

UVC/T-AR, UVC/T-M-AR, UVT-B-AR, UVT-S-AR **DNA/RNA UV-cleaner box**



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1. About this edition of the operating manual

The manual applies to following models and versions of DNA/RNA UV cleaner boxes:

- UVC/T-AR version V.3AD
- UVC/T-M-AR versions V.4AD, V.4A02, V.4A03, V.4A04 and V.4A12
- UVT-B-AR versions V.3AA, V.3AB, V.3AD, V.3AE and V.3A12
- UVT-S-AR versions V.4AA, V.4AB, V.4A7 and V.4A04

2. Safety precautions

The following symbols mean:



Caution: Make sure you have fully read and understood the present Manual before using the equipment. Please pay special attention to sections marked by this symbol.



Caution: Do not work in the cabinet or open the front protective screen while the open UV lamp is switched ON. Otherwise, it can expose the operator to a dangerous level of UV emission.



Caution! Exposure to UV light is harmful and can cause damage to unprotected eyes and skin. The UV Cleaner box contains a powerful source of UV radiation, therefore, before operating the unit, ensure all personnel working with the UV Cleaner box are properly protected. The operator should wear a closed-front lab coat (fully buttoned), UV certified safety glasses and gloves, which should overlap the lab coat or surgical gown cuffs.

GENERAL SAFETY

- Use only as specified in the operating manual provided.
- Do not use the unit if dropped or damaged.
- Store and transport the unit at ambient temperatures between -20°C and +60°C and maximum relative humidity of 80%.
- After transport or storage in humid conditions and before connecting to electric circuit, keep the unit under room temperature for 2-3 hrs.
- Before using any cleaning or decontamination methods except those recommended by the manufacturer, check with the manufacturer that the proposed method will not damage the equipment.
- Do not make modifications to the design of the unit.

ELECTRICAL SAFETY

- Connect only to the mains with voltage corresponding to that on the serial number label.
- Ensure that the switches and plug are easily accessible during use.
- Do not plug the unit into an ungrounded power socket, and do not use an ungrounded extension lead.

- Disconnect the unit from the mains before moving.
- If liquid penetrates into the unit, disconnect it from the electric circuit and have it checked by a repair and maintenance technician.
- Do not operate the unit in premises where condensation can form. Operating conditions of the unit are defined in the Specifications section.

DURING OPERATION

- Do not operate the unit in environments with aggressive or explosive chemical mixtures. Please contact manufacturer for possible operation of the unit in specific atmospheres.
- Do not operate the unit without dust filters installed.
- Do not operate the unit if it is faulty or has been installed incorrectly.
- Do not use outside laboratory rooms.
- Do not work in the box while the open UV lamp is switched ON.

BIOLOGICAL SAFETY

- It is the user's responsibility to carry out appropriate decontamination if hazardous material is spilt on or penetrates into the equipment.

WASTE DISPOSAL

- Daylight and UV lamps used in the unit must be disposed of according to national standards and Waste Electrical and Electronic Equipment (WEEE) Directive guidelines.

3. General information

DNA/RNA UV Cleaner boxes – **UVC/T-AR**, **UVC/T-M-AR**, **UVT-B-AR** and **UVT-S-AR** – are designed for clean operations with DNA/RNA samples. They provide protection against contamination.

All models are bench-top type, with metal framework, glass or acrylic walls and working surface painted with powder enamel or made of stainless steel. Box is equipped with inlet for power cables or built-in power outlets for units inside the box. For availability of the required characteristics, please clarify for each model separately (see Table 2 on page 11).

UV Cleaner boxes are equipped with an open UV lamp installed in the upper hood. UV radiation from the open lamps disinfects the working area inactivating DNA/RNA fragments during 15-30 min of exposure. A digital timer controls duration of the direct UV irradiation. A daylight lamp provides proper illumination of the working surface.

UV Cleaner box is equipped with a flowing bactericidal UV cleaner-recirculator AR, which provides constant decontamination inside the box during operation. It is recommended for operations with DNA/RNA amplicons.

