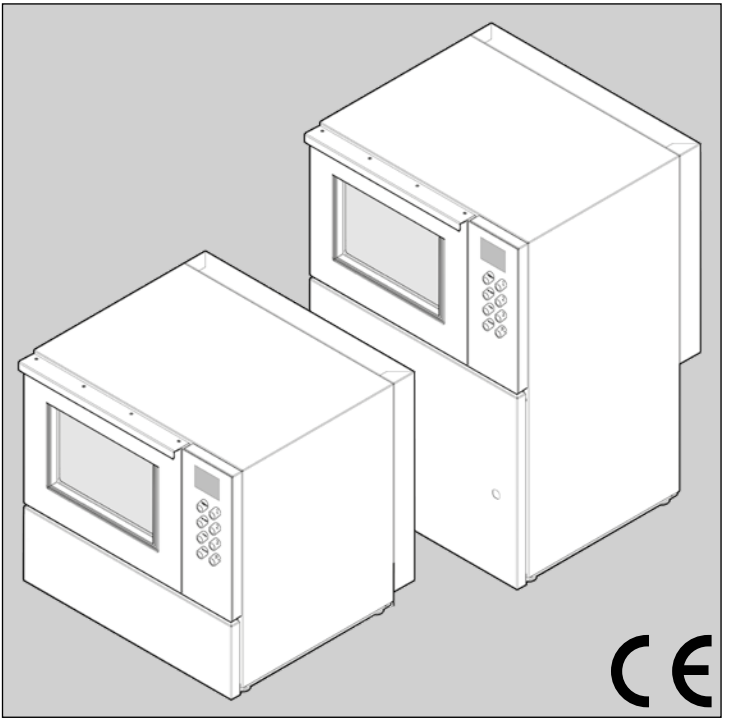
Tuttnauer
Innovation · Legacy · Partnership

# Thermodisinfector
# TIVA2
# TIVA2H



MAN205-0717001EN

# Instructions for use

Before starting to operate with the thermodisinfector, read these instructions for use

**Translation of the original instructions**
Edit. 1/2019

Transcribe the machine data:

Model:.........................................................................................

Serial number: ..............................................................................

Year of manufacture: ......................................................................

**This data must always be quoted when requesting assistance and/or spare parts to the Manufacturer.**

Manufacturer:
**Tuttnauer Europe b.v.**
Hoeksteen 11, 4815 PR P.O.B. 7191, 4800 GD Breda
The Netherlands
Tel. +31 (0) 765 423 510 - +31 (0) 765 423 540
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## ⚠ WARNING ⚠

**IT IS STRICTLY FORBIDDEN TO USE THE MACHINE BEFORE HAVING READ AND UNDERSTOOD THIS MANUAL.**

**TUTTNAUER EUROPE B.V. DECLINES ALL AND ANY LIABILITY FOR DAMAGE DUE TO NEGLIGENCE AND FAILURE TO COMPLY WITH THIS MANUAL AND IS ALSO NOT LIABLE FOR ANY DAMAGE CAUSED BY INCORRECT INTERPRETATIONS OF THE INSTRUCTIONS CONTAINED.**

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# 1. Symbols used in the manual

Actions of particular importance or of potential risk and danger are highlighted in the manual with a symbol whose meaning is set out below.

**CAUTION!** This sign warns that if the operations described are not correctly performed, **they can damage the machine.**

**WARNING!** This sign warns that if the operations described are not correctly performed, **they can cause serious injury, death** or long-term health risks.

**HAZARD!** This sign warns that if the operations described are not correctly performed, **they cause serious injury, death** or long-term health risks.

**HAZARD!** This sign indicates hot surfaces. Danger of burns.

**HAZARD!** This sign indicates a potential risk of electric shock that can **cause serious injury, death** or long-term health risks.

**IMPORTANT NOTE!** Carefully read and memorise the information.

# 2. Presentation

This use and maintenance manual is specific for the use of the thermodisinfector, hereinafter also called machine, produced by **Tuttnauer Europe b.v.** Breda, The Netherlands.
This manual is an integral part of the thermodisinfector itself, which must be kept in a safe place and known to the personnel in charge and must always accompany it when moved or resold.
The personnel in charge must be suitable and able to read and understand the contents of this manual. Furthermore, the personnel in charge must use the thermodisinfector bearing in mind the accident-prevention regulations in force, the conditions of use and the thermodisinfector features.
The same personnel must store it and keep it intact to allow its consultation throughout the life-span of the machine itself.
The personnel in charge must strictly and diligently follow the instructions, warnings and all indications contained in this manual.
The contents relate to normal use and maintenance operations. The manual does not include instructions for extraordinary interventions that are outside the routine use of the thermodisinfector.
The removal and/or tampering with the safety devices and protections, fitted on the thermodisinfector, will automatically void the warranty and liability of Tuttnauer Europe b.v..

**WARNING: Tuttnauer Europe b.v. also declines any and all liability for failure to comply with the safety and prevention regulations provided by the legislation and the provisions of this manual.**

If the manual is damaged or lost, a copy must be immediately requested from Tuttnauer Europe b.v..

**WARNING: The machine must only be installed and dismantled by personnel trained for the purpose.**

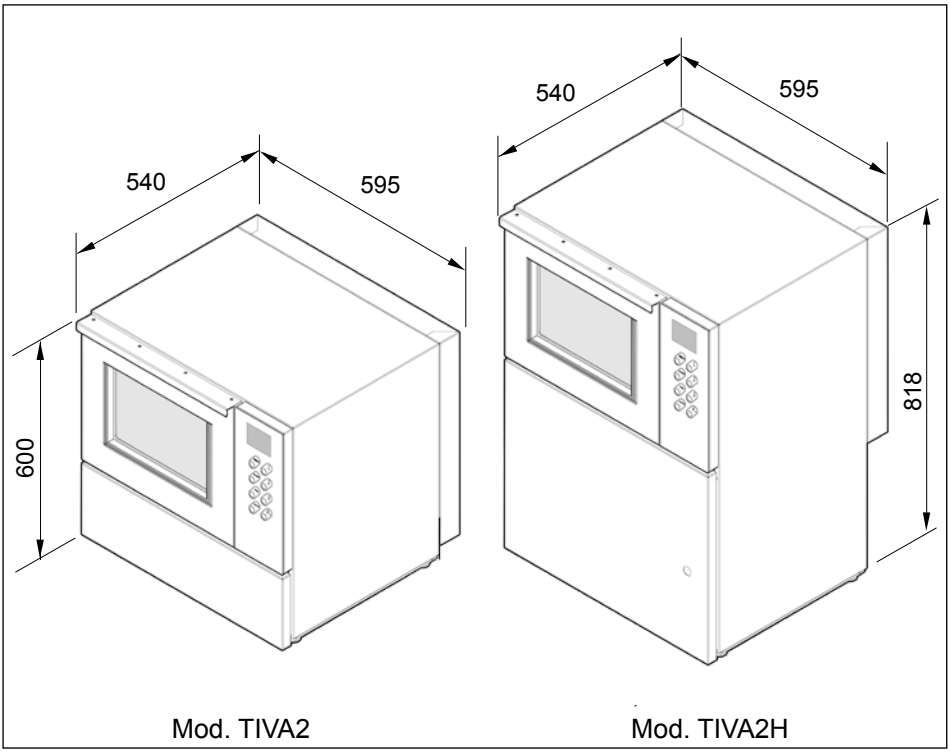


*Fig. 1 (Dimensions in mm)*

There are two models of disinfector discussed in this manual: **TIVA2** and **TIVA2H**, which substantially differ externally from its dimensions, as shown in figure 1:

The **TIVA2** model is the classic model of thermodisinfector with small-sized product bowls, which can be positioned on any piece of furniture capable of withstanding its weight, within a dental practice.

The **TIVA2H** model is a thermodisinfector with much more capable product bowls than the TIVA2 version and which, usually, is embedded under a piece of furniture where appropriate space is already provided, within a dental practice.

**WARNING. Failure to comply with the instructions in manual, operational negligence, incorrect use of the thermodisinfector and execution of unauthorised changes, both on the machine and on the programs, are the cause of cancellation by Tuttnauer Europe b.v. of the warranty granted.**

## 2.1 Field of application

This machine, intended for washing and disinfecting, is considered a class IIb medical device (as defined by Directive 93/42/EEC class IIb). With this machine, also called thermodisinfector, it is possible to treat medical devices, e.g. dental instruments, saliva ejectors, transmission tools, etc., whose manufacturers expressly state that they can be treated in the machine. Follow the instructions of the instrument manufacturers (according to EN ISO 17664), as well as the national laws and directives for the automatic treatment of medical devices. The personnel in charge using the machine daily must be aware of its main features, and must also receive adequate and continuous training.

**Each thermodisinfector is equipped with an identification plate bearing:**


- Manufacturer's Address;
- «CE» Marking;
- (A) Serial number
- (B) Product
- (C) Technical data
- (D) Reference
- (E) Date of construction
- (F) Power

## 2.2 Warranty

- Tuttnauer Europe b.v. warrants its newly manufactured products for 12 (twelve) months from commissioning from the date of delivery of the thermodisinfector provided that in the meantime it has not undergone changes and interventions of any kind by the user. Within the aforementioned terms, Tuttnauer Europe b.v. undertakes to supply free of charge the spare parts of those parts which, at its sole discretion, or of its authorised representative, show manufacturing defects, or at its discretion, carries out repairs directly or through authorised personnel. In any case, labour costs for replacing defective parts are always charged to the Customer.
- The right to warranty services is only recognised if, once the defect is found, it is immediately reported to Tuttnauer Europe b.v., at the same time sending the related repair request.
- Without prejudice to the Customer's right to warranty service in the above terms, it is expressly excluded that the Customer may request termination of the contract, replacement of the thermodisinfector or reduction of the sale price, as well as compensation for any direct or indirect damage.
- Tuttnauer Europe b.v. grants the warranty at its discretion, according to the technical needs, to repair or replacement of the defective parts.
- The replacement or repair of under warranty parts will not, in any case, extend the warranty terms.
- The expenses due to routine and extraordinary maintenance interventions on the thermodisinfectors are, in any case, the purchaser's responsibility.
- Transport costs, VAT and any custom duties are the purchaser's responsibility.

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**- The purchaser will only be able to enforce its warranty rights if it has complied with any additional conditions concerning the warranty service, also indicated in the supply contract.**

## 2.3 Warranty exclusions

The warranty lapses (in addition to what is stated in the supply contract):
- When the purchaser has not complied with the contract payment obligations.
- When the purchaser has not reported the vices to the seller within eight days of delivery, in writing and commissioning the execution of the related intervention.
- If the thermodisinfector or parts thereof have been used differently from their intended use.
- If the thermodisinfector has been previously entrusted for repair to personnel not authorised by Tuttnauer Europe b.v..
- If an operating error attributable to the operator occurs.
- If the damage is due to insufficient maintenance.
- If parts have been assembled on the thermodisinfector, the use of which has not been authorised by Tuttnauer Europe b.v..
- If the instructions regarding use, maintenance and assistance of the thermodisinfector, contained in this use and maintenance manual, have not been complied with.

Damages deriving from negligence, carelessness, misuse and improper use of the machine are also excluded from the warranty.
For complex repairs or revisions, please contact specialised and authorised personnel or the Manufacturer directly, which is available to ensure prompt and accurate technical assistance and everything necessary for restoring the full efficiency of the thermodisinfector.
If the parties do not intend to submit to arbitration any disputes arising from the supply contract or in any other case in which the judgement of a judicial body is required, only the Court of Verona will have jurisdiction.

⇒ **This manual is the basic tool for personnel who, in various capacities, takes care of the machine, such as:**

- **USER:** The user is the person, body or company that has purchased or rented the machine and intends to use it for the intended purposes.

It is the authority appointed personally for training the personnel in charge of using and maintaining the machine. Must also make sure that the personnel in charge has acquired all the information necessary for the use and routine maintenance of the machine.

- **INSTALLATION OPERATOR:** The person(s) in charge of installing, operating, adjusting, maintaining, cleaning, repairing and transporting the machine. Can perform every operation concerning machine positioning at the User's premises, the connection of different systems, machine commissioning as well as routine and extraordinary maintenance. It is also able to proceed with the final demolition of the machine.

- **RUNNING OPERATOR:** The machine operator must be perfectly familiar with all of its command and control devices. The operator in charge of the machine must also be able to perform these actions:
- Machine commissioning and operation;
- Loading and unloading of the material being washed on the baskets;
- Using the machine in all the different operating modes, such as the start-up of the different washing cycles provided;
- Reset any alarms triggered;
- Using all personal protection devices, and complying with all adequate safety procedures, he/she should be able to carry out some routine maintenance operations, such as cleaning the clogged filters on the tank bottom and filling the machine with cleaning liquids and chemical additives.

- **SPECIALISED PERSONNEL:** People specially trained and authorised to perform repairs or maintenance that require special knowledge of the machine and are able to recognise

the dangers deriving from incorrect or improper use of the machine itself.

