XO FLEX

INSTALLATION INSTRUCTIONS

CONTENTS

1 INTRODUCTION

Dear XO service provider,

Please read this manual carefully before you start installing XO FLEX.

In the document “XO FLEX Instructions for Use” you will learn more about:

- how the unit is operated
- how the unit is configured
- infection control procedures
- maintenance
- lists of accessories, detachable parts and consumables
- legal information

You will also find a Quick Guide explaining its operation in one page.

Please visit xo-care.com for other installation instructions, service and repair instructions and schematics.

Best regards
XO CARE A/S service team

	***XO FLEX unit must be installed by an XO authorized service provider. Authorized service providers are listed under “Distributors” at xo-care.com.***

	***WARNING: No unauthorized modification of this equipment is allowed!***

	***Please fill out all fields in the enclosed installation report using CAPITAL LETTERS and submit the report to technicalservice@xo-care.com immediately after the installation.***

2 INSTALLATION REQUIREMENTS

2.1 SUPPLIES AND CONNECTIONS

Before installing the unit, please make sure that the installation supply requirements listed in Table 1 are fulfilled.

Table 1 – Installation requirements

Electrical	Requirement	Length above floor surface
Mains supply	230 VAC ± 10%, 50 Hz. PVC cable rated for >75° with earth and min. 3 x 1.5 mm^2. Main fuse: the electrical installation must be secured with a 10 A fuse.	75 cm
Equipotential earth (if required by national law)	1 x 4.0 mm^2	
Assistant call control cable	Min. 2 x 0.1 mm^2 and max. 2 x 1.25 mm^2 Max. 2 A / 60 VDC or 2 A / 25 VAC	75 cm
X-ray unit attached to the XO unit	Cable for X-Ray must have its own installations pipe. Cable shall be connected to an installation box in the floor.	
Suction motor control cable	Min. 2 x 0.1 mm^2 and max. 2 x 1.25 mm^2 Max. 2 A / 60 VDC or 2 A / 25 VAC	75 cm
Positioning of cables in the floor	See installation drawing YB-235.	
Data	**Requirement**	**Length above floor surface**
Isolation transformer	When connecting the external PC to the unit, the external PC must be equipped with a medical grade power supply or be powered via a medical grade isolating transformer! XO part number: XO-620.	
RS-232 cable	Connect unit and external PC through a RS-232 cable, male/female. Connect the cable's male connector to the unit end.	70 cm
XO HD Display	Connect XO HD Display and an external PC through a HDMI cable. Depending on the environment, it might be necessary to use an HDMI amplifier with the HDMI cable.	10 cm
Intraoral video camera	Connect the intraoral video camera to an external PC through a USB A cable male/female. The cable's female connector is in the unit end. It is recommended to use a USB Extension 10 m cable with Repeater.	USB extension cable: 20 cm
Suction, air and water	**Requirement**	**Height above floor surface**
Suction	Suction machine power >600 l/min. Vacuum pressure at the connection point under static conditions: Min = 35 mbar, Max = 150 mbar. Plastic pipe Ø 32 mm with socket – see YB-235.	6 cm max.
Incoming (compressed) air	Pipe 3/8" female internal thread – preferably fitted with a ball valve – see YB-235.	7 cm max.

<table>
<tr><td></td><td>Incoming air:
• Air pressure 5.5 – 7.5 bar
• Air flow rate > 55 l/min
• Humidity dew point < -20°C at atmospheric pressure
• Oil contamination max. 0.5 mg/m^3
• Particulate contamination < 100 particles/m^3 (particle size 1 – 5 µm)
If the incoming air pressure exceeds 7.5 bar, a reduction valve must be fitted.
Air quality must be in accordance with local air regulations.</td><td></td></tr>
<tr><td>Incoming water</td><td>Pipe 3/8” female internal thread – preferably fitted with a ball valve – see YB-235.
Incoming water:
• Inlet pressure 2.5 – 6 bar
• Water flow rate > 5 l/min
• pH: 6.5 – 8.5
• Maximum particle size < 100 µm
If the incoming water pressure exceeds 6 bar, a reduction valve must be mounted in front of the unit.
Water quality must be in accordance with local drinking water regulations.
Maximum inlet water conductivity: 850 µS/m</td><td>7 cm max.</td></tr>
<tr><td>Replace XO water softener filter cartridge (UH-200).</td><td><table><tr><th>Water hardness °dH</th><th>Filter replacement interval</th></tr><tr><td>1 - 12</td><td>Every 12 months (part of preventive service)</td></tr><tr><td>13 - 22</td><td>Every six months</td></tr><tr><td>23 -</td><td>Every three months</td></tr></table></td><td></td></tr>
<tr><td>Backflow prevention</td><td>If the unit is <u>not</u> supplied with “unit backflow water prevention”, it must have an external backflow prevention device at the connection point with the water supply, or an air gab of at least 20 mm.</td><td></td></tr>
<tr><td>Drain</td><td>Plastic pipe Ø 32 mm with socket – see YB-235.
Gradient of waste water lines <u>≥</u> 1%
Drainage capacity <u>≥</u> 10 l/min</td><td>6 cm max.</td></tr>
</table>

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

To avoid the risk of electric shock, always switch off the power to the unit in the electrical panel before opening or touching the internal components.

When connecting an external PC to the unit, the external PC must be powered by a medical grade isolating transformer!
Equipment connected to USB and RS-232 connections, must conform with IEC 60950-1.

	***Incoming water must be in accordance with local drinking water regulations.***

	***If the unit is not supplied with "backflow water prevention", an external backflow prevention with an air gap of at least 20 mm is required.***

	***If the incoming water pressure exceeds 6 Bar, a reduction valve must be mounted in front of the unit.***

	***To ensure correct operation of the unit, the compressor must be an oil-free type and fitted with an air dryer.***

	***If the incoming air pressure exceeds 7 Bar, an appropriate reduction valve must be fitted.***

2.2 DIMENSIONS OF OPERATORY

XO FLEX is intended to be permanently installed in a dental operatory at least 220 cm wide and 360 cm long[1] – see Figure 1. Please also see the installation drawing in a scale of 1:20 (YB-231) and the installation plan in a scale of 1:1 (YB-235).

	***Please check drawings YB-231 and YB-235 carefully before finalizing the placement of the XO FLEX unit in the operatory.***

2.2.1 CEILING HEIGHT

	***The ceiling height of the room should preferably be 255 cm for easy installation of operating light arm – minimum height is 245 cm!***

2.2.2 OPERATING AND TRANSPORT CONDITIONS

Table 2 – Operating and transport conditions

Condition	Operation	Transport and storage
Temperature:	+15°C – +35°C	-40°C – +70°C

[1] Note: This dimension depends on the depth of the cabinets – in the example shown in Figure 1 the cabinets are 50 cm deep

Relative humidity:	20% – 95%	10% – 95%
Air pressure:	700 hPa – 1060 hPa	700 hPa – 1060 hPa
Installation altitude	Max. 2,000 meters above sea level	-

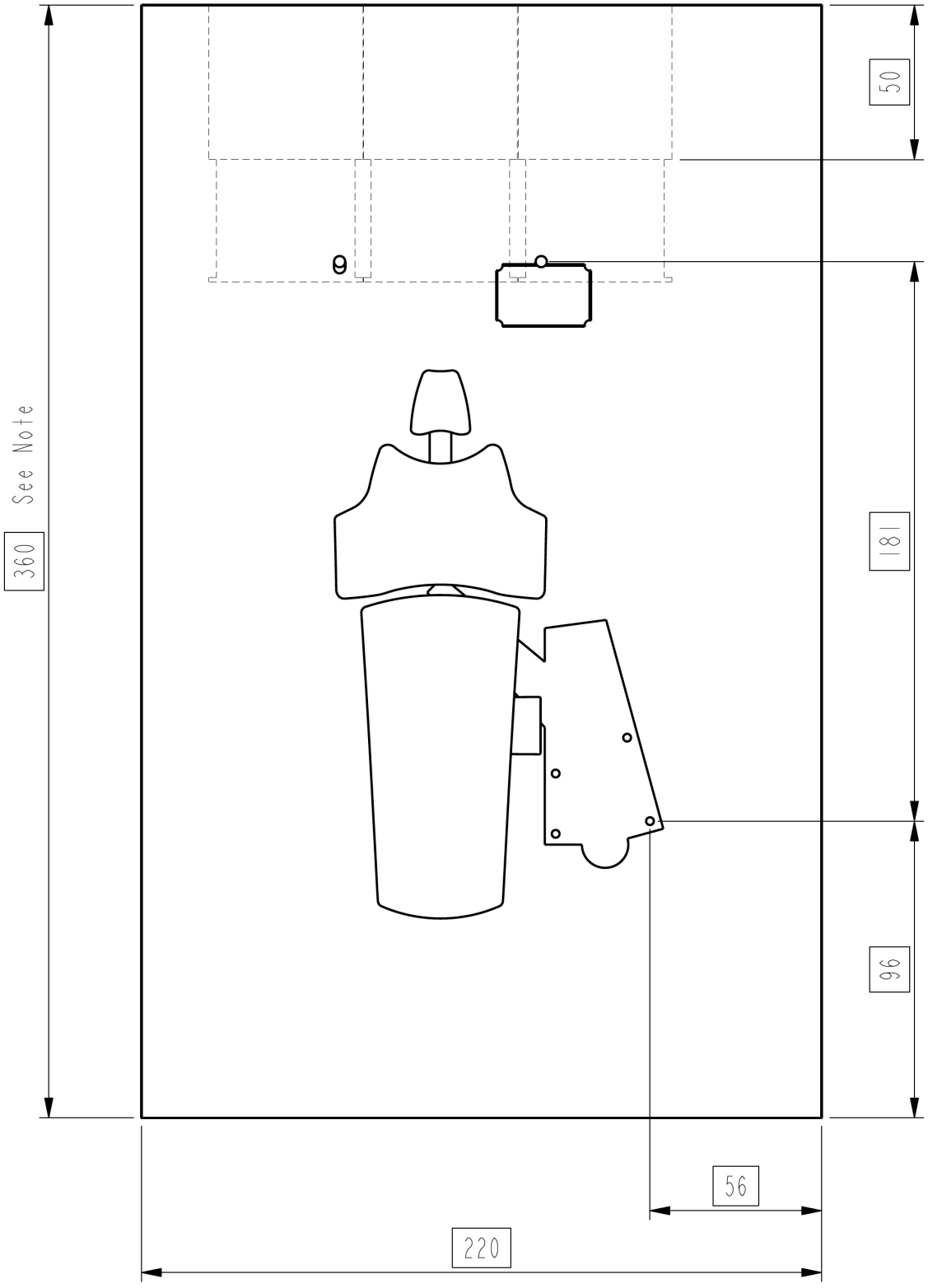

Figure 1 – Plan of installation – XO FLEX (1:20)

2.2.3 FLOOR

Please make sure that the floor construction is designed to carry the weight of the unit and withstand the forces generated.

