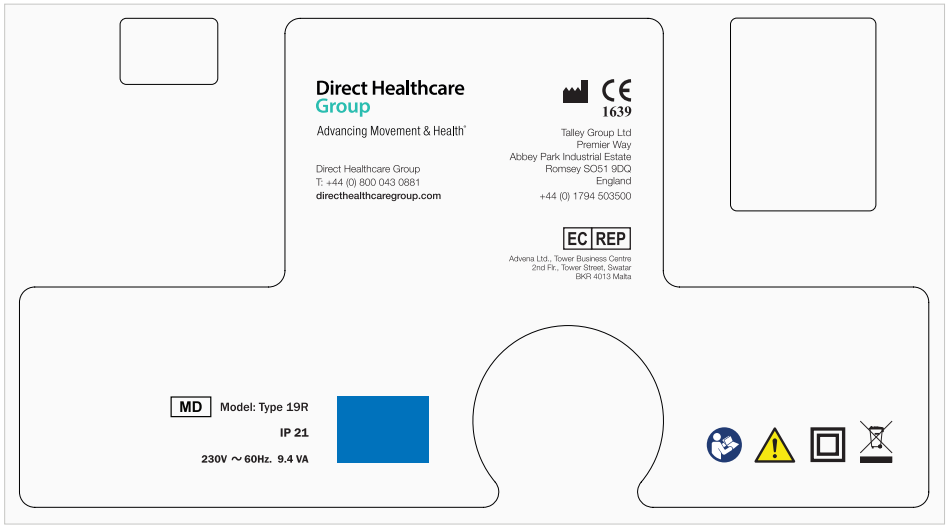
Label kits are available for direct replacement on QUATTRO power units. The labels are self-adhesive. Ensure that any adhesive residue from the discarded label is removed, and that surfaces are clean and dry. QUATTRO label kit illustrations:-

LABEL KIT FRONT:
LOGO QA T19R:
PART NUMBER 11389

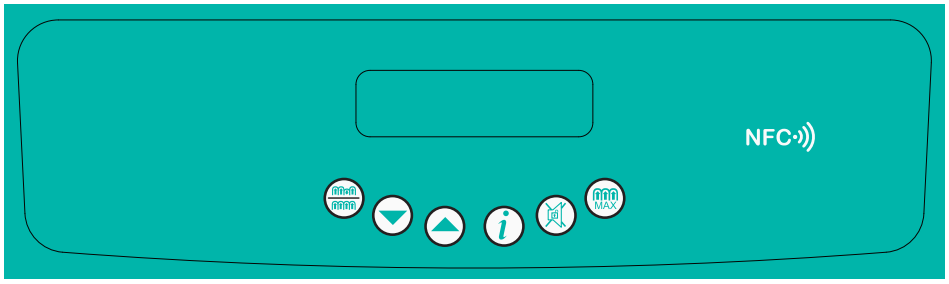
LABEL KIT FRONT:
LOGO QP T19R:
PART NUMBER 11383



LABEL REAR UNI QUATTRO
RANGE 230:50 T19R:
PART NUMBER 11017

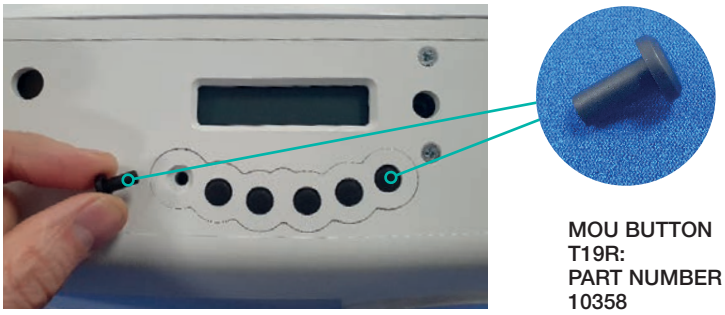


LABEL REAR UNI QUATTRO
RANGE 230:60 T19R:
PART NUMBER 12391



LABEL TOP QUATTRO
T19R:
PART NUMBER 10563

When replacing the top label make sure that all the buttons are in place before the new top label applied.

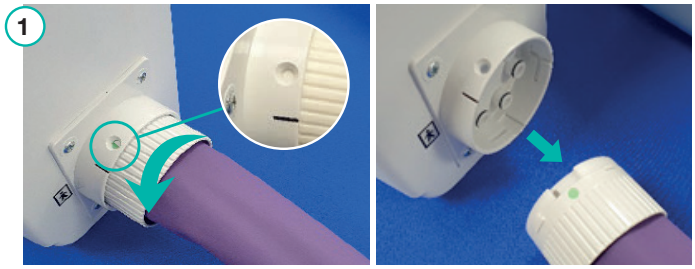


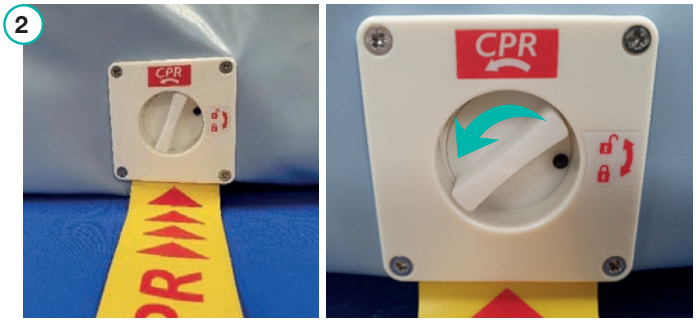
MOU BUTTON
T19R:
PART NUMBER
10358

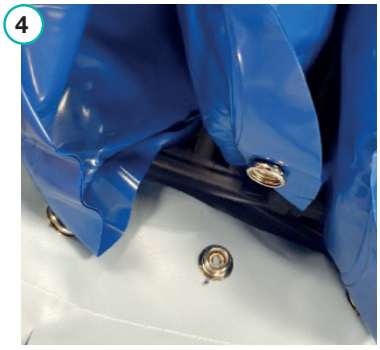
3.10 Mattress Cover and Air Cell Replacement

1. Disconnect the mattress umbilical from the unit if it is still connected.
2. Deflate the mattress by releasing the CPR.
3. Unzip the top cover (there are two zips at opposite corners of the mattress) and remove from the mattress. Replace cover if damaged.

   SEE SPARES LIST FOR APPROPRIATE COVER REQUIRED FOR MATTRESS.
4. Unfasten both the end poppers of the air cell. To prevent the possibility of tearing the polyurethane of the air cell it is important to roll the popper off the socket rather than applying a direct face on force.







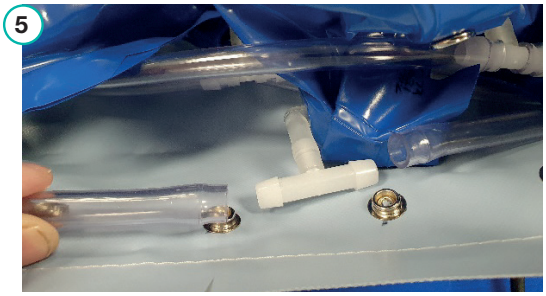
5. Detach the two tubes from the elbow or T-piece of the air cell.

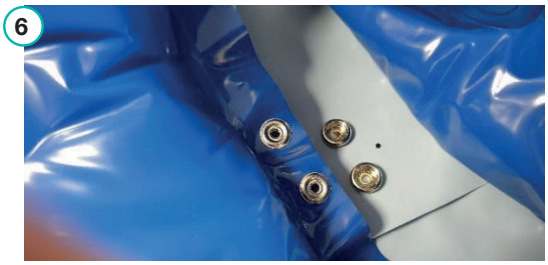
6. Remove the air cell from the centre popper strip. Apply the reverse procedure for air cell replacement.

