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STERIMEDIC - Technical manual

Model: A device for automatic non-contact hand disinfection by spraying.
Type:

A) Sterimedic Glass Series,
B) Sterimedic Alu Pro Series,
C) Sterimedic Stainless Pro Series

Bieruń 2022

Contents

1. Introduction

Thank you for purchasing the STERIMEDIC sterilization device. Welcome to the growing group of users of our products and congratulations on your choice! We are convinced that the combination of elegance and the latest technical solutions with the reliability of the brand will bring you a lot of satisfaction.

The instruction manual presents the principles of proper use, safety requirements, inspection schedules and other tips for everyday use of the device. Before starting the device, you should carefully read the Manual, because it can significantly contribute to increasing satisfaction with its operation.

The instruction manual contains important information about the control systems and accessories, which facilitate comfortable and safe use of the device.

It also contains guidelines for periodic inspections and maintenance activities affecting the safe use of the device. We recommend that all inspection and maintenance activities be performed by an Authorized Company Service. This ensures the highest level of inspection and maintenance activities and other services necessary during the operation of the device.

This User Manual is an integral part of your device and should be available to its user at any time. If the device is resold, the Owner's Manual must be handed over to the new Owner.

1.1. Range

All information contained in this User's Manual is current as of the date of its publication. The company reserves the right to make changes at any time, in accordance with the policy of continuous improvement of manufactured products.

The instruction manual applies to all versions of the devices, therefore it contains descriptions and explanations of standard and optional equipment. The Manual may contain fragments that do not apply to a specific copy.

1.2. Related documents

Name of the document	Comments
EC Declaration of Conformity	The declaration of conformity will be attached in a separate document.

Table1: Related Documents

2. Security measures

Please read this manual before use. In the event of faulty operation or faults that cannot be removed on one's own, it is recommended to contact the manufacturer. The manufacturer reserves the right to introduce technical changes.

2.1. Requirements

- This device can be used by children aged 8 years and over and persons with reduced physical, sensory or mental abilities or without experience and knowledge, if they are supervised or have been instructed on how to use the device in a safe way and understand the hazards. Children must not play with the device. Children must not clean or maintain the appliance without supervision.
- Close supervision is necessary if the appliance is used by or near children.
- Unplug the device from the wall outlet and/or battery when not in use for long periods and before cleaning.
- If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or a similarly qualified person in order to avoid a hazard.
- This device is intended for use in public places and similar applications such as:
    - staff kitchens in shops,
    - offices and other workplaces,
    - by customers in hotels,
    - motels and other residential environments.
- There is a potential risk of injury due to misuse
- Do not use the device if any part or cover is damaged or has visible cracks.

When using electrical appliances, basic safety precautions should always be followed to reduce the risk of fire, electric shock and/or injury to persons.

2.2. Security measures

Please read this manual carefully before using the device for the first time.

- Before using the device for the first time, make sure that the power supply corresponds to the current requirements specified on the casing.
- Do not use the device outdoors unless the version allows it.
- Do not place the device on a hot surface.
- Use only manufacturer's accessories.
- Do not allow children to play with the device.
- To avoid electric shock, do not immerse the device in water or other liquids.
- Make sure the cord does not come into contact with sharp edges or hot surfaces.
- Do not use the device if the power cord is damaged.
- Do not repair the device yourself. If there is any damage to the device, contact an authorized service center.
- Always turn off and unplug the device when not in use or before cleaning.

3. Device description

3.1. Delivery range

The package contains a ready, complete device. The content may vary depending on the selected ordering option. The standard set is:

- SteriMedic device 1 piece.
- Charger 1 piece.
- User manual 1 piece.
- Mounting template 1 piece.
- Tray for excess fluid 1 piece.

Optional content:

1. remote control with a preview of the device data

Packaging instructions

If the purpose of the packaging is not explicitly stated, it is a typical transport packaging. It is quantitatively reduced to the minimum necessary so that high-quality parts can be transported and unloaded without damaging them.

Packaging dimensions 200x400x500.

Transportation and storage

If there are restrictions related to the transport of the device in an assembled state, it will be delivered in subassemblies. Pay attention to careful unloading and storage of components until assembly. The device and additional elements should be stored in a safe and dry place. The recipient of the goods bears the storage risk. Do not use sharp objects to unpack to prevent damage.

Claims for missing parts as well as shipping damage should be reported immediately. Complaints about damage or missing parts submitted late will not be accepted.

3.2. Principle of operation

The basic function of the device is effective and safe hand disinfection. Disinfection takes place by bringing the hands closer to a fixed distance in the disinfecting chamber, followed by automatic detection of the hands and the separation of the appropriate amount of disinfectant

liquid in the form of a mist sprayed on the hands. If necessary, the operation can be repeated until a satisfactory result is obtained.

3.3. Device specifications

This manual covers a series of types of disinfecting devices that differ in the material from which they were made. Thus, we can distinguish the following types:

A) Sterimedic Glass Series,
B) Sterimedic Alu Pro Series,
C) Sterimedic Stainless Pro Series

