

**JOINT-STOCK COMPANY  
KRONT-M**

**ULTRAVIOLET BACTERICIDE  
IRRADIATORS-AIR RECIRCULATORS  
DEZAR SP**

**OPERATION MANUAL**

## TABLE OF CONTENTS

1.	PURPOSE OF THE PRODUCT.....	4
2.	TECHNICAL CHARACTERISTICS.....	5
3.	SET OF THE PRODUCT .....	6
4.	SAFETY ENGINEERING .....	6
5.	DEVICE AND OPERATION PRINCIPLE .....	7
6.	PREPARATION AND OPEATION PROCEDURE .....	8
7.	APPLICATION MODES .....	8
8.	MAINTENANCE .....	9
9.	TRANSPORTATION AND STORAGE.....	12
10.	POSSIBLE FAULTS AND METHODS OF ELIMINATION.....	13
11.	RECYCLING .....	13
12.	TEST CERTIFICATE.....	14
13.	MANUFACTURER'S WARRANTY .....	14
	EU DECLARATION OF CONFORMITY .....	16
	WARRANTY CERTIFICATE .....	17

**Caution!** Operational properties of recirculator provided in this operation manual are calculated in condition of operation of one device. If necessary to disinfect larger volumes (areas), respective number of recirculators should be used, placing them on route of main air flows.

Recirculator design is calculated at optimum proportion of productivity, dimensions and sound characteristics and is protected by patents.

## Appearance of ultraviolet bactericide irradiators-air recirculators DEZAR



DEZAR SP

## 1. PURPOSE OF THE PRODUCT

- 1.1. Ultraviolet bactericide irradiator-air recirculator DEZAR is developed in accordance with the manual *Use of ultraviolet bactericide radiation for disinfecting air in premises*.
- 1.2. DEZAR – closed-type irradiator (hereinafter referred to as Recirculator), **is intended for disinfecting air in presence of people in ambulance vehicle cabin** in accordance with requirements to condition of the air environment matching Category I and II premises (see Table 1):
- in absence of people:**  
recirculator is used to prepare vehicle cabin for operation (transportation of the next patient) after transportation of patient with signs of an infectious respiratory disease.
- in presence of people:**  
recirculator is used to prevent rise of bacterial semination level in process of transportation of patients and provision of emergency medical aid.

Table 1

Category	Type of premises
I	Operating theatres, presurgical, maternity, sterile zones of central sterilization departments, children's wards in maternity homes, wards for premature and traumatized infants.
II	Dressing wards, breast milk sterilization and pasteurization wards, resuscitation department wards, premises of non-sterile zones of central sterilization departments, bacteriological and virological laboratories, hemotransfusion stations.
III	Wards, offices and other premises of medioprofilactic institutions (not included in Category I or II).
IV	Children's playrooms, school classrooms, orphan homes, nursing homes, amenity rooms of industrial and public buildings crowded by people for a long time.
V	Smoking rooms, public toilets and staircases of premises of medioprofilactic institutions.

***Manufacturer retains the right to replace component units with analogues, installation of which does not change recirculator's technical characteristics.***

## 2. TECHNICAL CHARACTERISTICS

Recirculator design is calculated at optimum proportion of productivity, dimensions and sound characteristics.

