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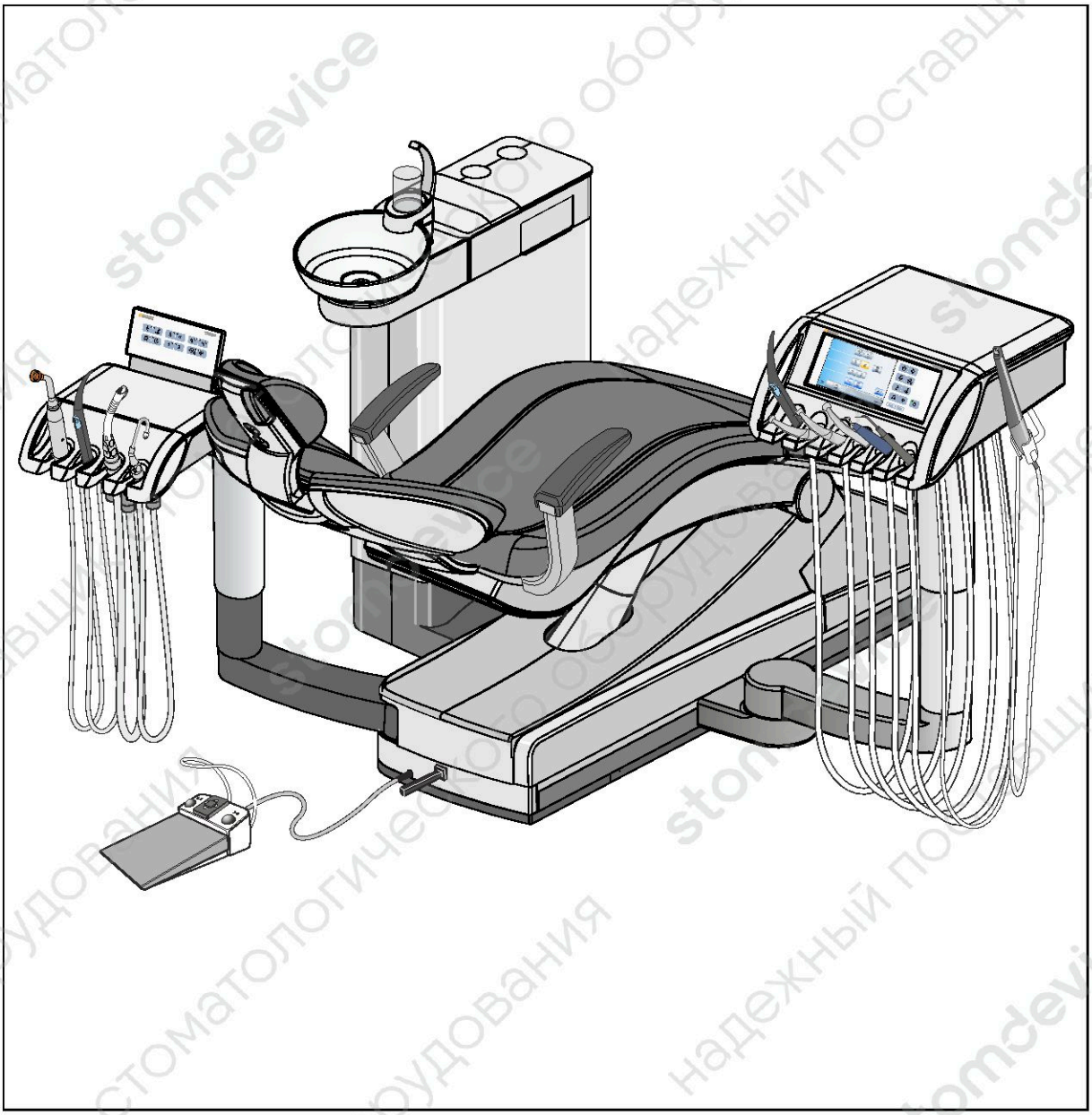
New as of: 04.2018

Dentsply Sirona

Teneo

Installation Requirements

English



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1 General information

1.1 Notes on the installation prerequisites

This document describes the installation prerequisites for the Teneo treatment center.

It contains the following information:

- Required information for practice planning.
- Information for the installer and operator regarding the necessary quality of the air and water supply media.
- Information for the installer, such as how to implement the connections for air, water, waste water, suction air and the power supply.
- Information on the cabling of the PCs to be connected.
- Information about electromagnetic compatibility and the prerequisites for setting up the treatment center.
- A checklist to ensure that all installation requirements have been fulfilled.

The subsequent installation of the treatment center is described in the installation instructions (REF 61 93 689).

You will also need the drilling template (REF 61 94 000) for the safe and secure attachment of the treatment center to the floor.

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1.2 Structure of the document

1.2.1 Identification of the danger levels

To prevent personal injury and material damage, please observe the warning and safety information provided in these operating instructions. Such information is highlighted as follows:

⚠ DANGER

An imminent danger that could result in serious bodily injury or death.

⚠ WARNING

A possibly dangerous situation that could result in serious bodily injury or death.

⚠ CAUTION

A possibly dangerous situation that could result in slight bodily injury.

NOTE

A possibly harmful situation which could lead to damage of the product or an object in its environment.

IMPORTANT

Application instructions and other important information.

Tip: Information for simplifying work.

1.2.2 Formats and symbols used

The formats and symbols used in this document have the following meaning:

✓ Prerequisite **1.** First action step **2.** Second action step or ➢ Alternative action ↳ Result ➢ Individual action step	Prompts you to do something.
See “Formats and symbols used [→ 6]”	Identifies a reference to another text passage and specifies its page number.
• List	Designates a list.
“Command / menu item”	Indicates commands, menu items or quotations.

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2 Safety information

2.1 Installation by qualified personnel

The installation of the supply connections must be carried out by qualified technicians only.

⚠ WARNING

Professional installation

Comply with the national regulations for electrical installation (e.g. IEC 60364-1, VDE 0100-100, IEC 60364-7-710, VDE 0100-710, National Electrical Code).

Comply with the national regulations for water supply installations (e.g. EN 1717) and sewage installations (e.g. EN 12056-1).

2.2 Radiotelephones

Mobile RF communications equipment can affect electro-medical equipment. Therefore, the use of mobile wireless phones in medical office or hospital environments must be prohibited.

2.3 Modifications and extensions of the system

Modifications to this device which might affect the safety of the system owner, patients or other persons are prohibited by law.

For reasons of product safety, this product may be operated only with original Dentsply Sirona accessories or third-party accessories approved by Dentsply Sirona. The user assumes the risk of using non-approved accessories.

If any devices not approved by Dentsply Sirona are connected, they must comply with the applicable standards, e.g.:

- IEC 60950-1 or IEC 62368-1 for information technology equipment, (e.g. PC, Ethernet switch, Ethernet hub, Ethernet converter, USB repeater, Ethernet router, USB switch, HDMI repeater/amplifier, audio sources, display port repeater/amplifier. etc. and their power adaptors), and
- IEC 60601-1 for medical electrical equipment.

The treatment center monitor must comply with the requirements of IEC 60950-1 or IEC 62368-1.

The loudspeaker port of the monitor may be connected only to a device that complies with IEC 60950-1, IEC 62368-1 (e.g., PC) or IEC 60601-1.Under no circumstances should it be connected e.g., to a stereo system.

If a system is created during the installation process, the requirements of IEC 60601-1, 3rd edition, must be complied with. The person assembling the system assumes responsibility for ensuring conformity, e.g., acc. to Directive 93/42/EEC.

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2.4 Power connection

⚠ WARNING

Shock hazard

It is essential that you switch off the power supply PRIOR to beginning the installation. There is a risk of electric shock. People can be injured or electrical components of the unit destroyed.

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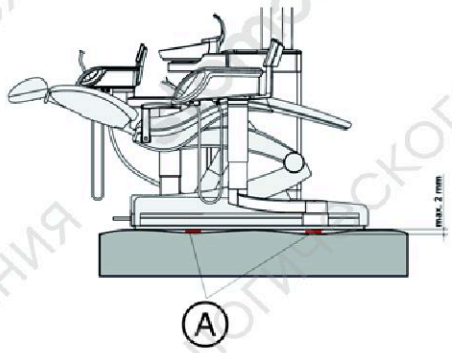
3 On-site installation

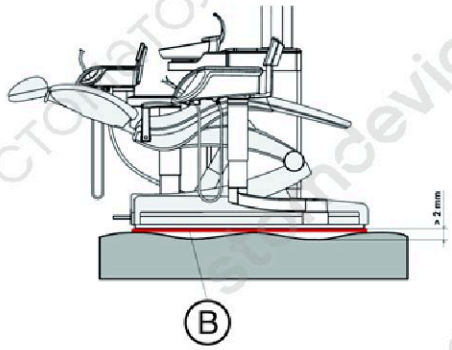
3.1 Substrate, floor

Unevenness

The floor must be level and horizontal in accordance with DIN 18 202.

The shimming plates (A) in the accessory pack can be used for evennesses of up to 2 mm.





If the unevenness of the floor exceeds 2 mm over the total length of the chair base (approx. 1300 mm), the steel adapter plate (B) must be used; see Mounting plates [→ 30].

3.1.1 Load-bearing capacity of the floor

Load capacity:

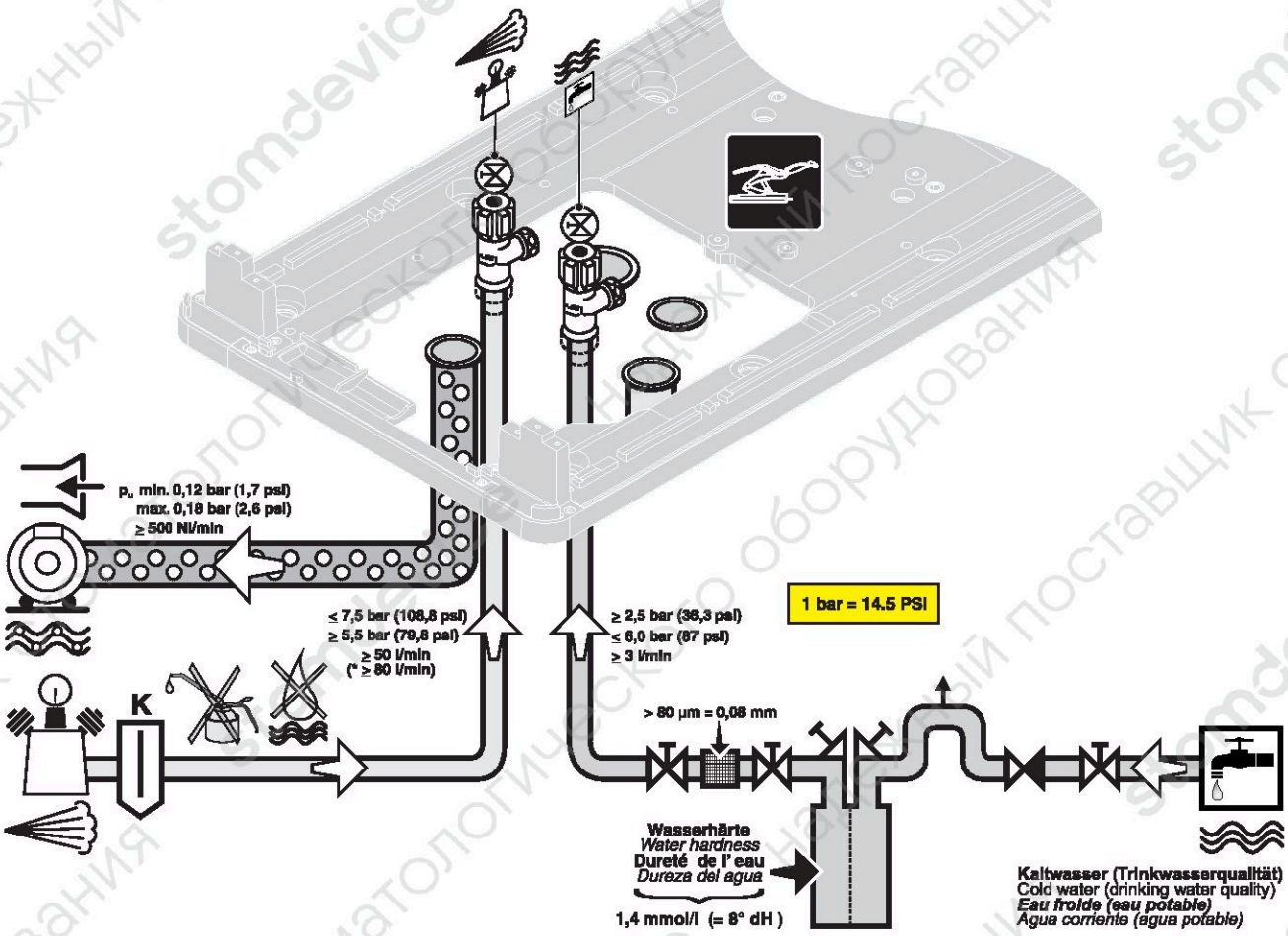


The minimum load-bearing capacity of the floor must be 0.5 N/cm^2 (corresponds to around 500 kg/m^2).

