TRIONIC 5

CE 0120

OPERATING MANUAL

TO TRIONIC 5 UNIT

TRIDAC Ltd

~~Unit 1A Rectory Farm, Cade Valley Close, Kings Langley, WD4 8HG~~.

Unit 13 The Wenta Business Centre, Colne Way, Watford WD24 7ND

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IMPORTANT SAFETY NOTE

As this drill unit is usually attached to a dental chair or used near one, please take note of the following.

CHAIR MOVEMENTS

Before any chair movements are undertaken, make sure that the surrounding area is clear of obstructions, such as units, stools and cabinets, that may come into contact with the chair or any equipment attached to it and cause damage.

Whenever chair movements are instigated, whether MANUAL or AUTO, the operator must remain vigilant and in control until all chair movements have ceased.

NOTE: The following is applicable to Tridac chairs but may apply to others.

At anytime the chair is performing a AUTO movement, pressing ANY chair function button will STOP all movements INSTANTLY.

THE TRIONIC 5 DENTAL DELIVERY UNIT

1.) IMPORTANT INFORMATION

1.1) GENERAL NOTES

These operating instructions form an integral part of the unit. They must be kept close to the unit at all times. Precise observance of these instructions is a precondition for use of the unit for the intended purpose and for its correct operation. New personnel must be made aware of the contents, and they should be passed on to future operating staff.

Refer to TECHNICAL SUPPLEMENT, document 86-1018, for installation details.

1.2) GENERAL SAFETY NOTES

The Tridac Trionic 5 dental units are intended for use only in the practice of dentistry and for use only by trained dental personnel. Please note the following:
The 3in1 Syringe and other instruments are 'APPLIED PARTS', the hoses of these instruments could also come into contact with the patient.
ALTERATION OR MODIFICATION OF THIS UNIT MAY IMPACT UPON IT'S SAFETY AND AFFECT ITS CONFORMITY TO THE STANDARDS TO WHICH IT IS BUILT.
WARNING: If this equipment is modified, appropriate inspection and testing must be conducted to ensure continued safe use of the equipment.
If any part of the enclosure(s) is dented or cracked following an impact, servicing is required before continued use.
DO NOT stand, sit or climb on this equipment.

1.2.1) ELECTRICAL SAFETY NOTES

WARNING. To avoid risk of electric shock this equipment must only be connected to a mains supply with protective earth.

Check all cables and connectors for damage and repair before use.
DO NOT touch accessible electrical contacts when the patient is present.

1.2.2) INTENDED ENVIRONMENT OF USE

The units are intended to be installed in dental surgeries in domestic, commercial, and light industrial premises, clinics and hospital dental departments. These premises must be able to maintain an ambient temperature not exceeding 35C and relative humidity of 30% to 70%.
It must be confirmed that the floor of the installation site is capable of safely supporting the weight of the unit and any other dental equipment in the area.

1.3) ELECTROMAGNETIC ENVIRONMENT

The Trionic 5 unit has been designed to satisfy the electromagnetic compatibility (EMC) requirements of international standard EN 60601-1-2. This means that it should operate within its intended environment of use without causing unacceptable deterioration in the performance of other electrical apparatus or appliances and that it should operate without unacceptable deterioration in its own performance as a result of the operation of such apparatus or appliances. Also see ANNEX 1.

Should adverse effects be noted in the operation of the Trionic unit or should it be suspected that operation of the unit is causing adverse effects in other electrical equipment as a result of EMC performance, users should contact Tridac for guidance and advice.
Examples of adverse effects in the operation of the unit are uninvoked changes of the electrical control settings, such as scaler power, micromotor speed or water source selection.

Do not stack other electronic equipment on top of the Trionic unit, for example, electro-surgey units, fee-standing ultrasonic scalers, as there is a risk of reciprocal interference. Similarly, avoid using the unit adjacent to other equipment.

Portable and mobile high frequency communications equipment (e.g mobile phones) may interfere with electro-medical equipment. To reduce the possibility, avoid using mobile devices in the vicinity of the Trionic unit. Ideally, do not use mobile devices in the dental treatment room.

Electromagnetic fields could interfere with implanted devices such as pacemakers and defibrillators. Ask your patients if they have any implanted devices before commencing treatment. For those that have, establish the immunity credentials of the implant with their consultant or surgeon before proceeding with treatment. It may be necessary to avoid the use of electrically powered or fibre optic instruments on susceptible patients.

EMC performance of the unit can be affected by the accessories, cables and instrument hoses with which it is used. Use only the approved accessories and the Tridac replacement parts which are identified by part number in section 10 of this manual. Do not lengthen cables or instrument hoses. Failure to observe this advice could result in an increase in electromagnetic emissions or a decrease in immunity.

1.4) INSTALLATION For details of the T5 unit, refer to the 'Technical Supplement', document 86-1018.

1.5) DISPOSAL

At the end of this products life it will be classified as **W**aste **E**lectrical and **E**lectronic **E**quipment and should be disposed of as such, separately from normal waste.
The equipment should be cleaned and disinfected before disposal.
To dispose of this equipment, you should contact your dealer in the first instance, who will normally take away the old product when installing new. Where this is not the case please contact Tridac for details and costs of direct take back arrangements. Tel 01923 242398, Fax 01923 250864, www.tridac.co.uk

1.6) SYMBOLS and WARNINGS

Used on equipment and instruction manuals

CE 0120 CE mark according to EU Directive 93/43 for medical devices

Equipment: Class 1 Type B

Safety symbol used for CAUTION, WARNING or DANGER

Important information. MUST read user manual

Protective Earth

Waste Electrical and Electronic Equipment

1.7) SERVICING AND REPAIRS

Repairs and servicing should be entrusted to the supplier of the equipment who will have the appropriately qualified personnel to carry out such tasks. Should any difficulty be experienced in obtaining satisfactory service, users should contact Tridac for advice.

Circuit diagrams and component part identification can be found in the 'Technical Supplement', document. 86-1018 and will be made available by Tridac to suitably qualified personnel, as well as guidance and advice on the repair of those parts deemed repairable. Repairers requiring assistance may contact Tridac by telephone on +44 (0)1923 242398, or write to the address given in the specifications section below.

ONLY USE TRIDAC REPLACEMENT PARTS.

2) SPECIFICATIONS AND RATINGS

Manufacturer	Tridac Ltd. Unit 13, The Wenta Business Centre, Colne Way, Watford WD24 7ND ~~Unit1A, Rectory Farm, Gade Valley Close, Kings Langley, Herts. WD4 8HG. England~~
Model Reference	Trionic 5
Year of Manufacture	This is identified by the last two digits of the units serial number.
Part Numbers	23 1125 Cart Unit 23 1126 Module Unit (Cabinet) 23 1130 Rear Attached Chair Unit. ECO19 23 1131 Rear Attached Chair Unit. ECO.Next
Weight	Gross 40kg. Net 35kg
Transport and Storage	The unit and its' packaging are suitable for transport and storage in an environment with a temperature range of 0 to 50 deg. C relative humidity of 30% to 95% and pressure of 500hPa to 1060hPa
Installation Type	Permanently installed
Equipment Classification	Class 1 To avoid risk of electric shock this equipment must only be connected to a mains supply with protective earth.
Equipment type	Type B
Anaesthetic Category	Not intended for use in an oxygen rich environment. Not intended for use with flammable anaesthetics.
Electricity Supply :	230 Volts
Phase	Single Phase
Frequency	50Hz.
Rating (Trionic Unit)	< 100 milliamps, minimum configuration 500 milliamps, maximum configuration, under maximum intermittent loading.

Note : the mains input fuse fitted to the floor type service box is rated at 13 Amps 240 volts, to allow for connection of auxiliary equipment. The mains transformer for the unit is internally thermally protected and is fused separately at T1.0 Amp 240 volts, in the control box.

Rating (floor connection box)	Max. permissible loading 13 Amps Total including auxiliary outlet.
Mode of operation :	Continuous, with intermittent loading.

Note : intermittent loading applies, for example, if an electric micromotor is used and when it is loaded by application of a bur or brush. The maximum rating of the unit will occur if the micromotor is close to stalling.

Mains input fuse	
Floor type services box	13 Amp. 240 volts,1" x 1/4" ceramic to BS 1362
Wall type control box	T 1 Amp. L. 240V 20 mm x 5 mm, glass, IEC 60127-2 Sht.3
Auxiliary Mains Socket	The floor type services box incorporates a switched socket outlet intended for connection of a dental chair. DO NOT use this socket for heavy loads, like room heaters..
Maximum Output	6.3 Amps. 230 volts AC
Water Supply (if applicable)	Minimum 1.7 bar (25 psi) Maximum 6.9 bar (100psi)

Note : Water Bye Laws may be breached by direct connection of the unit to a mains water supply. Check with your local water company, before installation.

Air Supply	Minimum 5.5 bar (80 PSI) Maximum 6.9 bar (100 PSI) Flow : Approximately 30 to 45 litres/minute at the stated pressures.

Note: the maximum flow in practice will depend on consumption of the particular air powered instruments used. Flow rates vary significantly between instruments from different manufacturers.

Working pressure (Factory settings)	High pressure air (regulator AR1)	5.5 bar (80 PSI)
	Low pressure air (regulator AR2)	2.7 bar (40 PSI)

DO NOT adjust air instrument running pressures by adjusting AR1. This must be left at approximately 5.5 bar. Use the adjusting screws set in the top of the instrument control blocks to adjust running pressures, with a suitable handpiece gauge attached.

3) ACCESSORIES

The Trionic 5 is either supplied with, or intended for use with, handpieces and accessories which have been accounted for in the design of the equipment, to provide safe and reliable operation. It is important to observe the following specifications when adding or replacing items. Seek technical advice if not replacing like with like, as compatibility must be ensured.

Micromotor Types

The current type of micromotor fitted, will be one of the following:
Bien Air MCX compact brushless motor, or the
Bien Air MX2 brushless motor, in either Plus, Optima INT Plus or Optima INT Pro versions.

Ultrasonic Scaler	NSK Varios 170 or Varios 170 LUX, piezo electric
Oscillation frequency	28 - 32 kHz.
Max. electrical input power	20 Watts @ 24 v AC

WARNING:- NOT TO BE USED ON PATIENTS WITH CARDIAC PACEMAKERS

Air Powered Instruments

The unit is designed to accept industry standard Airmotors, High Speed Turbines and Sonic Scalers, with Borden 2 & 3 hole or Midwest 4 hole couplings.

Air Powered Instruments with Fibre Optics

The unit provides 6 hole 'Midwest' style hoses, suitable for connection to mating instruments and / or hose couplings, where the bulb is located either in the coupling or in the instrument itself.

