

DAC UNIVERSAL

User Manual

English



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1. Introduction to the DAC UNIVERSAL

 **CAUTION:** U.S. federal law restricts this device to sale by or on the order of a licensed healthcare professional.

Operator training

- a) All personnel who operate or maintain the DAC Universal **MUST** be trained in the operation and safe use of the DAC Universal. The praxis shall point out a person responsible for training all personnel operating and maintaining the DAC Universal.
- b) All personnel who operate or maintain the DAC Universal must comprehend the process with vapour and the relevant methods for safe use, and methods to detect escape of the agent.
- c) All personnel who operate or maintain the DAC Universal must receive training including emergency procedures for any toxic, flammable, explosive or pathogenic material released into the environment. Records of attendance at training are maintained, and evidence of understanding demonstrated.

Retention of documentation

It is very important to make sure that this manual is stored together with the unit so that it will also be available at any time in the future. In case the unit is sold or the right to use it is transferred to a different owner, make sure that the manual always remains located near the unit. This is necessary to ensure that the new owner can use the unit properly and has all required information.

Read carefully before starting!

These instructions serve to promote safety. Be sure to read them carefully before installing and using the unit.



This symbol is located on the rating plate to remind the user to observe the manual.

Medical electrical devices may be used only with reference to the risk of electrical shock, fire or mechanical hazards according to IEC 60601-1.

Disclaimer

The manufacturer assumes no liability whatsoever in cases involving:

- work or repairs performed by any personnel not authorized by the manufacturer or importer.
- an application which does not correspond to the ones described in this manual.
- the use of non-OEM components or any components not described in the section 6 entitled **Cleaning and maintenance**.

Electromagnetic compatibility

In order to prevent possible risks caused by electromagnetic interference, no electro medical or other such devices should be used near the DAC UNIVERSAL. The unit complies with the currently valid directives concerning electromagnetic compatibility (IEC 60601-1-2).

Only medical devices which comply with the IEC 60601-1 standard may be connected to the DAC UNIVERSAL. Any non-medical devices connected also must comply with the IEC 60601-1-1 standard for medical devices.

- This unit does not cause any harmful interference. It can, however, pick up interferences from other devices, including interferences which cause undesirable operation.

Indication for use

- The DAC UNIVERSAL is intended to clean, lubricate and steam sterilise dental hand pieces, air-motors, and attachments, which are suitable for steam sterilization.
- The DAC UNIVERSAL is intended to clean and steam sterilise dental instruments, which are suitable for steam sterilization.
- Steam sterilization at 134°C/273°F and 3.1 bar/44.95 psi absolute for 3 minutes.
- Maximum load is six (6) dental hand pieces (high-speed hand pieces, air-motors, and/or attachments) or five (5) dental instruments.
- Sterility of devices is compromised on exposure to a non-sterile environment.

Contraindications

The DAC UNIVERSAL is not intended to sterilise instruments, liquids, cloth loads, biomedical waste or other devices or materials, which are not compatible with steam sterilization. The DAC UNIVERSAL is not intended to clean other instruments than dental hand pieces, attachments, or motors with a suitable DAC UNIVERSAL adapter. The processing of such articles may result in incomplete sterilization, damage to the incompatible articles, and/or damage to the DAC UNIVERSAL.

Warnings

This product is intended for use by licensed healthcare professionals only. Before operating the DAC UNIVERSAL, carefully read and follow these instructions and save them for future reference. Observe all cautions and warnings.

Precautions

Oil, water and hot steam are discharged through the drain from the autoclave.

Heat

Note that the instruments are hot after the cycle has ended. Allow them to cool before handling.

Ventilation

Operate the steriliser in a well-ventilated area. Ventilation requirements will vary with room size, frequency of use, etc.

Oil

Sirona Dental Systems GmbH recommends our users at all times to use the type of oil that is recommended by the manufacturer of the instruments. Please contact the manufacturer of your instruments for further information on the type of oil to use.

Water

Periodically, it is necessary to add water to the DAC UNIVERSAL.

It is important to make sure that the water is added to the water tank, cf. appendix 1.

To ensure long durability of the instruments and the autoclave, it is important **only** to use demineralised or distilled water in the DAC UNIVERSAL.

Tap water contains a very high level of calcium/lime scale that will damage both the instruments and the autoclave.

The DAC UNIVERSAL requires a maximum water conductivity of 3.0 µS/cm (micro Siemens).

Drying

If the instruments are to be stored for a longer period (e.g. during the weekend), it is important that they are blown through with compressed air (max. 3.2 bar/46.4 psi) to remove the condensate water from the instruments.

Condensate water can cause corrosion on instruments.

Compressed air

The compressed air to the DAC UNIVERSAL must be dry and must not contain any oil remains.

Please contact the supplier of your compressed air unit, if you have any questions regarding this issue.

It is necessary to install an air filter before the DAC UNIVERSAL in order to prevent particles from the air to be let into the DAC UNIVERSAL. Please contact your supplier regarding Sirona air filter (order number 60 78 575).

Power supply

The DAC UNIVERSAL is operated with an AC-input power supply of 90-120 / 190-240 volt, 50/60 Hz, grounded outlet – 1100 W.

As the manufacturer, Sirona Dental Systems, GmbH provides on written request qualified technical personnel, wiring diagrams, parts lists, and other useful information for the repair and maintenance of those parts which the manufacturer considers to be repairable.

Maximum load

The maximum load is either six (6) dental hand pieces (high-speed handpiece, air-motor, and/or attachment), or five (5) dental instruments.

Sterility

Devices are rendered non-sterile once the lid is raised to the cooling position.

Safety ring.

The DAC UNIVERSAL is equipped with a safety ring that prevents the operator's fingers from getting crushed between the adapter lid and the chamber.

If you accidentally touch the edge of the chamber while the lid is on the way down, the autoclave stops immediately. Then the lid will go up for 5 seconds and error code 86 is shown.

Please do as follows:

1. Press "Clear" to reset the DAC UNIVERSAL. The lid goes up.
2. When the lid is up, it is possible to restart the autoclave.

Instruments:

Dental handpieces, attachments, and motors placed on the adapters should not have clogged oil and water passages and should not be bagged – or rinsing/flushing, lubrication, and sterilization may be impeded.
The instruments placed on the adapters must not be sealed. If an instrument is partly sealed then it must be checked after each cycle whether it gets sufficient oil.
There must be flow through the instruments.

The six adapter positions on the adapter lid are each marked with dots, which symbolises the adapter-position-number on the adapter lid. On position 1 on the lid the instruments must not be longer than 145 mm/5.71 inches (total length of instrument and adapter).

The maximum length on position 2-6 is 160 mm/6.30 inches (total length of instrument and adapter).

Solid instruments are placed in the basket considering the opening and the closing.

i NOTE: The basket is only intended for solid instruments. Do not process any hinged instrument that cannot be fully opened when placed in the basket.

Wrapped instruments are placed on the special lid for wrapped instruments.

i NOTE: See section 3.2 for exact use of the wrapped lid.

i NOTE: The special lid for wrapped instruments is only intended for wrapped instruments. Do not process any unwrapped instruments on this lid!

Moreover, it is important to respect the directions of the manufacturer of the instruments to ensure that the instruments are properly cared for.

Surrounding environment

The DAC UNIVERSAL is to be used indoor only under the following conditions:

- Maximum relative humidity 80% for temperature up to 31°C/87.8°F decreasing linearly to 50% relative humidity at 40°C/104°F.
- Altitude up to 2000 m above sea level.
- Temperature 5°C/41°F to 40°C/104°F
- Mains supply voltage fluctuations not to exceed ±10% of the nominal voltage.
- Transient over voltages according to installation category II
- Pollution degree 2

Disposal

It generally applies that any disposal of this product must comply with the relevant national regulations.

Please observe the regulations applicable in your country.

Within the European Economic Community, Council Directive 2002/96/EU (WEEE) requires environmentally sound recycling/disposal of electrical and electronic devices.



Your product is marked with the adjacent symbol. Disposal of your product with domestic refuse is not compatible with the objectives of environmentally sound recycling/disposal.

The black bar underneath the "garbage can" symbol means that it was put into circulation after Aug. 13, 2005. (See EN 50419:2005)



Please note that this product is subject to Council Directive 2002/96/EU (WEEE) and the applicable national law of your country and must be recycled or disposed of in an environmentally sound manner.

Please contact your dealer if final disposal of your product is required.

Warning Symbols



Be aware of high voltage



Be aware of heat



Warning

Placed on the back plate of the DAC UNIVERSAL next to the:

- COM PORT: External computing devices connected to communication interface port marked "COM of the equipment has to comply with the standards, UL 1950 and IEC/EN 60950 and only connected to SELV circuits"

Please read the section regarding reports. See section 2.2.1 and section 5.

- Connections for water, air and drain: Please read the section regarding how to install the DAC UNIVERSAL. See section 2.2.

Purpose of this manual

The purpose of this manual is to provide the user with sufficient information about the DAC UNIVERSAL in order to use it effectively in the dental clinic immediately after delivery. We recommend that you study appendix 1 thoroughly before using the DAC UNIVERSAL the first time. In this way you will have a better understanding of how the DAC UNIVERSAL functions.

It is not allowed to use the DAC UNIVERSAL in another way than described in this instruction for use.

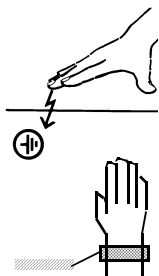
1.1 Safety and technical Information

1.1.1 ESD protective measures

ESD stands for **E**lectro**S**tatic **D**ischarge.



CAUTION: Connector pins or sockets bearing ESD warning labels must not be touched or interconnected without ESD protective measures.



ESD protective measures include:

Procedures for preventing electrostatic charge build-up (e.g. air conditioning, air moistening, conductive floor coverings and non-synthetic clothing)

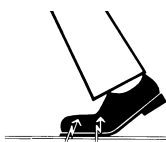
Discharging the electrostatic charges of your own body on the frame of the UNIT, the protective ground wire or large metallic objects

Connecting yourself to ground using a wrist band.

We therefore recommend that all persons working with this system be instructed on the significance of this warning label. Furthermore, they also should receive training in the physics of electrostatic discharges which can occur in the practice and the destruction of electronic components which may result if such components are touched by electrostatically charged USERS.

1.1.2 About the physics of electrostatic charges

ESD stands for **E**lectro**S**tatic **D**ischarge. Electrostatic discharge must be preceded by electrostatic charging.



Static electric charges generally build up whenever two bodies are rubbed against each other, e.g. when walking (shoe soles against the floor) or driving a vehicle (tires against the street pavement). The amount of charge depends on several factors:

Thus the charge is higher in an environment with low air humidity than in one with high air humidity; it is also higher with synthetic materials than with natural materials (clothing, floor coverings).

The following rule of thumb can be applied to assess the transient voltages resulting from an electrostatic discharge.

An electrostatic discharge is:

- perceptible at 3,000 V or higher
- audible at 5,000 V or higher (cracking, crackling)
- visible at 10,000 V or higher (arc-over)

1 nanosecond
= 1 / 1,000,000,000 second
= 1 billionth of a second

The transient currents resulting from these discharges have a magnitude of 10 amperes. They are not hazardous for humans because they last for only several

nanoseconds.

Voltage differentials exceeding 30,000 volts per centimetre (0.39 inches) may lead to a charge transfer (electrostatic discharge, lightning, arc-over).





Integrated circuits (logical circuits and microprocessors) are used in order to implement a wide variety of functions in dental/X-ray/CEREC systems. The circuits must be miniaturized to a very high degree in order to include as many functions as possible on these chips. This leads to structure thicknesses as low as a few ten thousandths of a millimetre.

It is obvious that integrated circuits which are connected to plugs leading outside of the unit via cables are sensitive to electrostatic discharge. Even voltages which are imperceptible to the user can cause breakdown of the structures, thus leading to a discharge current which melts the chip in the affected areas. Damage to individual integrated circuits may cause malfunction or failure of the system.

To prevent this from happening, the ESD warning label next to the plug warns of this hazard.

1.1.3 Technical description

Supplier:	Sirona Dental Systems, GmbH
Model:	DAC UNIVERSAL
Dimensions:	60cm (H open), 35cm (H closed), 36cm (W), 37cm (D)
Material: Cover	Anodized aluminium and plastic
Weight (net without packaging):	23 kg / 51 pounds
Noise:	<65 dBA
Supply voltage:	90 – 120 and 190 - 240 VAC
Current fluctuations:	+/- 10% Max
Frequency:	50/60 Hz
Nominal current:	10A
Nominal power:	1,1 kW
Electric class:	II
Type:	NA
Type BF applied part:	NA
Safety class:	Never use this unit in the presence of inflammable anaesthetics or gases
Mode of operation:	12 – 27 min. continuously
Operating conditions:	Temperature: 20°C/68°F and 30°C/86°F The DAC UNIVERSAL must NOT be stored in minus temperature (Celsius scale)
Protection against harmful ingress of water:	Ordinary
Degree of protection:	Ila
Transport and storage conditions:	Temperature: -40 °C / +65 °C (+41 °F / +149 °F) Relative humidity: 20 - 90% Air pressure: 500 -1060 hPa
External carton::	
	This product bears the CE marking in accordance with the provisions of the Council Directive 93/42/EEC of June 14, 1993 concerning medical devices.

