

Installation manual
Operating manual

INSTRUMENT WASHER



Serial No:

Manufacturer:

STEELCO S.p.A.
Via Balegante, 27
31039 Riese Pio X (TV)
ITALY

Medical device model name: DS 500 CDL



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Thank you for purchasing this appliance.

The installation, maintenance and operating instructions given in the following pages have been prepared to ensure the long life and good performance of the appliance.

Follow the instructions carefully.

The appliance was designed and constructed using the latest technological innovations available.
Please take good care of it.

Your satisfaction is our best reward.

ATTENTION

NON OBSERVANCE, EVEN IN PART, OF THE RULES INDICATED IN THIS MANUAL WILL CAUSE THE PRODUCT GUARANTEE TO BECOME INVALID AND RELIEVES THE MANUFACTURER OF ANY RESPONSIBILITY.

1. GENERAL GUIDELINES

1.1 Limits of manufacturer's liability

The manufacturer shall not be held liable for failures or problems which arise due to tampering and/or incorrect applications and/or improper use of the machine.

The purchaser must comply with all instructions set forth in the user's manual, and must in particular:

- Always work within the limits for use of the machine;
- Always carry out constant and diligent maintenance;
- Allow use of the machine by persons with proper skills and abilities for their job who have been properly trained and instructed;
- Use only manufacturer original spare parts.

Any modification, adaptation or other which may be made to machines that are subsequently placed on the market does not oblige the manufacturer to intervene on previously supplied machines, nor to consider the machine and the related user's manual lacking and inadequate.

The installation, maintenance and operating instructions given in the following pages have been prepared to ensure the long life and optimal performance of the equipment.

For some especially demanding programming or maintenance operations, this manual serves as a reminder of the main operations to be carried out. It is possible to obtain specific knowledge on these topics by attending training courses held by the manufacturer.

The instructions in this manual do not replace but rather complete the employer's obligations in relation to complying with current legislation on health and safety standards.

The machine is guaranteed for 15 months as from the time of shipment.

1.2 Manual validity, contents and conservation

- This manual reflects the state of the art at the moment of manufacture and delivery of the appliance and is valid for its entire life cycle.
- The manufacturer is at clients' disposal for further information or to receive suggestions for making the manual more compliant with the needs for which it was prepared.
- The contents of the manual have been carefully translated into the client's language.
- In order to prevent possible accidents to persons or property due to incorrect translation of the instructions, the client must:
 - not perform operations or manoeuvres with the machine in case of any doubts or uncertainties about the operation to be performed;
 - ask the After-Sales Service for clarifications on the instruction.
- If lost, ask the manufacturer for a new copy.

It is important to keep this instruction manual with the machine for future reference. If the machine is sold or transferred, the manual must be handed over to the new owner or user in order that they may become acquainted with its operation and the relative warnings.

Read the instructions carefully before installing and using the machine.

This is a translation of the Italian text, which prevails in case of doubts.

1.3 Regulations

The purpose of the warnings is to safeguard the user in compliance with the following regulations and harmonised standards:

EUROPE:

- 93/42/EEC and subsequent amendments/integrations. (Medical Devices Directive);
- 2014/35/EU (Low Voltage Directive);
- 2014/30/EU (Electromagnetic Compatibility Directive);
- CEI EN 61010-1 (Safety);
- CEI EN 61010-2-040 (Safety);
- 2011/65/EC (RoHS II);
- 2012/19/EC (WEEE);
- 2006/42/CE (Machinery Directive)

And recognised international standards:

- IEC 61000 (Electromagnetic Compatibility);
- ISO 14971 (Medical Device Risk Analysis);
- IEC 61326-1 (Electromagnetic Compatibility);
- ISO 15883-1 (Washer-disinfectors);
- ISO 15883-2 (Washer-disinfectors);
- ISO/TS 15883-5 (Washer-disinfectors);
- IEC 60529 (IP Grade).

2. SAFETY INFORMATION



Compliance with the safety standards allows the operator to work productively and with peace of mind, without the danger of harming himself or others.

Before starting to operate, the operator must be completely familiar with the functions and the proper operation of the machine and must know the precise function of all the machine command and control devices.

2.1 Intended use, improper use

INTENDED USE:

Use is permitted of this machine only and exclusively for the washing and thermal disinfection of medical instruments, trays and objects normally used in medical studios, hospital wards, assisted living centres, like:

- Scissors
- Clogs
- Glass works
- Laboratory instruments

IMPROPER USE:

Improper use of this device is any use other than that for which the machine is intended.

	WARNING
	Any use other than that for which the machine is intended is forbidden.
	Improper use of this device can be dangerous for the health and the safety of the operator and can cause serious damage to the machine itself.
	If the device is used in a manner not specified by the manufacturer, its protection may be compromised.

Information note: The ISO 17664 standard: 2004 defines the responsibility of the manufacturer of the reusable medical instrument in providing all the instructions for its proper reprocessing and maintenance after outpatient use. This is the information for the correct preparation, cleaning, disinfection, drying, packaging, control, test, sterilisation and storage phases. If medical devices have been used and exposed to compromised blood or tissues, before each use/reuse with human patients, these devices must necessarily be reprocessed in accordance with the instrument manufacturer's guidelines, in compliance with the international, local standards, as well as respecting good hospital practices. Thermal disinfection washing devices perform a partial function within the entire process of reprocessing of reusable medical devices.

This washing and disinfection device is therefore not intended to be used for terminal disinfection or sterilisation.

2.2 Advice and important warnings

For the proper use of the machine, and in order to safeguard the safety of the personnel, carefully comply with the following general and specific standards.

THE OPERATOR MUST:

- **Carefully follow the provisions and instructions provided** by the employer, managers, and supervisors for individual and group safety.
- **Use safety devices and group and individual safety gear**, provided by the employer appropriately and with care.
- **Immediately report to the employer**, the manager and the supervisor the deficiencies in the aforementioned devices and means, as well as any hazardous conditions which he/she may become aware of, directly taking action in case of urgency, within the scope of his/her responsibilities and abilities to eliminate or reduce these deficiencies or hazards.

THE OPERATOR MUST NEVER:

- **Remove or modify, without authorisation, the safety**, signalling and measuring devices, nor the individual and group safety gear.
- **Undertake on his/her own initiative operations or manoeuvres which are not within his/her responsibility** which may compromise safety.
- **Insert foreign objects into the electrical parts**. Do not insert foreign bodies into the covers of the electrical motors or in the moving parts of the machine.
- **Power the machine by tampering with the main switch and the safety devices**.

2.3 Safety recommendations

- If the new machine appears to be damaged, contact your dealer before operating.
- Any adaptations to the electrical and hydraulic systems needed to install the machine must be carried out only by qualified and authorised operators.
- This machine must only be operated by qualified and trained personnel;
- The machine is intended to treat and thermally disinfect medical instruments and laboratory glassware.
- Any use other than the one for which the machine was intended is forbidden.
- The user is forbidden to carry out any repair.
- Technical assistance to this machine must only be carried out by qualified and authorised operators.
- The equipment must be installed by authorised persons only.
- Do not install the equipment in areas with risk of explosions (ATEX).
- Do not expose the equipment to intense cold.
- The electrical safety of this machine is only guaranteed if it is connected to an efficient earthing system.
- Take great care when handling detergents and additives. Avoid contact, wear rubber gloves and observe the safety requirements specified by the manufacturer of chemicals.
- Avoid inhaling the chemicals.

ATTENTION: Chemical products are irritating to the eyes, in case of contact, wash thoroughly with water and consult a doctor. In case of contact with the skin, wash thoroughly with water.

- The water contained in the tank is not drinkable.
- Do not lean on the door and do not use it as a step.
- During the operating cycle, the machine reaches a temperature of 93°C; be very careful, there may be a burn risk.
- Do not wash the machine with a high pressure water jet.
- Disconnect the machine from the electrical supply before carrying out maintenance work.
- The sound pressure is less than 70 dB(A).
- Before starting the cycle, the operator must always check the presence of the water filters in the well and their correct positioning.



2.4 Attention

- The operator must monitor the machine during the cycle.
- The connection with the wash water injection hose must always be made with a suitable basket.
- During operation, do not interrupt the cycle as the disinfection will be impaired.
- Ensure correct disinfection by way of periodic checks, using chemical indicators.
- Use only recommended detergents and chemical additives. The use of other products may damage the machine.
- The use of appropriate PPE is mandatory when handling the objects to be treated in order to prevent contact with infected material and the risk of contamination.
- Do not introduce instruments soiled with substances that must not be discharged into the sewer (according to current legislation) but must be disposed of in a specific manner.
- The fact of recommending chemical additives does not mean that the manufacturer assumes responsibility for damage that may be caused to the materials and objects to be treated.
- Strictly respect the instructions provided by the manufacturer of chemical products. Use products only in the specified cases.
- Check that the type of chemical product is suitable for the specifications of the washing program used.
- The use of appropriate PPE is mandatory when handling the objects to be treated in order to prevent contact with infected material and the risk of contamination.
- The machine has been designed to work with water and chemical additives. Do not use with organic or other solvents, there may be a risk of explosion or rapid deterioration of certain parts of the machine itself.
- Residue left behind by solvents or acids, in particular “hydrochloric acid”, may damage the steel; avoid contact with them.
- Use only original components.
- Never use powder detergents.
- Never use foaming detergents.
- The machine must only be used with the baskets and/or components included by the manufacturer.
- Components that are not approved by the manufacturer may compromise the results achieved as well as user safety
- Never use chloride-based chemical products (bleaches, sodium hypochlorite, hydrochloric acid, etc.)
- These types of chemical products irreparably damage the machine and compromise the integrity of the instruments.
- Pollution degree 2.
- Rating IP20.
- Impact protection rating: IK06.
- Ambient lighting: 215lux max 1500lux.

The water supply taps must always be closed in the following situations, as the safety and diagnostic systems will be deactivated:

- If the machine is left unused;
- If the machine is disconnected from the electrical connection.

The manufacturer declines any liability for accidents to persons or things arising from failure to comply with the above-mentioned rules.

The failure to comply with the rules produces the immediate and total cancellation of the guarantee.

2.4.1 Water quality at machine inlet

The quality of the water used in all cleaning phases is important in order to obtain good results.

The water used in each phase must be compatible with:

- The material from which the machine is made.
- The chemicals used in the process.
- Requirements for the various phases of the process.

The main factors for good inlet water quality in relation to washing efficiency are:

HARDNESS	High water hardness inactivates the detergent, reducing its efficacy. Moreover, it can lead to limescale deposits in the machine, compromising the cleanliness of both the instruments and the machine itself, especially on the hot parts.
IONIC CONTAMINANTS	A high concentration of ionic contaminants can lead to the corrosion of instruments made of steel, manganese or copper.
MICROBIAL CONTAMINANTS	Microbial contaminants can increase the microbial contamination of the instruments at the end of the washing phase.

The manufacturer recommends that:

- the water used in the pre-washing and washing phases is drinkable and of quality compliant with the "3rd Edition drinking water guideline" published by the World Health Organisation.
- use demineralised water for rinsing.

The typical specifications for demineralised water are:

Ion concentration H⁺	4.5...7 pH
Conductivity	< 30 $\mu\text{S}\cdot\text{cm}^{-1}$
Fixed residue 180 °C (TDS)	< 40 mg/l
Maximum hardness (CaCO₃)	< 10 mg/l
Chlorine	< 10 mg/l
Heavy metals	< 10 mg/l
Phosphates	< 0.2 mg/l as P ₂ O ₅
Silicates	< 0.2 mg/l as SiO ₂
Endotoxins	< 0.25 EU/ml
Total number of colonies of microorganisms (UFC)	< 100 per 100 ml (*)

(*) for rinses following disinfection, the upper limit becomes 0.

Further information can also be obtained from the manufacturers of chemicals and medical equipment. Where the local regulations are stricter than the ones provided, the manufacturer recommends following them.

NOTE: it is the user's responsibility to supply the machine with suitable water.

2.5 Residual risks

The appliance includes a series of fixed guards to prevent access to hazardous internal parts or zones. It is however considered that the **INSTRUMENT WASHER** includes some residual risks. Below are set out the appropriate measures to be taken for each phase or significant intervention of work:

PHASE	BASKET LOADING
RISK	Contusions and cuts to the upper limbs , due to accidental contact due to falling or collision against tools and instrumental objects, mainly while loading and handling the basket.
MEASURE	Assign trained persons equipped with suitable work tools (e.g. baskets with protection, transport trolleys) and suitable clothing and PPE (e.g. overalls and safety gloves).

