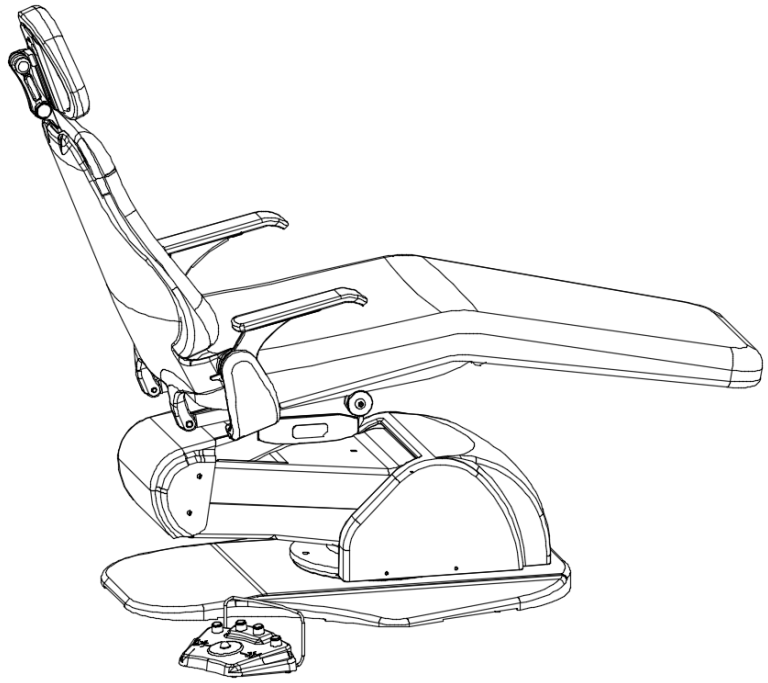
FDC37H Dental Chair

User Manual



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Introduction

Thank you for choosing Firstar Dental products. This booklet contains detailed information about the operation instruction and maintenance information for the FDC-37H model.

To assure that services and operations are completed safely and correctly, please read this entire manual before performing any services or repairs on this unit. Please keep this booklet in a safe place for future reference.

Safety Precautions

- Equipment operating environment shall match with the specified requirements.
- Make sure this equipment is connected to a supply mains with protective earth.
- DO NOT attempt to service or modify this unit without certified service technicians.
- Follow the maintenance schedule to properly service the unit.

Definition of Symbols

The following symbols may be used throughout the product manual:

Caution: Failure to carefully follow the described procedure may result in damage to the equipment.

Warning: Failure to carefully follow the described procedure may result in damage to the equipment and the operator.

Electric Shock Risk: Risk of electrical shock present. Make sure power is disconnected before attempting this procedure.

IEC Symbols

The following symbols conform to IEC labeling standards and may be located throughout the product:

AC (Alternating Current)

Protective earth (Ground)

Protected against splashing

Attention: Consult accompanying documer

Type B equipment
(Protected against electrical shock)

Dangerous voltage

Refer to instruction manual / booklet

Manufacturer ID

Manufacturer Date

Waste Electrical and Electronic Equipment

Conforms with the Essential Requirements
the European Device Directive 93/42/EEC f
Class I Devices

Indicates conformity to General Requireme
for Safety is certified by Intertek testing
services

Transportation and Storage Instructions

- Surrounding environment such as atmospheric pressure, temperature and relative humidity shall match with the manual specified requirements.
- Protect from moisture and rain during transportation and storage is required.

- Protect against impact, vibration and falling is required during transportation and storage.
- Transport and store the boxes upright.
- Storage location shall be well ventilated. Storage environment shall not contain any corrosive gases.

Recommended Environment Conditions

Transportation and Storage Environment

- Ambient Temperature: -29°C to +74°C
- Relative Humidity: 0% to 95%
- Atmospheric Pressure: 50KPa to 106KPa

Operation Environment

- Ambient Temperature: +15°C to +27°C
- Relative Humidity: Conditioned Air
- Atmospheric Pressure: 50kPa to 105kPa

Classifications

ETL CLASSIFIED
C ETL US
LISTED
Intertek
4010684

CE
0120

Medical – General medical Equipment Certified as to electrical shock, fire and mechanical hazards only in accordance with:
ANSI/AAMI ES 60601-1:2005 + C1;A2
CSA std. C22.2#60601-1:2008 Ed.2+C2
IEC 80601-2-60:2012 Ed. 1
IEC 60601-1-2:2014

Electrical Specifications

Classification:	Class 1, Type B
Operation Mode (Duty Cycle):	Intermittent 25s ON – 300s OFF
Supply Power:	115 VAC, 60Hz / 230 VAC, 50Hz/60Hz, as applicable
Fuse Size:	F1/F2-10A, F3-100mA / F1/F2-6.3A, F3-63mA
Control Voltage:	5VDC
External Controls:	Optional Touchpad / Foot Control