1.1.4 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
HF emission according to CISPR 11	Group 1	The UNIT uses HF energy only for its internal function. The HF emission is therefore very low, and it is improbable that nearby electronic devices might be disturbed.
HF emission according to CISPR 11	Class B	The UNIT is intended for use in all facilities, including residential areas and in any facilities connected directly to a public power supply providing electricity to buildings used for residential purposes.
Harmonics according to IEC 61000-3-2	not applicable Power output < 50 W	
Voltage fluctuations/Flicker according to IEC 61000-3-3	not applicable no significant flicker	

1.1.5 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	± 6kV contact discharge ± 8 kV air discharge	± 6kV contact discharge ± 8kV air discharge	Floors should be wood, concrete, or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30 %.
Electrical fast transient /burst according to IEC 61000-4-4	± 1kV for input and output lines ± 2kV for power cables	± 1kV for input and output lines ± 2kV for power cables	Mains power quality should be that of a typical commercial or hospital environment.
Surge voltages according to IEC 61000-4-5	± 1kV push-pull voltage ± 2kV push-pull voltage	± 1kV push-pull voltage ± 2kV push-pull voltage	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and variations of the power supply according to IEC 61000-4-11	< 5 % UT for ½ period (> 95 % dip of UT) 40% UT for 5 periods (60% dip of UT) 70 % UT for 25 periods (30 % dip of UT) < 5 % UT for 5 sec. (> 95 % dip of UT)	< 5 % UT for ½ period (> 95 % dip of UT) 40% UT for 5 periods (60% dip of UT) 70 % UT for 25 periods (30 % dip of UT) < 5 % UT for 5 sec. (> 95 % dip of UT)	Mains power quality 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	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.
Remarks: UT 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 HF interference IEC 61000-4-6	3_{Veff} 150 kHz to 80 MHz ¹	3_{Veff}	$d = [1,2] \sqrt{P}$

Radiated HF interference IEC 6000-4-3	3V/m 80MHz to 800MHz ¹ 3V/m 800MHz to 2,5GHz ¹	3 _{Veff} 3 _{Veff}	$d = [1,2] \sqrt{P}$ at 80 MHz to 800 MHz $d = [2,3] \sqrt{P}$ at 800 MHz to 2,5 GHz where P is the nominal transmitter output in watts (W) specified by the transmitter manufacturer and d is the recommended working clearance in meters (m). The field strength of stationary radio transmitters is based on a local investigation for all frequencies ² less than the conformance level for all frequencies ³ . Interference is possible in the vicinity of equipment bearing the following graphic symbol. 
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1. The higher frequency range applies at 80MHz and 800MHz.
2. The field strength of stationary transmitters such as the base stations of radio telephones and land mobile services, amateur radio stations as well as AM and FM radio and television broadcasting stations cannot be accurately predetermined. An investigation of the location is recommended to determine the electromagnetic environment resulting from stationary HF transmitters. If the field strength measured at the **UNIT** location exceeds the conformance level specified above, the **UNIT** must be observed with respect to its normal operation at each application site. If unusual performance characteristics are observed, it may be necessary to take additional measures such as reorientation or repositioning of the **UNIT**.
3. A frequency range of 150kHz to 80MHz results in a field strength of less than 3V/m

1.1.6 Working clearances

Recommended working clearances between portable and mobile HF communication devices and the UNIT:

The **UNIT** is intended for operation in an electromagnetic environment, where radiated HF interference is checked. The customer or the user of the **UNIT** can help prevent electromagnetic interference by duly observing the minimum distances between portable and/or mobile HF communication devices (transmitters) and the **UNIT**. These values may vary according to the output power of the relevant communication device as specified below.

Nominal transmitter output [W]	Working clearance according to transmission frequency [m]		
	150 kHz to 80 MHz	80 MHz to 800 MHz	800 MHz to 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

For transmitters whose maximum nominal output is not specified in the above table, the recommended working clearance d in meters (m) can be determined using the equation in the corresponding column, where P is the maximum nominal output of the transmitter in watts (W) specified by the transmitter manufacturer.

Annotation 1

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

Annotation 2

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

1.2 Functioning

According to EN13060 the DAC UNIVERSAL is classified as a Class S autoclave for hand pieces, turbines and solid instruments which fit in the basket.

The DAC UNIVERSAL automatically cleans, lubricates and sterilises turbines, handpieces and contra-angles (in the following designated instruments).

In approx. 12 minutes 6 instruments will be cleaned, lubricated and sterilised and are ready for use again after cooling down.

A basket (auxiliary equipment) for flushing and sterilization of solid instruments is available.

The DAC UNIVERSAL reduces the risk of cross-contamination and ensures optimum maintenance of the instruments.

Maximum length of hand-pieces and turbines:

The six adapter positions are each marked with dots, which symbolise the adapter-position-number on the adapter lid. On position 1 on the lid the instruments must not be longer than 145 mm/5.71 inches (total length of instrument and adapter). The maximum length on position 2-6 is 160 mm/6.30 inches (total length of instrument and adapter).

The DAC UNIVERSAL Autoclave contains an absolute pressure sensor.

The absolute pressure sensor means that the pressure shown in the display (see description 1 in appendix 2), when the machine is open, is equal to the actual pressure in the surrounding environment.

When the autoclave is on, but inactive, the pressure indicated in the display always will be about 1 bar/14.5 psi at ocean level. At high barometric pressure the pressure will be about 1.03 bars and at depression it will be about 0.98 bars.

Furthermore the absolute pressure sensor means that the autoclave can be placed in areas situated high above the ocean-level (i.e. in mountain areas) without showing errors because of difference in pressure.

(i.e. the autoclave will adjust itself to differences in the surrounding pressure.)

1.3 Cleaning of non-wrapped instruments

The instruments are cleaned internally as well as externally.

When using the basket for solid instruments, the instruments are only cleaned externally.

Internal cleaning

The internal cleaning ensures that the spray channels of the instruments are cleaned.

The instruments are cleaned, by flushing the internal spray channels with water and air pressure to ensure, that no dirt is left in the channels.

The internal spray channels are flushed 4 times during the internal cleaning.

External cleaning

The DAC UNIVERSAL uses a cleaning procedure called pulse wash. The pulse wash uses water under pressure.

The DAC UNIVERSAL autoclave cleans 1 time with cold water and 1 time with warm water, thereby removing biofilm on the instruments easier and more quickly. It is possible to increase the number of washes to 6 times via the menu system.

Solid instruments are cleaned externally by means of the pulse wash.

It is possible to increase the effect of the pulse wash by means of a Nitra Clean tablet (order number 60 53 842). This tablet is to be introduced to the chamber before the cycle has started.

We recommend use of one NitraClean tablet once a day, based on 10 cycles per day.

We recommend that you do NOT use a NitraClean tablet in a cycle where Sirona SiroPure or other oil-free instruments are placed on the lid.

1.4 Lubrication of non-wrapped instruments

Prior to the sterilization cycle the drive channels are cleaned and lubricated.

When using the basket for solid instruments the lubrication cycle should be omitted.

Once the cycle has finished the lubrication cycle is automatically switched on again.

NOTE

The amount of oil that is supplied to each instrument during a DAC Universal cycle is designed for the instrument undergoing a DAC cycle between each patient.

1.5 Sterilization of non-wrapped instruments

At the beginning and the end of the sterilization, the instruments are exposed to both an internal and an external sterilization cycle.

During the cycle of internal sterilization, a very high level of pressure of saturated steam is generated in the autoclave chamber which is extracted backwards through the drive and spray channels of the instruments.

The flow of steam-pressure is repeated 16 times in total, throughout the cycle. This cycle is called back-flush.

In addition to this, an external sterilization of the instruments is carried out.

Here the instruments are exposed to the temperature and steam pressure as chosen in the program. It is possible to choose between three different sterilization programs: 121°C/250°F with a sterilization time of 15 minutes, 134°C/273°F with a sterilization time of 3 minutes and 134°C/273°F with a sterilization time of 18 minutes.

Sterilization control system:

The sterilization control system works by regulating the pressure and at the same time controlling the corresponding temperature.

This means that if the temperature or the pressure is below or above the limit values of the sterilization an error will appear in the display.

1.6 Sterilization of wrapped instruments

See section 3.2 'Use of the wrapped lid'.

1.7 Processing handpieces and turbines

The DAC UNIVERSAL is made for immediate use of handpieces and turbines. This means that the handpieces/turbines are transported directly from the dental chair to the DAC UNIVERSAL where they are introduced into the machine.

It is recommended to pre-clean the instruments if the handpieces and turbines are very dirty or if the handpieces and turbines have been left to dry before processing in the DAC UNIVERSAL.

During the time of handling the handpieces/turbines the dirt, blood etc. will dry and will increase the need for pre-cleaning. After the process in the DAC UNIVERSAL and after cooling down, the handpieces/turbines are ready for immediate use in all dental treatments.

In case the instruments are not to be used immediately it is recommended to bag the handpieces/turbines in e.g. dental wrapping bags, which clearly indicates date and time and that the instruments have been processed in the DAC UNIVERSAL and that they are not to be used for surgical procedures.

NOTE: Please always follow the demands of your own specific country.

The procedure is described more in detail below:

Pre processing information:

1. Take the used/soiled instruments off the dental chair using normal handling procedure.
2. Bring the soiled instrument to the "NOT clean area"/"infected area" in the sterilization room.
3. If the outside of the handpieces/turbines are visual dirty – please perform a pre-cleaning – before step no. 4.
4. Load the handpieces/turbines into the DAC UNIVERSAL and start the cycle of cleaning, lubrication and sterilization.

Post processing information:

5. After the DAC UNIVERSAL has finished the cycle, allow the handpieces/turbines to cool down before handling, as they are hot after a cycle.

6. NOTE

The chuck of the instruments should after a mechanical cleaning; always additionally be lubricated according to the recommendations of the manufacturer of the instruments.

7. After cooling down either
 - bag the handpieces/turbines in dental wrapping bags, which clearly indicates date and time and that the instruments have been processed in the DAC UNIVERSAL and that they are not to be used for surgical procedures. NOTE: Please always follow the demands of your own specific country.

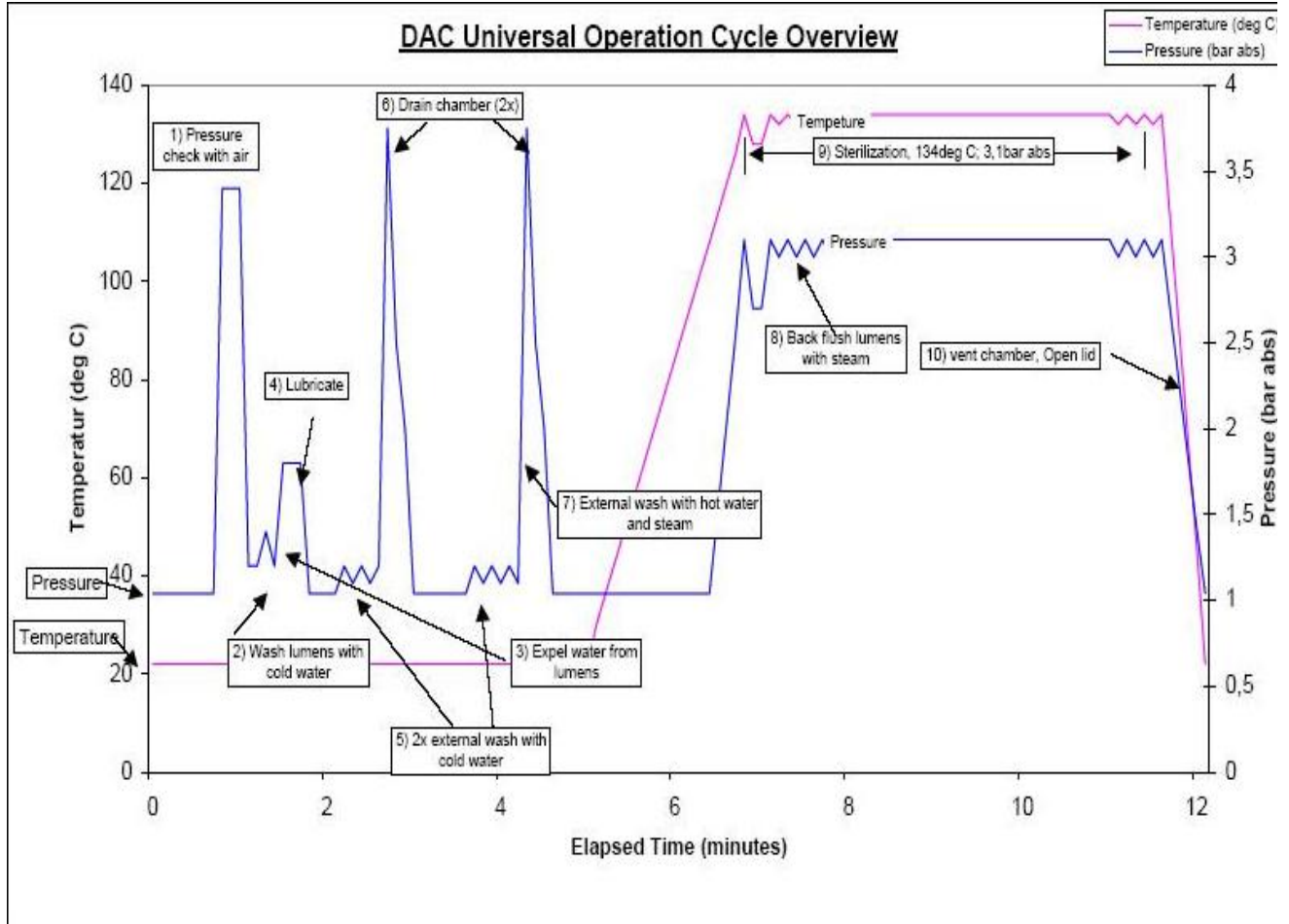
or

- bring the handpieces/turbines directly to the dental chair to be used immediately.

8. If the handpieces/turbines are bagged - place the date and time of sterilization on the bag and name which steriliser was used and store it. NOTE: Please always follow the demands of your own specific country.

Please contact your DAC UNIVERSAL dealer if you have any further questions!

The graph below is a process overview, which shows the temperature and pressure as a function of time.



2. Installation of the DAC UNIVERSAL

The purpose of this chapter is to provide the user with information about how the installation of the DAC UNIVERSAL should take place.

It is recommended that the instruction manual be examined thoroughly before the installation is carried out.

Please note that the autoclave must be left to warm to the ambient temperature before it is connected (i.e. between 20°C/68° F and 30°C/86° F).

The DAC UNIVERSAL must NOT be stored in temperatures lower than 1°C /33.8° F.

NOTE: Only Sirona trained technicians with a Sirona training certificate are qualified to perform the installation, service, repair and maintenance of the DAC Universal.

2.1 Requirements concerning placing

The DAC UNIVERSAL should be placed in an open space on a horizontal position/surface.

Place unit in a well ventilated area on a level heat resistant counter top near both compressed air and an electrical source.

Recommended minimum space to the wall: 10 cm / 3.94 inches.

Furthermore, there must be enough space to allow the autoclave to open (upright).

Total height of the DAC UNIVERSAL when open: 60 cm. / 23.62 inches .

When closed the autoclave is 35cm / 13.78 inches x 36cm / 14.17 inches (H x W).

