Ferroplast UV Air Disinfection Unit

Versions:
Ferroplast UV Air Disinfection Unit-2S

Operation Manual.
Data Sheet.

CONTENTS

1. INTRODUCTION

1.1. This Manual is a combined document with the technical description and operation manual.

1.2. The Manual is intended for familiarization with the Ferroplast UV Air Disinfection Unit-2S two-lamp UV germicidal recirculation unit with forced air flow circulation for indoor air disinfection (hereinafter referred to as the recirculation unit).

1.3. The recirculation unit can be used to prepare premises for operation during its preparation for the medical staff work and for disinfection of indoor air in the presence of people.

1.4. The Manual specifies the rules for recirculation unit operation (use, maintenance, current repairs, transportation and storage).

1.5. Do not use children or people with disabilities

2. PURPOSE

2.1. The recirculation unit is intended for air disinfection of Category II-V rooms up to 50 m3 in medical and preventive institutions in the presence and absence of people by means of air flow disinfection during its forced circulation through the body with two low-pressure 15 W germicidal lamps placed inside:

In the presence of people: - in Category II-V rooms to prevent air microbial contamination level increase (especially in cases of high risk of spread of diseases transmitted by airborne droplets and air).

In the absence of people: - in Category II-III rooms to reduce air microbial contamination (as a final link in the set of sanitary and hygienic measures).

3. MAIN TECHNICAL DATA

3.1. The recirculation unit operates from 230±10% VAC voltage with a frequency of 50 Hz.

3.2. Power consumed by the chamber from AC voltage is not more than 50 VA.

3.3. Irradiance from a UV radiation source at a distance of 1 m at a wavelength in the range of 253.7 nm is at least 1 W/m3. The UV radiation source is two low-pressure mercury germicidal lamps with power of 15 W that do not form ozone during the combustion process.

A special glass with high transmittance of germicidal ultraviolet rays is used for lamp manufacturing. At the same time, this glass absorbs radiation below 200 nm that forms ozone from the air. Due to this, the extremely small ozone formation is recorded (within MPC) which disappears completely after about 100 hours of the lamp operation. The average service life of lamps subject to proper operation and maintenance is at least 9,000 hours.

3.4. Continuous running time of the recirculation unit is not more than 7 days. Break between start-ups is not regulated.

3.5. Recirculation unit warm-up time must not exceed 1 minute.

3.6. Class of application potential risk is 2A.

3.7. Recirculation unit overall dimensions are 755x115x170 mm.

3.8. Recirculation unit weight is not more than 4.5 kg.

3.9. Mean time between failures is at least 1,500 hours.

3.10. Mean life time is at least 5 years.

3.11. Outer recirculation unit surfaces are made of metal coated with powder paint and impact-proof chemically resistant polycarbonate and allow disinfection by wiping with disinfectants registered and permitted in the Russian Federation for surface disinfection according to the modes regulated by the current documents on the use of disinfectants approved in the prescribed manner.

3.12. Recirculation unit operating conditions correspond to the temperature is from +10 C to + 35 C; relative humidity is 80 % at 25 C; pressure is 630-800 mm Hg.

3.14. Total output power of the air-flow (capacity) at nominal voltage is 60 m3/hour. Measurements were carried out by "TESTO-435" thermoanemometer. A fan with a sound power level of not more than 40 dBA is used to ensure the necessary output power of the air flow.

5. DEVICE AND PRINCIPLE OF OPERATION

5.1. The recirculation unit is a closed-type irradiator where UV germicidal flux from the non-ozone forming UV lamps is distributed in a small confined space. Air disinfection in this process is carried out during its pumping by a fan through an area with ultraviolet radiation sources.

5.2. The irradiation zone is made using materials with high reflective properties to ensure effective germicidal treatment of the air flow (75% UV reflectivity aluminum).

5.3. The recirculation unit consists of:

- Body that can be fastened by means of a suspension system (lugs) on a vertical surface (wall) or recirculation unit moving stand with wheel supports.
- Lighting equipment (two 15 W UV germicidal lamps, a fan with air flow output power of 60 m3/hour and sound power level of not more than 40 dBA, start-up control equipment, control unit).