**Before proceeding with the various operations, the above listed operators, must have carefully read and memorised this manual.**

The thermodisinfector packaging, in addition to the use and maintenance manual, contains the two spray arms that will be applied on the tank, the flexible hoses for the hydraulic connections and the drain pipe.
**Upon delivery, check that the thermodisinfector is intact and that the above-described material is actually present.**
The installation, wiring and hydraulic diagrams (water filling and draining) can be downloaded from www.tuttnauer.com.

## 2.4 Product analysis

The disinfector was tested by applying *«IEC EN 61010-2-040 Safety requirements for electrical equipment for measurement, control, and laboratory use Part 2-040 Particular requirements for sterilizers and washer-disinfectors used to treat medical materials»*, where the thermodisinfector is expected to:

- be used exclusively for internal uses;
- be operational up to a maximum altitude of 2000 metres;
- be operational at a temperature between 5 and 40°C;
- operate in an environment with a maximum humidity of 80% for temperatures up to 31°C, decreasing linearly to 50% at 40°C;
- with a mains voltage fluctuation up to +/-10% compared to the nominal voltage;
- temporary type overvoltages:
  - of short duration, which may occur between the line conductor and the system earthing, which may have a voltage equal to the power supply voltage on the line-neutral +1200V, and a duration up to 5s;
  - of long duration which may occur between the line conductor and the system earthing, which may have a voltage equal to the power supply voltage on the line-neutral +250V, and a duration greater than 5s;
  - pollution degree 2.

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- **The validation of the product was made by the manufacturer in compliance with standard ISO 15883; the validation of the disinfection process is borne by the user.**

- **The machine does not cause harmful vibrations.**

- **The residual radiation emitted within the limits is non-ionising.**

- **The useful life cycle of the device is 10 years.**

- **The machine must not be dumped when scrapped, as it contains materials subject to legislation requiring disposal at special centres.**

## 2.5 Technical data

| Description | TIVA2 | TIVA2H |
|---|---|---|
| Width (mm) | 595 | 595 |
| Depth with door closed (mm) | 540 | 540 |
| Height (mm) | 600 | 818 |
| Total weight (Kg) | 65 | 80 |
| Washing tank dimensions: | | |
| width (mm) | 415 | 415 |
| depth (mm) | 480 | 480 |
| height (mm) | 375 | 375 |
| Protection absorbed power voltage | See data plate and installation diagram | |
| Average sound level degree | <70 dB (A) | |
| Type of protection (according to IEC 60529) | IP 20 | |
| CE Marking | Directive on medical devices 93/42/CEE, class IIb | |
| **Manufacturer's address** | **Tuttnauer Europe b.v.<br>Hoeksteen 11, P.O. Box 7191,<br>4800. GD Breda, The Netherlands<br>Viale del Lavoro, 19<br>37030 Colognola ai Colli (VR) Italy** | |

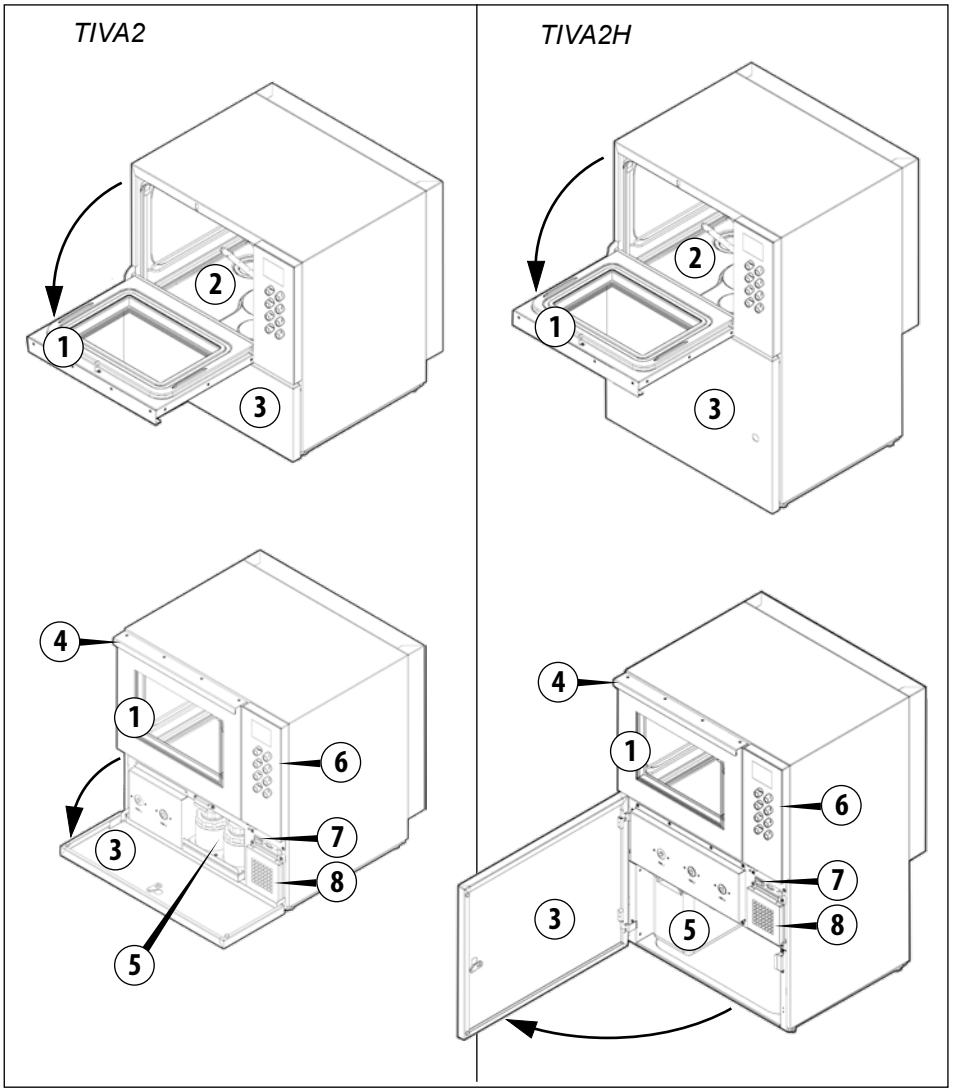



*Fig. 2 - Main components of the thermodisinfector*
*1) Upper door with tempered glass (maximum capacity with open door 12 Kg). - 2) Internal tank. - 3) Lower drawer door with lock. - 4) Upper door opening handle. - 5) Detergent containers for washing and rinse aid/neutralising product. - 6) Control panel. - 7) ON-OFF switch (machine on / off). - 8) Air suction filter.*

## 2.6 **Accessories** (Figure 3)

The machine leaves the factory without any accessory/basket. The user must request the most suitable accessory/basket from Tuttnauer Europe b.v., with reference to figure 3.

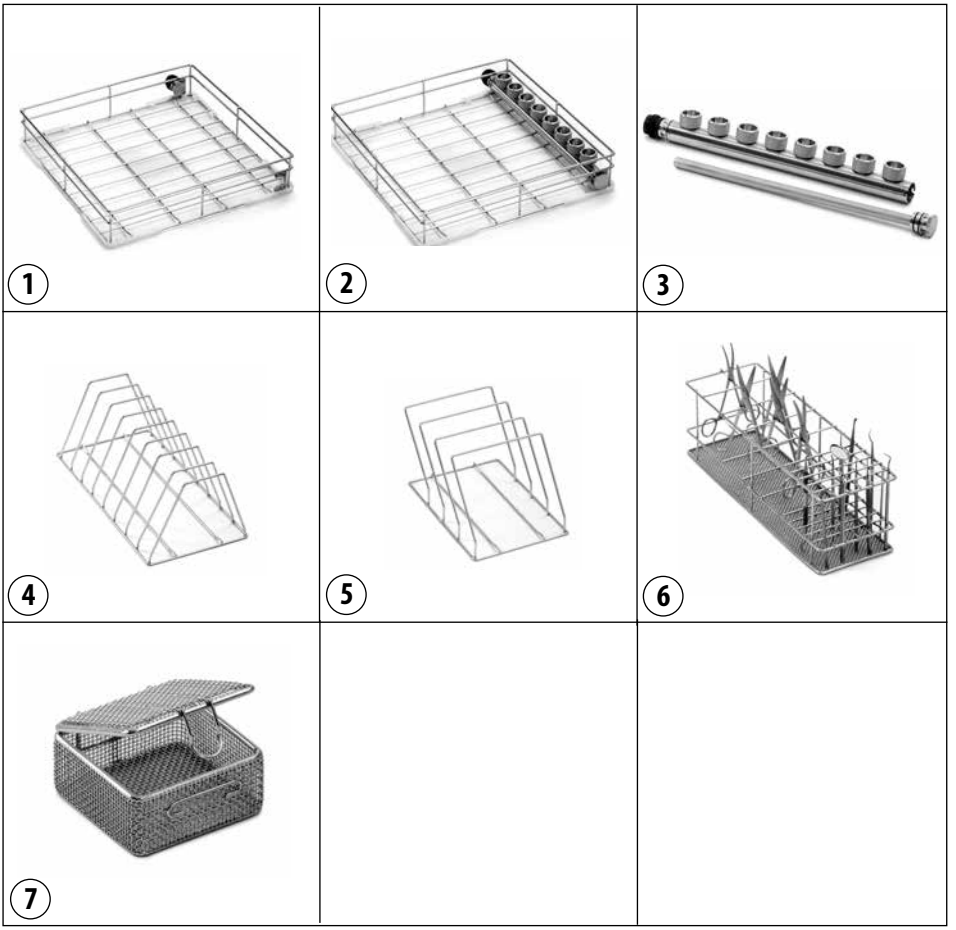



*Fig. 3 - Baskets and accessories*
*1) Standard basket without duct for handpieces with closing cap. - 2) Standard basket with duct for 8 handpieces with integrated filter. - 3) Duct for 8-position handpieces with integrated filter. - 4) Insert for 8 small trays/boxes. - 5) Insert for 3 large boxes. - 6) Insert for vertical instruments. - 7) Basket for small bits and objects.*

# 3. Safety and prevention

The operator in charge must be instructed on the risks deriving from accidents, on the devices prepared for the safety of the operator and on the accident-prevention rules provided by the legislation of the country of use of the machine. When realising the machine, all potentially dangerous situations have been foreseen and appropriate protections have been adopted. However, the level of accidents caused by careless and awkward use of the machine remains high. Distraction, lightness and too much confidence are often cause of injuries; as well as tiredness and sleepiness. It is, therefore, mandatory to carefully read this manual, in particular section “3 Safety and prevention”.

## 3.1 General warnings

### 3.1.1 User obligations

- The user undertakes to entrust the machine only to qualified and trained personnel.
- The user undertakes to set up an electric circuit breaker with an effective regulatory earthing system and the various connections for water inlet and drain.
- The user is required to take all measures to prevent unauthorised people from using the machine.
- The user undertakes to adequately inform and train its personnel on the application and observance of the safety regulations.
  Failure to comply with these rules may jeopardise the safety of the device and IMMEDIATELY void the warranty.
- The user must inform Tuttnauer Europe b.v. if defects or malfunctions of the accident-prevention system are found, as well as any presumed dangerous situation.
- The user undertakes to use only Tuttnauer Europe b.v. original spare parts. Otherwise, the warranty lapses. It also undertakes not to intervene for any repair work.

### 3.1.2 Installer obligations

- The thermodisinfector must be installed and set up for use exclusively by specialised personnel and authorised by Tuttnauer Europe b.v..
- Check that the machine has not been damaged during transport and handling.
- Use the thermodisinfector only in environments that are not at risk of fire and/or explosion and in rooms at ambient temperature.
- Before installing the equipment, ensure that the supply voltage complies with the one shown on the identification plate and that the water supply pressure is equal to the one indicated in the technical data. Furthermore, make sure that the drain matches the dimensions provided on the installation drawing.
- The electrical and water connections can only be made by specialised technicians, paying particular attention not to crush the power supply cable and the water flexible hoses.
- Do not use the machine without securing it to the ground using the fixing kit supplied with it.
- Do not install the machine in the same room where patients are housed. The machine can heat the environment, thus increasing humidity.

### 3.1.3 Operator obligations

- Before starting to operate for the first time, familiarise with the control devices and their functions.
- The operator must not carry out operations or interventions which are not within his/her competence on their own initiative.
- It is strictly forbidden to operate or have the machine operated by anyone who has not read and understood the information in this manual, as well as by unskilled personnel who are not in good mental and physical health.
- The machine must not be operated with the guards removed or partly damaged.
- Use the thermodisinfector only for the operations described in this manual.
- Do not damage or change the power cable or plug.