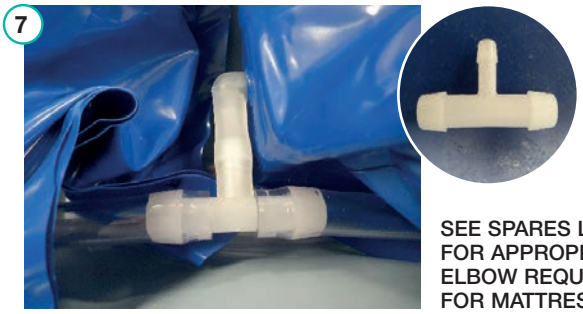
   SEE SPARES LIST FOR APPROPRIATE AIR CELL REQUIRED FOR MATTRESS.

7. If a T-piece connector is damaged or broken when changing the air cell, it must be replaced. Extract old connector from tubing or air cell and replace with new connector.

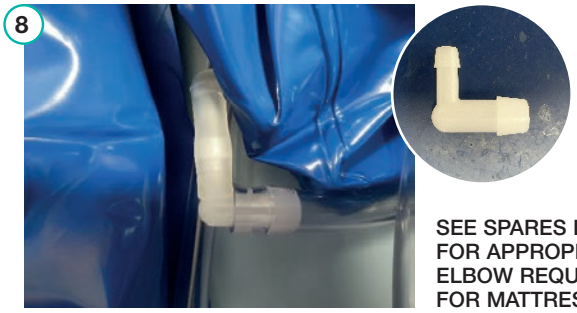
8. If an elbow connector is damaged or broken when changing the air cell, it must be replaced. Extract old connector from tubing or air cell and replace with new connector.







SEE SPARES LIST FOR APPROPRIATE ELBOW REQUIRED FOR MATTRESS.



SEE SPARES LIST FOR APPROPRIATE ELBOW REQUIRED FOR MATTRESS.

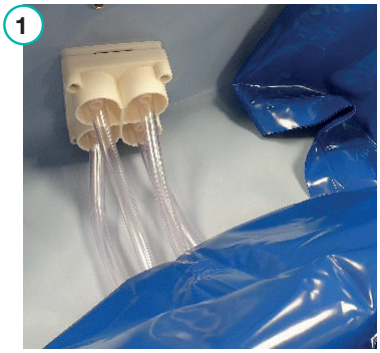
3.11 Mattress CPR Replacement

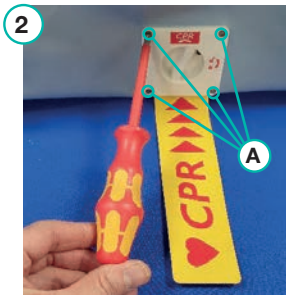
1. Deflate the mattress, and un-fasten the air cells in the proximity of the CPR (see section 3.10).

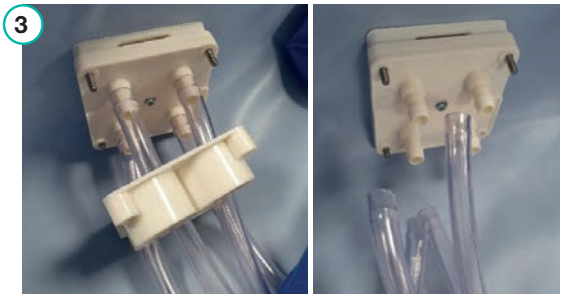
2. Unfasten the 4 screws on the outside of the mattress (A). Ensure the Nyloc nuts on the inside of the mattress are retained.

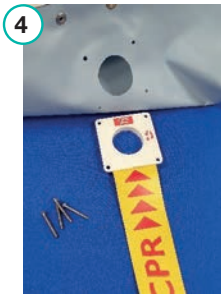
3. Slide the internal shroud off the CPR assembly to expose the tube mounts and pull the tubes away from the four tube mounts on CPR back plate.

4. Remove the CPR assembly. Apply the reverse procedure for CPR replacement.







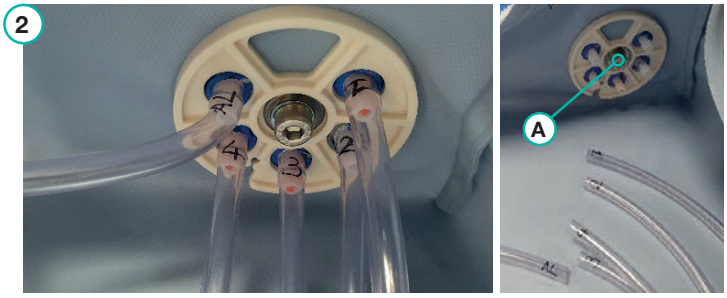


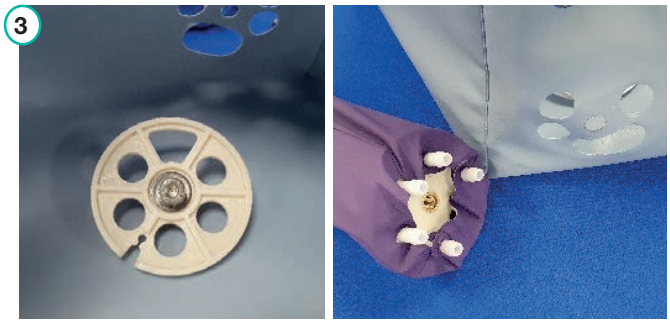
CPR ASSEMBLY 12MM SPARE: PART NUMBER 10869

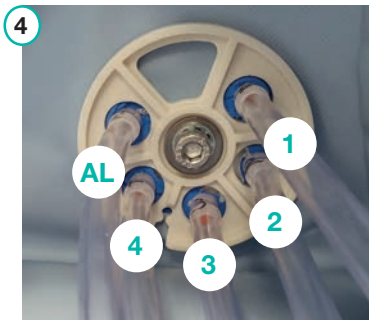
CPR ASSEMBLY 9MM G4 SPARE: PART NUMBER 12189

3.12 Mattress Umbilical Replacement

1. Remove the cover, deflate the mattress, and unfasten the cells in the proximity of the umbilical (see section 3.10).
2. Identify the tubes that go to the umbilical for ease when reassembling, then remove the tubes from the tube mounts and fully unscrew the M8 cap head alun screw in the centre of the flange (A).
3. Remove the inner umbilical plate and then remove the umbilical. Apply the reverse procedure for umbilical replacement.
4. When reassembling, the new umbilical tubes should be attached in the orientation shown.







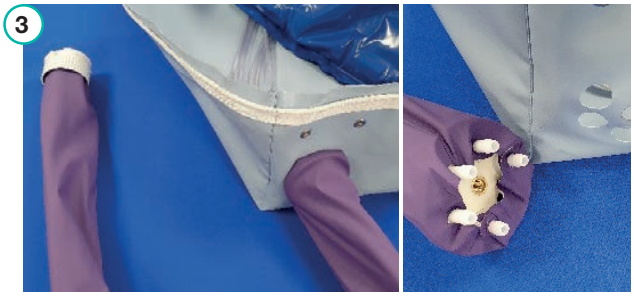
UMBILICAL WITH BARB AND SLEEVE ASSEMBLY QA
G4 SPARE: PART NUMBER 12198

UMBILICAL WITH BARB AND SLEEVE ASSEMBLY QP
G4 SPARE: PART NUMBER 12197

3.13 Mattress Base Sheet Replacement

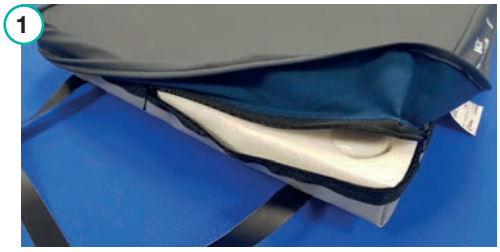
1. Deflate the mattress, remove the mattress cover and unfasten the end and centre poppers of all the air cells (see section 3.10).
2. Remove the CPR as shown in section 3.11.
3. Remove the umbilical as shown in section 3.12.
4. Remove the air cell set and tubes from the base sheet and apply the reverse procedure for mattress reassembly.

