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1 Introduction

Thank you for purchasing this reliable dental treatment system. This product is designed and manufactured to meet the highest quality standards for dental equipment.

1.1 Manufacturer

This product is manufactured by:

Fimet Oy
Teollisuustie 6
FI-07230 Monninkylä
Finland

Tel: +358 19 521 6600
Fax: +358 19 521 6666
fimet@fimet.fi
http://www.fimet.fi

1.2 Models Covered by this User Guide

This user guide covers the following Fimet-manufactured models:

- Dental Treatment System F1
- Dental Treatment System F1 CART
- Dental Treatment System F1 CAB
- Dental Treatment System F1 HANDY
- Dental Treatment System F1 PRIME
- Dental Treatment System F1 PRIMEPLUS
- Dental Treatment System F1 CITY
- Dental Treatment System F1 MONDO
- Dental Treatment System F1 EUROPA
- Dental Treatment System F1 CEILING
- Dental Treatment System F1 SIDE

Dental Treatment System F1 is also sold under trade names:

- F1 CONTINENTAL
- F1 TRADITIONAL
- F1 MODULARARM – Podiatry unit
- F1 PODOCART – Podiatry unit
- F1 HANDYARM – Podiatry unit

1.3 Directives and Standards


This product complies with the requirements of the following standards:

- EN 60601-1:1990 Medical electrical equipment Part 1 General requirements for safety
- EN ISO 14971:2012 Medical devices - Application of risk management to medical devices
- EN 980:2008 Symbols for use in the labelling of medical devices
1.3.1 Quality Standards

Fimet Oy is a responsible dental device manufacturer. The company’s quality management system is certified by a notified body according to the following standards:

- ISO 9001:2008 Quality management system - Requirements
- ISO 13485:2003 Medical devices - Quality management system - System requirements for regulatory purposes

1.4 Terms and Abbreviations

System: Dental Treatment System, consisting of Dental Unit, Dental Chair, Operating Light, Foot Control, and Hand Control.

Dental Unit: Part of the System consisting of Cuspidor, Instrument Bridge, Display, Suction Head, Connection Box, and Tray(s).

Dental Chair: Part of the System consisting of the patient chair, including a seat, a backrest, a headrest, armrests, a footrest, display and joysticks.

Connection Box: An enclosure consisting of the power supply and connections to drainage, pressurised air, mains power, suction, and water.

Operating Light: Light source with swivel arms and an optional power supply.

Display: Flat panel display with a swivel arm.

Cuspidor: Main part of the unit consisting of a pneumatic centre, a spittoon bowl, a clean water bottle, a water heater, filter(s), an amalgam separator, and water taps for glass filling and bowl flushing.

Instrument Bridge: Device consisting of instrument holders, hoses with whip arms or hanging hoses, swivel arms, control buttons, and a display. Normally used by the dentist.

Suction Head: Device consisting of hanging hoses with holders, swivel arms, control buttons, and a display. Normally used by the assistant.

Tray: Metallic or plastic tray with a supporting arm.

Foot Control: Radio operated control device with batteries or pneumatic remote control.

Hand Control: Radio operated control device with batteries.

Joystick: Four-way control device for controlling the chair.

1.5 Symbols and Markings

Follow the instructions for use

The information provided is important and must be read.

Note!

The information provided is important and should be read before use.
1.6 Referred Documents

Registration form – Supplied with the device.
2 Product Description and Operation

Dental Treatment System F1 is a system designed for use in many kinds of dental treatments. This product can be used, for example, in dental clinics, dental receptions and for dental surgeries. The product is intended to be used for dental treatment by dental care professionals. The system may contain advanced tools or parts, the use of which may require additional training.

The F1 Dental Chair is a medical device designed to be used in dental, ENT, podiatry, cosmetic, eye or other similar procedures. The product is intended for professional use only. The product is not intended to be used in surgical operations other than dental.

Dental Treatment System F1 is designed to be used in immobile premises only. Using the product in a moving vehicle is prohibited.

The F1 Dental Chair is designed for patients of normal physique. It may be used with all kind of patients but the convenience of use may vary. The maximum weight of the patient is limited to 135 kg. If the F1 Dental Chair is used as stand-alone (with no unit), the maximum allowed weight of the patient is 160 kg.

The F1 Dental Chair can be positioned with the help of electric motors to pre-set working, entry, exit and spitting positions. The height of the seat and the tilt of the back rest can also be set separately to the wanted position. The dental chair can be rotated around its central point. The head rest is double articulated.

The instrument arm has five and the suction arm four degrees of freedom.

Pressurized air is mandatory for the instruments and to control some valves.

Water for the instruments and syringes can come either from the mains water or the clean water bottle.

The dental system needs a sewage connection for the secretions.

The product requires regular service to ensure constant and safe operation.

This chapter describes the main parts of the System and its functions.

All devices inside the patient area (within 1.5 meters of the patient) must be IEC 60601-1 approved or equally deemed safe.

See section 4.9 for information about network connections.

⚠️ Warning!
Connecting devices not compliant with IEC 60601-1 or IEC 60950 may cause an electric shock hazard.
**Warning!**
Do not touch non-medical devices and the patient simultaneously. There is a risk of electric shock.

*Illustration of the Complete System*
## 2.1 Differences between various F1 Models

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Control Type</th>
<th>Instrument Delivery Type</th>
<th>Chair Mount</th>
<th>Unit Mount</th>
<th>Mobile Unit</th>
<th>Cuspidor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dental Treatment System F1</td>
<td>Electric / Air</td>
<td>Hanging hose / Whip arm</td>
<td>Floor</td>
<td>Chair</td>
<td>No</td>
<td>No/Yes</td>
</tr>
<tr>
<td>Dental Treatment System F1 PRIME</td>
<td>Electric / Air</td>
<td>Hanging hose / Whip arm</td>
<td>Unit</td>
<td>Floor</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Dental Treatment System F1 PRIMEPLUS</td>
<td>Electric / Air</td>
<td>Hanging hose / Whip arm</td>
<td>Unit</td>
<td>Floor</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Dental Treatment System F1 CITY</td>
<td>Electric / Air</td>
<td>Hanging hose / Whip arm</td>
<td>Floor</td>
<td>Chair</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Dental Treatment System F1 SIDE</td>
<td>Electric / Air</td>
<td>Hanging hose</td>
<td>Floor</td>
<td>Chair</td>
<td>No</td>
<td>No/Yes</td>
</tr>
<tr>
<td>Dental Treatment System F1 MONDO</td>
<td>Air</td>
<td>Hanging hose / Whip arm</td>
<td>Floor</td>
<td>Chair</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Dental Treatment System F1 EUROPA</td>
<td>Electric</td>
<td>Hanging hose / Whip arm</td>
<td>Floor</td>
<td>Chair</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Dental Treatment System F1 CEILING</td>
<td>Electric</td>
<td>Hanging hose / Whip arm</td>
<td>Floor</td>
<td>Ceiling</td>
<td>No</td>
<td>No (yes)</td>
</tr>
<tr>
<td>Dental Treatment System F1 CAB</td>
<td>Electric / Air</td>
<td>Hanging hose / Whip arm</td>
<td>Floor / Wall</td>
<td>Wall</td>
<td>No</td>
<td>No/Yes</td>
</tr>
<tr>
<td>Dental Treatment System F1 CART</td>
<td>Electric / Air</td>
<td>Hanging hose / Whip arm</td>
<td>Floor / -</td>
<td>-</td>
<td>Yes</td>
<td>No/Yes</td>
</tr>
<tr>
<td>F1 PODOCART</td>
<td>Electric</td>
<td>Whip arm</td>
<td>Floor / -</td>
<td>-</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>
2.2 System Overview