The load-bearing capacity of the floor must be ≥ 500 kg/m².
The floor must have a tensile strength to accommodate a force on the four mounting bolts (see section 5.2.1 and 5.2.2) of ≥ 8kN.

Using the supplied expansion anchors and screws, the unit shall preferably be fixed to a concrete floor with the following minimum characteristics:

- Concrete class C20/25 to C50/60, not cracked
- Mounting bolts to be fixed at least 120 mm from the edge or other openings in the concrete

If the operatory has a wooden floor you must make sure that the floor construction is stable enough to withstand the forces applied from the unit to the floor.

If it is not possible to drill holes in the floor or if the floor is not stable enough, the unit can be installed on a steel mounting plate available at XO CARE – see section 5.2.7.

2.3 FUSE REPLACEMENT

Fuses shall be according to the specifications in Table 3.

Table 3 – Fuses

PCB name	Part no.	Fuse identifier	Specifications	Dimensions
Mains PCB	AP-005	F2	T8.0AL / 250 VAC	5 x 20 mm
		F6	T3.15AL / 250 VAC	5 x 20 mm
Power Supply PCB	AN-371	F11	T8.0AL / 250 VAC	5 x 20 mm
		F12	T8.0AL / 250 VAC	5 x 20 mm
		F13	T10.0AL / 250 VAC	5 x 20 mm
		F14	T10.0AL / 250 VAC	5 x 20 mm
Stand Control PCB	AO-891	F1	T2.0AL / 125 VAC	SMD*
Bridge PCB	AN-368	F1	T3.0AL / 125 VAC	SMD*

*Surface mounted device

3 NECESSARY TOOLS

The following tools are necessary for installing, adjusting and servicing the XO FLEX unit:

3.1 STANDARD TOOLS

- Hammer drill for at least 18 mm concrete drill bit (SDS-system recommended)
- Carbide drill bit for concrete 18 mm (SDS-system)
- Carbide drill bit for concrete 10 mm (SDS-system)
- Wood bit 6 mm and 8 mm
- Spirit level 20 – 30 cm
- Combination wrench 17, 19 and 22 mm
- Socket spanner with extension 19 mm
- Torx screwdriver: T8, T9, T10, T15, T20, T25, T30 and T40
- Pozidrive screwdriver: PZ 1-2-3
- Allen key set: 1.5 – 10 mm
- Digital multimeter

3.2 SPECIAL TOOLS SUPPLIED WITH THE UNIT

- Special wrench (MG-416)

3.3 NECESSARY SPECIAL TOOLS AVAILABLE FROM XO CARE

- Manometer, four holes, Midwest – for adjustment and control of drive air pressure to air instrument (turbine) (FA-041)
- Four carrying handles for the unit stand (AN-181)
- Flowmeter – for adjustment and control of cooling air for motor (FA-400)
- Antistatic wristband (UC-600)
- Drill template 1:1 (AP-919)

3.4 OTHER SPECIAL NECESSARY TOOLS

- Torque wrench 75 Nm
- Two component flame retardant foam: Würth part nr 0893 303 200

4 TRANSPORTATION AND UNPACKING

4.1 TRANSPORT

	***Upon arrival, check that no boxes suffered transportation damage.*** ***Any signs of damage must be noted on the shipping documents and the transport company / forwarding agent must be contacted.***

	***If the "shock indicator" attached to the patient chair box has turned red – please unpack the chair immediately and check that the chair did not suffer any damage!***

4.2 UNPACKING

XO FLEX is delivered on two pallets, containing 4–8 boxes, depending on the configuration.

Figure 2 – XO FLEX packed in boxes

The boxes contain the following:

A. Unit stand, including foot control, installation kit, panels, instructions for use and accessories
B. Unit mounting plate
C. HD display
D. Operating light
E. XO Stool / XO Seat
F. Instrument bridge and suction hoses
G. Patient chair with upholstery

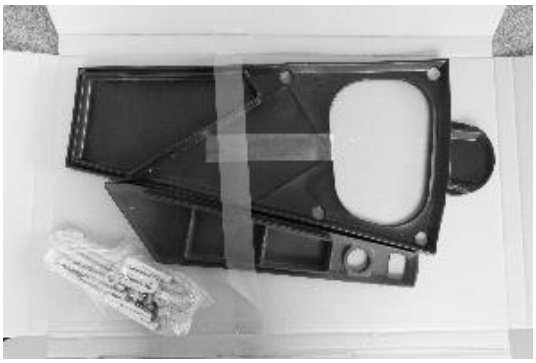

Figure 3 – Installation kit

Figure 4 – Unit stand

Figure 5 – Instrument bridge

Figure 6 – Operating light

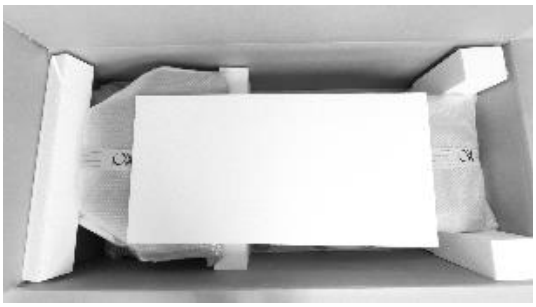

Figure 7 – Patient chair

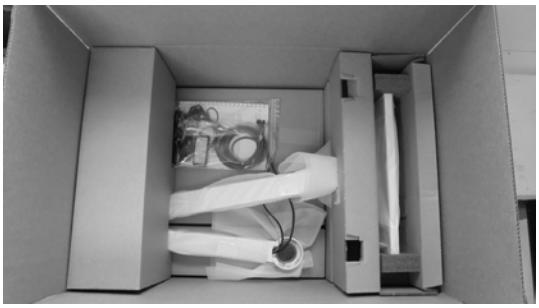

Figure 8 – XO HD Display

Figure 9 – Instruments

Figure 10 – Panels

Open the boxes and check that the goods delivered correspond to the goods ordered. Then start to unpack the unit stand. If possible, leave the other components in the boxes until you need them.

	***The unit stand must only be lifted at its base using the carrying handles.*** ***Never lift the stand at its top or in other ways!***

5 INSTALLATION

5.1 INSTALLATION KIT

The included installation kit contains all necessary components for the installation – both for installation on concrete floor, wooden floor or on a steel installation plate.

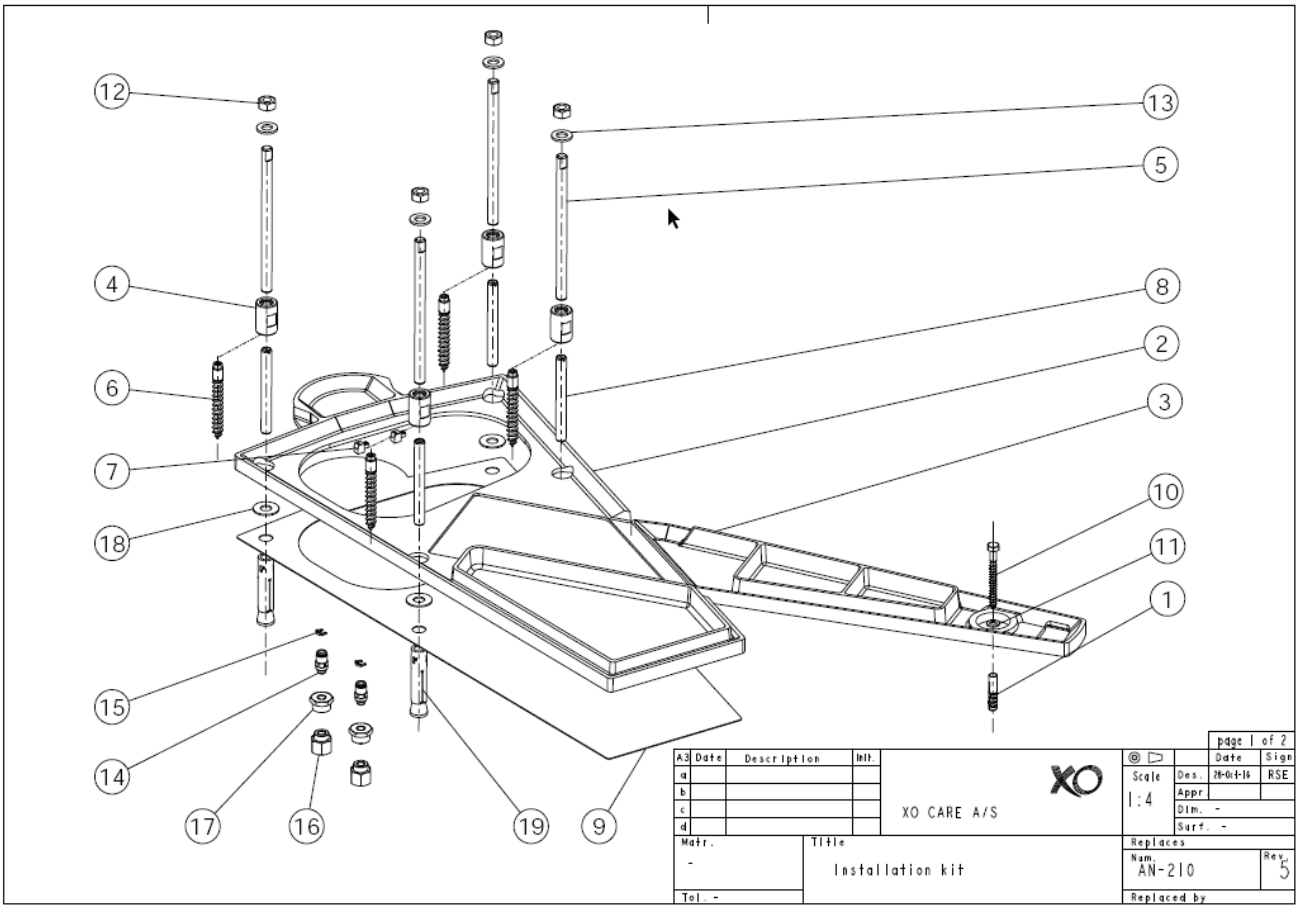

Figure 11 – Installation kit (AN-210)

5.2 INSTALLATION OF THE UNIT STAND

Make sure to place the unit stand correctly in the operatory. See Figure 1.

	Prior to drilling holes in the floor, be sure that the supplies and connections have been laid out correctly in accordance with the requirements mentioned in section 2.1.

Start by placing the 1:1 installation plan (YB-235) on the floor and mark the five hole-positions shown on the drawing.
For this purpose, a steel drill template can be supplied (AP-919).

	As the floor in the dental operatory is not completely horizontal the unit stand is designed to be installed on bushings and lifted about 5 mm from the floor surface. To tighten the gap between floor and unit base a rubber gasket is supplied.