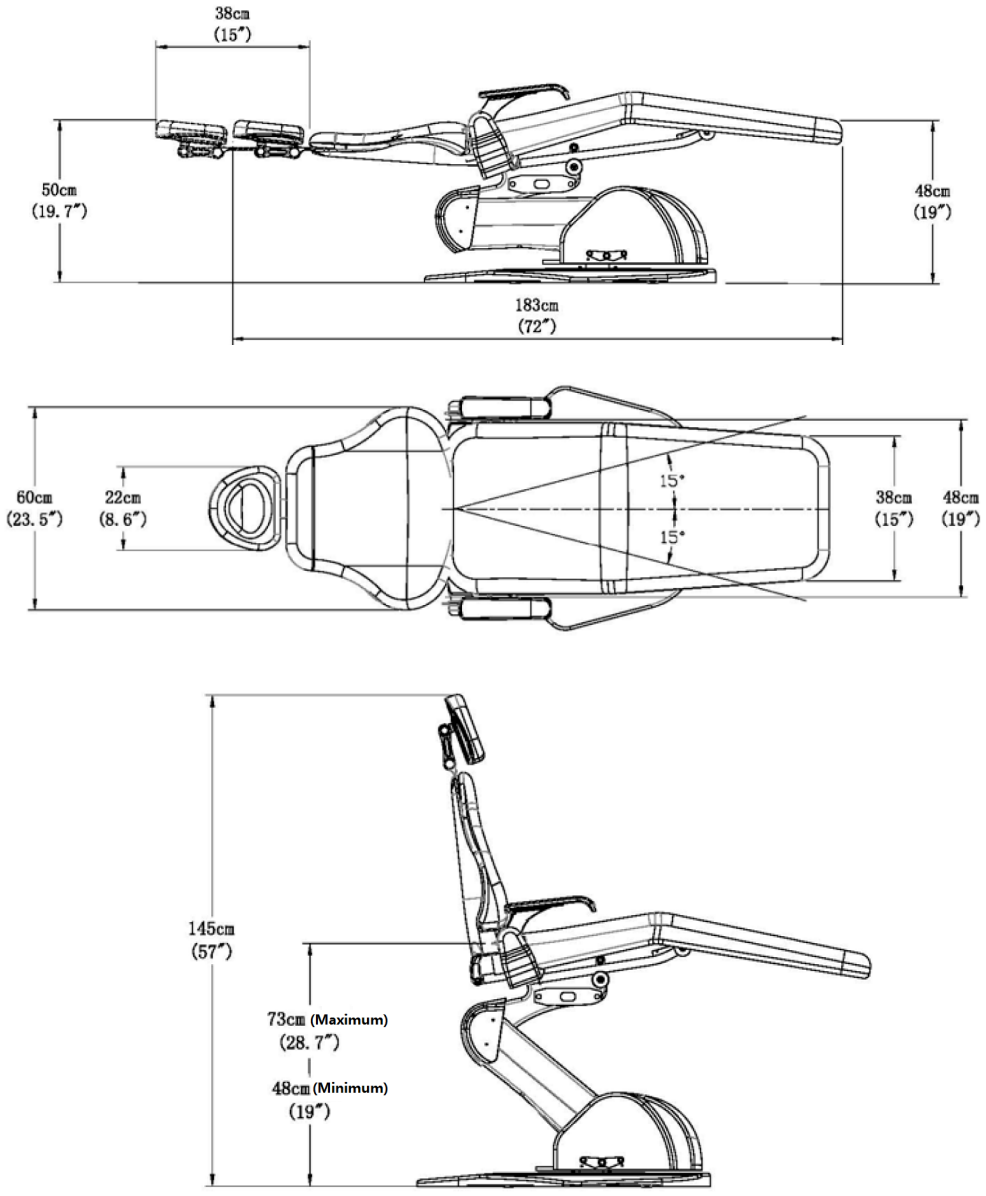
Mechanical Specifications

Minimum installation space	10ft x 10ft (3m x 3m)
Base plate footprint	35” x 25” (90cm x 65cm)
Total Lift capacity	450lbs (225kg)

Maximum Patient Weight	300lbs (136kg)
Delivery system capacity	125lbs (57kg)
Empty weight	300lbs (136kg)
Package weight	396.9 lbs (160kg)
Package dimensions	57”L x 32”H x 34”W (145cm x 81cm x 86cm)