[Diagram of a dental unit with labeled parts: Lamp, Lamp Arm, Dental Chair, Instrument Arm, Dental Unit, Instrument Board, Container of the flushing liquid, Headrest, Backrest, 7 segment display, Chair Main Board, and Dental Unit.]
### System Parts and Options

<table>
<thead>
<tr>
<th>Imaging Devices</th>
<th>Cuspidor</th>
<th>Operating Light</th>
<th>Instruments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sopro 617, 717 or Life video camera</td>
<td>Metasys MST1</td>
<td>Faro Alya</td>
<td>Electric Scaler (Am-dent, Satelec, NSK, Mectron, EMS)</td>
</tr>
<tr>
<td>Ag Neovo 17” TFT display X-17</td>
<td>Cattani Mini-Separator</td>
<td>Faro Edi</td>
<td>Micromotors (Bien-Air, Kavo, NSK), max. 3 pcs.</td>
</tr>
<tr>
<td>Ag Neovo 22” TFT display X-22</td>
<td>Dürr CAS 1</td>
<td>G.Comm Vision</td>
<td>Syringe(s) (Luzzani, DCI, Forest)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>G.Comm Polaris</td>
<td>Curing light (Satelec, Lysta, Mectron)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Air driven instruments (turbine, air motor pneumatic scaler) (NSK, Kavo, Bien-Air, MTI, DentalEZ)</td>
</tr>
</tbody>
</table>
### 2.3 Connectable Parts and Devices

<table>
<thead>
<tr>
<th>Part</th>
<th>Connection</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>PC</td>
<td>HDMI connection to display</td>
<td>Must be equipped with a power source conforming to IEC 60601-1 or IEC 60950 standard</td>
</tr>
<tr>
<td>PC</td>
<td>VGA connection to Display</td>
<td>Must be equipped with a power source conforming to IEC 60601-1 or IEC 60950 standard</td>
</tr>
<tr>
<td>External simple devices, for instance electrical door lock, external suction motor, etc.</td>
<td>Relay</td>
<td>Max. 25 V AC / 60 V DC, 5 A</td>
</tr>
</tbody>
</table>

### 2.4 Instrument Bridge

**Warning!**

*Beware of damaging the instrument bridge arms when lifting the backrest of the chair.*

The Instrument bridge is used to hold the instruments so that they are conveniently available for use when needed.

*Instrument Bridge*

Swivel arms guide the instrument hoses, so that they are located ergonomically. The instruments are easily reachable and in correct position ready for working. An instrument
can be selected and activated simply by lifting it from its resting place. Only one instrument can be operated at a time, except for the syringe, which can be used simultaneously with any other instrument.

2.4.1 Swivel Arms

The instrument bridge is located at the end of the swivel arms. The swivel arms enable the wide movement range of the instrument bridge, which in turn enables wide variety of working positions. No extra weight is intended to be placed on the swivel arms.

2.4.2 Instrument Bridge User Interface

<table>
<thead>
<tr>
<th>Key</th>
<th>Symbols</th>
<th>Memory slot</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bowl rinse</td>
<td><img src="image1" alt="Bowl rinse" /></td>
<td><img src="image2" alt="Memory slot" /></td>
<td>Rinse bowl for pre-set duration</td>
</tr>
<tr>
<td>Doorbell</td>
<td><img src="image3" alt="Doorbell" /></td>
<td><img src="image4" alt="Memory slot" /></td>
<td>Open door, activate relay</td>
</tr>
<tr>
<td>Cup fill</td>
<td><img src="image5" alt="Cup fill" /></td>
<td><img src="image6" alt="Memory slot" /></td>
<td>Fill cup for pre-set duration</td>
</tr>
<tr>
<td>AUX</td>
<td><img src="image7" alt="AUX" /></td>
<td><img src="image8" alt="Memory slot" /></td>
<td>Activate relay</td>
</tr>
<tr>
<td>Backrest up</td>
<td><img src="image9" alt="Backrest up" /></td>
<td>1</td>
<td>Chair to exit position Raise backrest</td>
</tr>
<tr>
<td>Backrest down</td>
<td><img src="image10" alt="Backrest down" /></td>
<td>2</td>
<td>Chair to working position Lower backrest</td>
</tr>
<tr>
<td>Chair down</td>
<td><img src="image11" alt="Chair down" /></td>
<td>3</td>
<td>Chair to spitting position / Return to previous position Lower chair</td>
</tr>
<tr>
<td>Chair up</td>
<td><img src="image12" alt="Chair up" /></td>
<td>4</td>
<td>Chair to alternative working position Raise chair</td>
</tr>
</tbody>
</table>

2.4.3 Instrument Bridge Display

When the system is in idle state, time and date are shown (the 7-segment display is an option). The number displayed in the top left corner displays the active instrument module. The display will react to instrument selection and show appropriate views accordingly.
Spray selection and rotating speed range selection displays

The spray selection display shows water and air selections for the selected instrument. The rotating speed range display shows the currently selected rotation speed range:

- **H (high speed)** range 0–100%
- **M (medium speed)** range 0–50%
- **L (low speed)** range 0–25%

The selected speed range is shown with three LEDs: in the Low speed range, only the L indicator is lit, in the Medium speed range both L and M are lit, and with the High speed range all three speed lights are illuminated. Speed is selected with the remote foot control. The colours represent the functions: blue for water, green for air, and orange for speed range. The colour coding makes it easy to recognize the active functions.

7-segment display (an option)

The 7-segment display normally shows the time. When using an instrument with rotation control, e.g. micro motor, the display shows the rotations per minute of that instrument. The display shows when air and water are switched on, and the speed scale of the selected instrument.

2.4.4 Silicone Covers

Silicone covers are designed to protect the instrument bridge, the suction head and the trays. The silicone covers may be disinfected in an autoclave.

Replace the silicone cover when its colour has noticeably changed. Contact your retailer or manufacturer for replacement covers.
2.5 Instruments and Hoses

Note!
Instruments are always manufactured by a third party. Please refer to their instructions for their correct use and maintenance.

Warning!
To avoid risk of eye damage, do not look straight at the curing light.

Warning!
Check the locking of the instrument drill bit mechanism after replacing the drill bit.

There are five places for instruments on the instrument bridge. The arrangement of the instruments is set according to the customer’s order. Changing the arrangement must be done by maintenance personnel.

Instruments that can be connected are:
- Micro motor
- Air motor
- Scaler, electric or pneumatic
- Turbine
- Syringe
- Curing light
- Special instruments, e.g. sandblasters

There are three places for instruments and suctions on the suction head. The suction head usually has two suction hoses with suction tips.