- Never start the machine if the cable or plug are damaged.
- Do not pull the power cable to unplug it. Always act on the plug.
- Use detergents and additives specific for Tuttnauer Europe b.v.-approved thermodisinfectors. **Always observe the manufacturer's instructions; if, despite this, the product has negative effects on the instruments or machine, the responsibility will be of the manufacturer of the cleaning liquids.**
- Only introduce instruments that can be treated with automatic cleaning and disinfection process (see manufacturer's instructions). It is particularly important to follow the manufacturer's instructions when inserting new instruments that are used for the first time.
- If additional accessories are used to load the instruments, especially hollow ones, the instructions contained in the manufacturer's instruction manual must be observed.
- Always use the base grid supplied with the device.
- Handle the liquid bottles with care. The cleaning, neutralisation and rinsing products contain irritants and caustic substances.
- The water in the tank is not drinkable.
- Do not lean on the door and do not use it as a step.
- The machine during its work cycle reaches a temperature of 95°C; be very careful: there may be a risk of scalding.
- Do not change, for any reason, the characteristics of the appliance, its installation specifications and the parameters set.
- At the end of loading and unloading the instruments to be used, always close the door of the washing tank in order to avoid possible unpleasant smells coming from the drain.
- In case of fire, to extinguish the flames intervene with a powder fire extinguisher, DO NOT USE WATER.
- Do not wash the machine with direct or pressure water jets, or corrosive substances.
- Do not use the machine to wash or disinfect objects and/or

containers that, because of their shape or material, are not compatible with the indications given by the manufacturer. For objects to be washed, please follow the instructions explicitly indicated in this manual.

- In case of long outage periods of the machine, please cut the power supply off and close the water taps.
- Do not try to open the tank door during operation: the appliance is equipped with a special safety lock system to prevent the door from being opened.

**Pay attention where indicated, for a potential danger of hot surfaces highlighted on the machine with this pictogram.**

**Pay the utmost attention where indicated, for a potential electrical hazard highlighted on the machine with this pictogram.**

### 3.1.4 Maintenance technician obligations

- Periodically check the integrity of the machine as a whole and the protection devices.
- Respect the laws in force in the country of use of the machine, in relation to the use and disposal of the products used for cleaning and maintenance. Dispose of any special waste through appropriate companies authorised for this purpose, with issue of a receipt of the successful disposal.
- The assembly of parts of other brands or any changes (in addition to voiding the warranty), can vary the machine characteristics and, therefore, compromise its operational safety.
- If the protective casings are removed, make sure that they are correctly restored before reusing the machine.
- At the end of the maintenance and repair operations, before restarting the machine, make sure that the work is completed, the safety devices reactivated and the guards reassembled.
- It is strictly forbidden to remove or tamper with the safety devices.
- The machine maintenance must only be performed with the power supply off, by qualified personnel and following the instructions in this manual.

**Failure to comply with section "3. Safety and Prevention" and any tampering with the safety devices, relieve the Manufacturer from any liability in case of accidents, damages or malfunctions of the machine.**

# 4. Handling

Usually the packaged and palletised machine is transported to the retailer/dealer who, by means of its personnel and suitable means, in compliance with current regulations, will itself make the delivery to the end user, ensuring transport and unloading operations depending on the type of transport vehicle.
Each package, on the outside, shows the machine handling instructions in brief.
Upon delivery, check that the thermodisinfector is intact and that the material indicated in the delivery document is actually present. In case of damage or inaccuracies in the delivery, immediately notify Tuttnauer Europe b.v. of the extent of the damage or inconsistencies found.
Should the need arise for transfers, the machine can be easily loaded on suitable equipment and on the available lifting equipment.

**HAZARD. The loading/unloading operations can be very dangerous if not carried out with the utmost care. Therefore, before starting loading/unloading, move unauthorised persons away; clear and delimit the area where the operation takes place, and check the integrity and suitability of the lifting and transportation equipment available.**

Also make sure that the area of operation is clear and that there is sufficient “escape space”, that is, a free and safe area, in which to move quickly in the event that the load falls. Before loading, check that there is sufficient space on the surface of the transport vehicle to accommodate the machine to be transferred.

**WARNING. After loading the machine, secure it firmly to the surface on which it rests with taut ropes to block any possible movement.**

After carrying out the transport and before releasing the machine from all constraints, check that the status and position cannot constitute danger.
Therefore, remove the ropes and unload using the same equipment and methods used for loading.

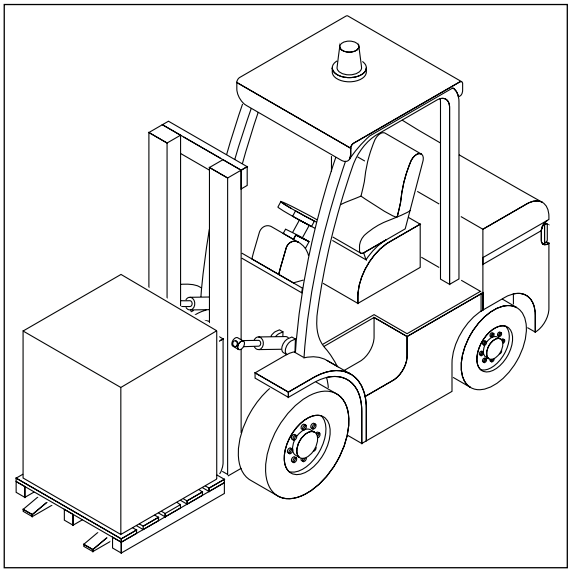


*Fig. 4*

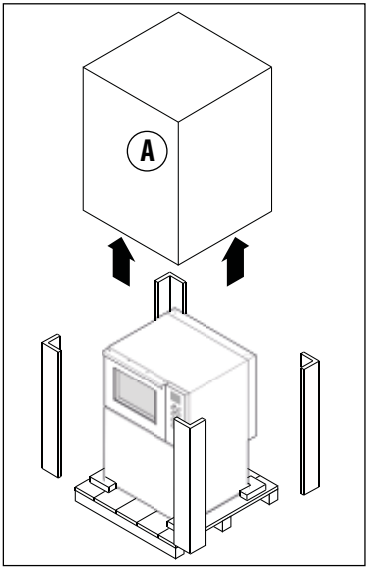



*Fig. 5*

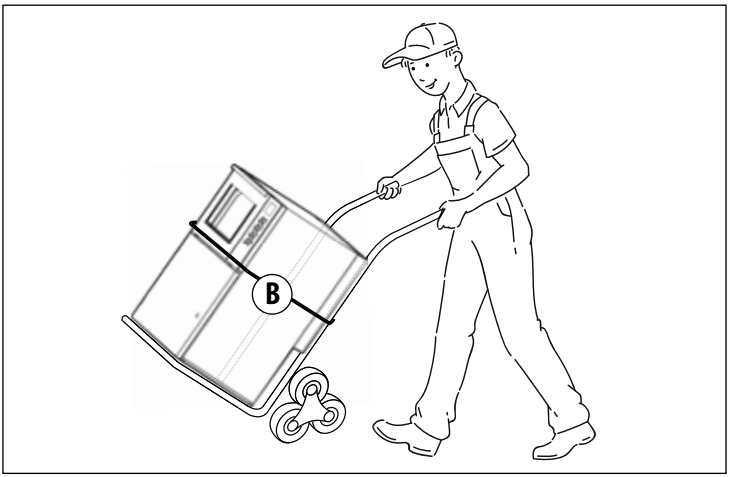
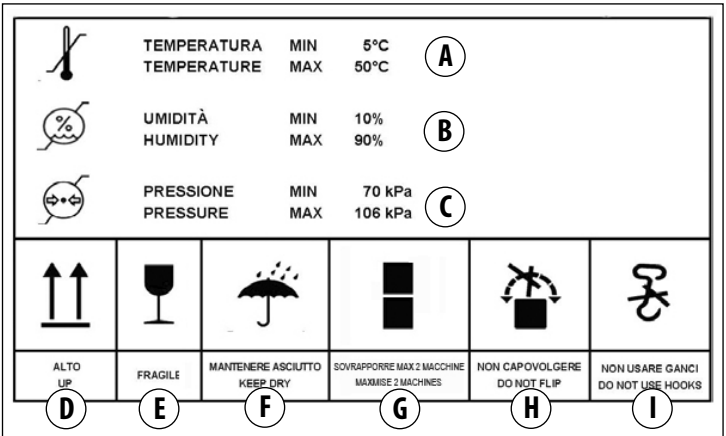



*Fig. 6*




***A label is placed outside the packaging that indicates:***

*A) Minimum and maximum temperature of the storage environment;*
*B) Minimum and maximum humidity of the storage environment;*
*C) Minimum and maximum pressure of the storage environment;*
*D) Position indicators "High";*
*E) Glass indicating "Fragile" material;*
*F) Keep the packaging dry;*
*G) A maximum of two machines can be stacked;*
*H) Do not overturn the packaging with the machine inside;*
*I) It is strictly forbidden to use hooks for handling the packaged machine.*

- **Handle the packaged machine only with forklift truck or transpallet with forks (Fig. 4).**
- **Remove the "hat" container (A) extracting it from the top (Fig. 5).**
- **Handle the machine with appropriate trolley. Lock the machine on the trolley with a sturdy belt (B Fig. 6)**

Do not lift the machine by grasping it from the protruding points, such as the control panel. They could be damaged or detached. With some metal components there is a danger of injury or cuts.

**WARNING. Wear cut-resistant protective gloves during manual transport and positioning of the machine.**

Inside the packaging, in addition to the machine, there are:
- the instructions for use manual
- the two spray arms that will be applied on the tank;
- the flexible hoses for hydraulic connections (hot water, cold water and purified water);
- the drain pipe.

If the machine is to be moved, it is advisable to keep the packaging for any other relocation.
If this is not provided, dispose of the packaging materials: cardboard, polystyrene and other, separated by single material, sending them to the most appropriate final destination, which may be recovery or storage in landfills.

## 4.1 Storage

If the packaged machine is temporarily stored, make sure that it is not subjected to blows and tampering. However, it must be placed in a closed, dry, dust-free environment and protected from atmospheric agents. When restored, a careful preliminary examination of its integrity by specialised personnel is necessary.
**Absolutely avoid overlapping weights or foreign bodies on the packaging and the machine.**

# 5. Installation

It is advisable that only furniture for professional use be positioned in the area around the machine, to avoid ruining them due to possible leakage of condensation water.

**HAZARD: Do not install and/or use the thermodisinfector in environments with flammable/explosive atmosphere.**

**Make sure that the floor is fit to support the load of the equipment when in operation, equal to 70 Kg.**

**Make sure that the machine is perfectly vertical and stable, using a spirit level, if necessary.**

Unevenness of the machine surface and height can be adjusted with the four adjustable feet placed under the machine itself.
There are two models of thermodisinfector (see Fig. 2):
The **TIVA2** model is the classic model of thermodisinfector with small-sized product bowls, which can be positioned on any piece of furniture capable of withstanding its weight, within a dental practice.
The **TIVA2H** model is a thermodisinfector with much more capable product bowls than the TIVA2 version and which, usually, is embedded under a piece of furniture where appropriate space is already provided, within a dental practice.

**HAZARD. All electrical and water connections (loading/unloading) can only be carried out by specialised and authorised personnel and by consulting the relative diagrams.**

**Before machine positioning make sure that:**
All the components needed for installation and proper use of the machine were installed: main switch, water supply taps, drain and

anything else necessary. These components should have all the needed features and should be installed at the locations shown on the installation scheme.

**WARNING: The use of unsuitable parts, and/or the implementation of installation procedures other than those shown on the installation diagram, will immediately void the machine warranty.**

The characteristics of the electricity network must be compatible with the values required for correct operation indicated on the machine identification plate and on the technical data sheet.
The machine must be connected to an efficient earthing system (according to electrical safety standards).

**The manufacturer is not to be held liable for any damage caused by improper earthing of the machine or faulty power supply.**

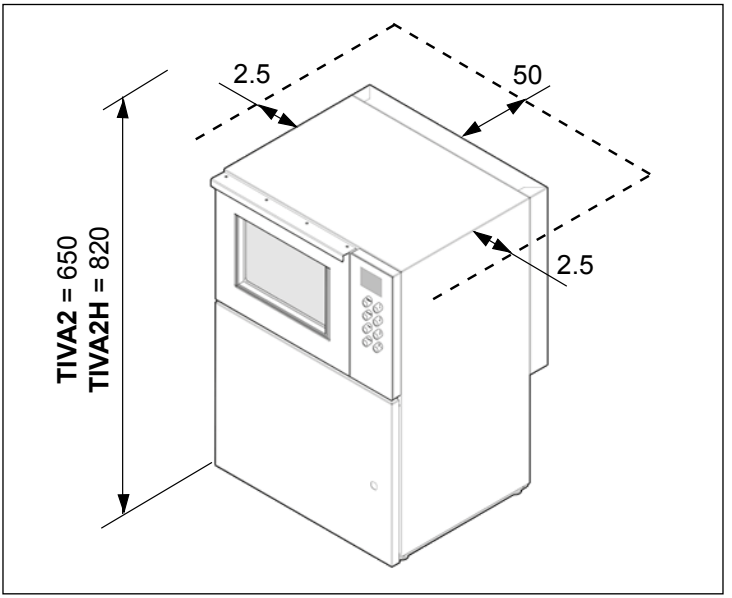



*Fig. 7 - Minimum distances in mm*

## 5.1 Built-in installation

The built-in machine can be inserted under a continuous worktop or under the sink's drip surface. The recess niche must have a minimum space as shown in figure 7.