- 2.1. Productivity at nominal supply voltage:  $20 \pm 4$  qu. m/h.
- 2.2. Air flow disinfection efficiency by *Staphylococcus aureus*: 99.9 %.
- 2.3. Radiation source: one ultraviolet lamp with 3.2 W bactericide flow.  
PHILIPS TUV 16 W or LightTech LTC 16W T5 bactericide mercury ozone-free ultraviolet lamps are used.  
\* Special glass having high bactericide ultraviolet ray transmission factor and absorbing radiation under 200 nm forming ozone from the air is used in production of bactericide lamps. Therefore, a very small amount of ozone lying within maximum permissible concentration is registered during operation of lamps and practically disappears after 100 hours of operation of the lamp (data from technical recommendations for use of bactericide lamps).
- 2.4. Fan: 1 pcs.
- 2.5. Filtration of input air flow is performed by Class G2 air filter using high-quality nonwoven, environmentally-friendly filtering material made of synthetic unbreakable fibres providing for filtration of particles larger than 10  $\mu\text{m}$ : settling dust, pollen, spores, hairs.
- 2.6. Fixation of the lamp operation time is performed by a digital four-digit meter allowing registering total operation time since connection of the new lamp in hours.
- 2.7. Average life-time of the lamp in case of observing operation rules and maintenance: at least 9000 hours.
- 2.8. Recirculator is intended for operation in the following conditions:
  - ambient air temperature:  $+10 \dots +35$  °C
  - relative humidity: max 80 % at  $+25$  °C
  - pressure: 630-800 mm Hg
- 2.9. Recirculator power supply: 12 V direct current mains with permissible voltage deviation  $\pm 10$  % of nominal value.
- 2.10. Total recirculator power consumption at 12 V nominal voltage: 20 W.
- 2.11. Product body is produced from metal with powder coating. Outer surfaces of recirculator are resistant to disinfection by wiping with all permitted disinfectants.
- 2.12. Climatic version: for cold-temperate climate in case of location in enclosed spaces with artificial ventilation.
- 2.13. By electrical safety recirculator conforms to Class III. Electrocutation protection in this product is provided for by recirculator's safe extra-low voltage.
- 2.14. Dimensions: 420 × 160 × 100 mm.
- 2.15. Weight: 2.2 kg.

- 2.16. Continuous operation time is defined by functional requirements to each specific ambulance vehicle type. **Intervals between switching-ons are not regulated.**
- 2.17. Adjusted acoustic power level: 40 dB.
- 2.18. Recirculator components contain precious metals:
  - gold – 0.0013873 g;
  - silver – 0.0349484 g.
- 2.19. Service life: 5 years.

### 3. SET OF THE PRODUCT

- 3.1. DEZAR SP recirculator supply set includes:
  - 3.1.1. recirculator – 1 pcs.
  - 3.1.2. auxiliary accessories and spare parts:
    - fixture components for installation of recirculator in vehicle cabin:
      - M6×35 screw – 4 pcs.;
      - M6 nut – 4 pcs.;
      - washer Ø6 – 4 pcs.;
      - lock washer Ø6 – 4 pcs.;
    - fuse filler – 2 pcs.;
    - replaceable filtering elements – 12 pcs.;
  - 3.1.3. operation documentation:
    - operation manual– 1 pcs.

### 4. SAFETY ENGINEERING

- 4.1. Recirculator may be operated by personnel instructed in safety engineering and acquainted with this operation manual.
- 4.2. Place recirculator during installation and connection so that power plug (cigar lighter plug) is easily accessible.
- 4.3. **Caution! Be careful!**

All works related to functional test of the lamp or works requiring switching recirculator on with open lid must be performed in clothes protecting the skin from UV radiation. In order to prevent inflammation that can be caused by ultraviolet rays in case of getting in eyes, it is forbidden to switch recirculator on with lid off without safety goggles.
- 4.4. Spent or out-of-service bactericide lamps must be stored packed in a separate room.

Bactericide lamps must be recycled in accordance with requirements and regulations in force in the territory of the country, where device is used.
- 4.5. In case of disintegrity of bactericide lamp bulbs, thorough demercurization of the vehicle cabin must be performed in accordance

with requirements and regulations in force in the territory of the country, where device is used.

- 4.6. In case of not using recirculator in accordance with this operation manual, safety of recirculator may be compromised.

## 5. DEVICE AND OPERATION PRINCIPLE

- 5.1. Recirculator is a closed type UV irradiator, where bactericide flow of ozone-free lamp is distributed in a small closed space, and air is disinfected in process of its circulation through ultraviolet radiation lamp chamber by fans.
- 5.2. Materials having high reflective properties and providing for efficient bactericide processing of the air flow are used in irradiation zone.
- 5.3. Body and light-screen membranes at recirculator input and output reliably protect personnel and patients from exposure to ultraviolet radiation.
- 5.4. Connection to 12 V supply mains is performed by cable with cigar lighter plug (also contains fuse).
- 5.5. Air flow is filtered at recirculator input. For this purpose, recirculator is equipped with a special filtering cartridge block with replaceable filter (see Fig. 1). Block consists of guard, replaceable filter and filter holder. Block is installed on recirculator end wall using screws.