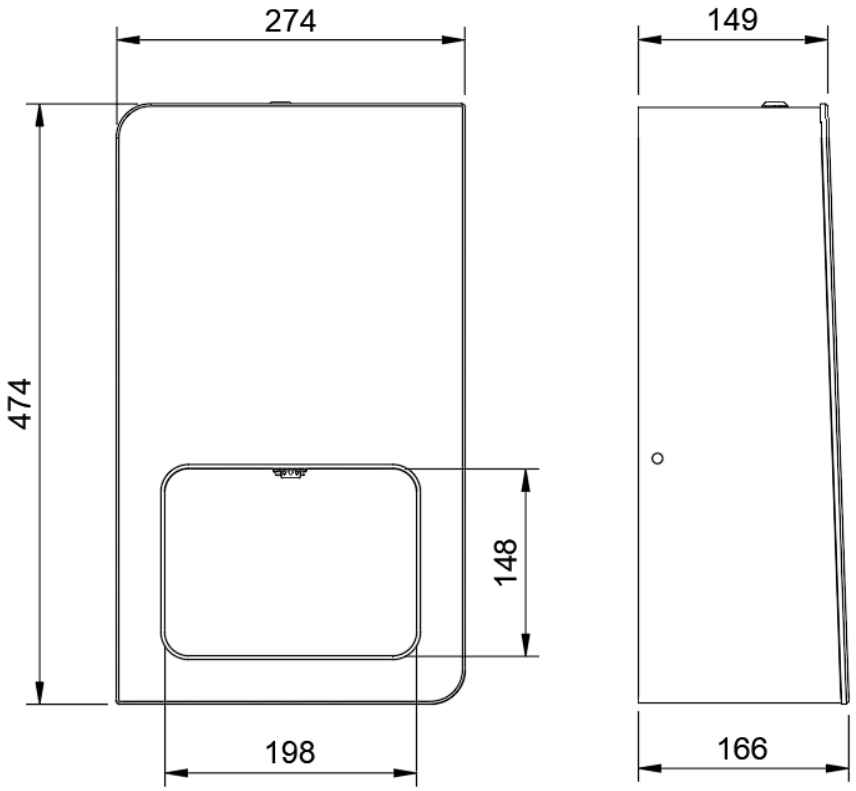

Figure 1: Dimensions of the device

Parameter	Slightly	typical	maximum
Mains voltage	~ 230 V, 50 Hz		
External, stabilized power supply voltage	12 V =	14 V =	14 V = (from battery) 24 V = (without battery)
Component supply voltage	7 V =	12 V =	14 V = (from battery) 24 V = (without battery)
Current at rest	18 mA	23 mA	28 mA
Current during disinfection	0.5 A	2,5 A	7.0 A
Standby power consumption	1W	1W	1W
Power consumption during disinfection	30W	48W	75W
Working temperature	-10 ℃	20 ℃	60 ℃
Efficiency of the dosing system	0.5 ml	2.5 ml	5 ml
Disinfectant capacity	1L		
Device weight	11kg		
Dimensions	474x274x166		