The instruments are ready for use when picked up from their resting place. The display of the instrument bridge shows information specific to the selected instrument; for example rotational speed.

The instrument is controlled with the remote Foot Control. Turning the lever adjusts the rotational speed of the instrument to the desired direction or activates the scaler.

2.5.1 Micro Motors

The speed scale of rotation can be changed by pressing the button 5 on the remote Foot Control. By default, the speed range is high (H), and can be changed to medium (M) and to low (L) by pressing the button.
2.5.2 Curing Light and Laser

**Warning!**
*To avoid risk of eye damage, the patient must not look straight at the curing light or laser beam.*

Please read the operation instructions in the manufacturer’s manual.

2.5.3 Ultrasonic Scaler

**Warning!**
*Check that the scaler gets water for cooling the tip. The scaler may be damaged if not cooled properly.*

The ultrasonic scaler power is controlled with a rotating knob on the back of the instrument bridge. Power setting 1 is the smallest, 10 is the maximum. For more information, see the instruction manual provided by the scaler manufacturer.
2.5.4 Ultrasonic Scaler Water Switch (optional)

**Warning!**
The hot tip of the ultrasonic scaler may damage the patient's soft tissue and teeth. The tip may also be damaged by heat. Always use cooling water in normal use.

The instrument bridge can be equipped with a scaler water control lever. This lever cuts off the water from the ultrasonic scaler. This option is only used in special purposes.

2.6 Suction Head

Normally, the suction head holds the suction hose(s), evacuator tips and syringe or other instruments. The instruments are easily reachable and in correct position ready for working. An instrument can be activated simply by picking it up from its holder.

*Suction head*

The suction head is connected either to the chair with swivel arms or to the cuspidor with an extendable arm depending of the model. The swivel arms enable a wide movement range of the suction head, which in turn enables wide variety of working positions. No extra weight is intended to be placed on the swivel arms.
### 2.6.1 Suction Head User Interface

<table>
<thead>
<tr>
<th>Key</th>
<th>Symbols</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bowl rinse</td>
<td>![Bowl rinse symbol]</td>
<td>Rinse bowl for pre-set duration</td>
</tr>
<tr>
<td>Doorbell</td>
<td>![Doorbell symbol]</td>
<td>Open door</td>
</tr>
<tr>
<td>Cup fill</td>
<td>![Cup fill symbol]</td>
<td>Fill cup for pre-set duration</td>
</tr>
<tr>
<td>AUX</td>
<td>![AUX symbol]</td>
<td>Activate external relay</td>
</tr>
</tbody>
</table>

### 2.6.2 Positioning the Suction Head

**Warning!**

*To prevent damage to the system, check that there is nothing obstructing the movement of the chair.*

![Positioning the suction head diagram]

**Positioning the suction head**

The suction head can be adjusted as shown in the above image. The height adjustment (an option) has a locking mechanism, which can be tightened by turning the locking screw.
2.7 Trays

**Instrument tray**

The tray is used for placing the hand instruments and utensils. Do not place more than 1 kg on the tray.

2.8 Dental Unit

The *Dental Unit* consists of a *Cuspidor*, an *Instrument Bridge*, a *Display*, a *Suction Head*, a *Connection Box*, and *Tray(s)*. The maximum total weight of the Dental Unit (without the Connection Box) is 50 kg.
2.8.1 Cuspidor

Warning!
Do not open the door of the cuspidor during patient treatment to prevent the risk of electric shock.

The cuspidor contains the spittoon bowl with flushing system, cup holder with cup filling system, and suction filters. Separation systems are located inside the cuspidor. Clean water bottle and waste management are also located in the cuspidor.

The spittoon bowl is easily detachable.*

(*) The maintenance door is optional. If there is no maintenance door, maintenance operations are made by lifting the top of the cuspidor out of way.
2.8.2 Filling the Cup and Rinsing the Bowl

To fill the cup, press the \( \text{-} \)–button briefly. The cup will be filled up to the pre-set level.

To rinse the bowl, press the \( \text{=} \)–button briefly. The duration of the rinsing is pre-set. The direction of the rinsing spray may be adjusted by rotating the nozzle of the faucet.

2.8.3 Water Heater (optional)

Heated water is often used with syringes and water injecting instruments. For that reason the system can be delivered with a water heater. The temperature of the water is regulated with a thermostat. Overheating is prevented with a non-reversible thermal cut-out device. If the injected water is cold, please check the position of the button of the thermal cut-out device. The release button is located on the right side of the water heater in the bottom of the cuspidor.

2.8.4 Clean Water Bottle

![Clean water bottle]

**Warning!**

*Use only bottles provided by Fimet Oy. Do not use bottles past their expiry dates. Otherwise there is a possibility that the bottle breaks.*

When the switch is turned on, the clean water bottle is pressurized to 1.5 bars and the water for instruments is taken from the bottle. If the bottle is not in use, the water is taken from the water main. The water for cup filling comes either from the clean water bottle or from the water main depending on the desired type of setup.
To add water, de-pressurize the bottle by turning the lever to the off-position. The bottle can then be detached safely by rotating it counter clockwise. Do not overfill the bottle; leave at least 2 cm free space on the top.

When starting to use the clean water bottle after main water line use, ensure the cleanliness of the water hoses by allowing the water run for a couple of seconds through every instrument, cup filling tap, and cuspidor bowl flushing tap.

2.8.5 Disinfecting the Water System

The clean water bottle can be used to disinfect the instrument hoses and the water tubing. See section 3.1 Cleaning, Disinfecting for more information.

2.8.6 Daily Use of Mild Disinfecting Solutions

Mild disinfecting solutions can be used to prevent contamination coming from main water line and build-up of microfilm. These liquids may be added to the clean water bottle in the right proportion. Please read the manufacturer’s instructions for correct usage.

2.9 Connection Box

⚠️ Warning!

The maximum connection voltage to the relays for the external devices is 24 V.

The Connection Box consists of a power supply and connections to drainage, air, mains power, and main water line. The main fuse, the main power switch, and the relays for external devices are also in the connection box. Connection Box is connected to the unit with flexible hoses and electric cables.

2.9.1 Switching the Device’s Power on and off

⚠️ Warning!

There are harmful voltage levels, pressurized air, and water inside the connection box. Only authorized maintenance staff may open the connection box.

⚠️ Note!

When the device is switched on, there are pressurized air and water in the instrument bridge, the suction head, the cuspidor, and the connection box.
Main power switch

The power of the device is switched on and off with the main power switch. The power switch controls all the electricity in the device. If it is switched off, the device is safe to service. When the power is turned off, the water and air inside the device are depressurized.

2.10 Display & Operating Light

⚠️ **Warning!**
The display is not water proof. Avoid getting the system wet when cleaning.

⚠️ **Warning!**
Do not look straight into the light. Looking straight at operating light beam may cause damage to eyes.

The display can be used with an intra-oral video camera and an external computer. The display must be either:

- Connected to the F1 power source, or
- Approved according to the medical device standard IEC 60601-1.

The operating light contains its own power switch, which controls the light. Please see the operating light’s user guide for detailed instructions.

The maximum torque for the pole holding the light is 100 Nm. This equals 10 kg at a distance of one meter or 5 kg at 2 meter distance.