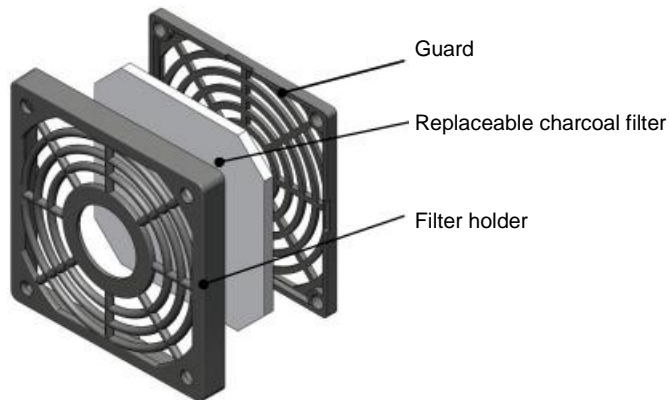


Fig. 1. Filtering cartridge block

- 5.6. ON/OFF switch is on the control panel located on the face of recirculator lid.
- 5.7. Light indicators on the control panel (Fig. 2) control supply voltage to the lamp and fan, as well as signal failure of the lamp or fan. If no  
Fig. 2. Control panel
- 5.8. Fixation of the lamp operation time is performed by a digital four-digit meter allowing fixing total operation in hours and storing existing information in switched-off recirculator for 1 year.



## 6. PREPARATION AND OPERATION PROCEDURE

- 6.1. Unpack recirculator.
- 6.2. Recirculator must be placed in the cabin, so that air intake and discharge takes place freely. Avoid placing device in cabin corners, where dead zones are formed.
- 6.3. In winter conditions recirculator may only be connected to mains after temperature in the vehicle cabin reaches at least +10 °C.
- 6.4. Install recirculator in desired place. Use fixture components in the supply set for installation.
- 6.5. Insert cigar lighter cable plug in 12 V cigar lighter socket. Verify mains voltage presence by cigar lighter plug indicator. Switch device ON.
- 6.6. Having finished operation, switch device OFF and disconnect cigar lighter plug from 12 V cigar lighter socket.
- 6.7. **Before cabin air processing by recirculator, it is necessary to perform sanitizing treatment of surfaces.**
- 6.8. It is necessary to take account of operation time of bactericide lamps. Operation time fixation and timely replacement of bactericide lamps may be performed by readings of digital meters.

## 7. APPLICATION MODES

**Application modes are recommended according to results of laboratory biomedical tests.**

Recirculator is intended for disinfecting air in ambulance vehicle cabin: **in absence of people** recirculator is used to prepare vehicle cabin for operation (transportation of the next patient) after transportation of patient with signs of an infectious respiratory disease.



**in presence of people** recirculator is used to prevent rise of bacterial semination level in process of transportation of patients and provision of emergency medical aid.

In order to disinfect air in ambulance vehicle cabin in case of preparation of the vehicle cabin for operation (transportation of the next patient) after transportation of patient with signs of an infectious respiratory disease, it is necessary to switch recirculator on and, in absence of people, treat cabin air for 10 minutes, having closed cabin doors and driver's window (if window can be opened). After 10 minutes, treat (with operating recirculator) all surfaces in the vehicle cabin with one of disinfectants permitted for disinfection of surfaces of premises, as well as devices and apparatus in accordance with valid instructions (methodical directions) for use of specific disinfectants.

In order to prevent rise of microflora level in ambulance vehicle cabin in presence of people, it is necessary to switch recirculator on during transportation of patients.

## 8. MAINTENANCE

- 8.1. Maintenance of medical equipment must be performed by service or technical specialists according to valid regulations and recommendations.
- 8.2. **Caution! All activities performed within the framework of maintenance: removal and installation of recirculator lid, replacement of lamps, fans and fuses, removal and installation of electric holders must be performed with device switched OFF and disconnected recirculator. In order to disconnect recirculator from mains, it is necessary to remove cigar lighter holder plug from cigar lighter socket.**
- 8.3. **Caution! In order to remind user about performance of preventive works (cleaning lamps and irradiation chamber inner surface) every 200 hours (200, 400, 600, 800...9000), readings of the digital time meter on the control panel flash for 1 hour and then return to normal mode.** Periodicity of performance of preventive works is set by user depending on device operation conditions, but at least quarterly.
- 8.4. **In order to clean lamp bulb and irradiation chamber inner surfaces,** perform the following:
  - Switch device OFF and remove cigar lighter plug from 12 V cigar lighter socket.
  - Remove recirculator lid by unscrewing M5×10 screws on the lid.  
**Caution!** Between electric components of lid and base there is a connecting electric cable.
  - Wipe the lamp bulb and irradiation chamber inner surfaces with napless cloth.