Table2: Technical data

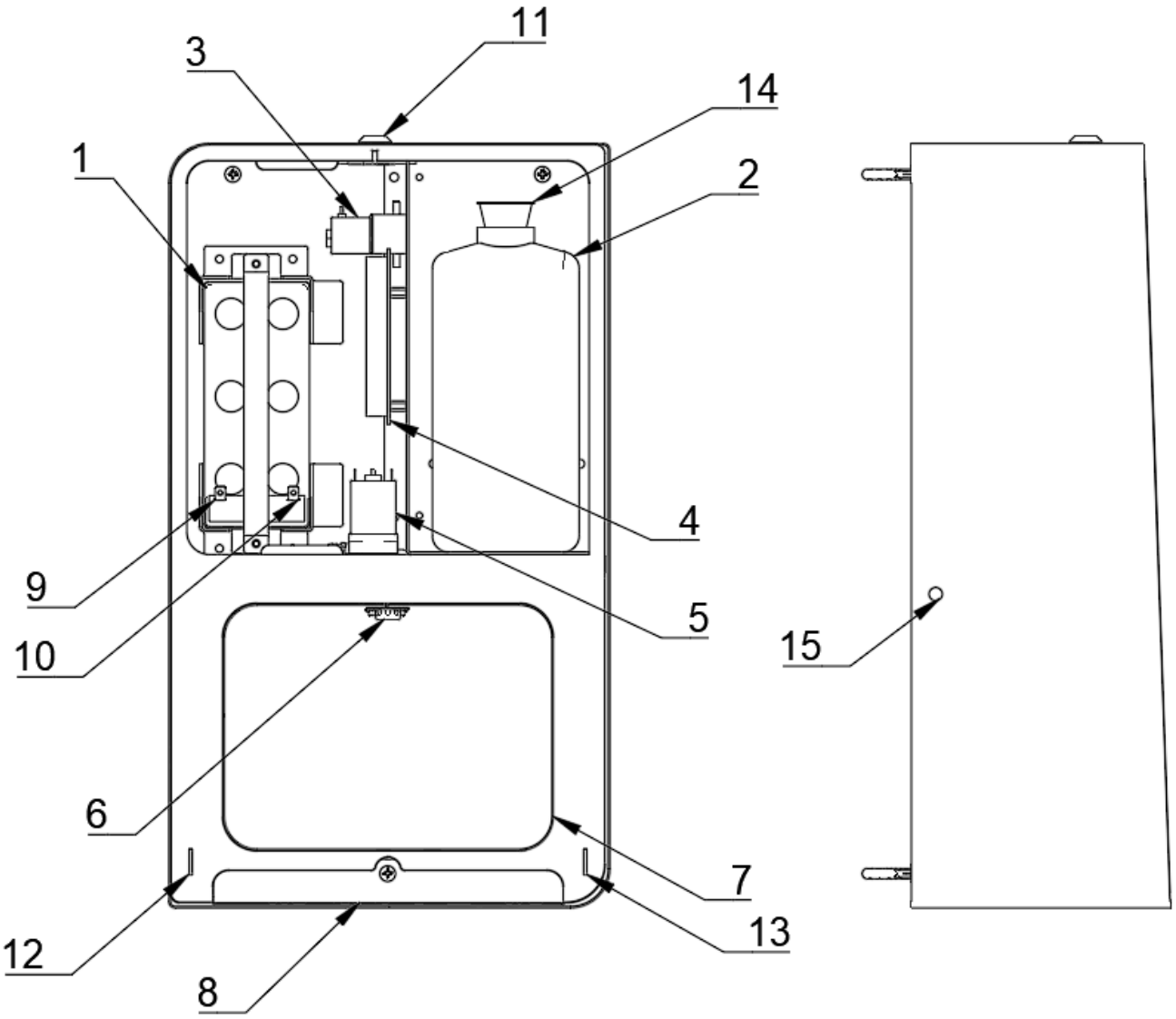

Figure 2: Diagram with description

1. 12V battery
2. 1000 ml bottle
3. check valve
4. Device control system
5. pump
6. Pump atomizer
7. Disinfection chamber
8. Tray compartment for excess fluid
9. Plus battery
10. Minus the battery
11. Main cover/device front mounting lock.
12. Mounting slot for the front handle.
13. Mounting slot for the front handle.
14. Bottle cap for hose attachment.
15. Device charging port.

3.4. Marking

The disinfecting device is marked with a permanent name plate or sticker with the content shown below. The marking should be visible after the installation of the device.

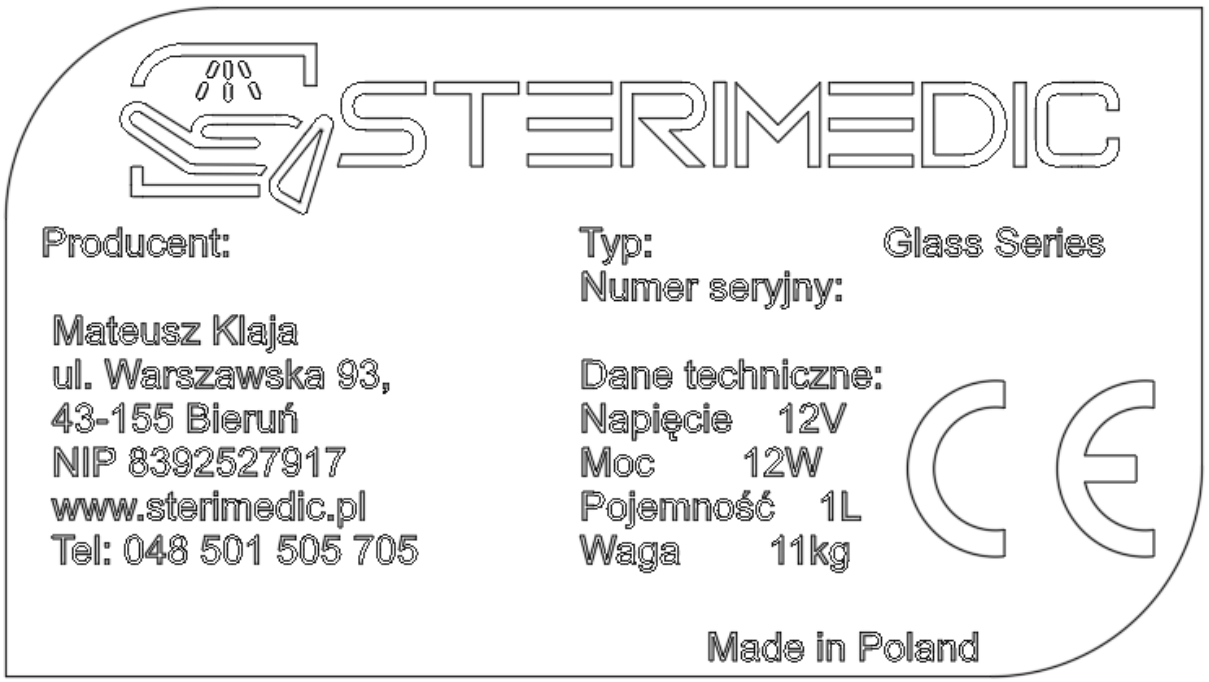

Figure 3: Model of the nameplate

3.5. Purpose of the device

The hand disinfection device is adapted to spray (predetermined dose) a mist of the disinfectant. The mist is created by compressing the agent and then expanding it throughI'm panting to atomize the fluid. The device was made in accordance with the rules of technology and applicable regulations.

The user should comply with applicable law. Each entrepreneur is obliged to keep records of pollutants released into the environment, in accordance with environmental protection regulations.

3.6. Device installation tips

The installation of the disinfecting device should be carried out by qualified professionals according to the guidelines on an even, stable surface. When mounting the device on a wall, use the template supplied with the device. It allows you to trace holes. It is recommended to install the device 90 cm from the floor or 70 cm from the floor if the users will be children.