The maximum allowed mass of the monitor is 10 kilograms.
2.11 Dental Chair

Note!
To prevent over-heating of motors, the continuous operation of lift and tilt motors is limited. The limiting system is load sensing. With full load, the chair lift and tilt motors operate a shorter time.

*Double articulated head rest*
*Removable hand rest*
*Adjustable foot rest*
*Chair control panel*

**F1 Chair**

*Chair control panel and remote foot control*
The body of the F1 Dental Chair is made of sturdy steel. The design of the compact lift mechanism offers excellent usability to the chair. From its lowest point of 45 cm, the chair moves nearly vertically up to 95 cm. All bearings are pre-lubricated and will seldom require maintenance. All visible parts are injection moulded. The seat, backrest and other parts that are critical to withstanding stress, are reinforced with either steel or plastic body. The maximum allowed torque of the unit attachment is 250 Nm. Maximum allowed mass of the unit is 60 kg.

(*)The max mass specified is for chair with no unit attached.

2.11.1 Motors and Electronics

The lift and tilt motors, and the electric circuits of the F1 Dental Chair are of low-voltage type, which reduces the risk of electric shock. A combination of steel and plastic materials is used in the gears of the lift and tilt mechanisms. This structure gives the chair a smooth and quiet ride and ensures a long lifetime of the mechanism. All major components of the F1 Dental Chair are easily accessible for fast and easy maintenance.

2.11.2 Positioning the Chair

**Warning!**

*Do not sit on the backrest or footrest. It may bend under your weight.*
Warning!
Beware of damaging the instrument and suction arms when raising or lowering the backrest or the chair.

The chair can be operated with several different kinds of controllers. These controllers are: joystick(s), remote foot control, instrument bridge buttons, and suction head buttons.

The movement speed of the chair seat and backrest are designed to be adequate, but not fast enough to cause danger to operator or patient.

Manual Positioning

<table>
<thead>
<tr>
<th>Function</th>
<th>Remote Foot Control</th>
<th>Remote Hand Control</th>
<th>Joystick Left (push and hold)</th>
<th>Joystick Right (push and hold)</th>
<th>Instrument Bridge / Suction Head buttons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raise Backrest</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Lower Backrest</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Chair Down</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Chair Up</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

Rotating the Chair and Locking the Position
The patient chair can be rotated ±45° after releasing the Chair rotation.
2.11.3 Using Pre-set Positions

**Warning!**
*Do not leave patient/chair unsupervised during the automatic positioning of the patient chair. Some part of the system may be damaged or the patient may be injured.*

**Note!**
The automatic movement of the chair can be stopped with any chair operating key (1, 2, 3 and 4 keys on instrument bridge, suction head panel, joysticks, remote foot control, and remote hand control).

**Using Pre-set Positions**

Remote Foot / Hand Control: Press 5-key / PROG key briefly and after that the desired key within three seconds.

Joysticks: Push either one of the chair’s joysticks in the desired direction.

Instrument Bridge and Suction Head: Press briefly one of buttons 1, 2, 3 or 4

1 - Chair to entry and exit position
2 - Chair to working position
3 - Chair to spitting position
4 - Chair to alternative working position

**Recalling Pre-set Chair Positions**
2.11.4 Programming Pre-set Positions

- Position the chair with manual positioning to the desired position.
- Press the \textit{PROG} button to start programming.
- Within three seconds, select the desired memory slot (2, 3 or 4) with the corresponding control from the instrument panel, joystick, remote foot control, or remote hand control. The upper segment of the 7-segment display flashes during the setting time \textit{000}.

The memory positions are user-specific. Both users (A and B) can be programmed separately.

Please note that position 1 is reserved for entry and exit-position and is pre-set at the factory. It cannot be reprogrammed the normal way. Please contact service personnel to change the default behaviour.

2.11.5 Selecting the User

- Chair control panel

Pressing the \textit{USER} button toggles the selected user between USER A and USER B. The 7-segment display shows a bar to illustrate the selected user.
2.11.6 Extending the Backrest

To adjust the length of the backrest, first press the button on the backside of the backrest to release the locking mechanism. Then pull or push the backrest to desired length. After adjusting the length, make sure the locking mechanism is locked before starting to use the chair.

2.11.7 Tilting the Seat and Trendelenburg / Shock Position

Unlocking the chair tilting lock allows the seat, backrest and legrest to be tilted, for setting the legs to a higher position than the head.

2.11.8 Headrest

The headrest is double-articulated and extendable. The locking mechanism locks the headrest to the desired position.

⚠️ **Warning!**

*Check the tightness of the locking mechanism after adjusting the position of the headrest.*

The distance between the headrest and the backrest can be adjusted simply by sliding the...
headrest in or out. Please note that the gap between the headrest and the backrest should be at most 10 cm. The headrest may not be steady enough if elongated too much. The locking lever locks the double articulated movements.

**Headrest adjustments**

The movements of the headrest are double-articulated. The headrest can be adjusted around the two axels when the locking lever is in open position.

**Double-articulated headrest movements**

**2.11.9 Legrest**

The legrest can be extended (*) and the knee break angle can be adjusted. The legrest moves synchronically with the backrest.

(*) Optional
Positioning legrest
(*) Optional

The legrest can be extended simply by pulling the extension part outwards. The knee break can be adjusted from 0° to 90°. To lift the legrest, simply just raise it. To lower it, press the knee break release button and lower the legrest. There are three different angles for the knee break.

The legrest is positioned synchronically with the backrest.

2.11.10 Joysticks

Joysticks are used to control the movements of the seat and backrest of the chair. The joystick can be moved to four different directions. Joysticks can also be used to position the chair to pre-set positions.

2.11.11 Armrests

You can turn the armrests and also detach them, if needed. Turning the armrests allows for easy entry and exit for the patients.
To turn and/or detach the armrest, lift it slightly to unlock it. After being unlocked, the armrest can be turned. When the armrest has been turned 90°, it can be removed completely by lifting it from its holder.

### Turning and detaching the armrest

#### 2.12 Remote Foot Control

*Foot Control* is used to control the movement of the seat and backrest of the chair, and also to control the instruments.

![Remote Foot Control Diagram]

- **Lift handle**
- **Foot control buttons**
- **Lever**
No instrument selected

<table>
<thead>
<tr>
<th>Key</th>
<th>Press briefly</th>
<th>Press and hold</th>
<th>Pre-set Positioning (activated with 5-key, user pre-defined position)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Raise backrest</td>
<td>Raise backrest</td>
<td>Chair to entry and exit position</td>
</tr>
<tr>
<td>2</td>
<td>Lower backrest</td>
<td>Lower backrest</td>
<td>Chair to working position</td>
</tr>
<tr>
<td>3</td>
<td>Lower chair</td>
<td>Lower chair</td>
<td>Chair to spitting position and back</td>
</tr>
<tr>
<td>4</td>
<td>Raise chair</td>
<td>Raise chair</td>
<td>Chair to alternative working position</td>
</tr>
<tr>
<td>5</td>
<td>Memory</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Instrument selected

<table>
<thead>
<tr>
<th>Key</th>
<th>Micro motor</th>
<th>Turbine</th>
<th>Scaler</th>
<th>Curing light</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Run</td>
<td>Run</td>
<td>Run</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Run reverse</td>
<td>Run</td>
<td>Run</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Chip blow</td>
<td>Chip blow</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Air / Water / Both / Off</td>
<td>Air / Water / Both / Off</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Select rotation scale</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Foot control operates at 2.4 GHz frequency, which is dedicated for ISM use (industrial, scientific and medical).