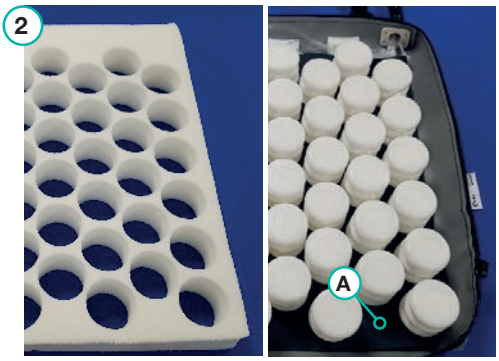
SEE SPARES LIST FOR APPROPRIATE BASE SHEET REQUIRED FOR MATTRESS.

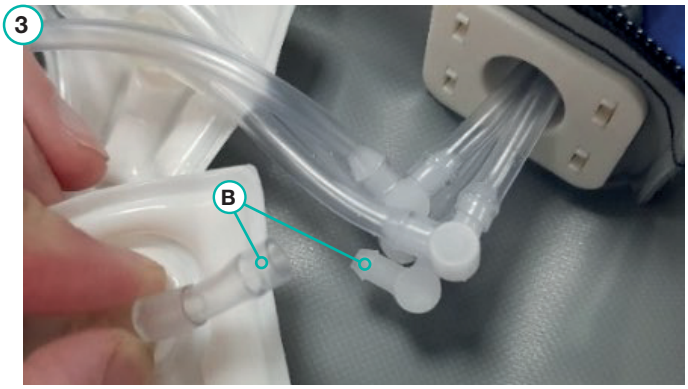


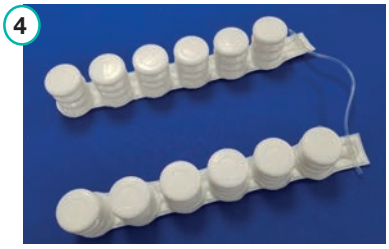
3.14 Cushion Bellows Replacement

1. Completely unzip the cover from the cushion.
2. Remove the foam insert from around the bellows, then remove the bellows sheet (A).
3. Disconnect the faulty bellow strip from the tube that connects it to the umbilical and (B) remove the bellows. Apply the reverse procedure for bellows replacement.
4. Spare bellows come in a set of 2 connected together with tube which is glued in place, so when replacing the bellows, you will always replace a set of 2.





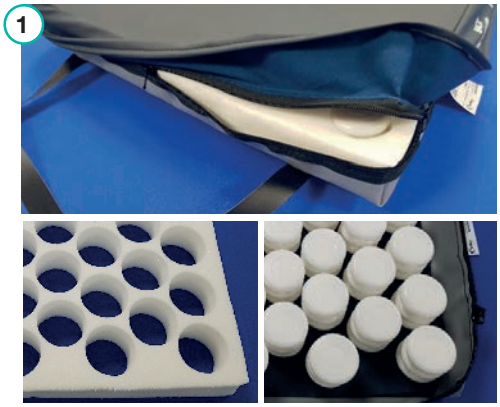


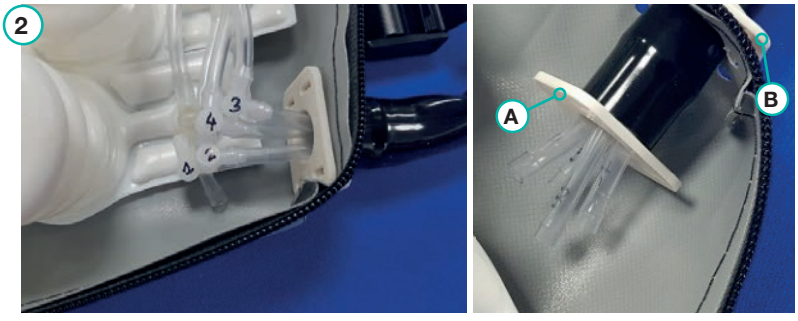


BELLOWS 6 WAY T-VALVES: PART NUMBER 10864

3.15 Cushion Umbilical Replacement

1. Unzip the cover from the cushion and remove the foam insert from around the bellows (see section 3.13).
2. Identify the tubes going to the umbilical and disconnect the umbilical tubes from T-pieces. Unclip the inner cushion clamp part (A) from the outer cushion clamp part (B).
3. Disconnect the umbilical from the inner cushion clamp part (A). Apply the reverse procedure for umbilical attachment.





UMBILICAL ASSEMBLY SHORT CUSHION: PART NUMBER 10832

4. Spares

4.1 System Spares List

Power unit:

Part Number	Description	Service Manual Reference
11981	Label RFID NFC	Section 1.9
10697	O-ring RM0080-10	Section 2.1
11086	Quattro test kit	Section 2.13
10951	Communications kit USB V2	Section 2.13
11082	Plenum chamber	Section 2.13
11069	Hand pump HP103	Section 2.13
11083	Flow meter assembly	Section 2.13
11079	Test equipment pump Quattro	Section 2.13
11080	Test equipment mattress Quattro	Section 2.13
10716	Inlet filter FW12 50% wool content	Section 3.1
10985	Filter inlet seal and cap set	Section 3.1
10993	Hanging handle set spare	Section 3.2
10181	Rear anti-vibration feet single T19R	Section 3.3
12163	Pump unit internal double 230:50 T19R	Section 3.4
12175	Pump unit internal double 230:60 T19R	Section 3.4
10984	Anti-vibration mount kit pack of 4	Section 3.4
10371	Upper pump mount T19R	Section 3.4
10944	CCV assembly 230:50 T19R	Section 3.5
10876	Opto slot PCB	Section 3.6
12193	IEC & shroud assembly T19R	Section 3.7
10887	Quattro Plus T19 PCB 230:50/120:60	Section 1.3 & 3.8
10888	Quattro Acute T19 PCB 230:50/120:60	Section 1.3 & 3.8
10891	Quattro Plus T19 PCB 230:60	Section 1.3 & 3.8
11383	Label kit front:logo QP T19R	Section 3.9
11389	Label kit front:logo QA T19R	Section 3.9
11017	Label rear Quattro range 230:50 T19R	Section 3.9
12391	Label rear Quattro range 230:60 T19R	Section 3.9
10563	Label top Quattro T19R	Section 3.9
10358	MOU button T19R	Section 3.9
10023	Mains Cable GBR 5m length	N/A
10024	Mains Cable ZAF 4.5m length	N/A
10026	Mains Cable EXP 5m length	N/A
10027	Mains Cable AUS 5m length	N/A

Mattress and Cushion:

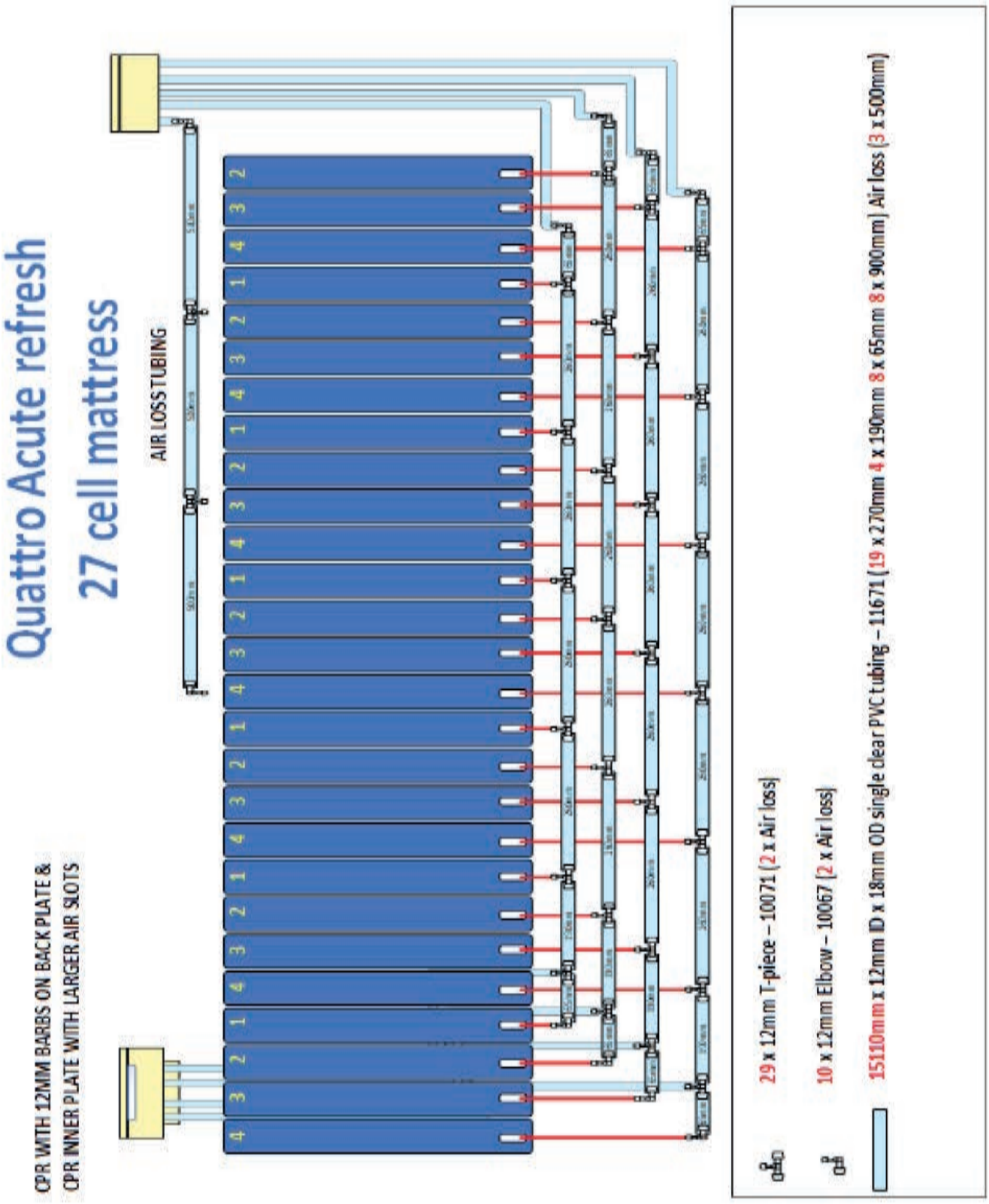
Part Number	Description	Service Manual Reference
11109 C013	Cover Mattress Quattro Acute G4 TAL 27C:90cm Spare	Section 3.10
11109 C014	Cover Mattress Quattro Acute G4 ILS 27C:90cm Spare	Section 3.10
11109 C015	Cover Mattress Quattro Acute G4 TAL 28C:90cm Spare	Section 3.10
11109 C016	Cover Mattress Quattro Acute G4 ILS 28C:90cm Spare	Section 3.10
11109 C017	Cover Mattress Quattro Acute G4 TAL 27C:78cm Spare	Section 3.10
11109 C018	Cover Mattress Quattro Acute G4 ILS 27C:78cm Spare	Section 3.10
11109 C019	Cover Mattress Quattro Acute G4 TAL 28C:78cm Spare	Section 3.10
11109 C020	Cover Mattress Quattro Acute G4 ILS 28C:78cm Spare	Section 3.10
11109 C021	Cover Mattress Quattro Acute G4 TAL 27C:83cm Spare	Section 3.10
11109 C022	Cover Mattress Quattro Acute G4 ILS 27C:83cm Spare	Section 3.10
11109 C023	Cover Mattress Quattro Acute G4 TAL 28C:83cm Spare	Section 3.10
11109 C024	Cover Mattress Quattro Acute G4 ILS 28C:83cm Spare	Section 3.10
11273 C013	Cover Mattress Quattro Plus G4 TAL 30C:78cm Spare	Section 3.10
11273 C014	Cover Mattress Quattro Plus G4 ILS 30C:78cm Spare	Section 3.10
11273 C015	Cover Mattress Quattro Plus G4 TAL 30C:83cm Spare	Section 3.10
11273 C016	Cover Mattress Quattro Plus G4 ILS 30C:83cm Spare	Section 3.10
11273 C017	Cover Mattress Quattro Plus G4 TAL 30C:88cm Spare	Section 3.10
11273 C018	Cover Mattress Quattro Plus G4 ILS 30C:88cm Spare	Section 3.10
11273 C019	Cover Mattress Quattro Plus G4 TAL 32C:78cm Spare	Section 3.10
11273 C020	Cover Mattress Quattro Plus G4 ILS 32C:78cm Spare	Section 3.10
11273 C021	Cover Mattress Quattro Plus G4 TAL 32C:83cm Spare	Section 3.10
11273 C022	Cover Mattress Quattro Plus G4 ILS 32C:83cm Spare	Section 3.10
11273 C023	Cover Mattress Quattro Plus G4 TAL 32C:88cm Spare	Section 3.10
11273 C024	Cover Mattress Quattro Plus G4 ILS 32C:88cm Spare	Section 3.10
11110 C001	Cell Set Quattro Acute G4 27C:90cm	Section 3.10
11110 C002	Cell Set Quattro Acute G4 27C:83cm	Section 3.10
11110 C003	Cell Set Quattro Acute G4 27C:78cm	Section 3.10
11110 C004	Cell Set Quattro Acute G4 28C:90cm	Section 3.10
11110 C005	Cell Set Quattro Acute G4 28C:83cm	Section 3.10
11110 C006	Cell Set Quattro Acute G4 28C:78cm	Section 3.10
11287 C001	Cell Set Quattro Plus G4 30C:78cm	Section 3.10
11287 C002	Cell Set Quattro Plus G4 30C:83cm	Section 3.10
11287 C003	Cell Set Quattro Plus G4 30C:88cm	Section 3.10
11287 C004	Cell Set Quattro Plus G4 32C:78cm	Section 3.10
11287 C005	Cell Set Quattro Plus G4 32C:83cm	Section 3.10
11287 C006	Cell Set Quattro Plus G4 32C:88cm	Section 3.10
11599	Air Cell QP:PCR 78cm Width	Section 3.10
11598	Air Cell QP:PCR 83cm Width	Section 3.10
11511	Air Cell QP:PCR 88cm Width	Section 3.10
11593	Air Cell Quattro Acute 78cm Width	Section 3.10
11594	Air Cell Quattro Acute 83cm Width	Section 3.10