Unit Dimensions and Technical Data
Dental Chair

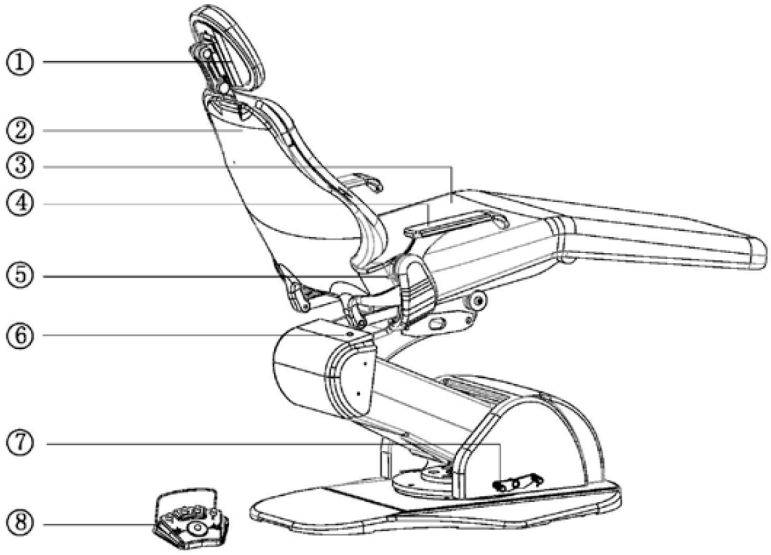
A. Dimensions



B. Technical Data

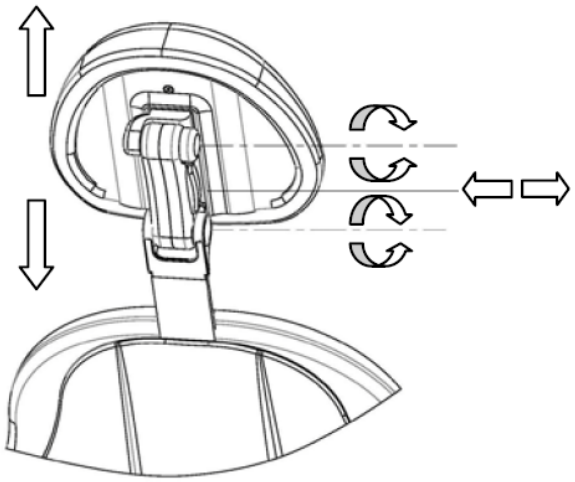
Hydraulic Liquid Pressure:	5.6MPa (55 kgf/cm^2)
Input Supply Power:	115 VAC, 60Hz / 230 VAC, 50Hz/60Hz, as applicable
Fuse Size:	F1/F2-10A, F3-100mA / F1/F2-6.3A, F3-63mA
Maximum Load (including unit):	2450N (250kgf)
Control Voltage:	5VDC
Modes of Operation:	Intermittent: 25 sec ON – 300 sec OFF

Operation Instruction
Dental Chair Components



① Adjustable Headrest Cushion
② Back Support
③ Seat
④ Armrest
⑤ Armrest Lock
⑥ “Program” Button
⑦ Chair Rotation Foot Lock
⑧ Foot Switch

Headrest Position Adjustment

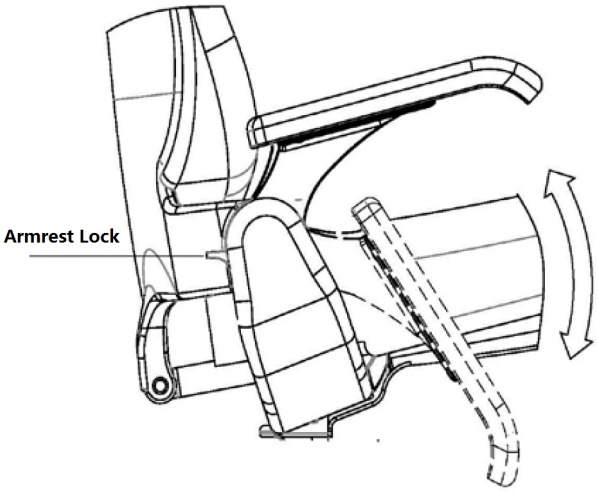


<u>Double Articulating Headrest</u>

Height Adjustment
Push down or pull up the blade from the chair back to change the headrest to the desired height.

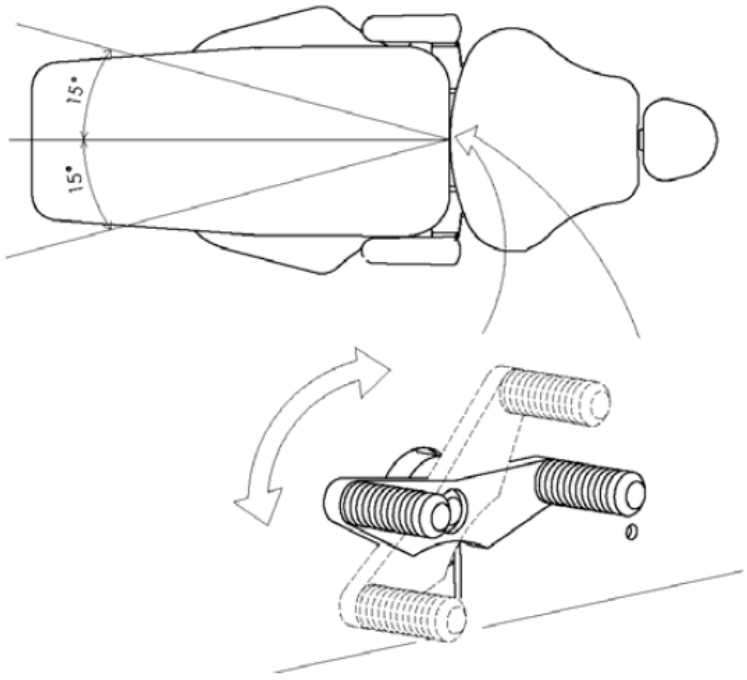
Angle Adjustment
Angle of headrest can be changed by grasping the headrest release lever on headrest release mechanism. Release the mechanism to lock the headrest at the desired position.