Standard Bulb Rating	3.5 volts @ approx. 700 mAmps.
Maximum Allowable Current	900 mAmps.

Spittoon Units

The Trionic control panel includes two membrane switches designed to allow the remote operation of the Bowl Flush and Tumbler Filler of suitably specified Tridac CS'M' spittoons.

Maximum switch rating: 24 Volts A.C. (Safety Extra Low Voltage) 1.0 Watt, resistive load.

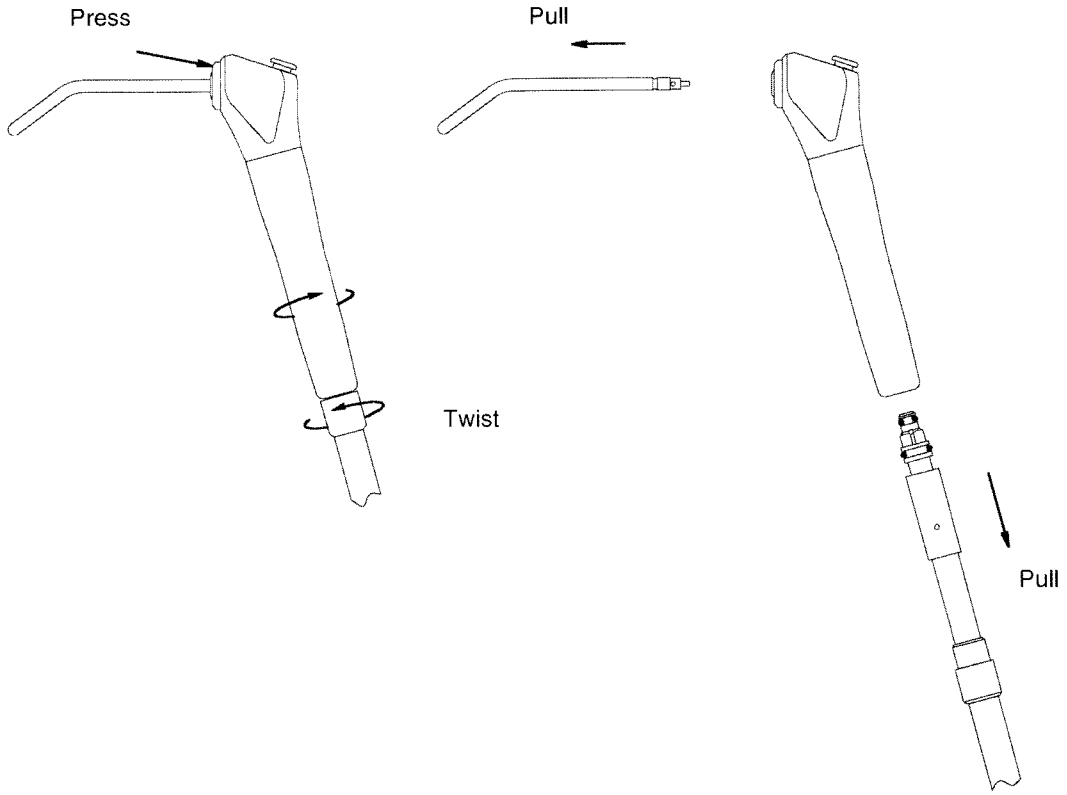
Note : If adapting to third party units, the integrity of the low voltage supply must be confirmed as complying with BS EN 60601-1 and the switch ratings must be adhered to.
NOT TO BE USED ON VOLTAGES HIGHER THAN 24 VOLTS.

4) CONNECTION AND DISCONNECTION OF ACCESSORIES

Syringe Nozzle

The Trionic 5 is supplied with the D.C.I. Autoclavable cold syringe, which can be detached from it's hose by twisting the connector Anti-clockwise through 90° at the base. The nozzle is also removable by depressing the ring around the nozzle and pulling on it.

Figure 1 DETACHABLE NOZZLES



4.1) Handpieces

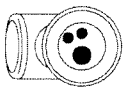
The unit is supplied with handpiece tubings which accept industry standard handpiece connectors, of various styles. All are tightened to the hose by their respective hose nuts, which use right hand threads. The threads are fine and great care should be taken to ensure that they are not crossed : hold the nut and handpiece square with each other and use as little force as possible when 'starting' the thread. Continue to tighten when there is an easy feel to the mating of threads. Tighten firmly to ensure that the handpiece gasket is compressed sufficiently to prevent air and water leaks.

Depending on the ordering specification, one or more of the following fitting styles will be fitted. The illustrations show the hose ends. Align the holes and tubes as indicated :

Ensure that the foot control is NOT OPERATED when attaching/detaching instruments, you can engage the locking handle to prevent this.

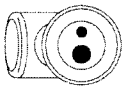
Handpieces Couplings

View on handpiece

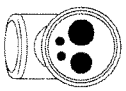


Borden 3 Hole

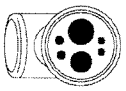
Align the three corresponding handpiece tubes.



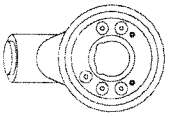
Borden 2 Hole
Align the two tubes with the holes shown vertically in line, and tighten the threaded sleeve.
Note:The third hole in the hose coupling will be blanked off by the handpiece gasket when a 2 hole handpiece is used.



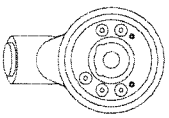
Midwest 4 Hole
Align the four corresponding handpiece tubes and tighten the threaded sleeve.



Midwest 6 Hole (electrified, for fibre optics)
Align the four corresponding handpiece tubes and two electrical contacts, shown on the right and tighten the threaded sleeve.
Note: The smaller of the two large holes, shown at the bottom, is the drive air input. Identifying this may assist in correct alignment.



Bien Air MX2
Supplied for connection of MX2 micromotors.
Align the centre spiggot with the corresponding handpiece and tighten the threaded sleeve.



Bien Air MCX
For connection of the MCX brushless micromotor.
Align the centre spiggot with the corresponding handpiece and tighten the threaded sleeve.

4.2) Ultrasonic Scaler Tips

Refer to the manufacturer's booklet supplied with the unit.

5) FUNCTIONAL DESCRIPTION

The Trionic 5 is a pilot air controlled dental unit, designed to provide, as appropriate, drive air, spray air and spray water to industry standard, air powered dental instruments, such as high speed turbine handpieces, low speed air motors, air powered 'sonic' scalers and a 3in1 air/water syringe. Automatic selection control is provided, to ensure that the required services are switched through to the instrument in use.
Controls are also provided to allow the adjustment of air and water flows to suit the instrument fitted and to adjust the degree of spray to that desired.

By linking the air control system to air/electric converters, the capability of the Trionic 5 is extended to the control of electrically powered instruments, allowing the customer to choose from a range of electric micromotors, piezo-electric ultrasonic scaler and composite curing light, if preferred. There is also an option of a low voltage power source and appropriate instrument hoses, to allow the use of suitable instruments incorporating fibre optic illumination.

The air operated foot controls supplied with the unit, disc or lever type, incorporate a variable pressure regulator, the output of which increases with increasing pressure on the disc or lateral movement of the lever. It is thus possible to control the speed of rotary instruments.
A pilot valve in the foot control may be engaged/disengaged by actuation of the spray select switch or button. When engaged, this valve is operated early in the movement of the foot control disc or lever and the signal used to open the spray air and water valves in the unit and thus provide coolant to the handpiece in use.
A second pilot valve in the foot control, operated by a switch on the disc type or when the lever movement is to the right of centre, is used to reverse the direction of electric micromotors, when fitted.

A pressurised water bottle system is used to provide spray coolant for the unit, so that it can be installed without dependence on a mains water supply. Such independence is often a mandatory requirement according to the interpretation of bye laws by the local water company.
The coolant system incorporates twin bottles and the facility to switch between one bottle and the other at the press of a switch.

Power to the electrical circuits of the Trionic 5 is derived from a safety extra low voltage supply (24 volt ac transformer). The 'basic' circuitry incorporated into the 'motherboard' of each unit acts to 'interface' the membrane switch panel and indicator lamps to other circuit elements. A unit specified with air instrumentation only still utilises the basic circuitry, to power the 3in1 syringe water heater and on/off switch and to control the selection of coolant from bottle A or bottle B, via a solenoid valve.

Since the basis of the unit control is by pneumatic means, the removal of electrical power to the unit will not be catastrophic : operation will 'drop back' to provide normal control of air powered instruments, with coolant available from one of the bottles. However, when the unit is fitted to a ECO 19 chair, i.e. CONTOUR package,it will not continue to operate as the chair is fitted with electrical solenoids that will shut down the air supply.

6) OPERATING INSTRUCTIONS

Before operating the unit, ensure that your installer has set the unit with the correct air and water pressures and particularly that an in-line handpiece gauge has been used to adjust the running pressure of air powered instruments, like air motors and turbines, to the manufacturer's recommended values.

6.1)Height Adjustment

See figure 2

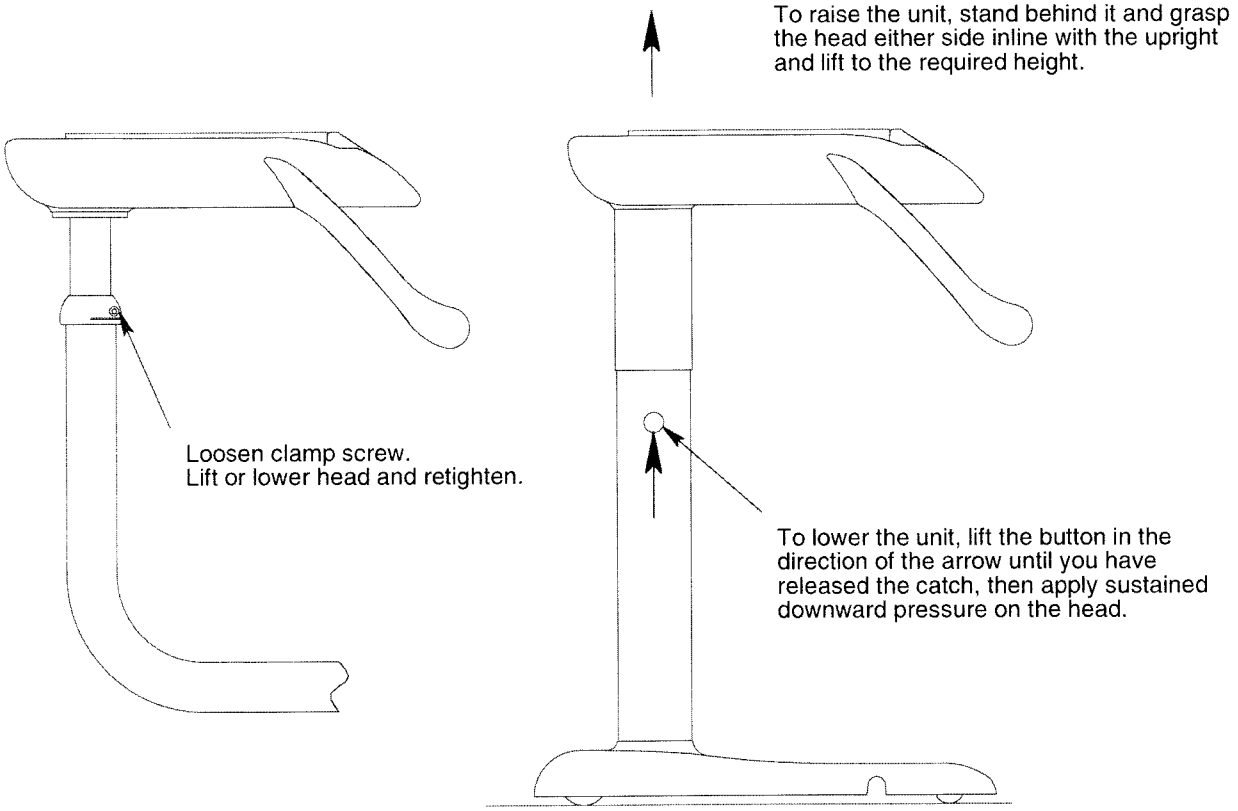
Standing to the rear of the unit when making adjustments will allow a proper lifting posture and lifting where indicated will result in the least strain being placed on the unit. When lowering the unit, keep clear of projections or sharps which could cause injury.