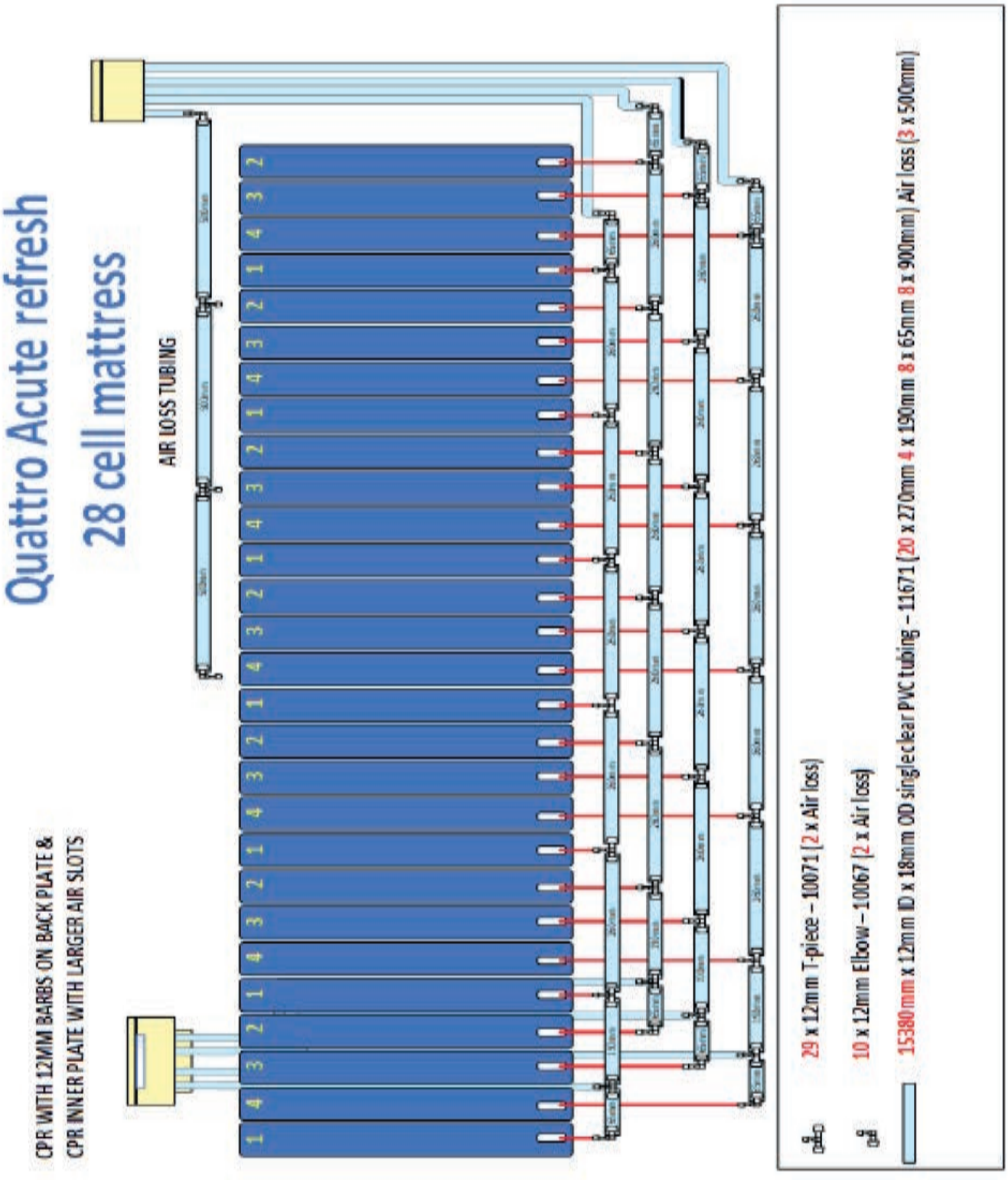
Part Number	Description	Service Manual Reference
11592	Air Cell Quattro Acute 90cm Width	Section 3.10
11010	MOU T Piece Tube Connector 9mm x 9mm x 9mm	Section 3.10
10628	MOU T Piece Tube Connector 9mm x 6mm x 9mm	Section 3.10
11012	MOU L Piece Tube Connector 9mm x 6mm	Section 3.10
10067	MOU Elbow 12mm	Section 3.10
10071	MOU T Piece 12mm	Section 3.10
12189	CPR assembly 9mm G4 spare	Section 3.11
10869	CPR assembly 12mm spare	Section 3.11
12197	Umbilical with barb and sleeve assembly QP G4 spare	Section 3.12
12198	Umbilical with barb and sleeve assembly QA G4 spare	Section 3.12
11113 C013	Base Sheet Quattro Acute G4 TAL 27C:78cm EE Spare	Section 3.13
11113 C014	Base Sheet Quattro Acute G4 TAL 27C:83cm EE Spare	Section 3.13
11113 C015	Base Sheet Quattro Acute G4 TAL 27C:90cm EE Spare	Section 3.13
11113 C016	Base Sheet Quattro Acute G4 TAL 28C:78cm EE Spare	Section 3.13
11113 C017	Base Sheet Quattro Acute G4 TAL 28C:83cm EE Spare	Section 3.13
11113 C018	Base Sheet Quattro Acute G4 TAL 28C:90cm EE Spare	Section 3.13
11113 C019	Base Sheet Quattro Acute G4 ILS 27C:78cm EE Spare	Section 3.13
11113 C020	Base Sheet Quattro Acute G4 ILS 27C:83cm EE Spare	Section 3.13
11113 C021	Base Sheet Quattro Acute G4 ILS 27C:90cm EE Spare	Section 3.13
11113 C022	Base Sheet Quattro Acute G4 ILS 28C:78cm EE Spare	Section 3.13
11113 C023	Base Sheet Quattro Acute G4 ILS 28C:83cm EE Spare	Section 3.13
11113 C024	Base Sheet Quattro Acute G4 ILS 28C:90cm EE Spare	Section 3.13
11315 C013	Base Sheet Quattro Plus G4 TAL 30C:78cm EE Spare	Section 3.13
11315 C014	Base Sheet Quattro Plus G4 TAL 30C:83cm EE Spare	Section 3.13
11315 C015	Base Sheet Quattro Plus G4 TAL 30C:88cm EE Spare	Section 3.13
11315 C016	Base Sheet Quattro Plus G4 TAL 32C:78cm EE Spare	Section 3.13
11315 C017	Base Sheet Quattro Plus G4 TAL 32C:83cm EE Spare	Section 3.13
11315 C018	Base Sheet Quattro Plus G4 TAL 32C:88cm EE Spare	Section 3.13
11315 C019	Base Sheet Quattro Plus G4 ILS 30C:78cm EE Spare	Section 3.13
11315 C020	Base Sheet Quattro Plus G4 ILS 30C:83cm EE Spare	Section 3.13
11315 C021	Base Sheet Quattro Plus G4 ILS 30C:88cm EE Spare	Section 3.13
11315 C022	Base Sheet Quattro Plus G4 ILS 32C:78cm EE Spare	Section 3.13
11315 C023	Base Sheet Quattro Plus G4 ILS 32C:83cm EE Spare	Section 3.13
11315 C024	Base Sheet Quattro Plus G4 ILS 32C:88cm EE Spare	Section 3.13
11070	Mattress carry bag	N/A
11081	Adaptor assembly rapid inflator	N/A
10864	Bellows 6 way T-valve	Section 3.14
10832	Umbilical assembly short cushion	Section 3.15
11485	Adaptor assembly cushion	Section 1.6
10750	Cam buckle	Section 1.6
11714	Cushion short 43cm:43cm:7cm	Section 1.6