## 5.2 Electrical connection

**HAZARD. Only qualified and experienced personnel can connect the machine to the mains supply, in compliance with the current laws and regulations.**

**WARNING: The main switch must be omnipolar circuit breaker, with adequate differential protection, positioned near the machine and not covered by machines or other that may hinder its use.**

The magnetic-snap safety system, or the fuses, must be calibrated according to the power indicated on the machine plate.

- Make sure that the measured voltage is equal to the one reported on the identification plate of the machine;
- Check that the voltage does not differ by more than 10% from its rated value;
- Make sure that the electrical system is equipped with an efficient earthing connection;
- Connect the cable installed on the machine to the three-phase plug (not supplied) and insert it into the interlocked socket next to the machine.
- The socket must be accessible after the machine installation. This facilitates verification of the electrical safety, e.g. in repair or maintenance interventions.
  The machine must be fed with current whose voltage, frequency and protection values correspond to those indicated on the data plate.
- The wiring diagram can be downloaded from www.tuttnauer.com.

Additional indications regarding the electrical connection are shown in the installation diagram. This can also be downloaded from www.tuttnauer.com.

### 5.2.1 Electromagnetic compatibility (EMC)

The machine has been tested on electromagnetic compatibility (EMC) pursuant to Standard EN 61326-1 and is suitable for operation in institutes such as hospitals, medical practices, laboratories and environments connected to the public electricity grid.
The high-frequency (HF) energy emissions of the machine are so small that interferences with electrotechnical equipment in the immediate vicinity are not likely.
The optimal positioning floor must be made of concrete, wood or ceramic tiles. In case of machine operation on floors made of synthetic materials, the relative humidity must be 30% to minimise the likelihood of electrostatic discharges.

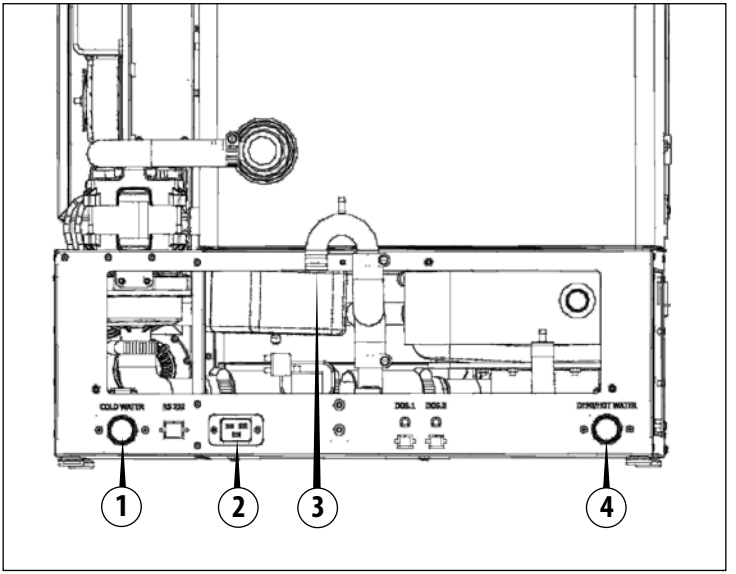



*Fig. 8 - Connections (rear view of the machine)*
*1) Cold water connection. - 2) Power supply socket. - 3) Drain connection. - 4) Cold or purified water connection (depending on the sales configuration).*

## 5.3 Water connection

**CAUTION: The water in the wash tank is not drinkable.**

The quality of the water used must be compatible with the manufacturing materials of the machine, with the chemicals and with the process needs in the various stages of the procedure. To have good washing results, the water must be soft and low in limestone. With hard water white patinas deposit on the objects to be treated and on the walls of the wash tank.
Starting from a water hardness of 0.7 mmol/l (4 °dH) it is necessary to soften the water. Water hardness is set by technical assistance.
The water used should at least have the characteristics of drinking water according to the relevant European legislation in force. A high iron content can cause rust on the load and in the special washing and disinfecting machine. If industrial water contains a higher amount of chlorides than 100 mg/l, the risk of corrosion significantly increases.
The special washing and disinfecting machine is standard prepared for
connection to cold and purified water. Connect the flow pipes to the shut-off valves for cold or purified water.
The minimum flow pressure corresponds to the connection to cold water at 100 kPa in overpressure and in the connection to the purified water at 30 kPa in overpressure.
The recommended flow pressure in cold water connection is ≥ 200 kPa in overpressure and for purified water connection is ≥ 200 kPa in overpressure, to avoid long water flow times.
The max. static water pressure allowed is 800 kPa in overpressure.

- **The machine must be connected to the water mains in accordance with current regulations.**
- If the system upstream of the equipment has not been used for a long time, or if it is used for the first time, purge it by draining the water into a container or in

a few minute drain in order to eliminate any impurities, air bubbles and/or anything else could damage the machine and obstruct its filers.

- Connect the cold and purified (if available) water hoses, exiting the machine with their respective network connections, as shown on the installation diagram. It will be the responsibility of the installer to make sure that the temperature of the cold water supply is not higher than 5/15°C, otherwise proper washing of materials cannot be ensured. The connections for cold and purified water must not feed any equipment other than the instruments washer. During the washing cycle, this is necessary to prevent the subdivision of the water supply with other users, thus leading to a substantial increase in the time required to fill the tank (in this case an alarm will be triggered to alert the user that the maximum time allowed for water loading is exceeded).
- If the machine is provided with a purified water feeding system but the plant is not equipped with it, the cold and purified water hoses should be connected together.
- The machine can be equipped with a built-in softener, which has the function of reducing the scale in the water supplied
- Connect the flexible hoses to the machine valves positioned in view at the back, making sure to connect them correctly based on the sales configuration.
  Make sure to connect the water flexible hoses in the positions shown in figure 8.

• Connect the cold water flexible hose to connection 1 in figure 8.
• Connect the purified water flexible hose (if any), to connection 4 in figure 8.

**WARNING. The flow pipes must not be shortened or damaged.**

The water supply taps must be capable of quickly stopping the water line, therefore, they must be

equipped with a ball or a gate valve. They must also withstand the operating pressure of the water, as indicated in the technical data sheet.
**The installer must check the water hardness which must be 0.7 mmol/l (4 °dH). Possibly use a softener.**

***Water hardness conversion table***

| Hardness expressed in French degrees (°fH) | Water hardness (mmol/l) | Hardness expressed in German degrees (°dH) |
|---|---|---|
| 0-10 | 0-1.01 | 0-5.60 |
| 11-15 | 111-1.51 | 6.16-8.40 |
| 16-20 | 1.61-2.02 | 8.96-11.20 |
| 21-25 | 2.12-2.52 | 11.76-14.00 |
| 26-30 | 2.62-3.03 | 14.56-16.80 |
| 31-35 | 3.13-3.53 | 17.36-19.60 |
| 36-40 | 3.64-4.04 | 20.16-22.40 |
| 41-45 | 4.14-4.55 | 22.96-25.20 |
| 46-50 | 4.65-5.05 | 25.76-28.00 |
| 51-55 | 5.15-5.56 | 28.56-30.80 |
| 56-60 | 5.66-6.06 | 31.36-33.60 |

Proper placement of the taps is shown on the device installation drawing that can be downloaded from www.tuttnauer.com.

### 5.3.1 Connection to the water drain

The machine is equipped with a built-in drain trap which must be mandatorily connected to the drain system of the building. The correct positioning and sizing of the drain trap are shown on the installation drawing. The user must carry out periodic maintenance of the drains and check that they are not clogged. Connect the grey drain pipe to the drain solenoid valve located at the back of the machine (3 Fig. 8).

**WARNING. The manufacturer is not liable in case of environmental pollution due to an incorrect use of the thermodisinfector.**

## 5.4 Filters, spray arms and regeneration rooms

### 5.4.1 Filters

Insert the supplied filters in the specific positions. Constantly check the cleanliness of the filters, especially the tank bottom filter (3 Fig. 9).
Use this filter to have a high filtering, taking into account that it will have to be cleaned after each cycle performed to avoid an excessive build-up of dirt.
Insert the mesh filter (2 Fig. 9) and place it in the tank seat. Finally, insert the central filter (1 Fig. 9) in the mesh filter hole.

### 5.4.2 Spray arms

The two spray arms are supplied loose to avoid possible breakage during transport. Place the two spray arms (top and bottom) in their seats and tighten them to the relative central pin inside the tank as shown in Fig. 10.


*Fig. 9 - Filter unit*
*1) Central filter. - 2) Mesh filter. - 3) Tank bottom filter. - 4) Salt tank cap.*

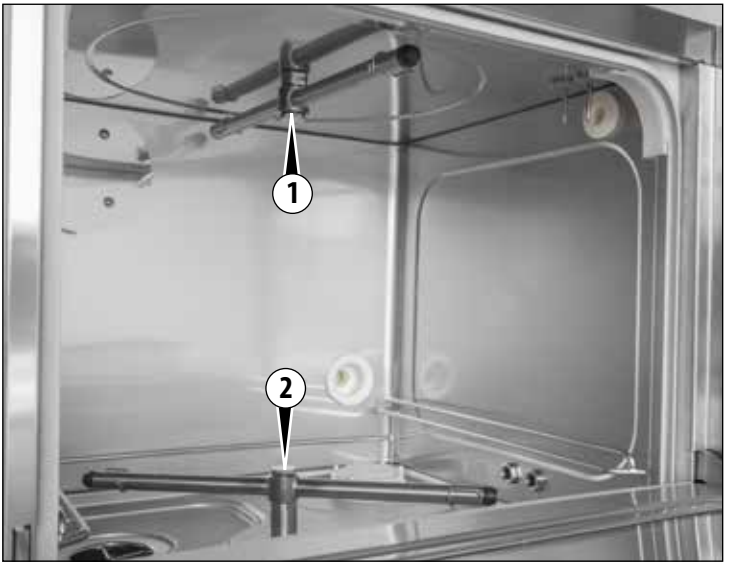



*Fig. 10 - Spray arms*
*1) Upper spray arm. - 2) Lower spray arm.*

⇒

- **After fixing the spray arms, carry out a test by manually turning it, making sure that they rotate freely and without impediments.**

- **After machine positioning, make sure nothing is preventing the tank door from being freely opened.**

- **Make sure the machine is connected properly to the electrical supply, to the water supply and to the drain trap, then level it by adjusting its feet.**

- **After installation remove the PVC protection layer covering the panels, make sure the liquid tanks are full and the suction nozzles are properly inserted into the right tanks. A label next to the cap indicates the type of liquid to be used for each suction tube.**

### 5.4.3 Regeneration rooms

The Thermodisinfector is supplied without regeneration salt which will feed the device automatically during the regeneration process.
The salt must be introduced through the tank outlet inside the tank (4 Fig. 9). To introduce the salt, unscrew the cap (counter-clockwise) and fill the tank with salt, paying attention not to spread salt outside the bowl then close the tank with the cap.
You must fill the salt tank every time the message “Refill salt” is displayed.

⟹

- **Use only appropriate coarse-grain salt.**
- **Do not use kitchen salt, crushed salt tabs or other types different from those indicated, as it may contain insoluble substances.**
- **Do not pour cleaning liquids or other solutions in the tank salt.**

Failure to comply with these recommendations can lead to a malfunction of the water softening device. Just before the salt runs out completely, the display will show the message «Lack of salt». At this point, the salt should be topped-up as soon as possible, otherwise an error message will appear and it will no longer be possible to activate a new cycle if not by resetting.

Proceed as follows to refill the salt:

1) Delete the message on the display by pressing the RESET key for 5 seconds.
2) Open the door and remove any already inserted load.
3) Loosen the salt tank cap and insert the funnel.
4) In the first filling, introduce ½ litre of water to dissolve the residue salt. FIRST FILLING ONLY
5) Fill with salt up to the edge. The tank contains about 1 kg of salt.
6) Thoroughly clean the edge of the tank.
7) Tighten the cap again.
8) Start the «Rinse» cycle.

⇒

- **It is absolutely necessary to remove any salt residues that may have settled in the tank after refill and before rinsing.**
- **After each top-up, start the «Rinse» program. In this way, any salt grains will dilute and rinse out. Salt residues and the overflowing water and salt solution can cause corrosion if they are not rinsed.**

**Following the instructions in the start-up paragraph, start the «Rinse» program.**

### 5.4.4 Automatic regeneration

It is possible to have a water softening device that can completely regenerate at precise intervals. This process is fully automatic. Regeneration will be implemented before the selected program is activated.
This device must be preset by the technician during installation.
Regeneration can also be performed manually, regardless of the warning message on the display. To start, select the «Regeneration» program.

## 5.5 Chemicals

The dosing system for chemicals consists of:

- **Standard:** A dosing pump for the standard detergent (a neutral or alkaline detergent is recommended).

- **Optional:** A dosing pump for the neutraliser. This pump set on the acid neutralising additive can also be used for dosing the rinse aid. In this case the installer must reset the device commands and modify the dosing pump.

- **TIVA2H:** In the TIVA2H version it is possible to have three pumps for three different products.

