FD-8000+ INSTALLATION MANUAL

For products:

FD-8000B1+
FD-8000B1x
FD-8000B2+
With Cuspidor Compact
With or without patient chairs FD-3600 and FD-5000

Your Local FINNDENT Dealer is:

February 2020
Document FD-RD-WI-1759-EN Ver. 5

CE 0537

TABLE OF CONTENTS

1 INTRODUCTION

This manual describes how to install Finndent 8000+/x dental units, with or without Finndent 3600 and 5000 patient chairs. Depending on the unit and chair configurations, not all parts of the installation manual will apply.

This manual only applies to FD-8000+ products sold in December 2014 or later.
Finndent products must be installed by a technician authorized by Finndent.

1.1 Incident Reporting

In the unlikely event of a safety incident involving a Finndent product, users should send a report to their local Finndent Dealer or directly to Finndent Oy (**support@finndent.com**). Incident reports must include the following:

Dental clinic name, address, telephone number and e-mail
Name of the person reporting
Product details (model, serial number, purchase location)
Date and time of the incident
Relevant patient details (age, size, procedure being given, etc.)
Detailed explanation of the incident

1.2 Medical Device Tracking

Due to EU regulations on medical device tracking, Finndent must know the final installation location of all dental units and chairs. **If a unit is re-sold, Finndent must know the new location. Please contact Finndent Finland immediately with the new owner name and address.**

1.3 Warranty

The manufacturer gives two (2) years warranty for the unit and the chair from the date of installation, or a maximum of 30 months from the date of shipments. Warranty validation requires that the Warranty document is filled with the installation details and returned to the manufacturer within two (2) weeks of the date of installation.

The warranty period for the installed instruments (Micro motor, turbine Multiflex, curing light, syringe, scaler) is that given by the manufacturer, usually one (1) year. The unit consumables such as the instrument pad, instrument tubes, doorio arms, membranes, valves, suction connectors, etc., have a warranty period of one (1) year. Suction tubes should be changed bi-annually and hold no warranty as consumable items.

Finndent spare parts have the same warranty as the dental unit, patient chair, and consumable items.
The warranty includes only replacement of the faulty item. The costs of dispatch, freight and installation or repair labor are not included in the warranty.

Complete warranty conditions have been delivered with the unit to the Customer and Distributor.

2 SYMBOLS AND ABBREVIATIONS

~	Alternating current
A	Ampere
Hz	Hertz
|/O	On/Off (IEC 60417-5007/5008)
IPX1	Protected against dripping water (IEC 60529)
kPa	kilopascal, pressure measurement, 100 kPa = 1 bar = 13 PSI
LED	Light emitting diode
N/A	Not applicable
PCB	Printed Circuit Board
PSI	Pounds per square inch, 13 PSI = 1 bar = 100 kPa
RPM	Revolutions per minute
TBA	To be announced, information will be added later
V	Voltage
W	Watt

T5AL250V Fuse description:
T = Slow blow
5 A = number of amperes, for example, 5 amp
L = low breaking capacity glass fuse
250 V = rated for 250 volts
35 A BC = Breaking capacity of 35 A

 / L / N Protective Earth (IEC 60417-5019) / Line In / Neutral conductor connection /Earth ground

 Warning: Dangerous voltage (IEC60878) Do not remove this cover unless the unit is disconnected from the power mains supply (building circuit breaker is turned off).

 Protection class B (IEC 60417-5840)

 Protection class BF (IEC 60417-5333)

 European Community approval mark

 Do not dispose in normal household waste (Directive 2002/96/EC)

 General warning: read carefully before using the unit (ISO 7010-W001)

 Refer to instruction manual / booklet (ISO 7010-M002)

 Fragile

 This End Up

 Keep Dry

 Temperature range

 Air pressure range

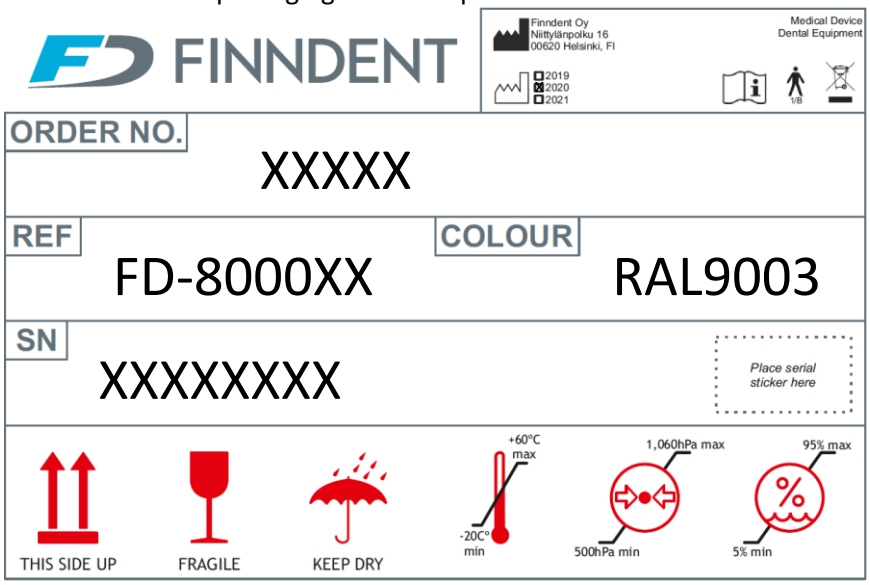
 Relative humidity range

Symbols for the control panel are described on separate paragraphs.

Labels on Unit:

Water In – the connection from the water mains
Air In – the connection from the hygienic air supply
To Drain – the fluid that goes to the public sewer
Air Pressure – main air pressure regulator
Water Pressure – main water pressure regulator
Bottle Select – to use water from the bottle, turn valve toward Bottle Select (left side)
Main Water Select – to use water from the main water, turn valve toward Main Water Select (down)
Glass Fill – the valve to adjust the flow rate of the glass fill
Suction – the high-volume suction tube
To Amalgam – the suction hoses output to the amalgam separator
-/+ – Flow rate increase or decrease

Transportation conditions are on the packaging. For example:



3 WARNINGS AND SAFETY

3.1 General Warnings

Do not modify this equipment without authorization of the manufacturer.

Only service personnel authorized by Finndent are allowed to carry out repairs and annual maintenance. Repairs and maintenance performed by unauthorized technicians will carry no warranty.

Do not use the unit and chair where there is a risk of causing a fire or explosion; e.g., in the presence of flammable liquids, gasses or dust.

This product contains moving parts. Be careful when using it in close contact with other moving devices.

If the unit has been in an environment outside the allowable operating temperature and humidity, it must be allowed to return to operating temperature and humidity before installation or use.

3.2 Electrical Warnings

Turning the unit off with the building circuit breaker disconnects the live mains voltage from all components. The building circuit breaker should be equipped with a locking device to prevent accidentally turning the power on.

WARNING: To avoid the risk of electrical shock, this equipment must only be connected to a supply main with protective earth.

Turning the unit off with the main power switch disconnects the live mains voltage from all components.

This unit contains live mains voltage parts. Disconnect the live mains voltage before opening the unit transformer box or servicing the chair positioning motors.

The patient must not be in contact with instruments while being resuscitated with a defibrillator.

The unit should always be connected through a leakage current detector.

This unit and chair contain only 24 V transformers.

Connections to protective earth are made with green and yellow cables and marked with the symbol ⏚.

Circuit boards may be damaged by static electricity. When handling PCBS, it is recommended to wear wrist grounding straps and store the PCB in an anti-static bag.

EMC requirements must be considered when installing the unit. The unit can interfere with other devices due to its EMC characteristics. The device can be affected by other devices due to its EMC characteristics. Do not install the unit in close contact with sensitive devices or devices that create high levels of electromagnetic disturbance. It may be necessary to take mitigating measures, such as relocating or shielding the location.

Dental units can be affected by mobile telephones and radio-frequency communication devices. For that reason, do not use mobile telephones when using the device.

Using 3rd party electrical components may increase electrical emissions or decrease immunity. Use only authorised Finndent parts and accessories. The use of other accessories will result in non-compliance.

3.3 Air, Water, Suction Warnings

National regulations concerning dental water must be followed (for example, EN 1717 for water supply installations, ISO 11144 for connections for supply and waste lines and EN 12056-1 for sewage installations).

National regulations concerning dental air must be followed (for example, EN 7494-2 for dental equipment water and air supply).

A shut-off valve must be mounted on each unit. **Always close the water supply when the unit is not in use.**

3.4 Safety Switches

Safety switches may not be disabled or removed.

The dental unit and chair are fitted with several automatic safety switches. Safety switches may not be disabled or removed. The safety switches are located in the following places:

Chair motion limit switches
Rotating cuspidor limit switch
Chair seat frame
Unit Door Safety Switch
Suction arm limit switch

4 TECHNICAL SPECIFICATION

Manufacturer

FINNDENT Oy, Niittylänpolku 16, 00620 Helsinki, Finland
Phone: +358 20 743 5115, *www.finndent.com*

Electrical Protection Class / Grade

Unit: Class I Type B
Chair: Class I Type B

Operational Safety Grade

The unit is not suitable for use in an oxygen rich environment in which the concentration of oxygen is greater than 25 % in normal operation conditions, including mixtures of inflammable anesthesia, oxygen or laughing gas and air.

Protection Against Fluids (Standard EN 60529 +A1 Degrees of protection provided by enclosures)

IPX1 for foot control

Backflow Prevention (Standard EN 1717 Protection against pollution of potable water in water installations and general requirements of devices to prevent pollution by backflow)

Category 4. The prevention device on the main water line is in conformance with liquids class 4.
The unit does not include separate Backflow Prevention.

Operating Conditions

	Temperature Ranges	Relative Humidity Range (no condensation)	Atmospheric Pressure
Operating Conditions:	15 – 40 ºC	20 – 75 %	80 kPa – 110 kPa (0.8 bar – 1.1 bar)
Storage Conditions:	0 – 50 ºC	20 – 75 % + Keep Dry	70 kPa – 110 kPa (0.7 bar – 1.1 bar)
Transportation Conditions:	-20 – +60 ºC	5 – 95 % + Keep Dry	70 kPa – 110 kPa (0.7 bar – 1.1 bar)

Table 1: Allowable Temperature and Humidity Ranges

Electrical Features

Supply Power:	230 V / 50 Hz or 60 Hz
Unit power consumption:	500 W
Chair power consumption:	700 W
Unit + Chair power consumption:	1200 W
Main fuse F3 (PCB):	T3.15AL250V (T3.15A slow blow fuse)
Main fuse F4 (unit + chair):	T6,3AL250V (T6,3A slow blow fuse)
Main chair fuse:	T5AL250V (T5A slow blow fuse)
Breaking capacity	35 A BC
Volt-amperes of unit only	460 VA

The power supply cord is non-detachable and may only be replaced by a technician. Power supply cord instructions are in Chapter 5.2 Supply Requirements.

Mode of Operation

Unit: Continuous operation.
Chair: Non-Continuous operation.
Suggested cycle time in normal use:
25 s motors ON / 400 s motors OFF.
Cycle to overheat at 25 ºC and 90 kg load:
600 s motors on / 240 s motors OFF.
Chair motors are equipped with an automatically re-setting thermal fuse. If the chair overheats, all motion will stop until the motors cool and the fuse re-sets.

Water Connection

Pressure range:	2 – 6 bar (200 – 600 kPa)
Flow Rate:	≤ 5 l/minute maximum consumption
Quality:	particle size < 10 µm
Hose Connector Size:	25 mm

Water lines are always GREEN or CLEAR/WHITE.

Compressed Air Supply

Pressure range:	6 – 8 bar (600 – 800 kPa)
Flow Rate:	≥ 55 l/minute maximum consumption
Quality:	dry, oil-free and hygienically clean (medical grade)
Hose Connector Size:	25 mm

Hygienic air lines are always blue.

The turbine air return line is red in the instrument bridge and black in the unit.

Suction Connection

Vacuum range:	150 – 170 mbar (less than 200 mbar) (15 – 17 kPa)
Flow Rate:	≥ 250 l/minute maximum at the point of connection to the unit
Hose Connector Size:	32 mm

Drain Connection

Capacity:	10 l/minute minimum
Hose Connector Size:	32 mm

Load Capacity

FD-3600 Patient Chair:	150 kg
FD-5000 Patient Chair:	200 kg
Instrument Tray:	1 kg

Colour

White painted parts and plastics are RAL 9003 Signal White.
Upholstery colour is the client's own choice. Please contact your local dealer for information.

Minimum Computer Requirements

Windows operating system
USB ports

Installation and Disassembly

The dental unit and chair must be installed by a technician authorized by Finndent.

4.1 Disposal of Waste

Finndent products have been designed and manufactured to be as safe as possible. Any waste materials must be recycled or disposed of in an environmentally friendly manner according to national regulations.

Hazardous materials requiring special waste collection must be disposed of in accordance with national waste and environmental regulations.

When handling waste materials, all precautions must be taken to reduce the associated risks.

When the chair and unit reach the end of their service life, return them to your dealer for disposal.

Contact your local dealer or national governmental agency for more specific information.

Description	Main Materials	Recycle	Waste Disposal	Special Waste Collection
Unit and chair frames	Aluminium Galvanized steel	X X		
Chair covers	PUR	X		
Electronics, PCBs, motors	Copper Steel Other	X X		X – EC directive 2002/96
Rubber			X	
Glass		X		
Amalgam separator	Mercury, bio waste			X
Battery (for the clock)				X – See EC directive 2006/66/EEC
Cleaning products	Chemicals			X
Oil collector	Chemicals			X
Packaging	Wood Cardboard Paper Foam padding Other plastics	X X X X	 X 	
Other accessories	See OEM Product Documentation	-	-	-

Table 2: Guideline for waste disposal

4.2 EMC Guidance

Finndent units are made to be used in an electromagnetic environment where radiated disturbances are controlled. These instructions will not cover all possible cases.

WARNING: Only Finndent approved spare parts, accessories and cables may be used with Finndent units. Use of any other parts may result in an increase or decrease of electromagnetic emissions.

This dental unit and patient chair should not be used adjacent to/stacked with other equipment. If stacking or adjacent use to other equipment is unavoidable, this dental unit and patient chair must be observed for normal function prior to use.

Guidance and manufacturer's declaration – electromagnetic emissions		
FD-8000 dental units and patient chairs are intended for use in the electromagnetic environment specified below. The customer or the user of the FD-8000 dental unit and patient chair is responsible for it being used in such an environment.		
Emissions test	**Compliance**	**Electromagnetic environment – guidance**
RF missions CISPR 11	Group 1	The FD-8000 dental unit 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 missions CISPR 11	Class B	The FD-8000 dental unit is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supplies power for buildings, which is used for domestic purposes.
Harmonic emissions IEC 6100-3-2	Class A	
Voltage fluctuations / flicker emissions IEC 61000-3-3	Complies	

Table 3: Guidance and manufacturer's declaration – electromagnetic emissions

Guidance and manufacturer's declaration – electromagnetic immunity			
FD-8000 dental units and patient chairs are intended for use in the electromagnetic environment specified below. The customer or the user of the FD-8000 dental unit and patient chair should make sure 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	± 2 kV line(s) to line(s) ± 1 kV line(s) to earth	± 2 kV line(s) to line(s) ± 1 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 FD-8000 dental unit and patient chair requires continued operation during power mains interruptions, it is recommended that the FD-8000 dental unit and patient chair be powered from an uninterruptible power supply or a battery.
Power frequency (50/60Hz) 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. The power frequency magnetic field should be measured in the installation location.
NOTE U_T is the a.c. mains voltage prior to application of the test level.			

Table 4: Guidance and Manufacturer's declaration – electromagnetic immunity

Guidance and manufacturer's declaration – electromagnetic immunity			
FD-8000 dental units and patient chairs are intended for use in the electromagnetic environment specified below. The customer or the user of the FD-8000 dental unit and patient chair should make sure that it is used in such an environment.			
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	Portable and mobile RF communications equipment should be used no closer to any part of the FD-8000 dental unit, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. **Recommended separation distance** d=12√P d=12√P 80 MHz to 2,5 GHz d=23√P 800 MHz - 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:
Radiated RF IEC 61000-4-3	3 V/m 80 MHz to 2,5 GHz	3 V/m	
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 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 FD-8000 dental units are used exceeds the applicable RF compliance level above, the FD-8000 dental unit should be observed to verify normal functionality. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocating the FD-8000 dental unit b Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.			

Table 5: Guidance and Manufacturer's declaration – electromagnetic immunity RF

Users can prevent interference between the unit and radio frequency transmitters by keeping the minimum distance shown on the table below, depending on the power of the transmitter:

Recommended separation distances between portable and mobile RF communications equipment and FD-8000 dental unit and patient chair			
The FD-8000 dental unit and patient chair are intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of FD-8000 dental units and patient chairs can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the FD-8000 dental unit and patient chair as recommended below, according to the maximum output power of the communications equipment.			
Rated maximum output power of transmitter W	Separation distance (m) according to frequency of the transmitter		
	150 kHz - 80 MHz d=12√P	80 MHz - 800 MHz d=12√P	800 MHz - 2,5 GHz d=23√P
0,01	0,2	0,2	0,3
0,1	0,4	0,4	0,7
1	1,2	1,2	2,4
10	4	4	8
100	12	12	24
The distance (d) in meters of the transmitters with power missing from the above table can be estimated using the equation for frequency range. P is the maximum nominal power (W) as provided by the manufacturer of the transmitter.			

Table 6: Recommended distances between the dental unit and devices using radio frequencies for communication

5 SITE REQUIREMENTS

The routine service procedures will be explained in this section (where an explanation is needed). For other service instructions and non-routine repairs, see the sections for Electrical, Mechanical and Wet System.

For detailed, step-by-step photo instructions, see the technical bulletins.

For Quint Control software, see the separate software manual.

ALWAYS CHECK THE LOAD BEARING CAPACITY OF THE BUILDING WITH THE ARCHITECT, BUILDER OR DESIGNER OF THE DENTAL CLINIC.
Finndent is not responsible for checking the installation for building code compliance.

RELIEVE THE PRESSURE IN THE WATER LINES BEFORE STARTING INSTALLATION!

ALLOW THE DENTAL EQUIPMENT TO REACH AMBIENT TEMPERATURE AND HUMIDITY BEFORE STARTING THE INSTALLATOIN.
Units may have been frozen or heated during shipping and storage and may be under pressure from heating, have condensation, or have experienced shrinking in the cold.

TURN OFF THE MAIN POWER SUPPLY BEFORE WORKING ON ELECTRONICS, WIRING, OPENING THE TRANSFORMER BOX OR WORKING ON MOVING PARTS!

LOCK THE BUILDING FUSE / CIRCUIT BREAKER IN OFF POSITION BEFORE STARTING WORK.

READ ALL THIRD PARTY INSTRUCTION MANUALS FOR SPECIFIC INSTALLATION INSTRUCTIONS!
Finndent pre-installs many of the accessories. For official third party product information read each product's documentation before using, installing or servicing.

STEP BY STEP INSTRUCTIONS MAY BE FOUND FROM THE FINNDENT DOCUMENTS WEBSITE!
This technical manual assumes that service personnel have been trained by Finndent, are capable of all basic technical skills and can make direct replacements of all parts.
For more detailed and step-by-step photographs of procedures, check the Finndent documents page.