Increasing the height of the work surface on a cart is accomplished by simply grasping the rear underside of the unit and lifting upwards. The unit will stay in position when released.
It may be necessary to rest the ball of the foot on the rear of the cart base in order to prevent the base from lifting. Protect the surface of the cart base, if applying pressure by foot, to avoid scuffing.

Decreasing the height of the unit is accomplished by moving and holding the catch knob upwards, identified in the diagram, then exerting downward pressure on the back of the unit. If after a long period in one position, the catch knob is difficult to move, lift the unit a little upward and try again.
Releasing the catch knob will again lock the unit in position. Check that the catch knob is properly down when adjustment is finished.

Vertical motion of the unit is controlled by a damping device, to prevent the unit crashing downwards. Thus there is resistance to movement which can make it feel stiff. Continued downward pressure, rather than an increase in force, will result in the desired downward movement. DO NOT be tempted to lubricate the damping device inside the unit. This would result in virtual complete loss of damping.

Figure 2 HEIGHT ADJUSTMENT



To alter the height of chair attached units, loosen the colunm clamping screw using a hexagon key. Raise or lower the unit to the required height and retighten. DO NOT twist the unit head whilst doing so as this would alter the rotational stop position.

6.2) Turning On See figures 3 & 4 for cart and module units, figure 5 for chair attached units, for identification of shut off valves and switches.
First, turn on the air supply, by turning the lever through 90 degrees, in the direction of the arrow.
Observe that there are no air or water leaks and then switch on the electricity supply, by moving the green rocker switch/indicator to the **I** position. The indicator will light.
On chair attached versions, switching on the electrics will atomatically turn ON the air and water supply.

With the power now on, observe the states of the control panel indicators. (figure 9)

IMPORTANT
It is **essential** to reset the water source selector **to position A** before proceeding. Switching to A is used to reset an internal circuit. (A false B indication may be given if it occurs when switching on from the mains.) Thereafter, A and B may be selected at will.

Change the settings to those desired at the beginning of the work session by operating the appropriate buttons. (see figure 9 for details)
When scaler and/or micromotor are fitted, the power and speed limit settings may come on at any position on the scale. It is good practice to reset the scaler and micromotor settings to position 1, before starting work.

When the scaler and/or micromotor are not fitted options, the relevant indicator lamps will remain illuminated in the No.8 and No. 4 positions , respectively, to act as power on indicators.

Figure 3 **CART SERVICES and optional FLOOR BOX**

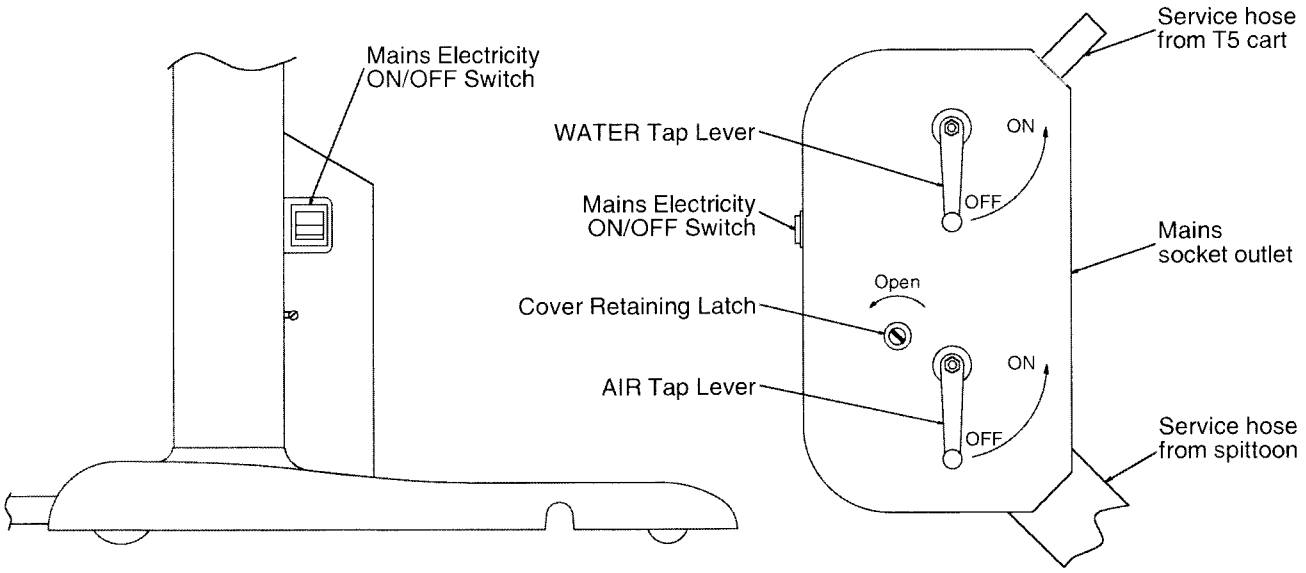


Figure 4 **WALL MOUNT SERVICES BOX (MODULE UNITS)**

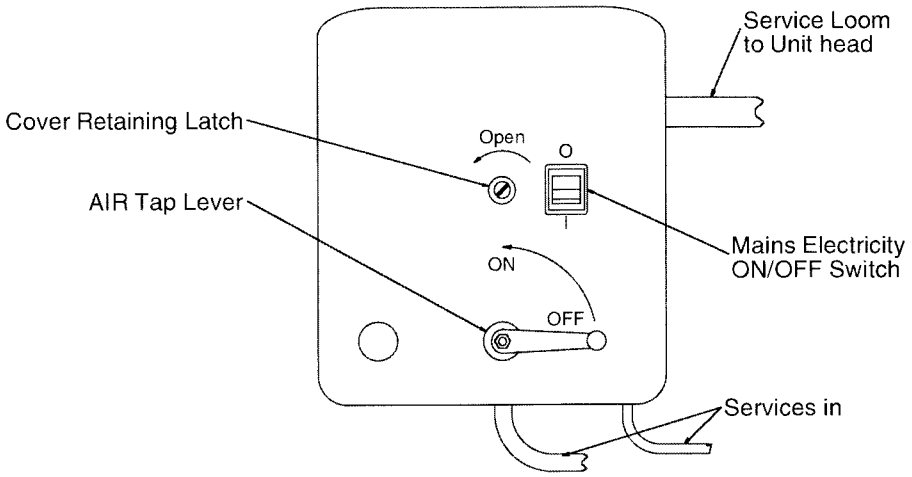
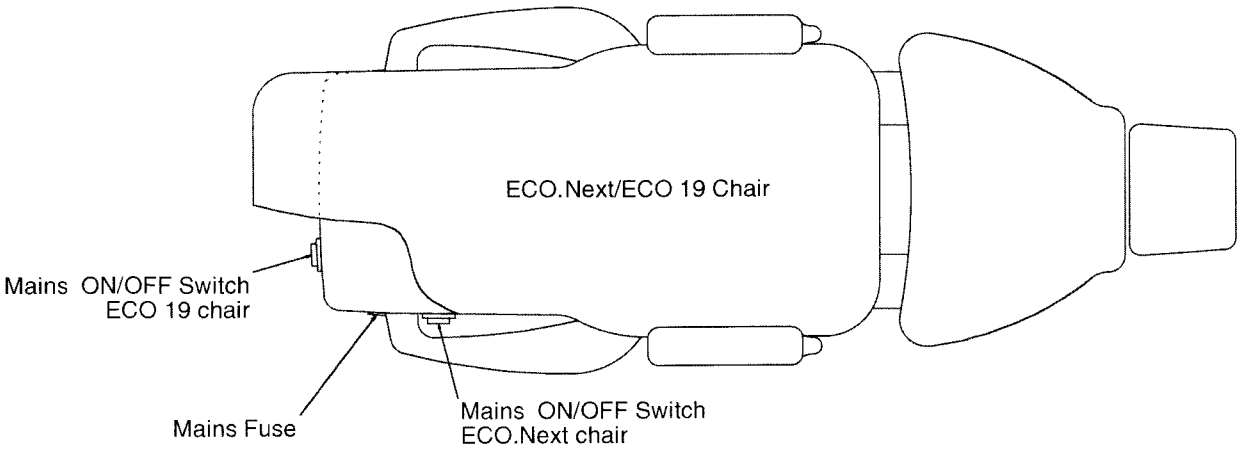