2.12.1 Recharging the Batteries

There are four AA size NiMH rechargeable batteries in the foot control. To recharge the batteries, connect the charging cable to the chair and to the foot control. The connector in the chair is located in the front side of the chair’s bottom part. The connector in the foot control is located on the bottom. Recharging time is about 24 hours and charging must be done periodically (in normal use after every 1...3 months) depending on the operating time. When letter “A” is displayed in the back panel of the chair, the charge of the batteries in the foot control is low.

The system has to be powered on to charge the batteries. The remote control can be operated normally during the charging. The batteries are always charged when the charging cable is connected and the chair is switched on.

Overcharging the batteries is not recommended, this will shorten battery lifetime. If the foot control is not to be used for a long time, it is a recommended to remove the batteries from the foot control.

When foot control is connected to the chair via the charging cable, the radio communication is stopped and all data is delivered through the charging cable. If there are problems with the radio communication, please connect the charging cable.
2.13 

**Pneumatic Foot Control**

Air unit instruments are controlled with the pneumatic foot control. This consists of three easy-to-use reliable controls.

The user controls the speed of the selected instrument by pressing the pedal. When the pedal is pressed, it supplies air to the instrument thus controlling the speed of rotation.

Lever switch is used to select water on/off for the instruments.

The Chip blow button releases extra amount of air for selected instrument when pressed.

---

2.14 

**3rd Party Devices**

*Warning!*

*Connecting devices not listed below may cause an electric shock hazard.*

All devices inside the patient area (within 1.5 m of patient) must be IEC 60601-1 approved.

All devices to be connected must be CE marked. All electrically connected devices must be compliant with IEC 60601-1 or/and other applicable IEC standards. The computer must be compliant with either IEC 60950 or IEC 60601-1.

Compliance with IEC 60601-1 has to be re-evaluated after each modification made to the system.

The computer must be powered from its own mains socket.

The following types of dental instruments can be connected:

- Air driven instruments (e.g. turbine)
- Electric instruments (e.g. micro motor)
- Curing light
- Ultrasonic scaler
- Syringe
- Amalgam separator
- Operating light
- Air/water separator
- Display
- Computer connected to the display
- Video camera
- External suction systems / motors
2.15 Control Relays for External Devices

Relays are used for controlling the external devices. These devices may be, for example, an electric door lock, an external suction motor, a compressor, or "doctor reserved" light, etc. Maximum connection voltage is 24 V.
3 Maintenance and Service

3.1 Cleaning, Disinfecting and Sterilisation

3.1.1 Instrument Disinfecting and Sterilisation

3.1.2 Prior to Treatment

3.1.3 Daily
Suction systems must be disinfected or flushed. To disinfect the suction system:

- Insert the suction hoses to the holes in the side of the cuspidor.
- Pour the disinfectant liquid into the filling hole. Find the location of the container of the flushing liquid from the pictures of chapter 2.2 System Overview.
- Wait until the disinfectant liquid has been sucked out.
- Return the suction hoses to their original positions.

Wipe the exterior surfaces of the hoses with a disinfectant.

If the cuspidor bowl has been used, it should be cleaned with a suitable solution. Disinfecting waterlines daily is highly recommended.

At the end of the day, clean all the surfaces where contamination from secretion is possible using a disinfectant liquid. Clean other surfaces with a suitable detergent.

### 3.1.4 Weekly

Clean and disinfect the suction system.

Artificial leather and genuine leather surfaces must be cleaned with a suitable solution (see 3.1.8 Artificial Leather and 3.1.9 Leather).

Waterlines must be disinfected.

All surfaces should be cleaned with a suitable detergent/disinfectant.

At the start of work week, let water flow through the instruments for at least 10 minutes before starting treatment.

### 3.1.5 Display

Use cleaning solutions designed for cleaning the displays. To disinfect the display, alcohol based solutions can be used. See the display’s user guide for detailed instructions on how to clean and disinfect the display.

### 3.1.6 Operating Light

See the operating light’s user guide for instructions on cleaning the light.

### 3.1.7 Secretion Stains

All the stains from secretion should be cleaned immediately after the treatment of the patient has finished (chloride-based solutions are suggested, concentration at least 1000 ppm or 1‰).

### 3.1.8 Artificial Leather and Textile

To clean artificial leather and textile surfaces it is suggested to use mildly alkaline (pH 8-10) cleaning solutions. Using alcohol-based solution to disinfect the artificial leather or textile is not suggested, because it may make the material more brittle.

### 3.1.9 Leather

To clean genuine leather surfaces, it is suggested to use soap-based cleaning agents that especially intended for cleaning leather surfaces. Do not use acidic or alkaline solutions.

### 3.1.10 Waxing

Waxing the painted surfaces at least once a year is recommended to keep the surfaces easy to clean. Common car waxes can be used.
3.1.11 Flushing of All Instruments

**Warning!**
After using disinfection solutions, remember to flush the water tubing and instrument hoses with fresh water before treating any patients. Follow the disinfectant liquid manufacturer’s instructions.

**Warning!**
Disinfection liquids containing hydrogen peroxide may reduce the effective operating time of the instrument block’s membrane.

This function flushes the instrument hoses and instruments with water for a pre-set time. The water is taken from the clean water bottle or from water main. The instruments are placed on a holder, located on top of the cuspidor bowl. Water goes through the water tubing and instruments and flows into to the drain.

It is also possible to use a disinfection solution in the bottle.

![Flush all instruments switch](image)

Flush all instruments switch

To start the flushing of all instruments, move the switch to the ON position. Flushing will stop automatically after three minutes or when the switch is returned to the OFF position.

3.2 Servicing and Replacing Filters

**Warning!**
There is pressurised tubing inside the connection box.

Suction filters must be checked regularly and replaced before they are filled with debris and stop functioning properly.

The cartridges of the water and air filters inside the Connection Box must be checked and replaced when needed during the annual service.
3.3 Replacing Fuses

⚠️ Warning: High Voltage!
The connection box contains mains voltage. Only qualified service personnel may replace the fuses.

3.4 Remote Foot Control

3.4.1 Pairing the Foot Control with Instrument Bridge or Patient Chair
- Attach the other end of the charging cable to the connector on the foot control’s bottom plate and the other end to the connector of the instrument bridge or of the chair, depending on which one you want to control.
- Pairing is done automatically.
- After this, the charging cable may be detached.

3.4.2 Pairing the Foot Control with Instrument Bridge and Patient Chair
- Attach the other end of the charging cable to the connector on the instrument bridge.
- Press and hold the button 5 on the foot control.
- Attach the other end of the charging cable to the connector on the foot control.
- Receiver in the instrument bridge starts to beep. Release the button 5.
- Before the beeping ends (in 30 seconds), detach the charging cable from the foot control and attach it to the charging connector of the chair.
- If pairing is successful, the beeping will end immediately.