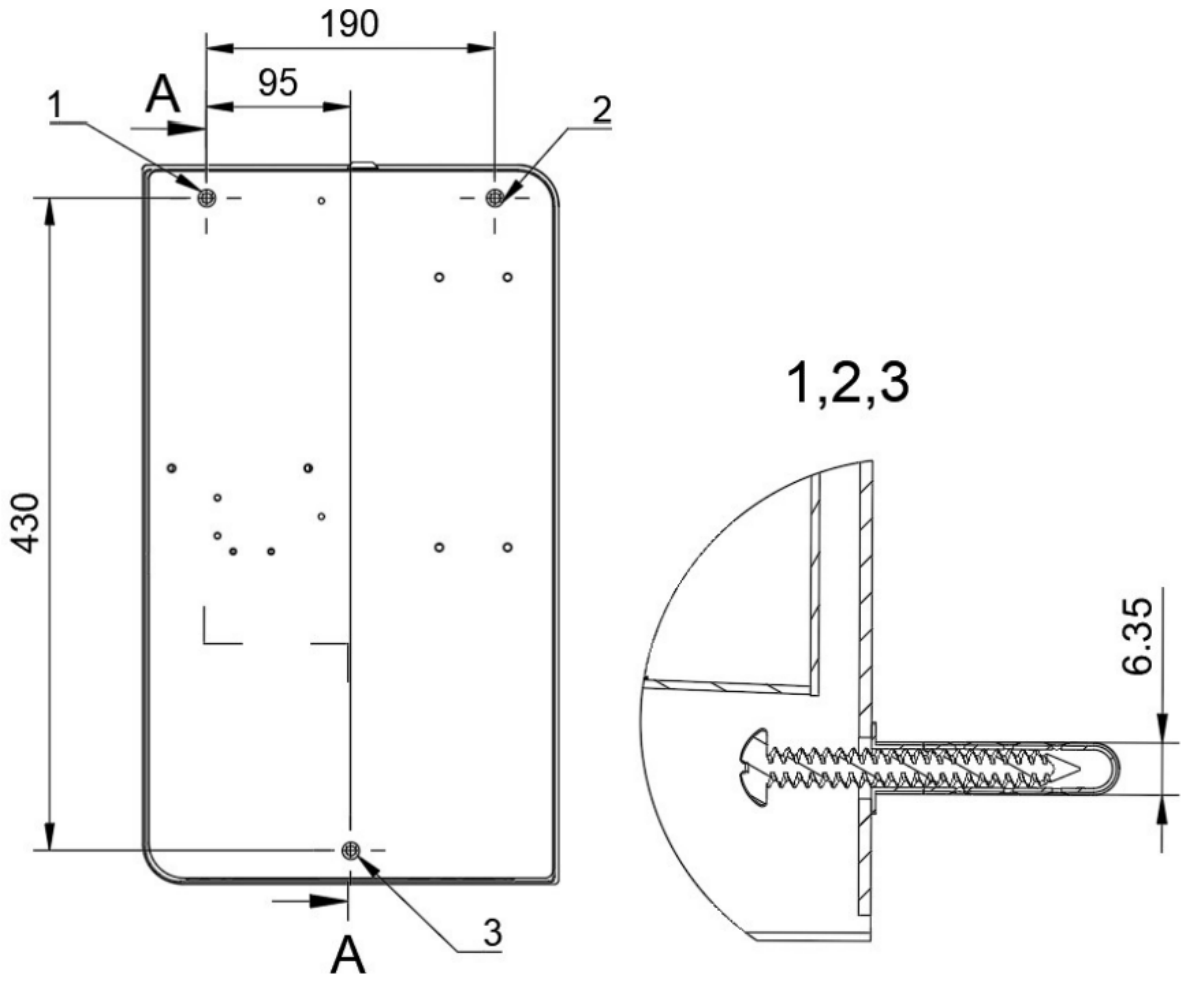

Figure 4: Installation diagram of the device

3.7. Materials used in the manufacture of disinfection devices

Structural elements

The following materials were used to manufacture the device:

Stainless sheet #1.0mm #1.5mm #2.0mm

Aluminum sheet #1.0mm #1.5mm #2.0mm

Tempered glass #6mm

Fasteners

The project used:

- Allen screws FROM 912
- Washer head screws ISO 7380
- Pads FROM 125
- Nuts FROM 934

3.8. Control system - motherboard

The motherboard contains the components that control all the components of the device. The microprocessor control unit allows for communication with the device, its configuration and control of the operating status. An OLED display is attached to the board, presenting all the operating parameters of the device.

3.8.1. Security requirements

ATTENTION! The motherboard contains delicate electronic components that should be handled with due care. In particular, you should pay attention to the OLED display, the main element of which is made of thin glass. Too much pressure can damage the display glass, rendering it unusable. In addition, glass elements can cause damage to the skin. A damaged display must be replaced.