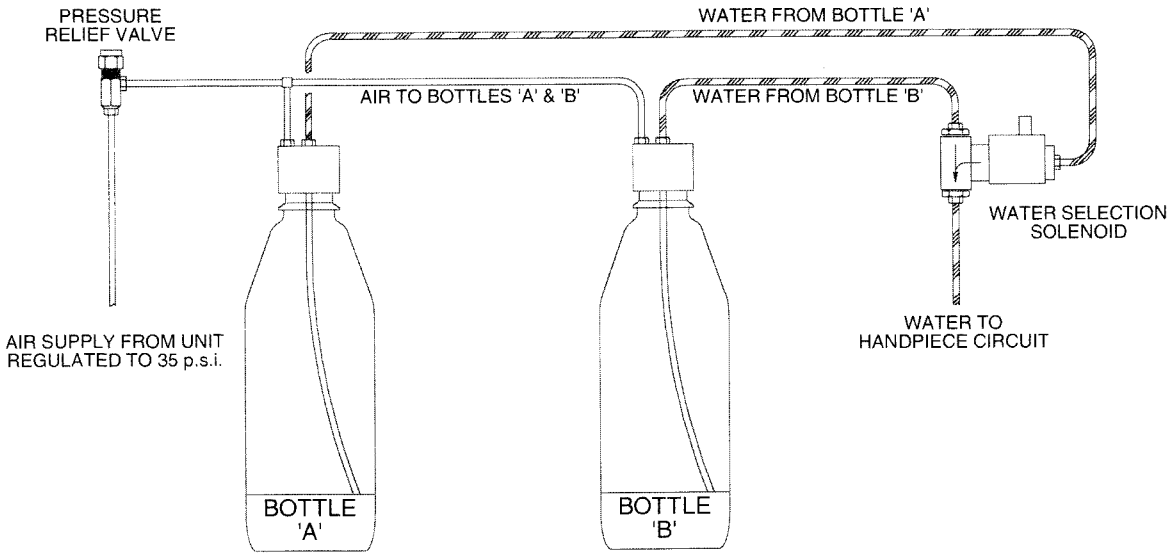
Figure 5 **CHAIR BASE SERVICES (CHAIR ATTACHED)**



6.3) Liquid Coolant The unit has been configured to Switch between bottle A and bottle B at will, this provides the user with continuous uninterrupted use as each bottle can be replenished while still using the other. Alternatively, one of the bottles may be filled with a suitable medicant for root work or for flushing the instrument hoses.
The reservoir bottles are screwed into special 'caps' housed in the unit head. These caps are fitted with a restrictor valve, so that the bottles may be removed, even when pressurised by the air supply. Escape of air is limited to a small hiss.

To remove a bottle for filling, grasp it around the 'shoulder', which is a stronger part, and unscrew in the direction shown by the arrows in the diagrams. Fill to a level below the neck and replace, by screwing up in the opposite direction. DO NOT over tighten. When the bottle is seated, the hiss will be heard to die away, giving assurance of a seal. Note that air pressure building up in the bottle makes it easier to handle, so slowly refitting is an advantage.

Figure 6 BOTTLE CONFIGURATION



Pressing button **A** on the touch panel will divert the contents of bottle **A** (left hand bottle, when viewed from the front of the unit) to the handpiece circuit and light the adjacent indicator. The contents of **A** will then be expressed independently of the contents of bottle **B**.

Pressing button **B** will likewise divert the contents of bottle **B** to the handpiece circuit, independently of **A** and light the adjacent indicator.

Reminder : Button **A** must be pressed after switching electricity on from the mains. **B** may subsequently be selected, if desired.
Since the bottles work independently, it is possible to refill the idle one while work continues with the other.

General :

DO check the bottles regularly for damage and discard suspect ones - they are inexpensive to replace. Use of bottles with nicks and cuts should particularly be avoided.

DO replace bottles routinely, even when apparently not damaged, as plastics can deteriorate through atmospheric and daylight exposure. Replacement at least twice per annum is recommended.

DO NOT allow the bottle in use to run out of coolant. Air can then enter the spray circuits and is a cause of spluttering at shut off (see section 9.3).

DO NOT use aggressive irrigants which may damage the unit or hanpieces.

6.4) Operation of Instruments

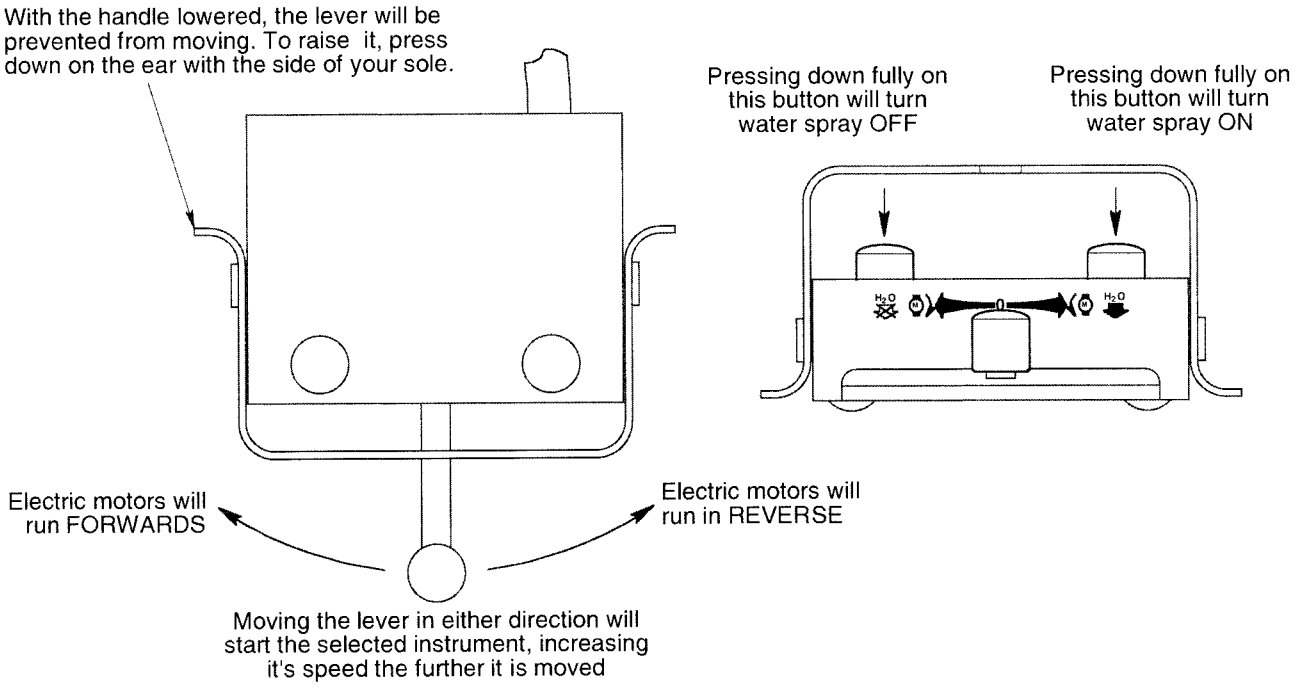
The unit is specified for the operation of one instrument at a time.

When lifting an instrument from its holder, a small air leak is allowed from the instrument holder valve (bleed valve). This signal is sensed by the unit which then automatically primes air, water and electrical supplies, as appropriate, for the selected instrument. Operation of the foot control then completes the function of feeding the requisite supplies through the instrument in use.

Foot Control Functions

Figure 5 explains the foot control functions. The handle will lock the lever for safety when changing burs or tips. Raising the handle unlocks the lever. Tucking the toe of the shoe under the raised handle allows the control to be lifted and moved, without hands. After placement, push the handle back, to rest on the umbilical where it exits the rear. DO NOT leave the foot control lever in its raised position. It may be vulnerable to items being lowered onto it. Operate the lever with the side of the foot. Choose wet or dry operation by use of the spray select buttons.
Note that for electric micromotors, the direction of lever movement automatically determines forward/reverse of the motor, but that for air instruments the control has no influence on direction.
Output from the foot control, and hence the speed of rotary instruments, varies with the degree of movement of the lever. However, If a piezo ultrasonic scaler is fitted, the control acts as purely on/off and does not affect power. Note that water spray MUST be selected for the ultrasonic to work.

Figure 7 FOOT CONTROL FUNCTIONS



Electric Micromotors

A top speed limit may be set (refer to figure 9). This prevents the operator from exceeding a desired speed. The foot control then gives variation from the start up speed to the set limit. Note that on limit 1, there is only a small foot control movement between the start up speed (dictated by the Bien Air controller) and the limit speed. The speed ranges are intended to allow the dental surgeon to subjectively determine a desirable maximum according to the nature of work.

Ultrasonic Scaler

The power setting of the scaler may be chosen as one of 8 steps. (See figure 9)
Refer to the scaler manufactures booklet for information on the use of the scaler.
Also see the notes under section 9) 'Precautions'

6.4) Operation of Instruments cont....

Spray Controls

The amount of water in the spray to individual instruments is adjustable by the spray water control valves (See figure 6). The controls may be operated by hand or alternatively, by the autoclavable key supplied. This is inserted through the small hole in the centre of the control knobs.

Individual spray air control is also provided on each control block. This varies the amount of spray air to each instrument. Note that some high speed turbines require spray air, but others do not, they bleed off some of the drive air. If your turbine requires spray air, then only water jets would be evident when the spray air control is turned right down.

Low speed motors do generally require spray air. Adjust the amount to suit your preference, but see the notes in section 12.7.vi regarding the balance of pressures.

Flush Control

Pressing the flush button with a instrument selected, will allow water to pass through that particular instrument. It is a good idea to use the flush facility after each use of an instrument, to reduce the risk that contaminants have been drawn back into it. Using the flush button makes a simple contribution to the reduction of cross infection risks.

6.5) Tumbler and Bowl Flush Buttons

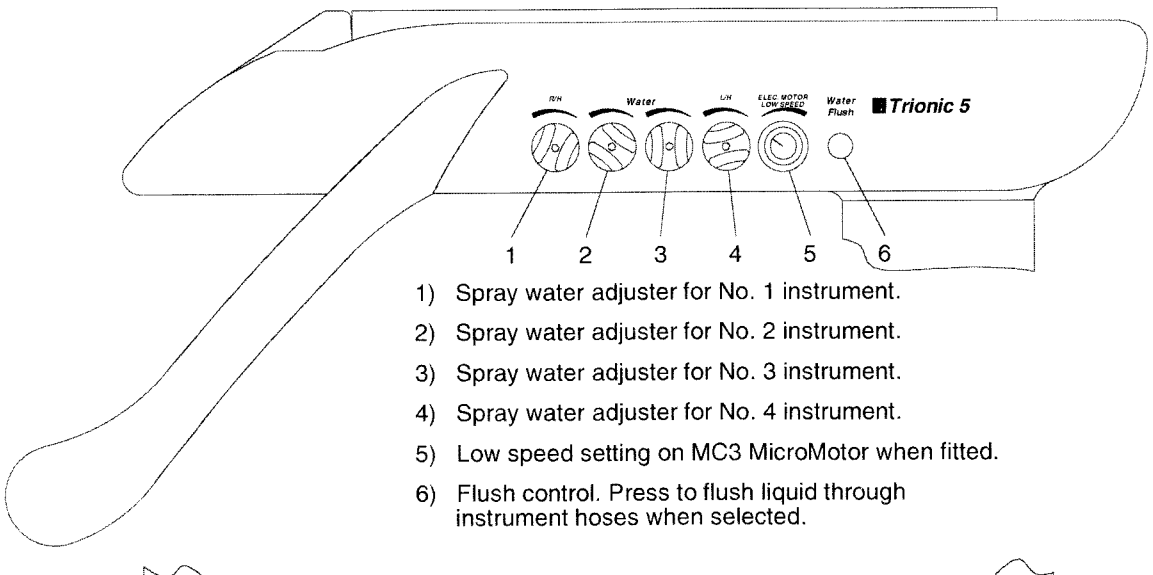
These are simple membrane switches designed to be used with the Tridac CS'M' spittoon units, when requested with remote tumbler and bowl flush operation. They may be used with other products provided that the switch ratings are rigidly adhered to and that the circuit they are used in complies with the Safety Extra Low Voltage requirements of International Standard BS EN 60601-1. This will often mean introducing an isolating relay or similar between the host product and the Trionic switch circuit. Contact your supplier for advice.