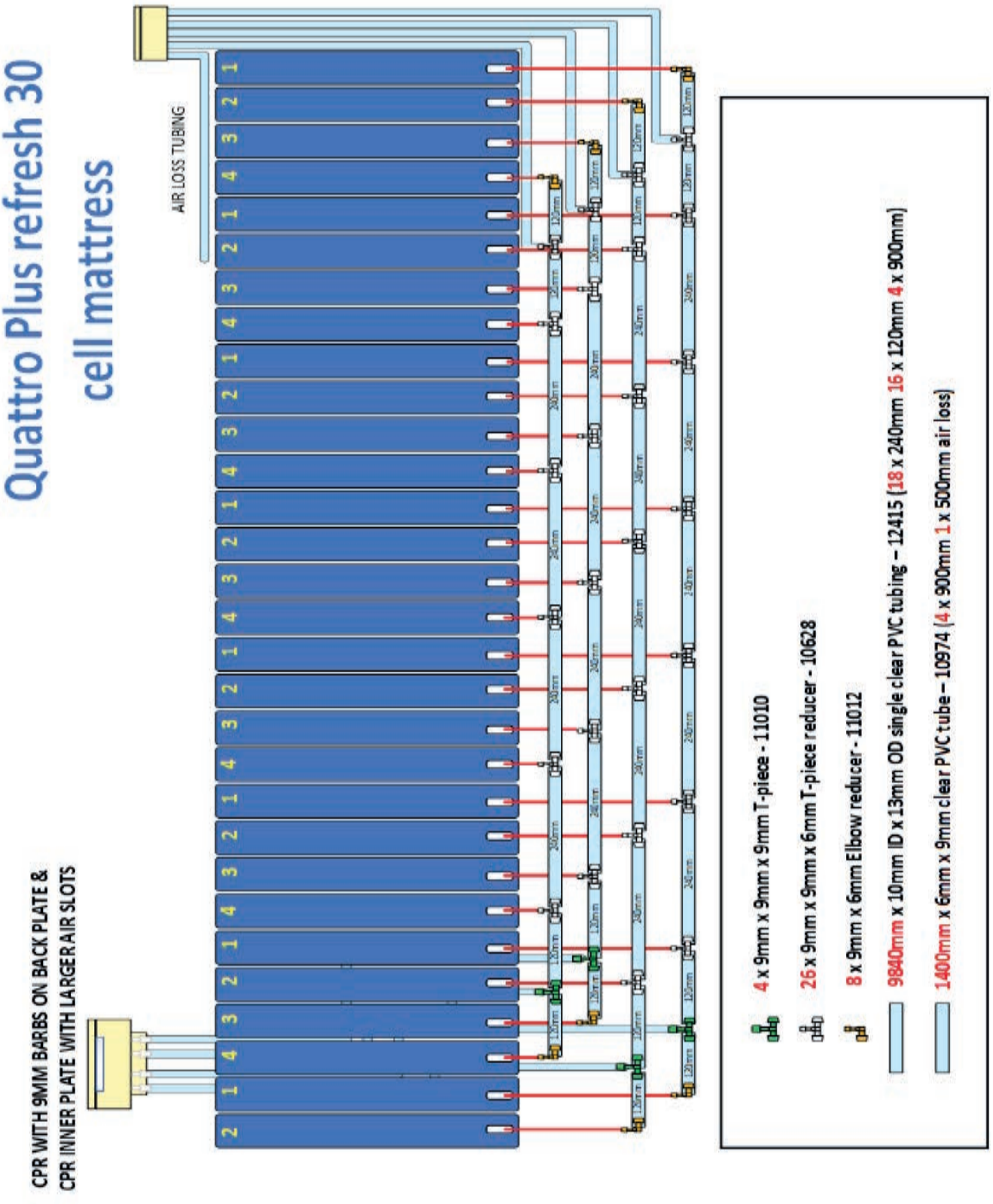
4.2 QUATTRO Mattress and Cushion System - Service Check Sheet (for checks and tests in section 2.1)

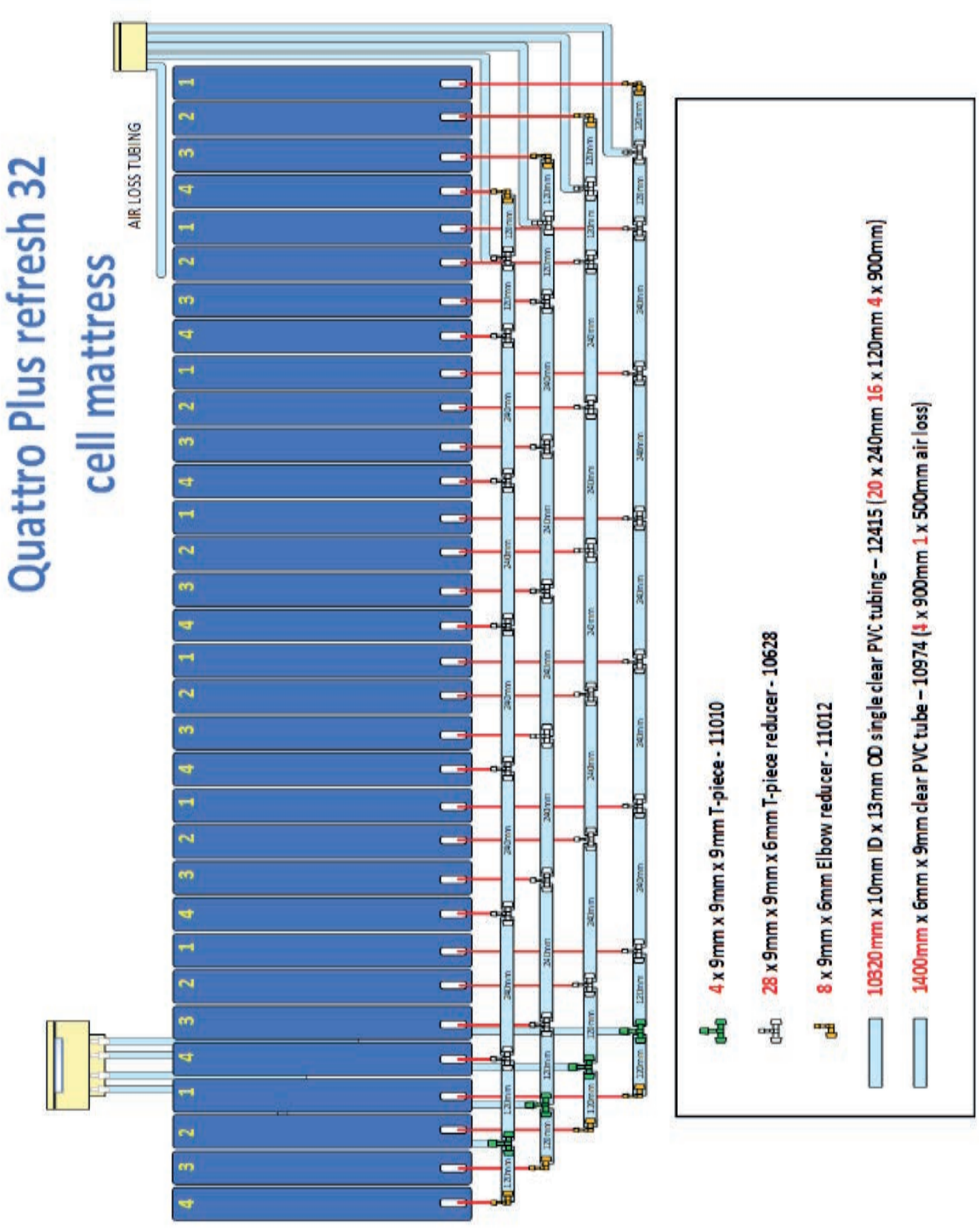
QUATTRO PLUS/ACUTE MATTRESS & CUSHION SYSTEM – SERVICE CHECK SHEET			
Power Unit Serial No:			
Mattress Serial No:			
Inspected by:		Date of Inspection:	
Item	**Inspection**	**Section**	**Checked**
Mattress/Cushion	Top cover and base sheet	N/A	
	Zips, and umbilical assembly,	N/A	
	Base tray fixing and storage straps	N/A	
	CPR connector undamaged	N/A	
	All labels and print is present and legible	N/A	
	All internal tubing and connectors undamaged and no kinks	N/A	
	Air cells/bellows and connectors undamaged (foam sections cushion only)	N/A	
	Mattress pressure tests	2.12	
Power Unit	Top & bottom case for damage and all case fixings present	N/A	
	Labels present & legible	N/A	
	Inlet filter present and clean (filter must be replaced annually)	3.1	
	Hanging handles operate correctly and no damage	N/A	
	AV mounts undamaged	N/A	
	Cycle control valve (Opto slot PCB & motor) assembly undamaged	*	
	IEC switch undamaged & On/Off switch functions correctly	*	
	All internal wires and tubes connected correctly and undamaged	*	
	PCB undamaged all fixings and P-clip present	*	
	Pressure sensor tube connected and fixed with cable tie	*	
	Internal double pump undamaged	*	
	Main power cord undamaged (fuse rating correct where applicable)	N/A	
	LCD and keys function correctly	2.2	
	Battery function correctly (and state voltage displayed)	2.2	
	Pump performance	2.8	
	Rotor and cycle control valve function correctly	2.9	
	PReg pressure regulation	2.10	
	Faults cleared & Service hours set to 7500 Hrs	2.6 & 2.7	
* Only check if the control unit has been opened			
Comments/notes:			