3.8.2. Sockets and components of the motherboard

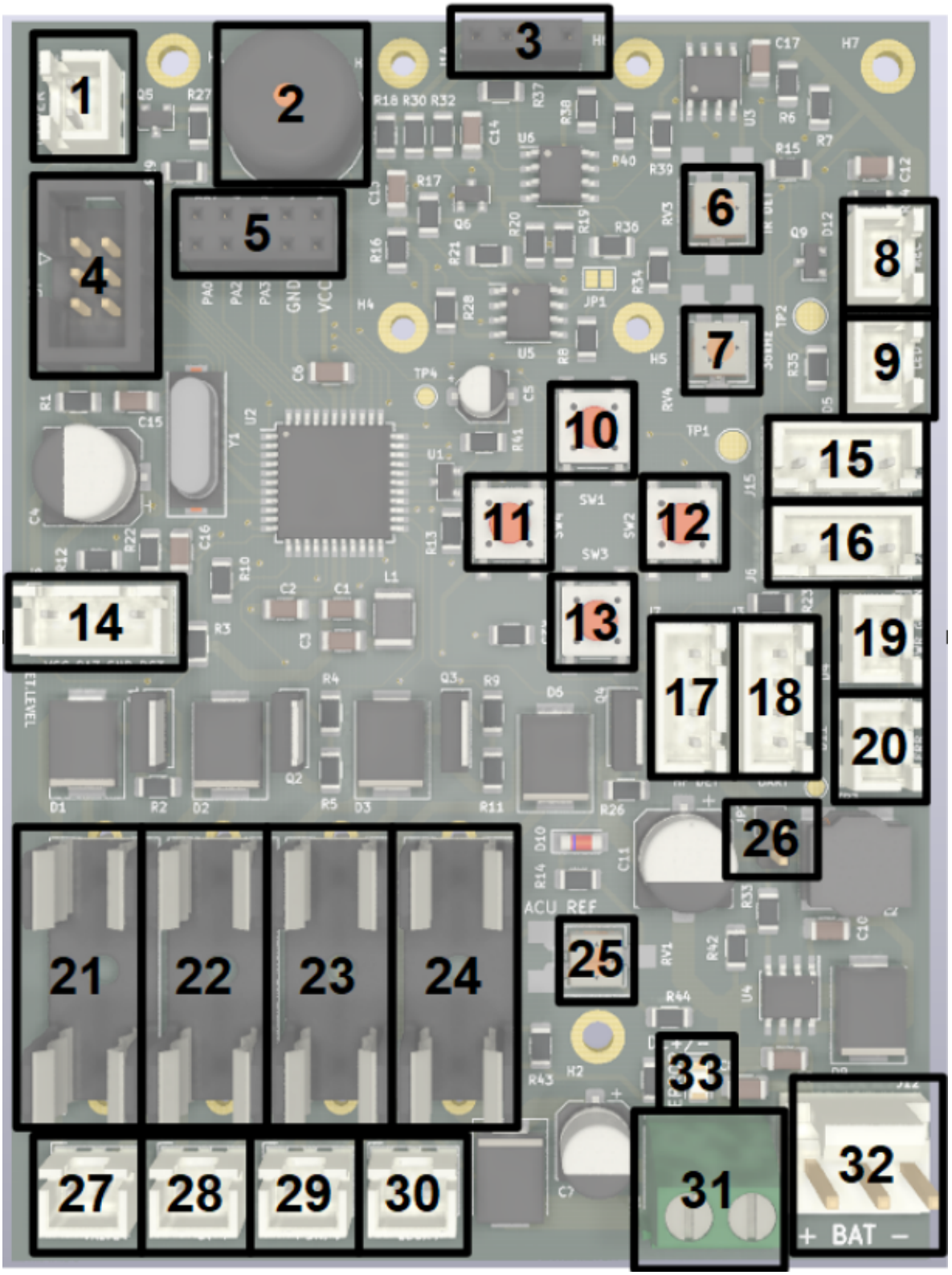

Figure 5: Layout of motherboard components

1. Housing sensor socket (COVER)
2. Sounder
3. OLED display socket
4. ISP programming socket
5. Expansion slot
6. Adjusting the IR hand presence sensor
7. Adjusting the frequency of the IR pilot signal emitter (36kHz)
8. Hand Presence IR LED Socket (Receiving)
9. IR remote control signal transmitter socket
10. Control button SW1 (top)
11. Control button SW4 (left)
12. Control button SW2 (right)
13. Control button SW3 (down)
14. Fluid presence sensor socket
15. Expansion Slot I^2C
16. ToF hand presence laser sensor socket
17. Proximity sensor slot, prompts
18. RS232 UART serial port socket
19. Work, green, power diode socket
20. Error LED socket, red
21. Fluid valve fuse seat
22. UV lamp fuse socket
23. Fluid pump fuse socket
24. Electric lock fuse socket
25. Battery voltage readout transducer adjustment
26. Control Power Jumper (5V)
27. Fluid valve seat
28. UV lamp socket
29. Fluid pump port
30. Electric lock socket
31. DC power socket from the power adapter
32. Battery socket
33. Incorrect power supply polarity signaling diode (red)

3.8.3. Power

The device can be powered in several configurations depending on the needs of a given installation.

- Mains power supply with a buffer battery operating as a backup power supply in the event of a mains power failure. Power supply via an external 14V power supply.
- Battery powered. The battery is recharged when needed using an external 14V mains adapter.

ATTENTION!Verify polarity before connecting power. The system is protected against connecting the power supply with the wrong polarity, which is signaled by the red diode on the motherboard, however, connecting the AC adapter with the wrong polarity to the battery will damage the power supply and/or the battery.

3.8.3.1 Battery

Parameter	Description
Product type	lead battery
Cell type	AGM
Tension	12 V
Capacity	7.2 Ah
Battery properties	VDS certified, Maintenance free, Low self discharge
Battery connection	4.8mm flat plug
Libra	2470 g
Manufacturer part number	LC-R127R2PG
Type (manufacturer type)	12 V 7.2 Ah
Rechargeable	so
dim.	(S x W x G) 151 x 94 x 65 mm

Table3: Battery specifications

3.8.3.2 AC adapter

Parameter	Description
Product type	Stabilized power supply
input voltage	~ 230V AC 50Hz
output voltage	14V DC
output current	3A (for the version of the device with a battery) min. 7A (for the version of the device without a battery)

Table4: Specifications of the AC adapter

3.8.3.3 Activation

Before the first use, check the technical condition of the motherboard, paying attention to any mechanical damage that may have occurred during possible transport.All initial adjustments and configuration settings are made by the manufacturer. In some cases it will be necessary to make adjustment adjustments. The system has been designed so that none of the adjustments in any of the settings will cause damage to the device.