Armrest Adjustment



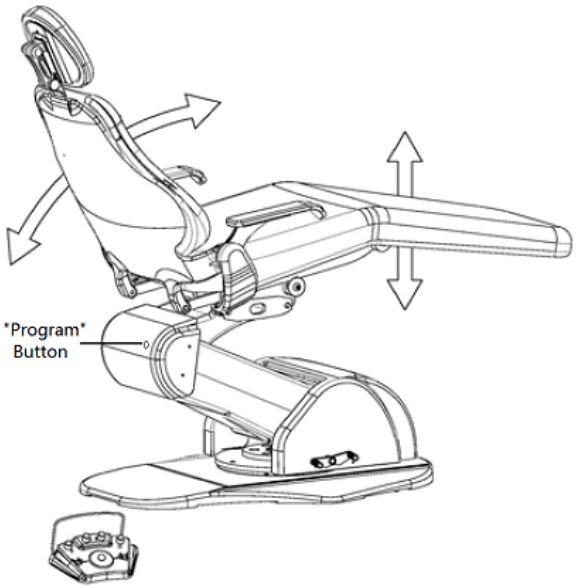
The chair's armrest can be lowered allowing patient to enter and exit from either side of the chair.
To lower and raise the armrest: Pull up the armrest lock trigger, push the end of the armrest to lower it.
Lift up the arm till you hear a click sound, which secures the arm in its original up position.

Chair Rotation Adjustment (Optional Upgraded Feature)



Release the chair rotation foot lock by stepping on it counterclockwise. The chair can rotate approximately 15° to either side of its center position. To secure the final position, simply lift up the leg to engage the foot lock again.

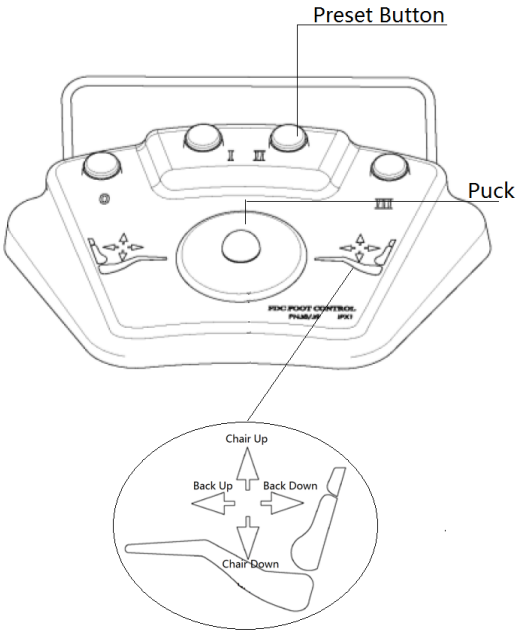
Dental Chair Foot Switch Settings



Manual positioning of the chair can be done by operating the footswitch or touchpad control located at the delivery system tray.

Chair & Back Up or Down Operation

- To move the chair up or down, push and hold the puck on the foot control (Up and down buttons)
- To move the back up and down, push and hold the puck on the foot control (Left and right buttons)



Programming the Position Preset Buttons

1. Using the menu control puck, follow the direction of the arrow to control the chair.
2. Push and hold the “Program” button located at the back of the chair until a beeping sound is heard.
3. Push any preset button to assign it to this position. The chair will beep three times to indicate the program is complete.
4. Program failure is indicated by more than three beeps.

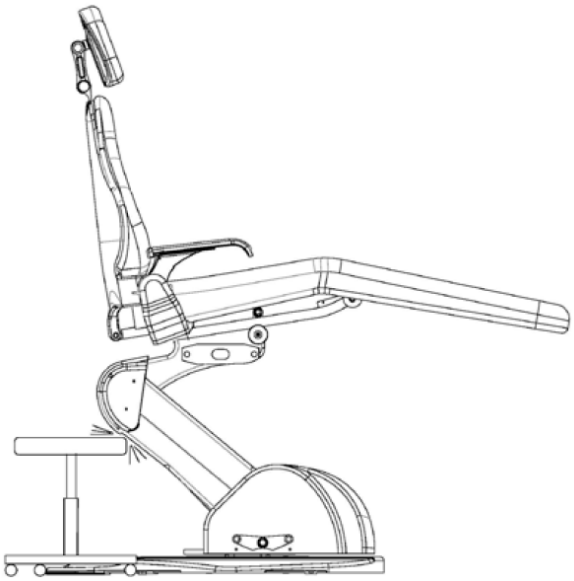
Activating Auto Positions

1. Push any preset buttons on the footswitch or touchpad.
2. A beep sound will be heard.
3. The chair will automatically move to the preset position.