PHASE	PROCUREMENT OF DETERGENTS/CHEMICAL ADDITIVES
RISK	Contact of parts of the body with washing chemicals.
MEASURE	Assign staff that is trained and equipped with appropriate clothing and PPE. Wear clothing, gloves and goggles and comply with the safety instructions indicated by the manufacturer of the chemical products.
FIRST AID MEASURE	- Immediately take off/remove clothing that has been contaminated or soaked by the product; - If the substances come into contact with the skin, wash off affected areas immediately and rinse with water.
RISK	Inhaled vapours of washing chemicals.
MEASURE	Assign staff that is trained and equipped with appropriate clothing and PPE. Comply with the safety requirements specified by the manufacturer of chemicals and in the case it is foreseen, wear a protective mask suitable for the protection of the respiratory tract.
RISK	Of accidental release of washing chemicals.
MEASURE	Not to disperse the concentrated chemical into drains or directly on surfaces; Collect any spilled fluid with absorbent material (e.g., sand, earth, sawdust); Rinse the residue quantity of chemical with plenty of water.
	IN THE EVENT OF CONTACT WITH THE BODY OR RELEASE OF CHEMICAL PRODUCTS ALWAYS LOOK AT THE SAFETY MEASURES INDICATED IN THE PRODUCT TECHNICAL DATASHEET.

PHASE	MAINTENANCE OF INTERNAL EQUIPMENT
RISK	Of burns to parts of the body from hot parts of the equipment.
MEASURE	Only allow maintenance operations to be carried out by trained and qualified staff, wearing protective clothes and PPEs; Wear suitable clothing and protective gloves.

PHASE	HAZARDOUS GAS EMISSIONS
RISK	Inhalation of hazardous gas vapours.
MEASURE	If installation is correctly carried out in accordance with the manufacturer's instructions, using only authorised chemical products in accordance with the rules in force in the country of installation, the machine does not generate hazardous gases; Regardless, the machine is equipped with a steam exhaust that must be connected in accordance with the instructions in chapter 3.

2.6 Safety signs adopted

To inform machine operators of their behavioural obligations and residual risks, suitable safety signs (provided for by Directive 92/58 EEC) are applied to the machine and near the workplace.

GENERIC SAFETY SIGNALS:

In particular, the labels with signals of obligation, prohibition and danger contained in this manual, relevant to this machine and most commonly used are:



Electrical risk



Warning! See the attached documentation



**CAUTION
HOT SURFACE**

Caution hot surface

PERSONAL PROTECTIVE EQUIPMENT:

The evaluation of risks for the health and safety of workers carried out in the workplace and on any other equipment used, as well as the evaluation of residual risks as indicated, allow the Employer to assess the need to adopt the most suitable and appropriate Personal Protective Equipment (PPE) to be provided to workers.

Considering the type of machine, it is believed that PPE should be provided to the staff.

2.7 Staff training

The Instructions for use of the machine will be provided by the STEELCO S.p.A. TECHNICIAN during the start-up phase to MACHINE OPERATORS and MAINTENANCE TECHNICIANS for their areas of responsibility, who will thus be instructed and trained. It will be the duty of the EMPLOYER to ensure that the degree of staff training is suitable for assigned duties.

2.7.1 Qualified personnel

Depending on the difficulty of certain installation operations, and of the operation and maintenance of the system, professional profiles are identified as follows:

IS **INSTALLATION AND REPAIR TECHNICIAN:**

Specialised installation and maintenance personnel are able to perform all machine positioning and installation operations, connect the various systems and start up the machine at the client premises, as well as all routine and special maintenance operations. This operator is responsible for training staff for machine operation and for testing the machine.

AS **AUTHORITY RESPONSIBLE FOR THE MACHINE IN THE WORKPLACE:**

Specialised staff assigned to the verification of safety devices and procedures for proper use of the machine in complete absence of hazards.

The "*Responsible Authority*" is personally responsible for training courses and for training the personnel assigned to machine operation and maintenance.

He/she must ensure that operating staff acquire all the information necessary for the proper use and routine maintenance of the machine, recording their attendance and documenting their comprehension.

The "*Responsible Authority*" must have a perfect understanding of all command, control and safety devices of the machine.

This person is responsible for informing all personnel assigned to the machine's operation and maintenance of the instructions relating to "*Safety*", "*Actions to be avoided*" and "*First Aid Measures*" connected with use of the machine and with the chemical agents contained therein.

The "*Responsible Authority*" must be aware of all the correct procedures for carrying out in absolute absence of danger the operation and maintenance of the machine and all the procedures for disposal of any residual polluting materials and manufacturing wastes.

He/she must always be present during extraordinary or programmed maintenance and give his/her "*approval to proceed*" to staff assigned to routine or extraordinary maintenance.

The "*Responsible Authority*" will be responsible for the functionality of all the command, control and safety devices of the plant machinery and must perform all the scheduled checks on these devices in order to ensure their optimal functionality over the time.

Ac **MACHINE OPERATOR:**

Trained personnel responsible for the operation of the machine.

The "*Machine operator*" must be perfectly aware of all of the machine's command and control devices.

Only after receiving approval by the "*Safety Supervisor*", the "*Machine Operator*" must be able to carry out the following using the commands provided:

- commissioning and start-up of the machine;
- operations of loading and unloading of materials to be cleaned in baskets;
- run the machine in the different possible operating modes, such as starting the various programmed cleaning cycles.
- programming and setting data from the operator panel, adjusting single control devices during working phases, starting or resetting work functions.
- Moreover, the "*Machine operator*" must, using all personal protective equipment necessary and following the relevant safety procedures, be able to perform certain routine maintenance operations such as cleaning the inside of the machine, cleaning clogged filters, discharging polluting materials and processing residue.

2.8 Sound level indications

The value shown refers to the measurement obtained on a machine of the same type as the machine in question and was measured using an instrument positioned at a height of 1.5 metres and a distance of 1 metre from the machine.

AVERAGE SOUND PRESSURE LEVEL: <70 dB (A)

2.9 Transportation and storage

ENVIRONMENT CONDITIONS:

- Permitted temperature range -5 ... +50°C;
- Relative humidity range Max 80% (5 ÷ 31°C); 80...50% (31...40°C);
- Ventilation: Non-influencing air exchange (only required if any containers of chemical products supplied are installed).

2.10 Table of symbols

Symbols applied to the machine

	Electrical risk
	Caution hot surface
	Manufacturer
	Manufacturing date
	Warning! See the accompanying documentation for important cautionary notices, such as warnings and precautions.
	Consult the user instructions
	Earth terminal
	CE Marking issued by the notified body: 0051 identifies IMQ Reported on the serial number label.
	WEEE waste disposal
	Medical device indication.
	Indicates the final product code of the medical device. Reported on the serial number label. The "COD" corresponds to the item code in the system (AS 400) and in the sale invoice. This code can vary depending on the model/specifications requested by the client. The machine model requested by the client is in line with the model reported in the technical documentation "DT-8051520DSXX2A" and in the document describing the medical device DD-8051520DSXX2A.
	Local Authorised Representative in Switzerland.
	Local Authorised Representative.
	Indicates the product model number. Reported on the serial number label.
	Indicates the unique identifier of the product device. Reported on the serial number label.

3. INSTALLATION (ONLY FOR THE INSTALLER)

3.1 Activity before installation

PREPARATION OF INSTALLATION SITE:

Preparation of the connections to the electricity and water supply systems must be carried out by the customer before installing the machine.

The connections must comply with the directives in force in the country of installation and follow the instructions contained in the documentation (provided on request) prior to machine installation.

ENVIRONMENT CONDITIONS:

- Temperature: +5...+40 °C;
- Relative humidity range Max 80% (5 ÷ 31°C); 80...50% (31...40°C);
- Maximum altitude: 2,000 m a.s.l. (special versions of the device are available for higher altitudes).
- Visibility: brightness of the environment from 100 lux to 1500 lux (in the case of more restrictive technical rules in force in the country where the machine is installed, refer to these rules).

3.2 Positioning

3.2.1 Handling, unpacking and placement

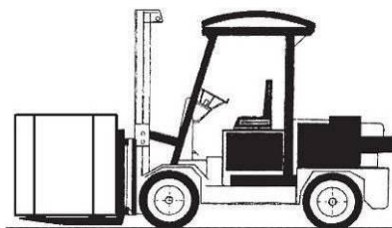
The machine is delivered to the client fully packed, resting on a wood base and completely protected by cardboard casing.

LIFTING AND HANDLING:

Handling of the machine is envisaged through the use of equipment for lifting and transportation and must comply with the following indications:

- The lifting capacity must be greater than the total weight of the load to be handled;
- The machine must be kept as close as possible to the ground during handling;
- Stacking: not permitted;
- Rotation: do not overturn.

The forklift operator must perform the displacement only when there are no persons or objects in the manoeuvring area.



UNPACKING AND PLACING:

Near the place of installation, unpack the machine by carefully following these steps:
All the packaging materials can be recycled.

- Carefully open the packaging.
- Do not overturn the machine as this may cause irreparable damage.
- Cut the strap, open the box and remove the expanded polystyrene corner protectors.
- Remove the cardboard first and then the nylon bag.

Caution:

the bag represents a serious hazard for children and should be disposed of immediately.

- Place the machine on the work surface and level it by means of the adjustable feet.
- The machine must be positioned horizontally with a maximum inclination of 1 ÷ 2°.
- Do not position the machine on a surface which could cause a fire or fume hazard.

3.2.2. Maximum floor load

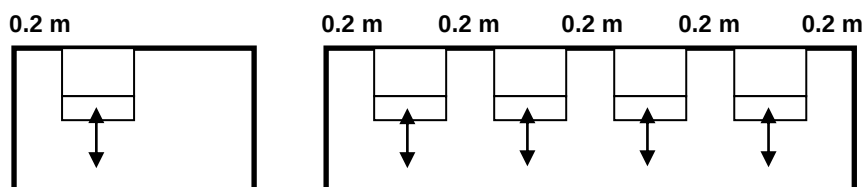
For the installation of the machine, the floor must be able to bear a minimum load of:

- 150 daN/m²

3.2.3 Positioning the machine

In normal conditions, we suggest the minimum dimensions for using the machine as a single installation or as a group.
For special installations consult the dealer.

Minimum height of the ceiling: MACHINE HEIGHT (in m) + 0.3 m



3.3 Water connection

To ensure adequate installation, take into account the following requirements:

- The machine must be connected to the water distribution network according to the regulations in force;
- Use only the hoses supplied with the machine;
- Do not shorten the rubber hoses supplied with the machine;
- Make sure that the mains water pressure is between 100 kPa (1 bar g) and 800 kPa (8 bar g);
If it is less than 100 kPa (1 bar g) a booster pump must be installed.
If the pressure in the network is higher than 800 kPa (8 bar g), applying a pressure reducer is mandatory.
- For machines equipped with steam condenser or softener, the minimum water pressure must be increased to 200 kPa (2 bar g) to ensure correct operation in terms of performance.
- For water with an average hardness higher than 7 °f it is mandatory to use an anti-limescale dosage unit;
- For connection, use taps with ¾" connections, placed in an easily accessible position;
- Make sure that the main supply hose is sufficient for the flow rate required by the machine and that it is equipped with a general shut-off valve.

	ATTENTION
	For the water connection specifications, refer to the installation plan.

During installation of the machine, the installer must perform the following procedure:

1. Identify the hoses supplied with the machine and check that they are not damaged;
2. Identify the correspondence between the flexible hoses and the general water supply taps set up on site, in accordance with the references in the table below.

CONNECTION	COLOUR
HOT WATER	RED
COLD WATER	BLUE
TEPID WATER	WHITE

3. Screw and tighten the hose ring nut to the attachment prepared on site.
4. Remove any debris in the hoses or taps. To do this, open the tap and let the water flow into a bucket.
5. Check the water temperature according to the specifications of the installation diagram.
6. Identify the correspondence of the connection of the flexible hoses to the water supply solenoid valves of the machine, in accordance with the references in the table above.
7. Screw and tighten the hose ring nut to the designated fitting in the machine.
8. Gradually open the water supply taps and check the tightness of the connections.
9. Once the connection is complete, repeat the procedure if there are any water leaks.

	ATTENTION
	The threaded connections can easily be damaged, therefore before applying the maximum tightening torque, manually screw the fixing ring nut by a few threads.

Information:

- The anti-return water system is already installed inside the appliance in accordance with the IEC 61770 standard;
- If double connection to hot and cold water is not available, the two supply pipes must be connected together;
- **The manufacturer declines all responsibility for damage or accidents caused by failure to comply with the rules relating to the supply systems.**
- **Failure to comply with the above conditions will mean the resulting damage will not be covered by the warranty.**
- In case of insufficient demineralised and hot water, set parameters 3.37 and 3.38 to 1.

	ATTENTION
	When the machine is not in operation, always close the supply taps.

3.4 Electrical Connection

The connection of the machine to the electrical mains must be performed by qualified, skilled staff.