Note : Timing of the bowl flush and tumbler fill circuits of the Tridac spittoons commences when the operating button is released.

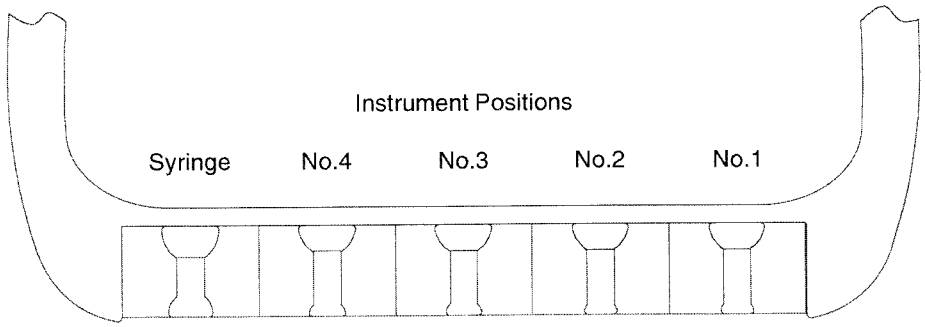
6.6) Syringe Heater, Radiograph Viewer and Water Source Buttons

Refer to the details given in Figure 9.

Figure 8 **SPRAY CONTROLS AND POSITIONS**

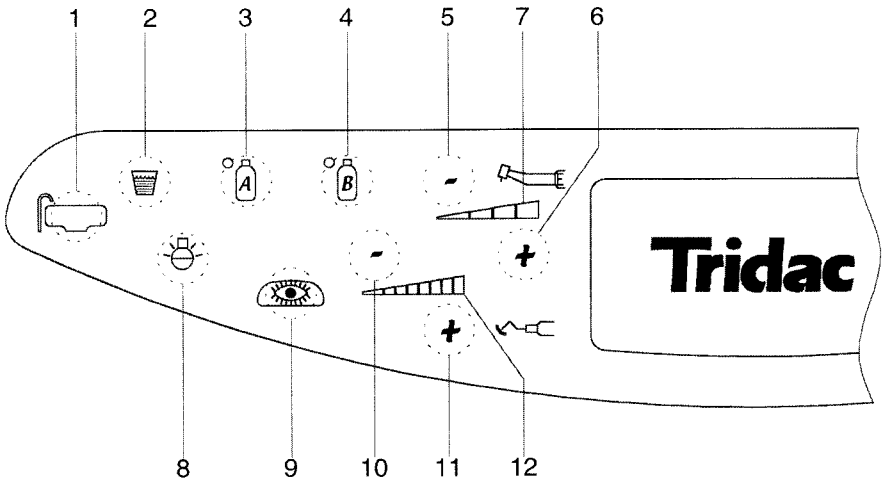


1) Spray water adjuster for No. 1 instrument.
2) Spray water adjuster for No. 2 instrument.
3) Spray water adjuster for No. 3 instrument.
4) Spray water adjuster for No. 4 instrument.
5) Low speed setting on MC3 MicroMotor when fitted.
6) Flush control. Press to flush liquid through instrument hoses when selected.



CONTROL PANEL FUNCTIONS and INDICATORS.

Figure 9 : CONTROL PANEL



1) **Bowl Flush Button** - This button is only operative when the Trionic unit is used in conjunction with a suitable spittoon unit, e.g. Tridac CSM. A momentary press will trigger the spittoon timer to flush the spittoon bowl. No audible signal is emitted when this button is pressed. Max Load : 24volts 1Watt, Resistive.

2) **Tumbler Fill Button** - This button is only operative when the Trionic unit is used in conjunction with a suitable spittoon unit, e.g. Tridac CSM. A momentary press will trigger the spittoon timer to fill the mouthwash tumbler. No audible signal is emitted when this button is pressed. Max Load : 24volts 1Watt, Resistive.

3) **Irrigant Source A** - Pressing this button will select the source of coolant spray designated 'A'. This will be from the left hand bottle viewed from the front of the unit. The adjacent indicator light will confirm that this bottle has been selected. Bleeps will sound while the button is kept depressed, but only one transition will occur (i.e. B to A)

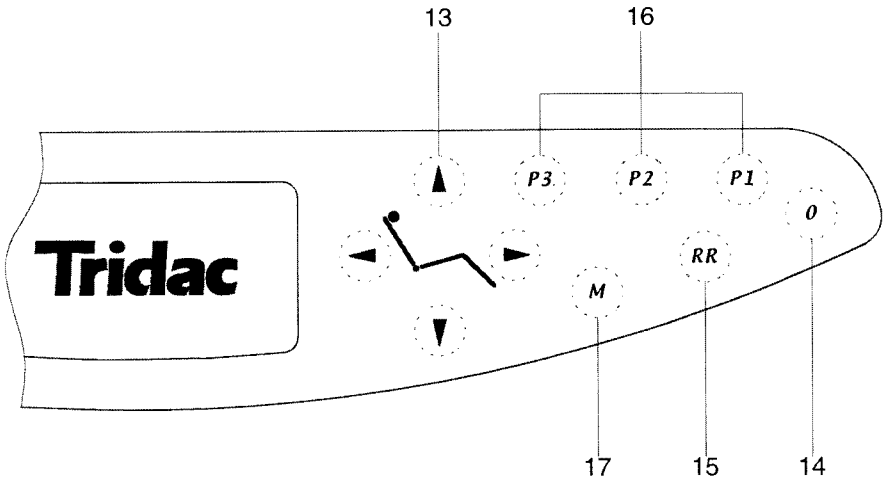
4) **Irrigant Source B** - Pressing this button will select the source of coolant spray designated 'B'. This will be from the right hand bottle viewed from the front of the unit. The adjacent indicator light will confirm that this bottle has been selected. Bleeps will sound while the button is kept depressed, but only one transition will occur (i.e. A to B)

5) **Micromotor Speed Limit Down** - This button is only operative if the Electric Micromotor option is installed. A momentary press will decrement the speed limit by one step. Holding the button down will cause the limit to decrement successively. Once at minimum, no further change of setting will occur even if the button is kept depressed, although bleeps will sound.

6) **Micromotor Speed Limit Up** - This button is only operative if the Electric Micromotor option is installed. A momentary press will increment the speed limit by one step. Holding the button down will cause the limit to increment successively. Once at maximum, the next step will return the limit to minimum and the sequence will start again. Steps are confirmed by an audible 'bleep'.

7) **Micromotor Speed Indicator** - The indicator light will assume one of four positions to signify the current speed limit setting. When the electric micromotor option has NOT been installed, the indicator light will remain lit in the number 4 position.

8) **Operating Light Switch** - If a chair attached operating light has been fitted, and has been wired through the chairs P.C.B. (Tridac chairs only) then this switch will override the chairs control. For instance, when the chair is sent to the exit position it will automatically turn the operating light OFF, if you wish to have the light ON when the chair is in this position, pressing this button will turn it ON again. Likewise if the chair is raised and the light is ON, pressing this button will turn it OFF if not required.



9) **X-Ray Viewer Switch** - If the Tridac X-Ray viewer has been fitted, pressing this button will alternately turn the viewer ON or OFF.

10) **Scaler Power Down** - This button is only operative if the Piezo ultrasonic scaler option is installed. A momentary press will decrement the scaler tip power by one step. Holding the button down will cause the scaler output to decrement successively. Once at minimum power, no further change of setting will occur even if the button is kept depressed, although bleeps will sound.

11) **Scaler Power Up** - This button is only operative if the Piezo ultrasonic scaler option is installed. A momentary press will increment the scaler tip power by one step. Holding the button down will cause the scaler output to increment successively. Once at maximum power, the next step will return the power setting to minimum and the sequence will start again. Steps are confirmed by an audible 'bleep'

12) **Scaler Power Indicator** - The indicator light will assume one of eight positions to signify the current output power setting. When the ultrasonic scaler option has NOT been installed, the indicator light will remain lit in the number 8 position.

Chair Controls - The chair controls situated on the right hand side are only operative if the unit is used with a Tridac chair and the appropriate connection made between them. The buttons give complete control of all the chair functions and are as follows:

13) The **four arrowed buttons** on the left provide the up/down back/forward motions and must be held down until the required position is obtained.

14) The **O** (Zero) button on the right, is to set the chair in the Exit position.

15) **RR** will bring the chair back up to a rinse position, pressing it again will return it to it's previous position.

16) **P1, P2** and **P 3** are used as preset positions that can be programmed by the user. These buttons must only be pressed momentary otherwise they will instigate a manual function.

17) The **M** button is used to set the programmes P1, P2 and P3. See separate chair operating instructions on how the programmes can be set.

7) PRECAUTIONS

7.1) General Safety

Mains voltages are present in control boxes :- DISCONNECT THE ELECTRICAL SUPPLY before service or maintenance.
NOTE: The input side of the mains switch remains live, disconnect the supply at the mains **isolating** switch serving the installation.
EACH NIGHT AND WHENEVER THE EQUIPMENT IS LEFT UNATTENDED FOR LONG PERIODS,
USE THE CONTROLS PROVIDED TO SWITCH OFF AIR, ELECTRICITY AND WATER SUPPLIES.
Tumbler and spittoon switches on the Trionic membrane switch panel are rated for 24 VOLTS MAXIMUM, 1 WATT MAXIMUM, with a resistive load. DO NOT connect higher rated loads without a suitable isolating interface or relay. If in doubt, ask your engineer or consult Tridac for advice.
If the tumbler and spittoon switches are used, or if any other connection is made between the unit and an ancillary power supply, it MUST be ensured that the latter conforms to the requirements of international standard EN 60601-1, for safety extra low voltage.
The connection of any ancillary power supply MUST NOT introduce an earth reference to the Trionic low voltage circuit. The Trionic circuit MUST REMAIN FLOATING.