Each dosing must is monitored by a dosing volume control. This electronic control checks the dosing amount.
In the event of a lack of product, a message appears on the display and the program stops

**WARNING. It is recommended to handle the liquids with caution:**
- **Protect eyes, hands, clothes and metal surface from contact with liquids, which contain partially irritating agents and caustic substances.**
- **In case of contact with liquids, consult the instructions provided with the product.**
- **Use only suitable liquids for cleaning and disinfection equipment. Carefully follow the manufacturer's information.**
- **Keep chemicals out of the reach of children and strangers. Possibly locked away.**
- **Use on only Tuttnauer Europe b.v. approved products.**
- **Do not use liquids for household dishwashers.**

The liquid containers are positioned at the bottom of the machine, inside a door closed with a key (Fig. 11).
Open the lower door of the machine with the key.

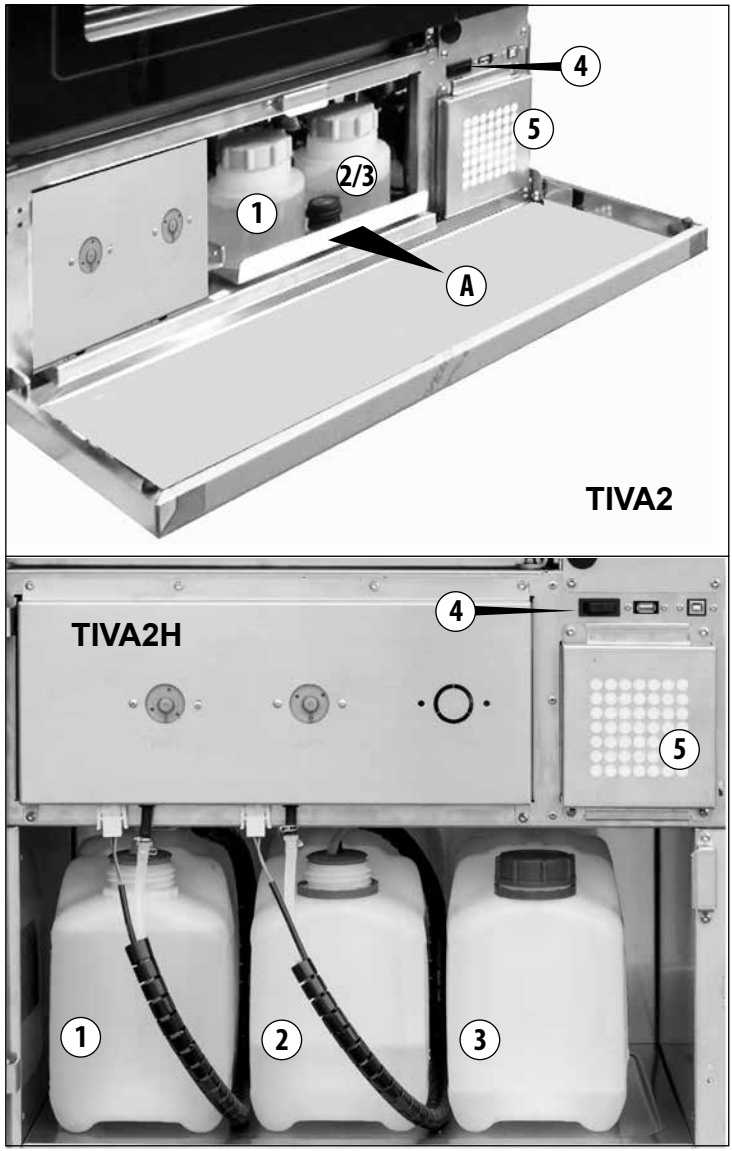



*Fig. 11 - Product containers. - A) Drawer extraction direction. - 1) DOS1 detergent liquid container. - 2) DOS2 rinsing liquid containers. - 3) DOS3 Neutralising liquid container.- 4) ON-OFF switch. - 5) Air suction filter.*

### 5.5.1 Refill procedure

**For the TIVA2 thermodisinfector**:

- Pull and extract the drawer manually (A Fig. 11);
- Loosen the cap with container 1 tube (or 2/3);
- Fill the container with the related chemicals.
- «Detergent»
- «Neutraliser / Rinse aid».

Tighten the cap well and put the drawer back in its position.

**For TIVA2H thermodisinfector**:

- Set up a new tank with the chemical;
- Extract the empty tank 1 or 2 or 3 (Fig. 11);
- Remove the tube and place it on a non delicate and easy to clean surface;
- Insert the tube in the relative tank and put it back in the corresponding position:
  - «Detergent»
  - «Neutraliser»
  - «Rinse aid».
- At the end, close the front door with the key.
- Start the program «Fill DOS1» for the detergent or «Fill DOS2» or «DOS3» for the neutraliser or rinse aid.

**Be careful not to reverse the position of the liquids.**

Failure to follow these recommendations may damage the thermodisinfector.

- With regard to the maximum dosage for each program, follow the instructions of the chemical manufacturer.
- To ensure efficiency of the dosing system, it is necessary to regularly carry out the maintenance operations set out in the «Maintenance» chapter.
- The indications concerning the storage and disposal of chemical substances are provided by the respective manufacturers and must be observed.
- Do not place the chemical containers on the thermodisinfector.

Completely empty the thermodisinfector before performing maintenance and before moving the machine to avoid contact with the chemicals and to protect the machine components.

### 5.5.2 Using and storing chemicals

Keep the containers tightly closed, stored in a dry place and protected from the sun, out of reach of children and strangers. Possibly locked away. Optimal storage temperature: from +0° to +25°C. The shelf life in the original containers is indicated on the chemicals' labels. Tuttnauer Europe b.v. recommends a method for inventory management (First In - First Out).
The Tiva thermodisinfector has a standard of two pumps for dosing the detergent and rinsing liquids.
Tuttnauer Europe b.v. recommends using cleaning agents and chemical additives. The use of other products can damage the machine.

**The flowmetres of chemical are calibrated according to the density of these tested products which ensure correct operation. Liquids recommended by Tuttnauer Europe b.v.:**
**- DOS1: MEDI CLEAN DENTAL (Neo Disher);**
**- DOS2: Z DENTAL (Neo Disher);**
**- DOS3: MEDI KLAR DENTAL (Neo Disher).**

When chemical disinfectant levels are low, a warning message appears on the display.
Chemical products dosing is set to an average value as recommended by the manufacturer.
When the actual dosing of the chemical disinfectant exceeds the tolerance of 5%, the system goes into alarm.

**If these recommended liquids are not used in the machine, the flow meters must be calibrated for the new liquids.**

**WARNING: ONLY USE LIQUID CHEMICALS. THE MACHINE CANNOT WORK WITH POWDER DETERGENTS**

# 6. Using the machine

Before starting the machine, the operator in charge must have read and understood this whole manual, in particular the information given in section «3 Safety and prevention».

Furthermore, before starting work, check that the machine is in order and that all parts subject to wear and deterioration are fully efficient.

## 6.1 Commissioning instructions

**These control operations (reported below) are performed to check if the machine works properly and should be performed when the machine installation is completed.**

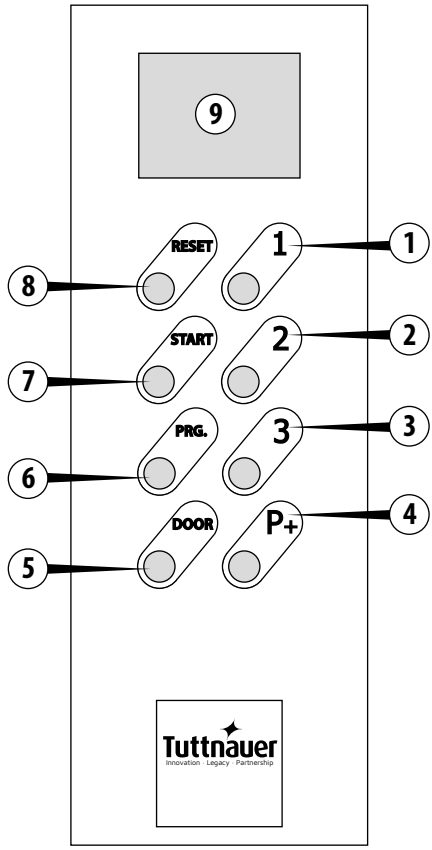
1) Open the tap that supplies water to the machine.

**WARNING. The water should NOT flow into the tank; otherwise the water loading solenoid valves (in the lower compartment of the machine) are dirty or blocked due to long storage in the warehouse and therefore they must be cleaned.**
**Check that there are no water leaks in the pipe fittings.**

2) Check that the suction tubes (located in the lower part of the machine) within the corresponding containers/tanks containing the liquids provided (detergent, neutralising, and/or others), are correctly inserted.

3) Using the main circuit breaker, supply power to the machine.

4) Check that the water supply flexible hoses are properly connected.




1) *Program 1 activation key;*
2) *Program 2 activation key;*
3) *Program 3 activation key;*
4) *Function progress key. Pressing in succession, accesses the programs from 4 to 40;*
5) *Door opening command key;*
6) *PRG key for consent to enter programming;*
7) *START key to activate the selected program;*
8) *RESET key to reset the alarms. Hold down for 5 seconds to stop the cycle;*
9) *Graphic and descriptive display.*

*Fig. 12 - Control panel*

5) Start the machine using the ON-OFF switch (1 Fig. 13).

6) At the beginning of the first cycle check the level probes of the liquid suction tubes (detergent, neutraliser and/or other): pull one tube at a time out of the container and check if the corresponding alarm flashes on the display, indicating the need for liquid refilling.

7) After running 3-4 washing tests, clean the water filters placed in the lower compartment of the machine (Fig. 9).

8) Check that the drain trap does not show water leaks and is firmly secured to both the machine and the drain.

9) Check if the pumps correctly suck washing liquids. To do this, check that the liquid rises along the tube connected to them.


*Fig. 13 - 1) ON-OFF switch. - 2) USB pendrive socket for PC connection and to use the «Win Tuttnauer Service tool wash» program. - 3) USB pendrive socket for inserting or extracting the pre-filled programs. - 4) Rubber cap to close access to the emergency release.*

## 6.2 Before use

The Tuttnauer Europe b.v. thermodisinfector can be used for cleaning and disinfecting:
- Medical instruments.
- Keys, trays, containers.
- Hollow instruments, e.g. suction cannulas, fixing them to the appropriate supports, using the suitable adapters.

### 6.2.1 Emergency release

In the event of a blackout, or any other need in which it becomes difficult to open the thermodisinfector door, there is a manual emergency release that can only be activated if the door cannot be opened normally.

**HAZARD. If the emergency release is used while a program is running, very hot water and chemicals may leak. Therefore, there is a danger of burns, scalding and irritation.**

To access the emergency release:
- open the lower door of the machine with the key;
- remove the rubber cap (4 Fig. 13);
- a plastic cable can be seen inside the hole.

Simply pull this cable manually and the door is released. Re-insert the cap after the operation.
In case of program interruption, proceed with a new treatment of the load.

### 6.2.2 Preparing the load

**WARNING. The maximum weight that the open door can withstand is 12 Kg.**
**The maximum volume available is 0.065 mW or 65 L. The maximum volume of the basket is 0.025 mW or 25 L.**

The instruments to be washed must be placed on the relative basket, making sure that they do not overlap on one another.

- Empty any residual liquids from the containers before inserting them into the tank, thoroughly washing any residue, e.g. disinfectant solutions.
- Insert the individual instruments in the appropriate supports or baskets and never directly into the base basket.
- Make sure that the instruments do not come out of the containers.
- Make sure that the instruments do not hang from the grid bars.
- Insert the hollow instruments into the appropriate injectors.
- Insert the other instruments into the adapters with silicone insert.
- The rinse arms must be free to rotate.
- The cleaning quality depends on the correct loading of the instruments.
- Position container-shaped objects so that liquids can flow easily and, if possible, place tall and heavy tools in the centre of the trolley.
- Components with special geometries must be arranged so as to allow the water to flow out.
- Introduce only suitable steel instruments, resistant to corrosion.
- Introduce only plastic components thermostable up to 95°C.
- To prevent possible corrosion, we recommend using only stainless steel instruments and tools, suitable for washing.
- Nickel-plated and chrome-plated and/or aluminium instruments and tools may not always be suitable for machine treatment.


*Fig. 14 - Basket insertion. - 1) Basket support lanes. - 2) Basket extraction and/or insertion direction.*

They require special process conditions.

- Objects made completely or partially of plastic must be resistant to high temperatures.
- Before loading the machine, remove substances such as composites, cement and amalgam in compliance with current directives.
- Transmission instruments with fibre optic rod are considered resistant, while fibre optic beams may be subject to premature wear.
- If possible, disassemble the modular instruments following the manufacturer's instructions and treat the individual parts separately.
- Treat small instruments and parts in special inserts or closable baskets.
- Before the automatic treatment, check that the lumen and hollow body instruments can be treated internally and remove any obstructions.
- Carefully place the load in the supports.
- Objects must not be put inside each other nor cover each other. Do not place objects so close to each other that they cannot be washed properly.
- Arrange the load so that all surfaces can be reached by the washing liquid. Otherwise they will not be cleaned!
- Place the objects so that the liquids can flow out without hindrance.
- Place tall or heavy objects in the centre of the basket.
- When arranging the load, make sure that the spray arms are not blocked by the load itself.
- Distribute the objects evenly in the baskets.
- After the treatment the transmission instruments must be cleaned according to the manufacturer's instructions. After the treatment, before reusing the transmission instruments, check that they work properly, e.g. by spraying liquid in the sink.