5.1 Building Requirements

The dental clinic must conform to all local building codes, including: IEC 60364-1, VDE 0100-100, IEC 60364-7-710, DIN 18 202.

The total weight of the empty chair and the dental unit is 150 kg with a potential weight of up to 300 kg with a patient mounted. Make sure that the floor can support this weight.

It is the responsibility of the dealer and the building designer/contractor/architect to perform a final analysis of the installation site. This analysis should include the load bearing capacity of the floor and the tensile forces at each bolt location.

The installation bolts provided may not be sufficient. The final site analysis done by the dealer and the building designer/contractor/architect must be done to determine the proper bolt size.

5.1.1 Floor

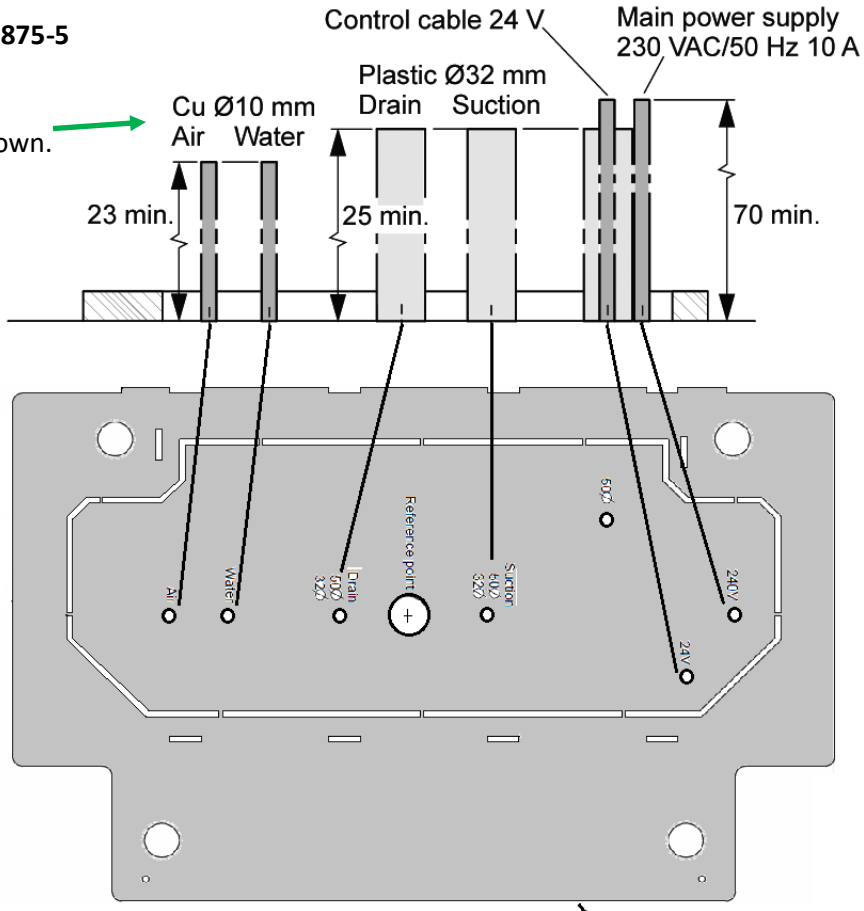
The floor may require addition reinforcement to meet the following requirements for the unit with chair:

The floor surface must be even, level and clean.
Load bearing capacity of 0.74 N/cm^2 (approximately 750 kg/m^2).
Tensile forces of > 1 kN at each floor bolt location must be expected.

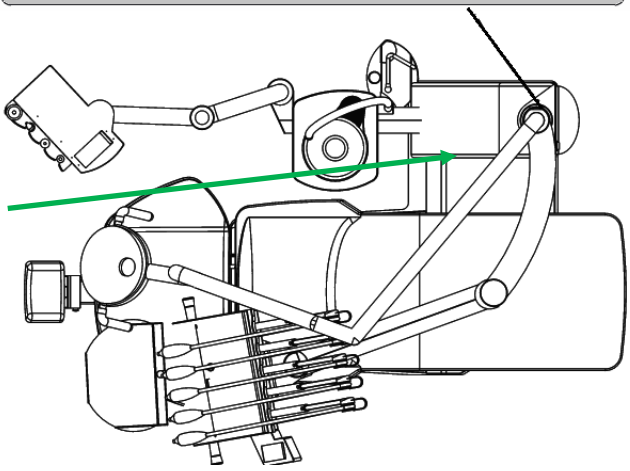
A floor mounting plate may be ordered from Finndent if the quality of floor is in doubt. By using the floor plate there is no need to drill holes to the floor. The floor plate is slightly less stable than a floor-drilled installation.

Unit floor drilling template P/N: 6409875-5

The cable and pipe positions and extra lengths for installation are as shown.



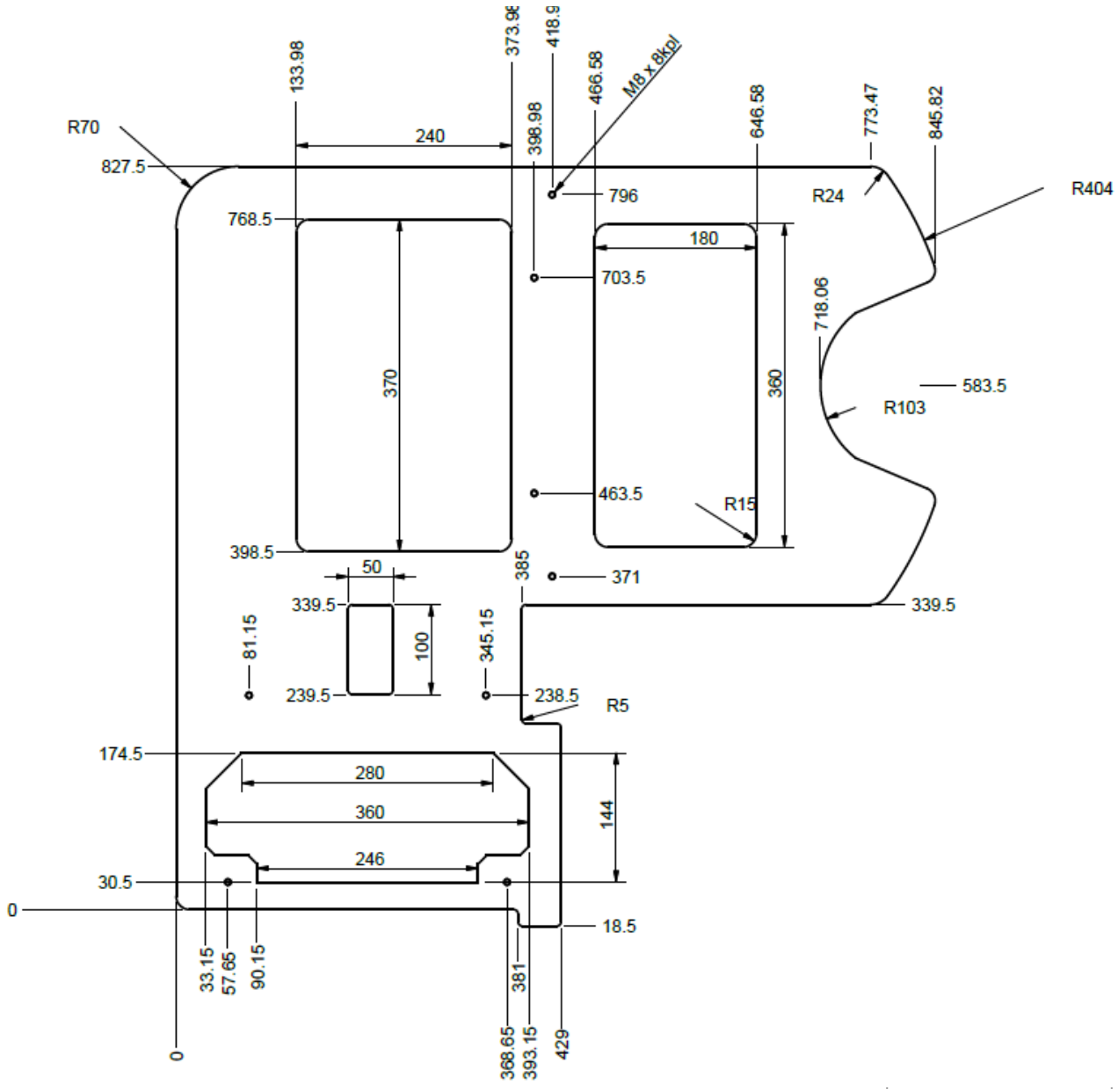
The patient chair power and control cables are connected to the unit via the unit floor box or from under the floor.



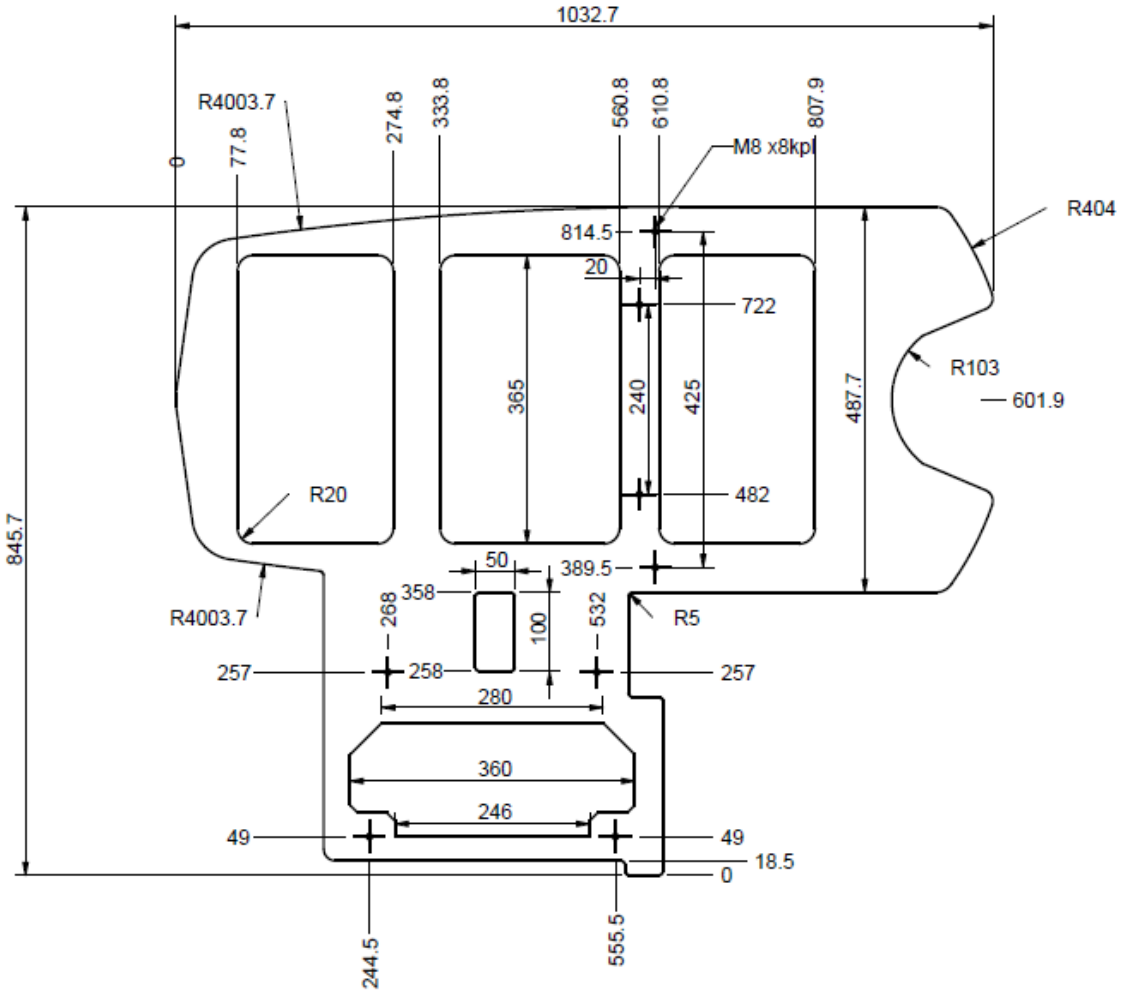
Optional floor mounting plates

There are 4 styles of floor mounting plates:

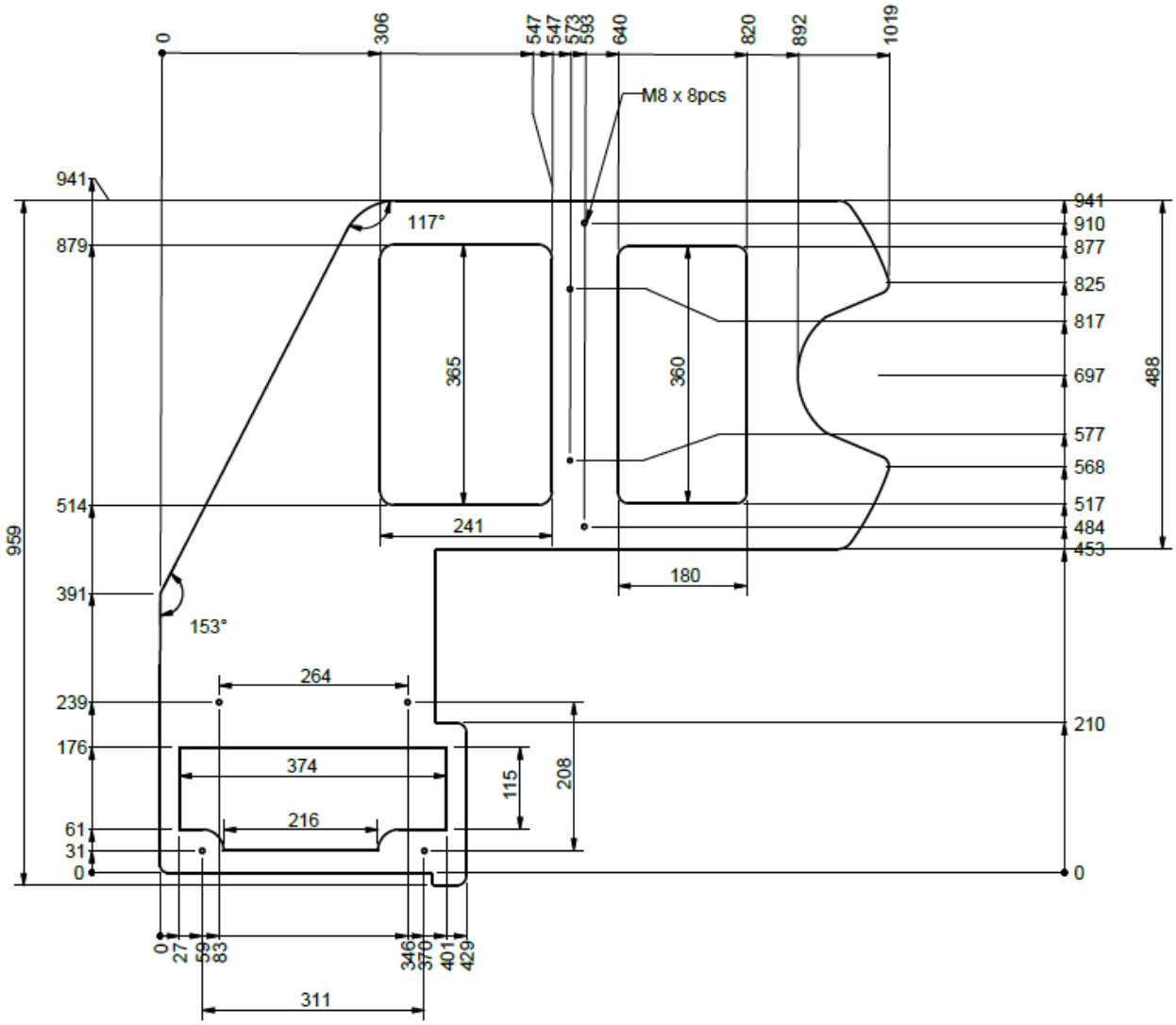
1. 6409880: FD-8000B+/x with glass cuspidor and patient chair



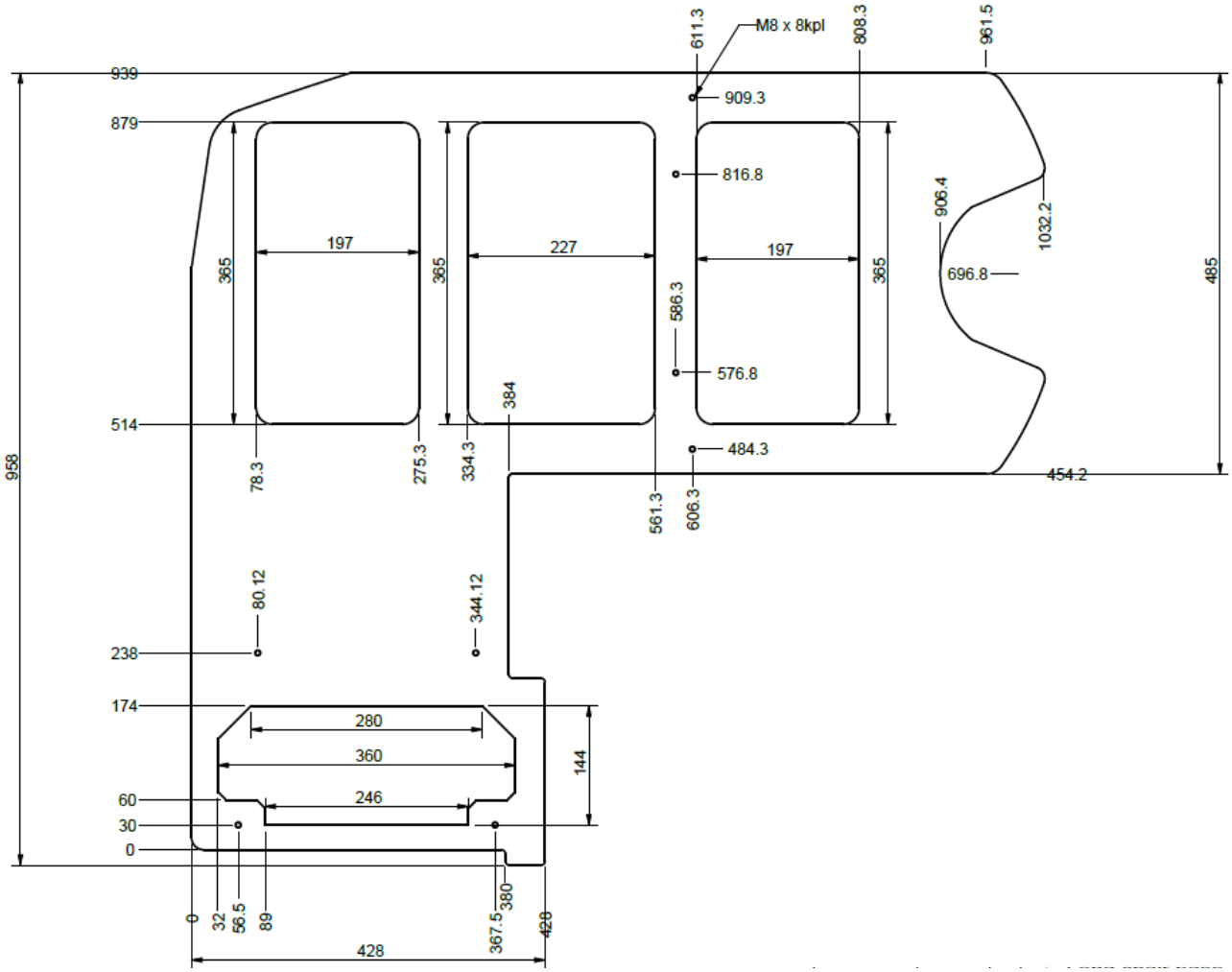
2. 6409885: FD-8000B+/x with glass cuspidor and chair mounted suction system (extended chair base)