- Insert cigar lighter plug into cigar lighter socket and switch device ON, observing safety engineering regulations in clause 4.3 of this manual, and visually verify lamp operation.
- Switch device OFF and remove cigar lighter plug from 12 V cigar lighter socket.
- Install the lid. Fasten with M5×10 screws.

8.5. **In order to replace the lamp**, perform the following:

- Switch device OFF and remove cigar lighter plug from 12 V cigar lighter socket.
- Remove recirculator lid by unscrewing M5×10 screws on the lid.  
**Caution!** Between electric components of lid and base there is a connecting electric cable.
- Remove holders from lamp electrodes. Remove lamp from holders.
- Replace the lamp with a new one.
- Install holders onto lamp base.
- Insert cigar lighter plug into 12 V cigar lighter socket and switch device ON, observing safety engineering regulations in clause 4.3 of this manual, and visually verify lamp operation.
- Switch device OFF and remove cigar lighter plug from 12 V cigar lighter socket.
- Install the lid. Fasten with M5×10 screws.
- Recycle replaced lamp (see cl. 11.1).

8.6. **In order to reset the meter**, perform the following:

- Switch device OFF and remove cigar lighter plug from 12 V cigar lighter socket.
- Remove recirculator lid by unscrewing M5×10 screws on the lid.  
**Caution!** Resetting of meter readings is performed with device switched off, observe safety engineering regulations in clause 4.3 of this manual.
- Insert cigar lighter plug into 12 V cigar lighter socket and switch device ON.
- In order to reset the meter, push RESET button (Fig. 3) on control panel indication board installed on recirculator lid.

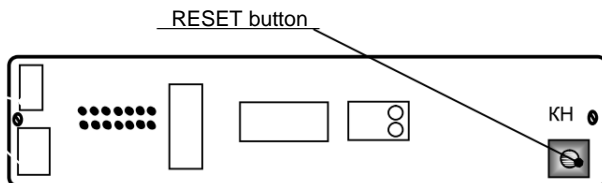


Fig. 3. Indication board

- RES9 appears on the device screen (with pushed button) and reverse counting to |0|0|0|0| takes place. When resetting the meter, release RESET button.

- Switch device OFF and remove cigar lighter plug from 12 V cigar lighter socket.
  - Install the lid. Fasten with M5×10 screws.
- 8.7. Medical personnel may replace the filter, since this procedure is simple and safe. Filter is recommended to replace as necessary.

**In order to replace the filter**, perform the following:

- Switch device OFF and remove cigar lighter plug from 12 V cigar lighter socket.
- Remove filtering block by unscrewing four M5×18 screws (Fig. 4).

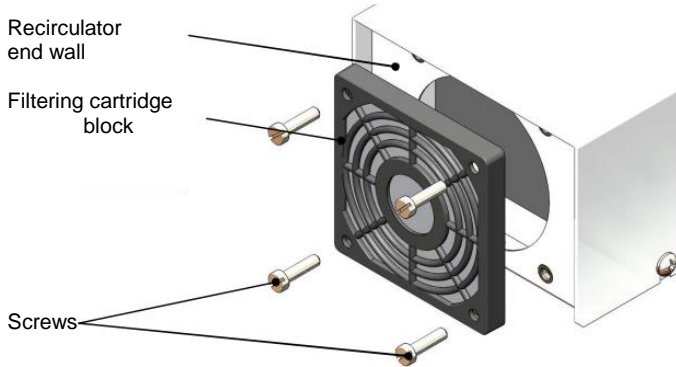


Fig. 4

- Remove filter from filtering block.
  - Treat filter holder and guard with disinfectants by submersing or wiping. After treating by submersing, grills must be dried.
  - Install new filter in filtering block.
  - Install the block, fasten with four M5×18 screws.
  - Recycle the removed filter (see cl. 11.2).
- 8.8. **In order to replace the fuse**, perform the following:
- Unscrew cigar holder plug cap.
  - Remove the fuse and replace with a new one.
  - Install the cap.
  - Recycle the removed fuse (see cl. 11.3).