For your information the mains disconnecting device is the appliance coupler.

Please see more about safety, service, warranty, certificates and approvals in section 7.

2.2 How to install the DAC UNIVERSAL?

Before the DAC UNIVERSAL is ready for use the following connections are required:

- AC input: 90-120 and 190-240 volt ~ 50/60 Hz, grounded outlet – 1100 W
The DAC UNIVERSAL is supplied with a main lead with plug, which must be connected to the autoclave (see figure 1 in section 2.2.3).

When the DAC UNIVERSAL is connected to electricity the lid will then open and error 92 can possibly occur; in this case press "C" on the display to reset the autoclave.

- Compressed air 5-8 bar/72.5-116 psi; flow: 60 litres/2.1 cubic ft pr. min.
A tube size 6/4mm (0.24/0.16 inches) is required for the connection between the DAC UNIVERSAL and the external compressor.
The compressed air tubing is inserted in the top screw coupling (see figure 1 in section 2.2.3).
The tube must be held in while simultaneously the nut is fastened with a 12mm/0.47 inches wrench.
To dismantle the tube the nut is unfastened and the tube can easily be drawn away.

The DAC UNIVERSAL has a built-in pressure regulator, therefore the autoclave will function at any level between 5 and 8 bar/72.5-116 psi.

The compressed air is used during the cleaning and lubrication cycle.

The compressed air is specifically used for flushing the spray channels during internal cleaning and for the pulse wash during the external cleaning.

Furthermore the compressed air is used for distributing the oil during the lubrication cycle.

The compressed air to the DAC UNIVERSAL must be dry and must not contain any oil remains.

Please contact the supplier of your compressed air unit, if you have any questions regarding this issue.

NOTE: It is necessary to install an air filter (order number 60 78 575) (20 microns) before the DAC UNIVERSAL, in order to be sure that the air is clean for the protection of the machine.

Drain for used water, steam and oil

Residual water emerges through the drain outlet.

Therefore the drain outlet (the middle screw coupling - see figure 1 in section 2.2.3) must be connected with a drain tank (order no. 60 78 526 – includes 3 meter (118.11 inches) of PFTE (heat resistant) tube 6/4mm (0.24/0.16 inches) and mounting instructions) in order to collect the residual water.

For this connection you must use a 6/4mm (0.24/0.16 inches) PTFE tube.

The PTFE tube must not be longer than 3 meter/118.11 inches.

The fitting and the removal of the tube are accomplished in the same way as the connection of compressed air.

The tube must be connected without pressure to the drain.

When connecting the drain tank to the drain it is important to fix the connecting piece thoroughly.

Be aware not to handle the drain tube when it is hot or the machine is running.

The waste from the drain should be handled following Universal Precautions as well as any applicable waste disposal regulations.

Warning

Oil, water and hot steam are discharged through the drain from the autoclave.

If using another type of tube than the PTFE tube, the tube must be steam resistant at approx. 134°C/273°F.

- **How to supply water to the water-tank**

One of the following connections must be made:

A) Constant connection to demineralised/ distilled water

Dismantle the stopper on the water inlet.

The constant connection of demineralised/distilled water is through a 6/4mm (0.24/0.16 inches) tube connected to the bottom screw coupling (see figure 1 in section 2.2.3).

i NOTE: It is necessary to install a water filter (20 microns) before the DAC UNIVERSAL, in order to be sure that the water is clean for the protection of the machine.

The fitting and the dismantling of the tube are done in the same way as the connection of compressed air.

Maximum water pressure: 6 bars/87 psi.

In order for the autoclave to work with an automatic connection to demineralised/distilled water the autoclave has to be put in an “automatic water inlet mode”.

This is done through the menu system (see section 3.7 under Settings).

When using the constant connection, please empty the drain tank once a day or when full (app. 12 standard cycles of 12 minutes).

See section 6. (1. Cleaning the drain tank).

A maximum water conductivity of 3.0 µS/cm (micro siemens) is required.

or

B) Manual supply of demineralised/distilled water

Leave the stopper on the water inlet.

All functions (cleaning and sterilization) of the DAC UNIVERSAL require demineralised or distilled water.

Therefore, it is necessary to frequently supply the internal water tank with water if the constant connection is not chosen.

1 filled water tank = approx. 4 complete cycles, with the use of the standard 3 min. 134°C/273°F sterilization program.

Total volume in water tank: 2.0 litres/0.44 UK gallons.

Minimum water charge in watertank: 0.3 litres/0.07 UK gallons.

A maximum water conductivity of 3.0 µS/cm (microsiemens) is required.

2.2.1 Mounting of adapters

Adapters

The DAC UNIVERSAL has room for 6 instruments at a time.

You can combine up to 6 different adapters depending on your clinic's requirements.

If the combination of instruments in your clinic changes, it is possible to change the adapters on the adapter lid.

Adapters are attached to the lid by two small screws.

A gasket is placed between each adapter and the lid during installation to seal the flow of air, water, steam and oil between each adapter and the lid.

Maximum length of hand pieces and turbines:

The six adapter positions on the adapter lid are each marked with dots, which symbolises the adapter-position-number on the adapter lid.

On position 1 on the lid the instruments must not be longer than 145 mm/5.71 inches (total length of instrument and adapter).

The maximum length on position 2-6 is 160 mm/6.30 inches (total length of instrument and adapter).

To mount the adapters onto the lid

1. Place the enclosed gasket on the lid so that the gasket fits over the screw holes and the holes for drive and spray channels.

NOTE: Please use the screws, which are delivered with the adapter.

2. Attach the adapter to the lid using the two provided screws. Use the 1½ mm allen key provided with the unit to tighten the screws holding the adapter to the lid.

Picture 1.



Picture 2.



Below please find the different kind of adapters available.

Order no.	Description
60 51 648	Complete hand-piece click adapter, E-type
60 51 655	Complete KaVo turbine adapter
60 51 663	Complete KaVo handpiece head adapter
60 51 671	Complete W&H turbine adapter
60 51 689	Complete W&H turbine adapter - for TA-98LW/96LW high-speed instruments only !
60 51 697	Complete Sirona turbine adapter
60 51 705	Complete Sirona TE & T1 Classic handpiece adapter
60 51 713	Complete Bien Air turbine adapter
60 51 762	Complete Castellini turbine adapter
60 51 804	Complete NSK turbine adapter
60 51 812	Complete NSK VIP II/ Pana QD adapter
60 51 838	Complete Lares turbine adapter
60 51 846	Complete Midwest adapter (fits 4,5,6 holes Midwest instrument with quick connect ring)
60 51 853	Complete Midwest adapter fixed back-end (fits 4,5,6 holes Midwest instrument with fixed back-end)
60 51 861	Complete Borden 2/3 holes adapter (with fixed back-end)
60 51 879	Complete Midwest XGT/Stylus turbine adapter
60 51 887	Complete STAR Swivel adapter
60 51 895	Complete STAR attachment adapter
60 51 903	Complete Midwest adapter for Rhino/Shorty
60 51 911	Complete Morita (PAR-DI) turbine adapter
60 51 929	Complete Morita (PAR-O) turbine adapter
63 23 831	Yoshida turbine adapter
60 85 745	Complete OSADA OFJ-MZL turbine adapter
60 51 945	Complete Micro Mega turbine adapter

All adapters are delivered inclusive a small gasket and 2 fixation screws.

NOTE: When using Sirona TE adapters (order number 60 51 705) you must not apply any force when mounting the handpiece on the adapter. The handpiece must be easy to click onto the adapter. If it is not easy to click the handpiece onto the adapter, the handpiece may be damaged. Sirona Dental Systems, GmbH does not cover any handpieces thus damaged.

Please at any time handle your instruments as recommended in the Instruction manuals from the supplier of the instruments.

2.2.2 Choice of display language

It is recommended that language corresponding to the main-language in your country or the language most familiar to the user of the DAC Universal is chosen as display language. The explanation of how to do this - please see section 3.7 Using the menu system. Please note that there are six language options: English, German, French, Spanish, Italian and Swedish.

2.2.3 Installation of sterile-filter for wrapped instruments

NOTE: It is necessary to install a sterile-filter before the DAC UNIVERSAL, in order to be sure that the air from the compressor is adequate for use in DAC Universal together with the lid for wrapped-instruments.

The sterile-filter **replaces** the normal air-filter for DAC Universal (mentioned in section 2.2 How to install the DAC UNIVERSAL - Compressed air).

A tube size 6/4mm (0.24/0.16 inches) is required for the connection between the DAC UNIVERSAL air-inlet (see figure 1 in section 2.2.3) and the external compressor. The sterile-filter must be mounted on this tube maximum 1 meter/39.37 inches away from the DAC Universal.

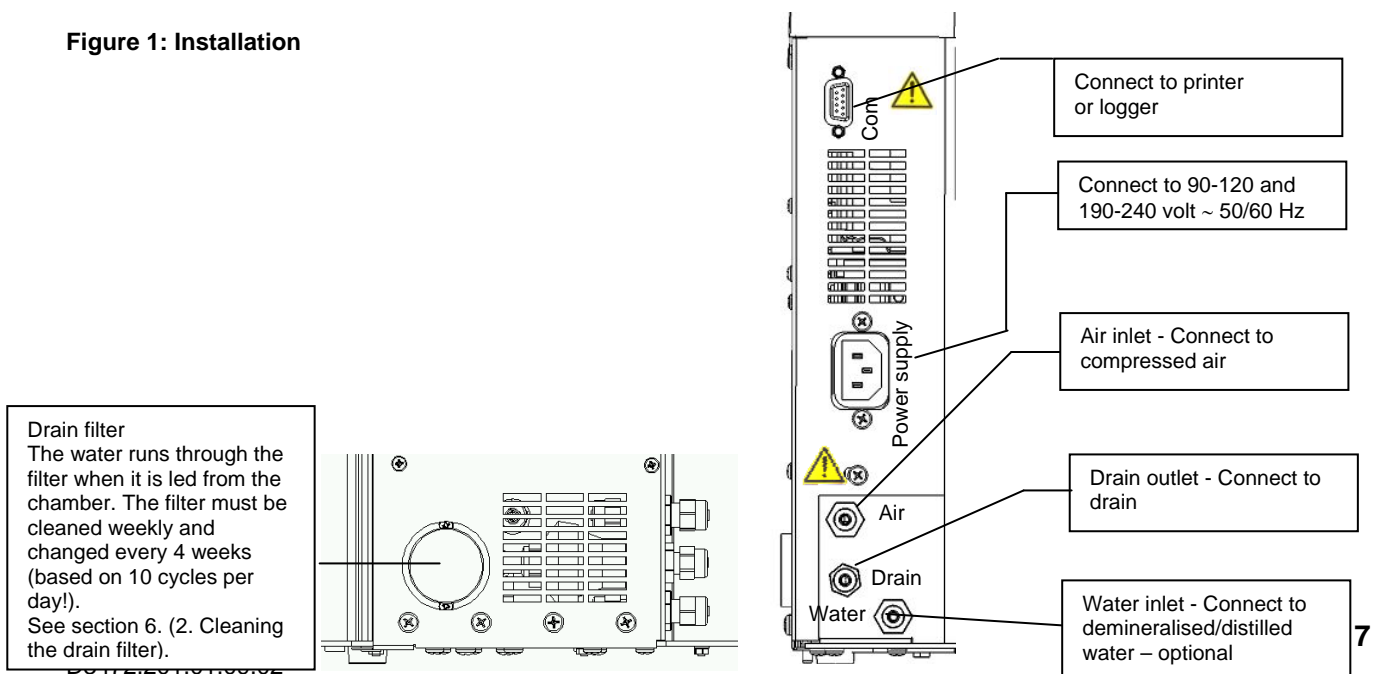
Mounting to be performed as described in section 2.2 for Compressed air installation.



2.2.4 Connection of the DAC UNIVERSAL to a printer

The DAC UNIVERSAL is prepared for connection to a printer in order to print autoclave reports (auxiliary equipment). Please refer to section 5. Reports.

Figure 1: Installation



2.2.5 Connection of the DAC UNIVERSAL to a logger system

It is possible to connect a USB data-logger system to the DAC Universal.

Every cycle is written on a USB stick and can on a daily basis be transferred to a computer in the clinic where the cycles can be digital signed.

The logger can be connected at the COM Port (RS 232) to the DAC Universal – see 2.2.3, Figure 1.

The logger, which is auxiliary equipment, can be bought at company Comcotec in Munich (www.comcotec.org).

Further more a larger network product called „SEGOSOFT“, also auxiliary equipment, can be bought also at company Comcotec in Munich (www.comcotec.org). „SEGOSOFT“ is compatible with most clinic-software-programs.

2.3 Before using the autoclave - important!

Before handling the autoclave please be aware that the weight of the machine is app. 23 kilograms/51 pounds. Therefore when lifting the machine please use a lifting technique adjusted to the weight of the machine. For more information regarding handling please refer to section 6.2.

NOTE: The bottom plate of the DAC can be hot.

In order to be able to use the machine please go through steps 1-6.

1. Connect the machine to a power supply.

The use of power for the autoclave is maximum 1100 Watt during the cycle.

Installation category for mains supply is II.

2. Starting the DAC UNIVERSAL: (please see section 3 for further instruction)

The machine will be turned on and be in standby mode when connected to a power supply.

3. Turning off the DAC UNIVERSAL:

Press the clear-button 'C' for more than 2 seconds, and the machine will go into stand by mode.

If you want to start up the machine from stand by mode – press the start button.

Or if wanted, disconnect the machine from power supply and the DAC UNIVERSAL will be completely switched off.

4. Introducing and changing the oil can

There is no oil bottle mounted in the unit when it is delivered. To ensure that the unit can lubricate the first time it is activated, the oil bottle must be mounted and the oil is led through the tubes by use of the manual controls – see section 6. (7. Check the oil entering the chamber).

The oil can holds approximately 0.2 litres/0.043 UK gallons of oil.

The DAC UNIVERSAL uses max. 1 ml./0.00022 UK gallons of oil per cycle, which is enough for approximately 230 cycles.