4.3 QUATTRO Acute and QUATTRO Plus Mattress Tubing Diagrams




Quattro Acute refresh
28 cell mattress
AIR LOSS TUBING
CPR WITH 12MM BARBS ON BACK PLATE &
CPR INNER PLATE WITH LARGER AIR SLOTS
29 x 12mm T-piece – 10071 (2 x Air loss)
10 x 12mm Elbow – 10067 (2 x Air loss)
15380mm x 12mm ID x 18mm OD single clear PVC tubing – 11671 (20 x 270mm 4 x 190mm 8 x 65mm 8 x 900mm) Air loss (3 x 500mm)


Quattro Plus refresh 30
cell mattress
AIR LOSS TUBING
CPR WITH 9MM BARBS ON BACK PLATE &
CPR INNER PLATE WITH LARGER AIR SLOTS
4 x 9mm x 9mm x 9mm T-piece - 11010
26 x 9mm x 9mm x 6mm T-piece reducer - 10628
8 x 9mm x 6mm Elbow reducer - 11012
9840mm x 10mm ID x 13mm OD single clear PVC tubing – 12415 (18 x 240mm 16 x 120mm 4 x 900mm)
1400mm x 6mm x 9mm clear PVC tube – 10974 (4 x 900mm 1 x 500mm air loss)


Quattro Plus refresh 32
cell mattress
AIR LOSS TUBING
4 x 9mm x 9mm x 9mm T-piece - 11010
28 x 9mm x 9mm x 6mm T-piece reducer - 10628
8 x 9mm x 6mm Elbow reducer - 11012
10320mm x 10mm ID x 13mm OD single clear PVC tubing – 12415 (20 x 240mm 16 x 120mm 4 x 900mm)
1400mm x 6mm x 9mm clear PVC tube – 10974 (4 x 900mm 1 x 500mm air loss)

4.4 Explanation of Label Symbols and Statements

Warning

Refer to instruction manual / booklet

Medical Devices Directive 93/42/EEC
Medical Device Regulation 2017/745

North America ETL listed

Class II Equipment (Double Insulated)

Do not dispose of with the normal household waste

Manufacturer

Date of Manufacture

Suitable for connection to type BF applied parts

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

MD — Medical Device

REF — Catalogue number

SN — Serial number

Power OFF

Power ON

Operating Instructions

WARNING — This is a statement that alerts the user to the possibility of serious injury or other 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

EC REP — Authorised Representative in the European Community

Example of a UDI label (located on the rear of the power unit and in the seam of the mattress cover/base tray)

Foot End

Min. - Max. patient weight

Safe Working Load

Machine wash 73°C max

Tumble dry low heat

Do not dry clean

Do not iron

Do not bleach

Do not use Phenol

Do not use sharp instruments

No smoking

Fragile, handle with care

Keep dry

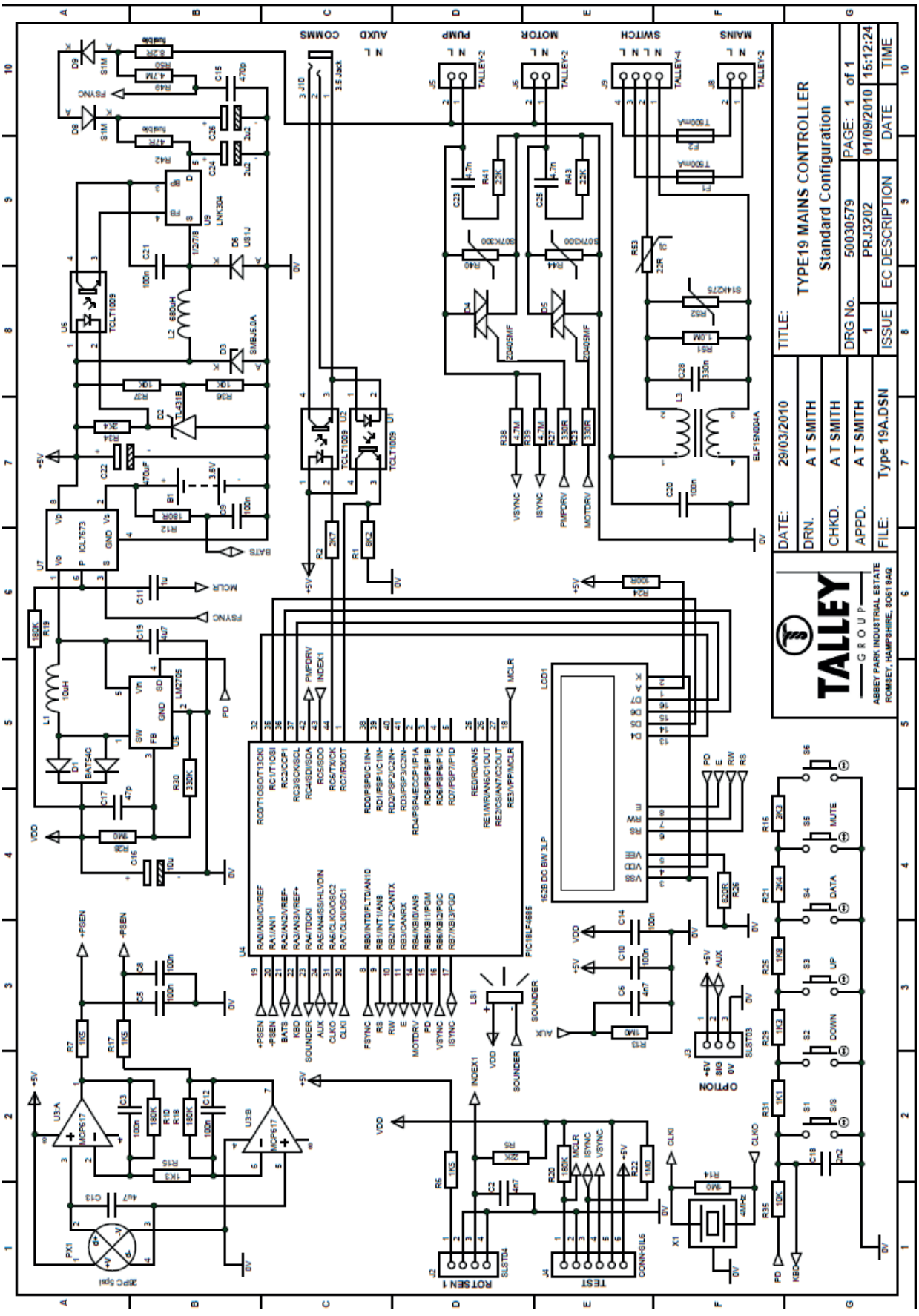
Protect from heat and radioactive sources