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3.2 Requirements of the supply media



	Suction machine
	Compressed air (free from oil) The compressor must be able to draw in air in an efficient, hygienic manner.
	Cold water (drinking water quality)
K	Steam trap

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3.2.1 Requirements of the water supply

3.2.1.1 Condition of the water

The water that supplies the treatment center must meet the following requirements to avoid operating faults.

Water pressure:	2.5 bar (36 psi) to 6 bar (87 psi)
Minimum flow rate:	3 l/min
Water hardness (overall hardness):	at > 2.4 mmol/l (= 12° dH), install a water softener. Set dilution hardness to 1.43 mmol/l (= 8° dH).
pH value:	6.5 to 8.5 (recommended)
Particle size:	≤ 100 µm
Water quality:	The water quality must comply with the national requirements for drinking water.
Colony count:	The bacterial count must comply with the national regulations for drinking water and must not exceed 500 CFU/ml under any circumstances (CFU: colony forming units).
	If the bacterial count is too high, the building water system must be checked and the cause of contamination eliminated. Alternatively you can also change over to a stand-alone water supply for a brief period.
	Sampling and the colony count must be performed by a competent laboratory.
	Before installation of the treatment center, an acceptable microbiological water quality for the domestic water supply must be ensured and documented in the form of the bacterial count.

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3.2.1.2 Connection to the public drinking water system

The treatment center complies with the requirements of EN 1717 (free discharge with an isolation distance ≥ 20 mm) and the DVGW German Gas and Water Association). It is intrinsically safe according to the W540 worksheet and thus also complies with W270 and KTW (Guideline on the use of plastics in contact with drinking water). It can be connected directly to the public drinking water system.



The treatment center has the "DVGW" label next to the rating plate.

Please comply with the national requirements with regard to connecting treatment centers to the public drinking water system.

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3.2.1.3 Installation of the water supply on the building side

- Carry out the installation in accordance with the national installation requirements (e.g. EN 1717).
- Connect the treatment center to the cold water supply.
- Use fine filters with a mesh size between ≤ 80 µm (0.08 mm) and ≤ 100 µm (0.1 mm).
- In order to reduce the microorganisms in the water supply pipe, take account of the following when laying this pipe to the treatment center:
  - Avoid long stub lines to the treatment center.
  - Carry out the installation so that, where possible, other main consumers (such as the sink) are fed from the same line downstream of the treatment center connection.
  - Avoid laying the supply line parallel to hot water pipes.
- Recommendation: Install a corner valve in the water supply to the treatment center with 2 outlets and 2 stopcocks. The second outlet makes it easy to take a sample of the water for microbiological testing.

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3.2.2 Requirements of the air supply

The air supply is required to drive the turbines, cool the drill drives, for the cooling spray and to control the treatment center.

3.2.2.1 Condition of the air

Air pressure:	5,5 bar (80 psi) to 7,5 bar (109 psi)
Minimum flow rate:	50 l/min
Minimum flow rate with air jet pump:	80 l/min
Air humidity:	Dew point ≤ -20°C at atmospheric pressure
Oil content:	≤ 0.5 mg/m^3
Particle content:	≤ 100 particles of size 1 - 5 µm in one m^3 of air (larger particles are filtered by the treatment center.)
Hygiene:	Hygienically acceptable air **IMPORTANT!** The treatment center does not require medical air.

3.2.2.2 Installation of air supply

- Carry out the installation in accordance with the national requirements.
- Install a steam trap.

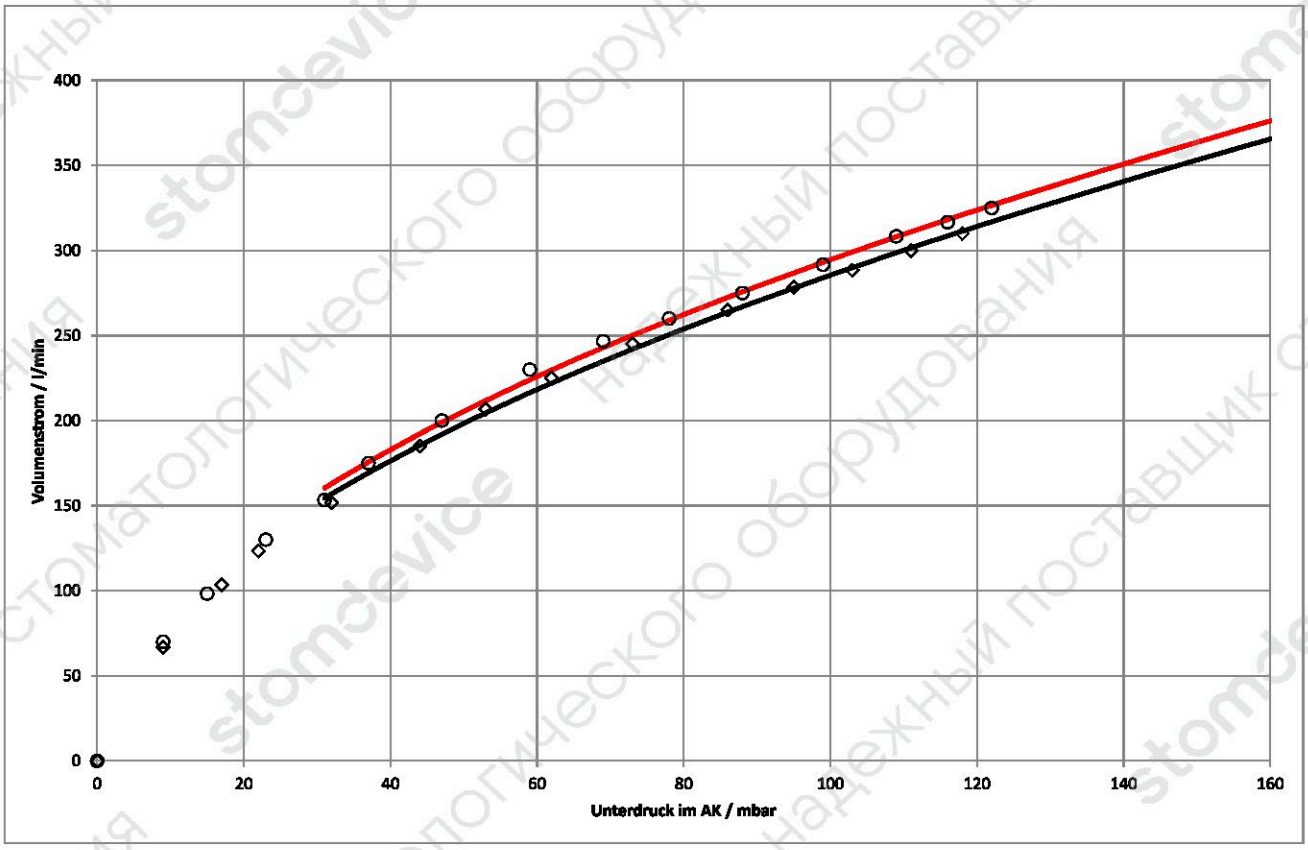
3.2.3 Requirements of the suction machine

- Vacuum in the suction machine at the connection point with the treatment center: min. 0.12 bar (1.7 psi), max. 0.18 bar (2.6 psi).
- With a vacuum of > 0.18 bar (2.6 psi) with no flow, the treatment center must be fitted with the "Vacuum limiter" retrofit kit (REF 59 68 826).
- Minimum suction power: 500 Nl/min
- For the suction line: adhere to the specifications in the installation instructions for "Suction machines".
- Suction system Type 1: High flow rate
- Wet or dry suction (depending on equipment)
- Suction handpiece diameter:
  - 6 mm: Saliva ejector and surgical suction
  - 11 mm: Spray aspirator
- Filter mesh size 1.8 x 2.6 mm
- Sirona recommends using cannulae with a bypass in order to prevent return flow in adhered cannulas.

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3.2.3.1 Typical pressure loss in the suction system

Suction flow of large suction hose



red (○): Only large suction device

black (◊): Saliva ejector in parallel

3.2.4 Requirements of the waste water installation

- The quantity of waste water from the treatment center is max. 3 l/min.
  - Carry out the waste water installation accordingly.
  - Fit the waste water pipe in accordance with the information in the table.
    The gradient of the waste water pipe must be at least 1°.

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3.3 Above-floor installation of supply lines

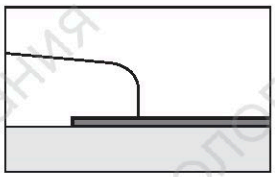
The supply lines can be installed above the floor (above-floor installation) or through the floor (underfloor installation).

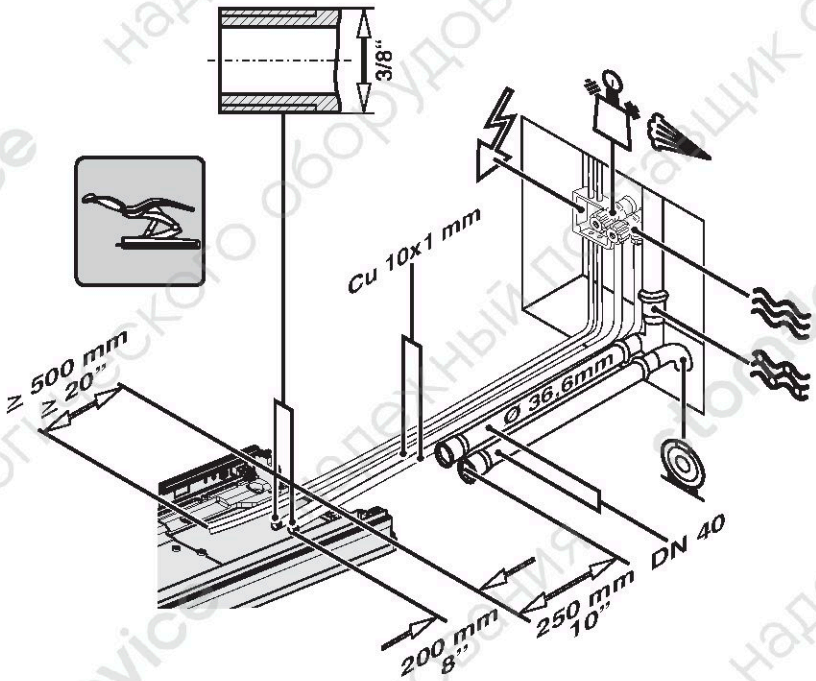
For the installation of the supply lines through the floor, see "Underfloor installation of supply lines" [→ 17].

✓ The retrofit kit "Above-floor installation" (Order No.: 62 05 004) is required for the connection.

➢ Lay the ends of the supply pipes, corner valves and lines as shown in the illustration.

↳ The supply lines are laid.





	Suction line DN40 HT-PP ISO 8283-3 (polypropylene, inner diameter approx. 36.5 mm)
	Compressed air supply Pipe 10x1 mm, corner valve outlet 3/8"
	Water supply Pipe 10x1 mm, corner valve outlet 3/8"
	Water drainage DN40 HT-PP ISO 8283-3 (polypropylene, inner diameter approx. 36.5 mm)
	Power supply 3x1.5 mm^2 (AWG16) Circuit breaker: for 230 V AC: 16 A medium-blow for 100-115 V AC: 20 A medium-blow Recommendation: Type B automatic circuit breaker