No toxic, harmful or dangerous gasses are produced by handling, use and removal of the oil. The oil is filled directly from the oil can into the DAC UNIVERSAL. Follow all handling instructions and general safety regulations for your specific lubricant when introducing the oil can. Do NOT handle the oil cans close to open fire. Storage and handling must be below 50 °C /122 ° F. Follow all applicable lubricant warnings on handling, use, and disposal of the lubricant. The use of flammable lubricants is allowed so long as the vapour point of the lubricant is above -8°C /17.6°F. If a flammable lubricant is used, smoking is not permitted within 3 meter / 118.11 inches of the unit or its drain tank.

The DAC UNIVERSAL does not accept aerosol lubricants.

Please refer to the safety data sheet for the used oil product.

In case of fire: The maximum amount of oil is only 200 ml/0.043 UK gallons). There is no danger that dangerous / harmful gasses will be created in the case of fire.

Description of how to change the oil-bottle:

To change the oil-bottle open the oil tank cover and follow the description a. – d. below

Picture a: Turn the empty oil-bottle five whole turns counter clockwise and remove it.



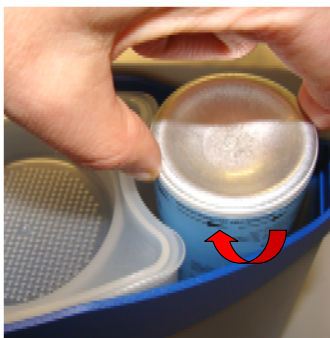
Picture b: Remove cap from new oil-bottle.



Picture c: Introduce the oil-can upside down into the machine. Please be aware that the oil- bottle must meet the matching oil- bottle attachment to be fastened.



Picture d: Turn the oil-bottle clockwise and gently tighten until you meet resistance. Please be aware that the oil-bottle can be damaged if tightened too hard.



After installation

There is no oil-bottle in the unit when it is delivered. To ensure that the unit can lubricate the first time it is activated, the oil-bottle must be placed into the DAC UNIVERSAL and the oil must be led through the tubes by use of the manual controls – see section 6. (7. Check the oil entering the chamber).

The oil bottle must be replaced, when the message "Low oil" is visible in the display or if error 81 occurs. Error 81 is removed by pressing C.

The message "low oil" automatically disappears, when the oil bottle has been replaced with a new bottle.

It is possible to remove an oil-bottle that is not empty and re-use it in the machine at a later time.

Increasing oil expel

If the user desires to increase the amount of time that air is blown through the instruments after lubrication – i.e. to increase oil expel, it is possible to do so by means of the menu system.

1. Enter the menu system by touching the "Menu/Enter" button.
2. Press the "Up" or the "Down" button until you reach "Settings".
3. Press the "Menu/Enter" button to select "Settings" mode.
4. Press the "Up" or the "Down" button until you reach "Oil Expel".
5. Press the "Menu/Enter" button to select "Oil Expel" mode.

6. Press the “Up” or the “Down” button to choose the level of oil expel.
Default is set at level 1. It is possible to choose between the level 1, 2, 3, 4, and 5. These levels indicate a multiplication level of the oil expel. Level 2 is 2 times as much oil expel as level 1, level 3 is 3 times as much oil expel as level 1 and so on! Increasing the level of oil expel will increase the time of the total cycle.
7. Press the “C” button until the normal display appears.

5. Filling the water tank

The water tank has a capacity of approximately 2.0 litres (0.44 UK gallons) of water.

This quantity of water is sufficient for approximately 4 cycles of the standard 3 min. 134°C/273°F sterilization program.

It is necessary to use distilled or demineralised water of max. 3 µS/cm (microsiemens).

Please note that the water should be poured carefully into the tank. Otherwise, the water may run in between the tank and the autoclave itself, resulting in water on the table or in worst-case, water on the main board of the autoclave, which can cause a short circuit.



The water must be free of foreign bodies.

Water is led through the tubes in either way:

1. The lid must be up
2. Press the rinse/flush symbol on the display for more than 1 sec., and hold until the water is automatically led through the tubes into the chamber.
3. When water is introduced to the chamber through the bottom adapter stop pressing the rinse/flush symbol on the display.

Or,

1. The lid must be up
2. Enter the menu system by pressing the “Menu/Enter” button
3. Press the “Up” or the “Down” button until you reach “Manual”.
4. Press the “Menu/Enter” button to select “Manual” mode.
5. Press the “Up” or “Down” button in order to reach “Water” in the menu.
6. When “Water” is marked you can press “Menu/Enter” in order to start pumping water into the tubes.
7. When water becomes visible in the chamber there is water in the tubes. The water will continue being pumped into the chamber until the “Menu/Enter” button is touched again to stop the water pump.
8. Press “C”-button until the normal display appears

There is now water in the tubes.

The water tank must be filled when the message “Low water” is visible in the display or if error 81 occurs. Error 81 is removed by pressing C. The message “Low water” automatically disappears when the water tank is filled. Remember to empty the drain tank when filling the water tank.

When you have ensured that there is both oil and water in the tubes, the instruments are placed on the adapters on the lid and the autoclaving cycle can be started (see section 3. Operating the DAC UNIVERSAL). If the adapters are not mounted on the lid when the machine is delivered, please refer to section 6.1 (Mounting of adapters).

6. Resetting the lid-holder:

Note! The autoclave must not be started without the adapter-lid being mounted.

Remember always to place the adapter-lid in the holder before pressing start.

In case the autoclave is being started without the adapter-lid in the holder, and the holder has pressed down the safety ring and is unable to go up - please follow below procedure:



1. Put in the adapter key in this hole to reset and open the machine.



2. Press carefully the adapter key in the hole until you hear a little click. The lid-holder will open up-wards (will take about 5 seconds – and error 86 will be displayed). Afterwards press C to open the lid-holder completely. The autoclave can now be used again.

7. Increasing expel of water

If the user desires to increase the amount of time that air is blown through the instruments after the sterilization process - i.e. to increase water expel, it is possible to do so by means of the menu system.

1. Enter the menu system by touching the "Menu/Enter" button.
2. Press the "Up" or the "Down" button until you reach "Settings".
3. Press the "Menu/Enter" button to select "Settings" mode.
4. Press the "Up" or the "Down" button until you reach "Expel".
5. Press the "Menu/Enter" button to select "Expel" mode.
6. Press the "Up" or the "Down" button to choose the level of blowing time.

Default is set at level 0. It is possible to choose between level 0, 1, 2 and 3.

Level 0 disables the water expel function, level 1 blows out air for 50 sec., level 2 blows out air for 100 sec. and level 3 blows out air for 150 sec.

Increasing the level of water expel will increase the time of the total cycle.

Note: For nearly all instruments of brand W&H, KaVo, NSK and most other brands we recommend to set the water expel level at 1. For instruments of brand Sirona TE or Classic we recommend water expel level set at 3. However please always be sure to act in accordance with the user manual/instructions from the manufacturer of the instruments.

2.4 Heating the autoclave

When starting the DAC UNIVERSAL (e.g. in the morning) approximately 10-12 minutes will pass before the autoclave has warmed up sufficiently.

During the heating-up the display shows “Heating” and the remaining temperature in %.

If the autoclave is activated before the chamber is properly warmed up nothing will happen. The autoclave is not ready to be used before it says “ready” in the display.

The heating-up process is automatically activated if the machine has been disconnected from electricity (e.g. during the night) and is connected to electricity again.

The heating-up process is a matter of heating-up the steam generator in order to be able to start a cycle at any time.

From the display it is possible to monitor the chamber temperature.

The chamber temperature can vary from time to time without effecting the sterilization cycle.

If the time between each cycle is short, the temperature of the chamber will be high. If the time between each cycle is long, the temperature in the chamber drops to around ambient temperature.

2.5 Perform installation testing with Biological- /Chemical Indicators after machine-installation

Follow appropriate agency sterilization monitoring guidelines for your office/clinic.

Before using your DAC UNIVERSAL after installation or major repairs, it is recommended that you perform a biological indicator test.

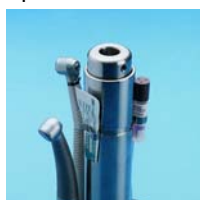
NOTE: Please ensure that whenever you use an indicator/tester, you will follow the instruction manual from the supplier of the indicator/tester.

There are three different ways how to monitor the performance of the DAC UNIVERSAL. They are all described below!

1. Select any commercial available biological indicator consisting of spores of *Bacillus stearothermophilus*. For example, 3M *Attest* Biological indicator.
2. Place the indicator vial in the bottom of the DAC UNIVERSAL chamber, approximately in the center, which is the “coldest” location in the chamber during sterilization or place the indicator in the holder for indicator (see below picture) and place the Holder for indicator on the lid in the marked area or place the indicator inside the Spore-/PCD-tester. The Spore-/PCD-tester (order no. 60 51 820) should be placed on the click adapter for handpieces (order no. 60 51 648) on the DAC UNIVERSAL adapter-lid.



Holder for indicator
Order no. 60 51 788



Indicator placing



Spore-/PCD-tester
Order no. 60 51 820

3. Place articles (handpieces, attachments and/or air motors) on the DAC UNIVERSAL lid. You should select those articles, which are representative of your routine practice. Usually, this will mean that you place articles on all six adapters.
4. Run the DAC UNIVERSAL unit through a normal cleaning, lubrication and sterilization cycle.
5. Allow the chamber to cool. Remove the biological indicator from the chamber and process it as to the instructions of the indicator manufacturer.
6. For installation testing, please repeat this testing three times.
7. If you routinely process static/solid instruments in the optional basket, similarly perform an indicator-test by placing the biological indicator in the basket, along with five (5) representative static/solid instruments.

CAUTION: If any biological indicator has a positive result (i.e. not all spores were killed), do not use the articles which were processed since the last cycle with successful biological indicator results. Do not use your DAC UNIVERSAL machine. Contact your authorised dealer.

3. Operating the DAC UNIVERSAL

We recommend you to study appendix 2 before this chapter is examined. App. 2 is a visual description of the display of the DAC UNIVERSAL.

To activate a complete sterilization cycle at 134°C/273°F the following needs to be done:

1. Go through 1-5 in section 2.3
2. Place the steam indicator strip into the clip on lid (see section 2.5).
NOTE: Please ensure that whenever you use an indicator/tester, you will follow the instruction manual from the supplier of the indicator/tester.
3. Manually clean up to six (6) instruments, attachments, and/or air-motors, and visually inspect all internal channels for blockage as instructed by the manufacturer.
4. Place instruments, attachments, and/or air-motors onto their respective adapters on the lid. Depending on the type of device and its adapter, you may need to push the article onto its adapter, manipulate a click-lock on the adapter, or tighten a threaded ring onto the article.
Please be sure that you hear a small 'click' when you push an instrument onto an adapter.
After having placed an instrument onto an adapter – please slightly pull the instrument to make sure that it is properly fastened onto the adapter.
5. Load the adapter-lid in the lid holder of the autoclave. (See below picture 1.)
Make sure to push the adapter-lid all the way back to fit the lid holder properly.

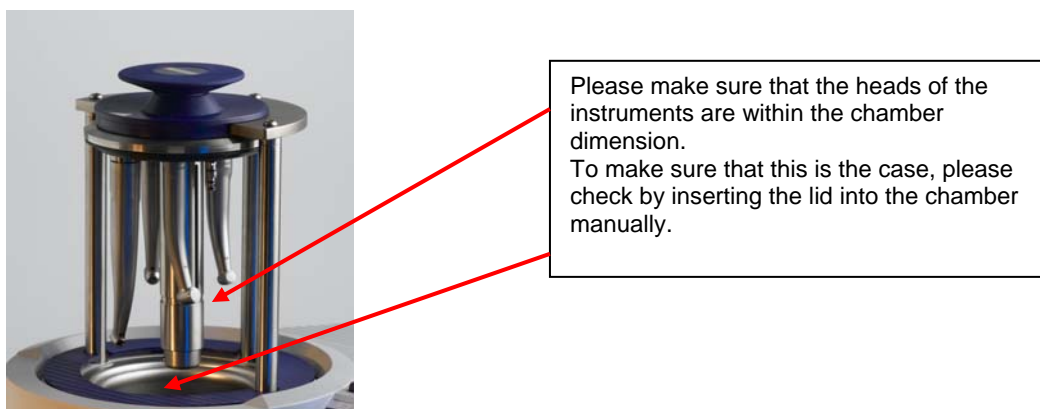
NOTE! The autoclave and or instruments can be damaged if the lid is not placed correctly.

NOTE: When using any adapter - no force must be applied when mounting the instrument to the adapter. The handpiece/turbine/scaler/spray nozzle must be easy to mount onto the adapter. If it is not easy to click or screw the instrument onto the adapter it is possible to damage the instrument. Sirona Dental Systems GmbH does not cover any of these damaged handpieces/turbines/scalers/spray nozzles.

NOTE: When using Sirona TE adapters (order number 60 51 705) you must not apply any force when mounting the handpiece on the adapter. The handpiece must be easy to click onto the adapter. If it is not easy to click the handpiece onto the adapter, the handpiece may be damaged. Sirona Dental Systems GmbH does not cover any instruments thus damaged.

Please check and ensure that the chamber is empty before starting the cycle.

Picture 1.



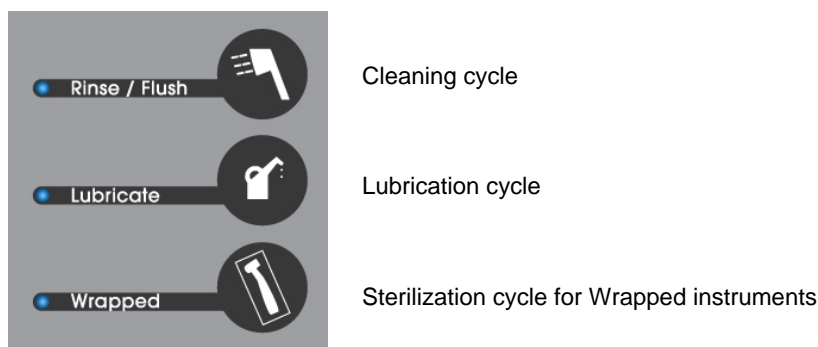
When the heating-up process in the DAC UNIVERSAL is finished (the heating-up process only takes place after connecting the autoclave to electricity - see section 2.4), the machine can be started.

Remember to place a sterilization indicator strip (holder for indicator order number 60 51 788) in the chamber.

6. Before pushing the start button, please ensure that the indicators next to the corresponding symbols are illuminated:

Please be aware to press the Lubrication button in case the basket is used for sterilization of static/solid instruments. This will leave out the lubrication cycle for this one cycle only! If the lamp is out (no blue light) then there will be no lubrication cycle.