Note! If the beeping stops before successful pairing, perform sections 1–5 again.

3.4.3 Calibration of the Foot Control Lever
- Press and hold down button 5
- Press chair up and down buttons simultaneously
- Turn the lever to the 1 and 2 directions a few times. Make sure the lever is turned to its maximum position.
- Release button 5

3.4.4 Replacing the Batteries

⚠️ Warning!
Only qualified service personnel are allowed to replace the rechargeable batteries.

⚠️ Warning!
The replacement batteries must be of type NiMH AA 1.2 V

The rechargeable batteries will be replaced every other year during the annual maintenance. If you see leaks in the batteries, ask your maintenance person to replace batteries immediately.
3.5 Amalgam Separators, Instruments, Suction Motors, Compressors, and other 3rd Party Devices

Follow the manufacturer’s instructions regarding maintenance, disinfection, sterilization, and service (supplied with the device).

3.6 Replacing the Lithium Battery of the Clock Control Card

The lithium battery is not replaceable. The clock control card has to be replaced instead of the battery.

**Warning!**

*Only qualified service personnel are allowed to replace the electronic cards*

3.7 Clean Water Bottle

The clean water bottle must be changed annually to prevent bursting of the bottle due to ageing of material.

3.8 Tightening the Headrest Lock Mechanism

The movements of the headrest are double-articulated. The headrest can be adjusted around the two axels when the locking lever is in open position. The tightness of the locking system is adjusted with a plastic tool delivered with the system.

*Headrest lock mechanism tightening tool*

Remove the plastic plug on the vertical bar carefully with the chisel end of the tool. Then adjust the tightness of the nut with the key and replace the plug. The plug locks the tightening nut in its place.

3.9 Annual Service Operations

Annual service is described in the F1 Technical Manual. Please contact your local retailer or manufacturer to obtain it.
4 Product Information and Safety

4.1 Device Label

The device label holds the product name, serial number, the year of manufacture, CE-mark and classifications.

![Device label diagram]

4.2 Intended Use

This dental treatment system is intended for diagnosis, therapy and dental treatment of persons by properly trained personnel.

4.2.1 Expected Service Life

The expected service life of F1 Dental Treatment system is 10 years. The manufacturer ensures that the System is safe, for at least this period of time, when serviced according to the manufacturer’s instructions. In normal conditions, the system is suitable for operation for a longer period of time than this. The manufacturer ensures that spare parts are available at least for this time period.

4.2.2 Limitations of Use

**Warning!**

*To avoid the risk of fire, this equipment must not be used with flammable anaesthetics.*

The maximum allowed weight of the patient on the chair with unit attached to it is 135 kg. The maximum allowed weight on the tray is 1 kg.

The system is designed to be used at altitudes below 2,000 meters. The electrical safety of the system may be inadequate in altitudes above 2,000 meters.
The maximum allowed oxygen level during use is 25%. The system is not designed to be operated in oxygen-rich environments.

4.3 Manufacturer's Guarantee

The product comes with a 24-month manufacturer's guarantee starting from the day of purchase.

The product must be registered to Fimet Oy. Registration can be done on Fimet’s website (www.fimet.fi) or by filling and returning a correctly filled Registration Form to Fimet. The registration instructions and the registration form are inside the unit manual folder. Guarantee is only valid after successful registration. The end user is responsible for completing registration.

The product must be maintained according to the instructions in section 4.5 Maintenance.

The product must be maintained according to the instructions in section 4.5 Maintenance.

Third party devices (like instruments and separation systems) are guaranteed by their manufacturer and thus excluded from Fimet Oy’s guarantee. Fimet Oy will take care of replacement of faulty device with the manufacturer, if the device was bought from Fimet Oy.

Manufacturer’s guarantee covers the parts to be replaced, but not the installation work. The guarantee time of the replaced parts is limited to the guarantee period of the product.

Manufacturer’s guarantee does not cover defects caused by the following:

- normal wear and tear
- improper installation, maintenance, repair, care, use, or service of the device, or part of it
- using non-compliant parts, for example instruments without CE-mark
- mains power surges, shortages or outages (such as lightning discharges)
- external causes (for example fires, floods, or vandalism).

The manufacturer or the vendor is not responsible for any damage caused by user failing to react to error notifications.

4.4 Installation and Service

**Warning!**

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

The installation procedure is described in the F1 Technical Manual.

For the warranty to be valid:

- Installation and service must be carried out by a service provider authorized by Fimet Oy.
- The safety of the product has to be evaluated after repairs and any modifications according to EN ISO 60601-1:2006.

The product must be serviced according to the schedule defined in section 3.9 Annual Service Operations.

4.5 Maintenance

Read the section 3 Maintenance to ensure the safe use of the device.
4.6 Classifications and Ratings

<table>
<thead>
<tr>
<th>Type of classification</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical Device Directive:</td>
<td>Ila (Chair alone: I)</td>
</tr>
<tr>
<td>Protection against electric shock:</td>
<td>Class I</td>
</tr>
<tr>
<td>Protection against electric shock, applied part:</td>
<td>Type B</td>
</tr>
<tr>
<td>IP classification:</td>
<td>IPX0, No special protection</td>
</tr>
<tr>
<td>IP classification of remote Foot Control:</td>
<td>IPX1, protected against dripping water</td>
</tr>
<tr>
<td>Mode of operation:</td>
<td>Continuous (Chair alone: non-continuous)</td>
</tr>
<tr>
<td>Electrical Rating:</td>
<td>100 V AC, 50/60 Hz, 450 VA (PS150C1/100, PS150C2/100)</td>
</tr>
<tr>
<td></td>
<td>110 V AC, 50/60 Hz, 450 VA (PS150C1/110, PS150C2/110)</td>
</tr>
<tr>
<td></td>
<td>115 V AC, 50/60 Hz, 450 VA (PS150C1/115, PS150C2/115)</td>
</tr>
<tr>
<td></td>
<td>220 V AC, 50/60 Hz, 450 VA (PS150C1/220, PS150C2/220)</td>
</tr>
<tr>
<td></td>
<td>230 V AC, 50/60 Hz, 450 VA (PS150C1/230, PS150C2/230)</td>
</tr>
<tr>
<td></td>
<td>240 V AC, 50/60 Hz, 450 VA (PS150C1/240, PS150C2/240)</td>
</tr>
<tr>
<td></td>
<td>100 V AC, 50/60 Hz, 600 VA (PS2150C1/100, PS2150C2/100)</td>
</tr>
<tr>
<td></td>
<td>110 V AC, 50/60 Hz, 600 VA (PS2150C1/110, PS2150C2/110)</td>
</tr>
<tr>
<td></td>
<td>115 V AC, 50/60 Hz, 600 VA (PS2150C1/115, PS2150C2/115)</td>
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<td>220 V AC, 50/60 Hz, 600 VA (PS2150C1/220, PS2150C2/220)</td>
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<td></td>
<td>230 V AC, 50/60 Hz, 600 VA (PS2150C1/230, PS2150C2/230)</td>
</tr>
<tr>
<td></td>
<td>240 V AC, 50/60 Hz, 600 VA (PS2150C1/240, PS2150C2/240)</td>
</tr>
</tbody>
</table>

4.7 Information about Electromagnetic Compatibility

The information in this chapter has to be considered when installing and using the F1 product family. Portable and mobile RF communications equipment, for example mobile phones, can affect the functionality of F1 products.