UV recirculator consists of an UV lamp (fig. 1/1), a fan and dust filters (fig. 1/2) organized in a plastic case. Operator working in a UV Cleaner box with a switched on UV recirculator is not exposed to UV radiation. It allows continuous treatment of the airflow with UV light without interrupting working process. Air circulation at a short distance from the UV lamp combined with reflective surfaces in the air duct results in increased density of UV rays leading to higher efficiency of disinfection. UV recirculator generates 100 volumes of PCR cabinet per one hour of airflow exchange ensuring maximally aseptic conditions inside the cabinet. Cabinet UV lamps do not produce ozone.

Box for clean operations with DNA/RNA samples with built-in recirculator is a patented solution (patent LV13115 from 20/05/2004, Dr. biol. V. Bankovsky).

Microbiological studies at the R&D Department of Biosan led by Dr. biol. V. Bankovsky demonstrated a high level of biosafety and efficacy of UV-cleaner box (maximal level of contamination is 1-3 cfu per 100 litres of air)*.

UV Cleaner box is designed to biologically protect the product, but not the operator, therefore, it is not recommended to use the UV Cleaner box for working with pathogenic microorganisms of biosafety level BSL-II and higher, without specialized protection.

Advantages:

- UV-recirculator;
- Ozone free high density UV decontamination;
- Open UV lamp is switched off automatically in case of opening the front screen;
- Long life UV lamps (9000 h);
- Low noise level and energy consumption;
- Compact tabletop model for personal laboratories;
- Table with drawer T-4 / T-4L (on request).

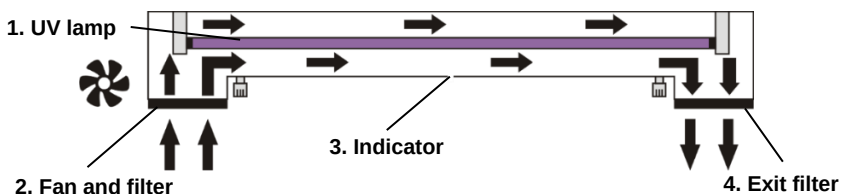


Fig. 1. Recirculator scheme.

* http://biosan.lv/efficiency_eng

4. Getting started

4.1. **Unpacking.** Remove packing materials carefully and retain them for future shipment or storage of the unit. Examine the unit carefully for any damage incurred during transit. The warranty does not cover in-transit damage. Warranty covers only the units transported in the original package.



Caution! Due to the unit's weight its unpacking and installing is to be carried out by two persons.

4.2. **Complete set.** Package contents:

4.2.1. Standard set

- DNA/RNA UV Cleaner box..... 1 pce
- Spare dust filters 2 pcs
- Spare fuse for control block* 1 pce
- Spare fuse for built-in power outlet** 1 pce
- Power cable 1 pce
- Operating manual, declaration of conformity..... 1 copy

4.2.2. Optional accessories

- T-4 / T-4L moving table for UV Cleaner box.....on request



T-4



T-4L

4.3. Setup:

- If the moving table is used, unpack it carefully and assemble according to the enclosed assembling scheme.
- Place the unit upon stable surface. Ensure that the unit is placed on a solid, level surface not less than 720x550 mm (1290x600 mm for UVT-S-AR model), which is able to support its weight and the weight of equipment and materials inside, for instance on the T-4 / T-4L table.
- Plug the power cable into the socket on the rear and position the unit for easy access to the power switches and the power plug.

* For information on fuses, see 7.4 on page 12

** Only for models with outlets, see table on page 11

5. Operation

- 5.1. Connect the power plug to a grounded power socket.
- 5.2. UV exposition of the working place.



Caution! The open UV lamp inside the unit (fig. 3/3) operates only when the front protective screen is fully lowered. Any operations under direct UV radiation is forbidden!

- 5.2.1. Turn ON the switch **2** (fig. 2/2) on the control panel (fig. 3/1). This switches on the UV recirculator inside the unit (fig. 3/2) and the open UV lamp exposition time controller. The UV recirculator will operate all the time until the switch **2** is turned OFF.