When the base grid is used together with the injectors, make sure to push the grid all the way back against the rear wall of the tank, so that the injectors can be perfectly fixed on their connection tube at the bottom of the tank itself.

### 6.2.3 Summary of the basket loading operations

| *Instruments* | *Insert type* | *Sequence* |
|---|---|---|
| **Knobs** | **Basket** | 1) Fill the basket arranging the instruments upside down in the appropriate holes;<br>2) Insert the basket in the tank up to the stop;<br>3) Close the door, start the program. |
| **Trays** | **Insert tray holder** | 1) Fill the insert by arranging the trays in the spaces provided;<br>2) Insert the insert in the basket;<br>2) Insert the basket in the tank up to the stop;<br>3) Close the door, start the program. |
| **Instruments Surgical** | **Insert instrument holder** | 1) Fill the insert by arranging the trays upside down in the spaces provided;<br>2) Insert the insert in the basket;<br>2) Insert the basket in the tank up to the stop;<br>3) Close the door, start the program. |

**HAZARD. Be very careful when inserting pointed or sharp instruments. Always insert the instruments starting from the bottom, and possibly wearing protective gloves.**
**Perforated baskets and supports do not provide protection against pointed and/or sharp instruments.**

**WARNING. Failure to follow these recommendations may cause injury. Pay the utmost attention when loading/unloading the instruments to be washed.**

### 6.2.4 Treatment of dental instruments

**WARNING. Insert only instruments suitable for automatic treatment in thermodisinfector devices, according to the manufacturer's instructions. In particular, follow the information provided by the same manufacturer.**
**Despite compliance with the manufacturer's instructions, in case of damage or alteration of the instruments, the responsibility will be borne by the instrument manufacturer.**

**Correct program**
Before starting the treatment, check that:
- The external surface of the instruments is clean of material residues (E.g. dental cement, etc.).
- The air and spray channels must be clean.
- Finally, carry out a test.

Use Tuttnauer Europe b.v. recommended liquids (see paragraph «5.5.2 Liquid use and storage»).

**Care of the instruments**
Major manufacturers recommend drying the spray/air/water channels immediately after cleaning and disinfection using clean compressed air with suitable maintenance products.
It is recommended to follow the specific instructions.

### 6.2.5 Treatment of ophthalmic instruments

- Only insert instruments designed for automatic treatment in thermodisinfector. Carefully follow the instructions provided by the instrument manufacturer.
- Do not insert instruments intended for interventions on the optic nerve and which come into contact with the retinal tissue.
  In case of damage or alteration of the instruments despite compliance with the manufacturer's instructions, the responsibility will still be borne by the instrument manufacturer.

**WARNING. The treatment of ophthalmic instruments requires the use of purified water.**

Comply with the following for automatic treatment:

- Use a slightly alkaline liquid for cleaning. Use a citric acid-based neutraliser for neutralisation. Never use liquids for rinsing.
- Rinse the hollow instruments after the application and check that the purified water passage is free before the automatic treatment.
- Insert the hollow instruments into the rinse bar, specially designed for this use.
- Make sure that no deposits form on the instruments.
- Dry the hollow instruments with compressed air after the treatment in order to remove all residue humidity.
- Follow the manufacturer's instructions with regard to the maintenance of instruments/accessories for loading.

## 6.4 Programs

**The machine leaves the factory programmed with three separate use programs already entered in the settings menu.**

To select the programs available, use key 1, 2 or 3 (on the control panel Fig. 12) depending on the most suitable program for the level of dirt of the load.
The following table shows the correct programs for each type of load.

| *Program* | *Use* |
|---|---|
| **SHORT Program 1** | Washing and disinfection program for the treatment of instruments with normal dirt, with times and dosages lower than Program 2. |
| **STANDARD Program 2** | Filling of the dosing system with additive for final rinsing or neutralising after filling or replacement of the container. Program tested and certified according to EN ISO 15883. |
| **INTENSIVE Program 3** | Washing and disinfection program (not EN ISO 15883 certified) specific for the treatment of instruments with stubborn dirt. |
| **Rinse cold water** | For rinsing water and salt solution of a particularly dirty load, e.g.: to eliminate coarse dirt or disinfectant residues before treatment and to prevent dirt from drying or the formation of limescale until a complete program is started. |
| **Drying** | Additional drying. |

Program structure:

- **Drain**
  It is used to empty the washing tank.

- **Pre-wash**
  Pre-wash is necessary to eliminate coarse dirt and foamy substances.

- **Wash**
  Depending on the load, washing normally takes place at 45°C - 65°C, adding the appropriate detergent.

- **Rinse**
  The rinsing operation eliminates and neutralises the chemicals of previous washes.

- **Disinfection**
  To prevent the load from being subject to corrosion or patinas, purified water (if available) should be used during the disinfection phase.

- **Drying**
  Sufficient drying reduces the risk of corrosion caused by the residual humidity on the load.

## 6.5 Starting the machine

After checking the integrity and full efficiency of the machine, proceed with start-up.

1) Power the machine using the main circuit breaker.
2) Start the machine using the ON-OFF switch (1 Fig. 13) and open the door (key 5 Fig. 12) to introduce the baskets.

### 6.5.1 Before starting the program

Before starting each program, check:

- Check that the filters, positioned on the bottom of the tank (Fig. 9) are perfectly clean. Clean them, if necessary.
- The nozzles of the upper and lower spray arms must be free and clean.
- Basket and products must be arranged correctly.
- The rinse arms must be able to rotate freely. The machine constantly monitors the rotation speed during the program.
- Liquid containers must be sufficiently filled. Check for any messages on the display before starting the program.

**Closing the door**

- Introduce the basket and load the instruments.
- Close the door and push it until the lock is activated. The door can be unlocked and opened at any time before the program starts, by pressing the key (5 Fig. 12).

**Selecting the program**

To select the programs available, use key 1, 2 or 3 on the control panel (Fig. 12).
Choose the most suitable program depending on the level of dirt on the products to be washed.

**Program 1 «SHORT»** is a washing and disinfection program for normal dirt, sufficient for daily used instruments.

**Program 2 «STANDARD»** is a program tested and certified according to EN ISO 15883 with filling of the additive dosing system for final or neutralising rinsing

.

**Program 3 «INTENSIVE»** is a specific program designed for treating instruments with stubborn dirt.

### 6.5.2 Starting the program

**WARNING. Always follow the indicated procedures. Inattentive and superficial use of electrical devices may lead to risks for the operator.**
**Tuttnauer Europe b.v. is not liable for possible damage caused by uncontrolled use of the device.**

After selecting the program with relative key, the display shows the selected program and the operating time and temperature. To start a program, press the START key (7 Fig. 12).

**Program execution**
Once the program has started, its progress can be followed on the display. The display shows the program phases during operations.

**Pre-wash**
Pre-wash is carried out with cold water (optional softened water) and without liquids. It mechanically dissolves encrusted organic materials and all proteins on the surface of the instruments. Avoid too high water temperatures.

**Wash**
It is the actual cleaning cycle. The cleaning tank heats up until it reaches the specific temperature for the selected program, a temperature that remains stable for the holding time. The cleaning liquid is automatically introduced before the start of the holding time.

**Rinse**
Rinsing is carried out with cold water, if the machine is equipped with the second pump (optional) it is possible to carry out the neutralisation cycle by introducing neutralising liquid which is designed to reduce the alkalinity and clean the instruments from residues soluble in acid, e.g. limestone and rust.

**Disinfection**
Thermo-disinfection is carried out with water, if the machine is equipped with the second pump (optional) it is possible to introduce the rinse aid to carry out the neutralisation cycle which is designed to reduce the alkalinity and clean the instruments from residues soluble in acid, e.g. limestone and rust.

⇒ **The TIVA2 thermodisinfector is equipped with a product container with relative pump (1 Fig. 15) for the detergent liquid. On request, it can be equipped with a second container (2/3 Fig. 15) used for the neutralising liquid or rinse aid.**
**The TIVA2H thermodisinfector is equipped with three tanks (Fig. 15), with relative pumps, for greater capacity of the liquids where tank 1 will contain the detergent liquid, tank 2 the neutraliser and tank 3 the rinse aid.**

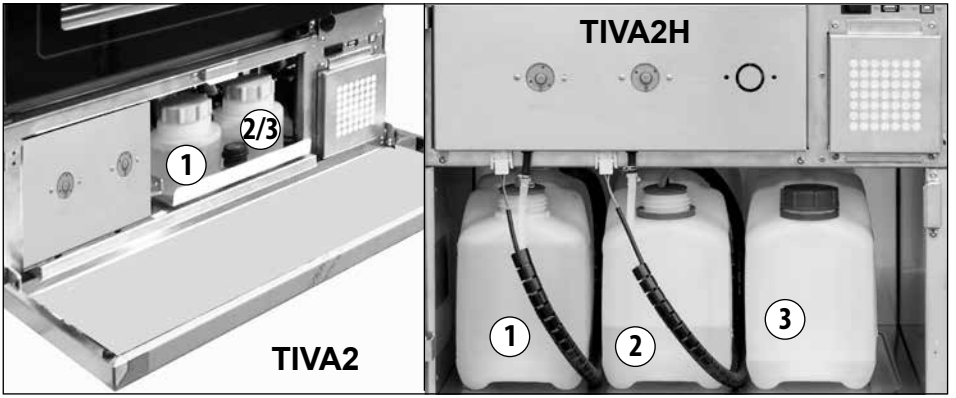



*Fig. 15 - Product containers*

**Drying**
The instruments are dried internally and externally with filtered hot air. Good drying reduces the risk of corrosion caused by the residual humidity on the load.
Instruments with a very small internal diameter must be dried further.

**WARNING. The program can be interrupted at any time. However, it must be remembered that once interrupted, it must restart from the beginning. Only if it is interrupted in the drying phase can the cycle be considered completed successfully. The instruments must be dried.**

### 6.5.3 Program End

The message «Successfully completed» on the display indicates that the program has been carried out correctly. Unlock the door by pressing the key (5 Fig. 12) and open it.

**Open the door immediately after the end of the program to avoid condensation forming.**

Check the results at the end of the cleaning process.
The instruments must be completely clean and dry.

**Hollow instruments with a small internal diameter must be dried further with air.**

- Check hollow instruments and retreat them if necessary.
- The hole (lumen) of hollow instruments must be free.
- The injectors must be correctly placed on the connection tube in the cleaning chamber.
- The nozzles and connections to the base grid must be firmly fixed.

If these checks are positive and the program has been carried out without interruptions or malfunctions, the load has been successfully cleaned and disinfected.

### 6.5.4 Extracting the load

At the end of the program and when extracting the load:

⟹ **- Do not force to open the door to avoid damaging the device and/or the leak of toxic steam.**

⟹ **- Particularly large instruments can be very hot at the end of the program. Allow instruments, containers and inserts to cool down before removing them.**

**Failure to follow these recommendations can cause burns.**

## 6.6 Display

The LCD display shows the status of the machine. The images show the various phases and the current operation. For example, if the machine is loading water, the display will show the image of the tap, of the water flow meter and of the water being loaded: if water is purified droplets will be light blue, if water is cold droplets will be blue and if water is hot they will be red. The images are animated, to show how the current operation evolves.