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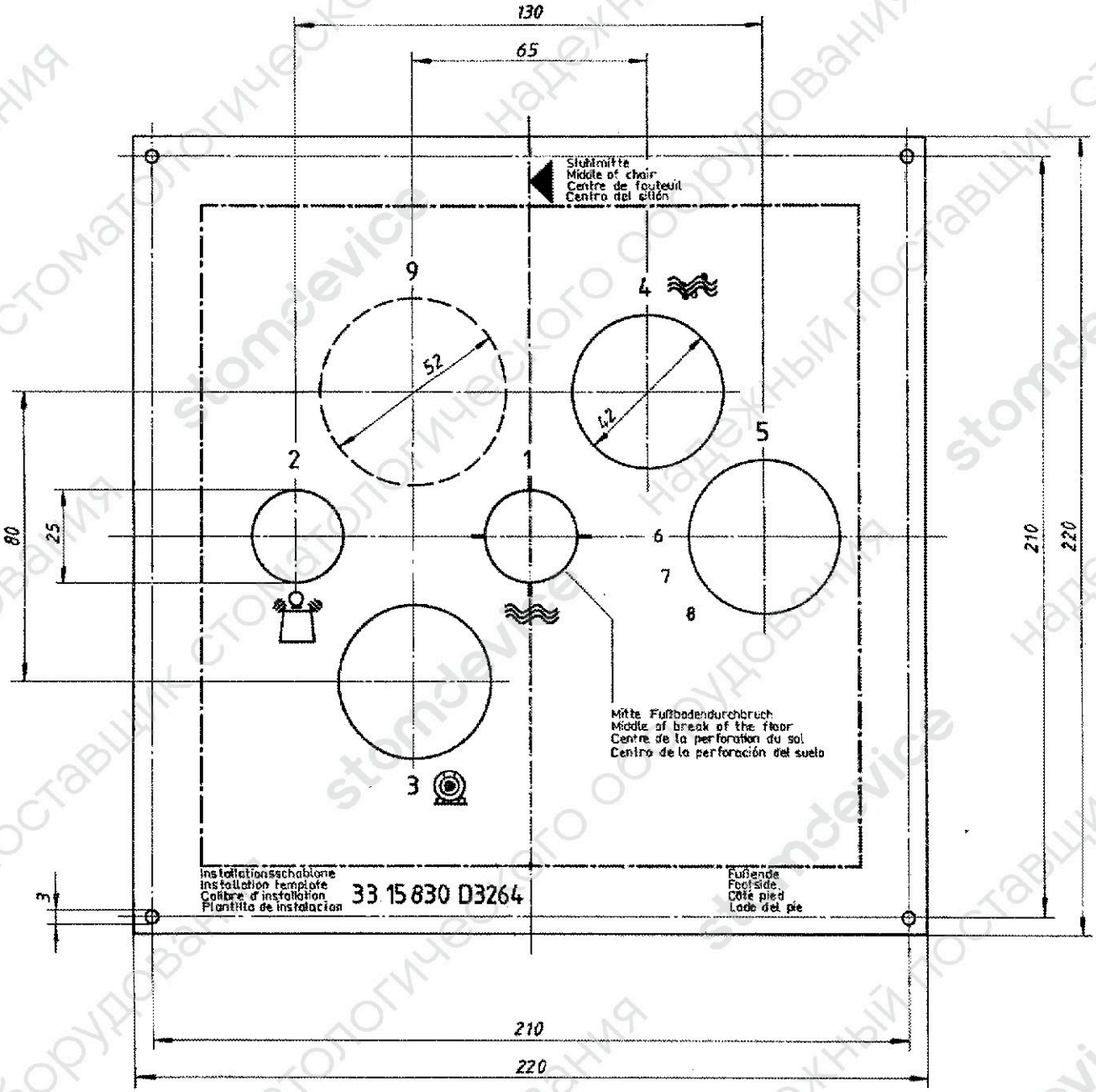
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3.4 Underfloor installation of supply lines

3.4.1 Installation template

We recommend that you order the installation template (REF 33 15 830) from Sirona for laying the pipe ends in the installation field.

If necessary, you can also prepare the template yourself based on the diagram below.
The specified dimensions of the segments are the dimensions of the core boreholes.



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1		Water supply Pipe 10x1 mm, corner valve outlet 3/8"
2		Compressed air supply Pipe 10x1 mm, corner valve outlet 3/8"
3		Suction line DN40 HT-PP ISO 8283-3 (polypropylene, inner diameter approx. 36.5 mm)
4		Water drainage DN40 HT-PP ISO 8283-3 (polypropylene, inner diameter approx. 36.5 mm)
5		Installation pipe (power supplies) inner diameter approx. 40 mm)
6		Control cable to relays for the suction machine (), call cable (), Special function (#) 3 x 1.5 mm^2 (AWG16) (quality as in the power cable)
7		Power supply 3x1.5 mm^2 (AWG16) Circuit breaker: for 230 V AC: 16 A medium-blow for 100 - 115 V AC: 20 A medium-blow Recommendation: Type B automatic circuit breaker
8		Option: HELIODENT Plus radiation cable (10 m) (free end 800 ±50 mm) **CAUTION** The HELIODENT Plus radiation cable cannot be laid together with USB or HDMI cables. If required, allow for a separate installation pipe or above-floor installation, see Above-floor installation of supply lines.
9		Installation pipe (IT) inner diameter min. 50 mm (or corresponding flat conduit) for the PC connection and CEREC AI connecting cable.

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3.4.2 Installation of the supply lines in the termination panel

✓ An installation template is available or was prepared.

1. Check the position of the supply lines against the installation template as per the practice blueprint. Ensure sufficient space is provided between the lines and the wall 1:20" [23]. The center of the hole in the floor must from the foot of the treatment center.

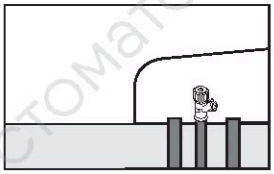
2. Lay the ends of the lines, in the electric

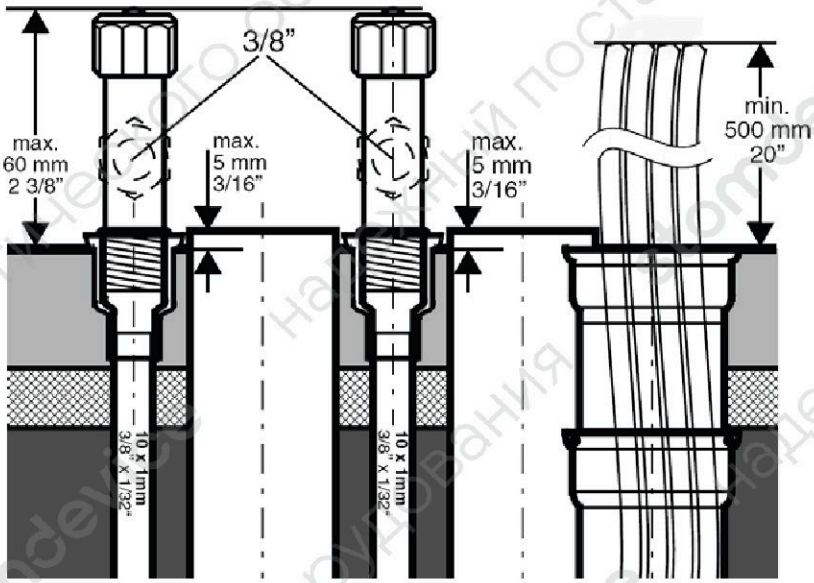
➧ The air and project

➧ The top edge of the floor diameter of both pipes is

➧ The electric 500 mm

➧ The supply lines are





3.5 Cleaning the air and water pipes

NOTE

Chips and other foreign materials could be flushed and/or blown into the treatment center.

Metal chips can cause malfunctions of the pneumatic components. The filters become clogged with foreign materials.

➢ During installation, ensure that no chips or other foreign materials enter the lines.

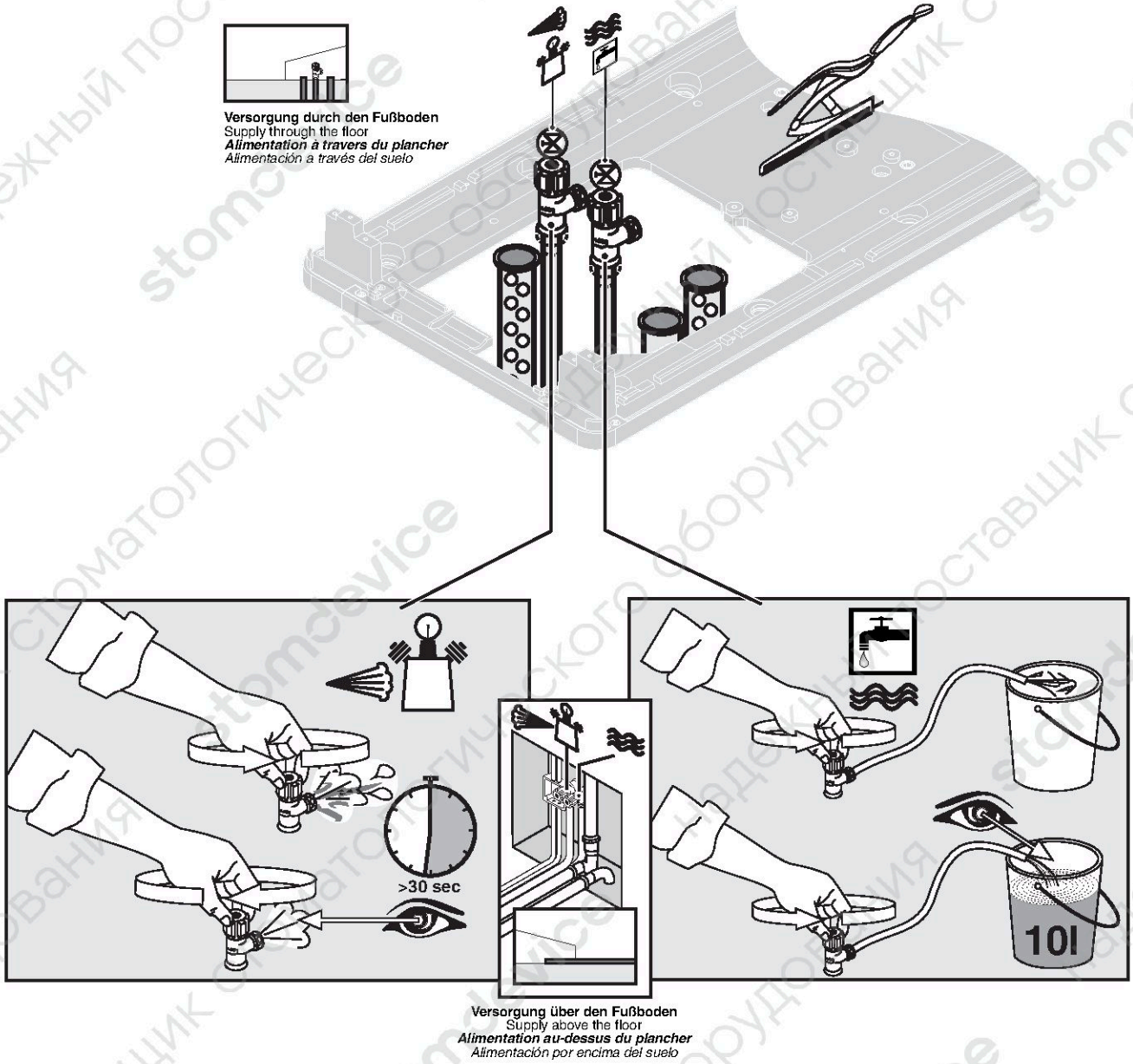
➢ Flush the water paths.

➢ Blow out the air lines.

➢ Ensure that no more foreign materials can enter the lines after they have been flushed or blown out.

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Versorgung durch den Fußboden
Supply through the floor
Alimentation à travers du plancher
Alimentación a través del suelo

Versorgung über den Fußboden
Supply above the floor
Alimentation au-dessus du plancher
Alimentación por encima del suelo

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3.6 Underfloor installation of the PC connections

Depending on the prevailing local conditions, the existing cable set can be installed in the cable duct of an underfloor installation by an installer.

Cable channel No. 9 is used for this purpose, see Installation template [→ 17].

IMPORTANT

The cable set for the PC connection must not be routed in the same cable channel as any existing radiation cables for a HELIODENT Plus unit model!

Cable sets for PC connection with HDMI and USB cable for camera SiroCam

- 5 m: REF 64 46 111
- 10 m: REF 63 29 655

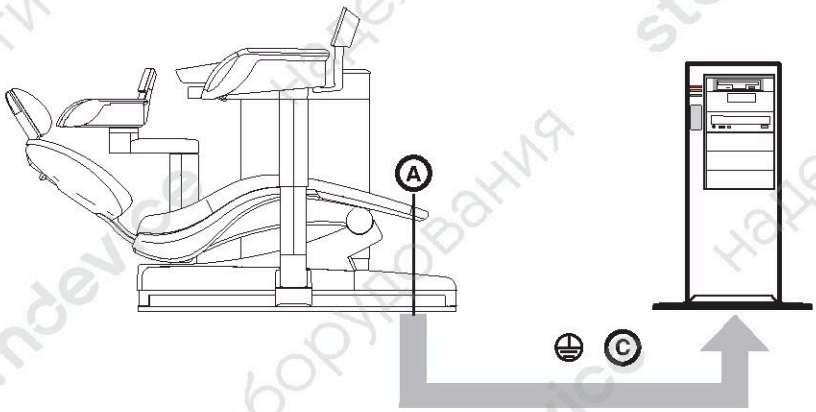
NOTE

Electric lines are susceptible to breakages.

Any kinks or twists in the cables could damage their wires. You must then replace such cables.

➢ Ensure that electrical lines do not become kinked or twisted.

Running cables to the PC



Lines USB repeater, **L339** (Ethernet), **L406** (HDMI) and **protective ground wire**. For PCs without a HDMI output, the **Audio** line is also required.

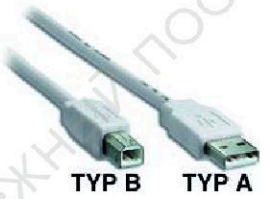
To prevent transmission interference, ensure that the cables are not crossed.