<table>
<thead>
<tr>
<th>Guidance and manufacturer’s declaration – electromagnetic emissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emissions test</td>
</tr>
<tr>
<td>RF emissions</td>
</tr>
<tr>
<td>CISPR 11</td>
</tr>
<tr>
<td>Harmonic emissions</td>
</tr>
<tr>
<td>IEC 61000-3-2</td>
</tr>
<tr>
<td>Voltage fluctuations/</td>
</tr>
<tr>
<td>flicker emissions</td>
</tr>
<tr>
<td>IEC 61000-3-3</td>
</tr>
</tbody>
</table>
### Guidance and manufacturer’s declaration – electromagnetic immunity

The F1 products are intended to be used in the electromagnetic environment specified below. The customer or the user of the F1 products should assure that it is used in such an environment.

<table>
<thead>
<tr>
<th>Immunity test</th>
<th>IEC 60601 test level</th>
<th>Compliance level</th>
<th>Electromagnetic environment - guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrostatic discharge (ESD) IEC 61000-4-2</td>
<td>± 6 kV contact</td>
<td>± 2, ± 4, ± 6 kV contact discharge</td>
<td>Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, relative humidity should be at least 30%.</td>
</tr>
<tr>
<td></td>
<td>± 8 kV air</td>
<td>± 2, ± 4, ± 8 kV air discharge</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>± 2, ± 4, ± 6 kV indirect contact discharge</td>
<td></td>
</tr>
<tr>
<td>Electrical fast transient/burst IEC 61000-4-4</td>
<td>± 2 kV for power supply lines</td>
<td>± 2 kV for power supply lines</td>
<td>Mains power quality should be that of a typical commercial or hospital environment.</td>
</tr>
<tr>
<td></td>
<td>± 1 kV for input/output lines</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surge IEC 61000-4-5</td>
<td>± 1 kV line(s) to line(s)</td>
<td>± 0.5, 1 kV line(s) to line(s)</td>
<td>Mains power quality should be that of a typical commercial or hospital environment.</td>
</tr>
<tr>
<td></td>
<td>± 2 kV line(s) to earth</td>
<td>± 0.5, 1, 2 kV line(s) to earth</td>
<td></td>
</tr>
<tr>
<td>Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11</td>
<td>&lt;5 % (U_T) (&gt;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 &lt;5 % (U_T) (&gt;95 % dip in (U_T)) for 5 s</td>
<td>&lt;5 % (U_T) (100 % 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 &lt;5 % (U_T) (100 % dip in (U_T)) for 5 s</td>
<td>Mains power quality should be that of a typical commercial or hospital environment. If the user of the Fimet F1 requires continued operation during power mains interruptions, it is recommended to power the Fimet F1 from an uninterruptible power supply or a battery.</td>
</tr>
</tbody>
</table>

### Guidance and manufacturer’s declaration – electromagnetic immunity

The F1 products are intended for use in the electromagnetic environment specified below. The customer or the user of the F1 products should assure that it is used in such an environment.

<table>
<thead>
<tr>
<th>Immunity test</th>
<th>IEC 60601 test level</th>
<th>Compliance level</th>
<th>Electromagnetic environment - guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conducted RF IEC 61000-4-6</td>
<td>3 Vrms 150 kHz to 80 MHz</td>
<td>3 V</td>
<td>Portable and mobile RF communications equipment should be used no closer to any part of the F1 product, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Recommended separation distance</td>
</tr>
<tr>
<td>Radiated RF IEC 61000-4-3</td>
<td>3 V/\text{m} 80 MHz to 2.5 GHz</td>
<td>3 V/\text{m}</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**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 use location of the Fimet F1 exceeds the applicable RF compliance level above, the Fimet F1 should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocating the Fimet F1.
- b) Over the frequency range 150 kHz to 80 MHz, field strengths should be less than \([\text{V/m}]\).
The Fimet F1 is intended for use in an electromagnetic environment where radiated RF disturbances are controlled. The customer or the user of the Fimet F1 can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the Fimet F1 as recommended below, according to the maximum output power of the communications equipment.

<table>
<thead>
<tr>
<th>Rated maximum output power of transmitter W</th>
<th>Separation distance according to frequency of transmitter m</th>
</tr>
</thead>
<tbody>
<tr>
<td>150 kHz to 80 MHz</td>
<td>$d = 1.17 \times \sqrt{P}$</td>
</tr>
<tr>
<td>80 MHz to 800 MHz</td>
<td>$d = 1.17 \times \sqrt{P}$</td>
</tr>
<tr>
<td>800 MHz to 2.5 GHz</td>
<td>$d = 2.33 \times \sqrt{P}$</td>
</tr>
<tr>
<td>0.01</td>
<td>0.12</td>
</tr>
<tr>
<td>0.1</td>
<td>0.37</td>
</tr>
<tr>
<td>1</td>
<td>1.17</td>
</tr>
<tr>
<td>10</td>
<td>3.69</td>
</tr>
<tr>
<td>100</td>
<td>11.67</td>
</tr>
</tbody>
</table>

For transmitters rated at a maximum output power not listed above, the recommended separation distance $d$ in meters (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.

### 4.8 Environmental Specifications

<table>
<thead>
<tr>
<th>Variable</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>During storage and transport</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Humidity</td>
<td>10%</td>
<td>95%</td>
</tr>
<tr>
<td>Temperature</td>
<td>-40°C</td>
<td>70°C</td>
</tr>
<tr>
<td>Temperatures for display and IDIS</td>
<td>-20°C</td>
<td>60°C</td>
</tr>
<tr>
<td>Air pressure</td>
<td>50 kPa (0.5 bar)</td>
<td>106 kPa (1.06 bar)</td>
</tr>
<tr>
<td><strong>During use</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Humidity</td>
<td>30%</td>
<td>75%</td>
</tr>
<tr>
<td>Temperature</td>
<td>10°C</td>
<td>35°C</td>
</tr>
<tr>
<td>Air pressure</td>
<td>80 kPa (0.8 bar, ca. 2,000 m above sea level)</td>
<td>102 kPa (1.02 bar, ca. 60 m below sea level)</td>
</tr>
</tbody>
</table>

Using the product in a moving vehicle is prohibited.

### 4.9 Connections to Networks

<table>
<thead>
<tr>
<th>Variable</th>
<th>Nominal</th>
<th>Min</th>
<th>Max</th>
<th>Min Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water pressure</td>
<td>150 kPa (1.5 bar)</td>
<td>300 kPa (3 bar)</td>
<td></td>
<td>5 l/min</td>
</tr>
<tr>
<td>Air pressure</td>
<td>550 kPa (5.5 bar)</td>
<td>800 kPa (8 bar)</td>
<td></td>
<td>60 l/min</td>
</tr>
<tr>
<td>Drainage diameter</td>
<td>25 mm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suction</td>
<td>50 m³/h 500 mm H₂O</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electricity</td>
<td>230 V AC / 50 Hz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power</td>
<td>600 W</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current</td>
<td>3 A</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4.10 Error, Warning and Information Displays

When there's a problem, the device informs the user of what has happened by displaying error codes. The error code is shown on the display of the chair's rear panel.