Fig. 5. Cigar lighter plug

## 9. TRANSPORTATION AND STORAGE

- 9.1. Recirculator in manufacturer's package must be stored in premises in the following conditions:
- ambient temperature:  $-50...+40$  °C;
  - relative air humidity: max 90 % at  $+25$  °C. In case of higher temperature, humidity must be lower;
  - no dust or acid fumes causing corrosion of metal may be in storage premises.
- 9.2. Recirculator must be transported in manufacturer's package in accordance with package labelling (Up, Caution! Fragile!, Do not take with hooks, Protect from moisture).  
Transportation by all types of transport is allowed in ambient temperature  $-50...+40$  °C and relative humidity 90 % at  $+25$  °C.
- 9.3. Recirculator must be securely fastened in transportation position.

## 10. POSSIBLE FAULTS AND METHODS OF ELIMINATION

Table 2

Name of fault, external evidence	Possible cause	Method of elimination
1. Irradiator is not operating	1.1. Burnt fuse – cigar lighter plug indicator does not light up. 1.2. Faulty cigar lighter plug.	1.1. Replace fuse in cigar lighter plug (see cl. 8.8). 1.2. Repair.
2. Lamp operation control indicator does not light up	2.1. Failed lamp. 2.2. One or more electric lamp holders disconnected. 2.3. Failed electronic power supply.	2.1. Remove lid, replace lamp (see cl. 8.5). 2.2. Remove lid, install electric holders on lamp electrodes. 2.3. Repair.
3. Fan operation control indicator does not light up	3.1. Failed fan. 3.2. Failed electronic power supply.	3.1. Repair. 3.2. Repair.
4. Time meter on control panel is not operating	4.1. Failed digital time meter.	4.1. Replace indication board on control panel.
<p><b>Caution!</b></p> <p>In order to remind user about performance of preventive works (cleaning lamps and irradiation chamber inner surface) every 200 hours (200, 400, 600, 800...9000), readings of the digital time meter on the control panel flash for 1 hour and then return to normal mode.</p>		

\* After warranty period, **SIA KRONT** performs repairs of and supply of all components for ultraviolet bactericide irradiators-air recirculators DEZAR on a contractual basis.

## 11. RECYCLING

- 11.1. Bactericide lamps must be recycled in accordance with requirements and regulations valid in the territory of country, where device is operated.
- 11.2. Filters must be recycled in accordance with requirements and regulations valid in the territory of country, where device is operated.
- 11.3. Recirculator and its components after its service life must be recycled in accordance with requirements and regulations valid in the territory of country, where device is operated, by medical electric device recycling services.

## 12. TEST CERTIFICATE

Ultraviolet bactericide irradiator-air recirculator DEZAR SP, factory number \_\_\_\_\_, conforms to manufacturer's technical conditions and is acknowledged valid for operation.

Production date: \_\_\_\_\_

Signature (QC department stamp): \_\_\_\_\_ Factory stamp:

## 13. MANUFACTURER'S WARRANTY

- 13.1. Manufacturer guarantees conformity of ultraviolet bactericide irradiator-air recirculator DESAR to requirements of manufacturer's technical conditions.
- 13.2. Warranty period: 2 years from recirculator production date.
- 13.3. During warranty period, manufacturer repairs the device or replaces its components free of charge (provided that consumer observes transportation, storage and operation regulations).
- 13.4. During warranty period, manufacturer may at his own account provide consumer with spare parts to be replaced, provided that replacement can be performed by qualified specialists in accordance with requirements of operation documentation.
- 13.5. If repair on-site is impossible during warranty period, consumer sends faulty product or spare parts to manufacturer at manufacturer's account.
- 13.6. Manufacturer only accepts products with warranty certificate for warranty repair. Warranty certificate must be fully completed.
- 13.7. Fault elimination term – max 30 days after manufacturer receives product.
- 13.8. Warranty does not include flaws (faults) of the product caused by:
  - mechanical damage of the product by impact or excessive force;
  - damage of the product by hot objects or liquids;
  - any tampering with the product design;
  - force majeure (incident, fire, flood).

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