5.2.1 INSTALLATION OF THE UNIT IN A CONCRETE FLOOR

1. Drill four holes for fitting the unit stand. Use drill Ø18, drilling depth min. 105 mm.
2. Drill one hole for fitting the support leg. Use drill Ø10, drilling depth min. 80 mm.

	Make sure to drill the holes precisely with a tolerance of ± 2 mm. Also, be sure to drill the holes perpendicular to the floor surface. If the above is not completely respected, it will be difficult to push the rods through the holes of the unit base!

3. Remove dust from the holes.
4. Fit four expansion Ø18 anchors – (18) in Figure 11 – and one Ø10 expansion plug – (1) in Figure 11 – into the holes, flush with the floor surface, using a hammer.
5. Assemble the four parts as shown in Figure 12 – see also parts (4), (8) and (17) in Figure 11.

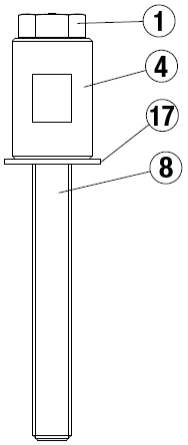

Figure 12 – Pre-assembly of mounting accessories

6. Use this assembly to secure the expansion anchors. Use a torque wrench and tighten to 75 Nm.
7. Once the expansion anchors are tightened to the correct torque, remove the hex cap screw at the top (1) in Figure 12. Use a wrench to hold the bushing (4) in Figure 12, while unscrewing the hex cap screw.
8. Remove the bushings and the washers and place the fire protection plate (9) in Figure 11. Re-mount the washers and the bushings and continue at 5.2.4

5.2.2 INSTALLATION OF THE UNIT STAND IN A WOODEN FLOOR STRUCTURE

1. Start by drilling the hole to fix the supporting leg, Ø 6 mm.
2. Then drill the four other holes, Ø 8 mm.

	***Make sure to drill the holes precisely with a tolerance of ± 2 mm.*** ***Also, be sure to drill the holes perpendicular to the floor surface.*** ***It the above is not completely respected, it will be difficult to push the rods through the holes of the unit base!***

3. Insert the four mounting bolts – (6) in Figure 11 – in the 8 mm holes and tighten the screws until the heads are approx. 24 mm above the floor surface.
4. Place the fire protection plate (9) in Figure 11.
5. Fit four washers – (17) in Figure 11 – and four bushings – (4) in Figure 11.
6. Turn the bushings until they rest on the floor.

5.2.3 SEAL OPENING IN THE FLOOR

If the unit is supplied with, for example, air, water or power from an opening in the floor, the opening must be sealed with a flame-retardant foam as a precaution to prevent the spread of fire.

Two-component flame retardant foam from Würth (part number 0893 303 200) must be used.

The flame-retardant foam should be level with the floor, cover the entire opening in the floor and seal all around the edges of the fire protection plate.
If the hole in the floor for the ground installations is deep, rockwool can be used to fill out the hole and create a support for the flame-retardant foam.

Figure 13 – sealing the floor installations with flame-retardant foam

5.2.4 POSITIONING THE UNIT STAND

Position the four long rods – (5) in Figure 11 – in the bushings.

	***Check that the bushings and long rods are perpendicularly in the floor using a spirit level.*** ***If the long rods are out of level, try to straighten out the bushings by applying force to the side of the bushings.***

Remove the four long rods to make installation of the unit easier.

Place the rubber unit base gasket on the floor over the long rods, as shown in Figure 14 and Figure 15.

Lift the unit stand and place it carefully on top of the rubber gasket, and make sure that the four bushings in the floor are placed precisely under the four adjustment nuts in the unit base.

Figure 14 – Positioning of the rubber gasket

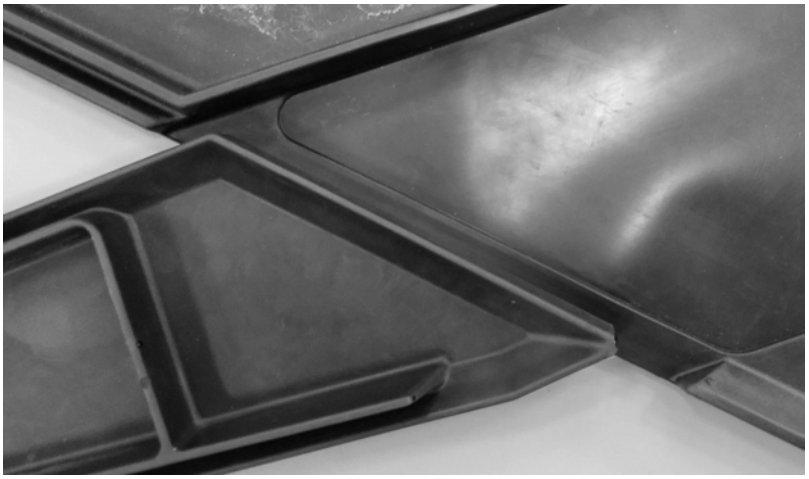

Figure 15 – Positioning of the two parts

When lifting the unit stand, use the carrying handles – see Figure 16.

Figure 16 – Lifting the unit stand

Adjust the rubber gasket for accurate positioning under the unit base and the supporting leg.

Place an 8mm washer – (10) in Figure 11 – and an M8 screw – (9) in Figure 11 – loosely into the supporting leg.

Insert the four long rods – (5) in Figure 11 – through the four holes of the unit base into the bushings in the floor and tighten.

Place four Ø12 washers – (12) in Figure 11 – and M12 nuts – (11) in Figure 11 – loosely on the studs. See Figure 17 and Figure 18.

Figure 17 – Adjusting the unit base

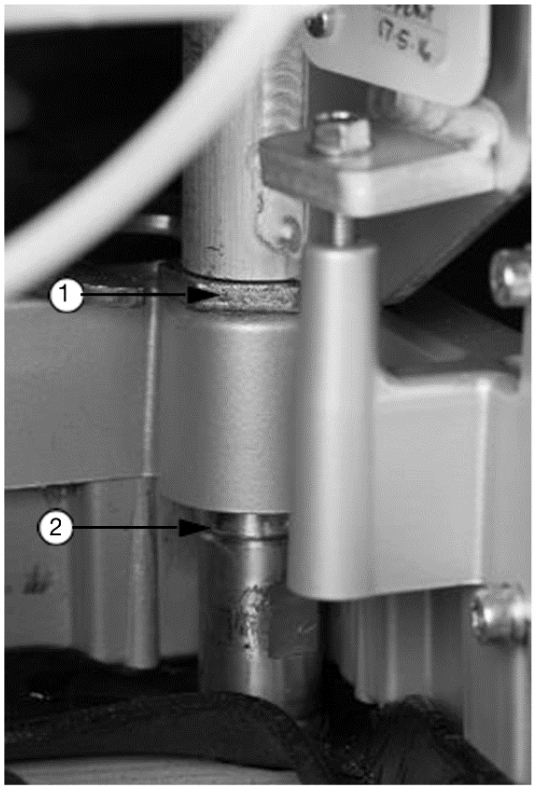

Figure 18 – Adjusting the unit base, (1) adjustment nut and (2) bushing in the floor

5.2.5 ALIGNMENT OF THE UNIT BASE

1. With the special wrench (MG-416), adjust the brass adjustment bushing – (5) in Figure 19 – in the supporting leg and allow for approximately 10 mm clearance between the supporting leg and the floor surface.
2. Fit the screw and the washer – (9) and (10) in Figure 11 – in the hole through the adjustment bushing – (5) in Figure 19 – do not tighten.
3. Turn the adjustment nuts – (1) – (4) in Figure 19 – into the unit base, allowing for approximately 5 mm clearance all the way between the unit base and the floor surface, and make sure that all four adjustment nuts are resting on the bushings in the floor. The nuts on top of the long rods should be loose.
4. Place a spirit level on top of the bridge arm post in the longitudinal direction – (A) in Figure 19 – see Figure 20.
5. Turn the adjustment nut – (2) in Figure 19 – until the post is plumb in the longitudinal direction and then tighten the nut on top of the long rod.
6. Turn the spirit level to adjust the unit stand in the cross-wise direction – (B) in Figure 19 – see Figure 21.
7. Turn the adjustment nut – (4) in Figure 19 – counter-clockwise and make sure it does not contact the bushing in the floor.
8. Turn the adjustment nut – (3) in Figure 19 – until the bridge arm post is horizontal in the cross-wise direction and tighten the nut on top of the long rod.
9. Turn the adjustment nut – (4) in Figure 19 – clockwise until it contacts the bushing in the floor and tighten the nut on top of the long rod.
10. Turn the adjustment nut – (1) in Figure 19 – clockwise until it contacts the bushing in the floor and tighten the nut on top of the long rod.

	***The four adjustment nuts must rest on the bushings in the floor. The stability of the unit stand will otherwise be compromised!***

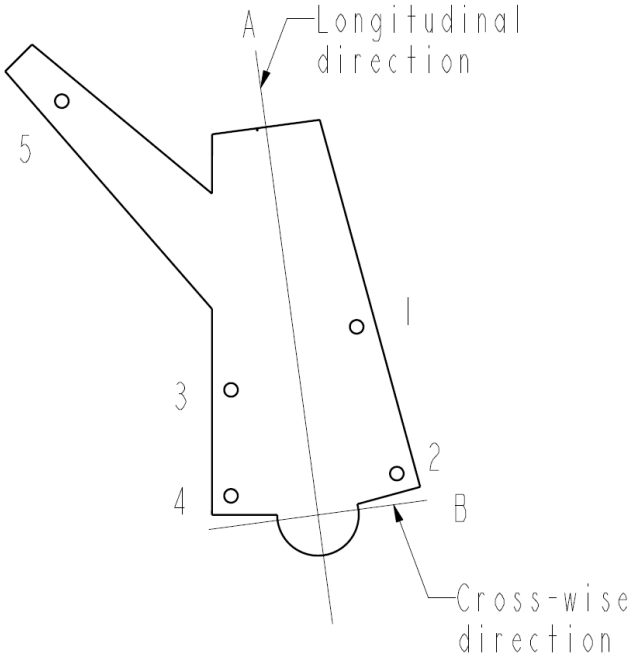

Figure 19 – Unit stand seen from above

Figure 20 – Adjustment of the unit stand in longitudinal direction (A)

Figure 21 – Adjustment of the unit stand in the cross-wise direction (B)

5.2.5 ALIGNMENT OF THE SUPPORTING LEG

When the unit stand is plumb, adjustment of the supporting leg and the chair lift can be performed!

Please note that the supporting leg and the chair lift can be adjusted independently of the unit stand.

1. Place the spirit level on the chair lift post as shown in Figure 22.
2. The chair lift is adjusted by turning the adjustment bushing in the supporting leg. See Figure 23. Use the special wrench (MG-416) for this adjustment.
3. When the chair lift is plumb, re-tighten the screw in the center of the adjustment bushing.