Temperature limitation

Humidity limitation

Atmospheric pressure limitation

4.5 Type 19R Circuit Diagrams



4.6 EMI/EMC Statement and Manufacturer's Declaration

This equipment has been tested and found to comply with the limits of EN 60601-1-2.

These limits are designed to provide reasonable protection against harmful interference in both a medical and residential environment. This equipment generates, uses and can radiate radio frequency energy and, if not used in accordance with manufacturer's instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception or other equipment, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment.
- Connect the equipment to an outlet on a circuit different from that to which the receiver or equipment was connected.

The equipment having been tested to operate within the limits of electromagnetic compatibility. (Immunity to interference from nearby sources radiating radio frequency energy). Sources exceeding these limits may give rise to operation faults. Where possible the system will sense the interference and if it is of short duration transparently take countermeasures whilst operating near normally, or failing this will issue a warning and take measures for the continued safely of the user. Further increased levels of energy may cause the system to stop operating, continuously generate random faults or continuous resets.

Try to ascertain the source of the interference by turning nearby or suspect equipment off, and see if the interference effects stop. In any such event the user is encouraged to try to correct the interference by one of the following measures:

- Have the interfering equipment repaired or replaced.
- Reorient or relocate the interfering equipment.
- Increase the separation between the equipment and the possible source of the interference.
- Connect the equipment to an outlet on a circuit different from that to which the interfering equipment was connected.

Information Regarding Electro Magnetic Compatibility (EMC) According to IEC60601-1-2

With the increased number of electronic devices such as PCs and mobile telephones, medical devices in use may be susceptible to electromagnetic interference from other devices. The EMC (Electro Magnetic Compatibility) standard IEC60601-1-2 defines the levels of immunity to these electromagnetic interferences. On the other hand, medical devices must not interfere with other devices. IEC60601-1-2 also defines the maximum levels of emissions for these medical devices. The QUATTRO conforms to this IEC60601-1-2 standard for immunity and emission. Nevertheless, special precautions need to be observed:

- The QUATTRO needs to be installed and put into service according to the EMC information below.
- The QUATTRO is intended for use in the electromagnetic environment specified in the tables below. The user of the QUATTRO should assure that it is used in such environment.
- In general, although the QUATTRO complies too the EMC standards, it can be affected by portable and mobile RF communications equipment (such as mobile telephones).
- The QUATTRO should not be used adjacent to or stacked with other equipment. In case adjacent or stacked use is necessary, the QUATTRO should be observed to verify normal operation.

Declaration – Electromagnetic Emissions

Guidance and Manufacturer's Declaration: Electromagnetic Emissions (IEC 60601-1-2)		
Emissions Test	**Compliance**	**Electromagnetic Environment - Guidance**
RF emissions CISPR 11	Class B	The QUATTRO systems are 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.
Harmonics emissions 61000-3-2	Class A	
Voltage fluctuations / flicker emissions 61000-3-3	Complies	

Declaration – Electromagnetic Immunity

Guidance and Manufacturer's Declaration: Electromagnetic Immunity (IEC 60601-1-2)			
Immunity Test	**IEC 60601 Test Level**	**Compliance Level**	**Electromagnetic Environment - Guidance**
Electrostatic discharge (ESD) IEC 61000-4-2	± 8kV contact ± 15kV air	± 8kV contact ± 15kV air	The relative humidity should be at least 5%.
Electrical fast transient/burst IEC 61000-4-4	± 2 kV For mains supply lines 100kHz repetition frequency	± 2 kV For mains supply lines 100 kHz repetition frequency	Mains supply quality for the mains adapter should be that of a typical commercial and/or hospital environment.
Surge IEC61000-4-5	± 2kV Line(s) to ground ± 1kV line(s) to line	± 2kV Line(s) to ground ± 1kV line(s) to line	Mains supply quality for the mains adapter should be that of a typical commercial and/or hospital environment.
Voltage dips, short interruptions and voltage variations on mains supply IEC 61000-4-11	0 % U_T; 0,5 cycle At 0°, 45°, 90°, 135°, 180°, 225°, 270° and 315°	0 % U_T; 0,5 cycle At 0°, 45°, 90°, 135°, 180°, 225°, 270° and 315°	Mains power quality should be that of a typical commercial and/or hospital environment. If the user of the QUATTRO requires continued operation during power mains interruption, it is recommended that the QUATTRO be powered from an uninterruptible power supply or battery.
	0 % U_T; 1 cycle 70 % U_T; 25/30 cycles Single phase: at 0°	0 % U_T; 1 cycle 70 % U_T; 25/30 cycles Single phase: at 0°	
Voltage interruptions	0 % U_T; 250/300 cycle	0 % U_T; 250/300 cycle	
Mains frequency (50/60Hz) magnetic field IEC61000-4-8	30 A/m	30 A/m	Mains frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial and/or hospital environment.
Note: U_T is the A.C. mains voltage prior to application of the test level.			

Declaration – Electromagnetic Immunity

Guidance and Manufacturer's Declaration: Electromagnetic Immunity (IEC 60601-1-2)			
Immunity Test	**IEC 60601 Test Level**	**Compliance Level**	**Electromagnetic Environment - Guidance**
Conducted RF IEC 61000-4-6	3 V rms 150 kHz ~ 80 MHz 6 V rms 150 kHz to 80 MHz in ISM and amateur radio bands between 0,15 MHz and 80 MHz	3 V rms 6 V rms	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:
Radiated RF IEC 61000-4-3	10 V/m 80 MHz ~ 2.7 GHz	10 V/m	
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 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 QUATTRO is used exceeds the applicable RF compliance level above, the QUATTRO should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the QUATTRO. [b] Over the frequency range 150 kHz to 80MHz, field strengths should be less than 3 V/m.			

Every care has been taken to ensure that the information contained in this manual was correct at the time of going to press. However, Direct Healthcare Group reserves the right to modify the specification of any product without prior notice in line with a policy of continual product development. Information is available in alternative formats on request.

Our standard terms and conditions apply.

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