Power supply cable: The retailer and/or importer and/or installer has the obligation to adapt the insulation class of the power supply cable to suit the working environment in compliance with the technical regulations in force in the country where the appliance is installed.

- Check that the electrical specifications match those shown in the label.
- The electrical connection must be carried out according to the technical regulations in force.
- Ensure that the measured value of the mains voltage corresponds to the voltage indicated on the machine plate.
- Check that the power supply voltage does not differ by more than 10% from its nominal value.
- The frequency of the power supply voltage must not differ by more than 1% of its value.
- The device must be powered by a mains with maximum impedance of $0.220\Omega + j0.137\Omega$.
- The connection of the machine to the mains must be equipped with an earth connection and an equipotential circuit as set forth by current regulations.
- Make sure that the electrical systems are efficiently earthed.

- The earth conductor must be connected to the earth terminal identified by the standard symbol.



- The machine is equipped with a terminal identified by the relative symbol for equipotential connections between appliances (see rules for electrical plants).

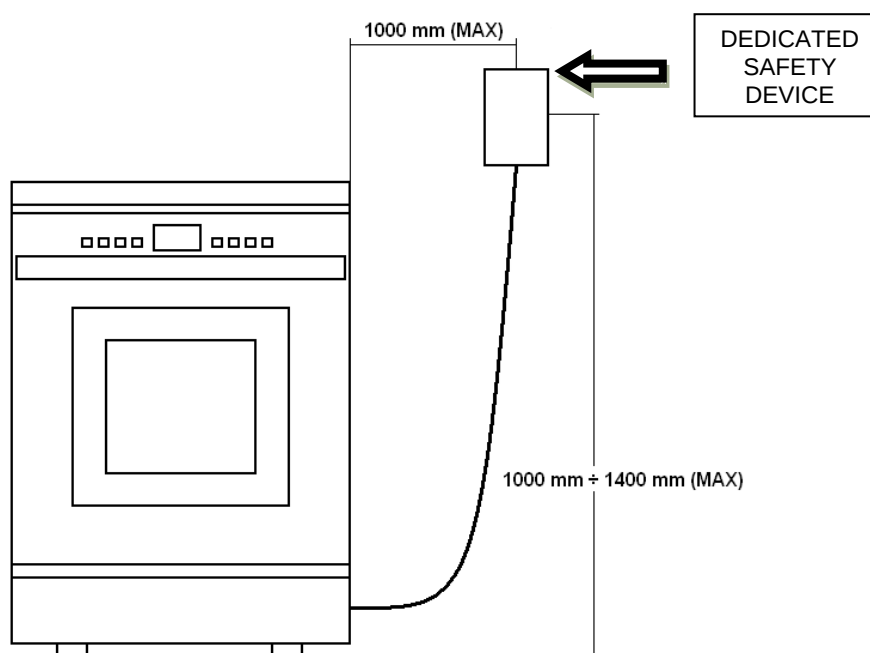


- Connect the machine and the relative dedicated safety device (not supplied) using a power cable compatible with the electrical characteristics of the machine.
- In the event of a prolonged machine stop, it is advisable to perform the electrical disconnection procedure, setting the dedicated safety device to "OFF".

The dedicated safety device must be positioned in an accessible location, free and not covered by other machines or anything that might obstruct the switch.

- The dedicated safety device must be of adequate size for the power and with quality labels and must be flagged as a power interrupting device for the machine.
- There must be a sign placed close to the dedicated safety device where it's written:

EXAMPLE OF DEDICATED SAFETY DEVICE POSITIONING



3.5 Fuses

The fuses are used to protect the electrical circuits of machine from possible failure due to overload or short circuits. If a fuse trips, the components connected downstream and their functions are no longer available.

The fuses must comply with the characteristics (size, dimensions and tripping characteristic) indicated in the wiring diagram.

3.5.1 Replacing the fuse

	ATTENTION The fuse must only be replaced by authorised technicians. Before replacing the fuse, establish and eliminate the cause of the fault. If necessary, contact the manufacturer's technical assistance service.
---	--

Fuse replacement procedure:

- Log out of the machine in conditions of safety using a dedicated security device.
- Access the electric switchboard.
- Based on the electrical diagram, identify the fuse to be replaced.
- Remove the relevant fuse from the fuse-holder.
- Replace the defective fuse with a new fuse with the same characteristics. The correct values of the fuses are shown in the wiring diagram.

Should the new fuse intervene at the reactivation of the electrical devices, repeat the diagnosis and replacement procedure as previously described.

	ATTENTION Use only fuses with the amperage and characteristics indicated in the wiring diagram. The use of fuses other than those specified voids the warranty and can cause damage to the machine.
--	--

3.6 Connecting chemicals

The chemical dispensing system consists of:

- chemical products dosing pump.
- chemical products presence sensor.
- the system can also be equipped with a dispensed product quantity meter.

Additional dosing pumps and related accessories can be ordered as an option.

Each pump is combined with a corresponding chemical type, in accordance with the references in the table below.

RODUCT	NOTES
DOS 1 ALKALINE/NEUTRAL/ENZYMATIC DETERGENT	
DOS 2 DET. NEUTRALISING AGENT	
DOS 3 RINSE AID/LUBRICANT	

	ATTENTION
	To ensure the correct treatment of objects, the use of specific products is recommended. If necessary, ask the dealer or the manufacturer for advice.

3.6.1 Chemical presence sensor

Each individual dosing pump is combined with a sensor that checks the presence of the chemical product inside the container. In case of insufficient product, the electronic control system of the machine sends a message, displayed on the screen, of the absence of product.

3.6.2 Chemical product quantity meter

Each single dosing pump can be combined with a volumetric sensor for measuring the quantity of chemical product dispensed. The electronic control system manages the value of the minimum quantity required and, if necessary, interrupts the cycle.

3.6.3 Filling the chemical product container

To fill the chemical product container, proceed as follows:

- Take the chemical product container.
- Turn off the machine.
- Open the chemical product tank.
- Insert the funnel into the tank.
- Fill the tank, taking care not to spill the chemical product.
- Close the chemical product tank.

	ATTENTION
	The chemical that is used can be dangerous if touched or inhaled. Before use, carefully read the safety information provided by the manufacturer of the chemical and the label applied to the package.
	During operations to replace the chemical product container, use suitable personal protective equipment (chemical resistant gloves, breathing masks, etc.).
	Access to the technical compartment, where the chemical product containers are located, is only permitted with the aid of keys and qualified personnel.

3.6.4 Warnings

- For the maximum quantity of product that can be used per wash cycle, follow the user instructions supplied with the product used.
- The quantity of dosed product can be calibrated by following the instructions in chapter 12.
- We recommend carrying out the calibration procedure of the chemical dosing system every 6 months to ensure correct operation.
- To always ensure perfect operation of the chemical dosing pumps, maintenance must be carried out at regular intervals, as described in chapter 18.
- Use only liquid chemicals, the machine cannot work with powder chemicals.
- To dispose of the chemical product and its tank, follow the instructions indicated on the technical and safety data sheet provided by the manufacturer.
- Check that the type of chemical product is suitable for the specifications of the washing program used.
- Do not place chemicals on the machine.

	ATTENTION
	Before carrying out any maintenance and/or extraordinary handling of the machine, make sure that the chemical dosing circuit and the tanks are completely emptied of the chemical product. It is advisable to run a chemical-free washing cycle. This action is to prevent the chemical substances from coming into contact with parts of the body and with the equipment/machine components that can be damaged.

3.6.5 Information

- The machine has been validated following the indications provided by the ISO 15883 Series standard.
- The Type Test was performed with the use of the most well-known chemical products on the market. Regarding the type of chemical products, concentrations and cycle parameters used, you can ask the manufacturer for details.

3.7 Connection to the drain

- The connection to the drain must be checked carefully.
- The drain must be suitable for biological, chemical and high temperature fluids.
- This model is equipped with a connection pipe to the drain with a diameter equal to that indicated in the installation diagram.

ATTENTION:

if the drain is obstructed, be very careful when treating the water and carefully avoid contact with hands, eyes, etc. If necessary, wash any parts that come into contact with the product with plenty of water.

DRAIN HOSE CONNECTION:

The connection of the drain hose to the sewer system takes place as follows:

- Having identified the drain hose and relative connection fittings, proceed with their assembly, making sure to correctly assemble the sealing gasket.
- Locate the drain manifold and connect the flexible hose through the specific outlet and locking ring nut, tightening it firmly.
- Insert the flexible drainage hose and lock it in place with the appropriate clamp.
- Insert the other end of the flexible hose to the drain outlet, connecting it appropriately and locking it in place.

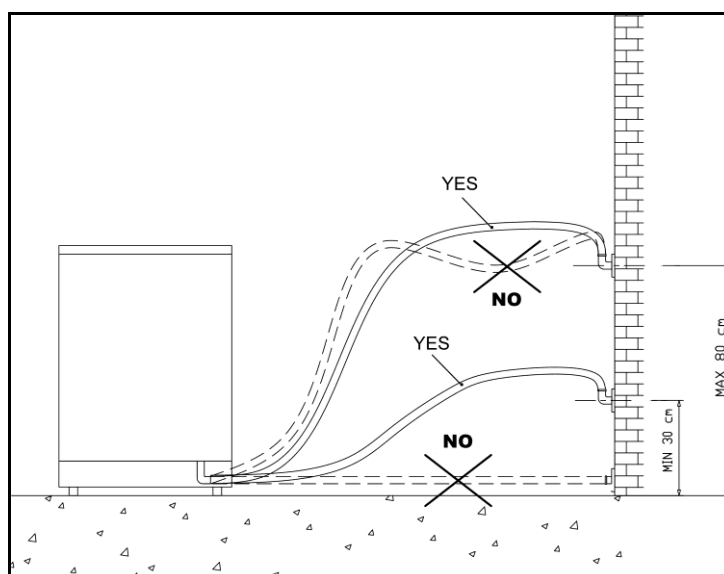
FOR CONNECTION TO THE DRAIN IT IS NECESSARY TO COMPLY WITH THE FOLLOWING INSTRUCTIONS:

- The outside of the drain hose must be connected using a clamp type closure.
- The drain hose must not feature any abnormal bends or angles.
- The drainage point must be placed at the same height as the machine drain outlet or in the floor.

Follow these instructions carefully, as an incorrect connection of the drain can cause the machine to block.

- The diameter of the drain hose must correspond to the diameter indicated in the installation diagram.
- Avoid drain hose extensions.
- Arrange a drain connection for each hose.

	ATTENTION
	Drainage must be carried out in compliance with the international directives; All liability is disclaimed should improper use of the machine cause contamination;
	In case of obstruction of the drain, be very careful when treating the water, and carefully avoid contact with hands, eyes, etc. If necessary, wash the parts in contact with plenty of water.
	When the machine is connected to a ventilation system, the exhaust pipe must be placed outside the building, protected from access by animals and ensuring that it cannot cause any danger.



3.8 Built-in softener

The built-in softener has the function of reducing the quantity of limescale contained in the supply water used for washing and thermal disinfection. If the instrument washer is fed with particularly hard water, it will quickly degenerate, thus compromising its performance and service life.

To keep the resins that perform the descaling activity active, they must be regenerated as described in the table.

For machines fitted with this device, the water hardness value must be entered upon installation (expressed in French degrees) by opening the machine's programming (PRG key held for 5 seconds) under parameter "P7.26", and entering one of the following values:

WATER HARDNESS (°f)	PARAMETER SETTING	CYCLES
0-10	Value 10	Regeneration not present
11-15	Value 15	Regeneration present every 30 CYCLES
16-20	Value 20	Regeneration present every 25 CYCLES
21-25	Value 25	Regeneration present every 21 CYCLES
26-30	Value 30	Regeneration present every 18 CYCLES
31-35	Value 35	Regeneration present every 15 CYCLES
36-40	Value 40	Regeneration present every 12 CYCLES
41-45	Value 45	Regeneration present every 9 CYCLES
46-50	Value 50	Regeneration present every 6 CYCLES
51-55	Value 55	Regeneration present every 3 CYCLES
56-60	Value 60	Present at every cycle (recommended for technical assistance only).

Each time "LOAD SALT", appears on the display, proceed as follows:

- Open the door of the machine.
- Unscrew the plastic cap of the salt container located inside the machine.
- Pour 0.5 kg of common table salt into the container, using the dedicated funnel.

ATTENTION: during the operation, do not pour the salt out of the container.

- Close the plastic cap of the salt container.

At this point, after inserting your items to be washed into the basket, start a normal washing cycle. The machine will automatically replenish the resins.

ATTENTION:

The wash cycle including regeneration will be longer, and all the machine functions will initially seem to be at a standstill, during which time the display will read "WAITING FOR CLEAN".