✓ A cable duct is laid from the treatment center to the location of the PC.

✓ Free length A of cables at the treatment center end:
Length **A** = 600 mm

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1. Pull the lines USB repeater, **L339** (Ethernet), **L406** (HDMI) and **protective ground wire** of the treatment center through the cable duct to the location of the PC **C**. For PCs without a HDMI output, insert the **Audio** line. For the USB line the TYPE A connector must be on the PC side and the TYPE B connector on the chair side.
2. Save the accessory parts for final installation!

↳ The preparation of the connection for the underfloor installation of the PC is completed.

IMPORTANT
Minimum requirements for the PC See document "Installation instructions and system requirements for PC configuration," (REF 61 94 075) Sivision Digital.

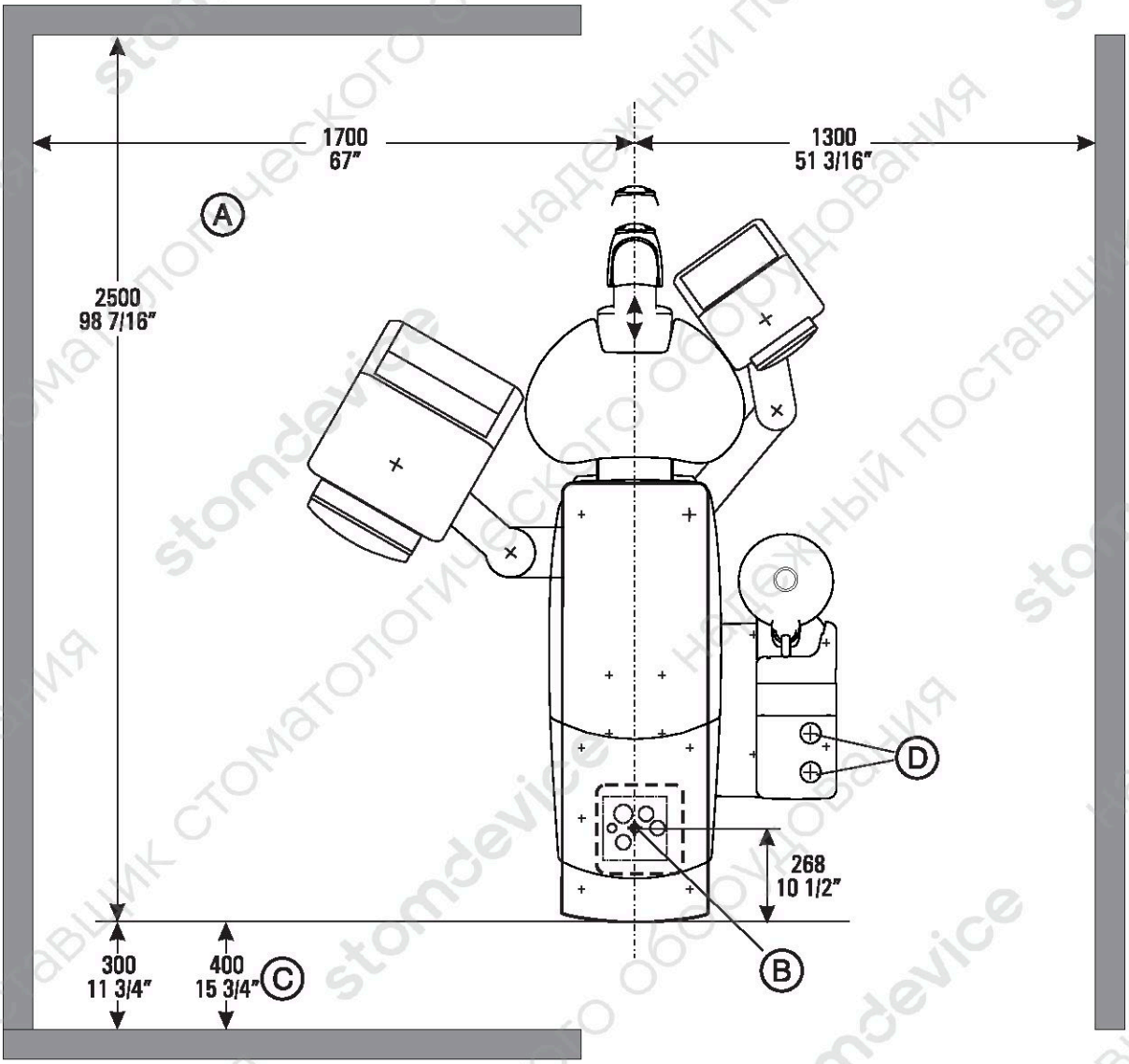
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4 Dimensions, technical data

4.1 Scale 1:20

4.1.1 Distances in the treatment room

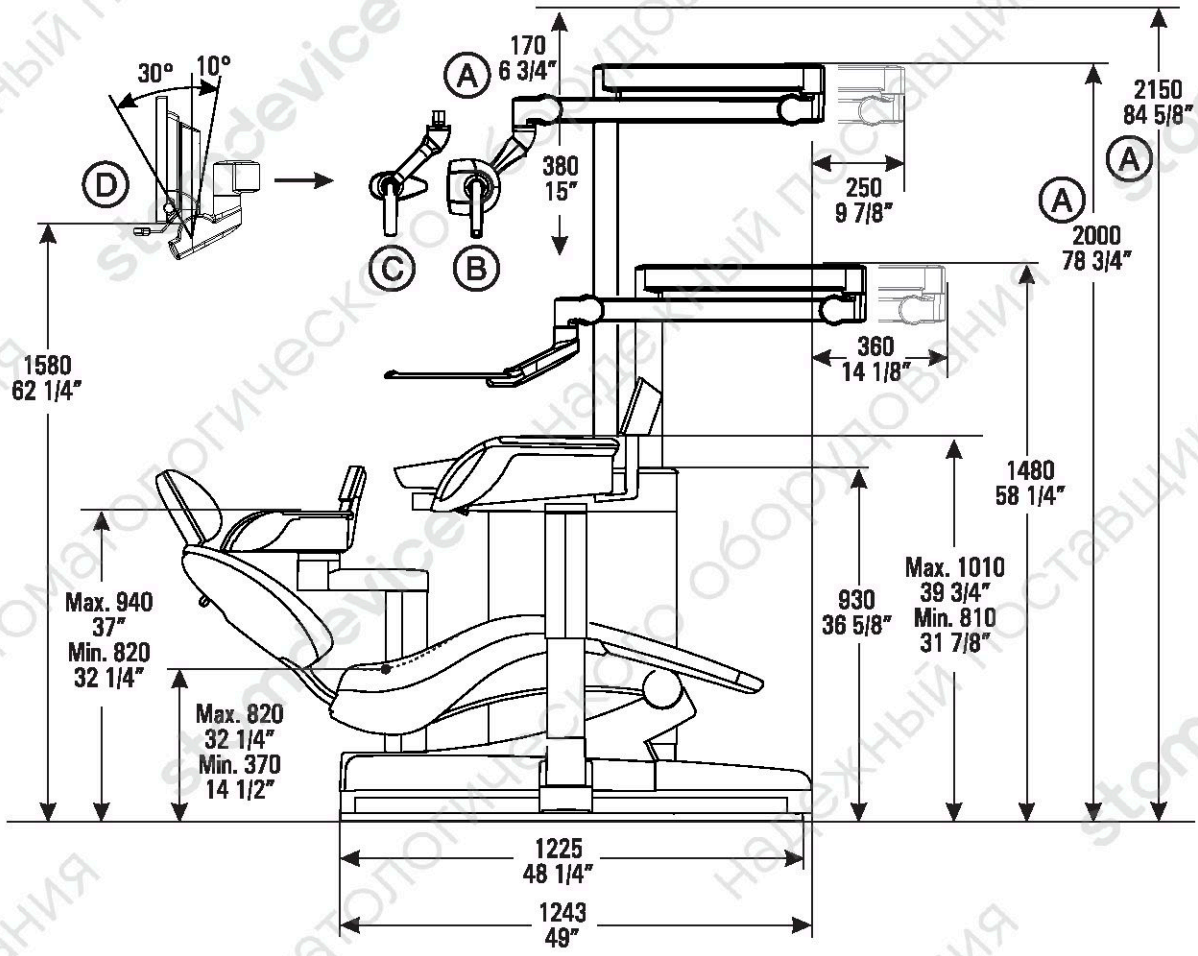


A	Recommended distances from cabinet or wall.
B	Center of the floor cut-out/installation area
C	Minimum distance with tray and/or Heliodent Plus
D	Hazard warning: The lamp installed here and the tray and Heliodent Plus have a swivel range which exceeds the specified distances!

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4.1.2 Side view

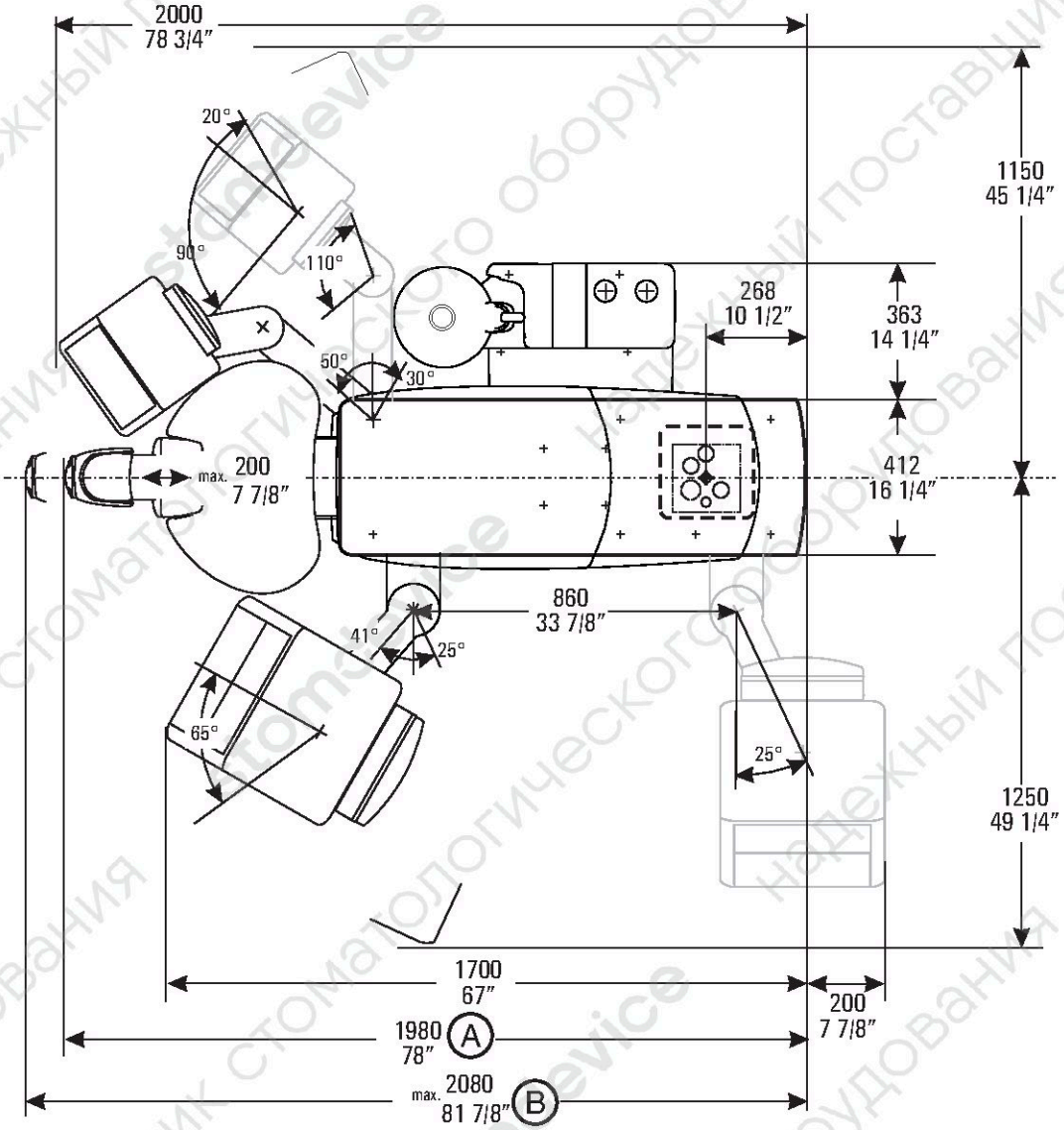


A	Height and swivel range of the lamp
B	LEDview Plus
C	LEDview
D	Monitor on lamp support tube