1. Connect the motherboard system to the power supply using the socket [31]. Note the diode [33]. If it lights up, change the polarity of the power supply.
2. Connect the optional battery to the socket [32]. Pay attention to the polarity of the connection “+” to “+” and “-” to “-”. The battery can also be the only power source for the system.
3. Jumper [26] must be installed.
4. Connect the housing sensor to the socket [1]
5. The liquid presence sensor should be connected to the socket [14].
6. The sockets [21], [22], [23], [24] should be fitted with appropriate fuse inserts.
7. Connect the liquid solenoid valve to the socket [27].
8. Connect the optional UV lamp of the chamber to the socket [28].
9. Connect the fluid pump to the socket [29].
10. Connect the electro-lock coil to the socket [30].
11. Signaling diodes should be installed in the sockets [19] and [20] - green operation and red error.
12. The hand presence laser sensor should be connected to the socket [16].
13. Connect the IR LEDs to the sockets [8] and [9] if applicable in the given configuration.

The motherboard connected in this way is ready to work. Turn on the power. After the initialization phase, the device will start up and start working. The green operation LED will flash and if the device housing is open, the red error LED will also flash.

During the first phase of starting the device, the display shows the STERIMEDIC logo and the firmware version number.

Figure 6: Welcome screen

After 2 seconds, the screen goes off, all services are started and the system starts working, signaling this with the flashing green operation diode [19].

3.8.3.4 Principle of operation

The work cycle of the device consists of one main control process, which includes:

- Control of operating parameters sensors:
- supply/battery voltage,
- ambient temperature,
- case,
- fluid level,
- laser hand presence sensor,
- transmitting data to the pilot,
- device key reading and OLED display control.

This cycle is constant and its individual elements are launched based on task management algorithms to ensure maximum efficiency and speed of the entire system.

In the event of a specific event, appropriate procedures for responding to the event are launched, taking into account the current state of the sensors.

3.8.3.5 Disinfection

The procedure is initiated by the activation of the hand presence sensor in the chamber. Each time the sensor is activated, the UV lamp inside the chamber is lit.

- If an appropriate delay time has elapsed since the last disinfection, the washer valve and pump are activated for a predetermined time (dose volume) and with a specified power. Both the dose volume and pump power are set by the factory or by the user. The factory setting is 1ml
- The pump and valve are turned off, the UV lamp stays on and the device waits for you to remove your hand from the chamber and unlock the sensor.
- When the hand is removed, the UV lamp goes off and, if it has been properly configured and connected, the electric gate lock or other device that allows a person to enter the secured room is triggered.

3.8.3.6 OLED display

Using the display and keys on the motherboard, the device communicates with the user.
The standby display is blank. It can be turned on by clicking any key on the motherboard. This causes the display of all current operating parameters of the device. Parameters are updated in real time.

Figure 7: Home screen

The individual elements on the display represent:

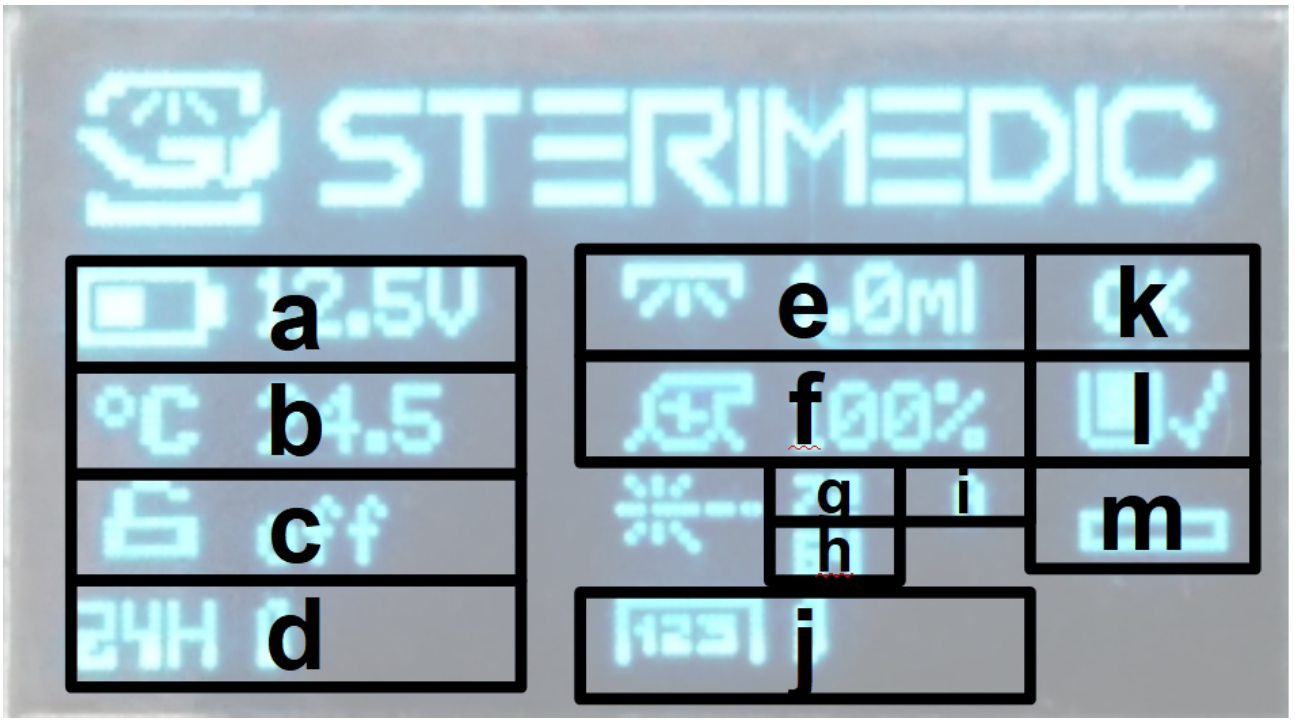

Figure 8: Description of the displayed functions

a) Battery voltage, power supply
b) Indoor temperature
c) Electric lock function status
    a. “on” - enabled

   b. “off” - disabled
d) “Daily” device usage counter. Reset after 24 hours of operation
e) The volume of a single fluid dose
f) Pump power
g) The current distance measured by the laser sensor
h) Laser sensor distance calibration value
i) Type of detected laser sensor
j) Total usage counter of the device
k) Device status
   a. "OK" - in case of no error
   b. “!!!” when an error is detected
l) Condition of the disinfectant
m) Case opening indicator

If the laser sensor has not been detected, a dash will appear instead of the values read from the laser (g, h, i). The device tries to re-establish communication with the laser every few minutes.