Description of the display (Fig. 16):

1) The number of the running program is displayed (e.g. P02 = program 2);

2) It displays the phase the machine is running. If the machine is going to run a wash cycle it will display the writing «Washing». When the machine displays an alarm that space background turns red and the message shows the number of the alarm and a brief description;

3) The A0 value is displayed during disinfection;

4) Several animated images showing the current status of the machine are displayed;

5) The elapsed phase time from the moment the temperature set for the phase (see 12) has been reached is displayed;

6) Bar indicating the progress of the program; if the program is ending, the bar will be almost entirely green;

7) The temperature measured by the PT1000 probe, placed after the air heater, is displayed to indicate the temperature of the air entering the tank;

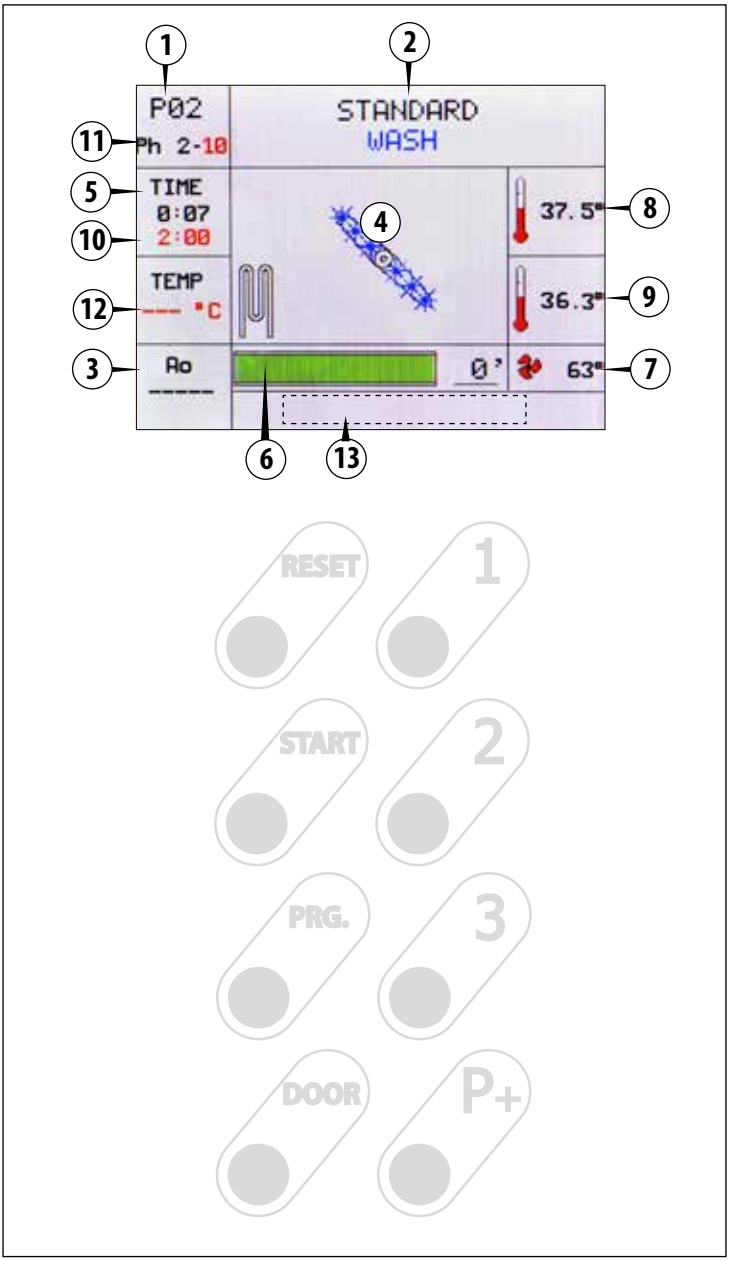



*Fig. 16 - Display*

8) It displays the temperature measured by the PT1000 probe placed in the tank. This is a control probe;

9) It is the display of the temperature measured by the PT1000 probe placed in the tank. This is a work probe. The temperature detectable by the two probes (control and work) must not differ from each other by more than 2°C;

10) Time for which the device should maintain the set temperature (see 12);

11) Phase of the program;

12) Temperature set for the current phase;

13) Date and time is displayed with the machine in stand-by.

### 6.6.1 Messages on the display

During washing, several messages may be displayed:

- Product 1 liquid reserve (meaning that the liquid inside the product 1 tank is finished and must be replaced);

- Product 2 liquid reserve (meaning that the liquid inside the product 2 tank is finished and must be replaced);

- Product 3 liquid reserve (meaning that the liquid inside the product 3 tank is finished and must be replaced).

These alerts are alternated with the description of the current phase.
When the cycle has finished the following message appears: «Program ended»; now the door of the «clean zone» is unlocked and the trolley with the washed instruments can be unloaded.
If the program is interrupted for one of the following reasons:
- when the Reset button is pressed,
- because of an alarm,
- power supply failure,

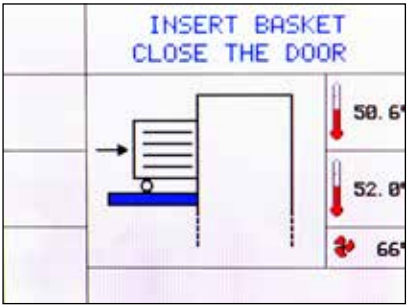
the display will show the message «Program interrupted no disinfection» (the words «no disinfection» only appear if the running program has not yet completed it).
The central part of the display also shows the message: «In 10 seconds the program will resume its operation or press and hold the reset button for 10 seconds to definitively stop it».
If the RESET button is pressed for 10 seconds, the program stops.

⟹ **If the RESET button is not pressed, after 10 seconds the machine resumes the program previously interrupted.**

⟹ **If an alarm occurs, the machine stops until the problem is solved.**

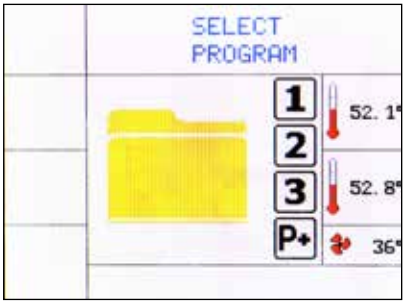
### 6.6.2 Display screens

After starting the machine, following the instructions in chapter «6.5 Starting the machine», the display will show the images indicating step-by-step the operations in progress.

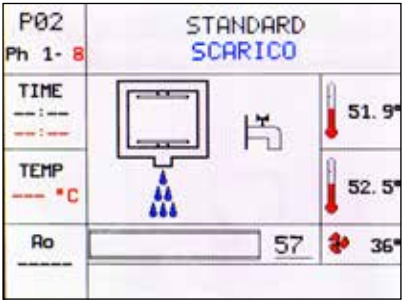



1) Once the machine has started, the display shows the screen indicating door open and the invitation to insert the basket with the instruments to be washed. Then insert the basket with the instruments and close the door.

**WARNING: The door must be tightly closed until you hear the classic closing «click», otherwise the program will not start.**

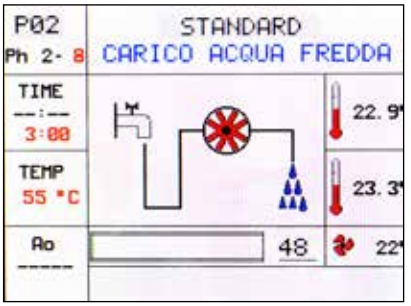



2) With the machine started and door closed, the screen for selecting the programs will appear
Press the selected key (1 or 2 or 3 Fig. 12) on the control panel. To access subsequent programs (if stored), press the «P+» several times;

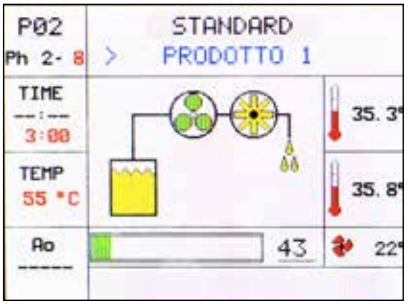



### Program 2 STANDARD

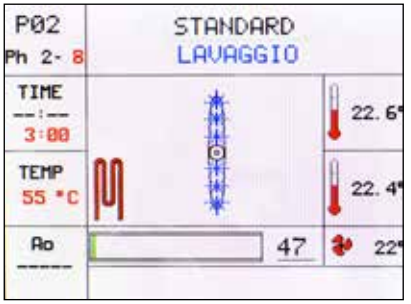
3) **PHASE 1.** After pressing key 2 (STANDARD), press the START key (7 Fig. 12). With this operation the machine starts the automatic work cycle and discharges any residual water present in the tank.



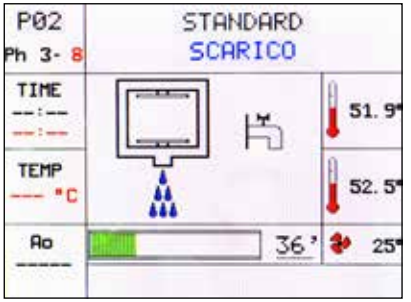

4) **PHASE 2.** Self-loading of cold water. During the self-loading phase, the machine will bring the water temperature to 50°C and will maintain it for the washing time, 3 minutes.



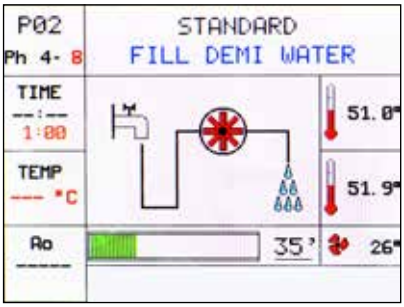

5) When the water reaches 35°C, the peristaltic pump will begin to inject the detergent liquid.



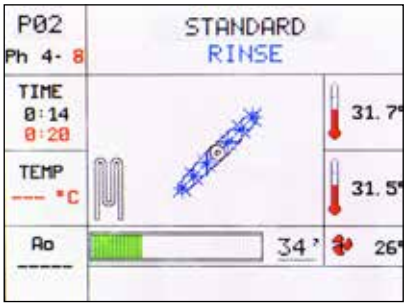

6) At this point the actual instrument washing phase begins.




7) **PHASE 3.** At the end of the washing operation, water and product used will be automatically discharged.

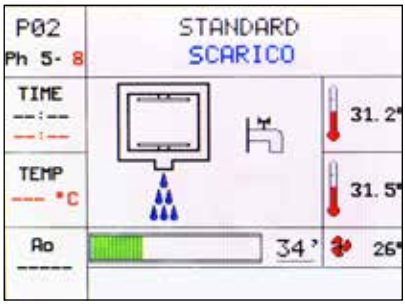



8) **PHASE 4.** Purified water load. The use of purified water is necessary for rinsing the instruments and will last 20 seconds in order to eliminate foam and remnants of detergents.

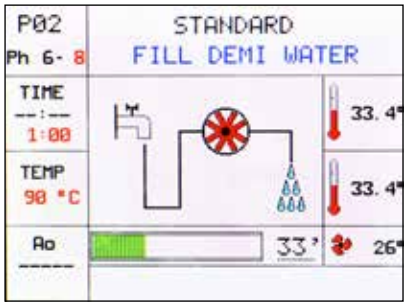


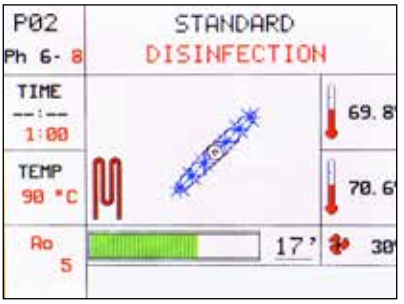

9) Rinsing of instruments with purified water.

10) **PHASE 5.** Purified water unload.

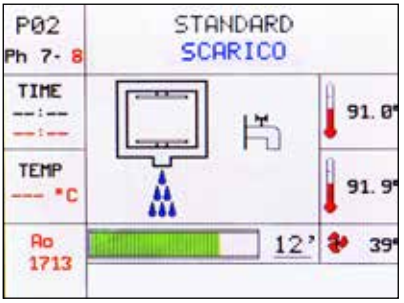



11) **PHASE 6.** Loading of purified water for disinfection.
The water will be brought to 90°C for the sterilisation operation.

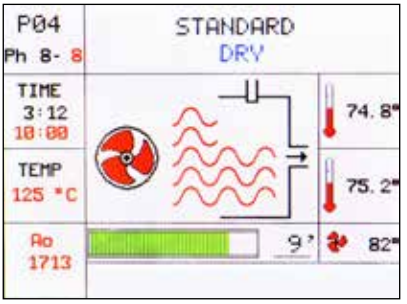




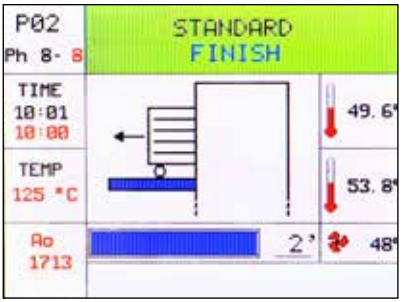

12) Instrument disinfection.




13) **PHASE 7.** Purified water unload after disinfection.




14) **PHASE 8.** Drying of instruments with blown hot air




15) End of the «STANDARD» cycle. Open the door and remove the basket.

If, for any reason, it is necessary to interrupt the cycle, simply hold down the RESET key for a few seconds until an audible alarm (buzzer) is heard and an alarm screen appears on the display with the message: «**WARNING. DISINFECTION CYCLE INTERRUPTED».**
Once the problem is resolved, resume the cycle from the beginning. If the problem cannot be solved, contact the technical assistance.

### 6.6.3 Alarm messages

The machine is equipped with an alarm system that indicates malfunctions detectable with an audible signal (buzzer) and with a screen on the graphic display of the control panel.

The alarms, description and possible solution are listed below.

At first the image concerning the alarm is displayed (for 5 seconds); then the alarm description is displayed (for 10 seconds). The image and text alternate until the alarm is reset.