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4.1.3 Top view

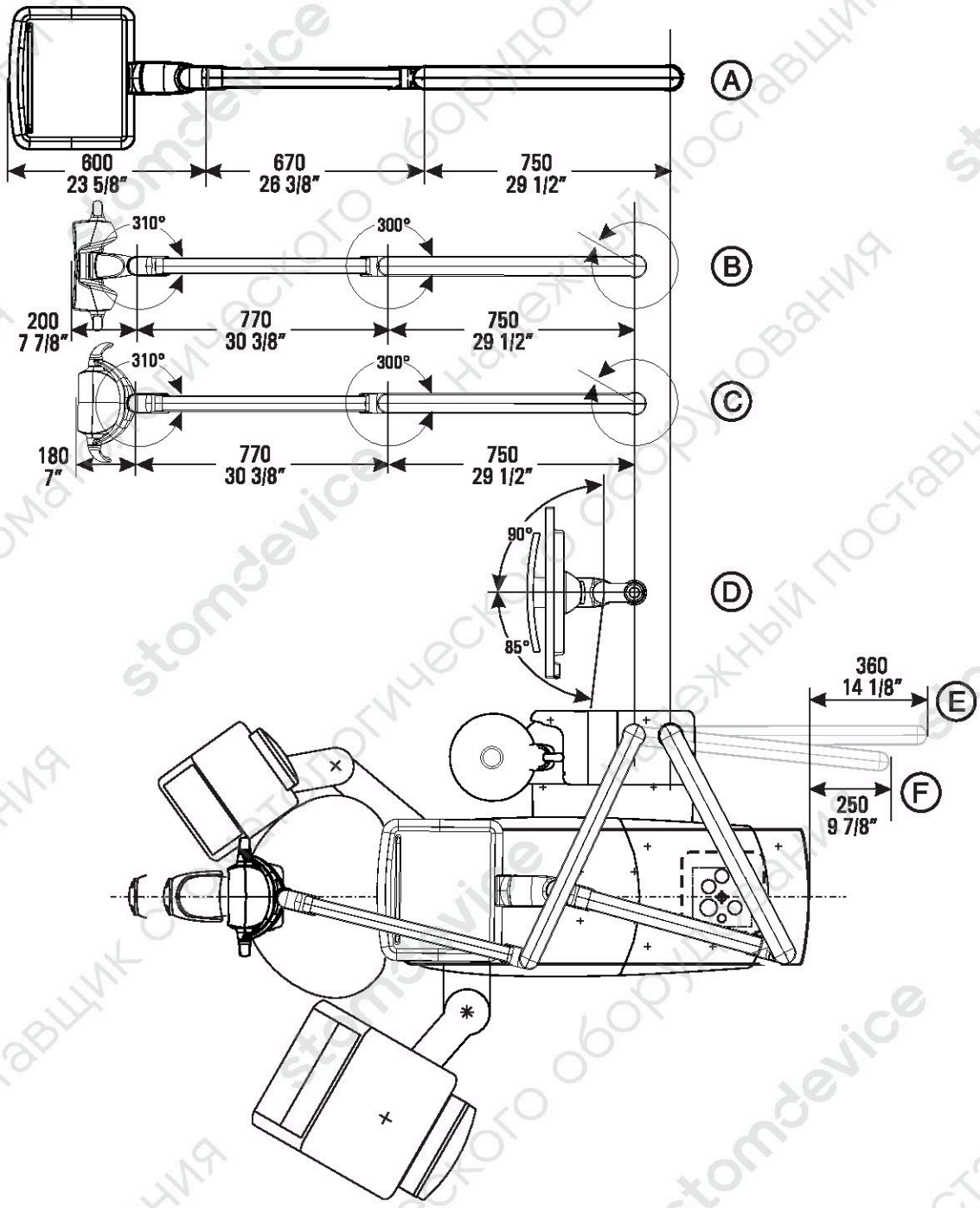


A	Length of the treatment center with 176 cm tall patient and program 2 and fully extended headrest
B	Maximum length of the treatment center with motor-driven headrest

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4.1.4 Top view with options

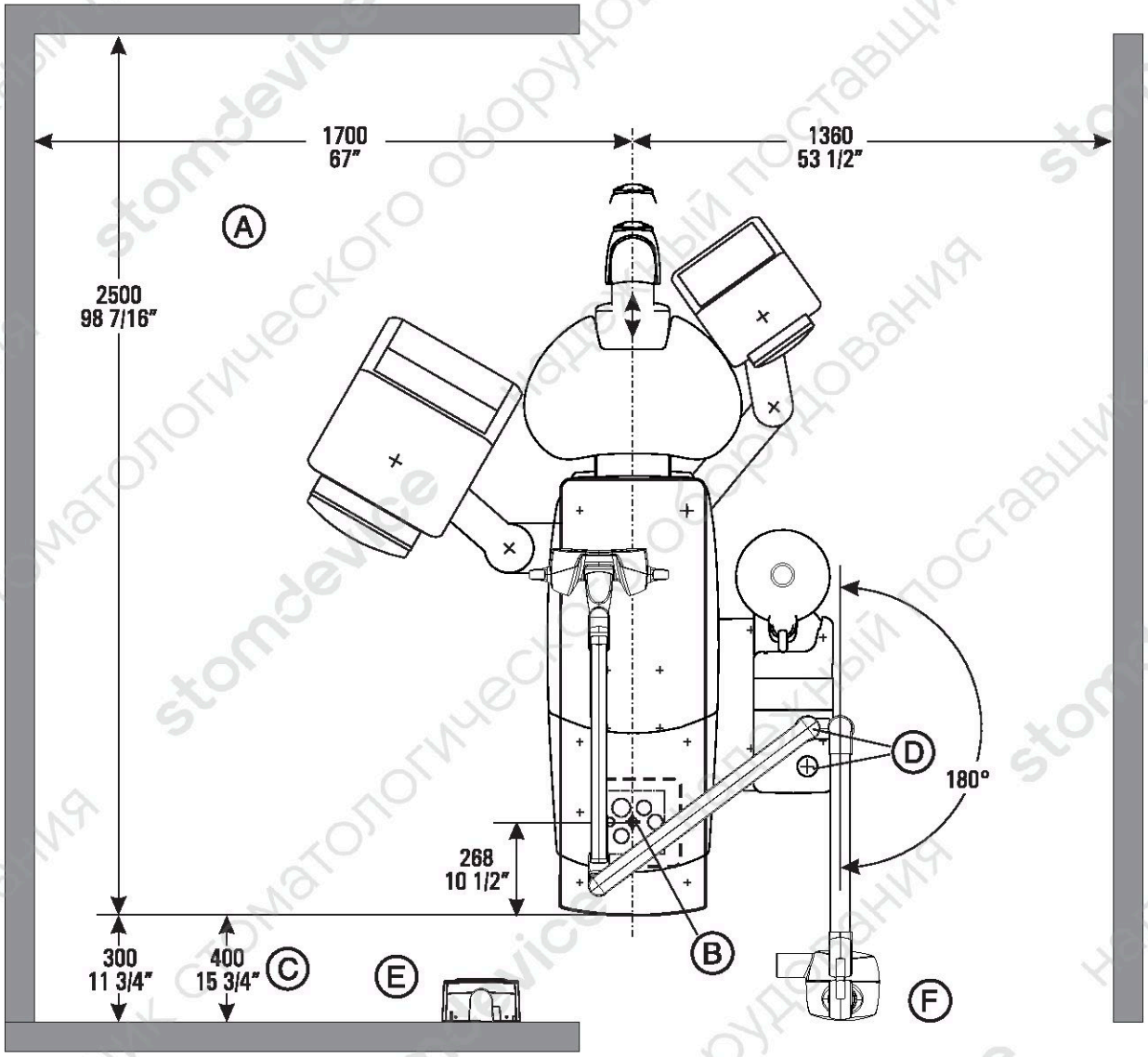


A	Tray
B	LEDview Plus
C	LEDview
D	Monitor
E	Projection of tray arm
F	Projection of lamp arm

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4.1.5 Distances in the treatment room with HELIODENT PLUS

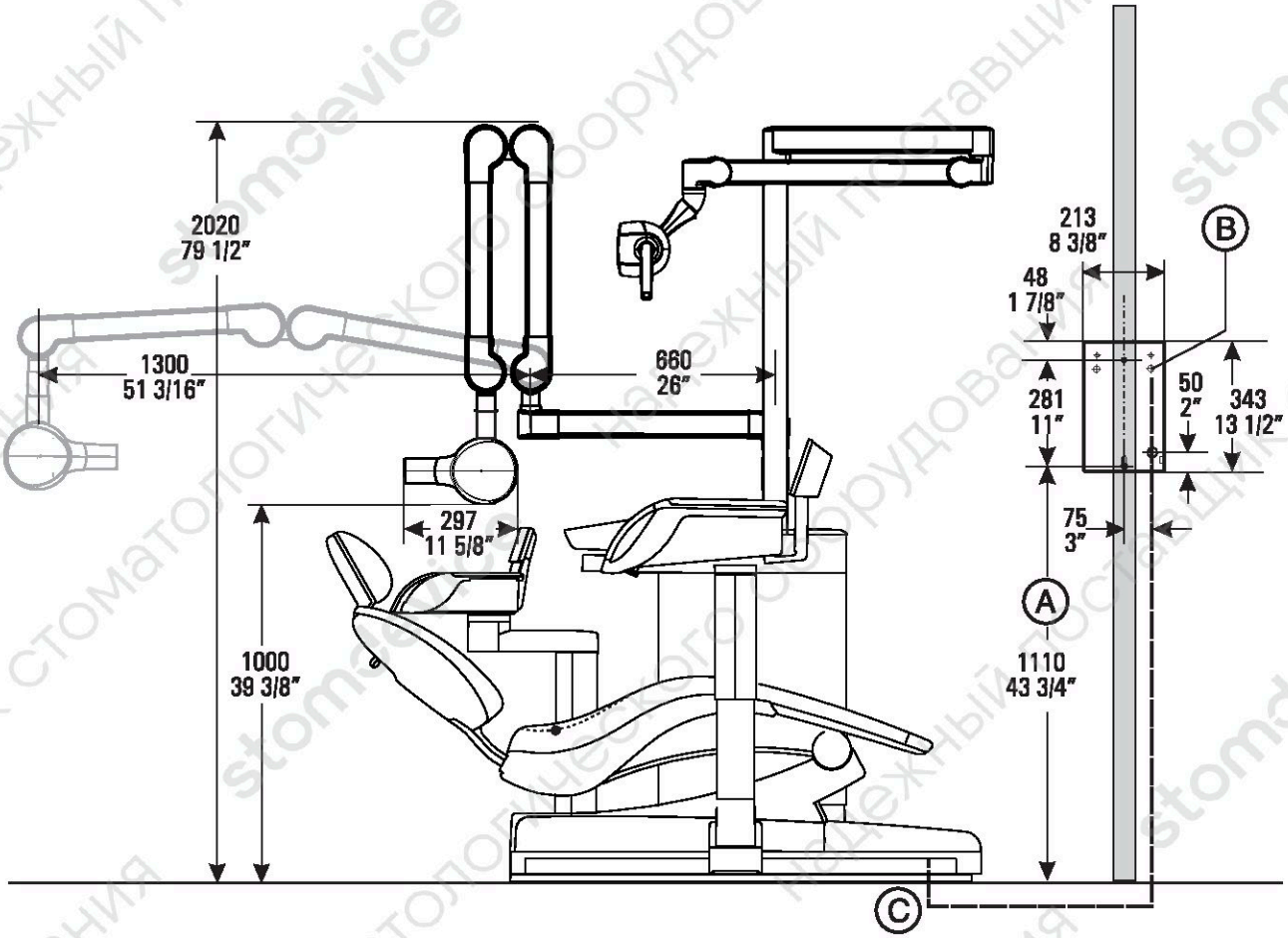


A	Recommended distances from cabinet or wall.
B	Center of the floor cut-out/installation area
C	Minimum distance with tray and/or Heliodent Plus
D	**IMPORTANT!** The lamp installed here and the tray and Heliodent Plus have a swivel range which exceeds the specified distances!
E	Heliodent Plus wall adapter Observe radiation protection regulations!
F	Support arm with Heliodent Plus tube assembly

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4.1.6 Side view with HELIODENT Plus