3.8.3.7 keys

There are four control keys on the motherboard. Each of them is assigned a specific function and reacts differently at a specific moment.

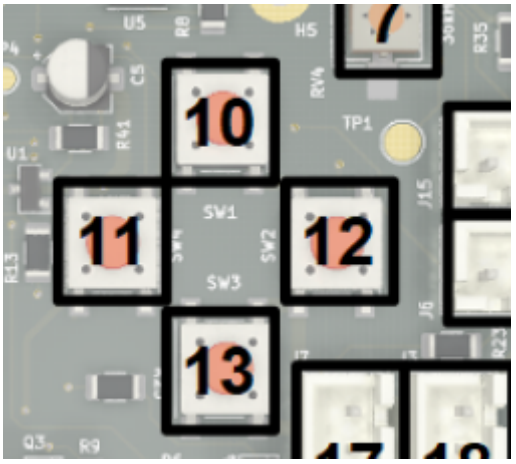

Figure 9: Description of the buttons

[10] Up - moving through the menu

[13] Down - moving through the menu

If the screen is blank, clicking displays the basic screen.
If the basic screen is displayed, the key has no function.
If a menu is displayed or a specific parameter is selected, then subsequent clicks cause the change up/down, i.e. either moving to the previous/next, higher/lower item in the menu or changing the parameter value up/down.

[12] Right - enter the function

If the screen is blank, clicking displays the basic screen.
Another click takes you to the menu, and another click causes you to edit the value of the configuration parameter.

[11] Left - exit the function, return

If the screen is blank, clicking displays the basic screen.
It causes exit from edition of the configuration parameter value or exit from the menu to the main screen.
On the home screen, turns off the display.

3.8.3.8 Configuration parameter menu

Figure 10: Menu

Changes to the device settings are changed using a simple menu. The menu is accessed via the SW2 key (“Right”). A list of menu items and parameters appears.

The list of menu items can be viewed, scrolled using the SW1 (“Up”) and SW3 (“Down”) keys. The “>” character indicates the active menu item.

Selecting the SW2 key (“Right”) again causes the transition to changing the value of the selected parameter.

Figure 11: Editing a parameter in the menu

The parameter value can be changed using the SW1 (“Up”) and SW3 (“Down”) keys. Each time a change is automatically saved in the non-volatile memory of the processor.

We return to the previous menu level by pressing the SW4 key (“Left”). In this way, we leave the

edition of the parameter value to the parameter list or exit the parameter list, from the menu to the main screen. Pressing the SW4 key (“Left”) again turns off the display.

In different versions of the device, additional menu items may be available and configuration parameters may appear, the value of which cannot be modified. Then, instead of the “>” sign, the “-” sign appears next to the item and you cannot proceed to editing the parameter.

Parameter. Tongue

Changing the language in the menu.

Parameter. Dose

The parameter determines the volume of the liquid dose for a single use from 0.5ml to 9.5ml in 0.5ml steps.

Parameter. Pump power

The parameter defines the power of the disinfectant pump from 10% to 100% in 10% steps.

3.8.3.9 Hand detection and sensor calibration

The device has two types of hand detection devices depending on the requirements of the installation. Both can work simultaneously and in specific cases detect hands in two different chambers.

- **laser sensor**

Hand detection is based on a precise laser sensor. The detection process is based on measuring the distance to the object (ToF).

When starting the device, the firmware calibrates the measurements by measuring the average value of the distance of the sensor from the bottom of the washer chamber and remembers this value. The value read in the calibration process is presented on the device display [h].

This sensor does not require manual calibration.

During operation, the device constantly monitors the distance with a laser sensor and if it falls below the calibration value, it starts the disinfection process.

- **Diode sensor**

Hand detection is based on IR (infrared) diodes, where one emits light signals and the other receives them. If the received signals are consistent with the transmitted signals, it is treated as the presence of a hand. This situation will only occur when the transmitted signal bounces off some surface.

For proper operation, the detection sensitivity must be set in each device under the target operating conditions. The potentiometer [6] on the motherboard is used for this. Turn it slowly from the right extreme position to the left until the UV diode of the device goes out, which means

that the hand is not detected. This switch-off point is the subsequent triggering point of the sensor. The setting should be checked by inserting your hands and, if necessary, correct the setting.

The diode sensor support function is disabled by default and can be enabled by the manufacturer.

- **Pilot signal transmitter**

The signal transmitter for the remote control is part of the LED hand detection sensor. It is factory set to generate a variable pilot tone with a carrier frequency of approximately 36 kHz. Correction of this frequency can be performed using a potentiometer [7]. In most cases, correction is not needed because the remote control has a sensor with a very wide range of signal detection.

The remote control beacon support feature is disabled by default and may be enabled by the manufacturer.

3.8.3.10 Voltage measurement calibration

The device is pre-calibrated and shows the value of the device's supply voltage with some accuracy. By default, this is the battery voltage value and indicates the battery's charge level. If for some reason it is necessary to correct these indications, it can be done by adjusting the potentiometer [25] on the main board

3.9. Dosing system

The dosing system is a suction-pressure gear pump. All elements of the system that come into contact with the disinfectant liquid are made of an inert material that does not react with the substance.