3.9 Drying air filtration (Optional)

In the ventilated drying versions, the machine is supplied standard with a “class F5” air filter pursuant to standard EN 779.

The filters should be replaced after about 100 hours of operation.

The machine can also be equipped with a supplementary “absolute” type filter, class “HEPA H14” pursuant to standard EN1822.

The filters should be replaced after about 300 hours of operation.

3.10 Environment ventilation requirements

During normal operation, the machine heats up, dispersing heat and hot air containing humidity; during the drying phase these values increase. Therefore, in order to ensure an environment with a constant temperature and humidity, which is comfortable for the operator, an air conditioning system or air exchange system must be provided, having a capacity able to balance the emissions indicated in the installation diagram.

For machines equipped with ventilated drying there is an air exhaust that can be connected to an external extraction system.



A detail of the data relating to the machine's connections is shown in the wiring and installation diagram.

4. CHECKS PRIOR TO START-UP

4.1 Introduction

The preliminary adjustments and controls are performed by a skilled technician, who has been specifically trained for this purpose.

4.2 Checks of safety systems

Indicative list of adjustments and checks of safety systems and devices to be carried out:

- Check the mains supply voltage;
- Check the efficiency of emergency equipment and machine shutdown devices (circuit breaker);
- Check the efficiency of the door opening safety micro switch;
- Check the functionality of the machine controls with particular attention to the commands to **START** and **STOP**.

4.3 General Checks

Indicative list of general adjustments and checks to perform:

- Check for the proper connection of the machine's general supplies (electricity and water);
- Make sure that the MACHINE OPERATOR is instructed in its use;
- Check the correct direction of rotation of the motors installed in the machine (only for machines equipped with motors with three-phase power supply).

5. USE OF THE MACHINE (FOR THE USER)

5.1 Checks

Check the quantity of chemical additives, fill the container if necessary, proceeding as described below.

- Obtain the necessary PPE (protective gloves for chemical substances, breathing masks etc.) and a container of detergent.
- Move near the machine and switch it off.
- Follow the instructions in section 3.6.

ATTENTION: The chemical product used may be damaging by way of contact or inhalation. Before use, carefully read the safety data sheet issued by the detergent supplier and the label applied to the package.

5.2 Opening and closing the door

- The door is made of high-strength tempered glass, a particular manufacturing test (HST) certifies its integrity and strength.
- The thermal dispersion of the glass has been contained thanks to the use of a particular material with a low dispersion coefficient.
- Nevertheless, particular attention is recommended during use, due to the danger of burns.



	ATTENTION
	• During normal use, be careful not to strike the glass sharply, as there is a risk of breakage.
	• Slowly introduce the basket inside the washing chamber to avoid the risk of breaking the glass.
	• Place the instruments in the basket in such a way that they do not come out, avoiding striking the glass.
	• Before opening the door, check that the opening zone is clear of obstructions.

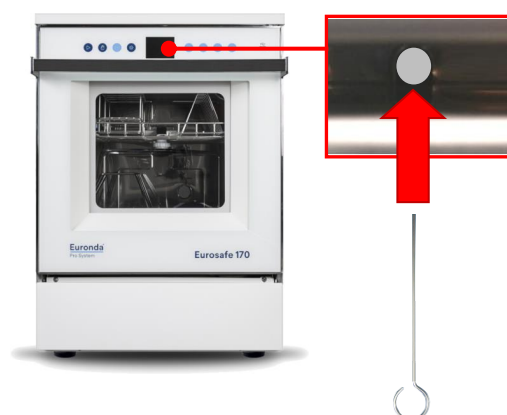
This device is equipped with an electric door lock system during operation.
To open the door during cleaning, the cycle must be interrupted, remembering that:

1. The material inside the machine may be very hot.
2. Subsequently it is necessary to repeat the complete washing cycle.

5.2.1 Door release

In case of a power failure or door lock malfunction, the door can be released and opened following the procedure below:

1. Find the hole between the door and the control panel (see figure on side).
2. Insert the dedicated tool.
3. Hold the dedicated tool pressed. The door will then be released and can be opened.
4. To close the door, hold the dedicated tool pressed as described in point 3.



5.3 Power-on

Turn on the machine by following the procedure:

- Operate the dedicated safety device
- The control panel will start automatically.
- Check that there are no alarm messages. If there are, remove them.

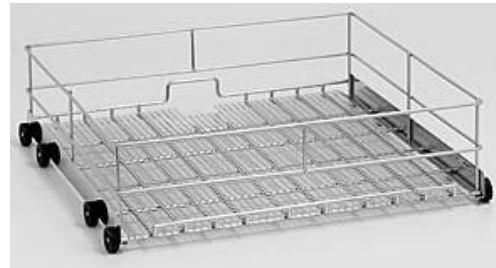
5.4 Preparation

- Insert the items to be washed, placing them carefully on the appropriate support.
- The items must neither touch nor cover each other.
- Receptacle-shaped objects must be placed so that the liquids contained can drain away.
- Arrange tall and heavy objects possibly towards the centre of the basket as this will facilitate their washing.
- Be careful not to block the washing arms; they must be able to turn freely.
- Place the load evenly on the basket.
- Check the patency of hollow instruments before processing in the machine.



	ATTENTION • The maximum load allowed for each cycle is 20 kg (Baskets included). • Do not use the machine with the baskets!!!!
	ATTENTION Before inserting instruments into the instrument washer, remove any composite material, cement and amalgam following the appropriate protocol and disposal regulations.

Below are a few example baskets:

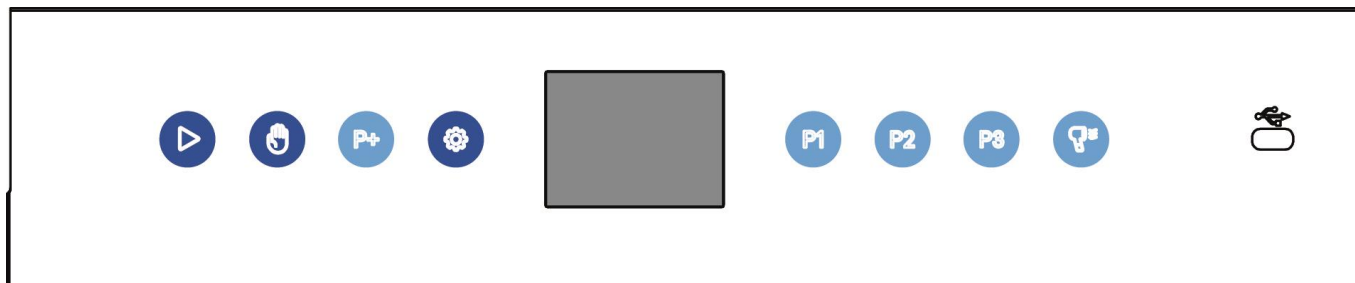


	ATTENTION
	• Do not insert solid dirt (excrement, toilet paper, ...). This could block the drain system of the machine. • The treatment cycle must only be activated if the machine is equipped with the upper basket, or if a basket equipped with an injection system is used. • Non-compliance can cause dangerous water leaks from the door.

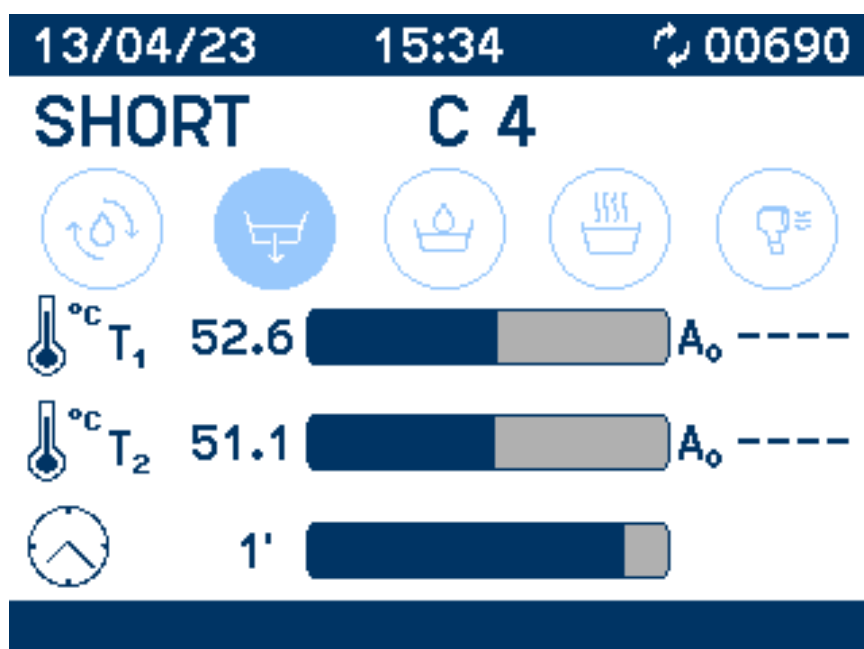
6. CONTROL PANEL AND SYMBOLS USED

The image shows the control panel with display.

This panel facilitates use of the machine as it signals the phases of the cycle and the maximum temperature reached during disinfection; it also warns of any anomalies with messages.



6.1 Control panel



LCD DISPLAY

Shows the following information:

- The selected program: **SHORT**.
- The phase.
- The date and time.
- The control and recorded temperature.
- The A_0 value for both the control temperature and the recorded temperature.
- The remaining time.
- Any machine malfunctions.
- The number of cycles run by the machine. During the cleaning cycle, the symbol  rotates.

Initially, in the waiting state, the display shows the selected program, the temperature, the date and time.

Tapping the (**P1**, **P2** or **P3**) key, the display shows the program linked to the key, and the message “**press start**” or “**door open**” appears in the bottom left.

Tapping the **P+** key, it is possible to scroll through all the available programs.

LEDS

The keys of the control panel are touch-sensitive and backlit.

BUZZER

There is a buzzer that sounds each time any of the buttons are pressed and intermittently in case of a Lockout (if set in parameter **P1.12**).

FIG. 2	During the cycle, pressing the PRG button displays the page showing the various temperatures of the machine and the values associated with the various transducers (pressure, conductivity) (Fig. 2).
FIG. 3	Pressing it a second time displays the page with the list of alarms and alerts that occurred during the cycle (Fig. 3).
FIG. 4	In the event of a lockout, a window opens indicating the alarm code and the associated message and shown in the figure Fig. 4.
In the event of a non-blocking malfunction, for example if one of the chemical products finishes, a message appears in the bottom left of the display (see Fig. 1 point 11), or during the cycle pressing the PRG button twice as per Fig. 3.	
FIG. 5	At the end of the cycle, a special window opens like the one in Fig. 5.

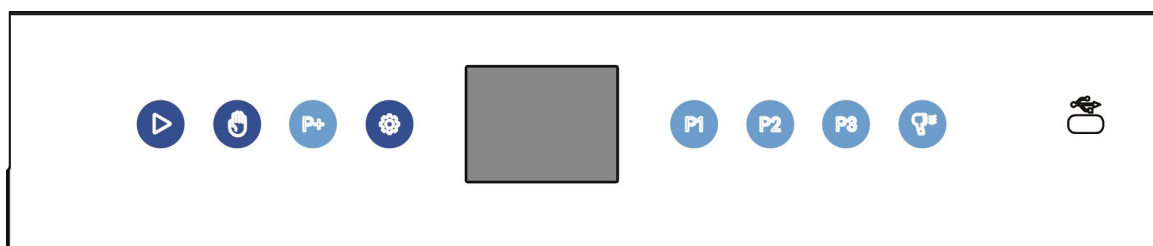
FIG. 6		
17/04/23 9:20 ↺ 00698 SHORT C 4  NO DISINFECTION Fig.6.A	13/04/23 15:51 ↺ 00692 SHORT C 4  NO DISINFECTION HOT MATERIAL Fig.6.B	If the cycle stops, a window opens with a message warning that the load has not been disinfected (Fig. 6). If the temperature of 65°C is not reached, the screen in figure 6.A is displayed, otherwise the screen in figure 6.B.

6.2 Buttons

There are 8 keys with the following functions:

BUTTON		DESCRIPTION
P1		"SHORT" cycle selection.
P2		"STANDARD" cycle selection.
P3		"INTENSIVE" cycle selection.
PRG		Holding this button pressed for 5 seconds during the STANDBY or LOCKOUT state, it is possible to open the Menu.
P+		Holding this button pressed, it is possible to select the various programs. The program changes with each press.
START		Pressing this button starts the previously selected wash program.
STOP		This button stops a cycle in progress. The display signals the lack of disinfectant and the "manual stop" message appears. The door stays locked and if necessary, it indicates the temperature inside the chamber. Pressing START resumes the cycle from the point where it was stopped, and pressing STOP again brings the machine back into the standby condition, and the door is unlocked.
DRYING		Pressing this button, it is possible to disable the forced-air drying phase before the start of the program.
USB		There is a USB port allowing the machine to be programmed and data to be saved.