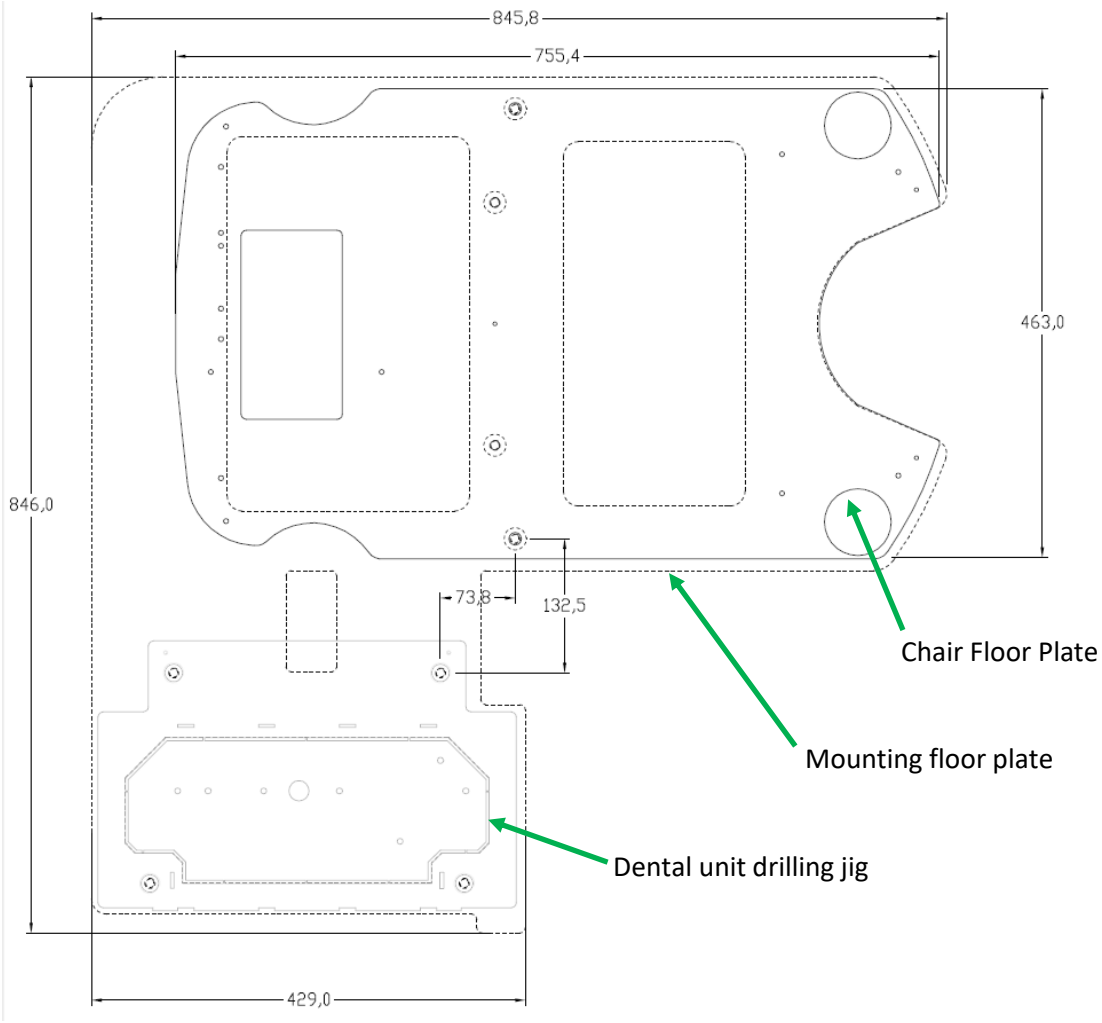
3. 6409870: FD-8000B with ceramic cuspidor and patient chair



4. 6409865: FD-8000B with ceramic cuspidor and chair mounted suction system (extended chair base)



The following example shows the FD-8000B+/x with glass cuspidor and patient chair:



5.2 Supply Requirements

Before the dental equipment is installed, check the installation positions with the dentist.
Use the floor unit jig to drill the holes for water, air and electrical supplies.
Check the technical specification for all minimum-maximum requirements.

The dental clinic must conform to all local building codes.

It is the responsibility of the dealer and the building designer/contractor/architect to perform a final analysis of the installation site supply requirements. This analysis should include all clinic air, water, suction and drain requirements.

Only the Finndent product requirements are given in this instruction.

Compressed air
The compressed air must be dry, oil free and hygienically clean. The air compressor must be fitted with an air dryer and/or a condensation valve.

Water
The water supply must be equipped with a non-return valve and a vacuum valve in accordance with the standard EN 1717 (also known as Backflow Protection).

If the dental unit is installed in an area where the water quality is poor, the water may cause problems such as:

- Premature clogging of filters.
- Rapid clogging of the small diameter water tubes and instruments.

If the water hardness is 12º d.H (German hardness = 2.15 mmol) or above, install a water softener. Set the blending hardness to 8º d.H (1.43 mmol). If the water contains particles larger than 20 µm (0.02 mm), install a fine filter.

Power supply
The power supply cord is non-detachable and may only be replaced by a technician.

The power supply cord must comply with 60601-1 8.11.3 requirements and all local electrical codes including:

- use a minimum of 1 mm^2 wires
- rubber sheathed/insulated
- strain-relieved
- installed so that the insulation remains in tact
- protected against excessive bending
- securely installed to prevent failure

For the patient's safety, the building main power supply must be equipped with a quick-closing 300 µA fault leakage current protection device.

The building power supply is the primary means of power isolation. It must have a lock-out device, so that the power can be locked in the OFF position during maintenance.

A lock out device clamps on to the switch and a keyed lock is used to prevent the clamp from being opened.

Examples of a lock-out device are:

Floor unit: It is advisable to install a few extra conduits in the electrical conduit system under the floor in case the dentist would like to change unit positions later.

5.3. Pre-Cleaning of Air and Water Lines

Dirt and debris from construction can get in the lines and can damage the dental unit and instruments.

Before installation, rinse the water lines and blow clean air through the air lines for 30 seconds. Cover open lines to prevent dirt from entering.

6 UNPACKING PRODUCTS

6.1 Inspection

Before opening the packages, inspect the outside for damage and check that the G-meter sensor is not blasted.

Allow the packages to reach the ambient temperature of the dental office before installation.

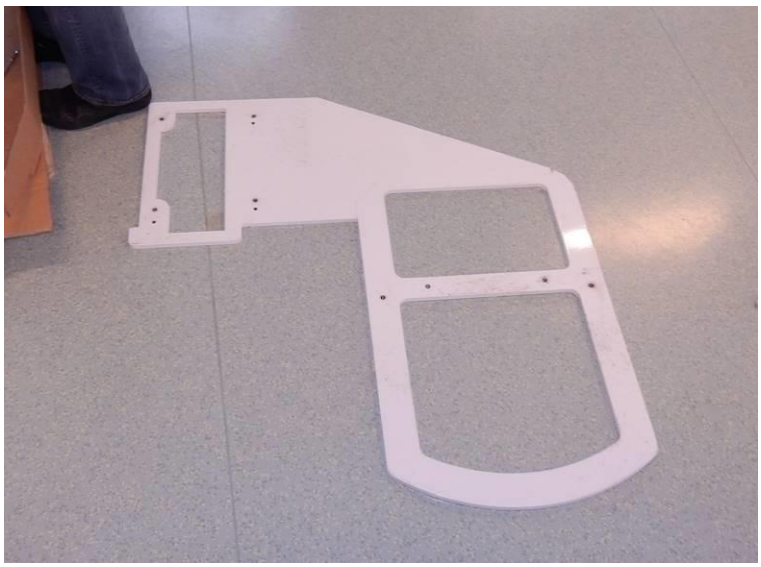
If a package is damaged and G-sensor is blasted, take photographs and make a report before the delivery truck leaves. This may help with any shipping claims if parts inside are damaged.

6.2 Unpacking

Items may have shifted during transportation. Be careful when opening and removing items.
Re-use packaging when possible.

Dental units and patient chairs are packed in separate pallet boxes.

If a floor plate has been ordered, place the plate on the floor in the installation location.



This is the floor plate for a right-handed unit installation. The unit is on the left. The patient chair is on the right.

6.2.1 Floor Unit Pallet

Remove the loose items from the pallet box that may fall when the pallet box sides are removed:

- Unit floor plate
- Faro lamp
- Extra padding
- Trays, etc.

Then remove the pallet box and lift out the instrument bridge, boxes and floor plate.

Place the parts on the floor and on top of their packaging to prevent paint damage.

The FD-8000B+/x models come with the cuspidor and unit door installed. It may be easier to grab the unit if the unit door is removed. Press the drawer slides to release the door and slide it off the unit.

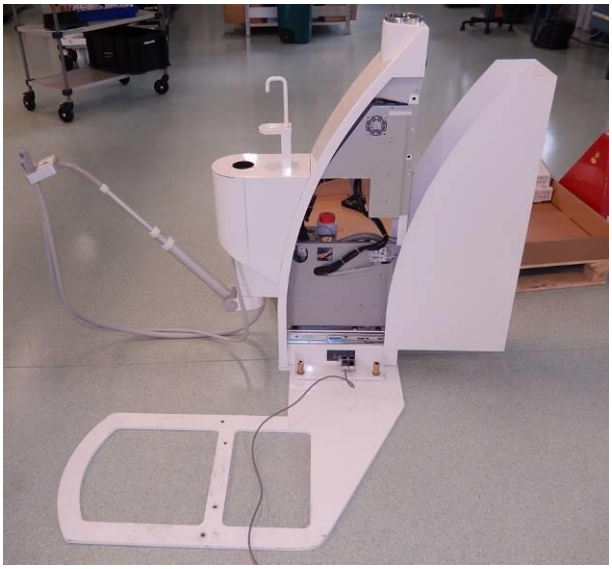
To move the unit, hold the unit frame and tilt the entire unit upright. Then hold the frame and lift it off the pallet.

Do not attempt to lift heavy items alone!

Check that the moving parts (unit door, suction arm, instrument arm) are secure before lifting.

In general, lift items by their solid frame and not by moving parts or attached accessories.

The floor unit is in place.



Align the unit door and place it on the drawer slides. Push the door to “click” it in place.

6.2.2 Patient Chair Pallet

Lift the pallet box away and lift out:

Seat and armrest upholstery
Floor cover
Chair mounted suction parts (optional)
Front cover

The accessories, paperwork and other small parts are located under the footrest and can be left there until they are needed for installation.

Unscrew the chair base from the pallet and slide chair off the pallet.

Do not attempt to lift heavy items alone!
The patient chair can be moved near to the location while on the pallet and carefully slid on to the floor.
When sliding, it is recommended to grab the chair by its fixed arm rests and back rest.

When lifting the chair, check that moving parts are secure before lifting.
Lift the chair by holding from the seat frame / chair body.
Do not lift from the armrests, headrest or footrest.

Reuse or recycle packaging materials according to national regulations.

6.3 Weights and Packaging

Finndent patient chairs are shipped in one pallet box. Finndent dental units are shipped in one pallet box. Dental stools are packaged in separate cardboard boxes. Dental lamps may be packed inside one of the pallet boxes, shipped on top of one or shipped individually.

Products are wrapped in lightweight packaging materials that do not add significant weight to the product.

When possible, re-use the packaging materials.

Heavier packaging items are listed below.

Item	Weight (kg)	Dimensions for shipping (cm, approx.)
FD-8000B+/x Dental unit (complete unit with cuspidor Compact)	60	118 x 80 x 100
FD-8000P+/x Dental Unit (complete unit)	40	-
FD-8000B+/x Dental unit (floor frame only)	28	22 x 44 x 116.5
FD-8000P+/x Dental Unit (mounting box)	20	24 x 24 x 30
FD-8000P+/x Dental Unit Transformer and fluids boxes	18	-
FD-3600 Patient Chair	115	110 x 66 x 95
FD-5000 Patient Chair	120	110 x 66 x 95
8000+/x whip arm instrument bridge (not including handpieces)	6	45 x 40 x 15
8000+/x hanging hose instrument bridge (excluding handpieces)	8	48 x 42 x 25
Instrument arm (floor mounted model horizontal arm)	8	90 x 35 x 25
Instrument arm (ceiling vertical column and horizontal arm)	12	-
Cuspidor Compact (PLUS) with telescopic suction arm	11	40 x 20 x 85
Patient chair cover	3	75 x 51 x 34
Patient chair upholstery	5	105 x 52 x 12
Work stool (min-max height and base diameter)	7	(50-120) x 60 dia.
Accessories box (empty)	1	58 x 38 x 30
Accessories box (full)	7	58 x 38 x 30
Wooden pallet	11	120 x 80 x 15
Pallet box (heavy cardboard)	10	118 x 80 x 86
Work stool box (empty)	2	50 x 50 x 25
Faro Dental Light (min-max weights, max length)	8-12	40 x 38 x 120 max
17” Neovo monitor (in original packaging)	8	50 x 48 x 24

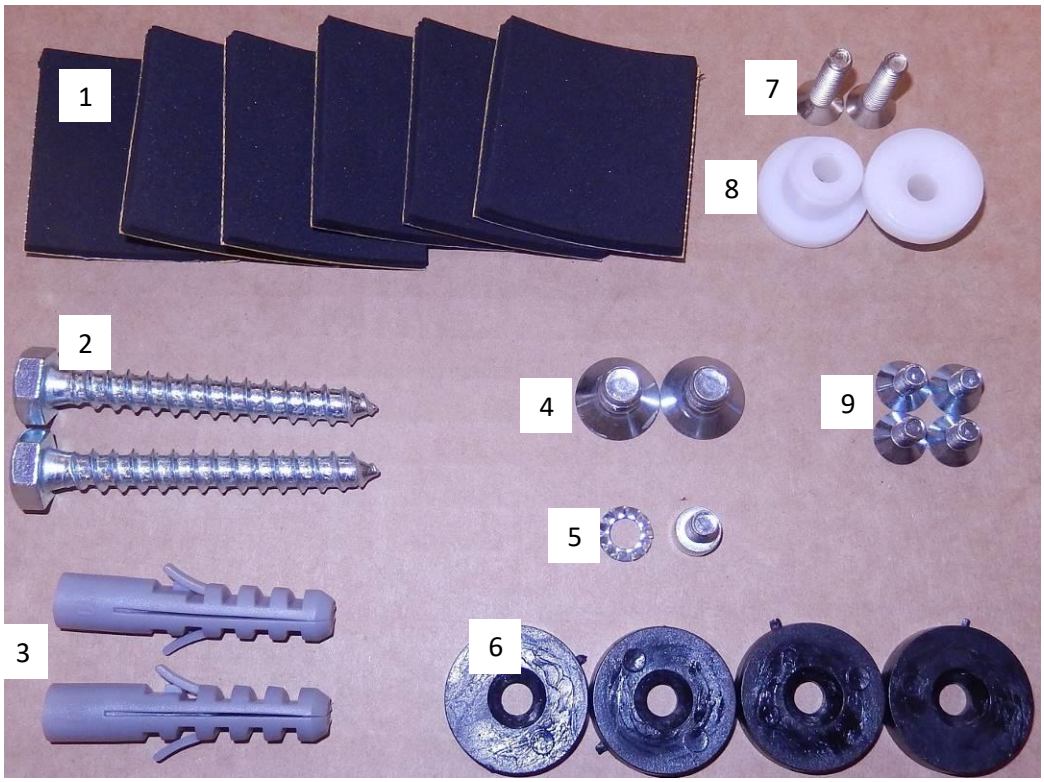
7 INSTALLATION

7.1 Installation Hardware Bags

After the unit and chair are unpacked, locate the installation hardware as described below.

The chair hardware is in the accessories bag in the chair seat.

7.1.1 FD-3600 Accessories Bag – Standard

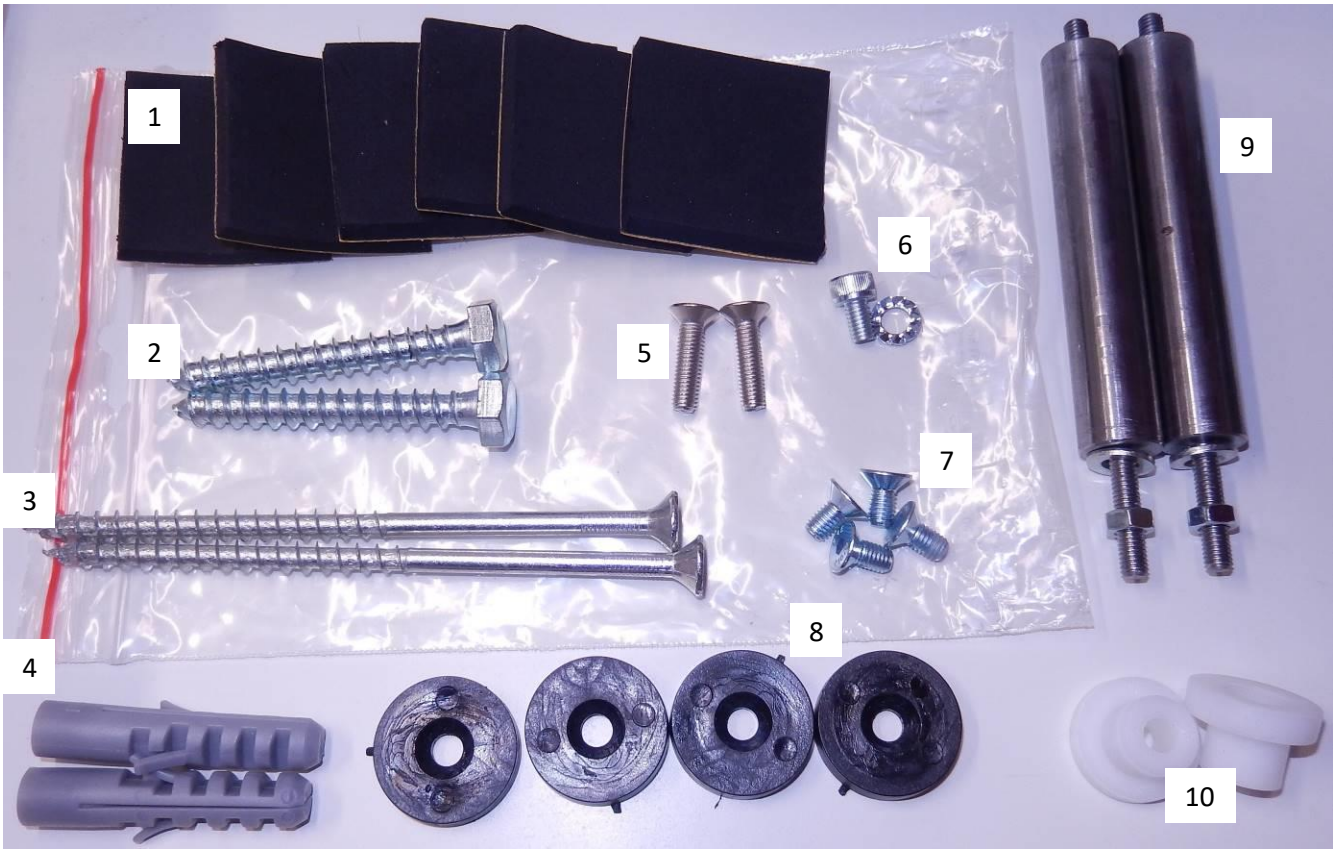


The standard FD-3600 chair installation hardware bag contains:

1. 6 x foam damping pads
2. 2 x installation bolts (requires a 13 mm socket wrench) **
3. 2 x alligator plugs **
4. 2 x 8 mm screws
5. 1 x 6 mm chair cover grounding screw and washer
6. 4 x black plastic damping washers
7. 2 x 12 mm screws for footrest sliders
8. 2 x foot rest sliders
9. 4 x 6 mm screws

The installation bolt type may vary depending on the floor type, or if a floor plate is used. Metal floor plates require flat bottom machine screws and washers.