7.2) Ultrasonic Scaler

The handpiece lead of a piezo-electric ultrasonic scaler carries high frequency, high voltage power. It is possible this could interfere with electronic devices brought into close proximity : -

ENSURE THAT THE SCALER IS NOT USED ON PATIENTS WITH CARDIAC PACEMAKERS

Polarity of the two wires in the handpiece lead IS IMPORTANT. If the lead is removed and refitted, ENSURE that the wiring is correctly terminated, in accordance with the note on the circuit board.
The frictional effect of the high energy, high frequency oscillations of an ultrasonic scaler will give rise to localised heating if contact is made with other materials (like rubbing two sticks together to start a fire). To avoid injury to the patient, the scaler tip should be kept moving at all times. DO NOT ALLOW THE TIP TO DWELL WHILE IN CONTACT WITH ORAL TISSUE. Use copious coolant spray to reduce the risk.

7.3) Water Bottle System

The pressurising air to the water bottles comes from the unit's low pressure air regulator. The system is intended to operate at a maximum pressure of 2.7 bar (40psi) :-
DO NOT INCREASE THE SETTING OF THE LOW PRESSURE REGULATOR ABOVE THIS VALUE.

Check the condition of the bottles regularly (see section 6.3). They must be undamaged and must particularly be free of nicks and cuts. Note that they are easy and cheap to replace.
Water from the bottles is not filtered. KEEP FOREIGN PARTICLES OUT OF THE BOTTLES.

7.4) Electric Micromotors

Cooling

The motors are cooled by forced air from the drive air circuit of the dental unit, which is adjustable by a restrictor screw in the control block (see section 11.7.i). Air pressure must be sufficient to displace an oil seal fitted to the front shaft of the motor, thus allowing air to pass. There must be sufficient flow to maintain a safe case temperature when the motor is in use. Refer to the instructions supplied with the motor for the manufacturer's recommendations on cooling.

Remove handpieces from the motor when not in use.

7.5) Fibre Optics

Check that the voltage rating of the fibre optic bulbs in your handpiece is compatible with the unit (3.5 Volts nominal).
A small amount of adjustment is possible about the nominal value. Have your technician check the voltage and, if necessary, adjust to suit your handpiece.

8) HYGIENE, DISINFECTION & CLEANING

When cleaning dental equipment, wear suitable protective clothing. This would include a face mask, eye protection and strong rubber gloves, household rather than surgical, as there is a danger that the latter could be easily split or punctured.
Where not required for the process, switch off the power prior to cleaning.
Keep water/solutions away from electrical devices
Use disposable, soft cloths for cleaning.

After carring out any of the following, dispose of all used contaminated materials, i.e, cleaning cloths, barrier film etc as clinical waste.

8.1) Barrier Protection : Change after each patient.

The surfaces of the Trionic 5 lend themselves to the application of thin film, barrier protection. Transparent films, like cling film, can be readily applied across the front panel, touch panel and tray holder surfaces , without adversely affecting function or visibility of controls. It is highly recommended that this approach be used to minimise soiling and possible contamination. Additionally, the need to utilise disinfectant cleaners , which may be corrosive and possibly expensive, is very much reduced.

8.2) Surface Cleaning: After each patient.

Cleaning of the unit's surfaces may be accomplished safely by wiping with a soft cloth, dampened with a mild detergent solution. Ensure that the cloth is squeezed out. DO NOT soak the unit. Dry the unit after cleaning.

Aggressive detergent based products, such as proprietary / domestic floor cleaners may damage the surfaces and must be avoided. Also avoid abrasive cleaners, which will dull, and eventually thin, the surface coating.

The approved disinfectant cleaners may be used after cleaning. Use liquid product applied to a cloth - do not use spray application directly on to the unit.

Allow surfaces to dry completely before applying barrier protection. This is particularly important with self adhesive films - low tak adhesive mixed with alcohol, for example, may not remain low tak! Solvents can have a temporary adverse effect on even resistant paint surfaces, but the paint will recover when dried. Sealing the paint under a film before it dries could damage the surface.

Recommended Detergent: Near neutral washing-up liquid, diluted. e.g." Fairy liquid".
Approved disinfectants:
1 "FD 366 sensitive' by Durr Dental AG
2 'Mikrozid AF' surface disinfectant, by Schulke & Mayr.

8.3) Water Line Flush After each patient.

Detach the instruments for cleaning and sterilisation, then flush the used instrument hoses into a suitable bowl, by pressing the flush button. This will purge selected hoses with a flow of coolant, minimising any potential for contaminated hose internals.

Disinfection: Alpron may be used in the water bottles as a continuos anti-microbial agent.

8.4) Instrument Trays After each patient.

The aluminium instrument trays provided with the unit are suitable for autoclaving at temperatures up to 135C.
Prior cleaning may be accomplished by washing in mild detergent and rinsing clear.
DO NOT use hypochlorite solutions or other disinfectants which react on contact with metals.

8.5) Instrument Hoses After each patient.

The silicone tubing material and metal ferrule nut may be cleaned with a cloth dampened with detergent. Once cleaned they may be wiped with approved disinfectants.

Avoid aerosol cans as the solvents/propellants can swell and degrade silicone materials.

Any 'stickiness' of the surface of the silicone, after cleaning, can be overcome by wiping the hoses with a cloth lightly dusted with talc.

Recommended Detergent: Near neutral washing-up liquid, diluted. e.g." Fairy liquid".
Approved disinfectants:
1 "FD 366 sensitive' by Durr Dental AG
2 'Mikrozid AF' surface disinfectant, by Schulke & Mayr.

8.6) DCI Syringe, Micromotor, Ultrasonic Scaler and any other instruments.
All of these should be cleaned and disinfected in accordance with their separate manufacturer's instructions.

9) MAINTENANCE & ADJUSTMENTS

Handpieces and attachments should be maintained in accordance with the respective manufacturer's directions. Few parts of the Trionic 5 unit require any routine maintenance, outside of that described under Hygiene & Cleaning. However, the items below may require adjustment or periodic attention.

9.1) Pressure Regulators

It should be checked that the air pressure regulators are holding their set pressures, which should be at the values listed in the specifications section.
A build up of debris can cause the performance to deteriorate. Have your service technician check this annually. If the regulators are suspect, have them serviced - the service kit contains a new diaphragm and seals to restore original performance.

Access to Pressure Regulators
First, switch off electrical power.
Cart units house the regulators in the upright column. See figure 12
Chair attached units have the regulators fitted in the base of the chair.

To gain access in a cart, lift the unit head to its' full height, remove screw A and pull off cover B.
Cabinet mounted units house the regulators in the wall mount services box. see figures 3 & 11.
Remove the nut securing the air handle in place. Pull off the handle then turn the cover retaining latch as indicated. Remove the cover.
On chair attached units, remove the front cover on the chair base, the regulators are positioned on one side.

9.2) Air Filter Element

A clogged filter in the high pressure air filter/regulator (AR.1) can restrict the air supply and reduce the performance of air powered instruments.
The condition of the element will depend on the quality of the air supply and it may remain serviceable. However, it is a good idea to replace the filter element when the regulators are checked, as it is an inexpensive part.

9.3) Purging Air from Water Circuit

Any air present in the water control circuits of the Trionic unit can cause spluttering or run-on of water when instruments are stopped.
Air may be present in the water pipes for several reasons :
The unit has just been installed.
The water bottles have been allowed to run dry.
Air, initially dissolved in the water, has been freed and has accumulated.

To purge air from the system, first ensure that the water bottles are filled. Then starting at one end, select a instrument hose for which a spray control valve exists, remove detachable instruments/motors and hold or hang the hose ends over a basin. Open the spray control valve several turns to allow a copious flow of water.
Press the flush valve button on the right of the unit (towards the rear) until a steady flow of water is emitted, then return the hose to it's holder. Repeat the exercise one hose at a time until all hoses have been flushed.

In practice, The unit will automatically clear the system of any air that has entered or built up, so the above procedure should not be necessary. If the bottle runs dry while in use, simply switch to the other full bottle and continue to run the instrument until a constant supply of water is emitted.

Figure 11 CONTROL BOX (wall mtg.)