Touchpad Operation (Optional)

Similar to the foot control operation.
Preset buttons ① ~ ④ are for auto-positions.
Buttons ▲ ▼ ◀ ▶ are for
Chair Up, Chair Down, Back Up, Back Down.
P is the “Program” button to assign different positions to any of the preset buttons

Dental Chair Collision Protection System



To prevent damage to the chair or other equipment, all FDC dental chairs are equipped with a Collision Protection System.

The safety switch located at the bottom of the chair senses the chair contacts an object when the chair is moving down; the *Chair Down* function will be disabled and motion of the base stops immediately. The chair will automatically run up a little before it stops.

Move the object away and move the base up will deactivate the safety switch and the chair can operate normally again.

Note:
When the safety switch is activated, the *Chair Down* function is disabled. The chair down button and the auto position buttons will no longer work.

⚠	Extensive long use of the chair movement will result in overheating of the hydraulic motor and shorten its life span. Make sure to follow the dental chair duty cycle: 25 sec ON – 300 sec OFF

⚠	Even with collision protection, chair can be damage with continuous contact. Keep objects away from chair to ensure proper unit operation.

⚠	Do not energize the unit until all shipping secured materials have been properly removed.

Dental Chair Cleaning and Maintenance

Attention: Firstar assumes no responsibility or liability for any result, expressed or implied. These are suggested practices, based on the best information available at this time.

Barriers: At the beginning of each workday, use barriers to cover any surfaces that must be protected from contamination. Remember that barriers should always be changed between patients.

Under normal use, your FDC37H dental chair should require no maintenance. In the event of equipment failure or damage you should contact your authorized Firstar Dental representative.

Refer to the Firstar Products Cleaning Guide for information on proper cleaning and disinfection guidelines of our products.

Improper cleaning and disinfection methods can lead to cross-contamination. Therefore, it is important to follow the cleaning instructions before each patient's dental procedure.

It is important to pay strict attention to the cleaning product manufacturer's instructions. Some cleaning products may contain harsh solvents that could damage the upholstery material with repeated use.

Electromagnetic Compatibility

All electrical medical devices are subject to special EMC safety measurements and as a result the equipment must be installed and operate according to the installation instruction manual and the user manual.

Portable and mobile RF communications equipment can affect medical electrical equipment.

ELECTROMAGNETIC COMPATIBILITY testing has been done for this product. All test results and electromagnetic environment guidance are shown below.

Emissions Test

Emissions TEST	COMPLIANCE LEVEL	TEST DATA	ELECTROMAGNETIC ENVIRONMENT GUIDANCE
RF emission (CISPR 11) Group 1 Compliance Class B Compliance	Limit at 3m [dB($\mu V/m$)] 200MHz 30 [dB($\mu V/m$)] 400MHz 37 [dB($\mu V/m$)] 800MHz 37 [dB($\mu V/m$)]	Limit at 3m [dB($\mu V/m$)] 200MHz <20 [dB($\mu V/m$)] 400MHz <27 [dB($\mu V/m$)] 800MHz <27 [dB($\mu V/m$)]	This product has very low radiated emission and it is not likely to cause any interference in nearby electronic equipment.
Harmonic emissions (IEC 61000-3-2) Class A Compliance	Max harmonic does not exceed 100% limit.	Worst harmonic was #5 with 6.66% of the limit.	This product 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.
Flicker emissions (IEC 61000-3-3)	Highest dt (%): <3.3 Time (mS) >dt: 500 Highest dc (%): <3.3 Highest dmax (%): <7 Highest Pst (10 min): <1	Highest dt (%): = 1 Time (mS) >dt: = 0 Highest dc (%): = 0.34 Highest dmax (%): = 1 Highest Pst (10 min): = 0.415	

Immunity Test

This product is intended for use in the following electromagnetic environment. Users should assure that the product is used in such an environment.