	***If necessary, disconnect the joystick cable during adjustment for better clearance. Remember to connect the cable correctly.***

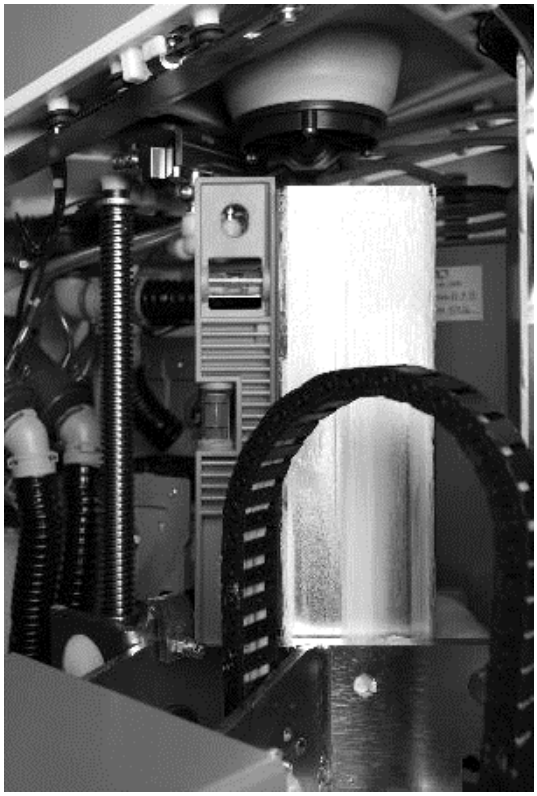

Figure 22 – Adjustment of the chair lift

Figure 23 – Adjustment of the supporting leg

5.2.6 CHECKING CLEARANCE BETWEEN BASE AND FLOOR

During adjustment, it may occur that the unit base or the supporting leg is pressed firmly against the floor, or alternatively that there is a gap between the rubber sealing and the floor of more than 10 mm.
In either case, the unit base and supporting leg must be re-adjusted using all five adjustment nuts (see Figure 19).
Note that one turn of an adjustment nut equals a vertical distance of 1.5 mm.

5.2.7 INSTALLATION OF THE UNIT ON A STEEL PLATE

If the unit cannot be mounted directly on the floor, a steel plate for installing the unit is available (XO-492).

	Note that installation with steel plate is not allowed if the unit is delivered with X-Ray adaptor.

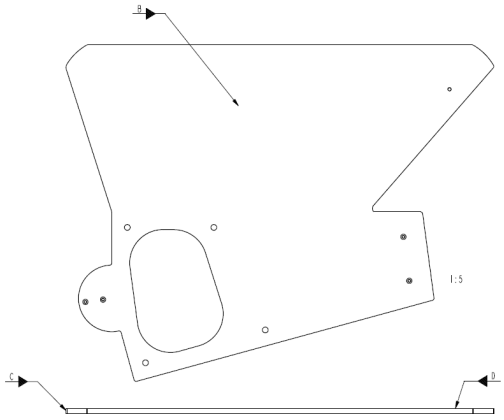

Figure 24 – Steel installation plate

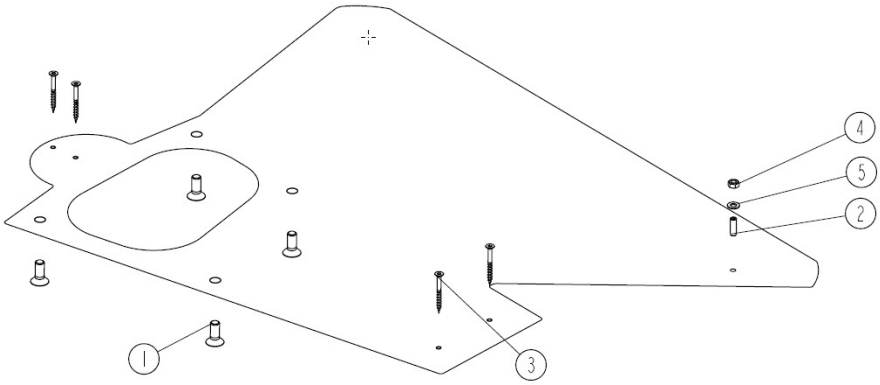

Figure 25 – Parts for installation on steel plate

1. Assemble the four bolts – (1) in Figure 25 – to the four bushings – (4) in Figure 11.
2. If installed on a wooden floor, place the steel plate on the floor and secure it to the floor with five 6 x 60 mm screws – (3) in Figure 25.
3. With the special wrench (MG-416), adjust the brass adjustment bushing – (5) in Figure 19 – in the supporting leg and allow for approximately 5 mm clearance between the supporting leg and the steel plate surface.
4. Fit the long rod, washer and nut – (2), (5) and (4) in Figure 25 – in the hole through the adjustment bushing – (5) in Figure 19 – do not tighten.
5. Fit the four long rods – (5) in Figure 11 – through the holes in the unit base into the bushings.
6. Fit the washers and nuts – (12) and (11) in Figure 11 – onto the long rods; do not tighten.
7. Turn the adjustment nuts – (1) – (4) in Figure 19 – in the unit base, allowing for approximately 5 mm clearance all the way between the unit base and the steel plate surface, and make sure that all four adjustment nuts rest on the bushings in the steel plate. The nuts on top of the long rods should be loose.

8. Place a spirit level on top of the bridge arm post in the longitudinal direction – (A) in Figure 19 – see Figure 20.
9. Turn the adjustment nut – (2) in Figure 19 – until the post is plumb in the longitudinal direction and then tighten the nut on top of the long rod.
10. Turn the spirit level to adjust the unit stand in the cross-wise direction – (B) in Figure 19 – see Figure 21.
11. Turn the adjustment nut – (4) in Figure 19 – counter-clockwise and make sure it does not contact the bushing in the floor.
12. Turn the adjustment nut – (3) in Figure 19 – until the bridge arm post is horizontal in the crosswise direction and tighten the nut on top of the long rod.
13. Turn the adjustment nut – (4) in Figure 19 – clockwise until it contacts the bushing in the floor and tighten the nut on top of the long rod.
14. Turn the adjustment nut – (1) in Figure 19– clockwise until it contacts the bushing in the floor and tighten the nut on top of the long rod.

5.3 FITTING THE BRIDGE ARM AND INSTRUMENT BRIDGE

	***If the unit has been stocked/transported at a temperature of less than 10°C for more than one hour, it needs to acquire room temperature before being connected to the mains supply.***

1. Fit the bridge arm carefully by lowering it onto the bridge arm post; be careful not to tilt the arm and squeeze the bearings – see Figure 26.
2. Route the tubing and cables inside the outer cylinder as shown in Figure 27.
3. Route the tubing to the water/air side of the unit stand and conduct the cables to the electronics section.
4. Fasten cables and tubing with cable ties to the cable holders.
5. Check that cables and tubing move freely while the rear bridge arm rotates in its full range.

Figure 26 – Fitting the instrument bridge arm

Figure 27 – Cables shall be placed between the outer cylinder and bridge arm post

	Connect cables and hoses to plugs and fittings, see Figure 28 to Figure 32.

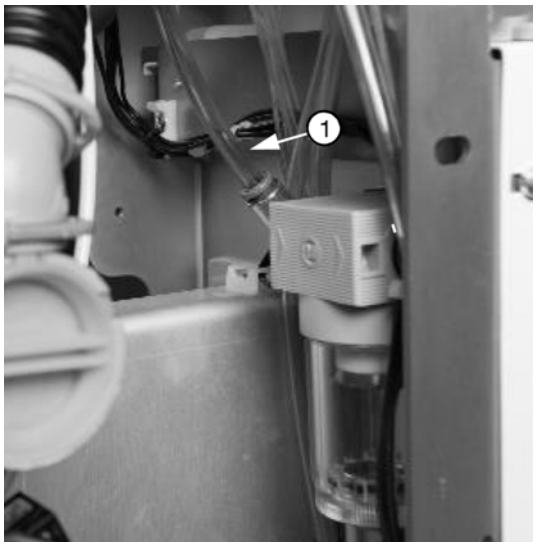

Figure 28 – Connecting return air hose: (1) transparent light blue 6 mm return air hose from instrument bridge connected to the oil collector at the unit front

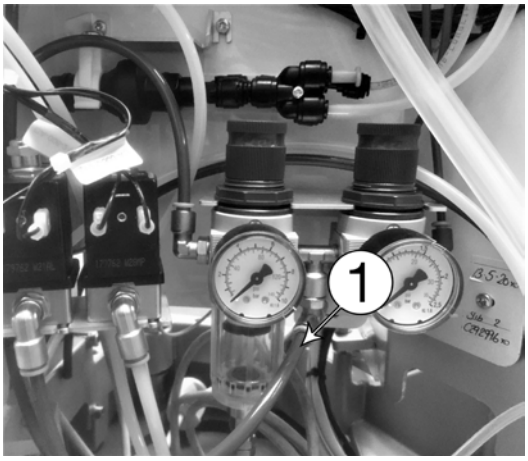

Figure 29 – Connecting the blue 6 mm air tubing (1) from the instrument bridge between the two manometers

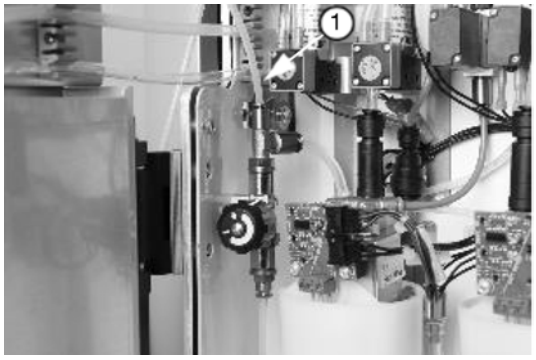

Figure 30 – Connecting the white 4 mm water tubing (1) from the instrument bridge to the T-fitting

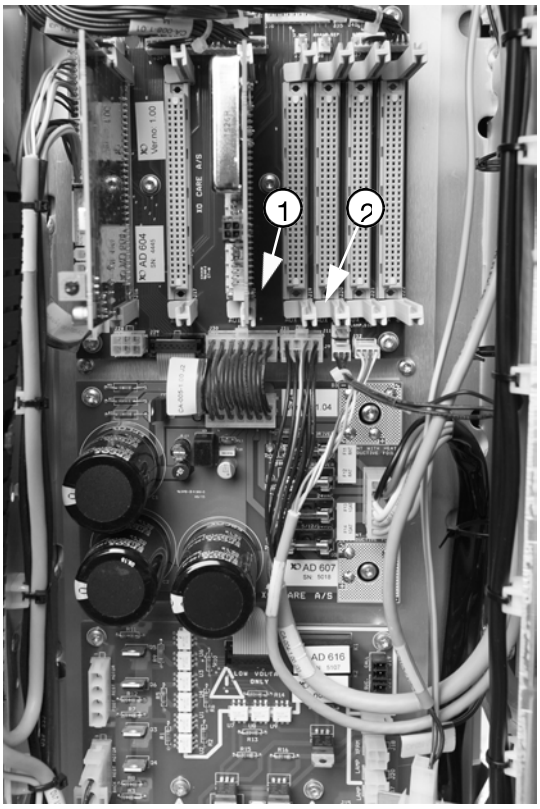

Figure 31 – Connecting cables from the instrument bridge: (1) connection of “Bridge Pwr” to J31 and (2) connection of “Bridge Com“ to J32