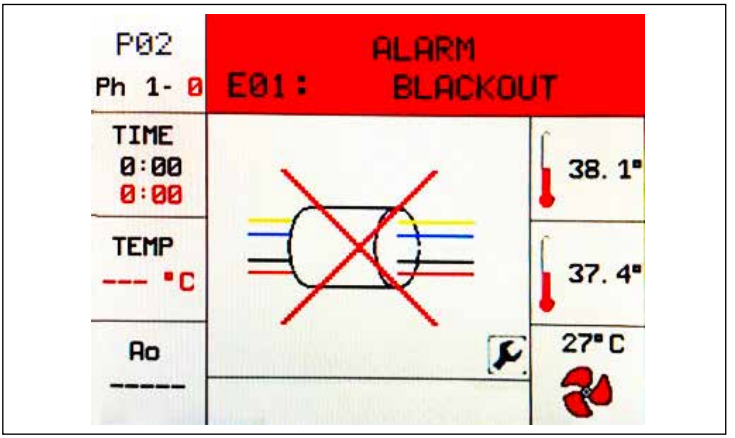



*Fig. 17 - Example on display of an alarm message*

| *ALARM* | *DESCRIPTION* | *ACTION* | |
|---|---|---|---|
| **E01:** | BLACKOUT | Power failure during the cycle and the program blocked. | Press RESET |
| **E02:** | DOOR OPEN | The door is open or unlocked. Close it. If it persists, please contact a technician. | Press RESET |
| **E02:** | DOOR OPEN | Close it. | Press RESET If it persists, please contact a technician. |
| **E07:** | NO DOOR LOCK | The door did not lock within the time preset. | Press RESET If it persists, please contact a technician. |
| **E09:** | NO DOOR UNLOCK | The door did not unlock within the time preset. | Press RESET If it persists, please contact a technician |
| **E11:** | DIRTY WATER | Check for dirt residues on the load and check the purified water in the network. | Press RESET If it persists, please contact a technician. |
| **E20:** | NO COLD WATER | The cold water valve could be closed or partially open. Check it. | Press RESET If it persists, please contact a technician. |
| **E21:** | NO HOT WATER | The hot water valve could be closed or partially open. Check it. | Press RESET If it persists, please contact a technician. |
| **E22:** | NO DEMI WATER | The purified water valve could be closed or partially open. Check it. | Press RESET If it persists, please contact a technician. |
| **E26:** | PRINTER PAPER | The printer ran out of paper. Insert a new roll. | Press RESET If it persists, please contact a technician. |
| **E30:** | FLOWMETER 1 | Tank 1 of the chemical liquid could be empty. Check it. | Press RESET If it persists, please contact a technician. |
| **E31:** | FLOWMETER 2 | Tank 2 of the chemical liquid could be empty. Check it. | Press RESET If it persists, please contact a technician. |
| **E32:** | FLOWMETER 3 | Tank 3 of the chemical liquid could be empty. Check it. | Press RESET If it persists, please contact a technician. |

| | | | |
|---|---|---|---|
| **E34:** | PRODUCT TIMEOUT | The density of the chemical liquid could be too high. Check. | Press RESET<br>If it persists, please contact a technician. |
| **E40:** | RELAY RES. H2O | There is a problem with the contactor of the water heating elements. | Press RESET<br>If it persists, please contact a technician. |
| **E41:** | DRAIN TIMEOUT | The drain pipe could be obstructed or crushed. Check it. | Press RESET<br>If it persists, please contact a technician. |
| **E42:** | AIR PRESSURE | The air pump could be malfunctioning or there could be leaks of air in the ducts. | Press RESET<br>If it persists, please contact a technician. |
| **E43:** | DRYING T. | The load may not be dry because the preset minimum temperature was not reached. | Press RESET<br>If it persists, please contact a technician. |
| **E44:** | PRE-WASH T. | A too high a temperature was detected during the pre-wash phase. | Press RESET<br>If it persists, please contact a technician. |
| **E45:** | TANK T. LIMIT | A too high a temperature was detected in the tank. | Press RESET<br>If it persists, please contact a technician. |
| **E46:** | AIR T. LIMIT | A too high air temperature was detected. | Press RESET<br>If it persists, please contact a technician. |
| **E47:** | PHASE T. LIMIT | A too high a temperature was detected during the phase in progress. | Press RESET<br>If it persists, please contact a technician. |
| **E50:** | PROBE 1 BROKEN | The PT1000-1 working probe (tank) could be faulty or disconnected. | Press RESET<br>If it persists, please contact a technician. |
| **E51:** | PROBE 2 BROKEN | The PT1000-2 control probe (tank) could be faulty or disconnected. | Press RESET<br>If it persists, please contact a technician. |
| **E52:** | AIR PROBE KO | The PT1000-3 probe (air) could be broken or disconnected. | Press RESET<br>If it persists, please contact a technician. |
| **E53:** | TANK T. DIFF. | A temperature difference has been detected between the tank probes that is too high. | Press RESET<br>If it persists, please contact a technician. |
| **E62:** | BUS CABLE | A faulty connection has been detected on the bus between the Micro-1 and Micro-2 | Press RESET<br>If it persists, please contact a technician. |

| | | | |
|---|---|---|---|
| **E66:** | NO HEAT | There is a problem with the heating of the water. | Press RESET<br>If it persists, please contact a technician. |
| **E67:** | CONDENSER L. | The water level in the steam condenser has reached the maximum level allowed. | Press RESET<br>If it persists, please contact a technician. |
| **E70:** | PUMP PRESSURE | There may be water leaks. | Press RESET<br>If it persists, please contact a technician. |
| **E71:** | HEPA FILTER | The HEPA filter could be dirty or obstructed. Check it. | Press RESET<br>If it persists, please contact a technician. |
| **E75:** | PRODUCT 1 EMPTY | Tank 1 of the chemical liquid is empty. Add liquid. | Press RESET<br>If it persists, please contact a technician. |
| **E76:** | PRODUCT 2 EMPTY | Tank 2 of the chemical liquid is empty. Add liquid. | Press RESET<br>If it persists, please contact a technician. |
| **E77:** | PRODUCT 3 EMPTY | Tank 3 of the chemical liquid is empty. Add liquid. | Press RESET<br>If it persists, please contact a technician. |
| **E89:** | NO DISINFECTION | The minimum value of A0 has not been reached and the load is still contaminated. | Press RESET<br>If it persists, please contact a technician. |

| ***Warning*** | | ***Description*** | ***Action*** |
|---|---|---|---|
| **1** | RELOAD SALT BOWL | 1-Remove the basket<br>2-Loosen the salt bowl cap<br>3-Fill the salt bowl<br>4-Tighten the salt bowl cap | Press RESET<br>for 5 seconds |
| **2** | MAINTENANCE REQUEST | Contact customer service or the technician in charge of periodic maintenance. | Press RESET |
| **3** | VALIDATION REQUEST | Contact customer service or the technician in charge of periodic validation. | Press RESET |

# 7. MAINTENANCE

## 7.1 General information

Maintenance is a set of periodic and predefined operations aimed at maintaining the machine functionality in all its aspects as a result of intrinsic wear and use.
The routine maintenance operations are described below. It should be remembered that the lower operating cost and a long life of the machine depend on the continuous observance of what is reported in this manual.

**For extraordinary maintenance operations, not included in this manual, contact the Manufacturer.**

**The thermodisinfector maintenance operations must be carried out with the machine completely switched off.**

The operator engaged in this type of intervention must wear PPE (Personal Protective Equipment) and must be sure that no other unauthorised person is present in the operating area of the machine.
Before maintenance, start a program to disinfect the washing tank.

**Maintenance request**
After a certain time or a certain number of operating hours, the display shows «MAINTENANCE». This signal has no influence on the machine operation.

### 7.1.1 Routine maintenance
Routine maintenance includes all those jobs needed to keep the machine clean and functioning. These jobs must be carried out regularly or when necessary and the user is responsible for verifying their regularity.

**Daily**

Regularly check the filling status of containers before starting the program.

- Clean the tank.
- Clean the wash tank filters.
- Daily check and clean the filters for handpieces and contra-angles.
- Clean the external panels with a damp cloth. Use only neutral pH detergents. Do not use aggressive products, solvents and/or diluents.
- Clean the control panel with a damp cloth and washing up liquid. Do not use aggressive products, solvents and/or diluents.
- Clean the wash tank filters.

**Weekly**

- Check the rotary movement of the spray arms.
- Open the panels and rinse the inside.
- Check the nozzles and clean them.


*Fig. 18 - Filter unit*
*1) Central filter. - 2) Mesh filter. - 3) Tank bottom filter. - 4) Salt tank cap.*

**WARNING. Do not spray the machine or near it with water jets, or with pressure devices.**

Proceed as follows to clean the filters in the wash tank:

- Open the door and remove the load basket.

**WARNING: Very hot surfaces.**

**DANGER of injury: Be careful with sharp and pointed objects, which are withheld in the baskets.**

- Remove the central filter (1 Fig. 18).
- Remove the mesh filter (2 Fig. 18).
- Remove the tank bottom filter (3 Fig. 18).
- Carefully clean the filters and remove the residual substances.
- Remove the deposits from the drain and clean the drain.

At the end of the cleaning operations, refit the filters in succession.

Clean the spray arms as follows:
- Open the door and remove the load supports.

**WARNING: Very hot surfaces.**

- Using the tools provided, loosen and remove both spray arms.
- Rinse the spray arms thoroughly.
- Reassemble and tighten in position.
- Reassemble the spray arms.

### 7.1.2 Extraordinary maintenance

Extraordinary maintenance operations are not foreseen by the user but must be performed exclusively by the Tuttnauer Europe b.v. technical assistance or by an authorised and qualified technician.
Extraordinary maintenance operations must be carried out every 1000 hours of operation or every 12 months

- Check the electrical safety according to VDE 0701/0702.
- Filter in the water flow valves.
- Replace the prefilter.
- Replace the HEPA filter.
- Check the dosing systems.
- Thermostat sensor, thermoelectric measurements.
- Conditions and functionality of the spray arms.
- Safety thermostat.
- Door gasket.
- Steam condenser.
- The functionality of the drain pump.
- Pressure switch.
- Drain pipes.
- Water flow pipes.

### 7.1.3 Air suction filter

The thermodisinfector is standard equipped with a suction filter for drying air (Fig. 19), to be replaced after about 100 hours of work (equal to about 200 cycles).
The machine can also be equipped with an «absolute» «HEPA H14» class supplementary air filter (on request), in compliance with EN 1822.
We recommend replacing the HEP filter every 500 working hours, which is equivalent to 1000 operating cycles circa.

*Fig. 19 - Air suction filter*

## 7.2 Troubleshooting

The following table lists the main malfunctions, with relative causes and recommended solutions, that the machine could present during its operation.
The interventions that may become necessary must be carried out by experienced and qualified operators.
If the problems persist or appear even more often after performing the work reported below, contact the Tuttnauer Europe b.v. technical assistance of an authorised and qualified technician.

| Problem | Cause | Solution |
|---|---|---|
| The machine does not start | Tripped fuse/ circuit breaker of the electrical system. | Activate the fuse /switch of the electrical system. |
| | The machine is off. | Press the ON/OFF key |
| The program does not start | Door closed not correctly. | Check closure of the door |
| The program stops | No chemical products. | Turn off the machine and fill the containers. |
| | Water flow closed. | Open the water flow. |
| The temperature of sensor operation for the program is not reached | The thermostat sensor in the wash tank is covered with deposits. | Clean the thermostat |
| The machine does not dry | The air filter in the drying system is dirty or clogged. | Replace the filter. Have extraordinary maintenance performed by technical assistance. |
| White deposits in the washing tank | Softener finished due to lack of salt. | Add the salt for regeneration. |

## 7.3 Equipment disposal at end of operation

Respect the laws in force in the country of use of the machine, in relation to the use and disposal of the products used for the cleaning and maintenance of the machine, as well as observe what the manufacturer of these products recommends.
When disposing of a thermodisinfector, it is necessary to remember that it can still be contaminated by blood and other organic liquids, pathogenic germs, genetically modified material, toxic or carcinogenic substances, heavy metals, etc. and, therefore, it must be decontaminated before its disposal.
For safety and environmental protection reasons, dispose of all chemical residues in compliance with applicable legislation. When performing this operation, use protective goggles and gloves.
Remove or damage the door lock so that no one can get closed inside the machine, e.g. playing children. Finally, deliver the machine to a suitable and authorised collection centre.
The electrical and electronic devices to be disposed of contain reusable materials.
They also contain components harmful for the environment, but necessary for the correct operation and safety of the equipment. If they are not disposed of correctly or are disposed of as household waste, these components can damage human health and the environment. Never dispose of the old thermodisinfector among conventional waste.
Unauthorised product disposal by the user entails the application of very strict administrative sanctions provided for by current legislation. Enquire about this at your local dealer. Depending on the country in which one resides and the regulations in force, one is obliged to delete the data referring to people and stored on the machine.

**Finally, make sure that the old equipment is kept out of reach of children until its actual disposal.**

## 7.4 Spare parts

The various machine components can be requested directly to:

**Tuttnauer Europe b.v.**
Hoeksteen 11, 4815 PR P.O.B. 7191, 4800 GD Breda
The Netherlands
Tel. +31 (0) 765 423 510 - +31 (0) 765 423 540
E-mail: info@tuttnauer.nl

accompanying the request with the following data:

- **Model, serial number and year of construction of the machine.** This data is stamped on the identification plate fitted on each individual machine.

- **Description of the detail and required quantity.**

- **Shipping method.** If this item is not specified, Tuttnauer Europe b.v., although dedicating particular care to this service, is not liable for any shipping delays due to force majeure. Shipping costs are always charged to the recipient. Goods travel at the risk and danger of the customer, even if sold carriage free.

**Finally, remember that Tuttnauer Europe b.v. is always available for any assistance and/or spare parts.**

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**Tuttnauer Europe b.v.**
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