7.1.2 FD-5000 Accessories Bag – Standard



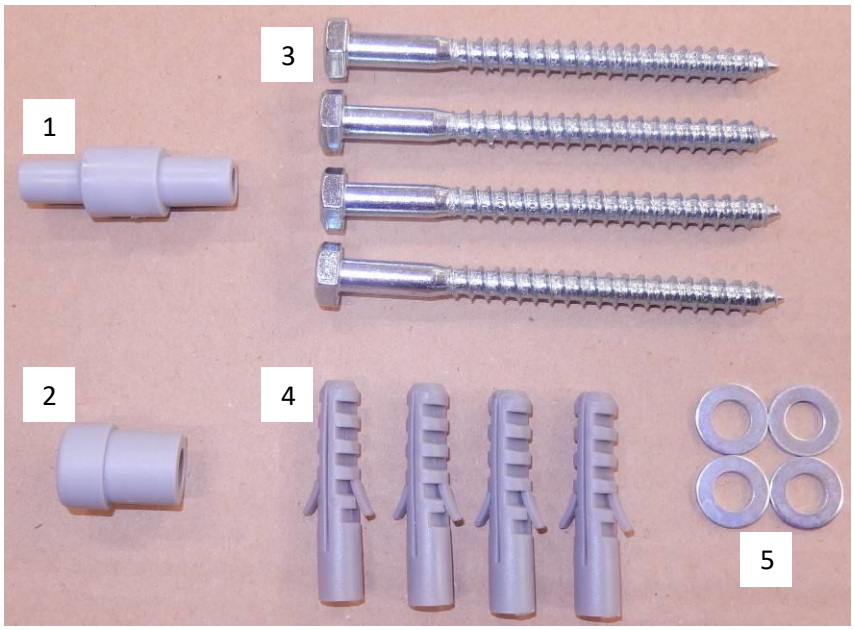
The standard FD-5000 chair installation hardware bag contains:

1. 6 x foam damping pads
2. 2 x installation bolts (require a 13 mm socket wrench) **
3. 2 x front upholstery screws
4. 2 x alligator plugs
5. 2 x 12 mm screws for footrest sliders
6. 1 x 6 mm chair cover grounding screw and washer
7. 4 x 6 mm screws
8. 4 x black plastic damping washers
9. 2 x back upholstery posts
10. 2 x foot rest sliders

The installation bolt type may vary depending on the floor type or if a floor plate is used. Metal floor plates require flat bottom machine screws and washers.

7.1.3 FD-8000B+/x Unit Hardware – Standard

Unit hardware is packaged in the accessories box that is shipped in the pallet.



The unit installation hardware bag contains:

1. 1 x suction adapter
2. 1 x suction adapter
3. 4 x floor installation bolts (require a 13 mm socket wrench) **
4. 4 x alligator plugs
5. 4 x washers

The installation bolt type may vary depending on the floor type or if a floor plate is used. Metal floor plates require flat bottom machine screws and washers.

7.1.4 Accessories Box – Standard

The Finndent branded box in the pallet contains the instrument tray, floor box, supply bottles, handpieces, unit hardware, accompanying documents, unit foot control, unit door handle, unit arm collar, and any other small items ordered with the unit.

Open this box so the items are easy to access during installation.

7.2 Patient Chair Installation

This section shows how to bolt the patient chair to the floor, run the cables and put the base covers on.
For electrical installation of the chair to the dental unit, See 7.3 Installation of the Floor Unit.

7.2.1 Damping Pads

Tilt the chair up and place the 6 foam damping pads on the floor or stick them to the base of the chair. They should be spaced evenly around the chair base. 4 plastic washers may also be used for damping.

The purpose of the damping pads is to prevent vibration and noise when the metal chair base comes in contact with the floor.

7.2.2 Raise the Patient Chair

The FD-3600 and FD-5000 patient chairs are shipped in the “extreme low” position for stability. The patient chair’s position must be raised slightly to expose the floor bolt holes.

CAUTION: The chair is not bolted to the floor and will be unstable. Do not fully raise the position! Use two people to move and hold the chair!

Power cable

The power cable is connected to the main power plate inside of the chair.

Plug the power cable to a wall socket.

Turn on the patient chair with the power switch.

Use the chair foot controls to raise the chair up.

Turn the power off and disconnect the chair.

Now the floor bolts can be screwed in to the floor or floor plate.

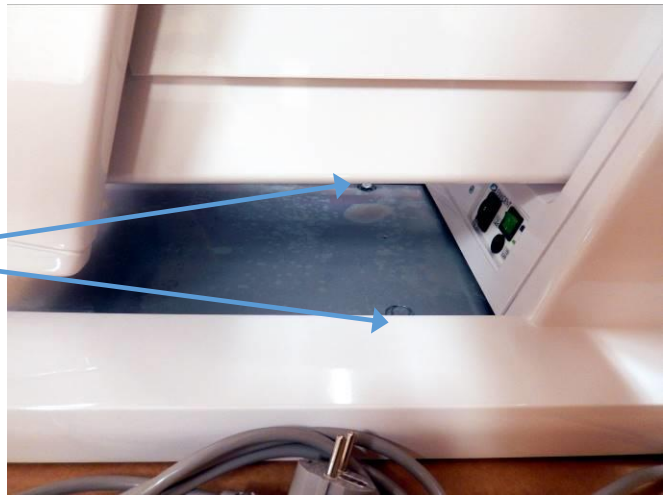
7.2.3 Fixing the Patient Chair in Place

To install directly to the floor:

Put the dental chair and the dental unit in place.
Check the distance between the cuspidor and the patient chair.
Drill a 10 mm x 50 mm hole for the plastic “alligator plugs”. Install the alligator plugs.
Use a 13 mm socket wrench to install the screws through the two centre holes of the chair base.

To install to a floor plate:

Position the chair on the plate and use the machine bolts and washers to secure the chair.

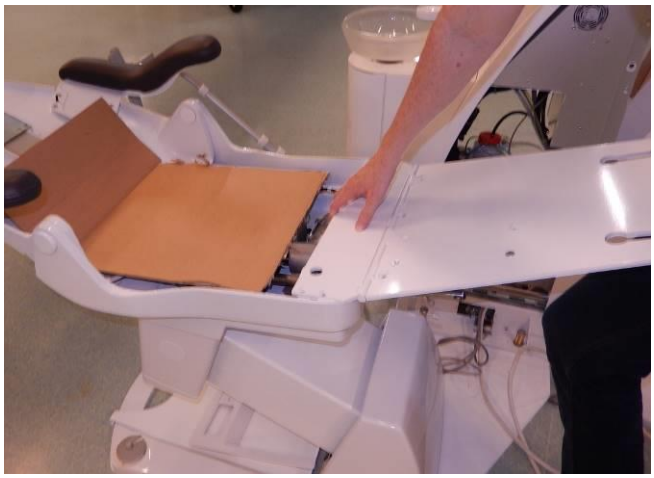


The installation bolts provided may not be sufficient for all floor types. The final site analysis done by the dealer and the building designer/contractor/architect must be done to determine the proper bolt size.

7.2.4 Flip the Footrest

The footrest plate is shipped upside down to reduce package size.

Unscrew the screws using a TX15 torque screwdriver.

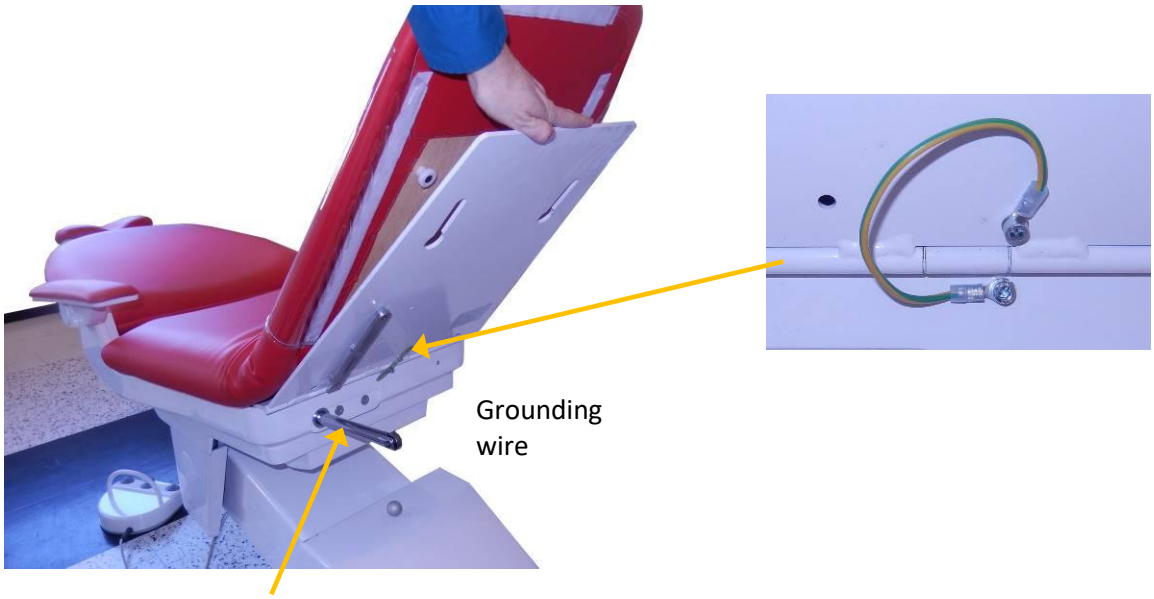


Flip the footrest right side up, so that the plate hangs off of the front of the chair. Screw in place.

7.2.5 Connect the Chair Frame Cover Grounding Wire

Use the screw and lock washer from the installation hardware bag.

Fasten the green/yellow wire to the frame under the foot rest.

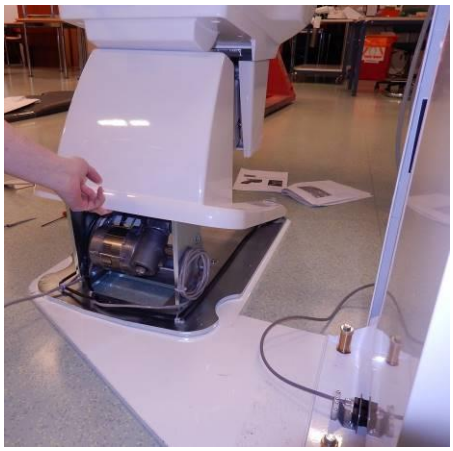


The correct footrest position has the roller and roller guide aligned and type plate on bottom.

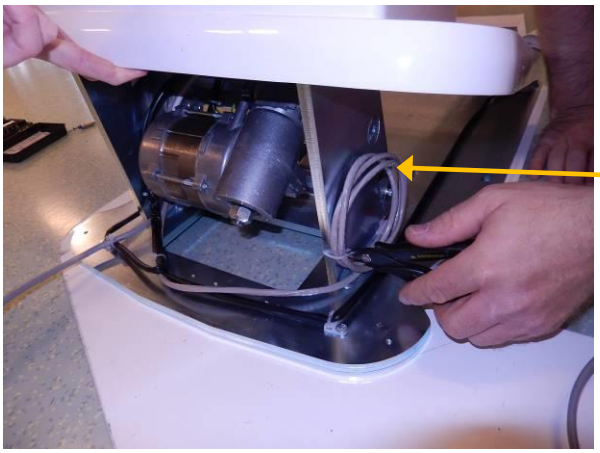
7.2.6 Connect the Chair Cables

To access the communications cable, the chair foot controls and the power cable, the covers must be removed and re-installed.

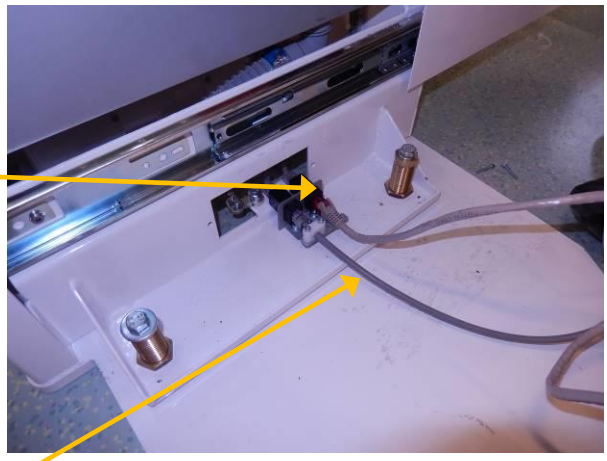
Remove control panel cover
It is held in place with one screw and clips at the top.
TX10 torque screwdriver needed.



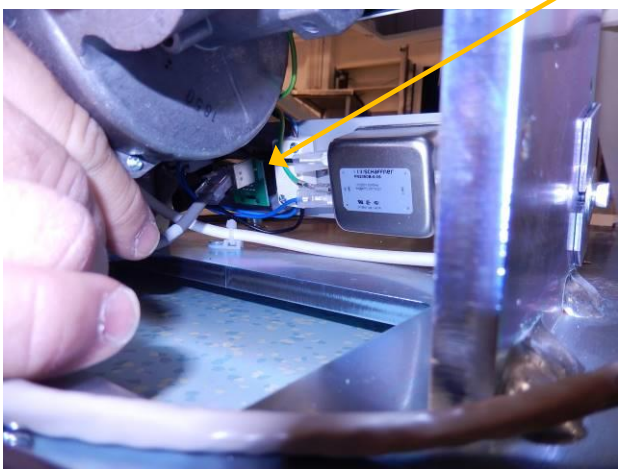
Lift front cover.



Release the communications cable.



Plug the cable the chair power plate (RJ45 connector).



Install the unit foot control cable from the unit base to in to the empty RJ45 connector on the unit base.

Pull the temporary power plug through the unit base.

Depending on the floor, the cables may either go under the floor or under a cable duct.

7.2.7 Install the Chair Covers

Replace base cover. Held in place with two pins located near the foot controls. Lift the cover up to remove it from these pins.

Install centre floor cover.

The middle panel cover is fastened in place by its hooks. If it is to be removed later, the control panel cover needs to be loosened.

The chair may need to be tilted to hook the cover under the base.

Replace control panel cover.

Replace the previously removed TX10 torque screw.

The patient chair is now mechanically installed. See 7.3 Installation of the Floor Unit for electrical installation to the dental unit.

We recommend connecting the patient chair to the dental unit before the upholstery is installed.

When chair covers and upholstery are off, moving parts are exposed.
Turn the patient chair off when testing is not being done.
The technician is responsible for keeping people and tools away from the uncovered chair.

The next section shows how to install the dental unit.

7.3 Installation of the Floor Unit

7.3.1 Bolting the Unit in Place

If using the floor mounting plate:

Place unit onto the plate and use the installation bolts and washers to secure the unit.

To install directly to the floor:

Put the dental chair and the dental unit in place and check the distance between the cuspidor and the patient chair. Mark the unit position.

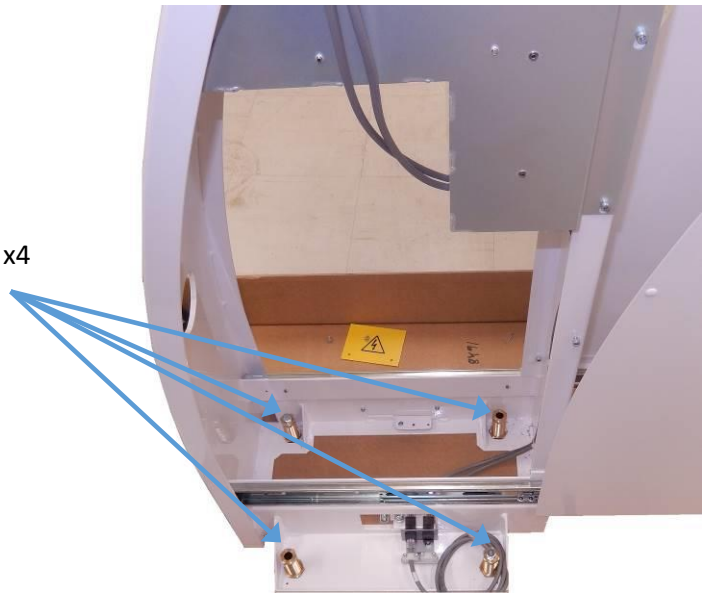
Place the floor jig in the unit position and drill the bolts, electrical, water, air and drain locations.

With the unit in place, drill the fixing holes or, if installing later, mark the positions of the drill holes with a pen.

Drill a 10 mm x 50 mm hole for the plastic “alligator plugs” (in the accessories bag).

Put the plugs in the holes, place the washers and screw in the installation bolts.

Hole locations x4



The dental unit is now stable.
The installation bolts provided may not be sufficient for all floor types. The final site analysis done by the dealer and the building designer/contractor/architect must be done to determine the proper bolt size.

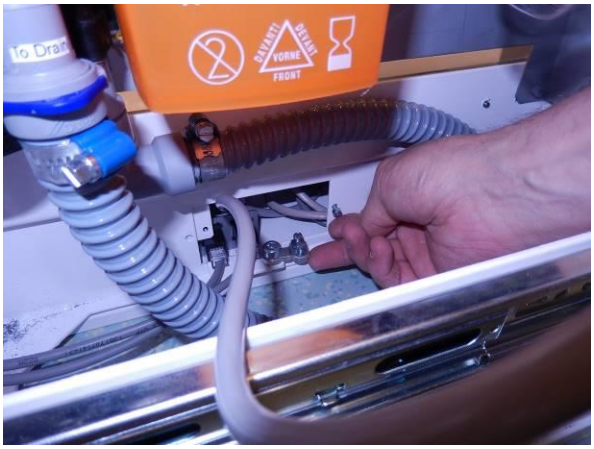
7.3.2 Connect the Protective Earth Cable

The protective earth terminal is on the unit base, next to the two chair communication cable connections. From there, connect protective earth cable to the mains supply. The larger screw uses a 6 mm hex screw driver and the small screws use a flat head screwdriver.