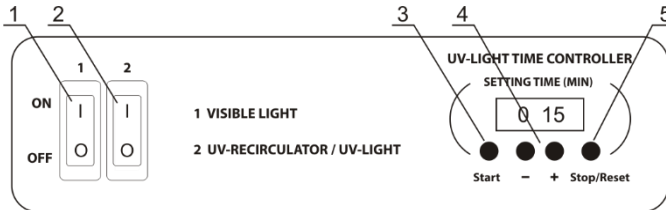


Fig. 2. Control panel



Note. Open UV lamp operation can be checked with the visible light lamp switched off (switch **1** is OFF). Use the indicator in the centre of recirculator cover (fig. 1/3) to check operation of UV lamp inside the recirculator. If indicator lights from inside while switch **2** is ON, then the UV lamp is functioning.

- 5.2.2. Use the timer **+** and **-** keys (fig. 2/4) to increase and decrease the time (UV-LIGHT TIME CONTROLLER) of direct UV light exposition of the working place, with 1 min increment. Pressing down and holding the button for more than 2 seconds increases the increment.

Recommended time of exposition is 15-20 min.

- 5.2.3. Press the **Start** key (fig. 2/3), the UV lamp will be turned on automatically and the timer will start counting the exposition time. Timer indicator shows actual time: until 1 hour - in minutes and seconds (mm:ss), after 1 hour - in hours and minutes (hh:mm). After reaching the set time the timer will automatically turn off the open UV lamp.
- 5.2.4. The open UV lamp can be switched off by pressing the **Stop/Reset** key (fig. 2/5). The set time of exposition will be saved in the memory. The set time will not be saved after the complete turning off the unit.
- 5.2.5. If the set time of open UV light exposition is 0:00, pressing the **Start** key will make the unit operate continuously during 24 hrs or until the **Stop/Reset** key is pressed.
- 5.3. The box is ready for operations. Work in the box.



Note. Opening the front protective screen will switch off the open UV lamp automatically, but the timer will continue counting the exposition time.

- 5.3.1. Turn ON switch **1** (fig. 2/1) for lighting of the working place. This turns ON the luminescent (visible light) lamp inside the cabinet (fig. 3/3).
- 5.3.2. Lift the front protective screen (fig. 3/5) up for work in the cabinet. The opening height is up to 180 mm (fig. 3/9).

**Note.**

Do not block recirculator openings (fig. 3/2).

- 5.3.3. To use electric devices inside the cabinet, pull their power cable through the inlet and close the flap (fig. 3/7 and 3/8, models with cable inlet) or connect the power cable to a built-in mains socket (fig. 3/6 and 3/8, models with mains socket).

**Caution!**

Overall consumed power of devices connected through internal mains sockets should not exceed 1000 W for 230V, or 600 W for 100 V, 120 V.

- 5.3.4. After the task is done, close the front protective screen.
- 5.4. After finishing the operation turn OFF switch **2** and switch **1**. Disconnect the power cable from the mains.

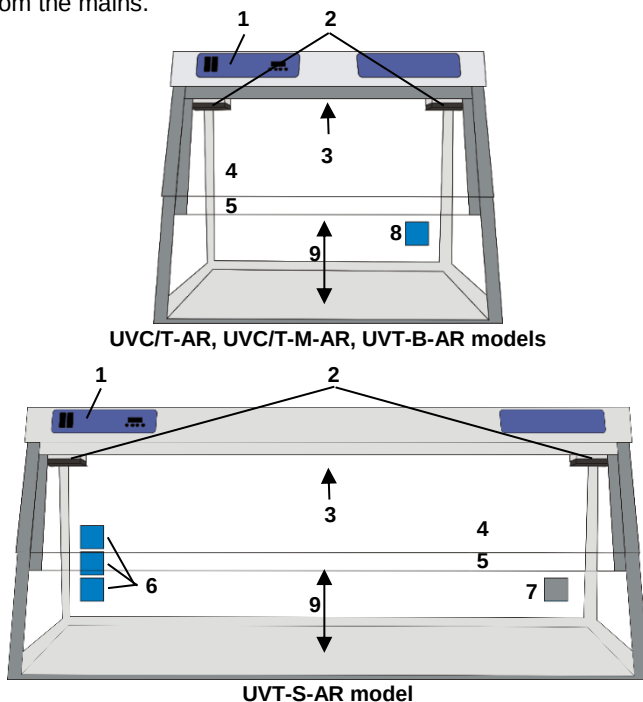


Fig. 3. DNA/RNA UV box, frontal view:

1. Control panel. 2. Recirculator openings. 3. Daylight lamp and open UV lamp.
4. Upper front panel. 5. Movable front protective screen. 6. Power outlets.
7. Cable inlet. 8. Power outlet OR cable inlet. 9. Opening height.

6. Specifications

The unit is designed for operation in cold rooms and closed laboratory rooms at ambient temperature from +4°C to +40°C in a non-condensing atmosphere and maximum relative humidity 80% for temperatures up to 31°C decreasing linearly to 50% relative humidity at 40°C.

Biosan is committed to a continuous program of improvement and reserves the right to alter design and specifications of the equipment without additional notice.

Model	UVC/T-AR Compact	UVC/T-M-AR Compact	UVT-B-AR Compact	UVT-S-AR Double
Back panel	Acrylic glass (ALTUGLAS EX)	Stainless steel		
Side panels		Glass (EUROGLASS, Germany)	Powder coated steel	Glass (EUROGLASS, Germany)
Front panel and screen		Glass (EUROGLASS, Germany)		
Working surface	Powder coated steel	Stainless steel		
Open UV lamp	1 x TUV 25 W G13 UV-C			2 x TUV 30 W G13 UV-C
UV intensity	15 mW/cm²/s			
Radiation type	Ultraviolet light (λ=253.7 nm), no ozone			
Digital timing setting of direct UV exposure	1 minute - 24 hours / non-stop (increment 1 minute)			
UV recirculator	1 x TUV 25 W G13 UV-C			1 x TUV 30 W G13 UV-C
Visible light lamp	1 x TLD 15 W G-13			1 x TLD 30 W G-13
Thickness of side panels	4 mm	4 mm	2 mm	4 mm
Thickness of upper front panel	8 mm			
Thickness of protective screen	8 mm	4 mm	4 mm	5 mm
Optical transparency	92%	95%		
UV protection	> 99.90% PMMA ALTUGLAS EX	>96% Clear film, 4 mil		
Working surface dimensions (WxD)	650 x 475 mm			1200 x 520 mm
Opening size (WxH, fully raised protective screen)	630 x 180 mm			1180 x 180 mm
Power inside the box (see Table 1)	Power cable inlet	Power cable inlet or 1 power socket*		Power cable inlet and 3 power sockets*
Operating current	100 - 240 V, 50/60 Hz			
Power consumption	67 W			135 W
Dimensions	690 x 535 x 555 mm		690 x 585 x 555 mm	1245 x 585 x 585 mm
Weight (net/gross)**	23 / 33 kg	28.8 / 39 kg	31.2 / 42 kg	58 / 68.5 kg
Laboratory table	T-4			T-4L

* **Caution!** Consumed power of devices connected to internal mains outlets must not exceed 1000 W for 230V models or 600 W for 100-120V models.

** Accurate within $\pm 10\%$.

Table 1. DNA/RNA UV cleaner box models and built-in mains outlets.

Model	Catalogue number	Version	Power inside the cabinet	
			Power cable inlet	Power sockets
UVC/T-AR	BS-040102-AAA	V.3AD	1	-
UVC/T-M-AR	BS-040104-AAA	V.4AD	1	-
	BS-040104-A06	V.4A02	-	1 x Euro
		V.4A03	-	1 x UK
		V.4A04	-	1 x US
		V.4A12	-	1 x AU
UVT-B-AR	BS-040109-A05	V.3AA	1	-
	BS-040109-AAA	V.3AD	-	1 x Euro
		V.3AE	-	1 x UK
		V.3AB	-	1 x US
		V.3A12	-	1 x AU
UVT-S-AR	BS-040107-AAA	V.4AA	1	3 x Euro
		V.4AB	1	3 x UK
		V.4A7	1	3 x US
		V.4A04	1	3 x AU



Caution!