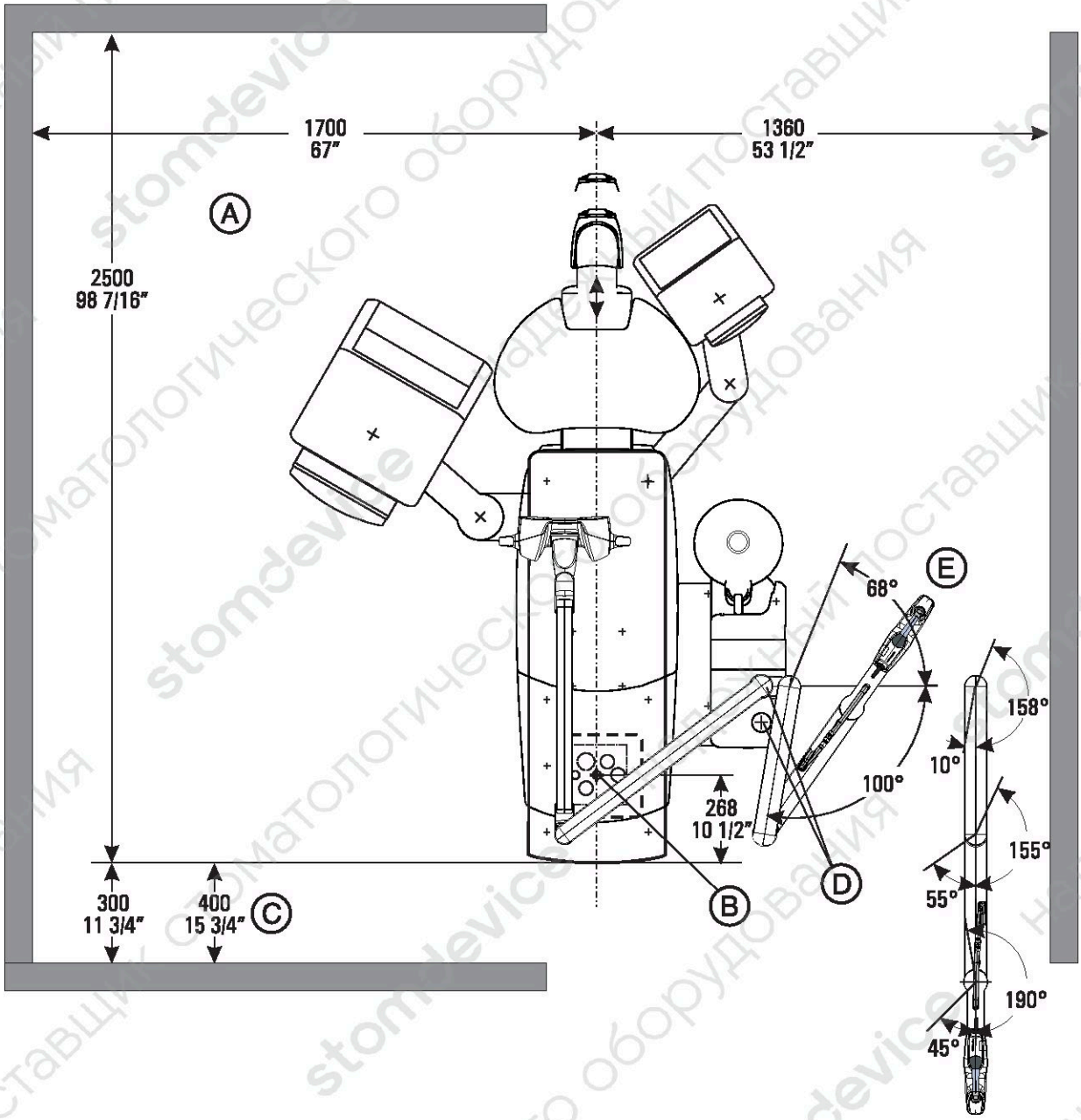


A	Recommended installation height for wall adapter: 1110 mm (43 3/4“)
B	Cable bushing for radiation cable
C	The radiation cable between TENEO and the wall adapter is supplied (12.5 mm outer diameter, max. cable length 10 meters (393”). **CAUTION** The Heliodent Plus radiation cable cannot be laid together with USB or HDMI cables. If required, allow for a separate installation pipe or above-floor installation, see Above-floor installation of supply lines [→16].

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4.1.7 Distances in the treatment room with CEREC AI

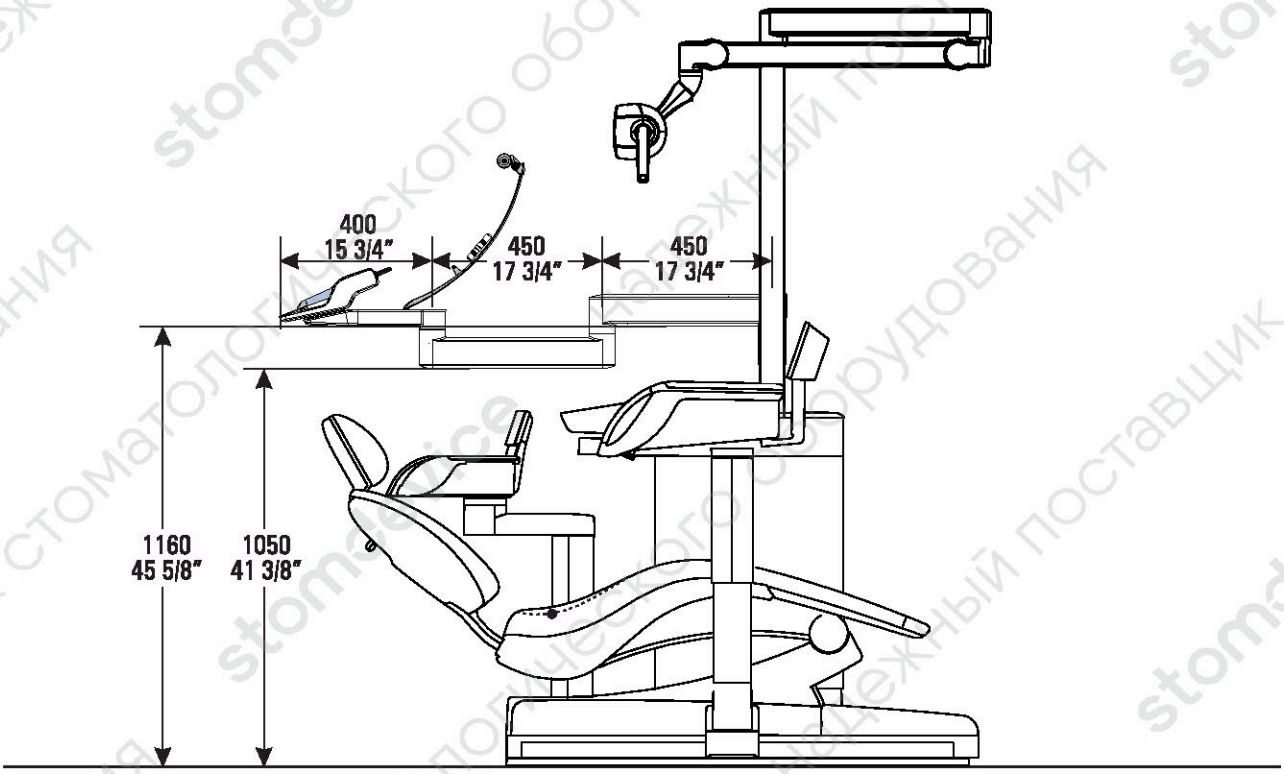


A	Recommended distances from cabinet or wall.
B	Center of the floor cut-out/installation area
C	Minimum distance with tray and CEREC AI/CEREC AI Connect
D	Hazard warning: The lamp installed here, the tray and CEREC AI exposure system/CEREC AI Connect have a swivel range which exceeds the specified distances!
E	Support arm with CEREC AI/CEREC AI Connect

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4.1.8 Side view with CEREC AI



4.2 Mounting plates

Adapter plate

If the dental treatment center is being installed as a replacement for an M1 previously installed at this location, an adapter plate is available for this purpose. You can use the existing drill holes for fastening. Two additional drill holes are required only in the area of the water unit. The treatment center is screwed onto the steel plate using M10 screws. The adapter plate also must be used if the unevenness of the floor exceeds 2 mm in the vicinity of the base plate.

Note: If a C-Line unit (e.g. C2$^+$, M1$^+$) was previously installed, the fastening drill holes must be re-drilled.

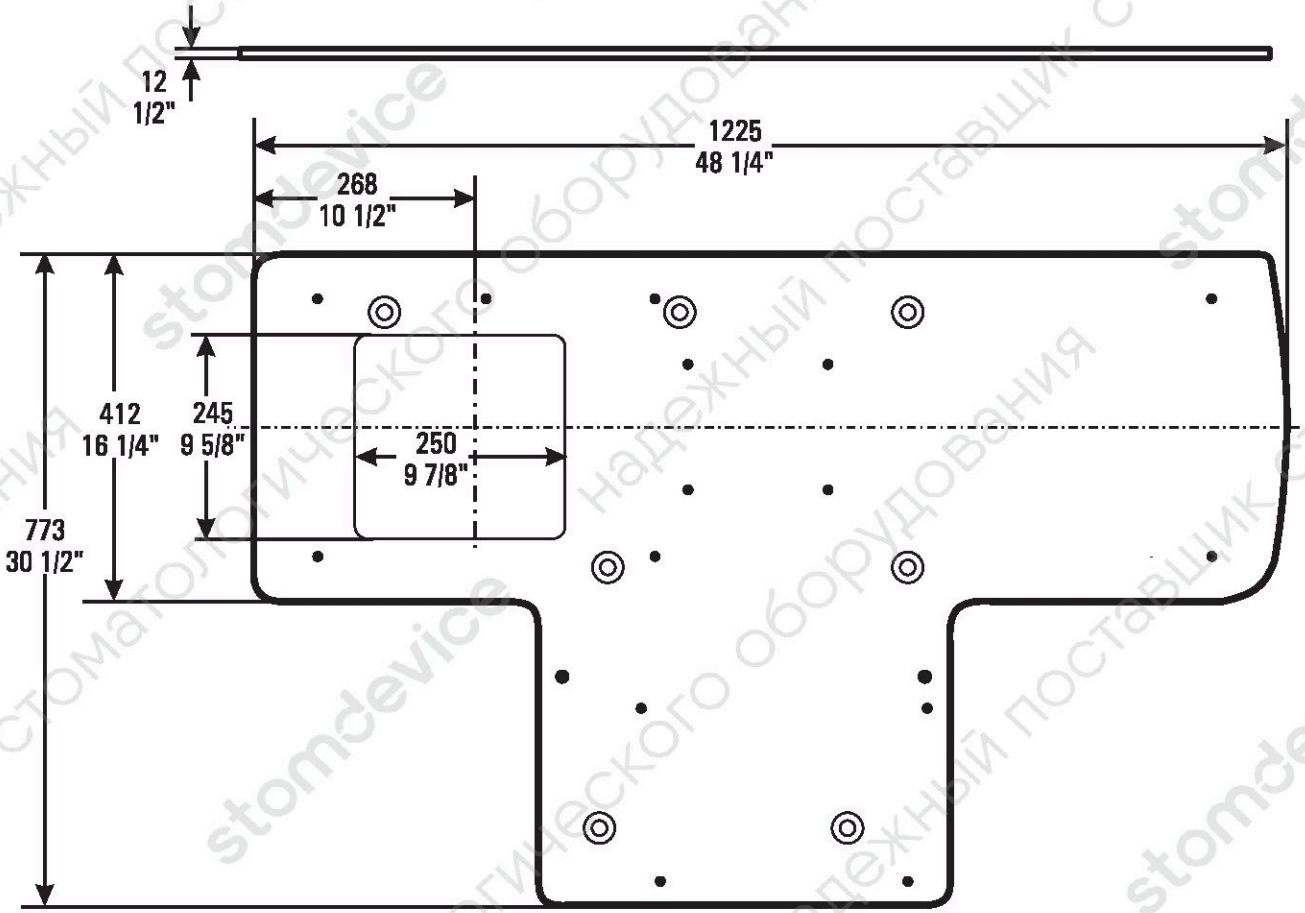
Adapter plate thickness: 12 mm

Drilling with floor (7x)