USE OF THE PROGRAMMING MENU IS RESERVED TO SPECIALISED TECHNICIANS WITH AN ACCESS PASSWORD.



7. WASHING PROGRAMS

The machine has several washing programs; it is possible to select the programs by pressing the **P+** key. The programs available to the user are:

PROGRAMMA	Fase 1	Fase 2		Fase 3	Fase 4	Fase 5	Fase 6	Fase 7	Fase 8	Fase 9	Fase 10
	SCARICO	PRELAVAGGIO	LAVAGGIO	SCARICO	LAVAGGIO	SCARICO	LAVAGGIO	SCARICO	DISINFEZIONE	SCARICO	ASCIUGATURA
PRELAVAGGIO		Acqua: Fredda Volume: 12 l Tempo : 120 s									
SPURGO			Acqua: Demi Volume: 12 l Dos.1 - 2 ‰ Dos. 2 - 2‰ Tempo.: 30 s Temperatura: 15 °C								
INSTALLAZIONE			Acqua: Demi Volume: 12 l Dos.1 - 8 ‰ Dos. 2 - 8 ‰ Tempo: 30 s Temperatura: 15 °C								
CORTO			Acqua: Calda Volume: 12 l Dos.1 - 5 ‰ Temp. Chimico: 40° C Tempo: 180 s Temperatura: 55 °C		Acqua: Demi Volume: 12 l Tempo: 60 s				Acqua: Demi Volume: 12 l Dos.2 - 2 ‰ Temp. Chimico: 60° C Tempo: 400 s Temperatura: 90 °C		Velocità bassa: 400 s Velocità alta: 600 s Tempo condensa vapori: 120 s Temperatura: 120° C
STANDARD		Acqua: Fredda Volume: 12 l Tempo: 120 s			Acqua: Calda Volume: 12 l Dos.1 - 5 ‰ Temp. Chimico: 40° C Tempo: 180 s Temperatura: 55 °C		Acqua: Demi Volume: 12 l Tempo: 60 s		Acqua: Demi Volume: 12 l Dos.2 - 2 ‰ Temp. Chimico: 60° C Tempo: 400 s Temperatura: 90 °C		Velocità bassa: 240 s Velocità alta: 1.080 s Tempo condensa vapori: 120 s Temperatura: 120° C
INTENSIVO		Acqua: Fredda Volume: 12 l Tempo: 120 s			Acqua: Calda Volume: 12 l Dos.1 - 5 ‰ Temp. Chimico: 40° C Tempo: 360 s Temperatura: 55 °C		Acqua: Demi Volume: 12 l Tempo: 60 s		Acqua: Demi Volume: 12 l Dos.2 - 2 ‰ Temp. Chimico: 60° C Tempo: 400 s Temperatura: 90 °C Conducimetro: abilitato		Velocità bassa: 240 s Velocità alta: 1.080 s Tempo condensa vapori: 120 s Temperatura: 120° C
CORTO 1			Acqua: Calda Volume: 12 l Dos.1 - 5 ‰ Temp. Chimico: 40° C Tempo: 180 s Temperatura: 55 °C								
CORTO 2			Acqua: Demi Volume: 12 l Tempo: 60 s								
CORTO 3									Acqua: Demi Volume: 12 l Dos.2 - 2 ‰ Temp. Chimico: 60° C Tempo: 400 s Temperatura: 90 °C		
CORTO 4											Velocità bassa: 240 s Velocità alta: 600 s Tempo condensa vapori: 120 s Temperatura: 120° C
STANDARD 1		Acqua: Fredda Volume: 12 l Tempo: 120 s			Acqua: Calda Volume: 12 l Dos.1 - 5 ‰ Temp. Chimico: 40° C Tempo: 180 s Temperatura: 55 °C						
STANDARD 2			Acqua: Demi Volume: 12 l Tempo: 60 s								
STANDARD 3									Acqua: Demi Volume: 12 l Dos.2 - 2 ‰ Temp. Chimico: 60° C Tempo: 400 s Temperatura: 90 °C		
STANDARD 4											Velocità bassa: 240 s Velocità alta: 1.080 s Tempo condensa vapori: 120 s Temperatura: 120° C
INTENSIVO 1		Acqua: Fredda Volume: 12 l Tempo: 120 s			Acqua: Calda Volume: 12 l Dos.1 - 5 ‰ Temp. Chimico: 40° C Tempo: 360 s Temperatura: 55 °C						
INTENSIVO 2			Acqua: Demi Volume: 12 l Tempo: 60 s								
INTENSIVO 3			Acqua: Demi Volume: 12 l Dos.2 - 2 ‰ Temp. Chimico: 60° C Tempo: 400 s Temperatura: 90 °C								
INTENSIVO 4											Velocità bassa: 240 s Velocità alta: 1.080 s Tempo condensa vapori: 120 s Temperatura: 120° C

7.1 Stored cycles

The machine in your possession can be used with three different wash programs according to your needs. In particular, it is possible to choose from:

SHORT PROGRAM	P1	Fast cycle designed for washing lightly soiled objects.
STANDARD PROGRAM	P2	Cycle designed for washing objects with normal soiling.
INTENSIVE PROGRAM	P3	Cycle designed for washing heavily soiled objects.

7.2 Phase parameters

7.2.1 Drain phase

- Rinsing water (cold) time (sec)
- Tank pump running time (sec)
- Discharge cooling enabling (yes/no)

7.2.2 Prewash phase

- Water type 1
- Water type 2
- Total litres of water (defines the capacity of the tank on which the chemical dosage per thousand is calculated)
- Product type 1 (first chemical)
- Dose per thousand of product 1
- Product type 2 (second chemical)
- Dose per thousand of product 2
- Phase time (sec)

7.2.3 Treatment phase

- Water type 1
- Water type 2
- Total litres of water (defines the capacity of the tank on which the chemical dosage per thousand is calculated)
- Product type 1 (first chemical)
- Dose per thousand of product 1
- Min temperature for insertion of product 1
- Product type 2 (second chemical)
- Dose per thousand of product 2
- Min temperature for insertion of product 2
- Phase time (sec)
- Phase temperature setpoint

7.2.4 Drying phase

- Fan low speed activation time (sec)
- Fan high speed activation time (sec)
- Phase temperature setpoint
- Steam condenser activation time (sec)

7.3 Wash cycle start

To start the wash cycle, follow the instructions below:

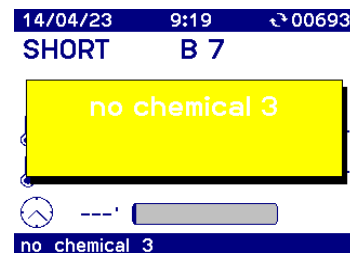
- Open the door, insert the basket and close the door.
- Select the wash program.
- If parameter P1.02=1: enter the operator code using the keypad.
- Press the **START** key to start the wash cycle.

8. MACHINE STATUSES

8.1 Waiting

The machine is ready to start a cycle.

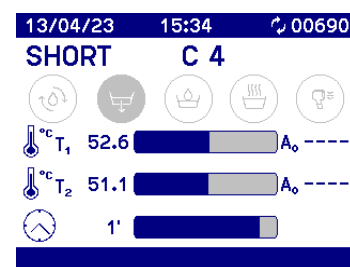
Diagnostics are active. The door open condition or any other warnings will be signalled: no detergent, no limescale, memory full (historic), or high chamber temperature.



8.2 Cycle

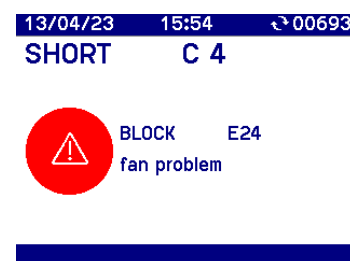
This status occurs in two ways: with the Start key, which is accepted only in the standby condition with the door closed.

The cycle operates according to its phases. The diagnostics and regulators are active. The user interface provides information on the various phases in progress and the temperature in the washing chamber.



8.3 Lockout

The diagnostics detected an anomaly causing a blockage. The cycle under way is suspended and the door is locked. The anomaly is signalled, and the user interface waits for a key sequence to release the door and restore the machine in the Standby condition (see release sequence).



9. SPECIAL SITUATIONS

9.1 Power failure

In the event of a power failure in the Preparation, Standby or Lockout status, when the power is restored, the board will revert to the previous program.

In the event of a power failure during a wash cycle, when the power is restored, the machine will automatically repeat the phase during which the power failure occurred and complete the cycle (in accordance with parameter P3.04).

9.2 Unlocking sequence

In the event of a "Lockout" during a wash cycle, the door remains closed and locked. To open the door, the following procedure must be carried out from the keyboard:

1. Press the **STOP**  and **START**  buttons simultaneously for 5".
2. The wording "key sequence" appears on the display.
3. Press the **P2**  program button and then the **P1**  program button.
4. Once the machine exits the "Lockout" status, it reverts back to the short cycle standby status.

NOTE: If the lockout persists due to the malfunction of any components (e.g.: broken probe, inconsistent levels, etc.), the door is unlocked, but the machine remains inactive.
If this situation arises, call the after-sales service

10. WORKING PROCEDURES

10.1 Introduction

The machine was built solely and exclusively for the washing and thermal disinfection of instruments for dental use, trays and objects in normal use in dental surgeries, hospital wards, nursing homes, etc. and is therefore subject to continuous contact with aggressive detergents and contaminated instruments.

For this reason, it is necessary to provide some useful indications for the operators responsible for its use.

10.2 Instructions to personnel

The operator responsible for the use of the machine in normal operating conditions, is not exposed to risks if he/she works in safety using the appropriate means of protection.

In order to operate safely the operator must:

- Carefully comply with the instructions set forth in this manual.
- Use safety devices appropriately and with care and the group and individual safety gear provided in the workplace.
- Personally take action, or report to responsible staff in the event of deficiencies in the aforementioned devices and means, as well as any hazardous conditions of which he/she may become aware of, taking immediate action in urgent cases within his/her scope of responsibilities and abilities, to eliminate or reduce the deficiencies or hazards.

Personnel in charge of maintenance in normal working conditions is not exposed to risks provided they work in safe conditions, using the appropriate means of protection.

In order to work safely the maintenance technician must:

- Carefully comply with the instructions set forth in this manual.
- Use safety devices appropriately and with care and the group and individual safety gear provided in the workplace.
- Take special care and precautions when repairing or replacing mechanical parts (e.g. discharge pump etc.) on broken-down machines that have not completed the thermal disinfection cycle.

10.3 Decontamination procedure

In the event of repairs and replacement of mechanical parts (e.g. drain pump, heating element, etc.) on faulty machines that have not completed the thermal disinfection cycle, before servicing any of the machine's internal parts, the disinfection procedure must be carried out to eliminate possible pathogenic residues and to protect the operators in contact with the machine from any risk of infection.

The decontamination procedure must be carried out by the "system operator"; for this purpose they must be equipped with all the personal protection devices provided.

MACHINE STATUS:

The machine must be de-energised with the dedicated safety device in the OFF position. The person performing the task must ensure that there is no-one around the machine during this operation.

SAFETY SYSTEMS TO BE ADOPTED:

The operation must be performed in compliance with the behavioural rules relating to use of the disinfectants used (see technical data sheet of the product used supplied by the manufacturer), in compliance with the rules relating to contact with parts of the machine potentially contaminated by pathogenic materials and with the use of appropriate PPE.

METHOD OF INTERVENTION:

If possible, run a no-load cycle to thermally disinfect the washing chamber. Open the access door to the washing chamber and spray an appropriate disinfectant product evenly inside it, covering all the internal parts and any basket with instruments contained in the operation. Then wait for the time necessary for disinfection (see the methods described on the technical data sheet of the disinfectant product used).

When proceeding with maintenance operations on machine parts that have not been reached by the disinfectant applied, use the appropriate precautions, devices and adequate PPE.