7.3.3 Install the Floor Box

The floor box is shipped in the accessories box.

Place it over the unit base and run the chair cables out through the front hole.



Use the two hex screws to secure the floor box from inside the unit.

7.3.4 Install the Patient Chair Power Cable

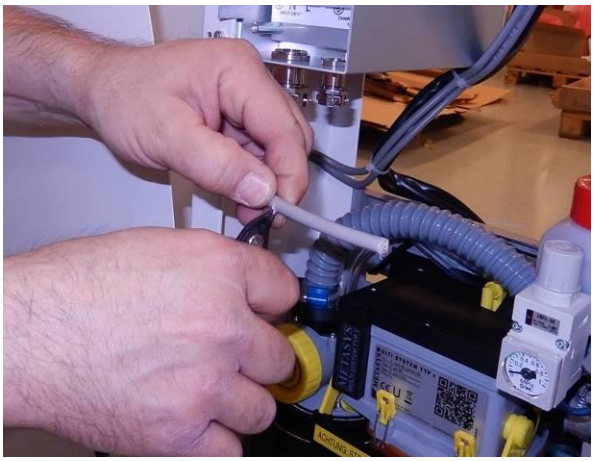
The colours of the power supply cord must be in accordance with IEC60277-1 or IEC60245-1.

Connect the incoming power cable to the left end of the terminal block in the electrical section of the floor box. Connect the yellow-green wire to the protective earth terminal, the blue wire to zero (N), and the brown/black wire to the phase current (L).

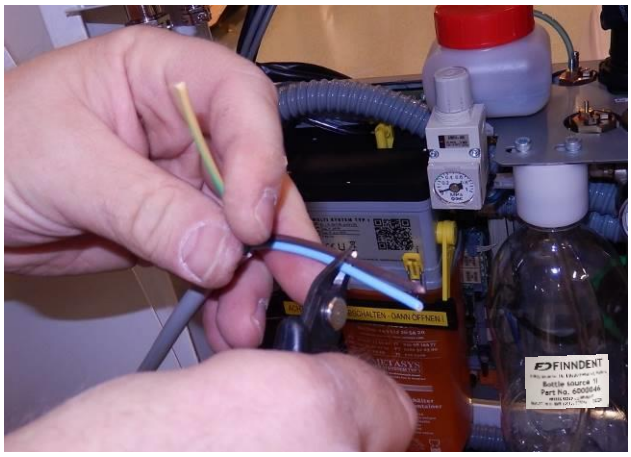
Remove the yellow hazard PVC cover from the transformer box with a 4 mm hex screwdriver.

The power cable from the chair is inside the unit.

Measure the length of cable needed. Cut at this length.



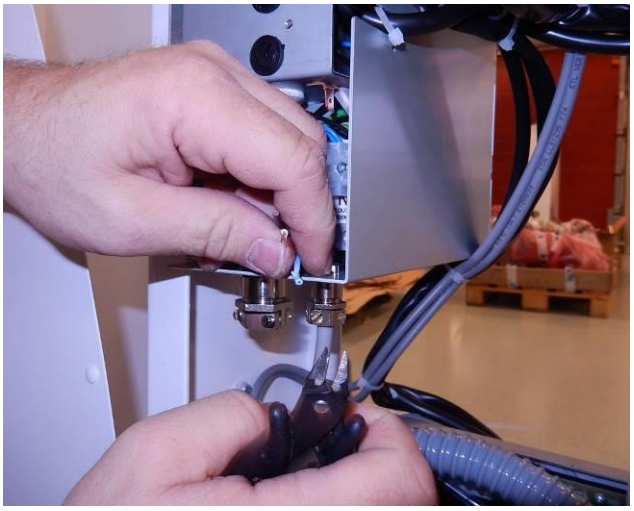
Remove about 5 cm of cable insulation.



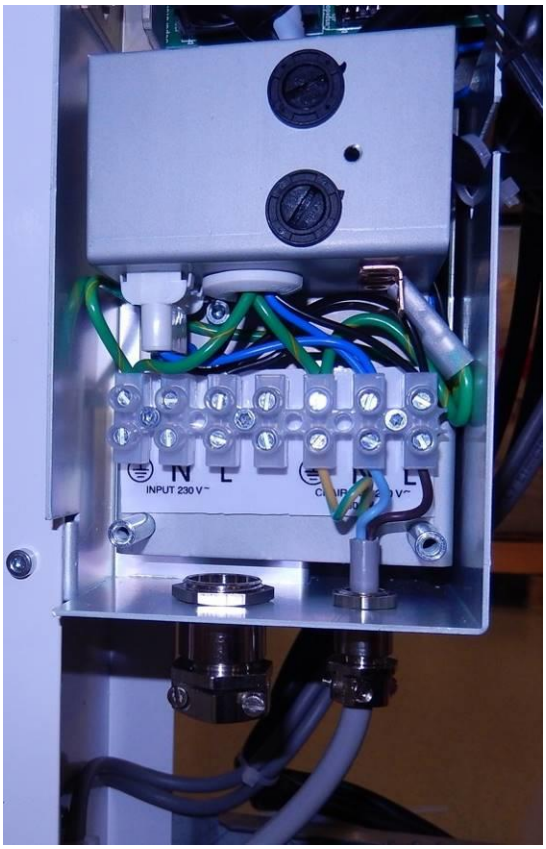
Cut the power/neutral cables 1.5 cm shorter than the protective earth connection.

Do not install the power cables unless the unit is disconnected from the power mains supply (building circuit breaker is turned off).

Push the power cable through the smaller, right side collar of the transformer box.



Remove 9 mm of cable insulation. Attach them to the connector. Tighten the cable collar on the bottom.

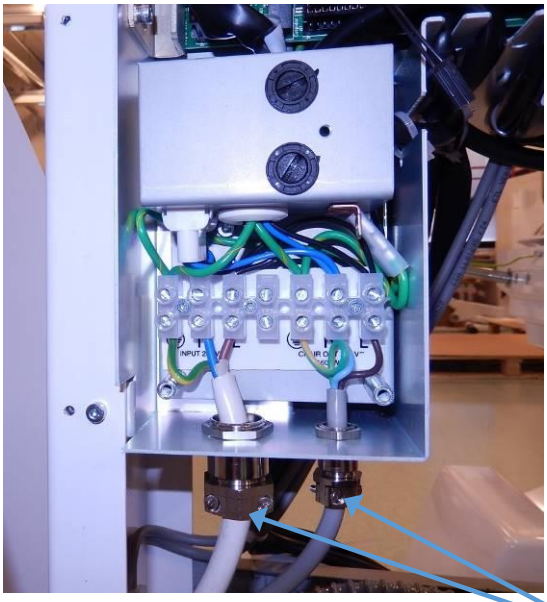


The power cable is installed to green/yellow to earth, blue to N and black to L.

7.3.5 Install the Dental Unit Power Cable

Do not install the mains power cable unless the unit is disconnected from the power mains supply (building circuit breaker is turned off).

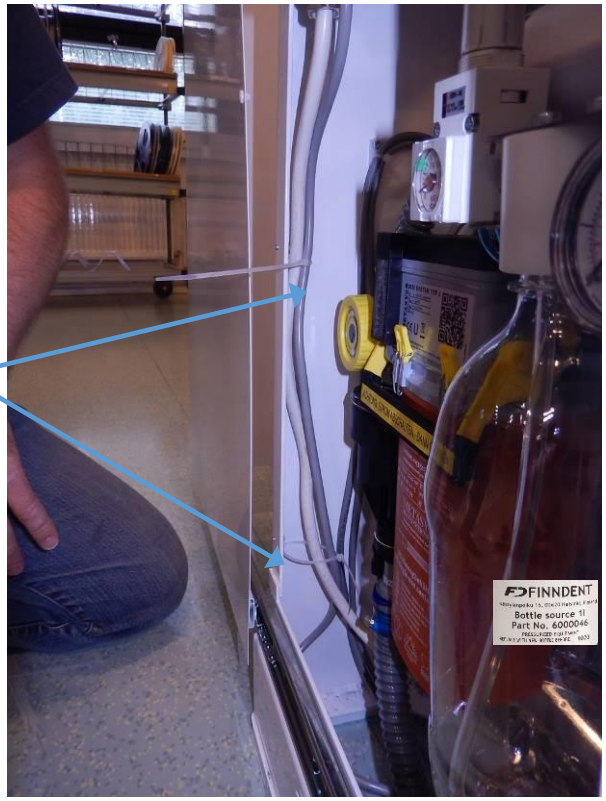
The unit power supply mains is installed in the same method as the patient chair.



The cable is installed on the left side.
Remember to tighten the cable collars on the bottom!

Install the PVC hazard plate over the power cable area.

Zip ties



Secure the power cables to the unit frame with the two plastic mounts and two zip ties.

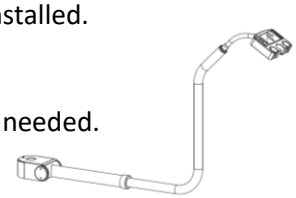
The power is now connected! Make sure the unit is turned off from the main power button on the frame before attempting to continue installation.

Make sure the patient chair power is also off.

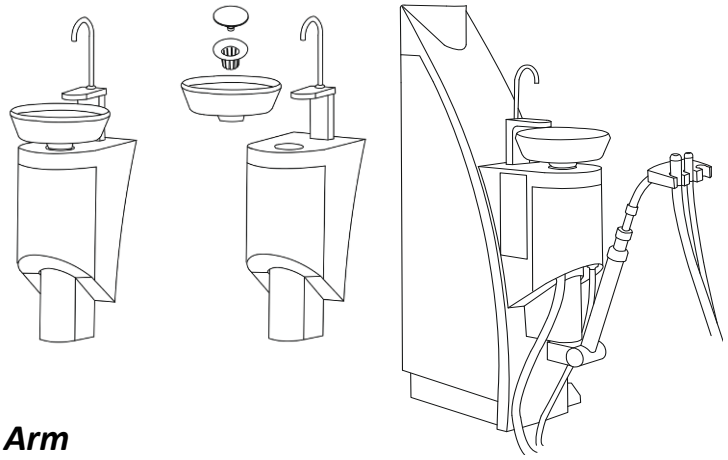
Use a voltmeter to check if unsure.

7.4 Installing the Wet System

The FD-8000+/x comes with the amalgam separator, Cuspidor Compact, telescopic suction arm and suction hoses installed.



No further installation is needed.



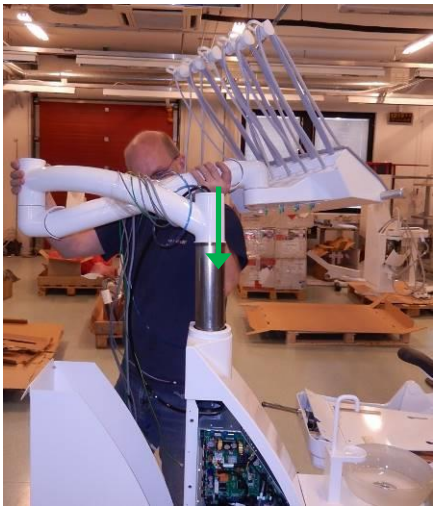
7.5 Installing the Instrument Bridge and Arm

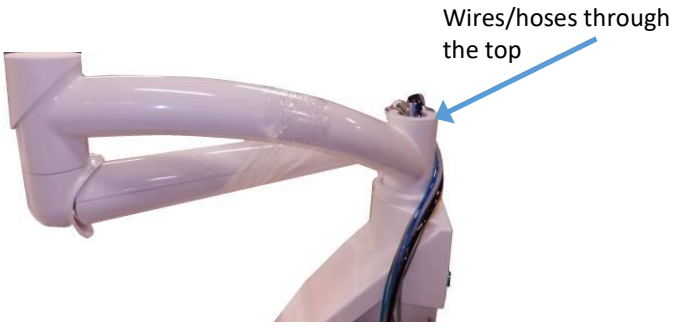
All instrument bridge models are installed in the same way.

Do not attempt to install the instrument bridge before the unit is bolted in place.

It is safest to install the instrument bridge before removing the packaging. This will prevent the arm from swinging and unbalancing during installation.

1. Lift the instrument bridge up and push the post in to the unit.



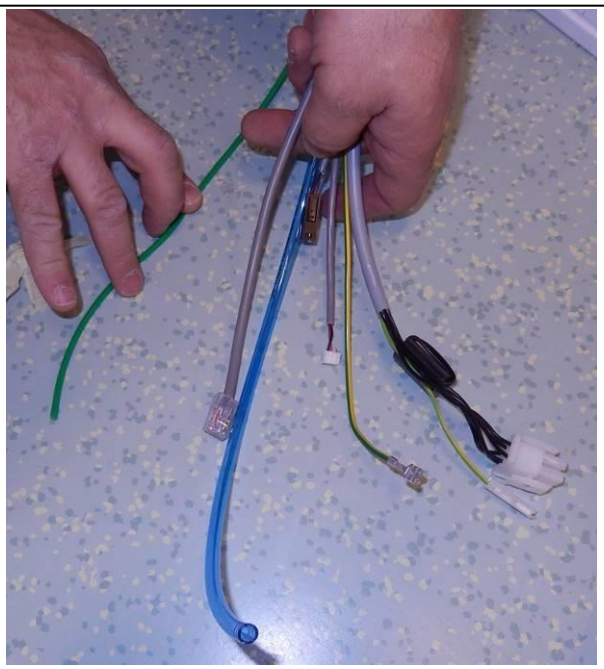


2. Wrap the wires/hoses with electrical tape to make threading them through the unit easier.


NOTE: The instrument arm is shipped with the wires and hoses pulled through the top. This is to protect them when the instrument bridge is pushed in the unit.

3. Thread the wires/hoses through the unit. They will exit under the left side of the transformer box.

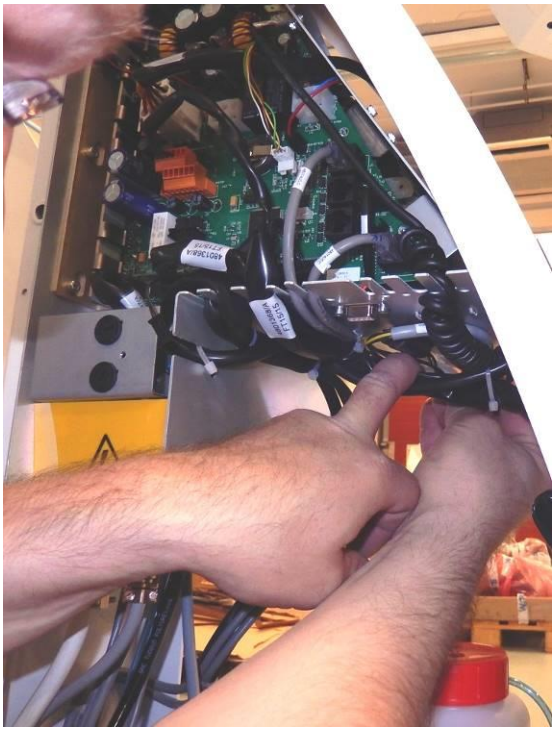

4. Un-tape the wires/hoses.



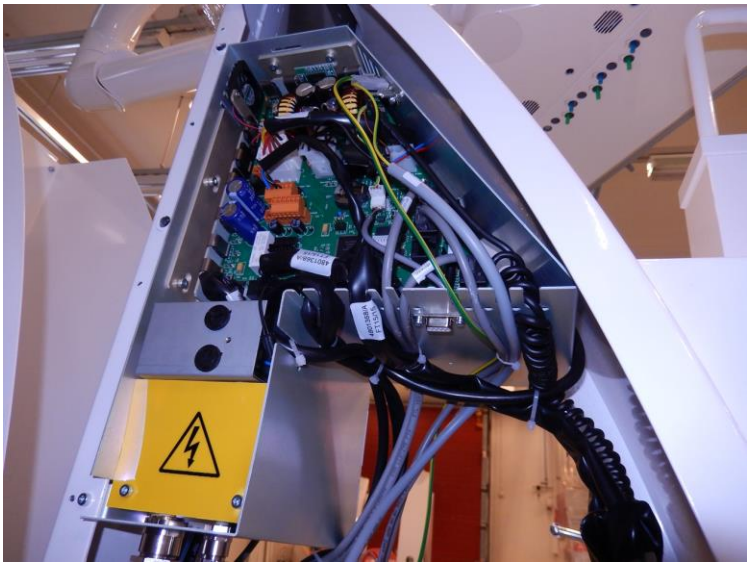
From left to right:

- Water (green).
- Communication CAT5 (to J14).
- Air (blue).
- Can-bus (small white connector, to J25).
- Secondary ground (yellow/green, to top ground place).
- Power and ground (power to J5, centre to middle ground place).
- Not shown – Turbine oil return (6 mm black hose is shorter in length).
- Not shown – Arm safety switch (to J21 output R102, shorter in length, See Step 10).

5. When installing the cables in steps 6-10, thread them up and behind of the black cables in the unit for a neat installation.

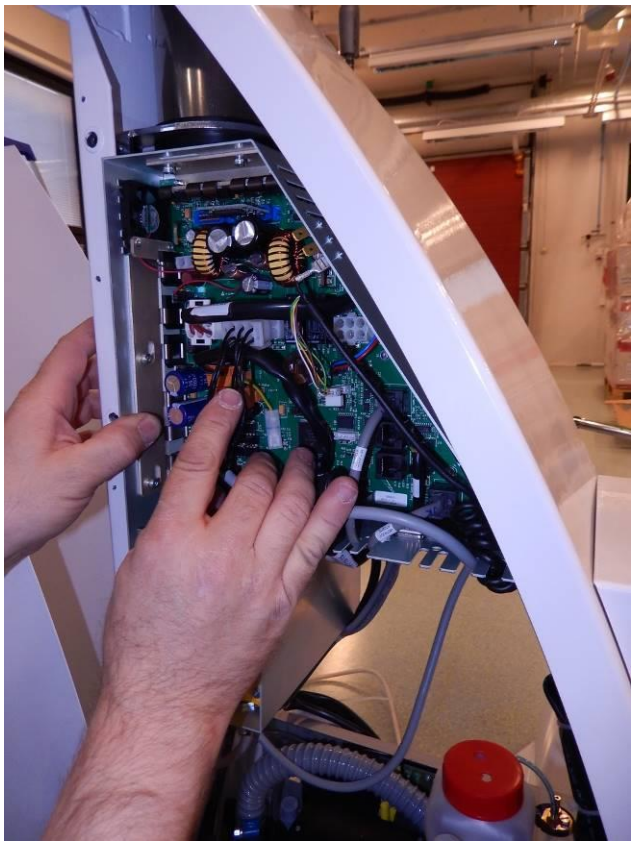


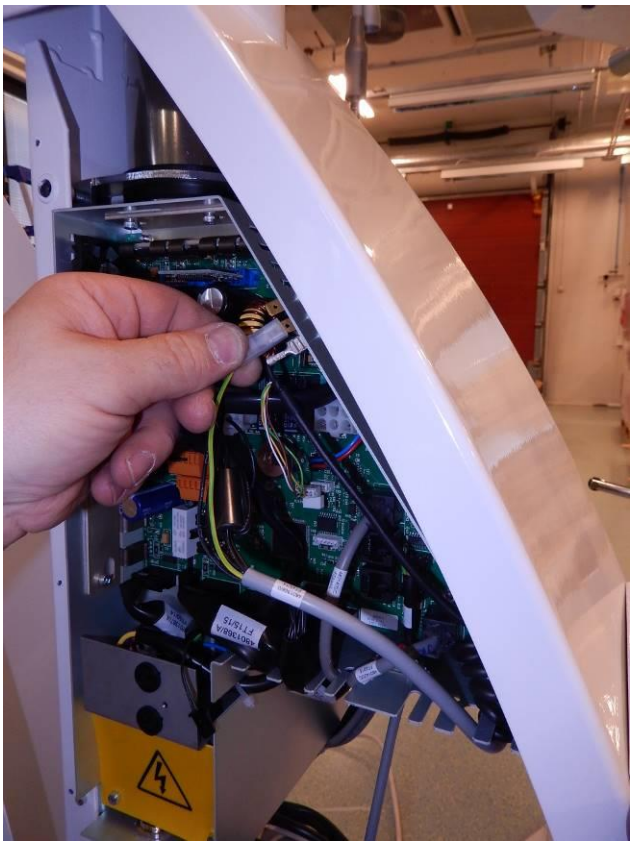
Starting installation.