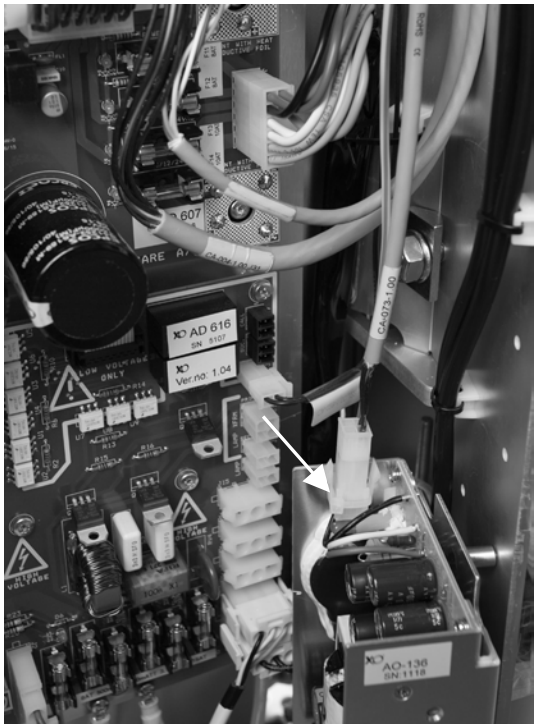

Figure 32 – Connection of cable CA-073 to MX power supply

5.4 OVER-THE-FLOOR INSTALLATION

If the installations cannot be fitted under the floor, they may run along the floor and into the unit as shown in Figure 33.
Remove the cylindric cover by loosening the two screws from within the unit stand.

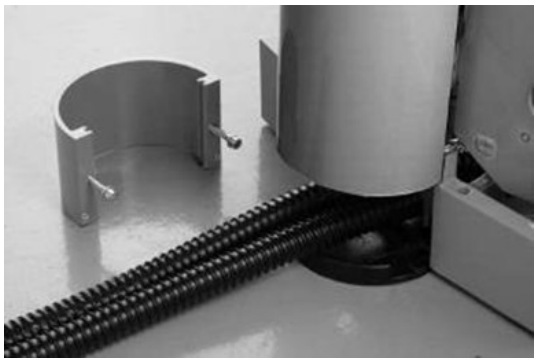

Figure 33 – Over-the-floor installation

5.5 X-RAY ADAPTOR

	***The weight of the X-ray unit head may not exceed 8 kg, and the weight of the arm system may not exceed 17 kg.*** ***The arm reach of the X-ray unit may not exceed 220 cm. See Figure 34.***

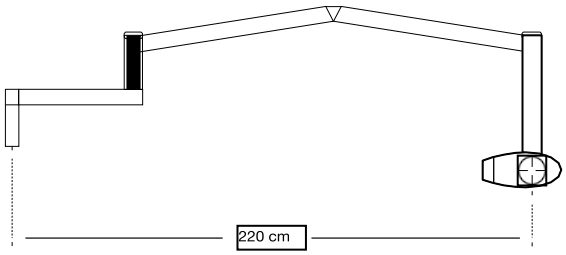

Figure 34 – Maximum arm reach of intraoral X-ray unit

	An X-ray unit must <u>not</u> be installed if the XO unit is fitted with a steel installation plate as the XO unit may not be stable!

1. Route the cables through the x-ray adaptor using the search wire.
2. Fit the x-ray arm onto the x-ray adaptor on the XO FLEX unit.

For further instructions, please refer to the instructions supplied by the x-ray unit manufacturer.

	The X-ray unit must not be electrically connected to the XO unit!

5.6 FITTING OF OPERATING LIGHT

5.6.1 UNPACKING THE OPERATING LIGHT

The operating light is delivered pre-assembled in a separate box.

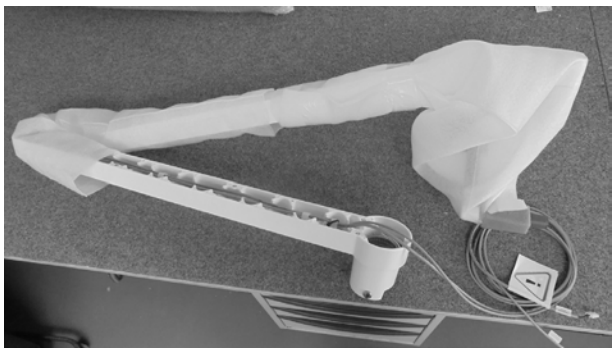

Figure 35 – Operating light arm

5.6.2 FITTING THE LIGHT ARM POST

1. Fit the large nut to the bridge arm post (only until engaged by thread) by turning it on to the bridge arm post. See Figure 36.
2. Attach the light arm post to the nut and turn until the thread engages (NB: The upper part of the nut has a left-hand thread). See Figure 37.

3. Turn the nut clockwise without turning the light arm post – the nut will cause the light arm post and the bridge arm post to engage. Rotate the light arm post with the stop screw at the top of the post, pointing towards the chairside.
4. When the nut begins to tighten, turn the light arm post slowly until the two posts engage. Then tighten the nut even further by hand, approx. 1 turn. Finally, fasten the nut with the supplied special wrench (MG-416). See Figure 38.

Figure 36 – Fitting the nut onto the bridge arm post

Figure 37 – Light arm post fitted into the nut

Figure 38 – Fitting the light arm post

5.6.3 FITTING THE LIGHT ARM CYLINDRIC COVER

Lower the Ø 100 outer cylinder over the light arm post; be careful not to push the O-rings in the outer cylinder out of their grooves. The outer cylinder must rest against the adjustable plastic ring. The plastic ring has been adjusted at the factory. See Figure 39.

Figure 39 – Fitting the outer cylinder

5.6.4 CEILING HEIGHT LESS THAN 255 CM

The ceiling height of the room needs to be at least 255 cm if the outer cylinder of the light is to be fitted in the manner described.
If the ceiling height is less than 255 cm, however, the outer cylinder and the light arm post will need to be fitted simultaneously. The outer cylinder may be raised, tilted and supported on top of the lower plastic guide ring while the light arm post is fitted and fastened.

	The post for the operating light arm and the outer cylinder may be fitted simultaneously in clinics with ceiling height lower than 255 cm. The outer cylinder can be supported by the lower plastic guide ring on the post during assembly.

5.6.5 FITTING THE LIGHT ARM

The easiest way to fit the light arm is to start by fitting the arm and then routing the cables down through the light arm post.

1. Lower the light arm carefully onto the light arm post – be careful not to tilt the arm and squeeze the bearings. See Figure 40.
2. Route the cables through the light arm post and pull them from the hole of the electronics side of the unit stand. If necessary, use a piece of hard wire as a “search spring”. See Figure 41.

Figure 40 – Fitting the light arm

Figure 41 – Cables from the light

5.6.6 FITTING THE BRAKE

1. Turn the outer cylinder until the hole for the brake aligns with the hole in the outer cylinder. See Figure 42.
2. Fit the brake in the rear arm of the operating light through the hole in the outer cylinder
3. Adjust the brake to the desired friction:
    - Turn clockwise to increase friction
    - Turn counter-clockwise to decrease friction
4. Fit the cover plug into the hole of the outer cylinder – see Figure 43.

Figure 42 – Fitting the brake

Figure 43 – Fitting the cover plug

	***Always remember to fit the cover plug into the hole of the outer cylinder. See Figure 43.***

5.6.7 FITTING THE CABLES TO THE OPERATING LIGHT

	***Secure the cables with cable ties and connect plugs to J11, LAMP.SIG. (on back plane) and on J5, Stand control PCB. See Figure 44.***

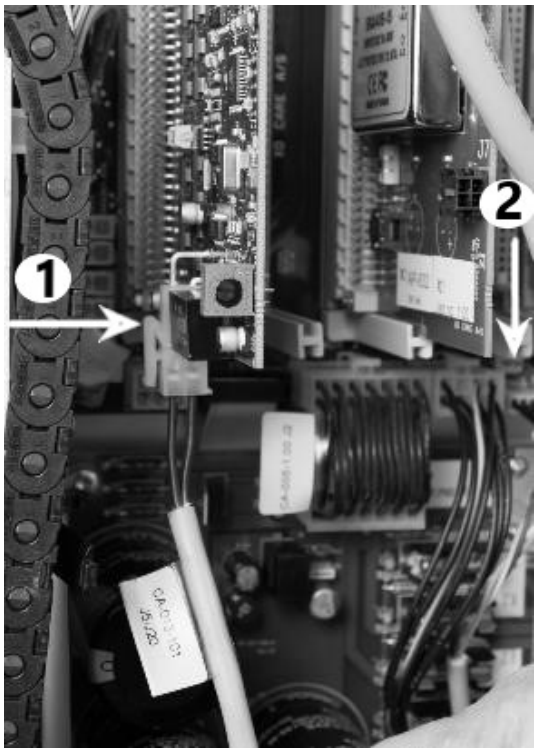

Figure 44 – (1) CA-013 (J5, Stand control PCB), (2) CA-012 (J11, Backplane PCB)

5.7 FITTING OF XO HD DISPLAY

If the unit has been supplied with an XO HD Display, the outer Ø100 mm cylinder is divided into two parts (an upper short and a lower long one) and the light arm post has separate friction adjustments for the display arm and for the light arm.

1. Fit the light arm post as described in section 5.6.2.
2. When the light post has been tightened securely, the lower Ø 100 mm outer cylinder shall be fitted – see Figure 45.
3. Fit the display arm – see Figure 46.
4. Fit the O-ring and the adjustable plastic ring on the light post over the display arm, as shown in Figure 46.
5. Route the cables from the display through the groove in the plastic ring and through the hole in the light post. See Figure 47.
6. Push the cables through the post until they appear in the electronics side of the unit stand.