When choosing Wrapped button the cleaning and lubrication cycle is automatically left out – i.e. the lamps are out (no blue light) next to the buttons. See section 3.2 Use of wrapped lid.



Before pressing the start button please make sure that no error codes are displayed.

7. Press the start button (see appendix 2, point 8) press safety ring as indicated in the display (see appendix 1). If the safety ring is not pressed within 20 seconds – you must once again press the start button.

When the safety ring has been activated, the adapter lid of the DAC UNIVERSAL will go down and close after which the autoclave automatically goes through the cycles: cleaning, lubrication (if not de-selected) and sterilization.

It is possible constantly to monitor which cycle the autoclave is going through by looking at the display.

The complete 134°C/273°F, 3 minutes sterilization cycle takes approximately 12 minutes – after which the lid automatically opens up a little bit.

8. The display indicates what part of the cycle the DAC UNIVERSAL is currently performing. When the cycle has been completed the message “cycle complete” will appear in the display. Then the lid automatically reopens and raises approximately half way out of the chamber.
9. “Cycle complete – press C to unload” will appear in the display.
To fully raise the adapter-lid with the instruments for removal and use, press the C button as indicated in the display and the lid will raise completely. This procedure is also confirming that the cycle was completed without errors and the instruments are ready for use.
10. Remove the lid and place it on the countertop or in the optional holder.
Remove each instrument from the adapter lid. Use normal wrapping procedure – see section 1.6.

NOTE: do not hold your head directly over the autoclave when it opens, as a little bit of steam will come out of the machine during opening. And do not hold on to the lid while the machine opens up.

CAUTION: When the adapter-lid is raised halfway or fully, the instruments are still hot.

Please let the instruments be cooled off before handling them.

When handling/placing the adapter lid for cooling, it is important only to hold on the blue part of the adapter lid.

During the cooling off, the heads of the instruments should be turned upwards to avoid corrosion.

It is possible to use a special holder for the adapter-lid (order no. 62 59 109) in order for the adapter-lid to be cooled down in the right position.

It is now possible to insert a new adapter lid in the DAC UNIVERSAL to start a new cycle.

Extra lid can be ordered separately (order no. 60 51 739).

Important!! If the instruments are to be stored for a longer period (e.g. during the weekend), it is important that they are blown through (horizontal) manually with compressed air in order to remove condensation in the instruments – as condensation can cause corrosion in the instruments.

NOTE: Be sure to use compressed air at pressure-level (bar) in accordance with the user manual/instructions from the manufacturer of the instruments.

After the instruments have been blown through they must be wrapped – see section 1.6.

3.1 Use of the basket

To sterilise solid instruments in the DAC UNIVERSAL you must purchase a complete basket (order no. 61 26 200), which consists of a metal basket and a special lid. See picture below.



Complete basket – 61 26 200

Operation instructions:

1. Remove the lid for hand-pieces from the autoclave.
2. Pre-clean all static/solid instruments according to the instructions from the manufacturer instructions before placing the instruments in the basket for the DAC UNIVERSAL.
3. Open up the snap-lock on the basket, get hold of the stub on the small lid and remove the small lid from the basket. Place up to 5 solid instruments in the basket – if possible with the pointed ends downwards.
Please note if the small lid unobstructed can be replaced on the basket, i.e. the instruments are not stuck in any way. Instruments with hinges, which cannot be opened up completely, when they are placed in the DAC Universal basket, should not be treated in the autoclave.
4. Get hold of the stub on the small lid and place the lid on the basket – lock on the lid with the snap-lock.
IMPORTANT: the stub of the small lid must turn up-/outwards.
5. Place the basket/the blue lid in the holder for the lid (semi-circle). It is important to push the blue lid **COMPLETELY** back, to fit in the holder.
NOTE! The autoclave and/or the basket and/or the instruments can be damaged, if the lid is not placed correctly.
6. Before starting the autoclave please ensure that no instruments can get jammed during closing.
7. Omit the lubrication by pressing the "Lubricate"-button – i.e. the small blue light next to the button is turned off. (See also section 3.4 Leaving out parts of the cycle)
Ensure that the indicator next to the corresponding symbol is illuminated and no error codes are displayed.



Cleaning cycle

8. Start the autoclave by pressing the start-button and then (within 20 seconds) the safety ring. The DAC Universal autoclave will automatically go through the washer- and sterilization cycles. For instance the standard program 134°C, with three minutes of sterilization, takes app. 12 minutes.
On the display of the machine is shown which part of the program the autoclave is going through.
9. "Cycle complete – press C to unload" is shown in the display. To lift the lid completely – press "C", as shown in the display.
10. Remove the basket/the blue lid from the lid holder (semi-circle) after the cycle. And place it on the table or in the holder for lid. **CAUTION!** The blue handle of the basket can be hot.
11. When the instruments are cold, they are ready for use.
12. After the cycle the autoclave automatically activates lubrication for the next cycle.

3.2 Use of the wrapped lid

To sterilise wrapped instruments (solid or rotating) in the DAC UNIVERSAL you must purchase a lid for wrapped instruments and a sterile-filter (order no. 62 59 092). The order no consists of a sterile-filter and a special lid for wrapped instruments. See pictures below.



Sterile-filter and lid for wrapped instruments – 62 59 092

Operation instructions:

IMPORTANT

The instruments you will process in the DAC Universal Wrapped cycle MUST just prior have been washed and sterilised in one of the three standard non-wrapped cycles - see section 3. and 3.1.

Drying

The most effective way to dry especially hole instruments in the DAC Universal is by blowing air through them. The air is supplied through the air filter further through the pressure regulator and the “Expel-Unit” within the DAC Universal. To avoid cross contamination, this Expel-Unit-valve (V12) is isolated from the channels connected to the chamber. During expel the drain valve 8 is opened, creating ventilation in the sterilization chamber.

The norm EN 13060 Clause 5.5 required 0,2% of residual water for solid instruments and for wrapped instruments, using the following equation.

$$C = \frac{m2 - m1}{m1} * 100$$

where

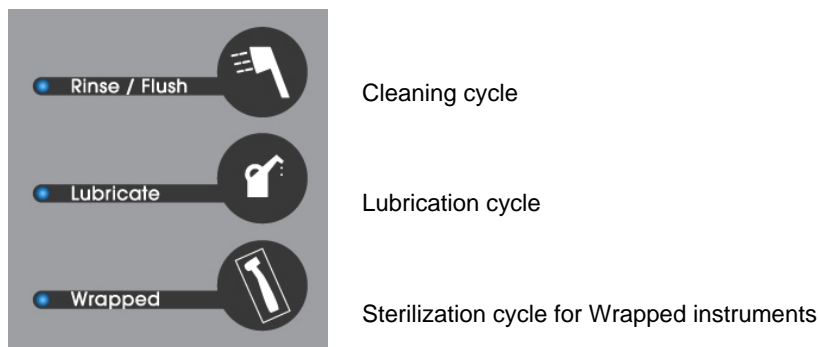
C is the change in moisture content, in per cent

m1 is the mass of the test load before sterilization, in grams.

m2 is the mass of the load after sterilization, in grams.

1. Remove the lid for hand-pieces from the autoclave.
2. Wrap three (3) instruments – each separately.
NOTE! Packing-/wrapping material used with the lid for wrapped instruments in the DAC Universal must be in accordance with EN868.
3. Place up to three (3) instruments – each in a wire-holder.
Slide the wrapped instrument in between the two main wires and fix the wrapped instrument with the spring-wire at the bottom of each wire-holder.
NOTE! If it is wrapped rotating instruments – you must place them so the heads of the instruments are the first to slide downwards between the wires and onto the lid.
Be sure that the instrument is firmly stuck between the wires – in order for it NOT to be sliding off the wires during cycle.
4. Place the blue lid in the holder for the lid (semi-circle). It is important to push the blue lid **COMPLETELY** back, to fit in the holder.
NOTE! The autoclave and/or the lid and/or the instruments can be damaged, if the lid is not placed correctly.
5. Before starting the autoclave please ensure that no instruments can get jammed during closing.
6. Choose Wrapped cycle by pressing the Wrapped button.

When choosing Wrapped button the cleaning and lubrication cycle is automatically left out – i.e. the lamps are out (no blue light) next to the buttons.



Before pressing the start button please make sure that no error codes are displayed.

7. Start the autoclave by pressing the start button.
8. The display will now ask you to confirm your choice of wrapped cycle by asking you to press the M button. Confirm your choice by pressing the M button.
9. Start the autoclave by pressing the safety ring. (Step 7., 8. and 9. must be performed within 20 seconds.)
The DAC Universal autoclave will now run a normal 134°C program, where wash and lubrication are left out.
Sterilization time 3 minutes. Total cycle time app. 22 minutes.
On the display of the machine is shown which part of the program the autoclave is going through.
10. "Cycle complete – press C to unload" is shown in the display.
To lift the lid completely – press "C", as shown in the display.
11. Remove the blue lid from the lid holder (semi-circle) after the cycle. And place it on the table or in the holder for lid. **⚠CAUTION!** The blue handle of the lid can be hot.
12. When the instruments are cold, they are ready for storage and/or use.
13. After the cycle the autoclave automatically deselects the previous wrapped cycle – and goes back to standard mode.

3.3 Choice of program

The DAC UNIVERSAL autoclave has three different programs, which can be used according to the needs. The three programs with corresponding cycle times are listed below:

Temperature	Pressure	Sterilization time	Total cycle time	Specification
134°C	3.1 bar/44.95 psi	3 minutes	12 min.	Normal sterilization of hand pieces and turbines in accordance with the norm EN 13060
121°C	2.1 bar/30.46 psi	15 minutes	24 min.	"Gentle sterilization" of hand pieces and turbines, and of materials that do not stand high temperatures in accordance with the norm EN 13060
134°C	3.1 bar/44.95 psi	18 minutes	27 min.	18 minutes holding time-program

You can choose between the different programs in the menu system (see section 3.7).

The latest chosen program will be remembered by the DAC UNIVERSAL, after the unit has been switched off - this is also the case if all power in the clinic has been shut off.

Locked Programs (programs not possible to use)

In connection with validations at the clinic – it is possible to neglect i.e. lock DAC Universal programs not used at the clinic. Please contact your supplier if such a 'lock' of programs should either be implemented or opened. Only a certified and trained technician must handle this issue.

3.4 Special program requirements

It is possible to get the DAC UNIVERSAL autoclave to run a special program. Please see below.

Leaving out parts of the cycle

If parts of the cycle should be left out, you have to push the button that indicates the part of the cycle, which you want to leave out. When the blue light is out, you have left out, the cycle in question.

E.g. you must press the Rinse/Flush button if the cleaning cycle should be left out – the blue light will turn off immediately.

E.g. you must press the Lubricate button if the lubrication cycle should be left out – the blue light will turn off immediately.

Activate the DAC UNIVERSAL as usual.

Please note that it is not possible to leave out the sterilization program.

The DAC UNIVERSAL automatically activates a complete cycle when a cycle has finished. This way accidental omission of cleaning and/or lubrication in the next cycle is prevented.

When using the basket for solid instruments, the lubrication cycle should be omitted, as these instruments do not need any lubrication.

3.5 Routine monitoring

Follow appropriate and country specific sterilization monitoring guidelines for your office/clinic.

For routine monitoring of the DAC UNIVERSAL, it is necessary to use certified spore tests or indicator strip (class 5).

Daily monitoring:

For every sterilization process it is important to place a sterilization indicator strip (class 5) in the clip shown below, or as an alternative, to place the sterilization indicator strip at the lid using autoclave tape.

It is also possible to place an indicator strip in the Spore-/PCD-tester (PCD = Process Challenge Device) for testing hollow instruments.

Used in the photo is a 3M indicator strip (class 5).

Weekly monitoring:

Once a week - or in accordance with your country specific demands - use a biological spore test indicator to ensure proper sterilization. This biological spore test indicator can either be shaped as a cylinder (e.g. 3M Attest™), an envelope or similar, which can be placed inside the Spore-/PCD-Tester shown below.

In some countries biological tests are not required – but please, always follow the demands of your own specific country.

There are three different ways how to monitor the performance of the DAC UNIVERSAL. They are all described below!

i NOTE: Please ensure that whenever you use an indicator/tester, you will follow the instruction manual from the supplier of the indicator/tester.

1. Select any commercial available biological indicator consisting of spores of *Bacillus stearothermophilus*.
For example, 3M *Attest* Biological indicator.
2. Place the indicator vial in the bottom of the DAC UNIVERSAL chamber, approximately in the center, which is the “coldest” location in the chamber during sterilization
or ...place the indicator in the holder for indicator (see below picture) and place the Holder for indicator on the lid at the marked area
or ...place the indicator inside the Spore-/PCD-tester. The Spore-/PCD-tester (order no. 60 51 820) should be placed on the click adapter for handpieces (order no. 60 51 648) on the DAC UNIVERSAL adapter-lid.



Holder for indicator
Order no. 60 51 788



Indicator placing



Spore-/PCD-tester
Order no. 60 51 820

3. Place articles (handpieces, attachments and/or air motors) on the DAC UNIVERSAL lid. You should select those articles, which are representative of your routine practice. Usually, this will mean that you place articles on all six adapters.

4. Run the DAC UNIVERSAL unit through a normal cleaning, lubrication and sterilization cycle.
5. Allow the chamber to cool and remove the biological indicator and/or indicator vial from the chamber.
If the Spore-/PCD-Tester has been used - the biological spore test indicator and/or indicator strip is removed by unscrewing the Spore-/PCD-Tester (be careful - the Spore-/PCD-Tester is very hot after the sterilization cycle).
Process the biological indicator and/or indicator vial as to the instructions of the indicator manufacturer.
6. If you routinely process static/solid instruments in the optional basket, similarly perform an indicator-test by placing the biological indicator and/or indicator strip in the basket, along with five (5) representative static/solid instruments.

⚠ CAUTION:

If any biological indicator or indicator strip has a positive result (i.e. not all spores were killed or is showing failed sterilization), do not use the articles which were processed since the last cycle with successful biological indicator results. Do not use your DAC UNIVERSAL machine. Contact your authorised dealer.