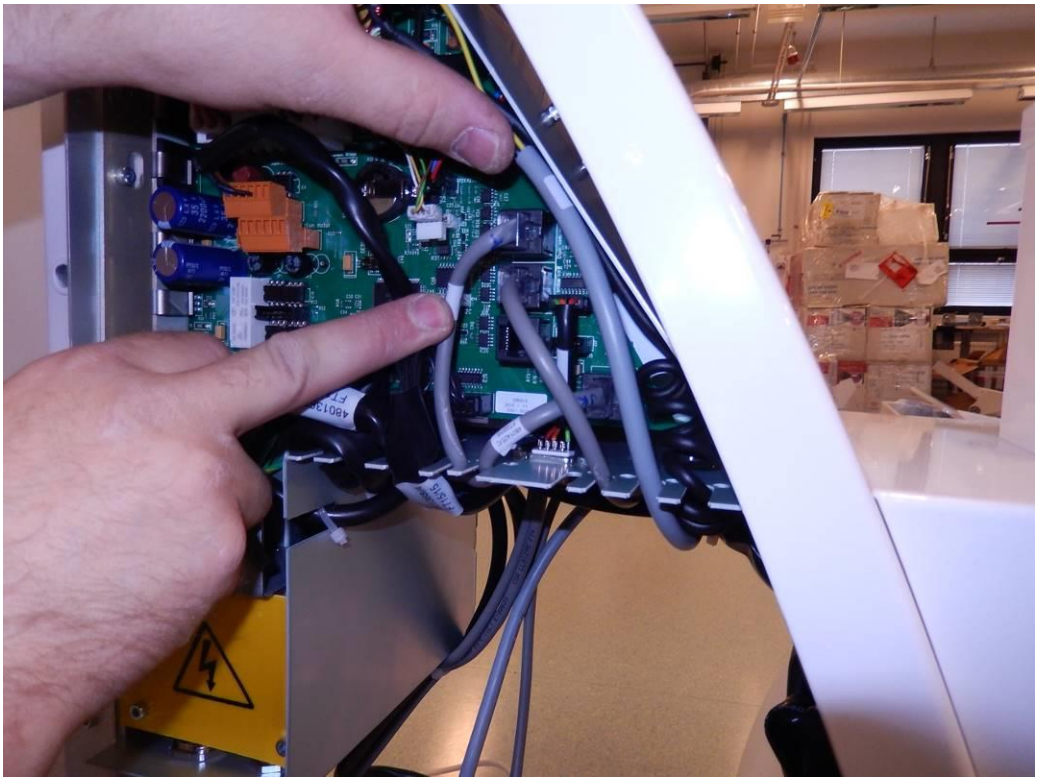
After installation.

6. Install the power to J5 and the protective earth to the centre grounding place.

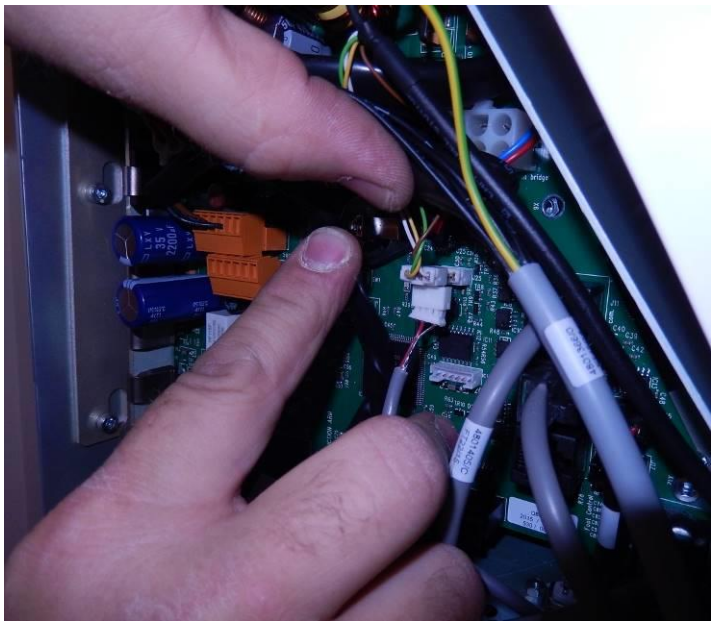




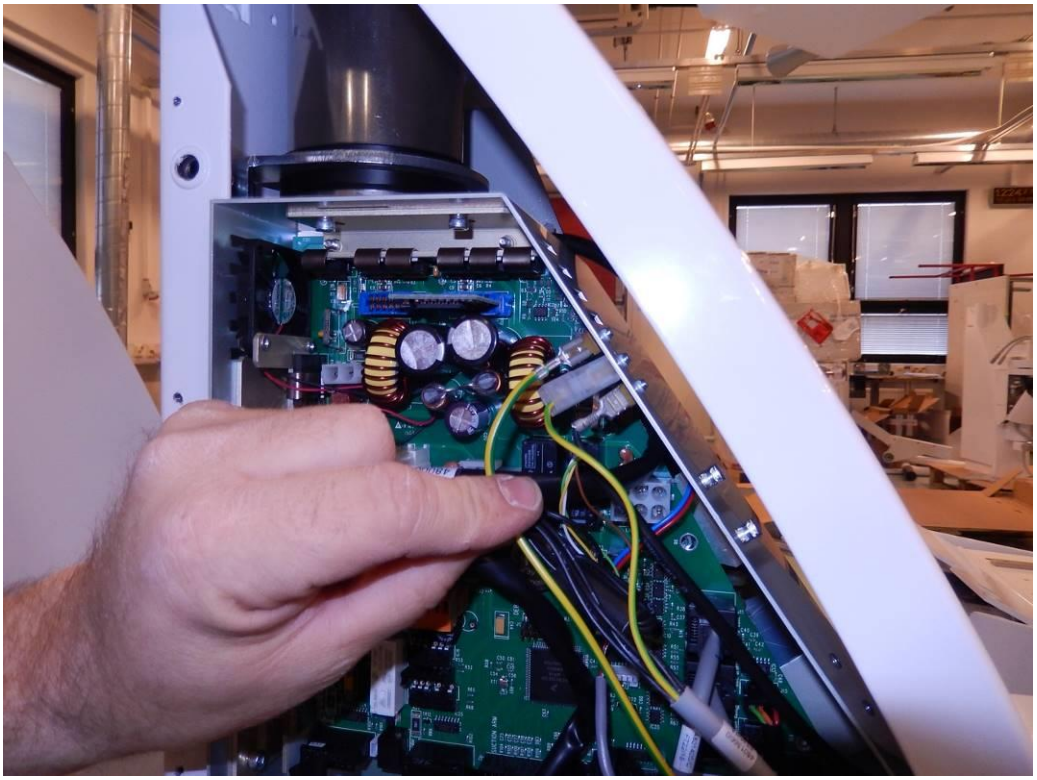
7. Install the communications cable to connector J14.



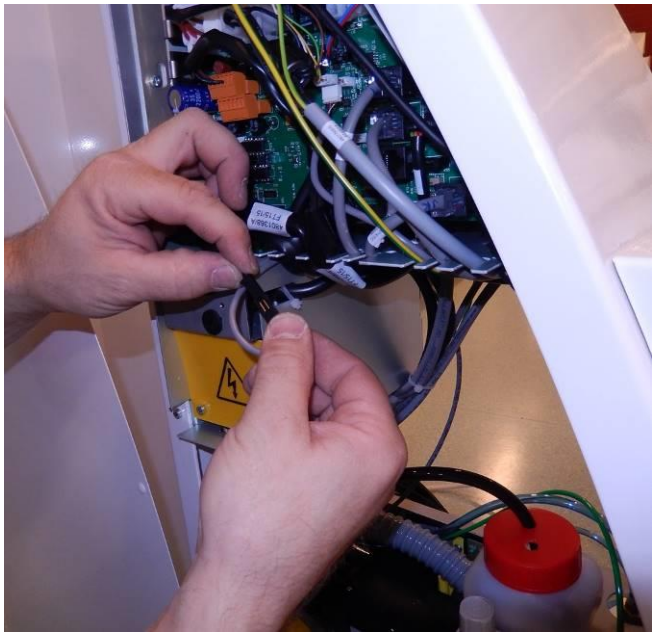
8. Install the CAN-bus cable. Push it up in to connector J25.

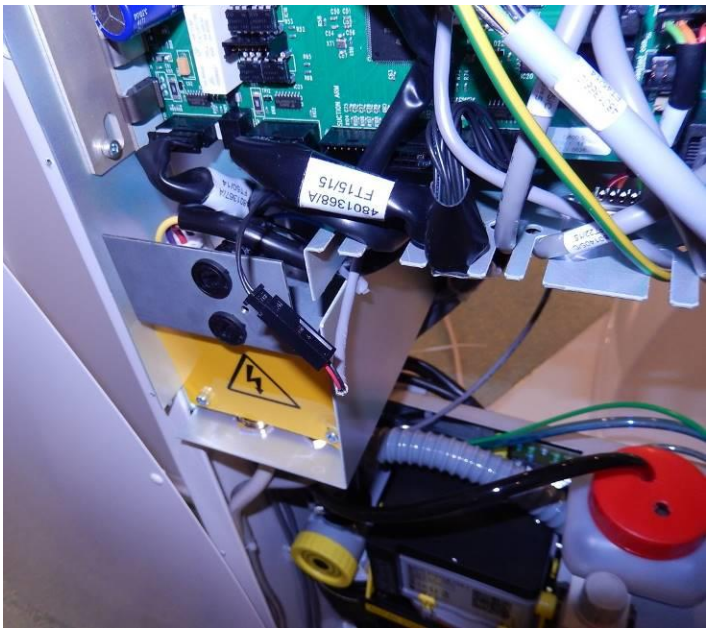


9. Install the secondary protective earth on to the top connector.

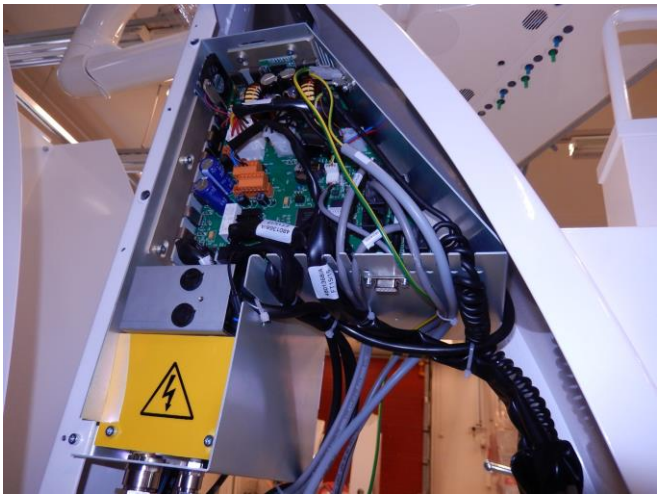


10. Install the arm safety cable to the right side output of J21 (location R102). Once installed, tuck the connector in to the transformer box.

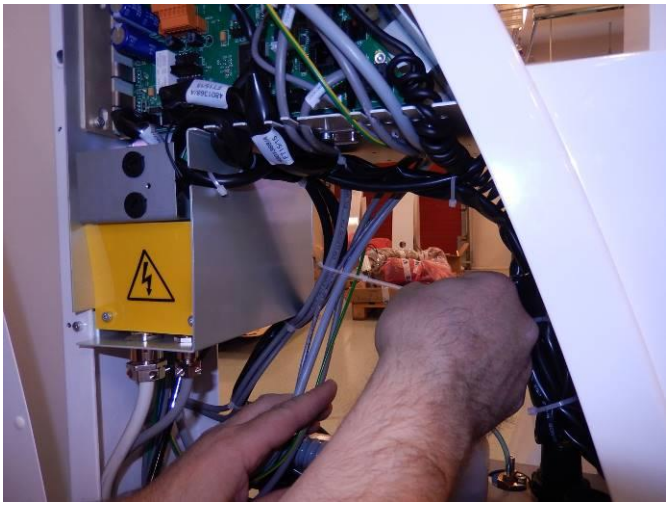




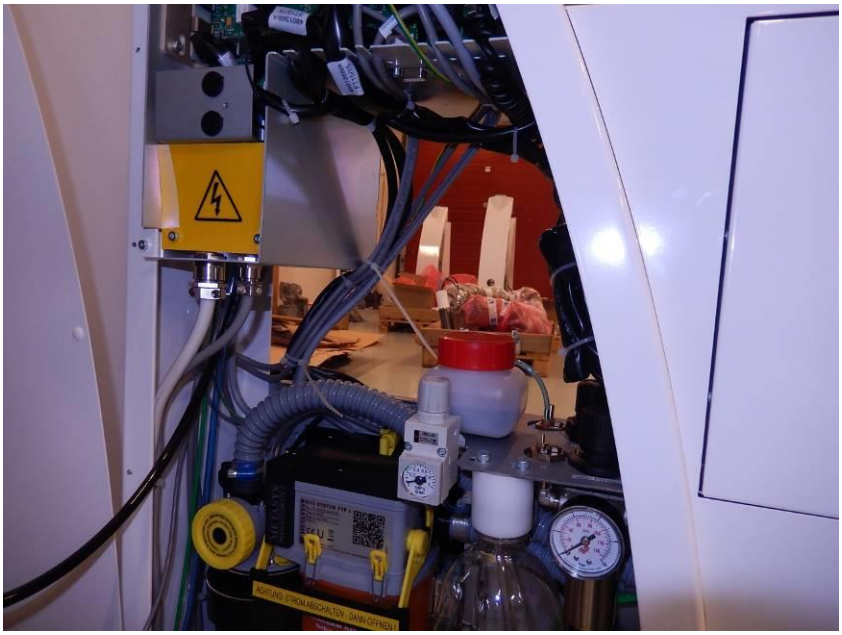
11. Use zip ties to secure all the loose cables in the unit.



Position all the cables in the transformer box slots.



Fasten cables together with zip ties.



Finished cable installation.

NOTE: If this dental unit was ordered with an optional Faro Dental Lamp, See 7.6 Installing the Faro Dental Lamp for installation instructions and install the lamp now.

12. Install the turbine oil hose in to the red container top.

13. Install the green water hose and secure with a zip tie.

14. Install the blue air hose and secure with a zip tie.

15. Close the transformer box cover and screw it in place.

16. Remove the packaging materials from the instrument bridge.

The instrument bridge is now installed.

7.6 Installing the Faro Dental Lamp

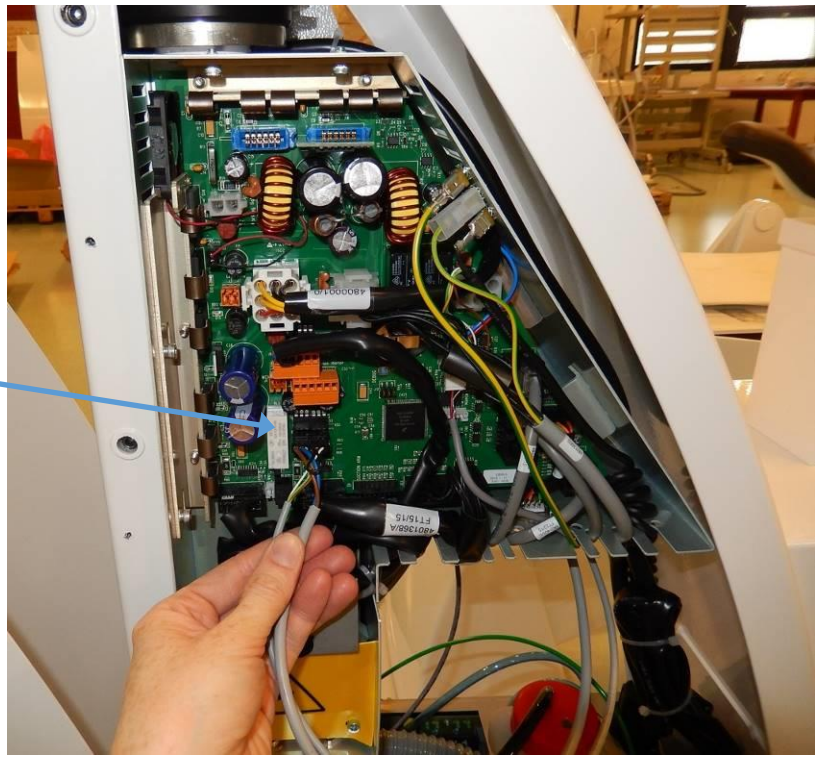
The most common accessory is a LED Faro dental light. The light column slides in to the top hole of the dental unit:

Cables go in first,
Then the light.

The light column fits in to the top of the instrument arm.

Be careful when threading the cables into the unit to keep the connectors from being damaged.

Connect the light cable to the Q800 connector J16.



Remember to install the lamp handles and save the instructions.

Read the Faro instructions before installation.

7.7 Installing the Instrument Hoses and Supports

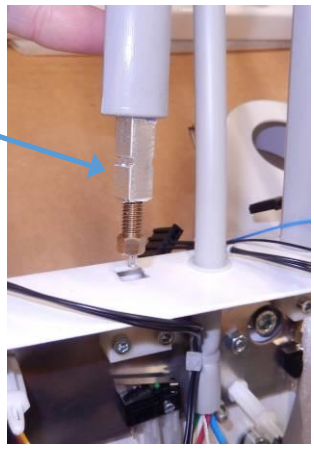
Instruments are always in places 1 to 5 (or 6), starting from the left side. The handpieces, whip arms and holders (for hanging hoses) are in the accessories box.