5.4. Start-up control equipment is made according to the scheme with ECG.

5.5. The recirculation unit is connected to the mains using a three-wire cable; one of cable wires is grounding.

5.6. There is a power switch on the side of the recirculation unit body.

5.7. On the recirculation unit front panel, there is a multifunctional button box containing:

5.7.1. Two-color indicator, located in the middle of the button box showing the total operating time of germicidal lamps (**green color** - lamp service life is not over; **red color** - lamp service life is over).

5.7.2. Button No. **1** - "**Permanent operation in the presence of people**"- intended for continuous air disinfection in the presence of people.

5.7.3. Button No. **2** - "**Category II up to 30 m3**", Button No. **3** - "**Category II from 31 to 50 m3**", Button No. **4** - "**Category III-V up to 30 m3**", Button No. **5** - "**Category III-V from 30 to 50 m3**" intended to set the recirculation unit operating time depending on the volume and category of the processed room during preparation for its operation.

5.8. Ferroplast UV Air Disinfection Unit-2S front panel comprises

5.8.1.version

Digital display to show the current time/rating time of germicidal lamps. After switching on the power switch, the current time is displayed (readings require correction after each deenergization). When activating any of the above programs, the current time changes to the operating time of germicidal lamps. The operating time is calculated in hours without minutes and is not reset when power is turned off. Press Button No. **6** to return to the current time display.

"**Hours**" and "**Minutes**" buttons are intended to correct (set) the current time on the display. Correction must be carried out when power supply is on and the recirculation unit is off.

6. PREPARATION FOR OPERATION

6.1. Remove the recirculation unit from the shipping container and release from polyethylene. Wipe the preserved surfaces with a gauze swab moistened with alcohol or gasoline (ample wetting is not recommended).

6.2. Check recirculation unit completeness.

6.3. After recirculation unit transportation under conditions of negative temperatures, it is kept indoors at room temperature for 24 hours before being plugged into the mains.

6.4. Carry out recirculation unit disinfection according to MU 287-113 "Methodical Guidelines on Disinfection, Presterilizing Cleaning and Sterilization of Medical Devices".. The lamp and reflectors are wiped with a swab moistened with alcohol and cationic surfactants: Gibitan, Veltosept and other. The swab must be wrung out.

7. OPERATING PROCEDURE

7.1. The recirculation unit must be placed in the room in such a way that the air intake and discharge occur freely and coincide with the main air flow directions.

7.2. Place the recirculation unit in the specified location.

7.3. **Recirculation unit operation in the mode of room preparation for operation**:

7.3.1. Plug the power cable to the 230 V outlet. Turn the power switch to the "**ON**" position.

7.3.2. Set the current time on the display using the "**Hours**" and "**Minutes**" buttons.

7.3.3. Press Button No. **6** "**Program start/reset**"

7.3.4. The recirculation unit operating time is set depending on the category and volume of the room to be processed. The time to be spent on the processing of premises of different volumes during their preparation for operation is shown in Table No. 3.

Table No. 3

Name of the recirculation unit	Advisable volume of the premises m^3	Processing time (min) at efficiency (*)		
		99,9 % Category 1	99.0 % Cat. 2 95.0 % Cat. 3	95,0 % Cat. 3,4,5
Ferroplast UV Air Disinfection Unit-2S	up to 30	-	60	45
	from 31 to 50	-	85	60

***** Germicidal efficiency is calculated for S. aureus.

7.3.5. Button No. **2** - "**Category II up to 30 m3**", Button No. **3** - "**Category II from 31 to 50 m3**", Button No. **4** - "**Category III-V up to 30 m3**", Button No. **5** - "**Category III-V from 30 to 50 m3**" switch on the recirculation unit operating time depending on the volume and category of the room to be processed.

7.4. **Recirculation unit operation in the presence of people**:

7.4.1. Plug the power cable to the 220 V outlet. Turn the power switch to the "**ON**" position.

7.4.2. Set the current time on the display using the "**Hours**" and "**Minutes**" buttons.

7.4.3. Press Button No. **6** "**Program start/reset**"

7.4.4. Press Button No. 1 "**Permanent operation in the presence of people**". The recirculation unit is intended for room air disinfection in the presence of people in continuous mode (up to 8 and more hours of continuous operation).

7.4.5. Press Button No. **6** to finish the work.

7.4.6. If there is no need to display the current time, turn the power switch to the "**OFF**" position to switch off the recirculation unit. The current time is not stored.