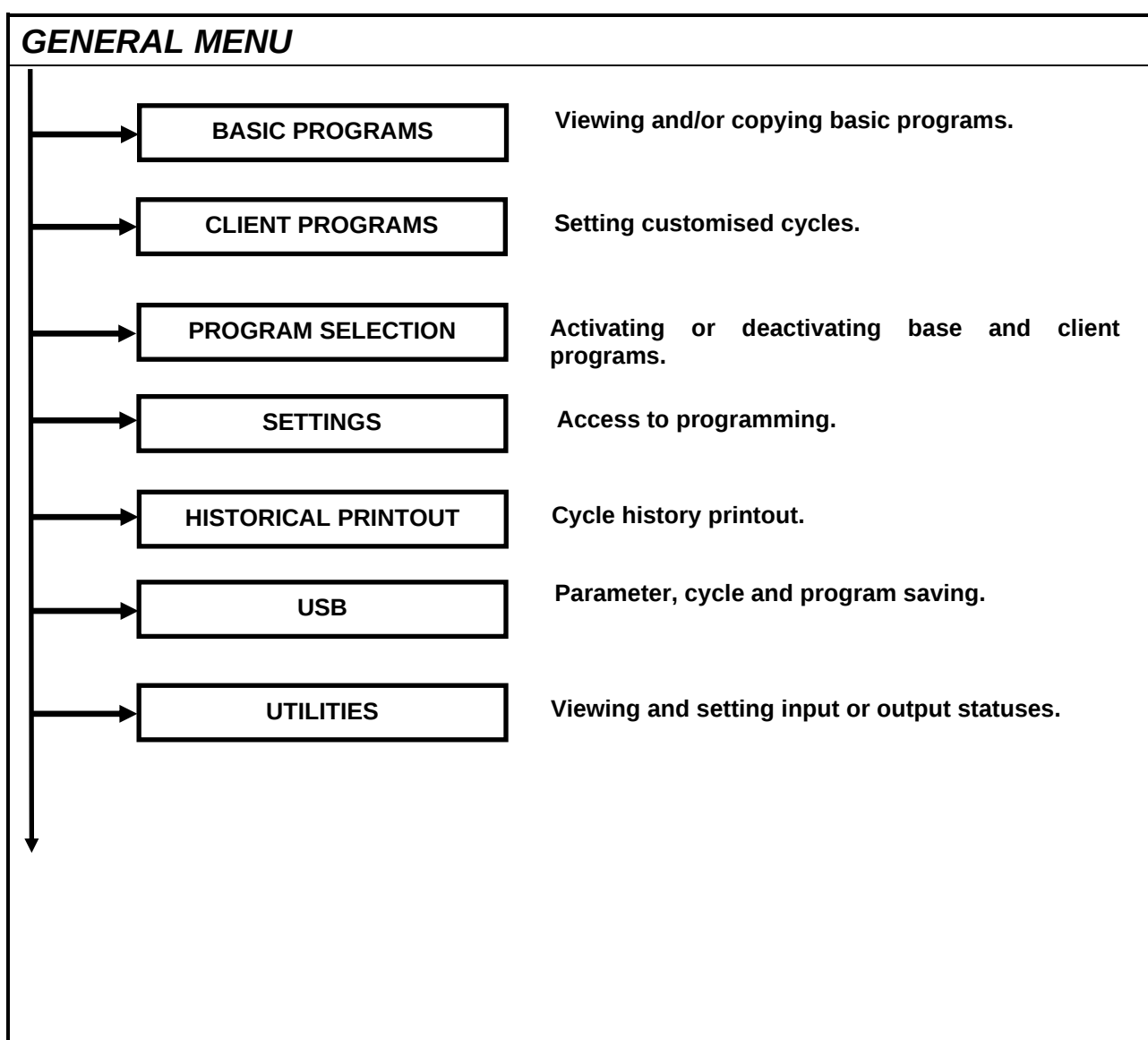
11. MENU

11.1 Access to menu

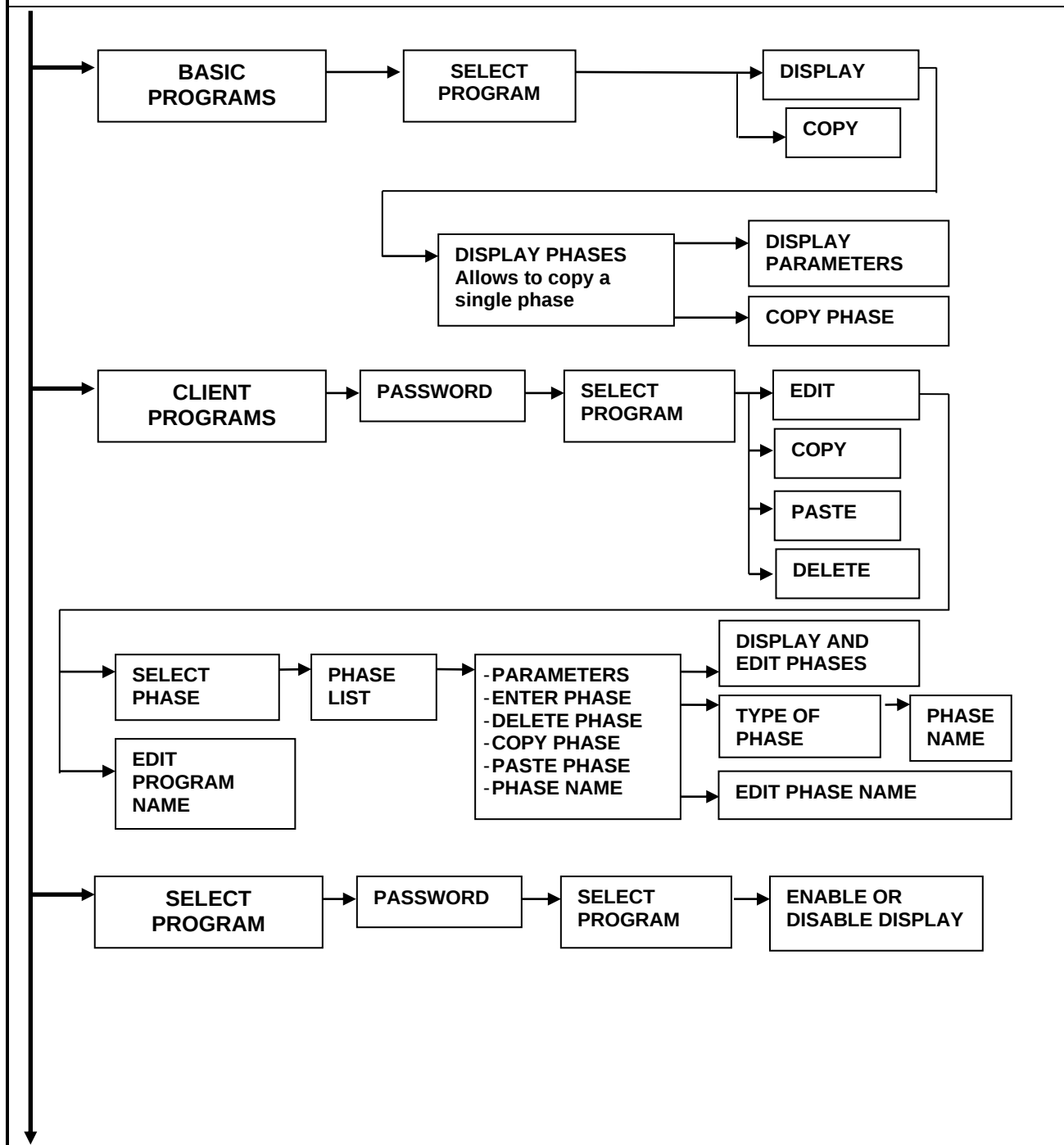
Open the menu by pressing the **PRG**  button for 5 seconds.

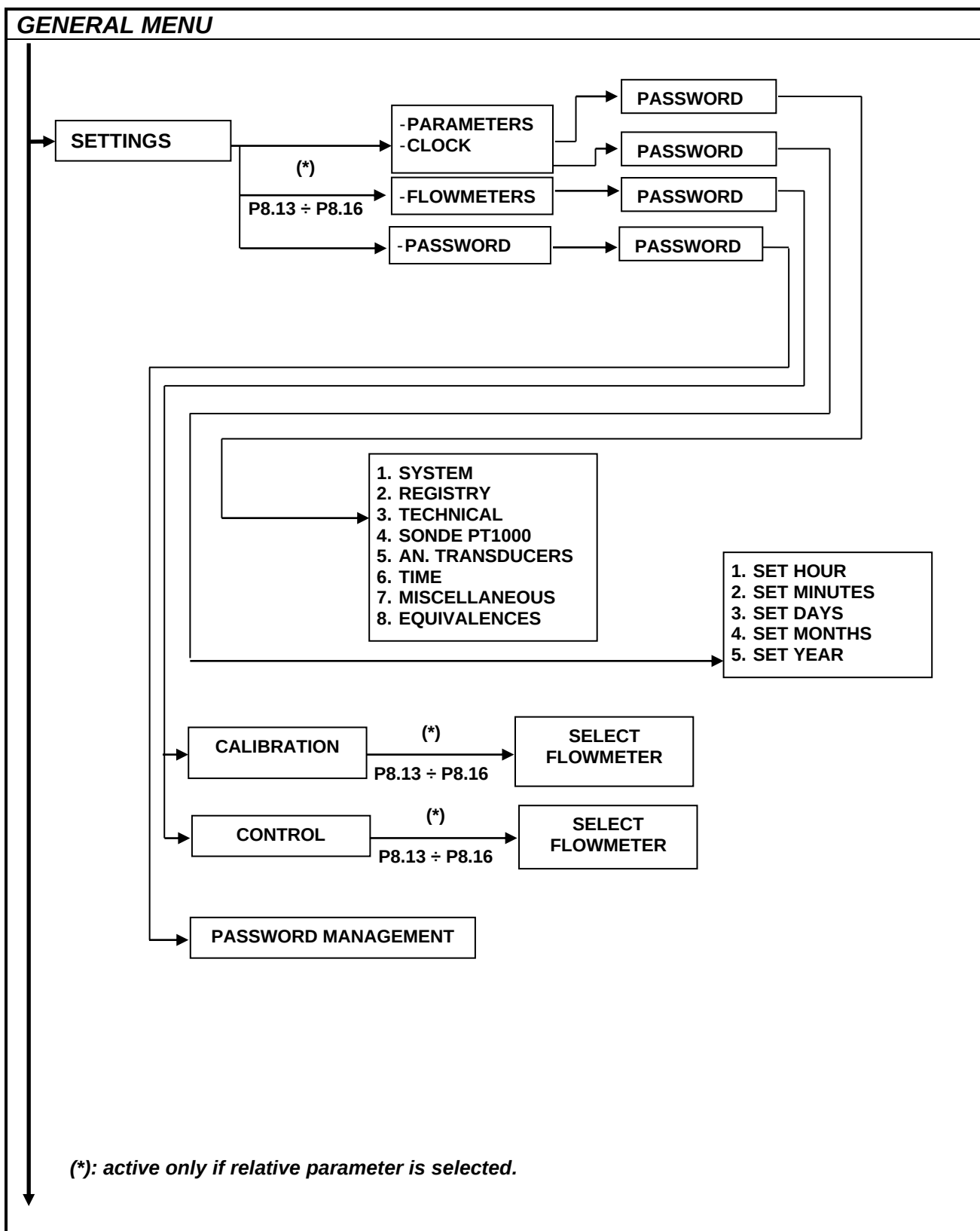
- The **P1**  and **P2**  buttons are used to scroll the various menu items.
- The **START**  key is used to confirm the selection, and the **STOP** key to go back to the previous menu.