3.6 Reading the display

During normal operation, the display will continuously show the current time, chamber temperature in °C, and chamber pressure. Chamber pressure is displayed in bar (atmospheres), absolute pressure.
The display will show the current system status as follows:

Status	Description
"Ready 121°C"	The machine is ready for a 121°C, 15 minutes program.
"Ready 134°C"	The machine is ready for a 134°C, 3 minutes program.
"Ready 134°C 18 min"	The machine is ready for a 134°C, 18 minutes program.
"In progress"	The operation has been started and lid is moving down.
"Pressure test" (is not written in the display)	Air enters the chamber.
"Door locked"	Indicates that the adapter lid is secure to begin cycle.
"Internal flush"	Indicates internal flush of spray channels.
"Lubrication" (when selected)	Oil is internally added to the instruments
"Cold rinse" (when selected)	Filling chamber with water for external rinse and pulse wash of instruments – and oil expel.
"Hot rinse"	Start of steam-pump and heat up the chamber to 107°C
"Heating"	Chamber warming up to chosen program temperature and pressure.
"Water reduction" (is not written in the display)	Chamber is emptied for condensed water.
"Stabilizing"	Stabilising to chosen temperature and pressure.
"Back-flush"	Steam is being pushed through the hand-piece channels before and after the sterilization cycle.
"Sterilization"	Count down of the sterilization time - corresponding to the chosen program.
"Expel" (when set at level 1, 2 or 3)	Water expel - by air being blown through the instruments.
"Cycle complete"	Opening procedure (see section 3. point 3. regarding opening procedure)
"Cycle complete – press C to unload"	Indicates that the cycle has been completed. Press "C" to open the DAC UNIVERSAL.
"Press safety ring!"	Start button has been pressed and cycle will start when safety ring is pressed and tested.
"Start wrapped cycle? Inst. treat in std. cycle before wrap? Press "M" to confirm"	Indicates that "Wrapped"-button has been pressed and reminds the user that instruments must be treated in standard cycle before wrapping and using the special lid for wrapped instruments.
"Service needed. Press safety ring!" (simultaneously 2 seconds of acoustic alarm is given)	Indicate that two years or 3000 cycles have passed since start of use or last service performed. Reminds the user that service is recommended. Please contact your supplier.

3.7 Using the menu system

The DAC UNIVERSAL has a menu system, which gives the user different options. The different options and how to use the menu system will be explained below.

To enter menu level 1, press the menu button, press Up or Down button until the desired option is selected, and press Enter to select.

At each menu level, press Up/Down until the desired option is selected, and press Enter to select.

Menu level 1	Menu level 2	Menu level 3	Result/action
Program	134°C		Sterilization program 134° Celsius for 3 minutes
	121°C		Sterilization program 121° Celsius for 15 minutes
	134°C, 18 min		Sterilization program 134° Celsius for 18 minutes
Manual	Open		Opens chamber lid
	Close		Closes chamber lid (remember to place the lid into the holder (semi-circle) of the autoclave)
	Water		Pumps water into the chamber
	Drain tank		Drains the water tank out through the water inlet.
	Drain chamber		Drains the chamber into the drain outlet. Remember to place the lid into the holder (semi-circle) before the use of this function. App. 60 sec. after having chosen Drain Chamber and pressed Menu/Enter - the lid goes up, and the chamber should be empty. The function can be repeated, if the chamber is not empty, after previous attempts.
Settings	Printer	On	Turns on printer reporting
		Off	Turns off printer reporting
	Rinse cycles	Rinse cycles (2-6)	Default is set at 2 pulse washes/ rinse cycles, but it is possible to increase it up to 6, if this is required. (please note that more than two Rinse cycles are prolonging total time of cycle)
	Oil expel	Oil expel (1-5)	Default is set at level 1, but it is possible to choose up to level 5, if a longer time for blowing air through the instruments is required. (please note that this is before sterilization and is prolonging total time of cycle)
	Language	UK	English is selected as display language
		D	German is selected as display language
		F	French is selected as display language
		SP	Spanish is selected as display language
		I	Italian is selected as display language
		S	Swedish is selected as display language
	Expel	Expel (0-3)	Default is set at level 0 – (NO water expel), but it is possible to choose up to level 3, if a longer time for blowing air through the instruments is required. Level 0: Expel off Level 1: 50 sec. effective blowing time Level 2: 100 sec. effective blowing time Level 3: 150 sec. effective blowing time (please note that this is after sterilization and is prolonging total time of cycle)
	Set time/date	Set year (00-99)	Sets year
		Set month (01-12)	Sets month
		Set day (01-31)	Sets day
		Time scale (12h/24h)	Sets time format
		Set hour (01-24)	Sets hour
		Set min (00-59)	Sets minute
	Automatic water	On	Turns water on
		Off	Turns water off
	Oil settings	Oil settings (1-3)	Default is set at level 1 – (oil adjustment), but it is possible to choose up to level 3, if a larger amount of oil/lubrication for the instruments is requested. Level 1: default amount Level 2: 25% more than level 1 Level 3: 50% more than level 1

Menu level 1	Menu level 2	Menu level 3	Result/action
History	Cycles		Displays number of cycles run in total
	Errorbuffer		Displays last machine errors w/Up & Down buttons
	Service		Displays when the machine is due for the Next Service – listed both as number of cycles left until next service and as the date (M-D-Y) for the next service.
About			Displays machine serial no. and software version

3.8 Resetting the menu system

Should you need to reset the menu – back to factory settings:

1. The display must state “Ready 134°C”
2. Press the “Wrapped” button and keep it down as you also press “Menu/Enter”

Your menu is now reset with the following features:

Program: 134°C
 Printer: Off
 Language: UK
 Oil Expel: 1
 Rinse cycles: 2
 Expel: 0

4. Errors

If the DAC UNIVERSAL shows an error in the display, it is important to find out exactly, what this error means and what action to take. Below you will find a list of the error codes.

If the DAC UNIVERSAL displays an error, you cannot be sure that a complete cycle has been carried out and therefore the instruments are not sterile – so you must start a complete new cycle.

If an error occurs during sterilization, the display will, when the lid opens, show that an error has occurred during sterilization. In order to clear this error and start a new complete cycle - you need to press the "M"-button together with the "C"-button (This will also be indicated in the display)

If the error light is flashing without giving an alarm signal, it is because the machine has reached 3000 cycles **or it has been 24 months** since the last service. Contact your supplier in order to do a biennial service on the DAC UNIVERSAL autoclave. Meanwhile the machine can still be used if 'only' the error light is flashing and no other error codes are visual in the display.

In case of an error, an alarm will sound and the error will be displayed visually.

Please note the error code before resetting the alarm. Pressing C resets the alarm.

When pressing C the lid will for approx. 2 seconds raise and then stop, until the temperature is below 104°C/219.2°F, following which it will open completely.

It is, however, possible to force the lid to open completely by pressing C repeatedly. For every press on C, the lid will continue opening for 2 seconds. We do not recommend this feature to be used.

NB: Do not open if the temperature is more than 104°C/219.2°F (°C indicated in the display), hot steam might come out of the chamber.

Error	Description
64	The safety system has been activated → Press C → Restart the autoclave.
65	The safety system is defective → Please contact your supplier.
66	The temperature during sterilization is too high → Please contact your supplier.
67	The time of sterilization has been less than 3 minutes → The instruments should be sterilised again → Please contact your supplier if this error appears more than once.
68	The pressure is too high during pressure test → Please contact your supplier
70	The pressure level does not decrease fast enough after pressure test → Empty the chamber for water → Clean or change the filter → Check that the drain tube is not blocked or broken (note that the drain tube <u>must</u> be of heat resistant material, e.g. PTFE) → Empty the drain tank if full → Please contact your supplier.
71	The autoclave was blocked due to use of bad water → Control the level of micro-siemens in the water → Empty the watertank → Fill in fresh water (below 3µS)
72	The closing system was blocked on the way up → Remove possible blocking for the lift → Please contact your supplier
73	The sterilization temperature has not been reached fast enough before the first back-flush → Pour in water in case of low level → Please contact your supplier
74	The right temperature for building up pressure for sterilization has not been reached fast enough → Pour in water if low level → If the autoclave is placed in a cold spot remove it to surroundings at room temperature → Press C to reset and then restart → Please contact your supplier
75	The right sterilization temperature has not been reached fast enough → Pour in water if low level → If the autoclave is placed in a cold spot move it to a surrounding at room temperature → Press C to reset and then restart → Please contact your supplier
76	Valve error → Please contact your supplier or try with only 5 instruments on the lid.
77	The autoclave does not lubricate → Please contact your supplier
78	Valve error → Please contact your supplier or try with only 5 instruments on the lid.
79	Valve error → Please contact your supplier or try with only 5 instruments on the lid.
81	Low level in either the water tank or the oil bottle → Pour water into the water tank or change the oil bottle → Please contact your supplier
82	The temperature in the steam generator is too high → Please contact your supplier
83	Temperature in chamber is too high → Please contact your supplier
84	The sterilization temperature has not been maintained during sterilization → Pour in water, if needed → Please contact your supplier
85	Inlet pressure is too high → Adjust the "air inlet" to maximum 8 bar → Please contact your supplier
86	The safety ring has been activated → Press C to reset, and then restart → Remove possible dirt on the spindle and the safety ring → Make sure that the handle is correctly placed in the holder → Please contact your supplier
87	The safety ring has been disconnected → Please contact your supplier
88	The steam pressure is too low during autoclaving → Pour in water in case of low level → Press C to reset, and then restart → Please contact your supplier

89	The steam pressure is too high during autoclaving → Check that the drain tube is not blocked or broken (note that the drain tube <u>must</u> be of heat resistant material, e.g. PTFE) → Empty the drain tank if full → Press C to reset, and then restart → Please contact your supplier
90	The pressure, during pressure test, was too low → Check that your compressor is turned on → Check if pressure connected to the air inlet of the DAC UNIVERSAL is 5-8 bar (if the pressure is dropping drastically during use, please contact the supplier of the compressor) → Make sure that the lid is placed correctly in the holder → Mount the lid for the filter house correctly → Clean the big black rubber gasket on the lid (put your thumb under the inner edge of the gasket and push it upwards all the way around) → Replace the gasket on the lid (see section 6) → Please contact your supplier
91	The pressure, during pressure test, was too low → Make sure that the lid is placed correctly in the holder → Mount the lid for filter house correctly → Clean the big black rubber gasket on the lid (put your thumb under the inner edge of the gasket and push it upwards all the way around) → Replace the gasket on the lid (see section 6) → Please contact your supplier
92	The power supply to the autoclave has been cut out, or the C button has been pressed during the cycle → Press C to reset and then restart → Please contact your supplier
93	The steam generator is superheated → Disconnect the autoclave immediately and contact your supplier
94	Oil consumption during standby → Disconnect power from the autoclave and wait 10 secs. → Reconnect the autoclave to the power and then restart → Please contact your supplier.
95	This error can only occur if the autoclave is connected to an automatic water supply. The autoclave has “asked” for water more than 7 times during standby → Check that water is being supplied to the autoclave → Check if the autoclave has a leakage → Please contact your supplier.
96	The pressure, during expel, was too low → Please contact your supplier
97	No water during external wash → Press C to reset and make sure that the chamber is empty → Check water level in water tank (fill in water if necessary) → Press Rinse/Flush button until water appears in the bottom of the chamber → If no water appears in the chamber - please contact your supplier
98	Lid did not close → Press C to reset and wait until the lid is in top position → Make sure that the lid is placed correctly in the lid-holder (look for things that might obstruct complete closure and remove these) → Start the machine again → If error appears again – please contact your supplier
99	Please contact your supplier
Leakage	Wipe up possible spilled water after filling → If there is still a leakage, please contact your supplier. NOTE that if the water is filled into the tank too abruptly or the tank is overfilled, the water may leak onto the table.
Water in chamber after cycle	Clean or change the filter → Check that the drain tube is not blocked or broken → Empty the drain tank if full → Please contact your supplier
Condensation in instruments	If the instruments are to be stored for a longer period (e.g. during the weekend), it is important that they are blown through (horizontal) manually with compressed air in order to remove condensation in the instruments - as condensation can cause corrosion in the instruments. NOTE: Be sure to use compressed air at pressure-level (bar) in accordance with the user manual/instructions from the manufacturer of the instruments. After the instruments have been blown through they must be wrapped.
Loose adapters	Tighten the adapter with the enclosed Allen key
Wrong liquid	If other liquids than demineralised or distilled water has been filled into the water tank, then the DAC UNIVERSAL must not be used → Please contact your supplier
Sterilization OFF Press safety ring! (simultaneously a long acoustic alarm is given)	Your DAC Universal technician has been running a special-program. VERY IMPORTANT: Disconnect the power-cable of the DAC Universal – and connect it again. NOTE: If this is not done sterilization phase will NOT take place!

5. Reports

Sterilization

To ensure sterilization, the instruments must be exposed to saturated steam at a certain temperature for a certain period of time.

Sterilization method

The DAC UNIVERSAL sterilises by means of saturated steam. To ensure that the saturated steam is present during the entire holding time, the pressure and the temperature is continuously checked during the cycle.

Printer

The printer for the DAC UNIVERSAL (see below picture 1.) can be purchased as accessory for monitoring the temperature and pressure during the cycle and after the cycle.

Picture 1: Printer for the DAC UNIVERSAL



Description: DAC UNIVERSAL thermal printer (WP-T610) by Sirona Dental Systems, GmbH
Order no. 60 51 770
Availability of wall mount
Power input at 24V/DC
Paper auto loading
Dimensions: 125Wx205Dx115H mm.

In order to connect the printer to the DAC UNIVERSAL, please do as follows:

1. Connect the printer to the DAC UNIVERSAL by means of a serial cable (through the RS232 port) – see figure 1: Installation, in section 2.2.2.
2. Press “Menu/Enter” button on the DAC UNIVERSAL.
3. Use the “Up” or “Down” button in order to find “Settings”. Press Menu/Enter.
4. Use the “Up” or “Down” button in order to find “Printer”. Press Menu/Enter.
5. Use the “Up” or “Down” button in order to find “on” or “off” mode. Press the Menu/Enter.
6. Press “Clear” until the normal display appears.

The below figure 2 shows a transcript from the printer.

The information from the printer is the following:

Serial number of the DAC UNIVERSAL

Date and time (start)

During sterilization time, temperature and pressure will be measured and printed every 30 seconds.