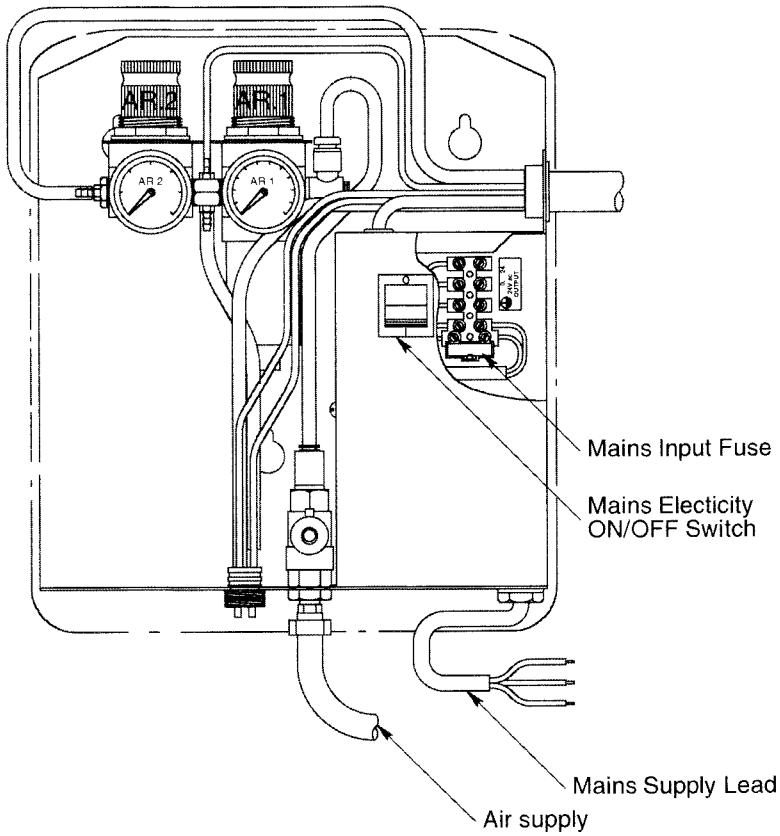


Figure 12 STAND UPRIGHT

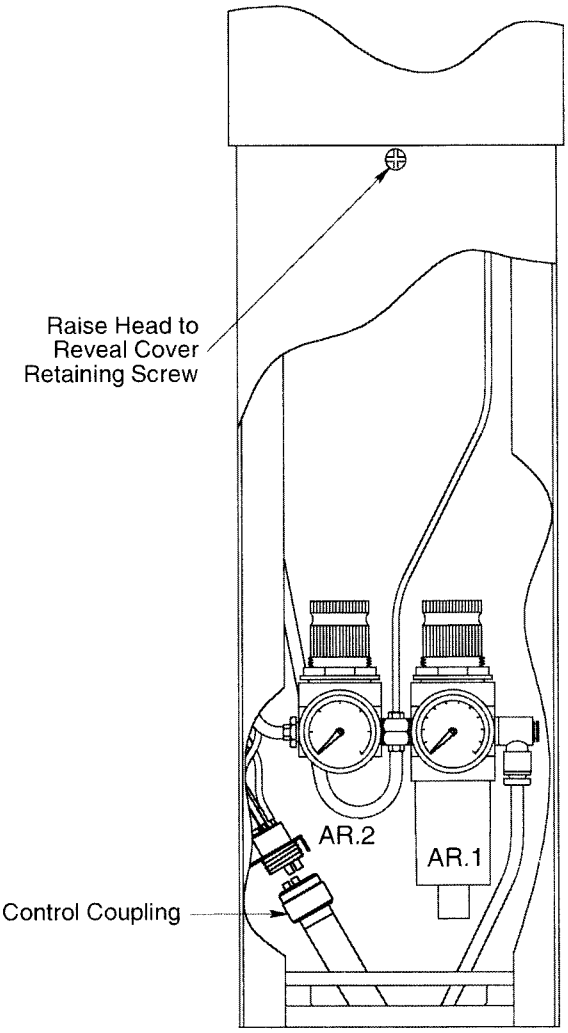
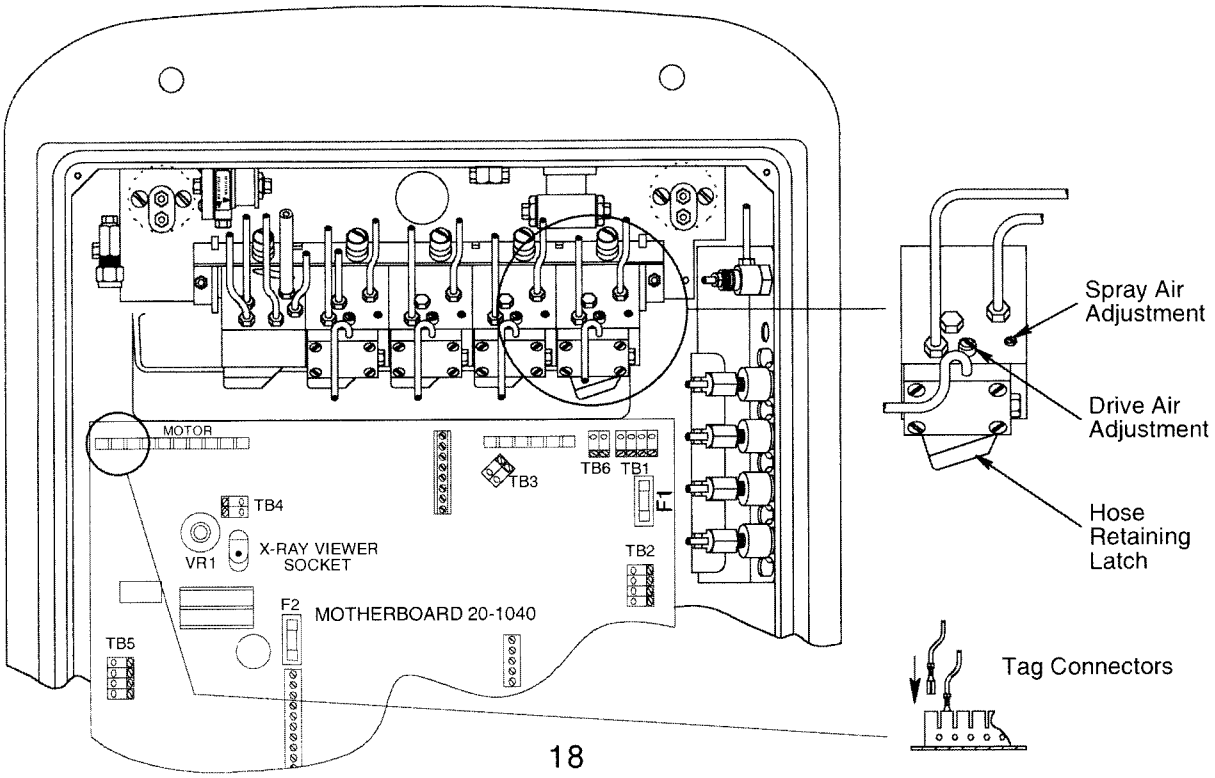


Figure 13 DRIVE AIR, SPRAY AIR & SYRINGE HEATER ADJUSTERS



9.4) Detachment of Instrument Hoses

Refer to figure 13

The hoses are a plug fit into the instrument control blocks - air and water are coupled to the tubings via the 'insert manifold'. To detach a hose, switch off electrical power, then push the hose retaining latch so that it clears the periphery of the insert manifold, when viewed from underneath. Now pull the insert manifold out of the control block by gripping the hose coupling close to the insert manifold - DO NOT pull on the tubing.
Sometimes, selecting the instrument and applying some air pressure by gradually operating the foot control can assist in pulling the insert manifold out of the block. Ensure water is not selected.

On hoses with electrical connections, remove the top cover from the unit head (as in section 9.1), the tag connectors must be pulled out of their respective circuit board connectors. MAKE A NOTE of the wire colours and positions before detaching wires. When re-installing, polarity and position ARE IMPORTANT. Grip the tags through the insulating boot - DO NOT pull on the wires.

When reinstalling, ensure the 'O' rings of the manifold connectors are perfectly clean and undamaged and wipe them with a smear of silicone grease.

10) USEFUL SPARE PARTS AND ACCESSORIES

Item	Part Number	Description/Comment
Mains input fuse (floor type services box).	10 1025	13 Amp 250 volt. 1" x 1/4" Ceramic, BS 1362
Mains input fuse (wall type control box)	10 1309	T 1 A L 250 volt. 20 mm x 5 mm, IEC 60127-2 sht.3
Transformer primary fuse	Ditto	Ditto
Motherboard fuse F1	10 1245	T 5 A L 250 volt. 20 mm x 5 mm, IEC 60127-2
Motherboard fuse F2	10 1220	T 1.6 A L 250 volt. 20 mm x 5 mm, IEC 60127-2
Micromotor board fuse F1	10 1245	T 5 A L 250 volt. 20 mm x 5 mm, IEC 60127-2
Scaler board fuse F1	10 1220	T 1.6 A L 250 volt. 20 mm x 5 mm, IEC 60127-2
Fibre optic board fuse F1	10 1186	T 500 mA L 250 volt. 20 mm x 5 mm, IEC 60127-2
Instrument holder valve	22 1199	Air 'bleed valve'
Diaphragm	30 1061	Under Cap on Control Block
'O' Ring	30 1086	Fitted in Bottle Cap
Mat	30 1142	Under Instrument Trays
Adjuster Key	45 1587	Autoclavable, Spray Water Valves
Borden Fitting Instrument Hose	60 1131	3 Hole Grey Silicone
Syringe Hose	60 1157	DCI Syringe
Syringe Nozzle	60 1158	DCI Syringe, Metal
MidWest Fitting Hose	60 1175	Grey Silicone
Fibre-Optic MidWest Hose	60 1176	Grey Silicone
NSK Scaler lead. Std.	60-1181	Grey Silicone
NSK Scaler lead. Lux.	60-1182	Grey Silicone
MX2 Micromotor Hose	60 1183	Grey Silicone
MCX Micromotor hose	60 1184	Grey Silicone
Water Bottle 1/2 Ltr.	70 1156	DO NOT use other types
Syringe Service Kit	70 1190	DCI Syringe, Incl. 'O' rings, valves and tool

11) OPERATIONAL CHECK AND FAULT FINDING

Any faulty operation of the unit is likely to be noticed in normal operation. However, we recommend carrying out a quarterly check to confirm all is working correctly. Leave the air and electrical supplies on during the check. Ensure water bottles are full.

This symbol § is used where investigation or repair should be entrusted to your service technician.
Disconnect electrical power before accessing the interior of the unit. Allow two minutes for internal circuits to discharge.

CHECK THE FOLLOWING	LIKELY CAUSE
11.1) Inspect the unit and services connection box for water leaks.	Any water leaks should be remedied without delay. § DO NOT use the unit if water leaks can potentially wet electrical components or connections or constitute a hazard to personnel or property.
11.2) Check electrical power : i) Mains switch indicator lit	i) Mains indicator extinguished, check : Surgery mains electricity supply is on. Unit mains switch is ON. Mains input fuse is intact - replace if necessary. If the problem is not resolved or if a new fuse blows, call your service.technician. § DO NOT continue to use the unit with electrical power connected.
ii) One lamp lit on each of scaler power and micromotor speed limit scales. and A or B indicator lit for water source	ii) If the indicators are not lit, check : Transformer primary fuse, located : Floor box, Chair Base Services Chassis, or Wall Service Box, as appropriate. § Fuses F1 and F2 on the circuit motherboard. §
iii) If an electric micromotor is fitted, press + and check that speed setting cycles through indicators 1 to 4, with accompanying 'beeps'	iii) No cycling 1 to 4, check fuse F1 of micromotor control board §
iv) If an ultrasonic scaler is fitted, press + and check that power setting cycles through indicators 1 to 8, with accompanying 'beeps'	iv) No cycling 1 to 8, check fuse F1 of scaler control board §
11.3) With all instruments parked, listen carefully, at a quiet time of the day, for air leaks.	If hissing is heard from the instrument holders : i) Check that instruments are properly and fully seated in their holders. A partially operated holder valve can cause a significant hiss. ii) If instruments are properly seated, it may be that the holder valve is worn or badly adjusted. § iii) Note that if the foot control is operated with all instruments parked, it is normal for it to emit a hiss.
11.4) With all instruments parked, and without spray selected, operate the foot control, to the full extent of the lever movement. None of the instruments should run.	If any instrument runs while parked in its holder, it is likely to be a faulty selection valve or in need of adjustment. Have it adjusted or replaced § An alternative cause is an air leak from the Multibloc cap.
11.5) Check the operation of the syringe, for air, water, spray and dripping.	Check the syringe as described in section 9.1. If unsuccessful, the syringe may require new internal seals, for which a service kit is available §
11.6) Check the operation of Air Powered instruments in turn and check the following : i) That no water is emitted from the hose when removed from it's holder. ii) Operate the foot control progressively, in either direction, WITHOUT spray selected. and check that there is a corresponding progressive increase in speed : iii) Attach a suitable handpiece gauge, operate the foot control at full lever movement and check that the unit is supplying pressure within the hand piece manufacturer's range.	i) If it does, air may be leaking across the control block diaphragm into the water channel. § ii) If there is no speed variation, check input air pressure (see iii, below). If that is O.K. then have your technician check the foot control valve operation. § iii) If the handpiece pressures are incorrect, check first that your compressor is providing sufficient output : ensure that the Trionic's high pressure air regulator is set to the recommended value (see specifications) and that it does not fall by more than about 0.3 bar (5 psi) when a turbine is run. If it does, then the regulator may be faulty, or the air supply to the unit may be restricted e.g. the air filter clogged, the supply tap not fully open or the compressed air supply inadequate. Have this checked. 9 If the supply pressure is O.K. the handpiece pressures may need adjusting, using the restrictor screws provided (see figure 10). DO NOT adjust the unit's pressure regulators.
iv) Select spray at the foot control, then move the lever slowly until water spray is emitted. This should happen at a low handpiece speed. v) Release the foot control and check that the spray shuts-off quickly. vi) Check that the water volume can be altered with the appropriate spray control valve. Refer to Figure 5 to ensure that the correct valve is being adjusted.	iv) If the spray does not start up or starts up very late, the spray pilot valve in the foot control may need adjusting or replacing. § v) If spray does not shut off cleanly, the cause may be : a) Air in the control system (see section 9.3). b) A faulty or badly adjusted foot control spray pilot valve. § vi) If water volume cannot be controlled the cause may be : a) The spindle of the control valve is stuck in (often due to infrequent adjustment) Open the valve fully, operate the instrument with water selected for several minutes to give the spindle a chance to work free. If unsuccessful, refer to your service technician. § b) The non return valve in the control block is faulty §