REF 62 04 965 Teneo adapter plate

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Demonstration chair plate

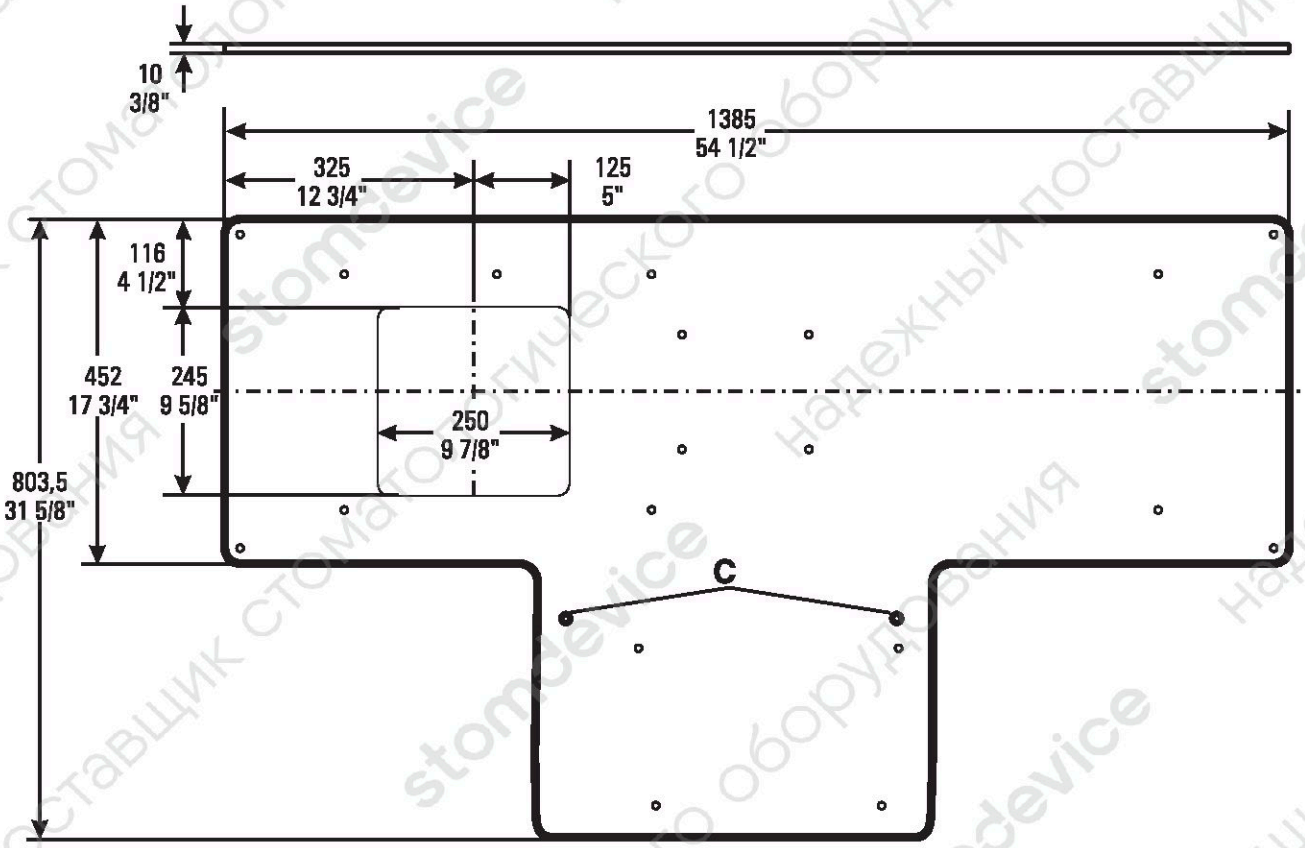
For floors which do not permit permanent connection of the unit (e.g. demo operation at a trade show, floor heating), installation on a steel demo plate is possible.

The treatment center is screwed onto the steel plate using M10 screws.

If the demo chair plate is **permanently** installed and whenever it is used for **medical purposes**, is must be screwed firmly to points **C** on the floor using two screws.

Demonstration plate thickness: 10 mm

REF 62 04 973 Teneo demo chair plate



4.3 Information on planning for the practice

The following file(s) for practice planning are available for download in the dealer area of the Sirona website under DOWNLOADS => CAAD files:

- PDF file with print symbol - for to-scale printing on paper or adhesive film
- CAAD file(s) - for professional implementation planning with 2D/3D CAAD systems

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4.4 Technical data

Model designation:	Teneo
Power connection:	100 – 230 V AC ± 10% 50/60 Hz
Rated current:	4.8 A at 230 V 9.6 A at 115 V 11 A at 100 V also max. 6 A for external devices
Type of ground connection:	TN-C-S system or TN-S system (acc. to IEC 60364-1)
Overvoltage category:	2 acc. to IEC 60664-1
Average power consumption (for dimensioning an air conditioning system):	0.35 kW
Power consumption in the Standby mode:	3 W (without internal mini PC)
Main building fuse:	Type B automatic circuit breaker 100 - 115 VAC: 20 A medium-blow 220 – 240 V AC: 16 A medium-blow
Protection class:	Class **I** equipment
Device class in accordance with Directive 93/42/EEC:	Class **IIb** equipment
Degree of protection against electrical shock:	 Type **B** applied parts Except for the Sirotom electrosurgical handpiece and the SiroCam AF+ intraoral camera. These are:  Type **BF** applied parts
Degree of protection against ingress of water:	Ordinary equipment (without protection against ingress of water) The foot control meets the IP X1 drip-proof standard.
Tests/Approvals:	See "Standards/Approvals" [→ 36].
Date of manufacture:	 **20yy-mm-dd** (on the rating plate)
USB port:	corresponds to USB 2.0 standard

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Foot control wireless interface

The wireless foot control can be equipped with various wireless modules. A label with the name of the wireless module used is on the underside of the foot control.

Wireless module until April 2017:

Model designation:	nanoLOC AVR
Frequency:	2.4 GHz – 2.4835 GHz (ISM band)
Transmitting power:	< 2 mW (short-range device)
Modulation type:	MDMA
Range:	approx. 10 m
Approval:	See "Standards/Approvals“ [→ 36].

Wireless module starting April 2017

Model designation:	BlueMod+S
Frequency:	2.4 GHz – 2.480 GHz
Transmitting power:	< 2 mW (short-range device)
Modulation type:	GFSK
Range:	approx. 10 m
Approval:	See "Standards/Approvals“ [→ 36].

IMPORTANT

Minimum requirements for the PC

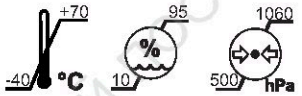
See document "Installation instructions and system requirements for PC configuration," (REF 61 94 075) Sivision Digital.

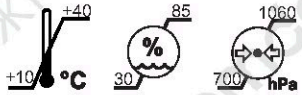
4.4.1 Operating, transport and storage conditions

Operating mode:	Continuous operation with intermittent loading corresponding to the dental mode of working. Drive motors for patient chair and backrest: max. 25 s on and 400 s off Other motors: max. 15 s on and 3 min off Permanently connected unit. Operation is not permitted in mobile vehicles.

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Transport and storage conditions:	Temperature: -40 °C – +70 °C (-40 °F – 158 °F)
	Relative humidity: 10% - 95%
	Air pressure: 500 hPa – 1060 hPa
Operating conditions:	Ambient temperature: 10 °C – 40 °C (50 °F – 104 °F)
	Relative humidity: 30% - 85% no condensation
	Air pressure: 700 hPa – 1060 hPa
Installation location:	≤ 3000 m above sea level
	This treatment center is not suitable for operation in areas subject to explosion hazards.
Pollution degree:	2 acc. to IEC 60664-1
Local pressure (min./ max.):For details see page Requirements of the supply media [→ 10]	Air: 5.5 / 7.5 bar (79.8 / 108.8 psi)
	Water: 2.5 / 6 bar (36.3 / 87 psi)
	Suction air: p_u min. 0.12 bar (1.7 psi), max. 0.18 bar (2.6 psi) ≥ 500 Nl/min
Water flow: For details see page Requirements of the supply media [→ 10]	Water absorption max. 3 l/min
	Residual water max. 3 l/min

4.4.2 Weight and packaging

	Dimensions of the packaging	**Weight** (with packaging and accessories/without packaging):
Dentist element:	108 cm x 67 cm x 96 cm	37 kg / 23.5 kg
Assistant element:	108 cm x 67 cm x 35 cm	25 kg / 16.6 kg
Water unit:	82 cm x 56 cm x 120 cm	63 kg / 48 kg
Chair:	159 cm x 71cm x 85 cm	125 kg / 100 kg
Upholstery:	80 cm x 60 cm x 36 cm	8.5 kg / 5.5 kg
LEDview Plus:	40 cm x 40 cm x 19 cm	3 kg / 2 kg
LEDview Plus support arm:	93 x 40 x 20 cm	8 kg / 6.5 kg
LEDview:	98 cm x 60 cm x 42 cm	12 kg / 8 kg
Support tube for lamp without monitor adapter:	128 cm x 20 cm x 20 cm	4.9 kg / 3.9 kg
Support tube with monitor adapter:	128 cm x 38 cm x 20 cm	6.4 kg / 5.6 kg
There are 2 types of accessory boxes:	120 cm x 80 cm x 54/78 cm	62.6 kg

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4.5 Standards/Approvals

The Teneo treatment center complies with the following standards, among others:

- IEC 60601-1 (electrical and mechanical safety plus software reliability)
- IEC 60601-1-2 (electromagnetic compatibility)
- IEC 60601-1-6 / IEC 62366 (usability)
- IEC 62304 (software process)
- IEC 60601-2-2 (HF surgery)
- ISO 6875 (patient chair)
- ISO 7494-1 (dental treatment units)
- ISO 7494-2 (dental treatment units, water and air supply)
- ISO 9680 (operating light)
- ISO 11143 (amalgam separator), see also below (provided amalgam separator option is available)
- EN 1717 (connection to the drinking water system), see also below and chapter "Connection to the public drinking water supply" [→ 12]

Original language of this document: German

China

Registration number: CFDA (I) 20142551752

Serial number: YZB/GER 1356-2014

Customer service: Sirona Dental Systems Trading (Shanghai) Co., Ltd
Hotline: 400-821-4888

CE 0123

This product bears the CE marking in accordance with the provisions of Council Directive 93/42/EEC of June 14, 1993 concerning medical devices.

The treatment center complies with the requirements of the RoHS Directive 2011/65/EU.

C SA US

The treatment center meets the requirements of the Canadian Standards Association (CSA) according to CAN/CSA-C22.2 No. 60601-1 and AAMI/ANSI ES 60601-1.

SIRONA Dental Systems GmbH 64625 Bensheim Fabrikstrasse 31 Z-64.1-24

adf conseille NF NF DENTAIRE

The amalgam separator achieves a separation efficiency of >95%. The unit thus fulfills the requirements of ISO 11143.
Separating procedure type 1: Centrifuge system
The amalgam separator is approved by the German institute for building technology (DIBt) and AFNOR (France).

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DVGW
CERT
Anschlusssicher
W 540

The treatment center complies with the technical regulations and requirements on safety and hygiene for connection to the public drinking water supply. The unit is certified according to the requirements of the German Technical and Scientific Association for Gas and Water (DVGW). It is intrinsically safe in accordance with worksheet W540. The unit thus also meets the requirements of standard EN 1717; see also the chapter entitled "Connection to the public drinking water system" [→ 12].

BELGAQUA

This unit meets the requirements of BELGAQUA and may therefore be connected to the public drinking water supply in Belgium.

WaterMark
ATS 5200.104
Certificate No. 21208

This unit meets the requirements of ATS and may therefore be connected to the public drinking water supply in Australia.

CE 0682
until April 2017

CE
since April 20

The wireless modules in the wireless foot control and in the treatment center meet the requirements of the R&TTE directive 1999/5/EC.
Standards:

- EN 60950-1
- EN 301489-1, EN 301489-17, EN 300328

FC

The modules meet the requirements of the Federal Communications Commission (Part 15 of the FCC Rules).

FCC ID: SIFNANOLOCAVR0108 (until April 2017) or
FCC ID: RFRMS (starting April 2017)

Industry Canada

The modules meet the requirements of Industry Canada (RSS210).

IC: 7654A-nanoLOCAVR (until April 2017) or
IC: 4957A-MS (starting April 2017)

The current approvals of the wireless foot control are listed on the rating label on the underside of the wireless foot control.

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5 Electromagnetic compatibility

The following information must be observed to ensure safe operation regarding EMC aspects.

Teneo complies with the requirements for electromagnetic compatibility (EMC) according to IEC 60601-1-2:2014

Teneo is designed for use in professional healthcare facilities.

Teneo is hereinafter referred to as "UNIT".

5.1 Accessories

Connecting the PC

The required interface cables can be ordered from Sirona.

Sivision digital HDMI 10 m cable set (REF 63 29 655)

Designation of the interface cables	Vendor
HDMI cable, 10 m (L406)	SIRONA
USB repeater cable, 10 m, connectors: type A, type B	SIRONA
Ethernet cable, 10 m (L339)	SIRONA
Audio cable, 10 m	SIRONA
2nd protective ground wire, 2.5 mm^2, 5 m	SIRONA

Sivision digital HDMI 5 m cable set (REF 64 46 111)

Designation of the interface cables	Vendor
HDMI cable, 5 m (L552)	SIRONA
AE USB cable, 5m (L530), connectors: type A, type B	SIRONA
Ethernet cable, 5 m (L553)	SIRONA
2nd protective ground wire, 2.5 mm^2, 5 m	SIRONA

Heliodent Plus cable set

Designation of the interface cables	Supplier
Radiator cable, 10 m (L7)	Sirona

CEREC AI with Omnicam cable set

Designation of the interface cables	Supplier
Connecting cable, 5 m	Sirona
Connecting cable, 10 m	Sirona

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The **UNIT** may only be operated with accessories and spare parts approved by Sirona. Unapproved accessories and spare parts may lead to an increased emission or to a reduced immunity to interference.

The **UNIT** should not be operated in the immediate vicinity of other devices. If this proves to be unavoidable, the UNIT should be monitored to ensure that it is operating properly.