This way, it is possible to monitor the sterilization cycle.

Minimum and maximum temperature

Minimum and maximum pressure

A statement saying that the “Cycle parameters were met” or “Sterilization failed”.

If sterilization failed, “Sterilization failed”, ERROR and error code will be printed on the label. See section 4. Errors for error-description.

Below you can see three examples of transcripts from the printer.

DAC Universal	DAC Universal	DAC Universal																																																																								
Serial 12080 Program: 134°C Charge no: 3 Date (m-d-y) 11-04-2008 Time 10.31.40	Serial 12080 Program: 134°C Charge no: 2 Date (m-d-y) 11-04-2008 Time 10.14.04	Serial 12080 Program: 134°C Charge no: 31 Date (m-d-y) 11-10-2008 Time 10.04.39																																																																								
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Figure 2: Transcripts from the printer (auxiliary equipment)

6. Cleaning and maintenance

After every 50 runs the DAC Universal will for 2 seconds give an acoustic alarm and the display will show the following information: "Remember Check & Clean – Press safety ring" - this to remind the user of the need to cleaning and maintenance of the DAC Universal.

Below please find the detailed service/maintenance schedule for the DAC UNIVERSAL.

In the table it is indicated how often the cleaning/maintenance should be carried out.

If you follow the schedule below, you will ensure optimal maintenance and performance of your DAC UNIVERSAL.

Task	Frequency*				
	Weekly	Every 4 th week	Every 3 rd month	Once a year	Every second year in connection with the biennial service or after 3000 cycles
1. Clean the drain tank	X				
2. Clean the drain filter	X				
3. Clean the adapter lid	X				
4. Check the adapters & matching O-rings	X				
5. Clean the machine externally	X				
6. Clean the chamber	X				
7. Check for oil entering the chamber	X				
8. Check the water entering the chamber	X				
9. Check the safety ring		X			
10. Drain the water tank		X			
11. Change the drain-filter		X			
12. Clean the water tank			X		
13. Change the O-rings on the adapters			X		
14. Change the filter in the Sterile-filter (IF a Sterile-filter is installed on the air-tube)				X	
15. Change the O-ring on the filter housing					X
16. Change the O-rings on the bottom adapter (in chamber)					X
17. Change the O-rings at each guiding tube in the lid.					X
18. Change the gasket on the lid					X
19. Change the O-rings in the valves					X
20. Change the gasket in the valves					X
21. Change the gasket under each adapter					X

* The above frequency is based on approx. 10 complete cycles per day. If you use your DAC UNIVERSAL more often than this, adjust your service frequency accordingly.

Only authorized technicians may perform the steps 16 to 21 in connection with biennial service.

Spare parts for the DAC UNIVERSAL can be purchased from your local supplier.

1. Cleaning the drain tank

⚠ CAUTION: Follow Universal Precautions as well as any applicable waste disposal regulations when handling drain tank contents

i NOTE: Please make sure to wear surgical gloves during this procedure.

It is recommended that you empty and clean the drain tank on a weekly basis – and/or of course if the drain-tank is full (level has reached top-mark).

To empty the drain tank, discard the content of the tank according to your local or national guidelines and/or regulations.

1. Screw off the lid and take out the drain-damper.
2. Empty the drain tank - rinse the tank thoroughly with hot water and then empty it again.
3. Clean the external surfaces of the drain-damper and the drain-tank with a towel wringed in hot water.
4. Fill the tank to the "minimum" line with a solution of 25% isopropyl alcohol and 75% water.

5. Re-install drain-damper and lid - and put the drain tank back into service.



Drain tank



Damper

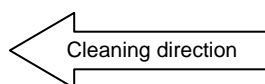
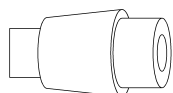
2. Cleaning the drain filter

⚠ CAUTION: The DAC UNIVERSAL should be turned off and cooled down before cleaning the drain filter.

i NOTE: Please make sure to wear surgical gloves during this procedure.

1. Unscrew the lid of the filter-housing with the supplied filter key.
2. Unscrew the filter from the housing with the filter key.
3. Clean the filter thoroughly under running tap water.
4. If possible hold the filter in a paper towel and blow compressed air through the filter from the direction shown.
5. Gently mount the filter into the housing with the filter key.
6. Tighten the lid of the filter-housing back on with the filter key.

i NOTE: The filter must be replaced with a new filter every 4 weeks, based on app. 10 cycles per day.



3. Cleaning the adapter lid

Clean the adapter lid with isopropyl alcohol or warm water.

NOTE! The adapter lid must not be cleaned with a product containing chlorine.

4. Check the adapters & matching O-rings

Check the attachment of the adapters to the lid, by gentle tugging in each adapter.

If any adapters are loose, tighten the screws holding down the adapters with the supplied allen key.

i NOTE: If you determine that any of the O-rings on the adapters are damaged or missing, please immediately go to point 13. on the following page.

5. Cleaning the machine externally

Clean the outside of the unit with isopropyl alcohol or warm water.

6. Clean the chamber

Clean the chamber with isopropyl alcohol or warm water.

i NOTE! The chamber must not be cleaned with a product containing chlorine.

7. Check the oil entering the chamber

Remove the adapter lid from the DAC UNIVERSAL lid holder, so that view into the chamber is unobstructed.

Oil is led through the tubes in the following way:

1. Press the lubricate button and hold it down.
2. After a few seconds you will hear the oil dispenser start pumping and shortly after oil will enter the chamber from the bottom adapter. When oil enters the chamber, **immediately** stop pressing the lubricate button.
3. The display of the DAC Universal will now indicate the number of shots from the oil dispenser.
If this number is 60 or above, or if no oil enters the chamber at all, please call your supplier.
The oil indication disappears automatically from the display after a few moments.

8. Check the water entering the chamber

Remove the adapter lid from the DAC UNIVERSAL lid holder, for unobstructed view.

Procedure A)

Water is led through the tubes in the following way:

1. Press the Rinse/Flush button on the display for more than 1 sec., and hold until the water is automatically led through the tubes into the chamber.
2. Through visual control, check that water appears in the chamber through the bottom adaptor.

or

Procedure B)

1. Press the Menu/Enter button.
2. Use the up/down arrows until "Manual" is selected, then press Menu/Enter.
3. Use the up/down arrows until "Water" is selected, then press Menu/Enter again.
Water should flow into the chamber through four small holes in the bottom of the chamber.
4. Press Clear to stop the water pump.

i NOTE: It is very important to see the water enter the chamber, if there is no water, the instruments are not washed. Contact your supplier, if water does not enter the chamber.

9. Check the safety ring

Press Start, and then press the safety ring (within 20 seconds) to start a cycle.
While the lid is closing, press and release the safety ring.
The lid retracts for 5 seconds and Error 86 is shown on the display.
Press Clear to return to normal operation (lid opens completely).

10. Draining the water tank

If an automatic 'external' water supply is installed - PLEASE remember to CLOSE this water supply – before performing one of the following procedures.

Procedure A)

At the DAC UNIVERSAL Water Inlet fitting, disconnect the water tube from the water supply. Connect a length of 4/6 mm (0.16/0.24 inches) tubing to the Water Inlet connection of the DAC UNIVERSAL and place the end of this tubing into a sink or bucket, at a height below the DAC UNIVERSAL. This tube will be used to drain the DAC UNIVERSAL water tank.

1. Press the "Menu/Enter" button.
2. Use the "Up" or "Down" button in order to find "Manual". Press Menu/Enter.
3. Use the "Up" or "Down" button in order to find "Drain Tank". Press Menu/Enter.
The valve between the water tank and the Water Inlet connection will open, and water will empty from the tank through the tubing into the sink or bucket. Note that it takes approximately five to ten minutes to completely drain a full water tank.
4. Await the water tank to be completely empty.
5. Press the "Menu/Enter" button – to stop the draining.

Reconnect the water tubes as they were prior to this procedure.

If an automatic 'external' water supply is installed - PLEASE remember to OPEN this water supply again.

If an automatic 'external' water supply is NOT installed – manually fill the water tank with demineralised or distilled water.
or

Procedure B)

NO need to disconnect the water tube from the water supply.

1. Remove lid from DAC UNIVERSAL lid holder so that view into chamber is unobstructed.
2. Press the "Menu/Enter" button. Use the "Up" or "Down" button in order to find "Manual". Press Menu/Enter.
3. Use the "Up" or "Down" button until "Water" is selected. Press Menu/Enter again.
Water should flow into the chamber through the center bottom adapter.
4. When the water from the watertank has filled the chamber half way up – Press the "Menu/Enter" button to stop the waterpump.
5. Replace the lid in the lid holder.
6. Press the "Up" or "Down" button until "Drain Chamber" is selected - then press Menu/Enter.
7. When the machine has closed (is done automatically), after 60 seconds the lid will open up automatically.

Repeat step 1.-7. until watertank and chamber are completely empty.

If an automatic 'external' water supply is NOT installed – manually fill the water tank with demineralised or distilled water.

11. Change the drain-filter (see Figure 1: Installation, section 2.2.1)

CAUTION: The DAC UNIVERSAL should be turned off and be cold before changing the filter.

i NOTE: Please make sure to wear surgical gloves during this procedure.
Unscrew and loosen the filter-housing lid with the filter key. Unscrew the old filter, and dispose of it.
Screw in the new filter with the filter key, and then tighten the filter-housing lid with the filter key.

12. Clean the water tank

Drain the tank (see no. 10.).

Remove power-plug from the autoclave – i.e. disconnect the DAC UNIVERSAL from power.

Remove the filter at the top of the water tank. Lift up the water tank.

The tank and the filter can now be cleaned with hot water (max. 50°C).

GENTLY clean the bottom adapter of the water tank (which is attached on the machine) with a damp cloth.

Remember to dry the tank and filter with a clean towel, after wash.

When cleaned put the tank back on the bottom adapter.

Press the water tank down over the water tank adapter and be very careful not to damage the water sensor or the conductivity sensor pins.

Put back the filter on top of the water tank – and fill in water of 3.0 µS/cm (microsiemens).

Reconnect the power-plug to the autoclave.

13. Change the o-rings on the adapters

Remove the o-rings on the adapters using a dental pick or another instrument.

Place new o-rings onto grooves; ensure to place each o-ring into the proper groove.

NOTE: If the o-rings on the adapters are not placed correctly, this might damage the instruments or the o-rings and compromise the sterilization.

NOTE: If you have an adapter for Yoshida Turbine (order number 63 23 831), your DAC Universal service technician must maintain this adapter at the biennial service.

14. Change the filter in the Sterile-filter (if a Sterile-filter is installed in stead of an air-filter on the air-tube)

1. Unscrew the filter-shield of the Sterile-filter by pressing down the black button and simultaneously turn the filter-shield app. 1/8. (Fig. 1)
2. Pull down the filter-shield.
3. Screw out (counter clock-wise) the filter. (Fig. 2)
4. Screw in (clock-wise) a new filter.
5. Screw back the filter-shield in the Sterile-filter.



Figure 1



Figure 2



Figure 3.

15. Change the o-ring on the filter housing

CAUTION: The DAC UNIVERSAL should be turned off and be cold before changing the o-ring.

NOTE: Please make sure to wear surgical gloves during this procedure.

Unscrew and loosen the filter-housing lid with the filter key.

Remove the o-ring on the filter-housing lid, and replace it with a new o-ring.

Screw the filter-housing lid back into the DAC UNIVERSAL with the filter key.

16. Change the o-rings on the bottom adapter (in chamber)

CAUTION: The chamber should be cold when this procedure is being performed.

The bottom adapter is located at the bottom center of the chamber.

To replace the two o-rings, remove them with a dental pick or a similar instrument and install two new o-rings on the adapter.

O-rings will be mounted on the adapter when the autoclave is delivered. However, it might be prudent to change the O-rings every year due to wear and tear.

NOTE: The o-rings must be placed at the upper and lower slide of the 3 slides on the adapter.

NOTE: If the o-rings are not placed correctly, this might damage the instruments and compromise the sterilization.

17. Changing the gasket around the perimeter of the lid

Use a screwdriver to loosen the gasket and remove it from the perimeter of the lid.

Place the new gasket so it fits into the outer groove.

Carefully force the inner part of the gasket into the inner edge using a screwdriver or a similar tool.

Only authorized technicians may perform the steps 16 to 21 in connection with biennial service.

Sparepart list for maintenance	
Product no.:	Description
60 78 583	Drainfilter for filterhouse (6 pcs)
60 78 797	O-ring for Sirona Turbine
60 79 532	O-ring for filter house
60 79 508	O-ring for bottom adapter
60 79 631	Gasket for lid
60 79 672	O-ring for Handpiece adapter
60 79 698	O-ring for KaVo turbine (small)
60 79 748	O-ring for KaVo turbine & Osada OFJ adapter (large)
60 79 763	O-ring for W&H turbine (small)
60 79 789	O-ring for W&H turbine (medium)
60 79 839	O-ring for Bien Air turbine (small)
60 79 854	O-ring for Bien Air turbine (large)
60 79 888	O-ring for Castellini turbine (small)
60 79 912	O-ring for Castellini turbine (large)
60 79 920	O-ring for NSK turbine (small)
60 79 938	O-ring for Sirona TE / NSK turbine (large)
60 79 953	O-ring for XGT/Stylus adapter (small)
60 85 547	O-ring for KaVo/Bien Air Heads & Osada OFJ adapter (small)
60 79 961	O-ring for Midwest fixed back-end (large)
60 79 979	O-ring for XGT/Stylus adapter (large)
60 79 987	O-ring for STAR Swivel adapter (small)
60 79 995	O-ring for STAR Swivel adapter (large)
60 80 001	O-ring for Midwest Rhino/shorty
60 80 019	O-ring for STAR attachment
60 80 027	O-ring for Midwest fixed back-end (small)
60 80 035	O-ring for Midwest adapter – 60 51 846 (small)
60 80 043	O-ring for Midwest adapter – 60 51 846 (large)
60 80 050	O-ring for Morita adapter (small)
60 80 068	O-ring for Morita adapter (large)
60 79 516	Gasket for adapter (6 pcs.)
62 63 045	Replacement filter for Sterile-filter

Tools for maintenance	
Product no.	Description
60 78 591	Filter key
490015	Allen key for adapters, angled (included in the machine)
60 78 518	Special allen key for adapters

Articles of consumption	
Product no.	Description
60 86 628	Nitram Oil, 1 box with 6 bottles
62 59 118	Nitram Oil #2 (blue), 1 box with 6 bottles

6.1 Handling the DAC UNIVERSAL

When handling the DAC UNIVERSAL it is important to grab the autoclave underneath the machine with two hands.