IMMUNITY TEST	IEC COMPLIANCE LEVEL	IEC60601 TEST DATA	ELECTROMAGNETIC ENVIRONMENT GUIDANCE
Electrostatic Discharge (ESD) immunity IEC 61000-4-2	±2, ±4, ±6 kV direct contact discharge ±2, ±4, ±8 kV direct air discharge	±2, ±4, ±6 kV direct contact discharge ±2, ±4, ±8 kV direct air discharge	Floors should be wood, concrete or ceramic tile. Maintain at least 30% room humidity if the floors are covered with synthetic material.
Electrical Fast Transient/Burst (EFT) immunity IEC 61000-4-4	± 2 kV for a.c. and d.c. power lines @ 5kHz repetition frequency	± 2 kV for a.c. and d.c. power lines @ 5kHz repetition frequency	Main supply power should be that of a typical commercial or hospital environment.
Surge immunity IEC 61000-4-5	±0.5 kV, ±1 kV a.c. power line to line ±0.5 kV, ±1 kV, ±2kV a.c. power line to earth	±0.5 kV, ±1 kV a.c. power line to line ±0.5 kV, ±1 kV, ±2kV a.c. power line to earth	Main supply power should be that of a typical commercial or hospital environment.
Conducted disturbance immunity IEC 61000-4-6	3V 0.15MHz-80MHz 6V in ISM and amateur radio bands between 0.15MHz and 80MHz 80% AM at 1kHz	3V 0.15MHz-80MHz 6V in ISM and amateur radio bands between 0.15MHz and 80MHz 80% AM at 1kHz	Main supply power should be that of a typical commercial or hospital environment.
Voltage dips and interruptions immunity IEC 61000-4-11	0% U_T = 0.5 cycle 40% U_T = 5 cycle 70% U_T = 25 cycle	0% U_T = 0.5 cycle 40% U_T = 5 cycle 70% U_T = 25 cycle	Main supply power should be that of a typical commercial or hospital environment. It is recommended to power the product by an uninterruptable power system (UPS).
Power frequency magnetic field immunity IEC 61000-4-8	50Hz X,Y,Z orientations of induction coil: 3A/m	50Hz X,Y,Z orientations of induction coil: 3A/m	Power frequency magnetic fields should be at levels characteristic of a typical commercial or hospital environment level.
Note: a. U_T is the AC mains voltage prior to application of the test level.			

IMMUNITY TEST	IEC 60601 TEST LEVEL	COMPLIANCE LEVEL	ELECTROMAGNETIC ENVIRONMENT GUIDANCE
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 kHz to 2.5 MHz	3 V/m	$d = 1.2\sqrt{p}$ 80MHz 800MHz $d = 2.3\sqrt{p}$ 800MHz 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 meters (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey, (a) should be less than the compliance level in each frequency range. (b). Interference may occur in the vicinity of equipment marked with the following symbol. 

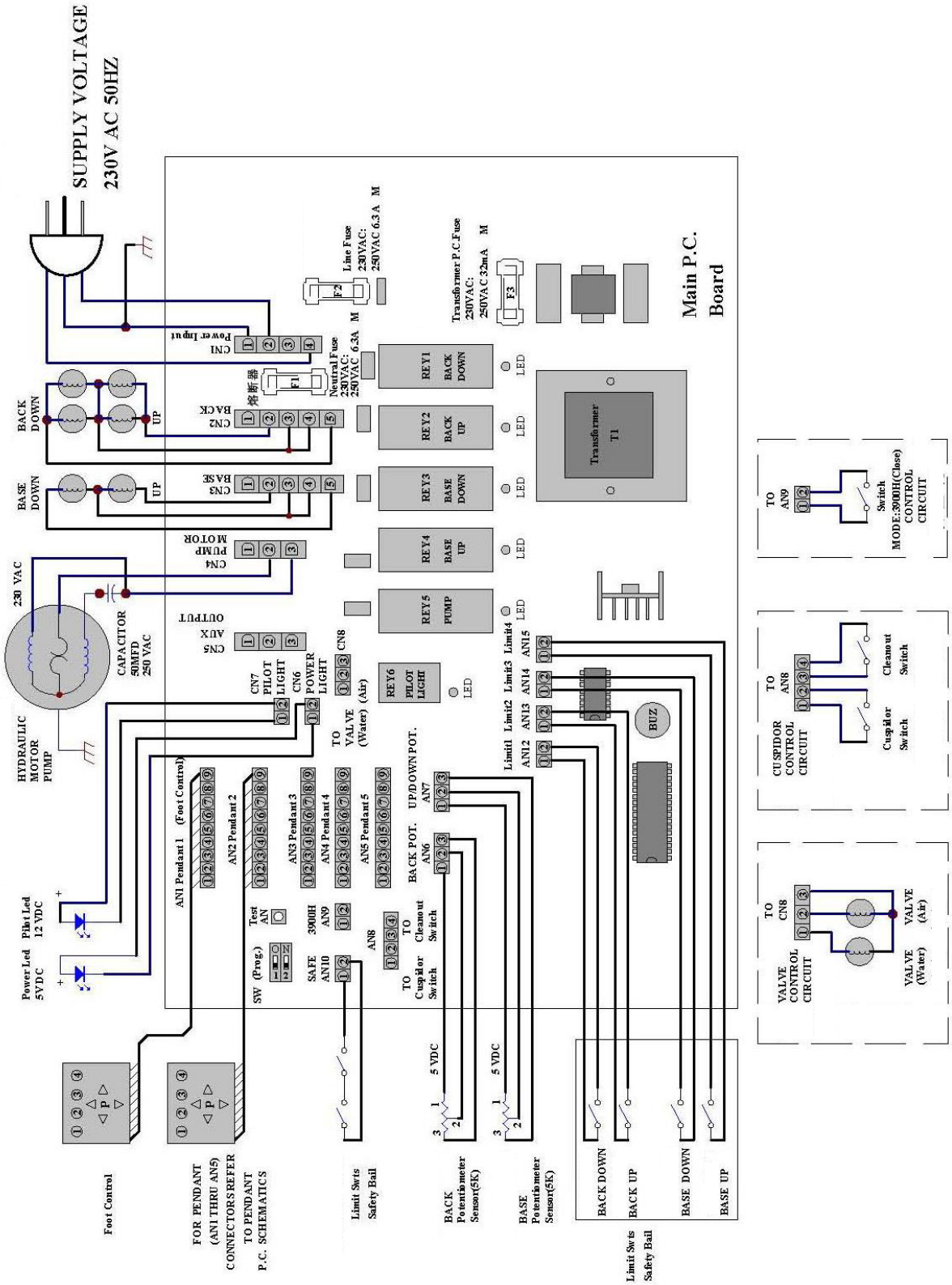
Portable and mobile RF communications equipment should be used no closer to any part of this unit, including cables, than the recommended separation distance calculated from the equation applications to the frequency of the transmitter.