Consumed power of devices connected to internal mains outlets must not exceed 1000 W for 230V models or 600 W for 100-120V models

Optional accessories	Description	Catalogue number
T-4	Movable table with a drawer and wheel locks, dimensions 800x600x745 mm	BS-040101-BK
T-4L	Movable table with a drawer and wheel locks, dimensions 1290x600x770 mm	BS-040107-BK

7. Maintenance

- 7.1. If the unit requires maintenance, disconnect the unit from the electric circuit and contact Biosan or your local Biosan representative.
- 7.2. All maintenance and repair operations (excluding mentioned below) must be performed only by qualified and specially trained personnel.
- 7.3. **UV lamp replacement.** Average lifetime of UV lamps supplied is 9000 hrs. Replacement is necessary after lamp stops functioning or at the end of manufacturer specified lifetime.



Only persons who have completed special training are allowed to perform lamp replacement.

Open UV lamp operation can be checked with the visible light off (switch 1 is OFF). Use the indicator in the centre of recirculator cover (fig. 1/3) to check operation of UV lamp inside the recirculator. If indicator lights from inside while switch 2 is ON, then the UV lamp is functioning.

7.4. Fuse replacement.

- 7.4.1. Fuse for the control box. Disconnect the unit from electric circuit. Remove power cable from its socket on the rear side of the unit. Open the fuse holder by pulling out the holder (fig. 4/A, compact models) or by screwing off the holder lid marked FU2 (fig. 4/C, model UVT-S-AR). Check the fuse and replace if necessary, M 3.15 A (type **M** - time lag: **Medium**).
- 7.4.2. Fuse for the mains outlets (for models with built-in mains outlets). Disconnect the unit from electric circuit. Open the fuse holder by screwing off the holder lid (fig. 4/B or 4/C, FU1). Check the fuse and replace if necessary, M 5.0 A (type **M** - time lag: **Medium**).

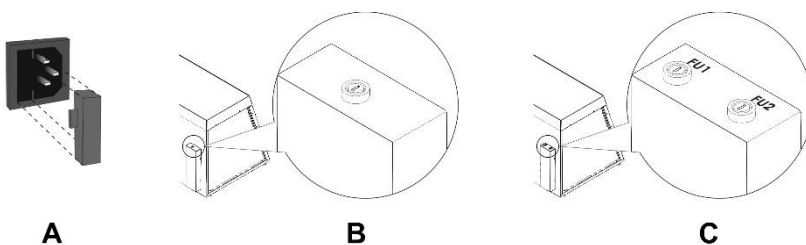


Figure 4. Fuse replacement

- 7.5. **Dust filter replacement.** The dust filters (fig. 3/2) on either end of the UV recirculator with the hidden UV lamp should be checked monthly and cleaned or replaced when they become clogged. To check, replace or clean the filters, simply unclip the covers, if it is necessary fit a new or rinse in water, dry and set up existing filters. Clip covers back in place.

- 7.6. **Cleaning and decontamination.** Disconnect the unit from the mains before cleaning.



Caution! Do not let liquid get into the control box.

- 7.6.1. Model UVC/T-AR, inner and outer cleaning. Front panel, front protecting screen and side panels are made of acrylic glass (polymethylmethacrylate ALTUGLAS EX) and are prone to scratches and optical transmission capacity decrease if improperly cleaned. Use mild soap and water with a soft cloth or sponge for cleaning the panels. Wipe excess water from inside and outside the unit with an absorbent soft cloth or sponge.

For decontamination, it is recommended to use a special DNA/RNA removing solution (e.g. DNA-Exitus Plus™, RNase-Exitus Plus™). After washing the inside parts of the box it is necessary to rub them dry.