The program version of the device is shown on the display when the power is switched on. This information can be helpful when trying to troubleshoot reasons for problems.

The error code consists of two numbers which are shown one after the other on the display. The first digit of the error code identifies the problem area: 1 for lifting motor, 2 for backrest motor, and 5 for potentiometer errors.

In case several problems occur at the same time, the error with a lower number is shown. For example, when the voltage is low for both motors, the error code shown is 10 (not 20).

**Chair control panel**

**Error codes during start-up**
- 10: Low or missing voltage for motors
- 12\(^{(1)}\): A wire to the lifting motor is broken
- 13\(^{(1)}\): Wires to the lifting motor are shorted
- 20\(^{(1)}\): Low or missing voltage for motors
- 22\(^{(1)}\): A wire to the backrest motor is broken
- 23: Wires to the backrest motor are shorted
- 50\(^{(2)}\): A lifting motor potentiometer wire or the potentiometer is defective.
- 51\(^{(2)}\): A lifting motor potentiometer wire or the potentiometer is defective.
- 52\(^{(2)}\): A back rest motor potentiometer wire or the potentiometer is defective.
- 53\(^{(2)}\): A back rest motor potentiometer wire or the potentiometer is defective.
- 54: Lift movement limits are too close to each other or too close to the mechanical limit.
- 55: Back rest movement limits are too close to each other or too close to the mechanical limit.
- 56: Lift movement limits are out of range (e.g. upper limit < lower limit).
- 57: Backrest movement limits are out of range (e.g. upper limit < lower limit).
- E: EEPROM is defective.
- EE: EEPROM is defective.
- U: Communication with Unit adapter failed. Unit has been disabled.
- 8: Processor is in reset-state. (Buzzer is usually on at the same time.)
- 0 Blinking: One of the safety switches is pressed.

All other codes mean that the main PCB is defective.

\(^{(1)}\) Probable fault. Faulty main PCB may also be the reason for the error code.

\(^{(2)}\) These codes are also displayed if the potentiometers are mechanically turned to their maximum or minimum values.

**During use**
- E: Attempted to store position on memory slot 1 (backrest down).
- H: Motor duty cycle reached.
- U: The device has been reset while using an instrument, and unit has been disabled.
- A: The battery needs recharging.
During manual movement
If movement stops abnormally, an error code is shown on the display.
- 5: Software current limit of the motor has been exceeded.
- 6: Hardware current limit of the motor has been exceeded.
- 7: Lower software movement limit has been reached.
- 8: Upper software movement limit has been reached.
- 9: No movement; the value of the position potentiometer doesn't change.
- No code shown: Communication between the remote foot control and the chair has been disturbed.
- 0: Normal

During automatic movement
If movement stops abnormally, an error code is shown on the display in the following manner:
- 1X2Y, where X and Y are replaced with error codes listed above. 1 is for lift motor and 2 is for back rest motor.

For example, error code 1520 means that lift motor has been stopped because the current was too high (1 for lift motor, 5 for software current limit reached). The back rest motor was ok (2 for backrest motor, 0 for OK). The actual reason for the stoppage could be a mechanical obstacle under the seat.
- F: Automatic movement has been stopped by a new command.

4.11 General Warnings

⚠️ **Warning!**
*Connecting devices not compliant with IEC 60601-1 or IEC 60950 may cause an electric shock hazard.*

⚠️ **Warning!**
*Do not touch non-medical devices and the patient simultaneously. There is a risk of electric shock.*

4.12 Fuses
See chapter 3.3 *Replacing Fuses* for details.
4.13 Safety Devices

**Warning!**
To prevent damage to the system, check that nothing is obstructing the movement of the chair.

**Chair safety devices**

The safety switches stop the chair movement when there is an obstacle preventing the movement. The safety switches protect the user from injuries in case of accidental misuse.

If the safety switch is activated, remove the obstructing object and continue working.

4.14 Temperature Limiters

The transformer is equipped with a temperature limiter. It prevents the temperature from rising above predefined levels. This can happen if the chair is operated excessively without adequate pauses.

The lift motor is equipped with software which measures active versus idle time. If the limit ratio is exceeded, operation is stopped for a certain period of time.

4.15 Programmed Safety Limits

The product logic stops movement before the mechanical limits are reached. The programmed safety limits are intended to protect the device against breakage.
4.16 Limit Switches
The movements of the seat and backrest are limited with fixed limit switches to prevent any damages and dangers in case of misadjusted programmable limits.

4.17 Waste Handling
All waste generated during the use of the product must be recycled or disposed of in a way safe for both people and the environment. This must be done in compliance with all applicable national regulations.

4.18 Disposal of the Device
The directive 2002/96/EC (WEEE, Waste Electrical and Electronic Equipment) regulates the disposal of this product in Europe. Do not dispose of the device or any part of it with normal household waste.
Prior to disassembly/disposal of the product, it must be fully prepared (cleaned/disinfected/sterilized).
The device may also be disposed of by the manufacturer, if no other adequate way is possible (transportation paid by the user).
The rechargeable NiMH batteries of the remote Foot Control and the lithium battery on the clock control card casing must be disposed of according to directive 2006/66/EC (batteries and accumulators and waste batteries and accumulators).
## Troubleshooting

<table>
<thead>
<tr>
<th>Problem description</th>
<th>Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>No warm water from instruments.</td>
<td>Instrument water heater thermal cut-out device has been activated.</td>
<td>Press down the button on thermal cut-out device to restore operation. Contact service personnel if this re-occurs.</td>
</tr>
<tr>
<td>Remote Foot Control does not function or functions intermittently.</td>
<td>Rechargeable batteries are empty.</td>
<td>Charge the batteries by connecting the charging cable.</td>
</tr>
<tr>
<td></td>
<td>Rechargeable batteries have leaked.</td>
<td>Ask the maintenance person to replace the batteries.</td>
</tr>
<tr>
<td></td>
<td>Device pairing is lost.</td>
<td>Pair the devices according to instructions in 3.4.1 or 3.4.2.</td>
</tr>
<tr>
<td>Remote Foot Control does not function at all without the charging cable.</td>
<td>Rechargeable batteries are loose.</td>
<td>Ask the maintenance person to return the batteries in their places.</td>
</tr>
<tr>
<td>Suction does not work and beeping noise is heard.</td>
<td>Metasys amalgam separator's waste container is full.</td>
<td>Empty the container according to the manufacturer's instructions.</td>
</tr>
</tbody>
</table>
1 Appendix A – Dimensions and space requirements

1.1 Dimensions – F1
1.2 Dimensions – F1 Cab

![Diagram of F1 Cab dimensions](image)
1.3 Dimensions – F1 Cart
1.4 Dimensions – F1 Prime

[Diagram showing dimensions and technical details for F1 Prime.]
1.5 Dimensions – F1 Side