NOTE 1: At 80 MHz and 800MHz, the higher frequency range applies.
NOTE 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by adsorption and reflection from structures, objects and people.

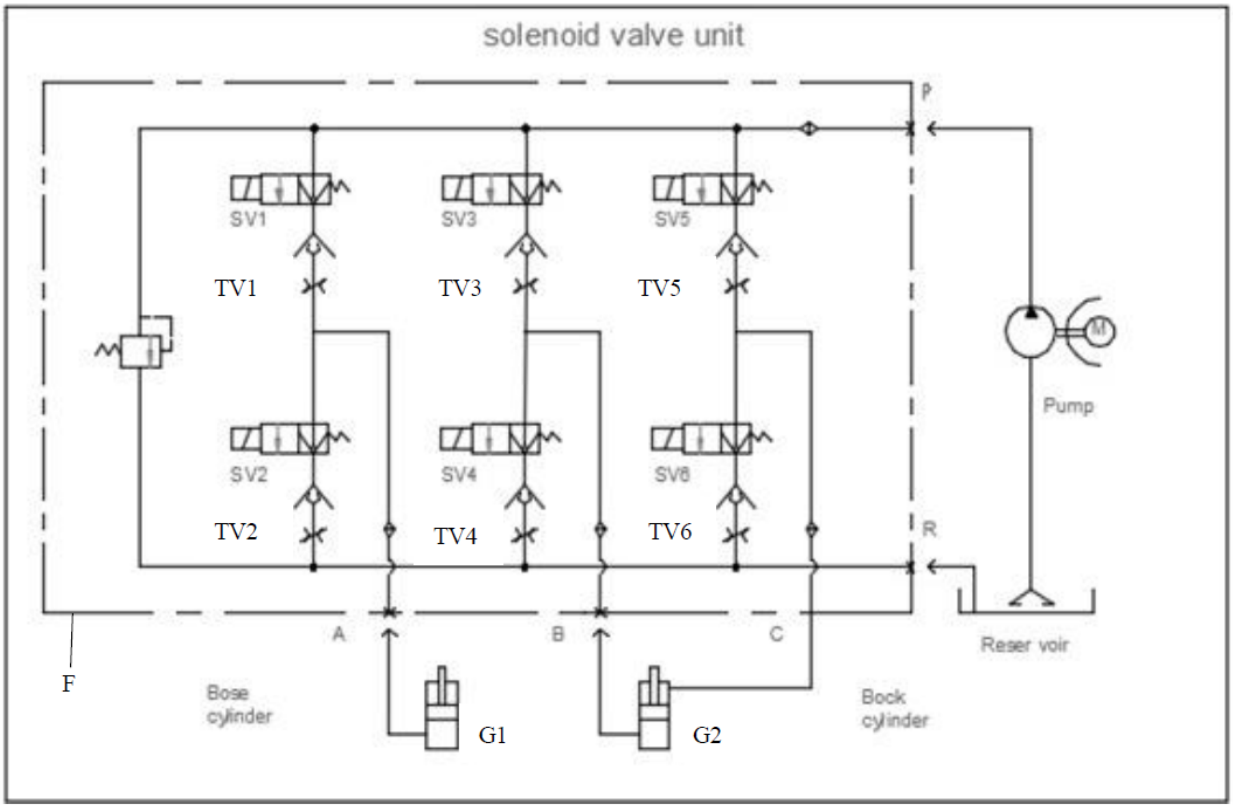
a. Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which this unit is used exceeds the applicable RF compliance level above, this unit should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating this unit.
b. Over the frequency range 150 KHz to 80 MHz, field strengths should be less than 3 V/m.