Caution! Never use organic based compounds, pure alcohol, alcohol-containing cleaners (more than 15%) or ammonia containing cleaners for acrylic glass. Do not use abrasives. The table below shows the interaction of acrylic glass with ethyl alcohol and other solutions.

Solution	Interaction with acrylic glass
DNA-Exitus Plus™	No reaction
RNase-Exitus Plus™	No reaction
H ₂ O ₂ (6%)	No reaction
Ethanol (10–15%)	No reaction
Ethanol (30%)	Limited reaction
Ethanol (98–99%)	Full reaction, do not use!



Note. Crazing is a normal process for acrylic glass panels exposed to open UV light. Crazing will occur over time. Crazing may occur within the warranty period and is regarded as normal wear and not covered by the warranty. Acrylic glass panels can be replaced.

- 7.6.2. Models UVC/T-M-AR, UVT-B-AR and UVT-S-AR, external cleaning. Glass panels on the outside are coated in 4 mil clear film for UV protection. Film manufacturer recommends using a soft sponge or cloth with common washing solution for glass, removing excess and wiping dry. Do not use ethanol or other organic solvents.
- 7.6.3. Models UVC/T-M-AR, UVT-B-AR and UVT-S-AR, internal cleaning and decontamination. The following substances are recommend to use for decontamination: 75% ethanol, sodium hypochlorite solution, DNA/RNA removing solution (e.g. DNA-Exitus Plus™, RNase-Exitus Plus™). After washing the inside parts of the box it is necessary to rub them dry.

8. Warranty and Claims. Registration

- 8.1. The manufacturer guarantees the compliance of unit with the requirements of specifications, if the customer follows the operation, storage and transportation instructions.
- 8.2. The warranted service life of unit from date of delivery to the customer is 24 months. For extended warranty, see p. **8.5**.
- 8.3. Warranty covers only the units transported in the original package.
- 8.4. If any manufacturing defects are discovered by the Customer, an unsatisfactory equipment report shall be compiled, certified and sent to the local distributor address. To obtain the claim form, visit section Technical support on our website at link below.
- 8.5. Extended warranty.
- For **UVC/T-M-AR** and **UVT-S-AR**, the *Premium* class models, one year of extended warranty is available free of charge after registration, during 6 months from the date of sale. Online registration form can be found in section **Warranty registration** on our website at the link below.
 - For **UVC/T-AR** and **UVT-B-AR**, the *Basic Plus* class models, extended warranty is a paid service. Contact your local Biosan representative or our service department through the **Technical support** section on our website at the link below.
- 8.6. Description of the classes of our products is available in the **Product class description** section on our website at the link below.

Technical support



biosan.lv/en/support

Warranty registration



biosan.lv/register-en

Product class description



biosan.lv/classes-en

- 8.7. The following information will be required in the event that warranty or post-warranty service comes necessary. Complete the table below and retain for your records.

Model	UVC/T-AR / UVC/T-M-AR / UVT-B-AR / UVT-S-AR DNA/RNA UV cleaner box
Serial number	
Date of sale	

9. EU Declaration of conformity

EU Declaration of Conformity

Unit type DNA/RNA UV cleaner boxes

Models **UVC/T-AR, UVC/T-M-AR, UVT-B-AR, UVT-S-AR**

Serial number 14 digits styled XXXXXYYMMZZZZ, where XXXXXX is model code, YY and MM – year and month of production, ZZZZ – unit number.

Manufacturer SIA BIOSAN
Latvia, LV-1067, Riga, Ratsupites str. 7/2

Applicable Directives EMC Directive 2014/30/EU
LVD Directive 2014/35/EU
RoHS2 2011/65/EU
WEEE 2012/19/EU

Applicable Standards LVS EN 61326-1: 2013
Electrical equipment for measurement, control and laboratory use. EMC requirements. General requirements.
LVS EN 61010-1: 2011
Safety requirements for electrical equipment for measurement, control, and laboratory use. General requirements.

We declare that this product conforms to the requirements of the above Directives



Signature

Svetlana Bankovska
Managing director

19.07.2016.

Date



Signature

Aleksandr Shevchik
Engineer of R&D

19.07.2016

Date

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