Accessories for EMC measurement

The EMC measurements were performed with the following PC:

PC as peripheral device for checking the interfaces with:	Fujitsu Siemens ESPRIMO Q series Mini PC Q5020
PC equipment:	
Processor	Intel Core 2 Duo; 1.4 GHz
RAM	2 GB DDR 2
Graphics card	Intel GMA 3100 on board
Hard disk drive	Serial ATA 80 GB (5400 rpm, 2.5")
Keyboard	Logitech Cordless Medic Board Pro (Bluetooth)
Mouse	
Interfaces:	1 x LAN; 4 x USB, Bluetooth
Software:	SIUCOM plus, SI-Video
Operating system	Microsoft Windows 7

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5.2 Electromagnetic emission

The **UNIT** is intended for operation in the electromagnetic environment specified below.

The customer or user of the **UNIT** should make sure that it is used in such an environment.

Emission measurement	Conformity	Electromagnetic environment – guidelines
RF emissions according to **CISPR 11**	Group 1[a]	The **UNIT** uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions according to **CISPR 11**	Class B	The **UNIT** is intended for use in all facilities, including residential areas and those directly connected to a public power supply, which also provides electricity to buildings used for residential purposes.
Harmonics according to **IEC 61000-3-2**	Class A	
Voltage fluctuations/flicker according to **IEC 61000-3-3**	Complies	

If an HF surgical unit is integrated, it must emit electromagnetic energy in order to function properly. When in operation, the HF surgical unit may cause interference in nearby electrical equipment. According to IEC 60 601-2-2, no limit values have been defined for active HF surgical units. They are therefore classified as Group 1 devices according to CISPR 11.

5.3 Interference immunity

The **UNIT** is intended for operation in the electromagnetic environment specified below.

The customer or user of the **UNIT** should make sure that it is used in such an environment.

Interference immunity tests	IEC 60601-1-2 test level	Compliance level	Electromagnetic environment - guidelines
Electrostatic discharge (ESD) according to **IEC 61000-4-2**	± 8KV contact discharge ± 15 KV air discharge	± 8 KV contact discharge ± 15 KV air discharge	Floors should be made of wood or concrete or finished with ceramic tiling. If the floor is covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient/ burst according to **IEC 61000-4-4**	± 1 kV for input and output lines ± 2 kV for power supply lines	± 1 kV for input and output lines ± 2 kV for power supply lines	The quality of the line power supply should be that of a typical commercial or hospital environment.
Surge voltages according to **IEC 61000-4-5**	± 1 kV differential mode ± 2 kV common mode voltage	± 1 kV differential mode ± 2 kV common mode voltage	The quality of the line power supply should be that of a typical commercial or hospital environment.

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Interference immunity tests	IEC 60601-1-2 test level	Compliance level	Electromagnetic environment - guidelines
Voltage dips, short interruptions and variations of the power supply according to **IEC 61000-4-11**	<5% U_T for ½ period (>95% dip of U_T) 40% U_T for 5 periods (60% dip of U_T) 70% U_T for 25 periods (30% dip of U_T) <5% U_T for 5sec. (>95% dip of U_T	<5% U_T for ½ period (>95% dip of U_T) 40% U_T for 5 periods (60% dip of U_T) 70% U_T for 25 periods (30% dip of U_T) <5% U_T for 5sec. (>95% dip of U_T	The quality of the line power supply should be that of a typical commercial or hospital environment. If the user of the **UNIT** requires it to continue functioning following interruptions of the power supply, it is recommended to have the **UNIT** powered by an uninterruptible power supply or a battery.
Magnetic field of power frequencies (50/60 Hz) according to **IEC 61000-4-8**	30 A/m	30 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.
Note: U_T is the AC supply voltage prior to application of the test level.			
			Portable and mobile radio equipment must not be used within the recommended working clearance from the **UNIT** and its cables, which is calculated based on the equation suitable for the relevant transmission frequency. Recommended working clearance:
Conducted RF disturbance **IEC 61000-4-6**	3 V_{eff} 150 kHz to 80 MHz[1]	3 V_{eff}	$d = [1,2]\ \sqrt{P}$
Radiated RF interference **IEC 61000-4-3** [4]	3 V/m 80 MHz - 800 MHz[1] 3 V/m 800 MHz - 2.7 GHz[1]	3 V_{eff} 3 V_{eff}	$d = [1,2]\ \sqrt{P}$ at 80 MHz - 800 MHz $d = [2,3]\ \sqrt{P}$ at 800 MHz - 2.7 GHz with P as the power rating of the transmitter in watts (W) according to the transmitter manufacturer's specifications and d as recommended safety distance in meters (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey[2] should be less than the compliance level[3] in each frequency range. Interference is possible in the vicinity of equipment bearing the following graphic symbol. 

1. The higher frequency range applies at 80 MHz and 800 MHz.

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2. The field strengths of fixed transmitters, such as base stations of radiotelephones and mobile agricultural radio broadcast services, amateur radio stations, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. A site survey is recommended to assess the electromagnetic environment due to fixed RF transmitters. If the measured field strength in the location in which the **UNIT** is used exceeds the applicable RF compliance level above, the **UNIT** should be observed to verify normal operation. If unusual performance characteristics are observed, it may be necessary to take additional measures such as reorientation or repositioning of the **UNIT**.
3. Over the frequency range 150kHz to 80 MHz, field strengths should be less than 3 V/m.
4. Test specification for radiated RF interference IEC 61000-4-3:

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Test frequency (MHz)	Band (MHz)	Service	Modulation	Maximum Power (W)	Distance (m)	Immunity test level (V/m)
385	380 - 390	TETRA 400	Pulse modulation 18 Hz	1,8	0,3	27
450	430 - 470	GMRS 460, FRS 460	FM ± 5 kHz deviation 1 kHz sine	2	0,3	28
710 745 780	704 - 787	LTE Band 13, 17	Pulse modulation 217 Hz	0,2	0,3	9
810 870 930	800 - 960	GSM 800/900, TETRA 800, iDEN 820, CDMA 850, LTE Band 5	Pulse modulation 18 Hz	2	0,3	28
1720 1845 1970	1700 - 1990	GSM 1800; CDMA 1900; GSM 1900; DECT; LTE Band 1, 3, 4, 25; UMTS	Pulse modulation 217 Hz	2	0,3	28
2450	2400 - 2570	Bluetooth, WLAN, 802,11 b/g/n, RFID 2450, LTE Band 7	Pulse modulation 217 Hz	2	0,3	28
5240 5500 5785	5100 - 5800	WLAN 802.11 a/n	Pulse modulation 217 Hz	0,2	0,3	9

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5.4 Working clearances

Recommended working clearances between portable and mobile RF communication devices and the UNIT

The **UNIT** is intended for operation in an electromagnetic environment, where radiated RF interference is checked. The customer or the user of the **UNIT** can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the **UNIT** - depending on the maximum output power of the communication device, as shown below.

Power rating of the transmitter [W]	Working clearance according to transmission frequency [m]		
	150 kHz - 80 MHz	80 MHz - 800 MHz	800 MHz - 2.5 GHz
	$d = [1.2] \sqrt{P}$	$d = [1.2] \sqrt{P}$	$d = [2.3] \sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

The recommended safety distance d in meters (m) can be determined for transmitters, whose maximum power rating is not specified in the above table, using the equation that belongs to the corresponding column, wherein P is the maximum power rating of the transmitter in watts (W) according to the transmitter manufacturer.

Note 1

The higher frequency range applies at 80 MHz and 800 MHz.

Note 2

These guidelines may not apply in all cases. The propagation of electromagnetic waves is influenced by their absorption and reflection by buildings, objects and persons.

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5.5 Foot control wireless interface

Insofar as the treatment center is equipped with a foot control, one wireless module each must be installed in the foot control and in the base of the chair of the treatment center. These modules transmit the foot control signals.

⚠ CAUTION

Interference with the wireless transmission

This wireless transmission may cause interference with or be disturbed by other radio services.

Wireless module in the wireless foot control and in the treatment center

The wireless foot control can be equipped with various wireless modules. A label with the name of the wireless module used is on the underside of the foot control.

Wireless module until April 2017:

Model designation:	nanoLOC AVR
Frequency:	2.4 GHz – 2.4835 GHz (ISM band)
Transmitting power:	< 2 mW (short-range device)
Modulation type:	MDMA
Range:	approx. 10 m
Approval:	See "Standards/Approvals" [→36].

Wireless module starting April 2017

Model designation:	BlueMod+S
Frequency:	2.4 GHz – 2.480 GHz
Transmitting power:	< 2 mW (short-range device)
Modulation type:	GFSK
Range:	approx. 10 m
Approval:	See "Standards/Approvals" [→36].

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6 Checklist

6.1 Installation site

We recommend performing an inspection of the circumstances on location at least 4 weeks prior to installation. The checklist should help you when doing this. This can help ensure a smooth procedure on the day that the Teneo is actually installed.

Installation location:	
• Installation location:	
• Unit location:	
• Building number:	
• Room name/number:	

6.2 Construction requirements

Connections: Media (see On-site installation [→ 9])	☑
• Water supply Pipe 10x1 mm, corner valve outlet 3/8"	☐
• Compressed air supply line Pipe 10x1 mm, corner valve outlet 3/8"	☐
• Suction line DN 40 HT-PP ISO 8283-3, inner diameter approx. 36.5 mm	☐
• Water drainage DN 40 HT-PP ISO 8283-3, inner diameter approx. 36.5 mm	☐
• Installation pipe (power supplies) inner diameter approx. 40 mm)	☐
• Installation pipe (IT), inner diameter min. 50 mm (or corresponding flat conduit)	☐

Connections: Electrical (see On-site installation [→ 9])	☑
• Power cable: 3 x 1.5 mm^2 (AWG16)	☐
• Type B automatic circuit breaker 230 V AC, 16 A medium-blow or	☐
• Type B automatic circuit breaker 100-115 V AC, 20 A medium-blow	☐
• Suction machine control cable and call cable: 3 x 1.5 mm^2 (AWG16)	☐

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Connections: Electrical (see On-site installation [→ 9])		☑
• Wireless systems in 2.4 GHz frequency range available? (e.g. room monitoring systems, video transmitters, etc.)	☐ Yes	☐ No
• If yes, this may damage the wireless foot control. Please consult our Product Service team.		
• Optional CEREC AI • Determine the required length of the connecting cable from the treatment center to the PC. • The connecting cable required is to be selected when ordering the CEREC AI unit. • **Available connecting cables:** – 3 meter – 5 meter – 10 meter		☐

Uneven floors: Mounting plates (see Mounting plates [→ 30])	☑
• No plate required (unevenness max. 2 mm, shimming plates can be used)	☐
• Adapter plate, REF 62 04 965	☐
• Demo plate (demo operation at a trade show), REF 62 04 973	☐
• Load capacity of the floor is indicated (pressure and tensile loads).	☐
• The treatment center can be safely anchored in the load-bearing structure (concrete/wood; NOT screed).	☐

6.3 IT hardware

Mode of operation	☑
• Stand-alone solution (mini PC required in the base of the chair)	☐
• PC in treatment room	☐

PC system requirements:	☑
IT hardware and software requirements are described in the document "Installation notes and system requirements for PC configuration", (REF 61 94 075) Sivision digital	☐

IMPORTANT!	
Please be aware that any deviations may cause malfunctions in camera mode. For further details, see document "Installation instructions and system requirements for PC configuration", (REF 61 94 075) Sivision digital.	

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6.4 Network

Network:	☑
• The entire network should be equipped with 100 MBit Ethernet.	
• - Cat 5	☐
- Cat 6	☐ ☐ 10 Mbps ☐ 100 Mbps
• Network connection for Teneo available.	☐
• Network connection for external PC available.	☐
IMPORTANT! The use of routers between Teneo and the treatment center PC must be avoided.	
• Network configuration plan available.	☐
• Network jacks have been certified.	☐
• Network certificate present.	☐
• Network installation company.	☐
• Remarks/Tasks:	

6.5 Data processing

IP addresses/firewall:		
• TCP/IP address range:	____ . ____ . ____ . ____ - ____ . ____ . ____ . ____	
• Subnet mask:	____ . ____ . ____ . ____	
• Are addresses already defined/present?	☐ Yes	☐ No
• Is there a DHCP server (dynamic TCP/IP address assignment)?	☐ Yes	☐ No
NOTE! A static address should be assigned for the Teneo. It must not lie in the dynamic address range!		
• Teneo:	____ . ____ . ____ . ____	
• Internal PC:	____ . ____ . ____ . ____	
• External PC:	____ . ____ . ____ . ____ - ____ . ____ . ____ . ____	
• Standard gateway:	____ . ____ . ____ . ____	
• Antivirus software available?	☐ Yes Name:	☐ No

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IP addresses/firewall:		
• Is a firewall installed? Software or hardware firewall?	☐ Yes ☐ SW ☐ HW	☐ No
• Remarks/Tasks:		

Practice administration programs:		
• Are connections to the practice administration programs, etc. installed or planned?	☐ Yes	☐ No
• If so, which system (manufacturer + name)?		
• Remarks/Tasks:		

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We reserve the right to make any alterations which may be required due to technical improvements.

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