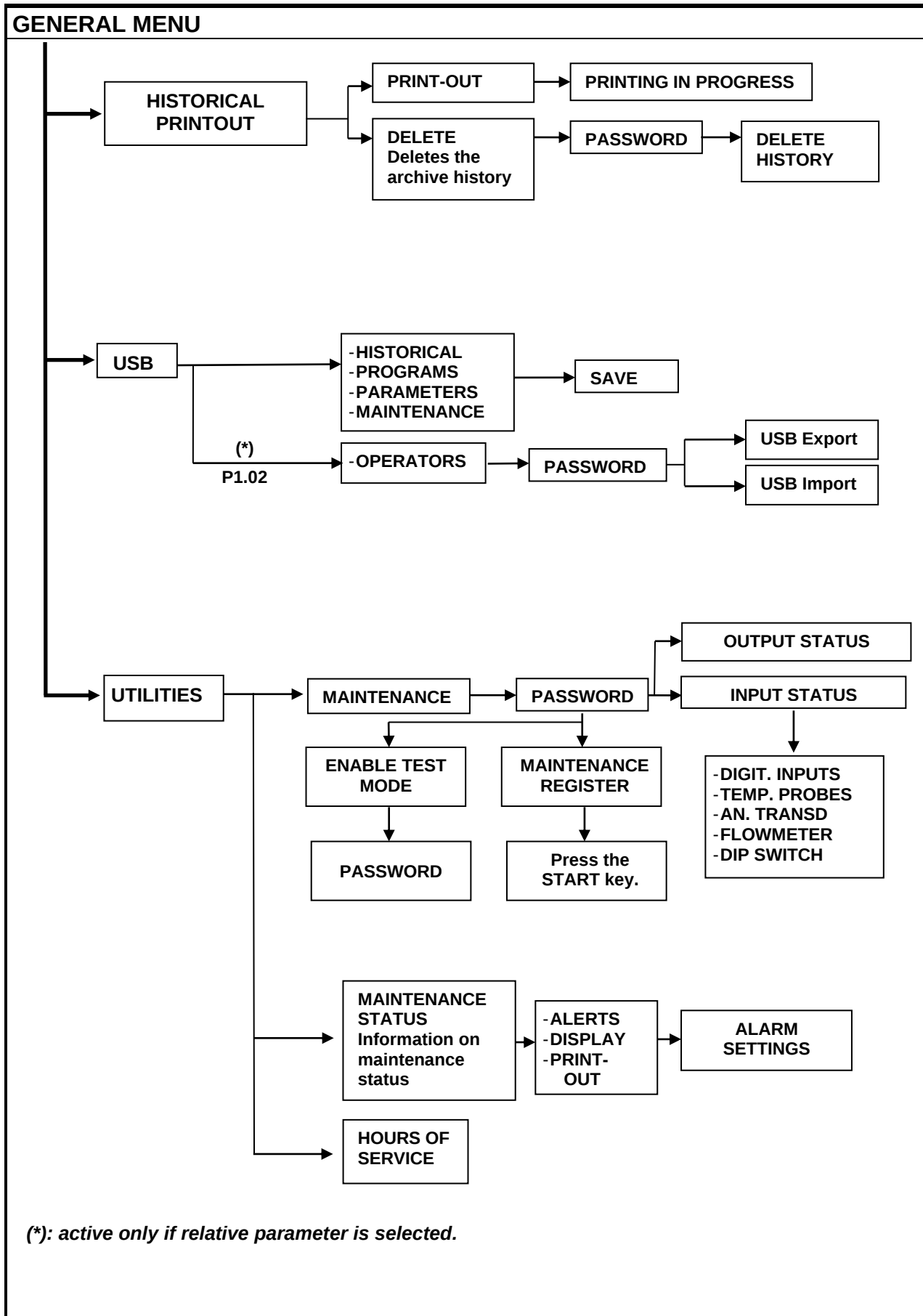
Holding the **STOP**  key pressed for 5 seconds closes the menu and takes the machine back to the standby or Lockout status.



GENERAL MENU







11.2 Parameter setting

A password will be requested for parameter setting, which will be entered using the **P1** and **P2** buttons.

If an incorrect password is entered, the menu is exited immediately.

By pressing buttons **P1** and **P2** it is possible to scroll through the various parameters. Press the **START** key to access the modification while pressing the **P1** and **P2** keys it is possible to increase or decrease the various parameters.

If the parameters are not changed, it is possible to exit the parameter setting with the **STOP** key.

ATTENTION:
ACCESS TO THE PROGRAMMING MENU IS ONLY PERMITTED TO AUTHORISED TECHNICAL PERSONNEL WITH A PASSWORD.

THE PASSWORD MUST BE REQUESTED FROM THE MANUFACTURER.

11.3 Parameter specifications

SW version 8.01			Key: sel=selection, sec=seconds, char=characters, num=number					
CATEG.	SECT.	PAR.	DESCRIPTION	U o M	MIN	MAX	NOTES	
SYSTEM DATA								
MACHINE	1	1	User name (16 characters).	char	,	~		
CYCLE	1	2	Operator identification; (0: no, 1: 1=password insertion via keypad, 2=bar code scanning)	sel	0	1		
PRINT-OUT	1	4	Graph print-out at end of cycle (0: no print-out, 1: graph print-out, 2: table print-out, 3: print on USB only)	num	0	3		
PRINT-OUT	1	5	Print results of cycle in progress (events, consumption,...).	sel	YES - NO			
PRINT-OUT	1	6	Automatic print to USB of results of cycle at end of cycle if graph printout is set P1.04 > 0	sel	0	1		
KEYBOARD	1	7	Buzzer volume keypad tone loading side (0: buzzer off).	num	0	50		
KEYBOARD	1	8	Buzzer volume end-of-cycle alert loading side (0: buzzer off).	num	0	50		
KEYBOARD	1	9	Buzzer volume alarm loading side (0: buzzer off).	num	0	50		
KEYBOARD	1	13	A0 value shown on display.	sel	0	1		
CYCLE	1	16	Enables warning that cycle history memory is full (0: no warning, 1: warning and does not prevent cycle start-up, 2: warning and prevents cycle start-up). Reset warning if complete cycle history printed on paper or on USB.	num	0	2		
KEYBOARD	1	18	Number of incorrect password insertions when accessing protected menus, which leads to the display of a password warning in the work screen (0: function disabled)	num	0	100		

SW version 8.01			Key: sel=selection, sec=seconds, char=characters, num=number					
CATEG.	SECT.	PAR.	DESCRIPTION	U o M	MIN	MAX	NOTES	
SUPERVISOR	1	19	Connection to the supervision system (Steelco Data)	sel	0	1		
SUPERVISOR	1	20	Machine IP address: field from 1 to 4	num	0	255		
SUPERVISOR	1	21	Gateway IP address: field from 1 to 4	num	0	255		
SUPERVISOR	1	22	Netmask IP: field from 1 to 4	num	0	255		
SUPERVISOR	1	23	Supervisor IP address: field from 1 to 4	num	0	255		
KEYBOARD	1	24	Menu settings in Miele mode (chemical product dose setting in %)	sel	0	1		
IDENTIFICATION DATA								
MACHINE	2	1	Machine model (8 characters).	char	,	~		
MACHINE	2	2	Machine serial number (character 5)	char	0	9		
MACHINE	2	3	Commissioning day.	num	1	31		
MACHINE	2	3	Commissioning month.	num	1	12		
MACHINE	2	3	Commissioning year.	num	10	99		
KEYBOARD	2	4	Language selection (NOTE: the available language depends on the machine's specific configuration.)	sel	ENGLISH ITALIAN GERMAN FRENCH SPANISH			
MACHINE	2	5	Station number.	num	0	99		
MACHINE	2	6	Client/distributor (16 characters).	char	,	~		
KEYBOARD	2	7	Font group selection: 0= European, 1= European+Japanese, 2= European+Cyrillic	num	0	2		
KEYBOARD	2	8	US System of Measurement (0: International).	sel	0	1		
TECHNICAL DATA								
PT1000	3	2	Enable registration probe (probe 2 in tank): 0: no, 1: on separate registration board, 2: on base board	sel	0	2		
PRINT-OUT	3	3	Printer installed on-board (0: none, 1: on board 1, 2: on both boards 1 and 2 (redundant printing for machines that manage it))	sel	0	1		
CYCLE	3	4	Activity after cycle interruption due to power failure (0: resumption from phase, 1: from start of cycle or 2: abort cycle)	sel	START STEP START PROGRAM END CYCLE			
CYCLE	3	5	Activity after cycle interruption due to alarm (0: resumption from phase, 1: from start of cycle or 2: abort cycle)	sel	START STEP START PROGRAM END CYCLE			
CHEMICAL PRODUCTS	3	6	Behaviour if chemical additive lacking (0: alert, 1: alarm with machine lockout)	sel	ALERT ALARM			
BOILER	3	8	Boiler presence (demineralised water heating)	sel	YES - NO			
PUMPS	3	13	Tank spray arms wash pump pressure switch	sel	YES - NO			
DRAIN	3	18	Cold water solenoid valve for discharge cooling (0=absent, 1=present on dedicated outlet)	sel	0	1		

SW version 8.01			Key: sel=selection, sec=seconds, char=characters, num=number					
CATEG.	SECT.	PAR.	DESCRIPTION	U o M	MIN	MAX	NOTES	
DRYING	3	20	Enable drying (0: no, 1: normally selected, 2: normally deselected, 3: always enabled)	num	0	3		
PUMPS	3	23	Transducer (4-20 mA) to control spray arms pump pressure	sel	YES - NO			
WATER	3	25	Analogue probe (4-20 mA) for electrical conductivity.	sel	YES - NO			
DOORS	3	29	Solenoid door lock.	sel	YES - NO			
BOILER	3	30	Configuration of cold water on boiler	sel	YES - NO			
DOORS	3	31	Door safety switch presence for UL compliance.	sel	YES - NO			
PT100	3	33	Drying probe presence	sel	YES - NO			
SYSTEM	3	35	Enable power reduction.	sel	YES - NO			
WATER	3	37	No demineralised water (1: fill cold water in its place)	sel	0	1		
WATER	3	38	No hot water (1: fill cold water in its place)	sel	0	1	Default value:1	
CYCLE	3	51	Number of automatic cycle repetitions for wash test (0=no repetition)	num	0	100		
DRYING	3	56	Value % modulating low speed drying control (0=non-modulating fan 0/10V)	%	0	100		
DRYING	3	57	Value % modulating high speed drying control (0=non-modulating fan 0/10V)	%	0	100		
STEAM COND.	3	58	Steam extraction steam condensing presence	sel	0	1		
PT 1000 PROBE								
PT 1000	4	1	ZERO offset probe 1 tank.	°C	-9.9	9.9		
PT 1000	4	2	SPAN offset probe 1 tank (in reference to 100°C).	°C	-9.9	9.9		
PT 1000	4	3	ZERO offset probe 2 tank.	°C	-9.9	9.9		
PT 1000	4	4	SPAN offset probe 2 tank (in reference to 100°C).	°C	-9.9	9.9		
PT 1000	4	5	ZERO offset drying probe	°C	-9.9	9.9		
PT 1000	4	6	SPAM offset drying probe (in reference to 100°C).	°C	-9.9	9.9		
PT 1000	4	7	ZERO offset boiler or canister1 probe	°C	-9.9	9.9		
PT 1000	4	8	SPAN offset boiler or canister1 probe (in reference to 100°C)	°C	-9.9	9.9		
ANALOGUE TRANSDUCERS								
PUMPS	5	1	Pressure scale lower limit.	bar	-1	P5.02		
PUMPS	5	2	Pressure scale upper limit.	bar	P5.01	3		
WATER	5	3	Electrical conductivity scale lower limit.	uS/cm	0	P5.04		
WATER	5	4	Electrical conductivity scale upper limit.	uS/cm	P5.03	20000		

SW version 8.01			Key: sel=selection, sec=seconds, char=characters, num=number					
CATEG.	SECT.	PAR.	DESCRIPTION	U o M	MIN	MAX	NOTES	
TIME DATA								
TANK	6	1	Max time for 1°C increase in tank.	s	0	999		
BOILER	6	2	Max timeout for 1°C increase in boiler or canisters.	s	0	999		
DRAIN	6	3	Max drainage time.	s	0	999		
DRAIN	6	4	Max discharge time with rinse water filling.	s	0	999		
WATER	6	5	Max timeout for cold water filling in tank or for canister3 water filling/draining level.	s	0	999		
WATER	6	6	Max timeout for hot water filling in tank or for canister2 water filling/draining level.	s	0	999		
WATER	6	7	Max timeout for demi water filling in tank or for canister1 water filling/draining or boiler filling level.	s	0	999		
WATER	6	8	Max timeout for cold + hot water level.	s	0	999		
WATER	6	9	Max timeout for cold + demi water level.	s	0	999		
WATER	6	10	Max timeout for hot + demi water level	s	0	999		
CHEMICAL PRODUCTS	6	12	Max timeout for chemical product flowmeter pulse.	s	0	99.9		
DOORS	6	13	Max timeout for door lock opening.	s	0	99.9		
DOORS	6	14	Max timeout for door lock closure.	s	0	99.9		
DOORS	6	15	Maximum time for door opening/closing (automatic door)	s	0	99.9		
PUMPS	6	17	Pump pressure switch reading delay.	s	0	99.9		
SYSTEM	6	18	Delay on thermal cut-out reading or heating element return inlet (0: diagnostics disabled)	s	0	99.9		
DRYING	6	19	Delay on fan pressure switch reading (0: diagnostics disabled)	s	0	99.9		
CHEMICAL PRODUCTS	6	20	Chemical product system fill time doser 1 after alarm.	s	0	999.9		
CHEMICAL PRODUCTS	6	21	Chemical product system fill time doser 2 after alarm.	s	0	999.9		
CHEMICAL PRODUCTS	6	22	Chemical product system fill time doser 3 after alarm	s	0	999.9		
CHEMICAL PRODUCTS	6	23	Chemical product system fill time doser 4 after alarm	s	0	999.9		
BOILER	6	24	Time after cycle inactivity for boiler or canister power-off.	h	0	24		
DRAIN	6	25	Discharge cooling solenoid valve activation time	s	0	99.9		
STEAM COND.	6	26	Steam condenser solenoid valve OFF time.	s	0	99.9		
STEAM COND.	6	27	Steam condenser solenoid valve ON time.	s	0	99.9		
PUMPS	6	28	Fractional wash pump OFF time.	s	0	99.9		