7.5. After 7 days of operation, the recirculation unit must be treated in accordance with Paragraph 8.4.

7.6. In the presence of people, the recirculation unit is rated for 8-hour or longer continuous operation.

7.7. The air microbial contamination level is reduced in rooms with a volume of up to 50 m3.

7.8. If it is necessary to process rooms larger than 50 m3, the number of recirculation units must be increased at the rate of 1 recirculation unit for 50 m3.

8. MAINTENANCE

8.1. Carry out timely maintenance in order to ensure reliable operation of the recirculation unit. Use this Manual for maintenance.

8.2. Check conditions.

8.2.1. Technical specifications are checked at nominal supply voltage and normal conditions accepted as:

Supply voltage is 230 V±10%, ambient temperature is 25±10°C, relative humidity is 65±15%, atmospheric pressure is 84 – 106, 7 kPa, 630-800 mm Hg.

8.2.2. Before checking the recirculation unit, it is necessary to: carry out an external inspection, examine technical documentation for the recirculation unit and devices used to check it.

8.3. Checking.

8.3.1. The following must be checked during external inspection:

- Any mechanical damage affecting performance
- Availability and fastening security of controls and switching devices, accuracy of their position lock as well as power cord and plug condition
- Any joined or poorly fixed circuit elements
- When using the stand-mounted recirculation unit, make sure that fasteners are secure (no cracks on the parts, hooking method) and stable (no clearance between connecting elements of the moving stand, wheel support are functional).

8.3.2. When opening the recirculation unit and performing preventive maintenance, keep in mind security measures listed in Section 6.

8.3.3. Before checking technical specifications, test the recirculation unit efficiency.

8.4. The list of the main technical condition checks is given in Table No. 4.

Table No. 4

Types of maintenance	Monthly periodic maintenance	Periodic maintenance Every 6 months
Responsible person	Specialists involved in recirculation unit operation	Specialists involved in recirculation unit operation
Scope of works, methods and means of maintenance	Functional test	Checking the condition and strength of power cord sealing by means of external examination by its accurate wiggling and twisting near the seal without special tools and equipment. External inspection of recirculation unit fasteners securing it to the wall or moving stand for mechanical damage. Check the moving stand when it is used with the recirculation unit.
Technical requirements	Recirculation unit operation in accordance with Section 9 "Operating procedure"	The cord surface must be free from breaks through which conducting cores are seen. Cord sealing must be durable and eliminate movement into the sealing hole. Mains plug pins must not be bent Recirculation unit mounting systems must be free from mechanical damages and cracks. The moving stand must have no clearance of mating parts at the fastened joints. Wheel supports must rotate without biting and excessive force.

8.4.1 All measuring instruments used in tests must be certified.

8.5. If the recirculation unit or its components fail to meet technical data specified in Section 3, further operation of the recirculation unit is not allowed and it must be repaired or replaced.

8.6. The lamp must be replaced after 9,000 hours of lighting.

9. CURRENT REPAIRS

9.1. General.

9.1.1. Current repairs are carried out by specialists of repair companies.

9.1.2. When repairing, observe safety measures specified in Section 6 of this Manual.

9.2. Current repairs procedure

9.2.1. Current repairs include the following steps:

- Trouble detection
- Troubleshooting
- Checking equipment performance after repair.

9.3. Trouble detection

9.3.1. Trouble detection is carried out in accordance with Section 11 of this Operation Manual.

9.4. Current repairs during the warranty period are carried out by the manufacturer specialists.

9.5. After performing current repairs, check the technical condition.

9.6. If the power cord is damaged, it should be replaced with a special cord or kit obtained from the manufacturer or customer service.

10. TROUBLESHOOTING

10.1. A list of the most common or potential troubles, probable causes and methods of their elimination are given in Table No. 5.

Table No. 5

Name of faults, external manifestation and additional signs	Probable causes	Methods of elimination
There is a message on the display.	Lamp is faulty	Replace lamp
	ECG (electronic ballast) is faulty	Replace ECG (electronic ballast)
	Fuse is faulty	Replace fuse
Presence sensor fails to operate	Low sensitivity is set. Control board malfunction.	Perform setup according to Section 6. Replace control board
Recirculation unit is not securely mounted on the wall	Damaged suspension systems	Repair suspension systems.
Recirculation unit is unsteadily located on the moving stand	Damaged suspension systems Loose fasteners (bolts and nuts)	Repair suspension systems. Tighten fasteners until clearances between components are eliminated.