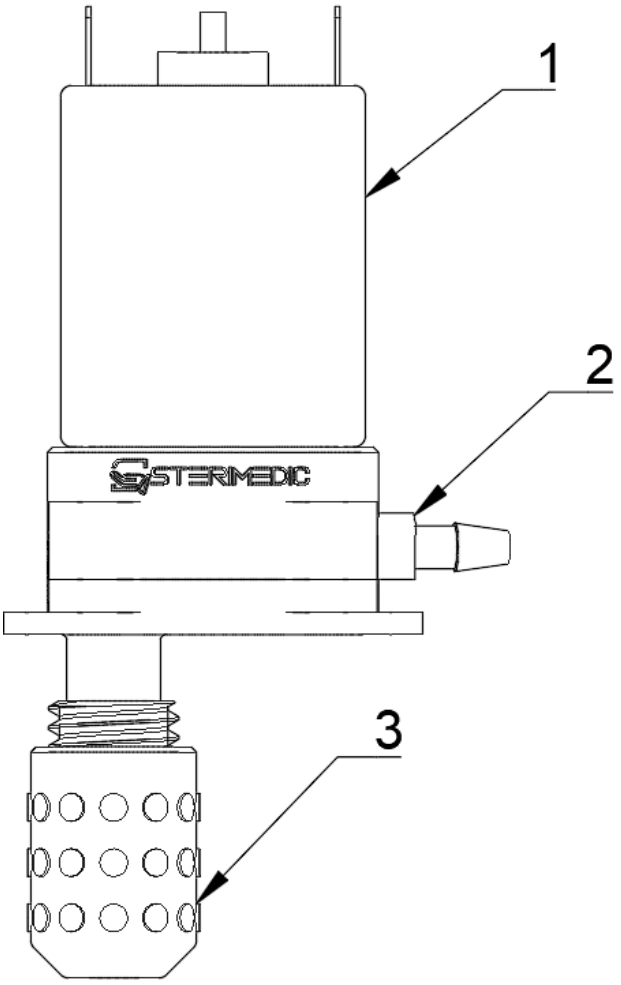

Figure 12: Schematic drawing of the pump

1. 12V motor
2. Pump mechanism
3. Pump nozzle

4. Risk card

The hazards (residual risk) that may nevertheless arise from improper handling are listed below. Other risks are also listed.

• Residual risks from mechanism and electricity:

Risk of injury to the machine during servicing and risk of electric shock when charging the battery if parts of the housing or guards that can only be removed with tools have been removed.

• Other risks from fire and explosion

Impermissible mixing and spraying of flammable materials, as well as the use of fire and smoking within the disinfection device may lead to self-ignition and explosion. If the electrical installation is not installed in accordance with the applicable technical rules, and the device is installed incorrectly, it is possible that a fire and explosion will occur.

5. Safety Tips

5.1. Customer guidance

The basic condition for safe operation and failure-free operation of the device is the knowledge of basic health and safety rules. Before commissioning the device, it is necessary to pay attention to the following points:

• Before setting up and commissioning the device, read the instruction manual in its entirety.

• Pay particular attention to the health and safety instructions.

• Ask us if you do not understand the description of a particular operation or maintenance.

• Keep the instruction manual in a place where each employee can refer to it at any time.

• On the basis of this manual, the rules of conduct in the plant should be developed. They must take into account the working conditions in the plant and the specific situation where the equipment is used.

• Servicing may only be performed by trained personnel.

• In the event of a failure, notify our service

5.2. Information about this manual

This manual has been written for the following users, among others:

• Service personnel

• Technicians responsible for maintenance and repair work.

5.3. Ways of behavior when working with the device

Smoking, open flames and similar sources of ignition are prohibited.

5.4. The use of flammable agents is prohibited

It is forbidden to use flammable agents.

5.5. Intended use

The device may only be used for its intended purpose. It is allowed to use the device only in its impeccable technical condition and being aware of the existing hazards and avoiding them while observing the instructions contained in the instruction manual.

If the hand disinfection device is not used in accordance with its intended purpose - safe operation of the device is not ensured. The manufacturer, but the user, is not liable for any damages suffered by persons or for damage to objects that result from improper and non-intended use of the device.

Failures that may affect safety must be removed immediately. Intended use also includes:

- following the instructions contained in the user's manual,
- adherence to inspection and maintenance periods,
- operation or maintenance of the device only by trained personnel.

6. User manual

6.1. Recommendations

Disconnect the power supply before opening the device, e.g. remove the charger. To prevent damage to the cable, please pull the charger, not the cable. Only use the original charger. Never connect damaged chargers. The used battery should be returned to a battery disposal point.

6.2. Working with the device

Put both palms insideside up into the hole.

The fingertips should point upwards.

Hands will be automatically sprayed with disinfectant.

Remove your hands and spread the liquid to increase its effectiveness.

7. Maintenance Manual

7.1. Scope of maintenance

Maintenance on the technical and electronic parts may only be carried out by qualified personnel. Only use original parts. Do not change anything on the device.

• Keep the device clean. Clean the device with a soft cloth and detergent. Clean the stainless steel device with a suitable agent.

• Do not spray with water, do not use pressurized air and do not use solvents to clean the device.

• Flush the system with alcohol before prolonged disuse. charge the battery 24 hours and disconnect the plus of the battery.

• Be especially careful when opening the front of the device, after releasing the safety lock, support the cover

It doesn't say that when you pull the lid off, how does the lock open? that the hatch must be held so that it does not fall.