7.7.1 Hanging Hose Holders

The hanging hose holders slide on to the instrument bridge.

7.7.2 Whip Arms

The whip arms are numbered 1-6, starting from the left of the instrument bridge. Align the flat side of the post to the front and the cut-outs to the side.



Push the whip arm in. Run the instrument hose through the roller.

7.7.3 Instruments

Each instrument has a unique supply connection.

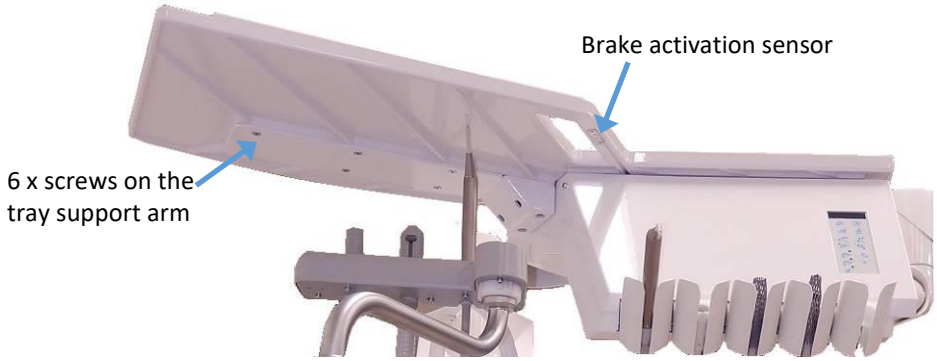
Check the instructions for each handpiece before installing on to the hoses.

7.8 Installing Instrument Trays

The instrument trays are shipped ready to install. The smaller whip arm tray is found in the accessories box. Instrument tray maximum load is 1 kg.

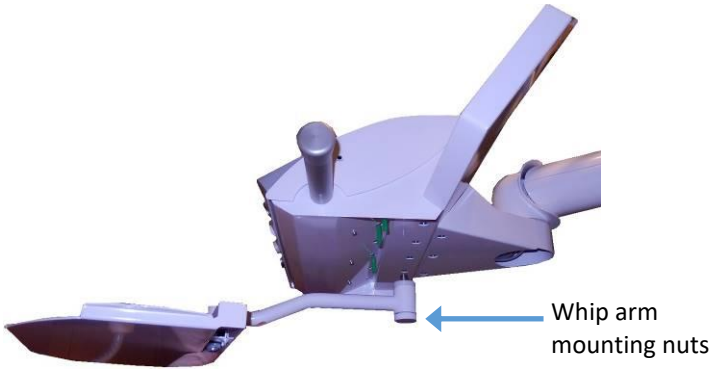
7.8.1 Hanging Hose Tray

The double wide tray is connected to the top of the instrument bridge with 6 screws located under the tray. Also connect the brake activation sensor cable under the handle.



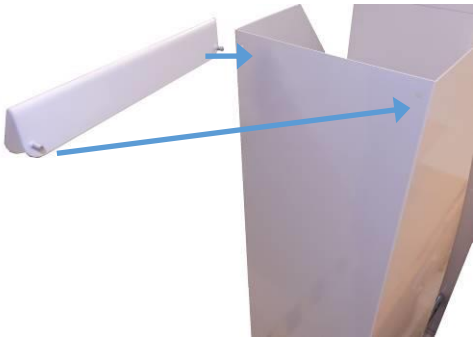
7.8.2 Whip Arm Tray

The single or double trays for the whip arm model are screwed in to the underside of the instrument bridge.



7.9 Install Unit Door Handle

The door handle comes with screws and nuts and is shipped in the accessories box.



7.10 Patient Chair Upholstery

Armrests and headrests come pre-installed. The seat upholstery is the last part to be installed on the patient chair.

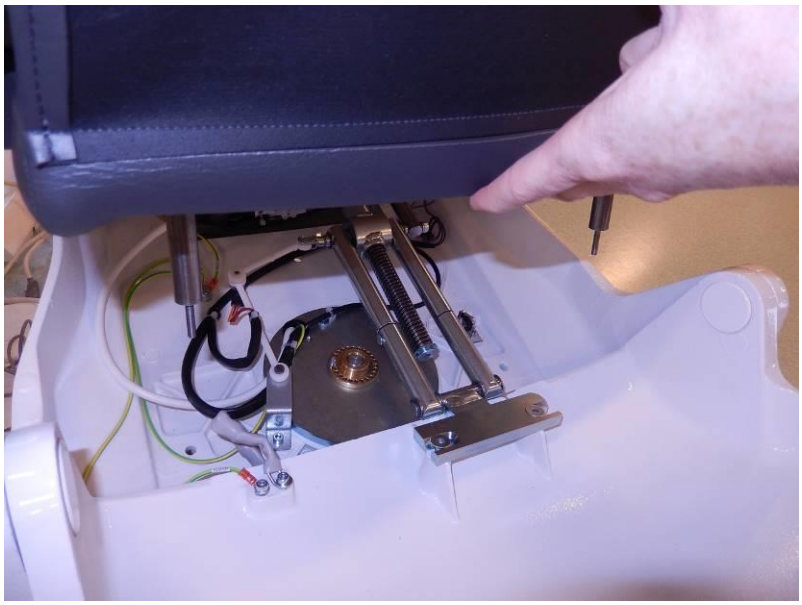
7.10.1 Installing FD-5000 Seat Upholstery

Install the two seat posts on the back of the seat:

Install the two footrest sliders on the back of the footrest:

Sit the upholstery on the patient chair and align the seat screws with the holes on the chair frame. Push the upholstery down to place.

CAUTION: Make sure the posts do not damage any switches or wires! Move all electric parts out of the way before installing the seat!

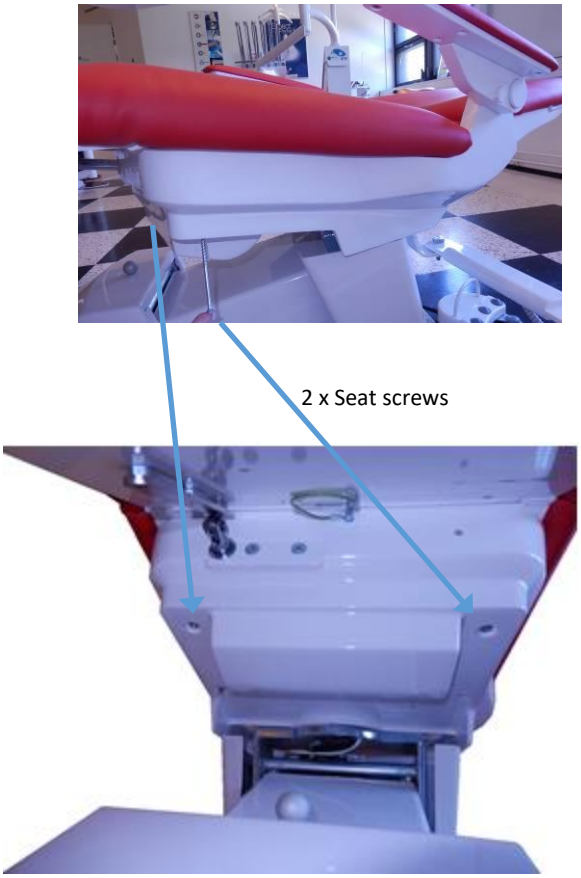


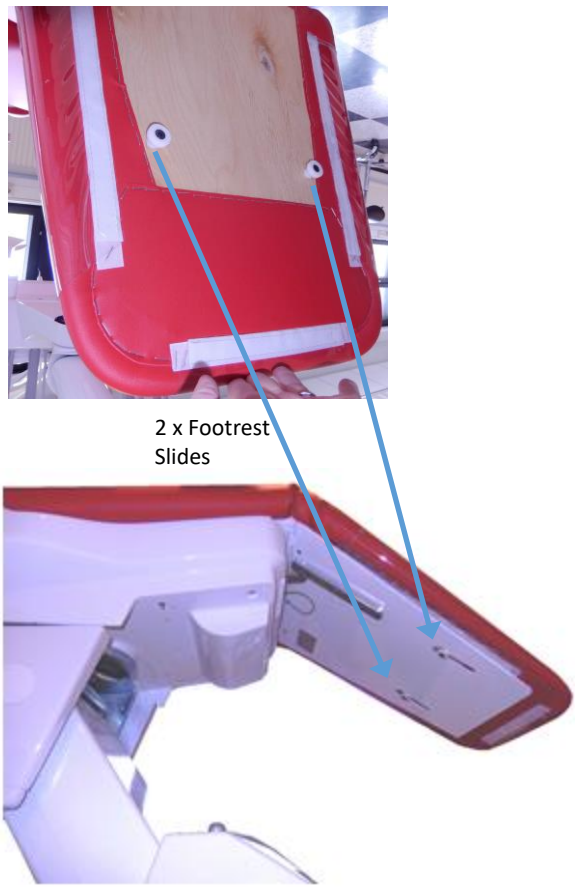
Affix the posts from the under-side.

TIP: To access the seat posts, rotate the chair left and right.

Align the back rest with the two screws on the frame. Push the upholstery hard on to the screws to have them lock in place.

Use the two longest wooden screws to fasten the lower seat through the frame. Hook the footrest sliders in to their slots.



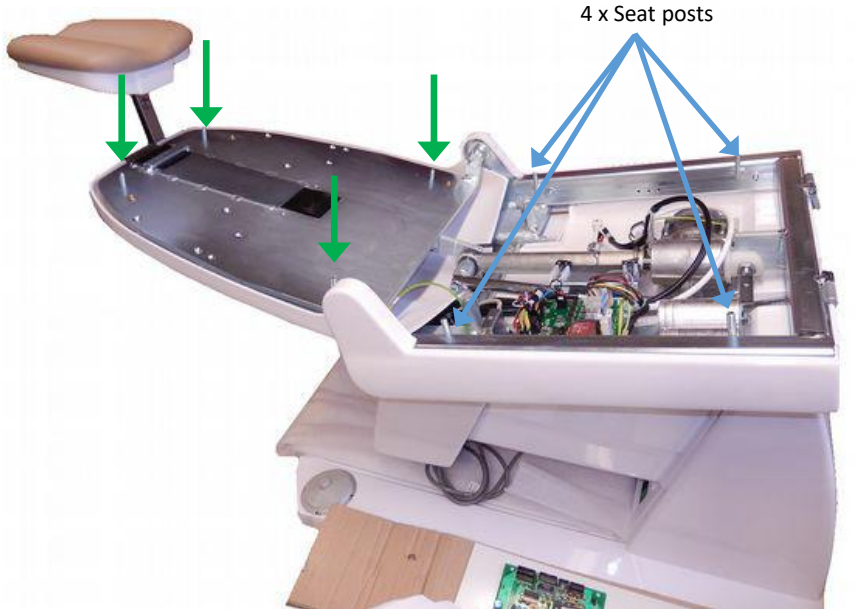


The FD-5000 is now complete!

7.10.2 Installing FD-3600 Seat Upholstery

The seat upholstery for the FD-3600 slides in place both vertically and horizontally. It is held in place by 4 seat posts. The footrest is held in place with the two sliders.

4 x Backrest posts
on chair frame



8 FINISHING TOUCHES

8.1 Rinse Bottles

If the unit is equipped with a bottle rinse system, screw in one of the 1 L bottles in the Accessories Box.

If the unit will use the bottle as the main water supply, adjust the selection valve to Bottle.

If the unit will use the office water supply, adjust the selection valve to Main.

Change bottles yearly.

8.2 Instrument Rest

Remove the silicone instrument rest from the Accessories Box and place it on the FD-8000B1+/x instrument bridge.

8.3 Suction and Drain

Connect the main drain and suction hoses. They are found in the bottom of the dental unit.

Drain is on the left, suction in is on the right.

WARNING: DO NOT CONFUSE THE DRAIN OUT AND SUCTION IN!

8.4 Connect the Unit Foot Control

Plug the foot control in to the connector on the patient chair power plate.

B-Slider (P/N: 9801940) and Spring Return B-Slider (P/N: 9801945) Foot Controls

Spring Return Foot Control (P/N: 9801935)

Foot Control FD-8000 (P/N: 9801930)

8.5 Set the Water and Air Pressure Regulators

To begin, set both the air and water to 3 bar (0.3 MPa). This is a safe average starting pressure.

8.6 Warranty Papers and Log Book

Fill in the warranty paperwork and return to Finndent within two weeks of delivery to activate the warranty.

Check the equipment list and the test reports shipped with the unit.

Begin a log book to record the results of the functionality and safety testing, user training, and maintenance.

9 FUNCTIONAL AND SAFETY TESTING

TURN BUILDING POWER SUPPLY TO THE UNIT ON.

Before finishing the installation, the unit must be turned on and given a full inspection.

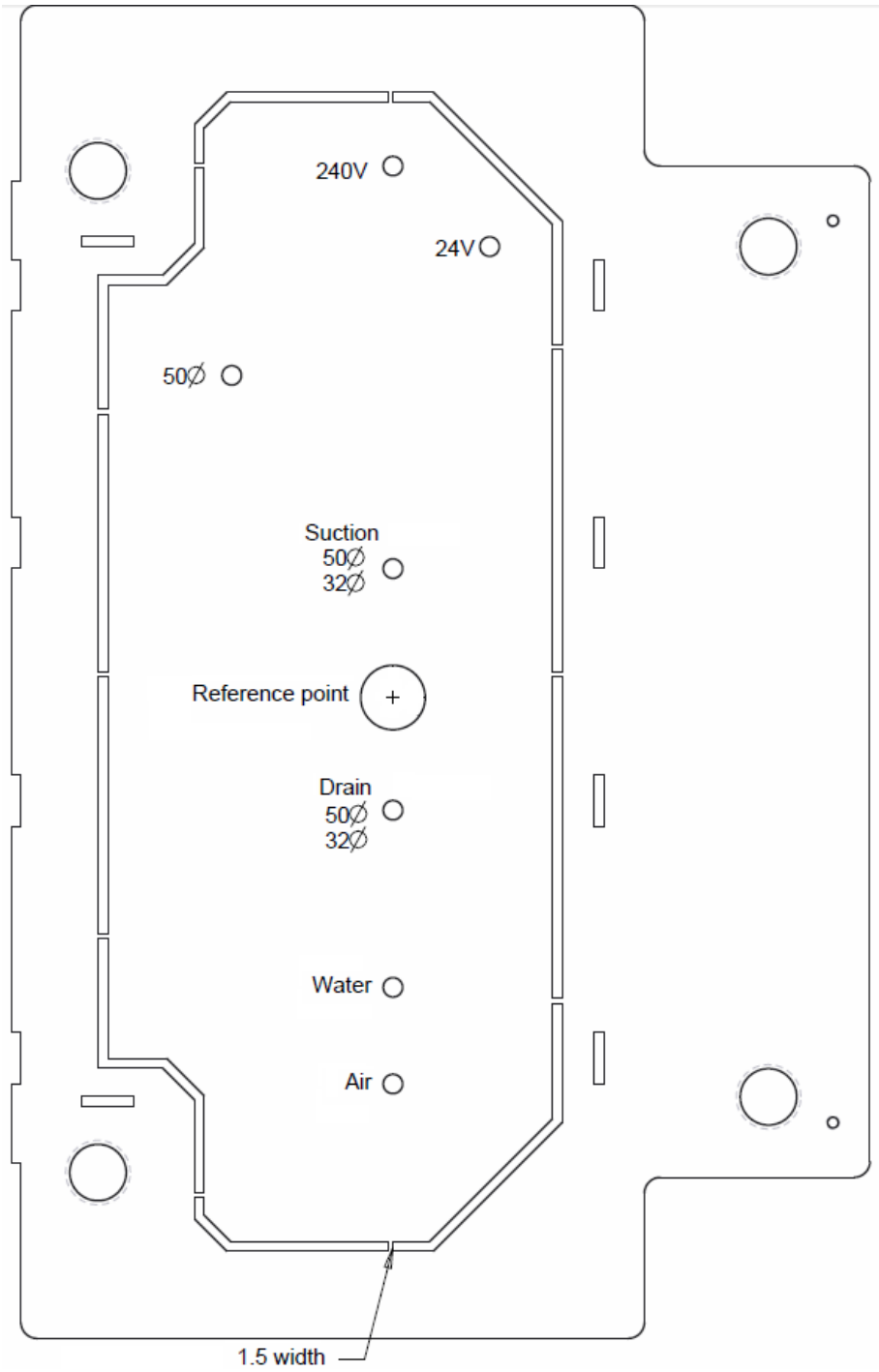
See the Doc-1756 Technical Manual for the annual service instructions. These instructions list all the features and functions to check.

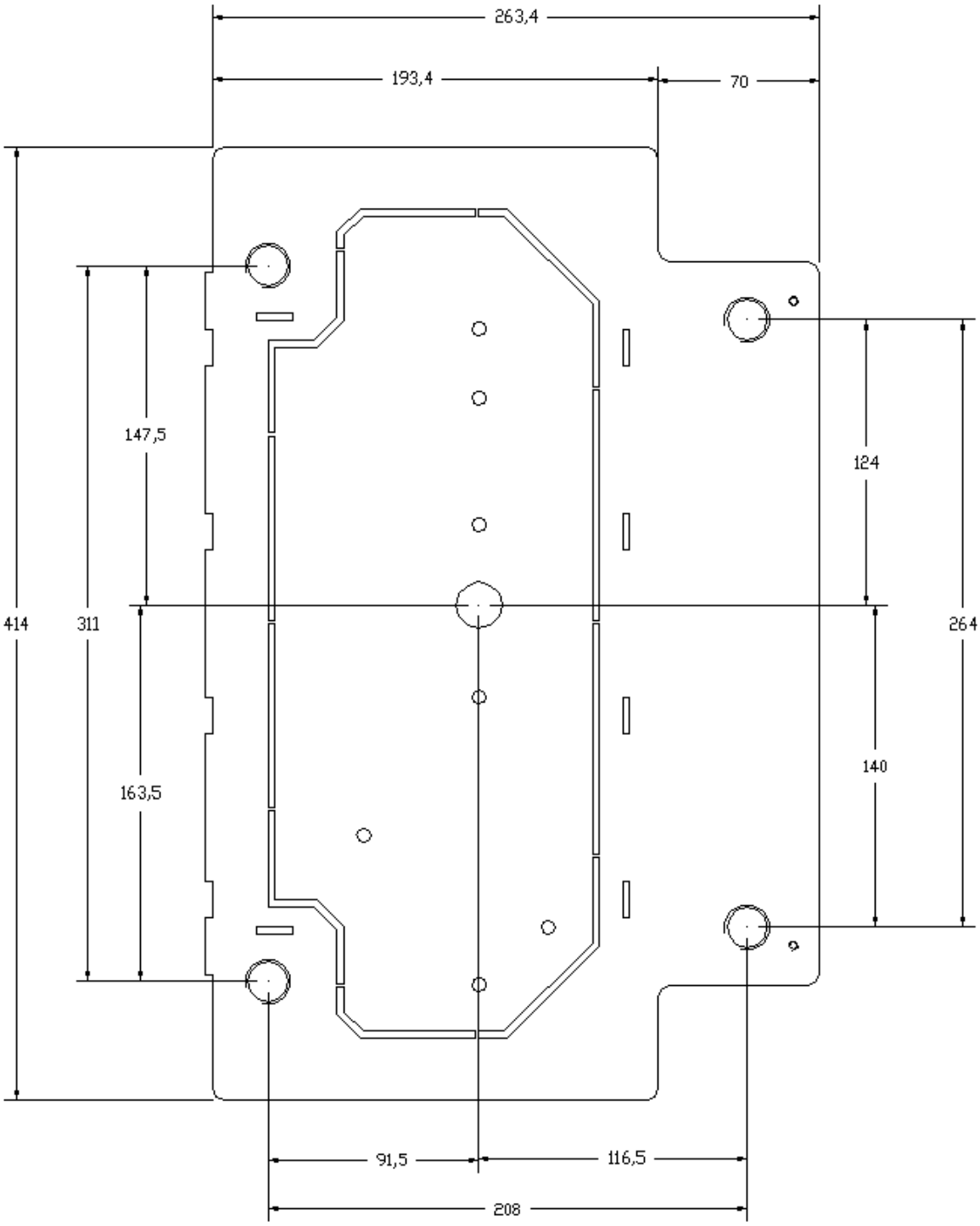
Check also the electrical safety using a medical device electrical safety measuring device to check for leakage currents, protective earth, etc.