7. Check the movability of the display arm and make sure that the cables do not obstruct the arm movements. The cables should be positioned like a small arc to allow for movement of the arm and secured under the non-adjustable plastic ring. The cables should furthermore be secured to the post with a cable tie. Please see Figure 48 & Figure 49.
8. Fit the O-ring and the non-adjustable plastic ring at the top of the light post.
9. Fit the stop screw for light arm in the threaded hole above the non-adjustable plastic ring.
10. Fit the wide-collar plastic ring in the groove above the stop screw, above which two bearing rings should be placed.
11. Fit the narrow-collar plastic ring on top of the bearing rings and secure them with an O-ring.
12. Fit the upper Ø 150 mm outer cylinder and check that there is equal space between the lower outer cylinder/screen arm and the upper outer cylinder/screen arm. If necessary, adjust the adjustable plastic rings.
13. Fit the friction brake in the rear arm of the display by turning the lower outer cylinder until the threaded hole aligns with the hole in the outer cylinder. See Figure 51.
14. Adjust the friction brake, following which the outer cylinder should be turned until the hole is pointing backwards.
15. Fit the cover plug into the hole of the outer cylinder. See Figure 43.
16. Route the cables from the display as shown in Figure 46.
17. Once the cables have been routed, check that the arm can rotate in its full range without pulling the cables.
18. Fit the operating light as described in section 5.6.

	***Always remember to fit the cover plug into the hole of the outer cylinder. See Figure 43.***

	***When connecting an external PC to the unit the external PC must be powered by a medical grade isolating transformer!***

Figure 45 – Fitting of lower outer cylinder

Figure 46 – Fitting of display arm

Figure 47 – Routing the display cables

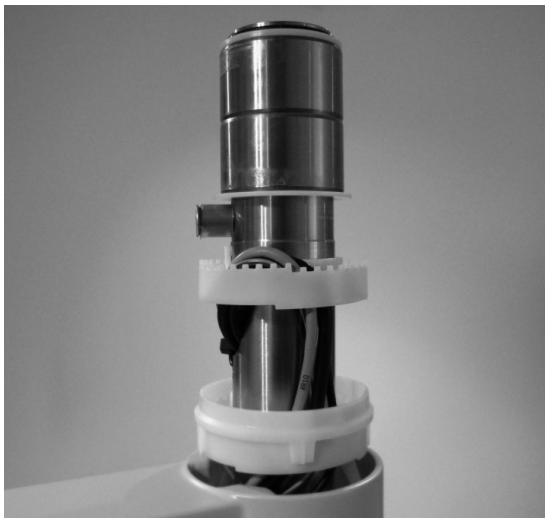

Figure 48 – Positioning of the cables

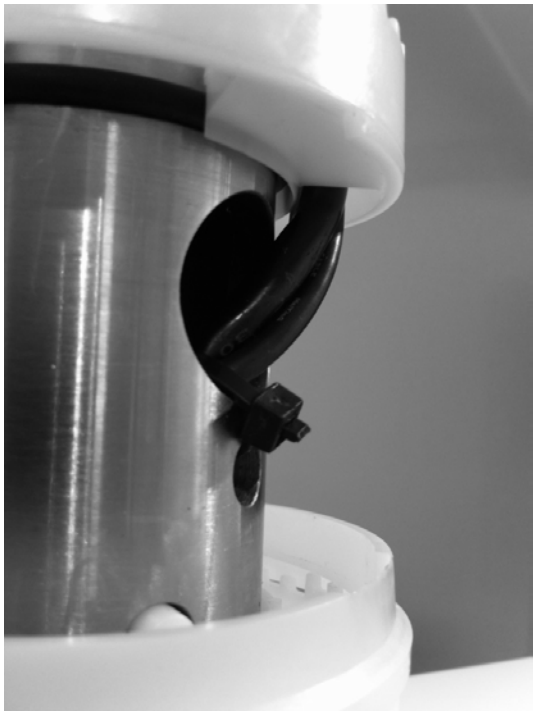

Figure 49 – Securing the cables

Figure 50 – Fitting the upper part of the outer cylinder

Figure 51 – Fitting the brake

	***Always remember to fit the cover plug into the hole of the outer cylinder after fitting the brake.***

5.8 ASSISTANT CALL

	***Connect the cable running from the call system on the Mains Board (marked J19, CALL.).***

5.9 SUCTION HOSES

Unpack the suction hoses and connect them in their designated places: the small hose is positioned closest to the chair and the large furthest away from the chair. See Figure 52.

Figure 52 – Connection of suction hoses

5.10 INSTALLATION OF DÜRR INTRA ORAL CAMERA

Please refer to duerrdental.com for installation software and instructions.

5.11 FINALIZING INSTALLATION OF THE INSTRUMENT BRIDGE

Fit the instrument pad and the bridge protection pad.

The instrument suspensions and instrument hoses are delivered separately and must be fitted to their designated positions. Matching instrument hoses should be attached as instructed by the customer in their designated positions (hoses marked with numbers 1–6). See Figure 53.

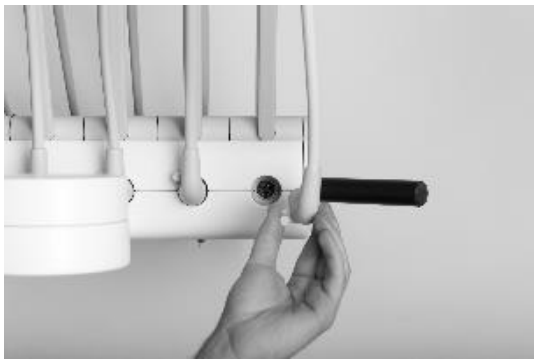

Figure 53 – Fitting the instrument suspensions and hoses

5.12 CONNECTING WATER, COMPRESSED AIR, SUCTION/DRAIN AND POWER SUPPLY

1. Attach the water and air fittings to the ball valve in the floor.
2. Connect the transparent water hose and blue air hose as shown in Figure 54. Secure the hoses in the fittings with the locking clips supplied with the installation kit AN-210.
3. Connect the unit suction system to the suction installation.
4. Connect the drain hose from the unit to the wastewater installation.

	***Flush the water pipes and blow thoroughly through air pipe before connecting the unit.***

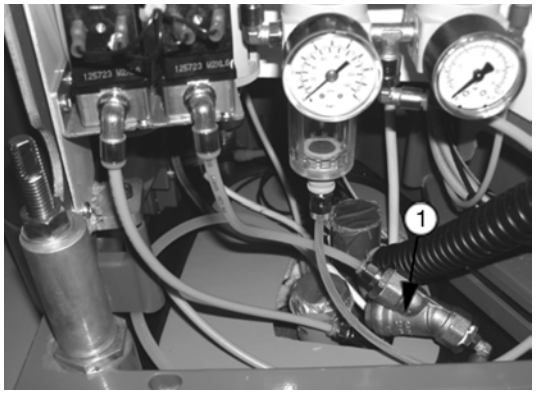

Figure 54 – Connecting incoming water and air

5.13 CONNECTING 230 V AND THE SUCTION MOTOR

5.13.1 CONNECTING MAINS SUPPLY CABLE

Before connecting the mains supply cable to the unit, route the wires three (3) times through the ferrite as shown below:

Figure 55 – Mains supply cable with ferrite

	***Connect the mains supply cable to the screw terminals marked J4 with symbols indicating line (L), neutral (N) and earth (⏚) on the Mains Board.***

5.13.2 CONNECTING SUCTION MOTOR CONTROL CABLE

Connect suction motor control cable to the screw terminals marked J21, “SUC” on the Mains Board:

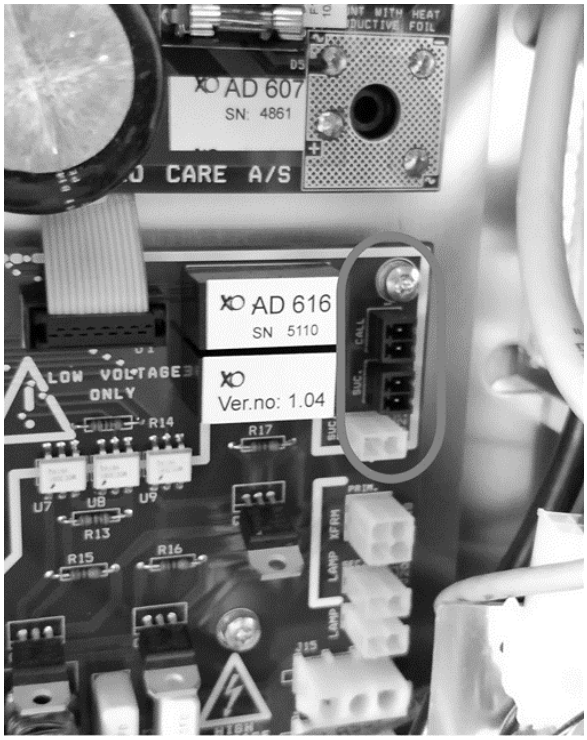

Figure 56 – Connection of suction motor control cable

	***Connect suction motor control cable to the connector marked J21, “SUC” on the Mains Board.***

5.14 FITTING THE PATIENT CHAIR

Remove the cover under the patient chair support.

Lift the patient chair onto the four rods of the chair support. See Figure 57.

Attach M12 nuts and washers to the four rods.

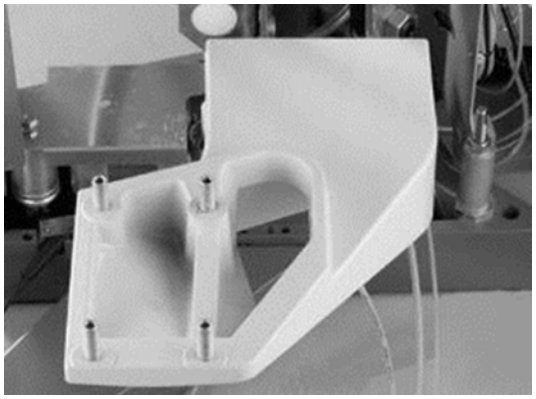

Figure 57 – Patient chair support

Tighten the nuts thoroughly with a 19 mm top wrench. See Figure 58.

Figure 58 – Fitting the patient chair

	***Lead the chair cables through the hole in the patient chair support and attach the control cable (1) to the PCB and the power cable (2) to the plug.*** ***Be sure to connect the earth wire.*** ***See Figure 59.***

Figure 59 – Connecting the cables: (1) chair control cable, (2) chair power cable

Refit the cover under the patient chair support.

Install the neck rest and secure the end-stop bracket as illustrated in Figure 60.

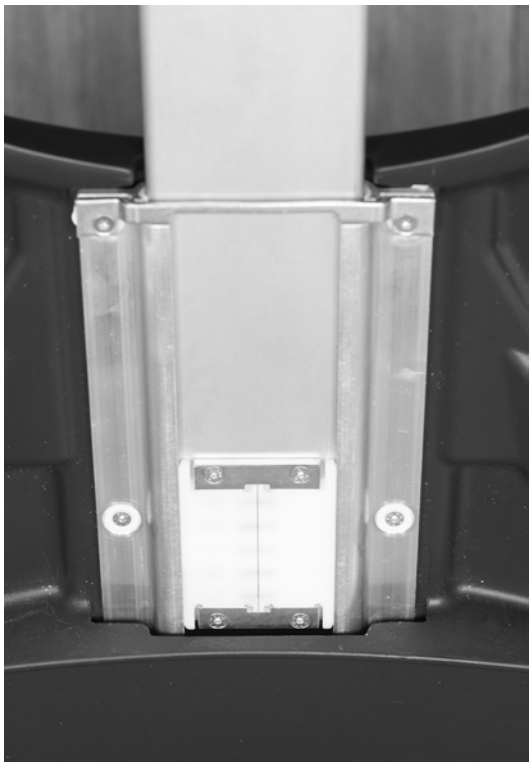

Figure 60 – Securing the end-stop bracket

5.15 FINALIZING THE INSTALLATION

5.15.1 ATTACH THE PATIENT CHAIR SEAT UPHOLSTERY

Unpack the upholstery and position it over the dowels embedded in the patient chair seat.
Press the upholstery into place.
Secure the seat upholstery with the four screws that should be inserted from under the chair.