OPERATIONAL CHECK AND FAULT FINDING cont:

CHECK THE FOLLOWING	LIKELY CAUSE
11.7) Check the operation of electric micromotors as follows :	
i) Select the motor, remove any fitted handpiece, select speed limit 1 on the panel, and operate the foot control, without spray, to its full lever movement in either direction. Hold the motor 'E' coupling close to your top lip and determine that coolant air is flowing through the motor - a slight draught should be felt .	i) If there is insufficient or no cooling air, check air supplies to the unit as described in 12.6.iii) above. If air supplies are OK, adjust the cooling air using the restrictor screw in the control block. (see fig. 10)
ii) Operate the foot control slowly, moving the lever to the left of centre, until the motor first starts to rotate. Observe the direction of rotation, which should be forward iii) Repeat ii), but moving the lever to the right of centre. The direction should be reverse.	ii)& iii) a) If the motor runs in the opposite direction to that expected, the micromotor tubing may have been replaced with the electrical connections to the circuit board inverted. b) If the motor runs in one direction, but not in the other, the switches on the micromotor control board may be faulty **§** c) If the motor runs in the same direction whichever direction the foot control is operated, the reverse pilot valve in the foot control may be faulty **§**
iv) Run the motor with the foot control lever fully operated in either direction. Now press the + button to consecutively select speed limits 2,3 and 4. Motor speed should rise at each step	iv) a) If there is no variation in speed, check air pressures as described in 12.6.iii) above. b) If the motor runs only at a very high speed, STOP USING IT. - It is likely that the electronic drive circuit is faulty. If so the motor will run above its' designed speed range and continued use could cause irreparable damage to the motor and/or handpieces. **§**
v) With the speed limit set to 4, observe that variations of foot control lever movement give corresponding variations in motor speed.	v) As iv) above. IF MOTOR DOES NOT RUN AT ALL, in any of the above tests, check fuse F1 of the micromotor control module. Check for broken wires in the instrument hose. **§**
vi) Check the operation of the spray circuit, as for air instruments.	vi) Note the remarks on spray operation given in 6.v) and 6.vi) above. Also note the following : Low speed motors generally mix separate spray air and water supplies together, either in the motor or in the handpiece. The consequences can be that : a) If the spray air is closed off, water at the mixing point will simply flow down the empty air tube. Serious run-on and dribbling will occur when the motor is stopped as some of the water will run back out of the air tube. Ensure at least some spray air is used on the low speed motors. b) If the spray air valve is opened too far, the spray air pressure will exceed the spray water pressure. Air at the mixing point will try to push the water back down the water tube into the unit. This will attempt to close off the water valve in the unit and will cause either a pulsating spray or an absence of spray water altogether. Ensure that the spray air valve is not opened further than necessary to produce an acceptable spray.
11.8) Check the operation of the ultrasonic scaler (if fitted) as follows :	i)
i) Select power setting 1. Select water spray at the foot control and then operate the foot control. Adjust spray water until drips are seen to fall from the end of the scaler tip. Now increase the scaler power settings through steps 2 to 8. As power is increased, more vigorous cavitation should be observed (the point at which cavitation begins may be seen to move back towards the handpiece end of the tip). NOTE that the degree of foot control lever movement has no effect on the power setting, it acts just as on/off.	a) If cavitation is present but operation of the tip seems discontinuous (hunting), then the tip is probably worn outside of the tuning range of the electronic generator. Check the tip against the Amdent wear template. If in doubt, try changing the tip for a new one. b) If power does not appreciably increase through the range, the tip may be worn. Check as above. c) If power does not appreciably increase through the range and the handpiece is felt to get hot, then the handpiece may be damaged, possibly by the entry of water. STOP using the instrument **§** NEVER attempt to dismantle the handpiece - if 'O' ring seals are disturbed, water will enter the transducer and cause permanent damage. d) If power does not appreciably increase through the range and it is not due to the previous reasons, then the electronic generator or scaler circuit module may be faulty **§**
ii) Deselect spray at the foot control, and check that the scaler does NOT operate. (The scaler is not intended to operate without a supply of water through it)	ii) If scaler continues to operate when water spray is deselected, either a) Your unit has a serial number earlier than T5181 b) The spray detect switch on the scaler circuit module is faulty. **§**
iii) Check the water shut-off as for air instruments. Note : It is normal to get one or two drips from the scaler after operation is stopped.	iii) Refer to 11.6.v) above.
iv) Check for tip wear using the template provided in the Amdent instructions.	iv) Replace worn tips.
v) IN NORMAL USE check that the scaler is not causing complaints of undue discomfort from patients. If it is, there may be a fault in technique or a fault in the equipment	v) If use of the scaler is causing complaints of severe discomfort from patients then a) Check your technique (see section 7.2) and the Amdent booklet). b) Check that the wires to the scaler handpiece have not been reversed. (See section 7.2) **§** Reversed wires will cause electrical stimulation of the gums which is likely to be most unpleasant.

Annex 1: Trionic 5 Electromagnetic environment

Emissions

The Trionic 5 is intended for use in the electromagnetic environment specified below. The customer or the user of the Trionic 5 should ensure that it is used in suh an environment.		
RF emissions CISPR 11	Group 1	The Trionic 5 uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment
RF emissions CISPR 11	Class B	The Trionic 5 is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions IEC 61000-3-2	Class A	
Voltage fluctuations/ flicker emissions IEC 61000-3-3	Complies	

Immunity

The Trionic 5 does not have Essential Performance, nevertheless it has been tested for immunity to electromagnetic disturbances:-

The Trionic 5 is intended for use in the electromagnetic environment specified below. The customer or the user of the Trionic 5 should assure that it is used in such an environment.			
IMMUNITY test	**IEC 60601 test level**	**Compliance level**	**Electromagnetic environment - guidance**
Electrostatic discharge (ESD) IEC 61000-4-2	± 6 kV contact ± 8 kV air	± 6 kV contact ± 8 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30 %.
Electrical fast transient/burst IEC 61000-4-4	± 2 kV for power supply lines ± 1 kV for input/output lines	± 2 kV for power supply lines ± 1 kV for input/output lines	Mains power quality should be that of a typical commercial or hospital environment
Surge IEC 61000-4-5	± 1 kV line(s) to line(s) ± 2 kV line(s) to earth	± 1 kV line(s) to line(s) ± 2 kV line(s) to earth	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	<5 % U_T (>95 % dip in U_T) for 0,5 cycle 40 % U_T (60 % dip in U_T) for 5 cycles 70 % U_T (30 % dip in U_T) for 25 cycles <5 % U_T (>95 % dip in U_T) for 5 s	<5 % U_T (>95 % dip in U_T) for 0,5 cycle 40 % U_T (60 % dip in U_T) for 5 cycles 70 % U_T (30 % dip in U_T) for 25 cycles <5 % U_T (>95 % dip in U_T) for 5 s	Mains power quality should be that of a typical commercial or hospital environment. If the user of the Trionic 5 requires continued operation during power mains interruptions, it is recommended that the Trionic 5 be powered from an uninterruptible power supply or a battery.
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.
NOTE U_T is the a.c. mains voltage prior to application of the test level.			

The Trionic 5 is intended for use in the electromagnetic environment specified below. The customer or the user of the Trionic 5 should assure that it is used in such an environment.

IMMUNITY test	IEC 60601 test level	Compliance level	Electromagnetic environment - guidance
			Portable and mobile RF communications equipment should be used no closer to any part of the Trionic 5, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. **Recommended separation distance**
Conducted RF IEC 61000-4-6	3 Vrms 150 kHz to 80 MHz	3 Vrms	$d = 1.2\sqrt{P}$
Radiated RF IEC 61000-4-3	3 V/m 80 MHz to 2,5 GHz	3 V/m	$d = 1.2\sqrt{P}$ 80 MHz to 800 MHz $d = 2.3\sqrt{P}$ 800 MHz to 2,5 GHz where *P* is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in metres (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey [a] should be less than the compliance level in each frequency range.[b] Interference may occur in the vicinity of equipment marked with the following symbol: 

NOTE 1 At 80 MHz and 800 MHz, the higher frequency range applies.

NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

[a] Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the Trionic 5 is used exceeds the applicable RF compliance level above, the Trionic 5 should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocating the Trionic 5

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

The Trionic 5 is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the Trionic 5 can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the Trionic 5 as recommended below, according to the maximum output power of the communications equipment.

Rated maximum output power of transmitter **W**	**Separation distance according to frequency of transmitter** **m**		
	150 kHz to 80 MHz **$d = 1.2\sqrt{P}$**	**80 MHz to 800 MHz** **$d = 1.2\sqrt{P}$**	**800 MHz to 2,5 GHz** **$d = 2.3\sqrt{P}$**
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

For transmitters rated at a maximum output power not listed above, the recommended separation distance d in metres (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

NOTE 1 At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.

NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.