10 DIMENSIONS AND DRAWINGS

10.1 Unit Floor Template

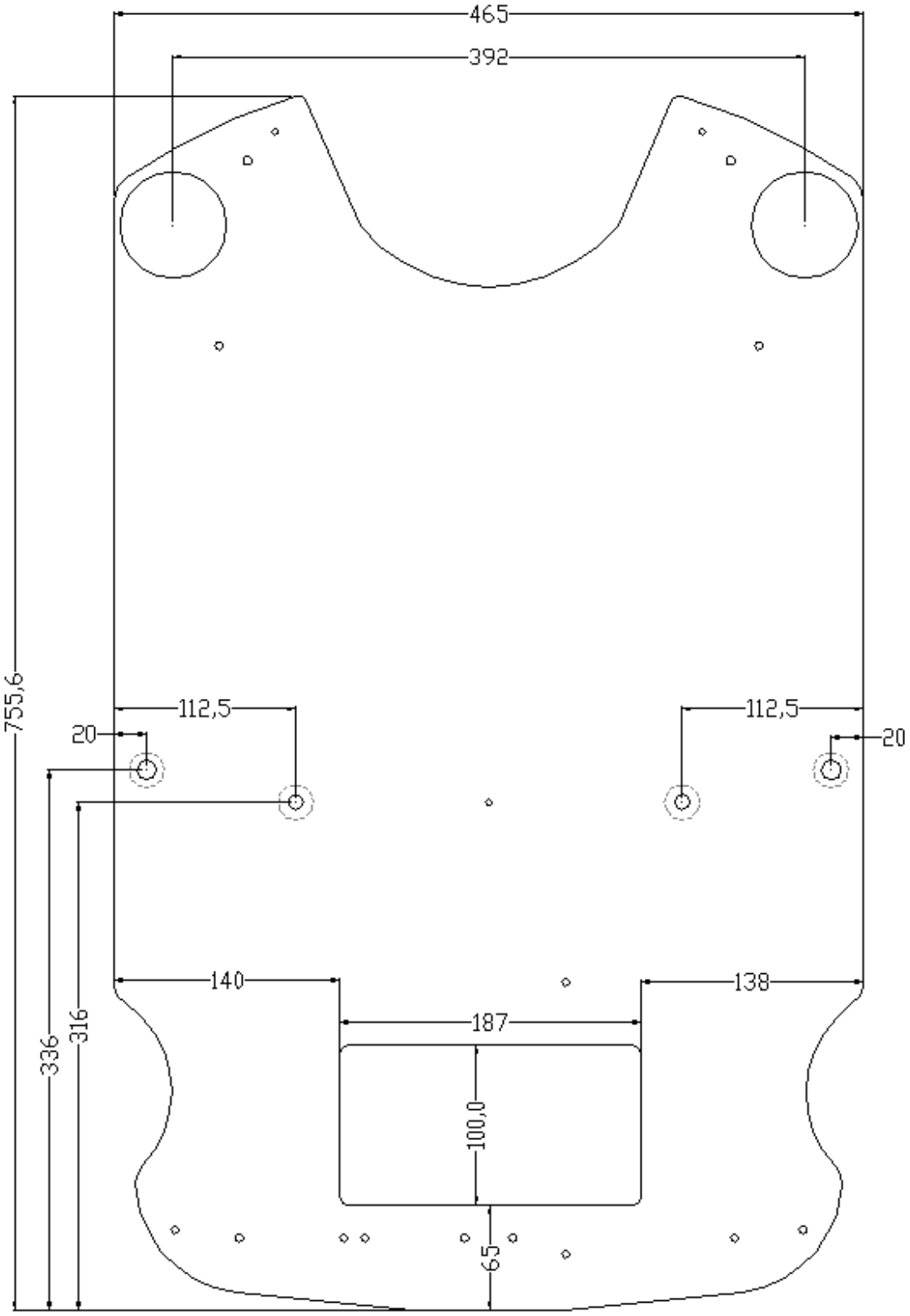
Drawings are not to scale.
Unit floor drilling template P/N: 6409875-5



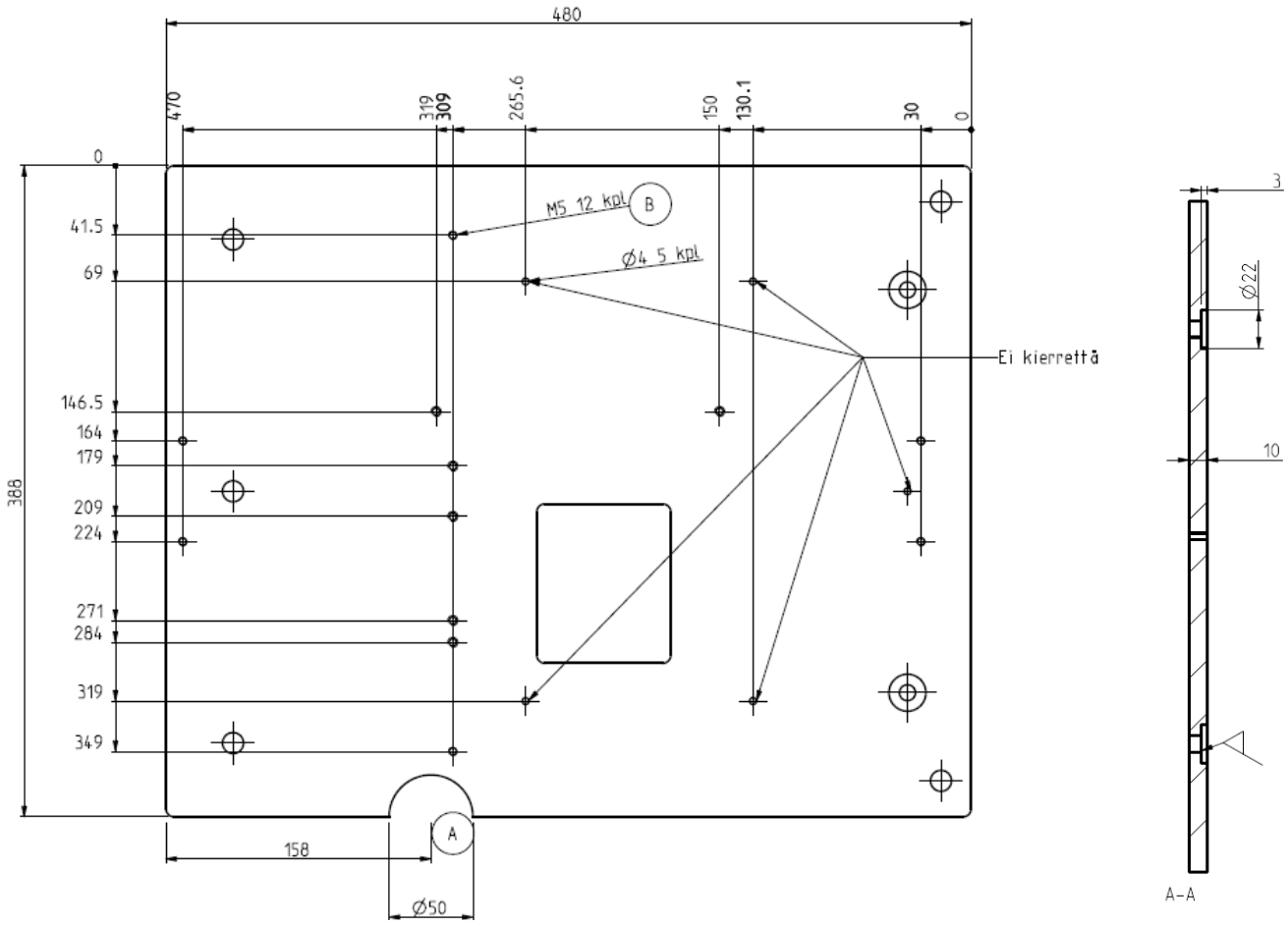

263,4
193,4
70
147,5
124
414
311
264
163,5
140
91,5
116,5
208

10.2 Extended and Short Patient Chair Bases

Drawing is not to scale.
Extended Base plate P/N: 6406800F

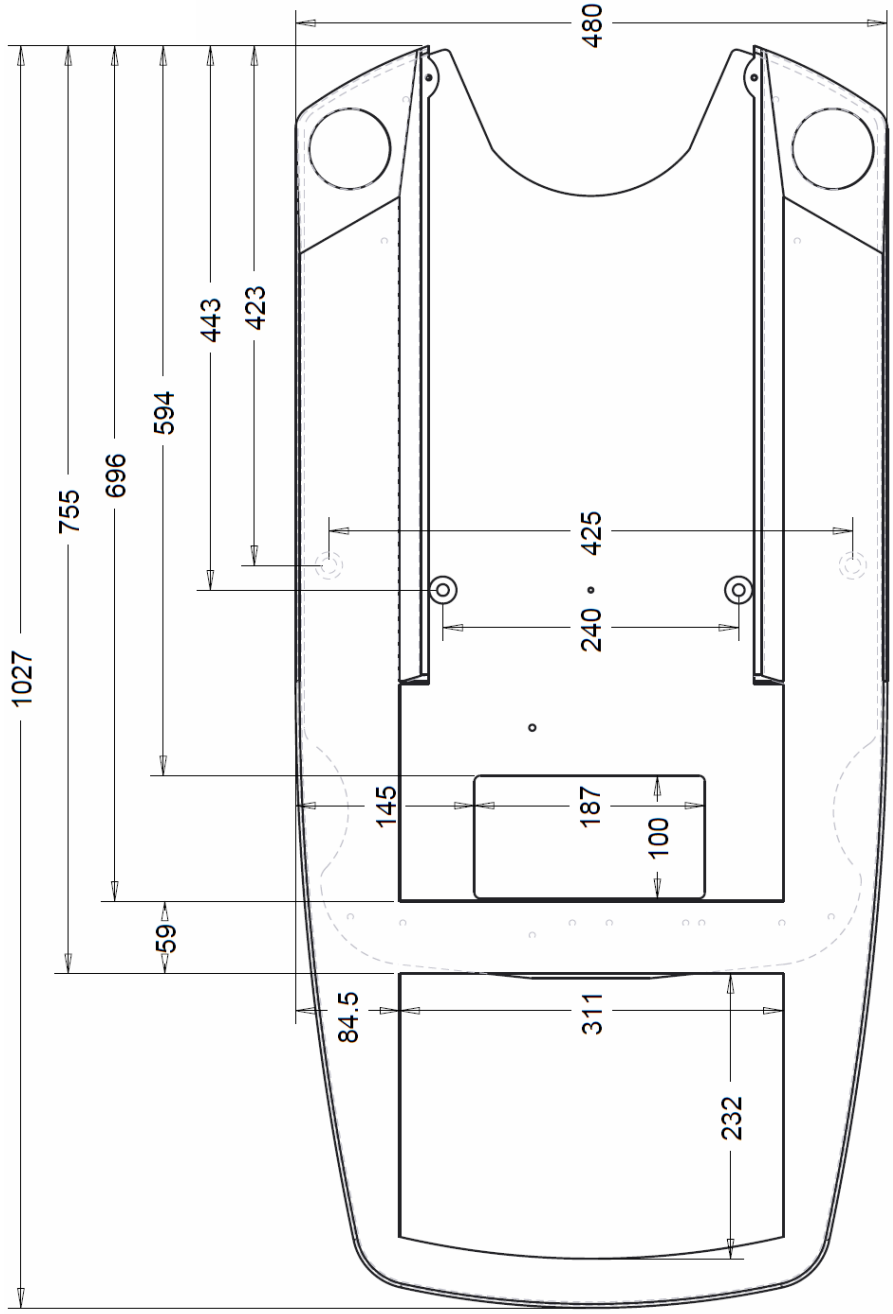


Drawing is not to scale.
Short Base plate P/N: 6420145B

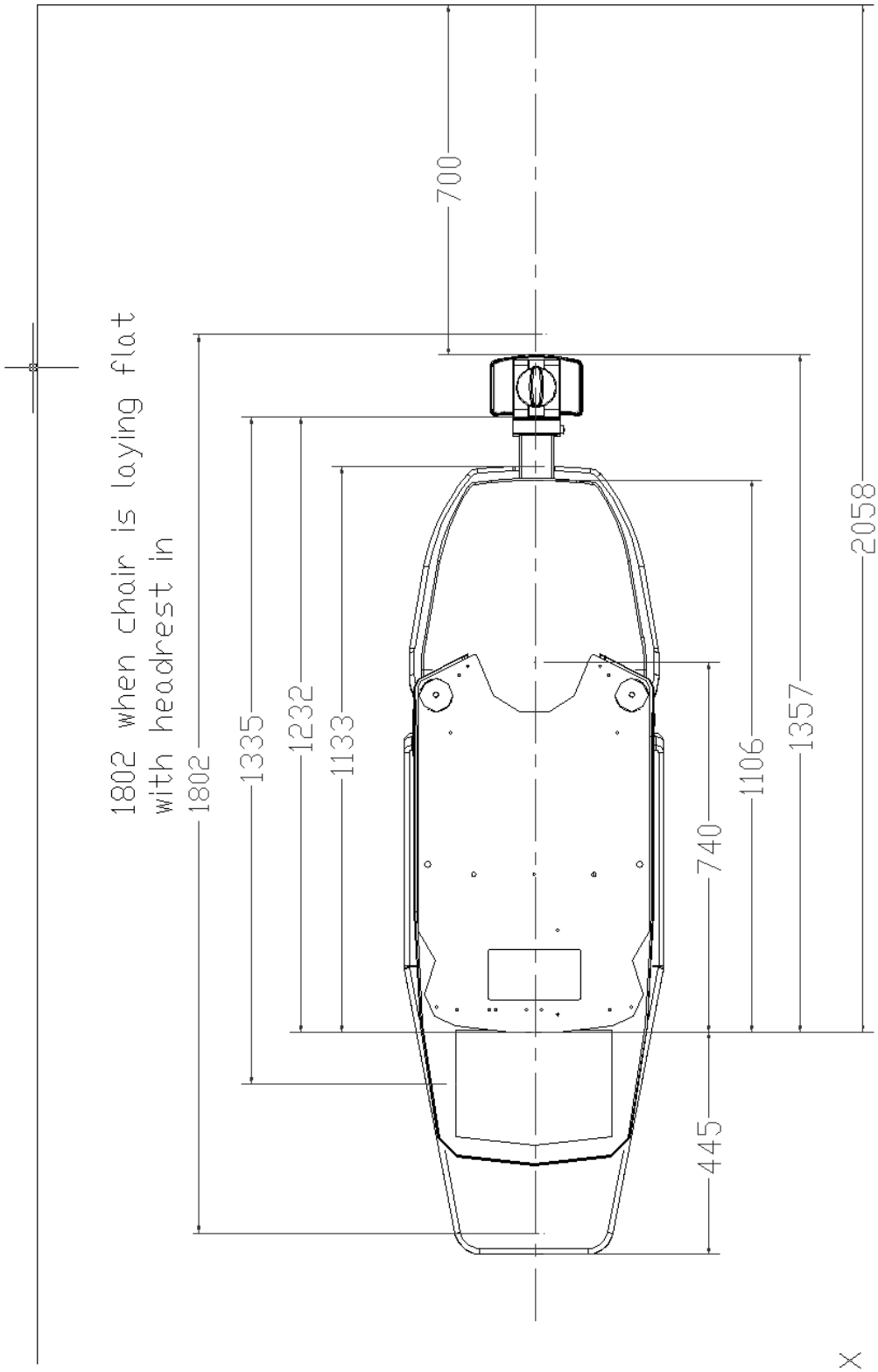


10.3 Extended and Short Patient Chair Base Covers

This assembly (9801159_2) is used with the chair mounted suction system.
Drawing is not to scale.
Extended Base plate P/N: 6406800F
Extended Cover P/N: 6805930_PITKA

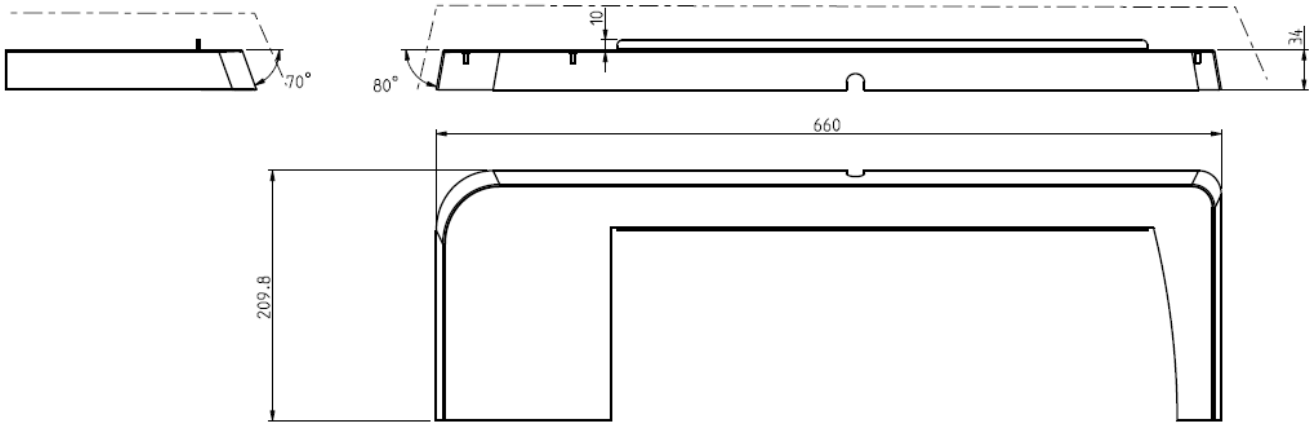


Chair mounted suction base, cover and chair dimensions.
Chair headrest must be 700 mm from the cabinet/wall.



Drawing is not to scale.
Short Base plate P/N: 6420145B
Short Cover P/N: 6511060A_Left and 6511065A_Right

Short Cover Left P/N: 6511060A



Short Cover Right P/N: 6511065A