It is important to get a firm hold of the machine, as it is quite heavy.

It is not recommended to lift the DAC UNIVERSAL and carry it over a long distance.

Carrying the DAC UNIVERSAL over a short distance can cause problems for persons who are not used to lift objects as heavy as the DAC UNIVERSAL.

The DAC UNIVERSAL weighs app. 23 kilograms/51 pounds.

Separately, the lid (incl. 6 adapters) weighs app. 1.7 kilograms/3.75 pounds.

7. Safety, service, warranty, certificates & approvals

This chapter deals with safety, service and warranty issues. We recommend the DAC UNIVERSAL user to thoroughly read this chapter before using the DAC UNIVERSAL.

7.1 Safety

It is very important that the DAC UNIVERSAL is operated as described in this manual to ensure a high safety level and high efficiency of the autoclave. In addition to this, some precautions should be considered when using the DAC UNIVERSAL.

These precautions are described in section 1.

Mechanical safety:

The safety valve is designed according to norm EN4126-1 and calibrated according to norm EN764-7

Safety valve in the DAC Universal – will open if the pressure is more than 3.6 bar/52.2 psi relative in the chamber.

Electrical safety:

Electrical safety test is performed according to EN61010-1 by UL-International.

Watchdog relays in the DAC Universal.

If the DAC Universal microprocessor does not send a signal to the two watchdog relays, they will switch off the power to the pumps, valves, motor and heater.

Safety ring on the DAC Universal - see photo on the following page.

There are 9 contacts in the safety ring, which are checked, before start of a cycle. The circuit will always be checked, when the power is on. If the ring is pressed – the motor for the lid will instantly stop.

Fuses are installed in the mainboard for protection against electricity overload.

Software safety:

The software is supplied with error codes which will stop the process if the pressure, temperature etc. fail during the cycle - see error code list in chapter 4. Errors.

7.2 Service

Sirona Dental Systems, GmbH assures you quick assistance, should this be needed for your DAC UNIVERSAL during the warranty period. Please contact your DAC UNIVERSAL supplier, who will repair your DAC UNIVERSAL on the spot or place a machine for loan, at your disposal while your DAC UNIVERSAL is repaired at a workshop.

i NOTE: Only Sirona trained technicians with a Sirona training certificate are qualified to perform the installation, service, repair and maintenance of the DAC Universal.

7.3 Warranty

Sirona Dental Systems, GmbH guarantees that the delivered product (the DAC UNIVERSAL) has gone through a complete quality test before it is sent from the factory.

A warranty of 12 months is granted on the DAC UNIVERSAL counting from the day of delivery.

The warranty covers manufacturing and material faults and includes spareparts and labour.

The warranty does not cover:

1. Defect products which are serviced by other service technicians than the ones connected to Sirona Dental Systems, GmbH or,
2. If the product has been neglected, distressed or has been exposed to an accident or,
3. If the product is used in another way than described in the instructions or,
4. If the prescribed rules concerning maintenance of the autoclave have not been observed, or
5. If the autoclave does not work because the water conductivity exceeds a level of 3.0 $\mu\text{S}/\text{cm}$ (microsiemens), or
6. If non-original spare parts have been used

Sirona Dental Systems, GmbH reserves the right to make improvements/alterations on a product built or sold by Sirona Dental Systems, GmbH, without being obliged to make the same improvements/alterations on products previously built or sold by Sirona Dental Systems, GmbH.

7.4 Certificates

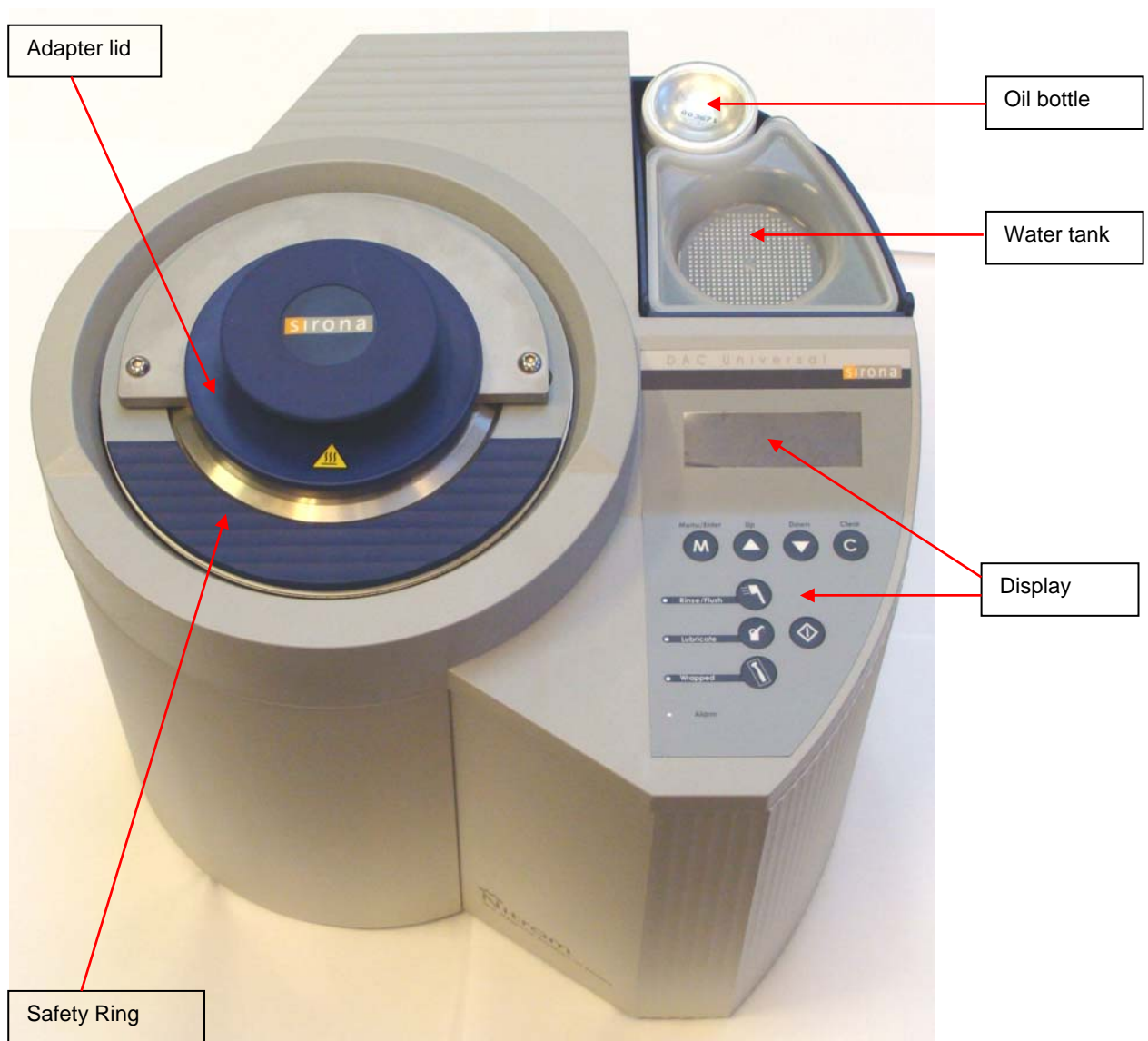
Sirona Dental Systems, GmbH is certified by TÜV in Germany.

The individual certifications can be seen at www.sirona.com - choose Company and Certifications.

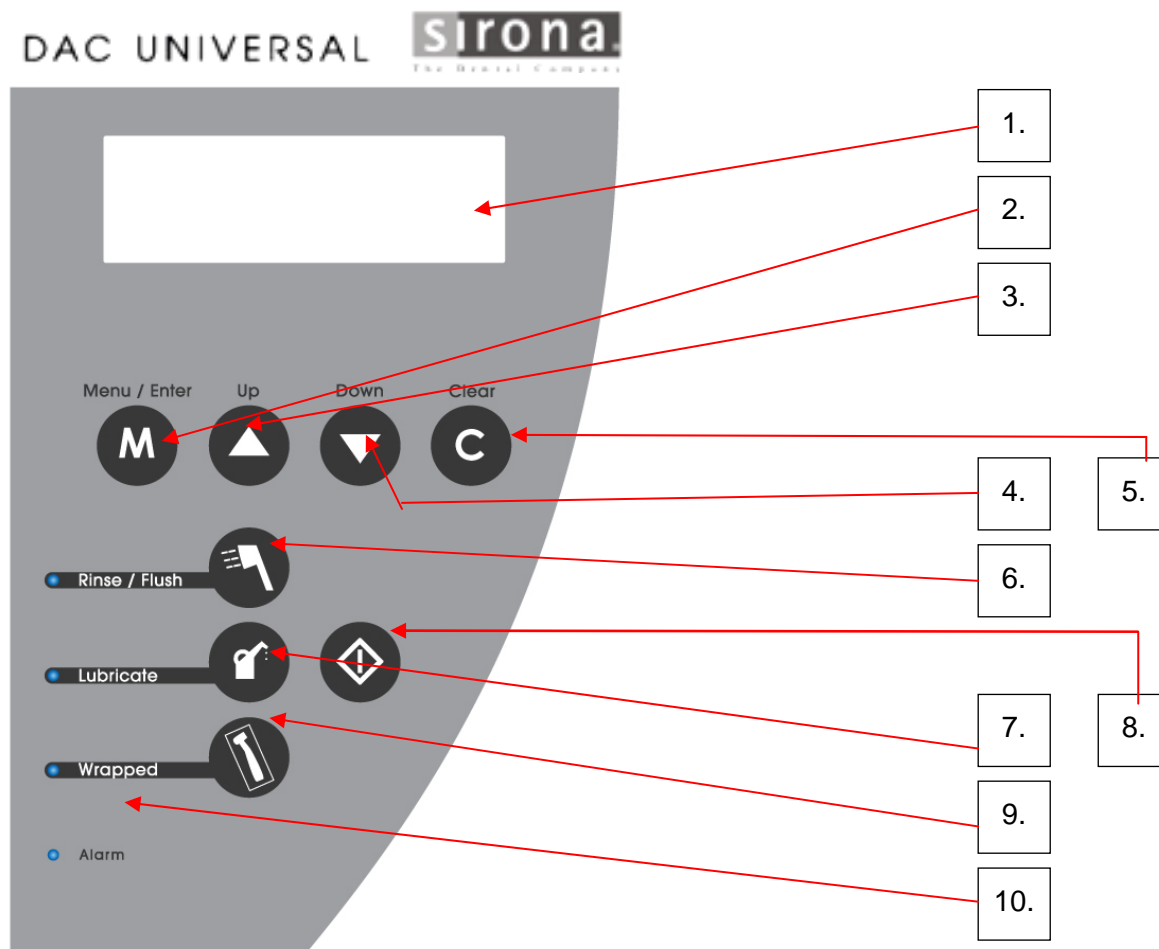
7.5 Approvals

DAC UNIVERSAL is approved by several manufactures of hand pieces and turbines, as well as by national organizations. For more information – please contact Sirona Dental Systems, GmbH.

Appendix 1: DAC UNIVERSAL with description



Appendix 2: DAC UNIVERSAL display & keyboard







Display/button	Description
1. Display	The temperature and pressure in the autoclave chamber is constantly shown. The pressure is displayed as an absolute value. (Includes surrounding air pressure).
2. Menu/Enter	This button gives access to the menu system. It also functions as an enter/cofirmation button when managing the menu system.
3. Up	This button is used to manage the menu system.
4. Down	This button is used to manage the menu system.
5. Clear	This button is used if the autoclave indicates an error. By touching this button the error is cleared. When holding this key down for a short while (more than 2 sec.), the machine goes in standby mode.
6. Rinse/Flush	A blue light will illuminate when the cycle is active. Pressing the symbol for wash toggles the washing cycle on and off. When the blue light is off, the washing cycle is deactivated.
7. Lubricate	A blue light will illuminate when the cycle is active. Pressing the symbol for lubrication toggles the lubrication cycle on and off. When the blue light is off, the lubrication is deactivated.
8. Symbol for start	This button activates the autoclave.
9. Wrapped	A blue light will illuminate when the cycle is active. Pressing the symbol for wrapped cycle - the wrapped cycle will be activated. When the blue light is on, the wash and lubrication has been deactivated.
10. Alarm	When this light is on, an error has occurred. The error code can be read in the display. It is important always to check the error if an error occurs. If the light is flashing <u>without</u> an error code and the light (alarm) flashing does not stop when pressing "C"-button – then it is time for biennial service.

Appendix 3: Connection to an external water treatment system

The DAC UNIVERSAL is prepared for connection of automatic water supply (see section 2.2 Constant connection to demineralised/distilled water). Make sure that you use a 6/4 mm (0.24/0.16 inches) tube, from the external water treatment system, to the DAC UNIVERSAL.

NOTE: A maximum water conductivity of 3.0 µS/cm (micro siemens) is required.

Manufacturer of the DAC UNIVERSAL

<p>sirona The Dental Company</p> <p>DAC Universal</p> <p>SN.: IC 104000 </p> <p>REF.: 6258342 D3472 2009</p> <hr/> <p>Pressure vessel: Max working pressure: 3.2 bar Max working temperature: 134°C Test pressure: 5.5 bar Design code: PED 97/23/EC Chamber vol.: 2 litres Mains supply: 90-120V AC 190-240V AC 50/60Hz, 1100W</p> <hr/> <p>Supplier: Sirona Dental Systems GmbH Fabrikstrasse 31 D-64625 Bensheim Germany</p>	  E231164 	<hr/> <p>Hole for reset of safety system. Please use a small metal pin</p>
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The DAC UNIVERSAL is UL listed (E231164).

The instruction manual for the DAC UNIVERSAL autoclave must be in your own language.
 Should this not be the case, please contact Sirona Dental Systems, GmbH.

Sirona Dental Systems, GmbH is certified according to ISO 9001:2008 and EN ISO 13485:2003.

The Sirona autoclave is CE-marked according to European regulations.

For technical assistance please contact your local supplier.

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

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