5.15.2 FIT THE CUSPIDOR BOWL AND CUP HOLDER

Fit the cuspidor protection disk, the cuspidor with gold trap and the cup holder.

5.15.3 FIT XO WATER DISINFECTION AND XO SUCTION DISINFECTION CARTRIDGES

If the unit is equipped with XO Water disinfection and/or XO Suction Disinfection, fit the cartridges as shown in Figure 61 and Figure 62.

Figure 61 – XO Water disinfection cartridge. Note that the receiving handle is white.

Figure 62 – XO Suction Disinfection cartridge. Note that the receiving handle is yellow.

5.16 CONNECTION OF EXTERNAL EQUIPMENT

The XO FLEX dental unit may be connected to an external PC for the following purposes:

a) use with XO SMART LINK
b) display of images from the intraoral camera
c) display of other information from the external PC on the unit display

The dental unit may also be installed furthest away third-party x-ray equipment and external imaging system. Note that when the external x-ray system is installed, the wires between the x-ray equipment and the x-ray imaging system are pulled through the dental unit but not electrically connected to the dental unit.

When an external PC or x-ray equipment is installed, this forms a medical electrical system according to IEC 60601-1, Clause 16, and the installation shall comply with the requirements of the standard.

The system consists of the following items:

- XO FLEX dental unit
- External PC
- External monitor
- Medical grade isolating transformed
- Third-party x-ray equipment and imaging system

The system is illustrated in Figure 63.

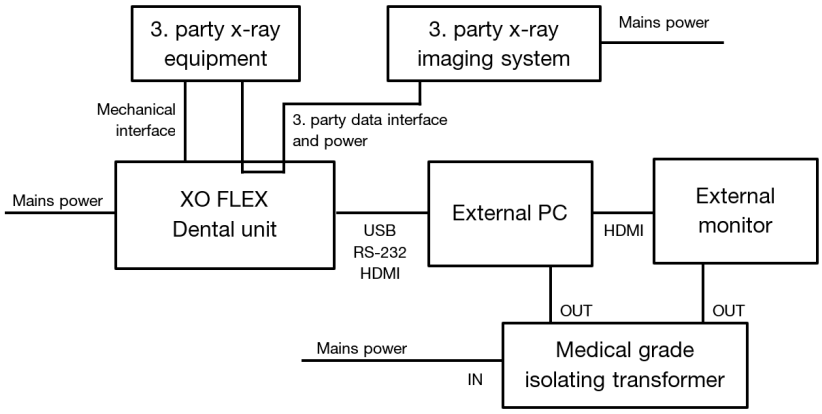

Figure 63 – Medical electrical system

The medical grade isolating transformer shall be installed out of reach of the patient. In cases where this is impractical (e.g. if the dental operatory is small), the isolating transformer shall be installed in a locked cabinet.

The operator of the dental unit shall avoid simultaneously touching the patient and the isolating transformer/external monitor/PC (including any corded keyboard/mouse or other accessories connected to the PC).

	***When connecting an external PC (including monitor) to the XO FLEX unit, the external equipment must be powered by a medical grade isolating transformer (e.g. XO part number: XO-620).*** ***The external equipment must also comply with the applicable standards, e.g.:*** • ***IEC 60950-1 (information technology equipment) or IEC 62368-1 (electronic equipment within the field of audio, video, information and communication technology), and*** • ***IEC 60601-1 (medical electrical equipment)*** ***When external equipment is connected to the XO FLEX unit to create a medical electrical system, the requirements of IEC 60601-1, 3rd edition, must be complied with.*** ***It is the responsibility of the person/organization installing and/or modifying the equipment to ensure that the system conforms to applicable legislation, e.g. Directive 93/42/EEC, or Regulation (EU) 2017/745, and the requirements of IEC 60601-1, 3rd edition.***

6 CHECKING THE UNIT

6.1.1 ADJUSTMENT OF THE INSTRUMENT BALANCE SUSPENSION

	***All instruments should be in perfect balance when lifted forward – i.e. you should feel no dragging from the instrument hose when holding an instrument!***

If necessary, adjust the instrument balance suspensions as follows:

1. Lift the suspension a bit forward, whereby an adjustment screw appears behind the roll.
2. Adjust the screw with a 2.5 mm Allen key.

Figure 64 – Adjustment of balance

6.2 START AND CHECK THE UNIT

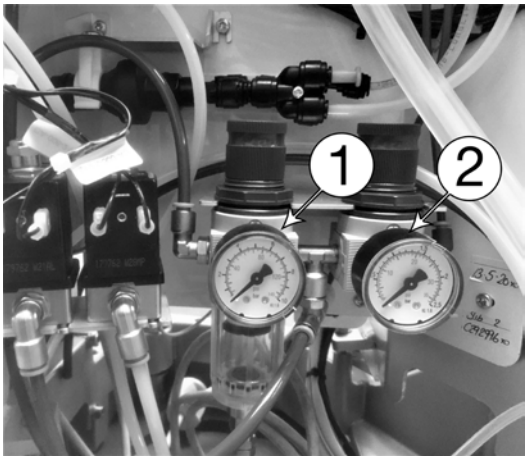

Figure 65 – (1) Air manometer for bridge, (2) Air manometer for backflow prevention

1. Switch the unit on
2. Hear the “welcome” sound
3. Check that the display shows XO FLEX, software version and the serial number of the unit just after power-on.
4. Open the water valve carefully.
5. Open the air valve.
6. Check that the air manometer shows 5.5 bar for the instrument bridge – (1) in Figure 65.
7. Check that the air manometer shows 2.5 bar – (2) in Figure 65.
8. If the unit is fitted with backflow prevention, wait about 5 minutes while the internal water container is filled.
9. Activate the water button on the syringe until the water supply is air-free.
10. Vent the valve blocks by activating the last water-bearing suspension until the water is air-free.

11. Place a cup in the cup holder and test the cup filler.
12. Test the cuspidor flush.
13. Test both suction hoses.
14. Test instrument suspension individually, assess power and mechanical function.
15. Test the foot control.
    a. Patient chair up/down
    b. Patient chair backrest inclination
    c. For all instruments test:
        i. Start/stop using the pedal
        ii. Adjustment of maximum speed/power using the joystick
        iii. Adjustment of spray water/irrigation setting using the joystick
16. Test the chair base joystick (all chair programs).
17. Test the operating light using the no-touch sensor:
    a. On/off
    b. Three light intensities
18. If installed, test the assistant call function.
19. If installed, test that the XO HD Display is functioning correctly.
20. If installed, test the XO Suction Disinfection system.
21. If installed, test the XO Water Disinfection system.
22. Check the unit for leakages:
    a. Water
    b. Air
    c. Suction
    d. Drain

6.3 FINALIZING THE INSTALLATION

1. Set the hour and date.
2. Set the date of the first preventive service and safety inspection – 12 months from today.
3. Fit the unit stand panels.
4. Move the patient chair up and down and check the clearance between the panels.
5. Check the unit for scratches or other handling damage.

6.4 ADJUSTING THE UNIT

6.4.1 ADJUSTING THE AIR INSTRUMENT (TURBINE), DRIVE AIR AND COOLING AIR OF THE MICROMOTOR

Table 4 – Adjustment of air instrument drive air

Check/adjust drive air pressure	Action	Display
Fit the test manometer (FA-041) and a turbine to the air instrument coupling.		
	Switch the unit on.	
	Lift the air instrument hose forward.	Speed % of maximum
Check the maximum drive air pressure.	Activate the configuration button under the bridge twice within one second (see Figure 66).	DA MAX

Check/adjust drive air pressure	Action	Display
	Activate ► (Figure 67)	Actual value (0–100)
Adjustment of maximum drive air to 3.2 bar.	Activate ➞ to increase pressure. Activate ← to decrease pressure.	Actual value (0–100)
	Activate ◄ to save value.	DA MAX shown
Check the minimum drive air pressure.	Activate ⬇	DA MIN
	Activate ►	Actual value (0–100)
Adjust to 1.5 bar.	Activate ➞ to increase pressure. Activate ← to decrease pressure.	Actual value (0–100)
	Activate ◄ to save value.	DA MIN shown
Check A/R Air (Anti-Retraction Air).	Activate ⬇	A/R AIR
	Activate ►	Actual value (0–100)
Adjust to have very small amount of airflow **without** the turbine burr spinning.	Activate ➞ to increase pressure. Activate ← to decrease pressure.	Actual value (0–100)
	Activate ◄ to save value.	A/R AIR shown
	Place the air instrument on the instrument bridge again.	

Figure 66 – Configuration button

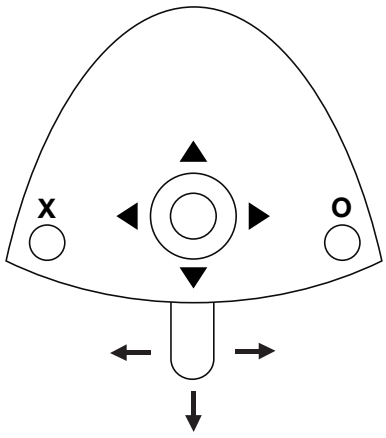

Figure 67 – Foot control

Table 5 – Adjustment of micromotor cooling air

Check/adjust cooling air	Action	Display
Fit the test flowmeter (FA-400) to the micromotor.		
	Switch the unit on.	
	Lift the micromotor forward.	Speed in RPM
Check the cooling air pressure.	Activate the configuration button under the bridge twice within one second (see Figure 66).	COOLAIR
	Activate ► (Figure 67).	Actual value (0–100)
Adjustment of cooling air to 10 l/min.	Activate ➞ to increase pressure. Activate ← to decrease pressure.	Actual value (0–100)
	Activate ◄ to save value.	COOLAIR shown
	Place the micro motor on the instrument bridge again.	