Appendix

Wiring Diagram



Hydraulic Fluid Power Schematics



Pump: single phase AC hydraulic motor pump

F: six in one solenoid valve

P, A, B, C, R: solenoid valve fittings

G1: base movement cylinder

G2: back movement cylinder

SV1: base up solenoid (fluid supply) SV2: base down solenoid (fluid return)

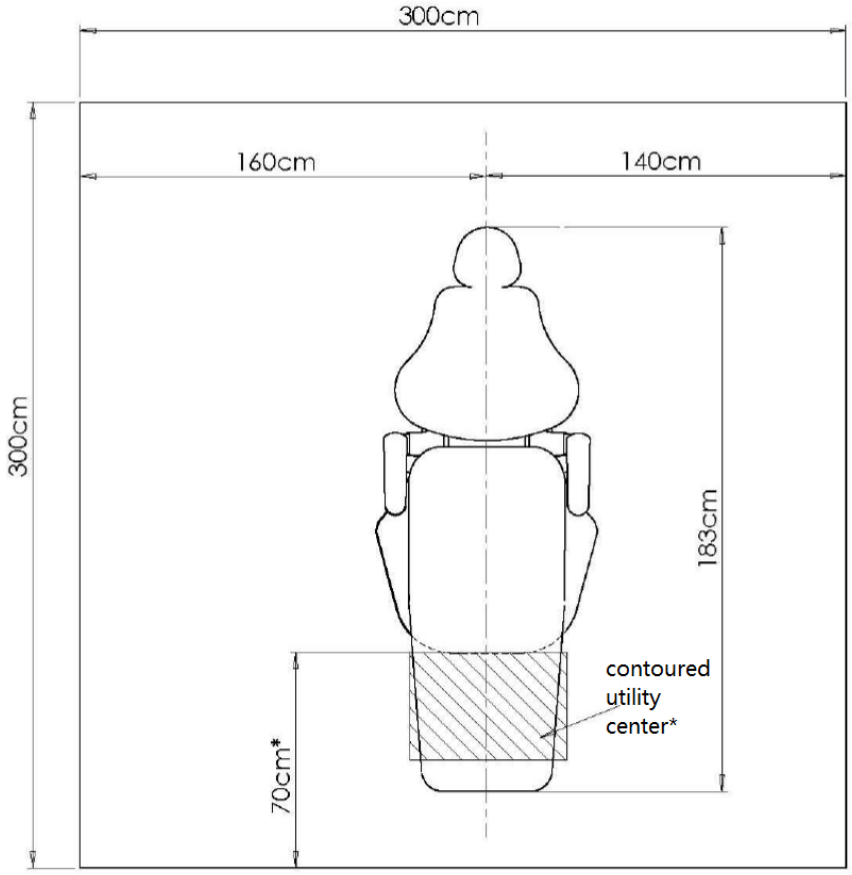
SV3: back down solenoid (fluid supply) SV4: back down solenoid (fluid return)

SV5: back up solenoid (fluid supply) SV6: back up solenoid (fluid return)

TV1, TV2, TV3, TV4, TV5, TV6: adjustable throttle

Reservoir: hydraulic reservoir

Dental Chair Required Operating Area



Note:

1. *contoured utility center size and tubing diagrams are shown on the next appendix.
2. *dental chair front clearance space is required to have at least 70cfm away from the wall.
3. Each dental chair required operating area is 9 m^2.

Warranty Statement

All FDC products sold to and installed by dealers are guaranteed to be free from defects in workmanship and materials for one year from date of purchase. Hydraulic motor pump itself has factory warranty of five years. During that period, FDC will replace any defective part at no charge. FDC WILL NOT be responsible for dealer or service company labor charges or shipping charges.

This guarantee does not cover normal wear, stains, cuts or scratches of upholstery or surface finishes or parts sold to OEM customers.

Staining, discoloration or deterioration of the equipment caused by disinfectant solutions is not covered under the warranty.

FDC will pay the return freight charges from the factory to the dealer. This guarantee does not cover damage resulting from improper installation, misuse or accidents incurred in shipping and handling.

All claims against the freight carrier must be initiated at the time the damaged items are received. The claim is the responsibility of the customer.

We are constantly striving to improve our products. We reserve the right to make modifications without the need for prior notification and are not obliged to modify previously manufactured items.

Warranty period begins as soon as installation is done and accepted by the end user. Please contact your local dealers for more information on the product warranty.

Caution: only authorized service technicians should attempt to service FDC equipment. Use of other than authorized technicians will void the warranty.