6.4.2 ADJUSTING THE BALANCE SPRING AND FRICTION BRAKE IN THE BRIDGE FOREARM

When all instruments – incl. handpieces – are fitted to the bridge and the hand instrument table carries the "normal" load (maximum load on instrument table is 1.5 kg):

- ***The instrument bridge should be in balance in all positions and***
- ***It should be easy to maneuver with "two fingers"***

1. Move the instrument bridge to the highest, middle and lowest positions.
2. Adjust the balance spring with a 6 mm Allen key as shown in Figure 68.
3. If necessary, adjust friction at the specified load and adjust with 4 mm Allen key as shown in Figure 69.

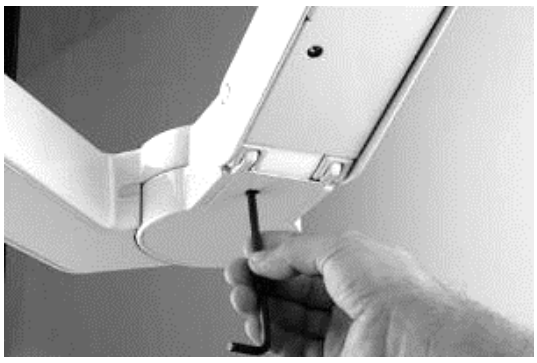

Figure 68 – Adjusting the balance spring in the bridge forearm

Do not tighten the friction brakes too much!
If the brake is too tight it may result in a mechanical hazard!
If it is not possible to keep the arms in balance without overtightening the brakes, the unit is not in level and the steps described in section 5.2.5 should be followed to level the unit.

6.4.3 ADJUSTING THE PIVOTING JONTS OF THE BRIDGE ARM

	The instrument bridge should be easy to move in the horizontal plane, and it should not move by itself.

The instrument bridge arm has three pivoting joints.
Each pivoting joint has its own friction brake adjustable with a 3 mm or a 6 mm Allen key. See Figure 70, Figure 71 and Figure 72.

The friction brake in the rear bridge arm is hidden behind the Ø 150 mm cylindrical panel covering the unit stand post. Remove the cover plug in the back of the cylinder to access the friction brake. See Figure 72.

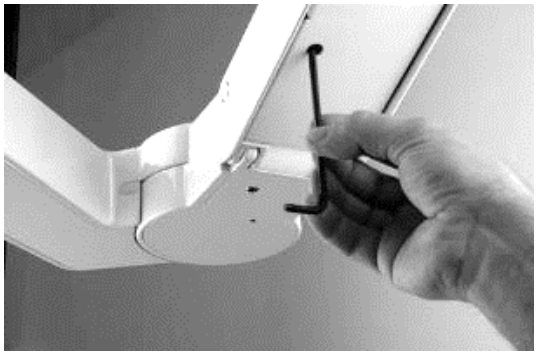

Figure 69 – Adjusting the friction brake in the bridge forearm

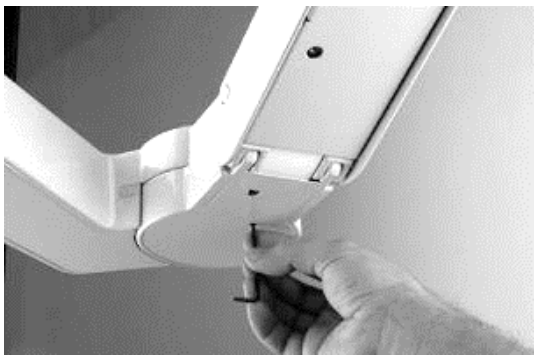

Figure 70 –Adjusting the friction brake in the swivel joint

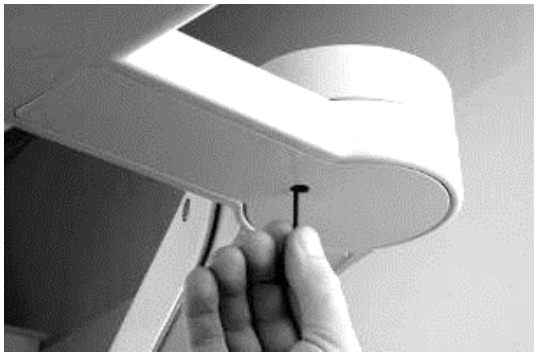

Figure 71 – Adjusting the friction brake in the swivel joint

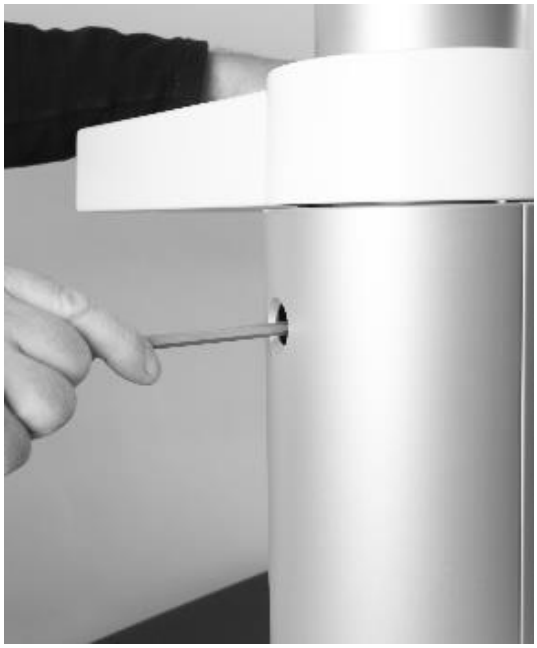

Figure 72 – Adjusting the friction brake of the rear arm

	***Always remember to fit the cover plug into the hole of the outer cylinder after fitting the brake.***

6.4.4 ADJUSTMENT OF THE FRICTION BRAKES IN THE OPERATING LIGHT ARM AND DISPLAY ARM

The arm for the operating light and the arm for the display have three pivoting joints. Each joint has its own friction brake, which can be adjusted with a 3mm - 6 mm Allen key.

Turn brakes clockwise to increase friction.

Turn brakes counter-clockwise to decrease friction.

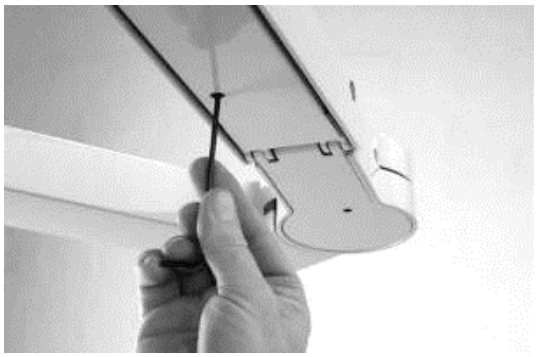

Figure 73 – Adjusting the vertical friction of the arm

Figure 74 – Adjusting the friction in the light head

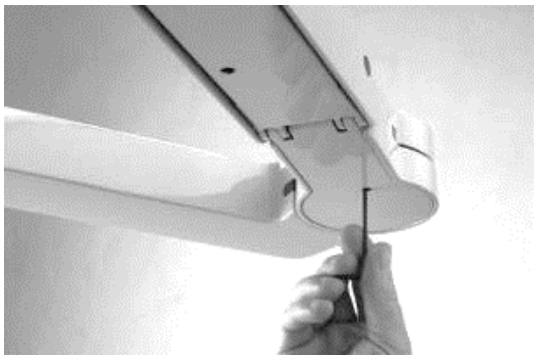

Figure 75 – Adjusting the friction in the middle joint

6.4.5 ADJUSTING THE CUSPIDOR AND CUP FILLER

Water pressure for the cup filler and cuspidor is pre-adjusted.
If further adjustments are needed, please follow the steps below:

1. Adjust the water pressure for the cup filler by turning the regulator – (1) in Figure 76.

- Turn clockwise to increase pressure
- Turn counter-clockwise to decrease pressure

To adjust the time the cup filler is activated, press the “configuration button” (see Figure 66) once, select the menu “CUP/S” and set the time.

2. Adjust the water pressure for the cuspidor by turning the regulator – (2) in Figure 76.

- Turn clockwise to increase pressure
- Turn counter-clockwise to decrease pressure.

To adjust the time the cuspidor is activated, press the “configuration button” (see Figure 66) once, select the menu “FLUSH/S” and set the time.

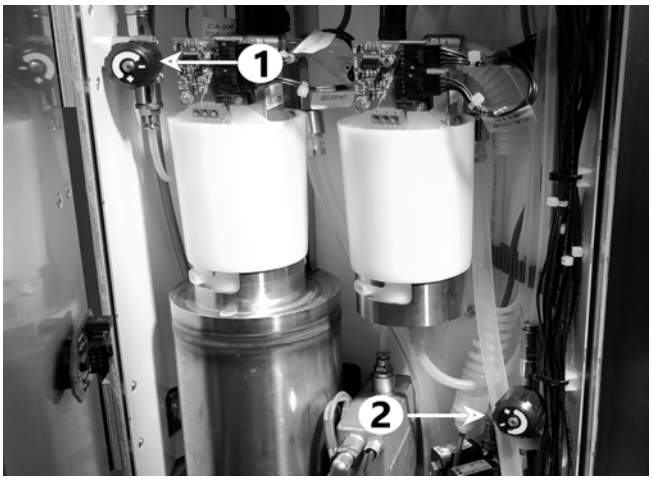

Figure 76 – (1) adjustment of water pressure for cup filler, (2) adjustment of water pressure for cuspidor

7 HANDING THE UNIT OVER TO THE USERS

1. Go through the Instructions for Use.
2. Make sure that adjustments of instrument suspensions and arms fit the users' expectations.
3. Make sure that the bridge arm, the display arm and the light arm are adjusted as expected by the users and ensure that the cover plugs are installed in the holes of the outer cylinders.
4. Complete the "Installation Report".

8 SYMBOLS

Table 6 – List of symbols

	***Warning*** ***Used to emphasize important safety-related information about the use of the device. Failure to follow operating instructions could place the patient or operator at risk.***
	***Warning: dangerous voltage***
	***Mandatory action***
	***Marks other important messages in this manual.***
	***Static electricity. The equipment must be turned off and you need to be electrically connected to the framework of the equipment (earthed) when touching sensitive electronics components or installing cables and plugs. We recommend the use of a wrist band which can be supplied to you by XO.***
	***Do not reuse. For single use only.***
	***Serial Number***
	***Sterilized by ethylene oxide***
	***EU representative***
	***Manufacturer***
	***Date of manufacture***
	***Dispose in accordance with instructions provided in this manual***

	***TYPE B applied part (degree of protection against electrical shock)***
	***Type BF applied part (degree of protection against electrical shock)*** ***Intraoral camera***
	Foot control pedal right
	Foot control pedal left
	***Foot control pedal down***
X	***X button on foot control***
O	***O button on foot control***
▲	***Foot control joystick north***
◀	***Foot control joystick west***
▼	***Foot control joystick south***
▶	***Foot control joystick east***
△	***Chair base joystick north***
◁	***Chair base joystick west***
▽	***Chair base joystick south***

	***Chair base joystick east***

Product
XO FLEX

2020-06-19
Ref. YB-675
Ver. 4.01

Subject to change.

CE 2460

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