SW version 8.01			Key: sel=selection, sec=seconds, char=characters, num=number					
CATEG.	SECT.	PAR.	DESCRIPTION	U o M	MIN	MAX	NOTES	
PUMPS	6	29	Fractional wash pump ON time.	s	0	99.9		
DRAIN	6	30	Discharge cycle OFF time.	s	0	99.9		
DRAIN	6	31	Discharge cycle ON time.	s	0	99.9		
DRYING	6	36	Low speed drying fan OFF time	s	0	99		
DRYING	6	37	Low speed drying fan ON time	s	0	9.9		
DRYING	6	38	Fan power-off delay (post-ventilation)	s	0	999		
BOILER	6	39	Boiler or canister filling delay after full level activation.	s	0	99		
DOORS	6	40	Door 1 lock opening ON delay after limit switch activation.	s	0	9.9		
DOORS	6	41	Door 1 lock closing ON delay after limit switch activation.	s	0	9.9		
REGENERAT.	6	44	Pause time during regeneration.	s	0	999		
REGENERAT.	6	45	Water filling time for regeneration.	s	0	999		
REGENERAT.	6	46	Cold water filling time for rinsing in regeneration.	s	0	999		
PRINT-OUT	6	47	Sampling time for temperature and pressure graphs in tank.	s	5	99		
CYCLE	6	48	Recurrence in months for notification of next maintenance since last service.	num	1	99		
CYCLE	6	49	Increment in machine hours for notification of next maintenance since last service.	h	1	9999		
VARIOUS DATA								
DRAIN	7	1	Number of fractional discharge cycles.	num	1	99		
BOILER	7	2	Boiler or canister1 standby temperature.	°C	0	80		
BOILER	7	3	Boiler or canister1 cycle temperature.	°C	0	80		
TANK	7	7	Min water quantity in tank.	L	0	P7.08		
TANK	7	8	Max water quantity in tank.	L	P7.07	99		
TANK	7	11	Max tank probe difference.	°C	0	99		
TANK	7	12	Min temperature to check max tank probe difference.	°C	0	95		
DRYING	7	13	Min temperature to be reached in drying (ventilated)	°C	0	100		
PREWASH	7	14	Max allowed temperature in chamber during prewash phase.	°C	0	95		
DRAIN	7	15	Min temperature for drain cooling activation.	°C	0	100		
STEAM COND.	7	16	Min temperature for steam condenser solenoid valve ON-OFF activation (in treatment phase).	°C	0	95		
WATER	7	19	Max electrical conductivity limit of water in tank.	uS/cm	0	20000		

SW version 8.01			Key: sel=selection, sec=seconds, char=characters, num=number					
CATEG.	SECT.	PAR.	DESCRIPTION	U o M	MIN	MAX	NOTES	
CHEMICAL PRODUCTS	7	21	Max surplus impulses by chemical flowmeter after turning off the doser.	num	0	99		
TANK	7	22	A0 temperature interval.	°C	0	99		
TANK	7	23	A0 reference temperature.	°C	0	99		
TANK	7	24	A0 lower temperature limit.	°C	0	99		
PRINT-OUT	7	25	Graph horizontal resolution (pixel/hour).	num	240	1000		
REGENERAT.	7	26	Regeneration [stored val./displayed val./no. complete cycles after which it is run] 1/10/never, 2/15/30, 3/20/25, 4/25/21, 5/30/18, 6/35/15, 7/40/12, 8/45/9, 9/50/6, 10/55/3, 11/60/1	sel	1	11		
REGENERAT.	7	27	Number of regenerations for salt loading alert.	num	1	18		
KEYBOARD	7	28	Program selected in position 1 (key).	num	1	40		
KEYBOARD	7	29	Program selected in position 2 (key).	num	1	40		
KEYBOARD	7	30	Program selected in position 3 (key).	num	1	46		
TANK	7	31	Temperature difference above setpoint for deactivation of tank heating, for lower setpoint at 90°C	°C	P7.32	3		
TANK	7	32	Temperature difference above setpoint for reactivation of tank heating, for lower setpoint at 90°C	°C	0.1	P7.31		
TANK	7	33	Temperature difference above setpoint for deactivation of tank heating, for setpoint equal to or greater than 90°C	°C	P7.34	3		
TANK	7	34	Temperature difference above setpoint for reactivation of tank heating, for setpoint equal to or greater than 90°C	°C	0.1	P7.33		
EQUIVALENCES								
CHEMICAL PRODUCTS	8	5	Chemical product at doser 1: pulses/millilitre (flowmeter).	IMP/ mL	0	9.999		
CHEMICAL PRODUCTS	8	6	Chemical product at doser 2: pulses/millilitre (flowmeter).	IMP/ mL	0	9.999		
CHEMICAL PRODUCTS	8	7	Chemical product at doser 3: pulses/millilitre (flowmeter).	IMP/ mL	0	9.999		
CHEMICAL PRODUCTS	8	8	Chemical product at doser 4: pulses/millilitre (flowmeter).	IMP/ mL	0	9.999		
CHEMICAL PRODUCTS	8	9	Chemical product at doser 1: sec/millilitre (timed).	SEC/ mL	0	9.999		
CHEMICAL PRODUCTS	8	10	Chemical product at doser2: sec/millilitre (timed).	SEC/ mL	0	9.999		
CHEMICAL PRODUCTS	8	11	Chemical product at doser 3: sec/millilitre (timed).	SEC/ mL	0	9.999		
CHEMICAL PRODUCTS	8	12	Chemical product at doser4: sec/millilitre (timed)	SEC/ mL	0	9.999		
CHEMICAL PRODUCTS	8	13	Chemical product to doser1: dosing mode (0: impulse-based, 1: time-based)	sel	IMPULSE – TIME			

SW version 8.01			Key: sel=selection, sec=seconds, char=characters, num=number					
CATEG.	SECT.	PAR.	DESCRIPTION	U o M	MIN	MAX	NOTES	
CHEMICAL PRODUCTS	8	14	Chemical product to doser2: dosing mode (0: impulse-based, 1: time-based)	sel	IMPULSE – TIME			
CHEMICAL PRODUCTS	8	15	Chemical product to doser3: dosing mode (0: impulse-based, 1: time-based)	sel	IMPULSE – TIME			
CHEMICAL PRODUCTS	8	16	Chemical product to doser4: dosing mode (0: impulse-based, 1: time-based)	sel	IMPULSE – TIME			
CHEMICAL PRODUCTS	8	17	Reference for automatic calibration of chemical flowmeters. If P2.08=YES, the value is expressed in fluid ounces/10.	mL	1	999		

11.4 General information on the electronic board

Electronic board designed to control an instrument washer.

No different use other than as specified above is permitted.

The electronic board has been designed in compliance with the requirements of the following reference standards:

EN 60335	Low voltage
EN 61000-6-3	Emission
EN 61000-6-1	Immunity

11.5 Basic board equipment

SERIAL INTERFACE

Com1:

Low voltage bus for bidirectional communication with the keyboard board.

Com2:

RS232 asynchronous serial interface for connection to PC or Printer.

11.6 Activation and viewing of devices

It is possible to view the status of the various devices making up the machine.

Enter the menu: **UTILITY → MAINTENANCE → Insert 3rd level password → INPUT STATUS.**

Press buttons **P1** and **P2** to scroll the list of devices, and press the **START** button to select the type of input to be displayed. After selecting the type of input, press key **P1** to show the status of the various inputs. The status of the input is shown on the side of the display. If the input is not active, the word **OFF** appears, if the input is active, the word **ON** appears.

The various devices making up the machine can be manually activated, except for the heating elements.

Enter the menu: **UTILITY → MAINTENANCE → Insert 3rd level password → OUTPUT STATUS.**

Press buttons **P1** and **P2** to scroll the list of devices, and press the **START** button to select the relay to be activated. After selecting the relay, press **P1** to activate it and press **P2** to deactivate it. The status of the relay is shown on the side of the display. If the relay is off, the word **OFF** appears, if the relay is on, the word **ON** appears.

If a relay cannot be activated, the word "**PROHIBITED**" appears.

	ATTENTION
	For specifications relating to inputs and outputs, refer to the wiring diagram.

11.7 Password management

Access to programming and the menu is protected by three password levels:

- **1st level:** *operator password* – allows access to the program selection, to the history and USB menu (viewing and printout, not history deletion).
- **2nd level:** *technical password* – allows access to all menus, but with limited editing possibilities.
- **3rd level:** *manufacturer password* – allows full access to all menus and machine settings.

The password consists of 4 characters, each of which can be set as follows:

- numbers from “0” to “9”;
- upper-case English alphabet from “A” to “Z”;
- lower-case English alphabet from “a” to “z”;
- space “ ”;
- minus sign “-”;
- point “.”.

11.7.1 Password change

To reset the password, proceed as follows:

Enter the menu: **SETTINGS → PASSWORD → Insert 3rd level password (currently in force)**

Select the password to be changed by pressing the **START** button.

When the new password is entered, the four characters will be represented by asterisks ****. The character selected for editing flashes.

Pressing buttons **P1** and **P2** sets the value of the character, while the **START** status is used to confirm the selection and proceed to the next character.

To confirm the newly entered password, press the **START** button.

The user will be asked to enter the new password: if the entered password coincides with the first password entered, the message **CHANGE - SUCCESSFUL** - appears, otherwise, if the password is incorrect, the **ERROR** message appears.

In case of an **ERROR**, or if the **STOP** button is pressed to exit the menu, the password is not changed and the existing password remains valid.

	ATTENTION Forgotten passwords cannot be recovered. Contact the manufacturer to receive a temporary password. This password can only be used to access the password change menu to set the new passwords.
--	---

11.7.2 Too many failed passwords alert

The aim of the “**PASSWORD ALERT**” is to notify any attempts to tamper with the menus by unauthorised personnel.

It is displayed each time the number of password attempts set in the parameter **P 1.18** is exceeded (if **P 1.18=0** the alert function is disabled).

To reset the alert, open the password programming menu by entering the password.

12. CALIBRATION PROCEDURE

Chemical products can have different viscosities; therefore, it is advisable to recalibrate the dosing system every time a chemical product different from the type used previously is loaded into the container. According to the machine configuration and the setting of the parameters **P8.13 ÷ P8.17** the dosing of the chemical products can be time-based or impulse-based (in this case **ONLY** if there are flowmeters, which can be ordered as **OPTIONAL ACCESSORIES**).

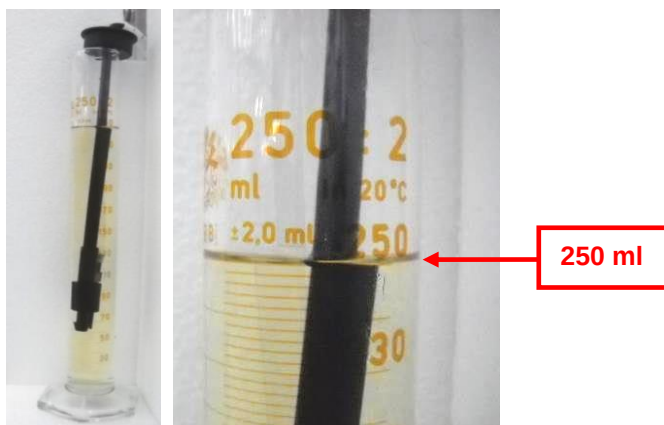
	ATTENTION
	There is a risk of contact with the chemical product, therefore wear appropriate PPE (chemical protective gloves, respiratory protection mask, goggles, etc.) while performing the operations. Chemical products are irritants for eyes, in case of contact wash immediately with plenty of water and consult a doctor; in case of contact with the skin, wash with plenty of water.

12.1 Timed dosing

In order to correctly calibrate the dosing system, check that the chemical product dosing system is completely filled. A timer is required for this type of calibration.

12.1.1 Calibration

Insert the chemical product level gauge into the graduated calibration cylinder and fill it with the chemical up to 250 ml.



Chemical product

To calibrate the time-based dosing system, it is necessary to manually activate the dosing device.

Enter the menu: **UTILITY → MAINTENANCE → Insert 3rd level password → OUTPUT STATUS.**

Press buttons **P1** and **P2** to scroll the list of devices.

Once the device to be calibrated has been selected (see section 11.6), press **P1** to activate the device, and at the same time, also the timer to start timing the dosing.

Press **P2** to deactivate the device when the graduated cylinder level has reached 100 ml and stop the timer.



Chemical product

Calculate the calibration value, given by the ratio between the time value measured by the timer and the actual amount of chemical dosed (e.g. 45 sec / 100 ml = 0.45).

Enter the previously calculated value in the relative parameter of the doser in the EQUIVALENCES section.

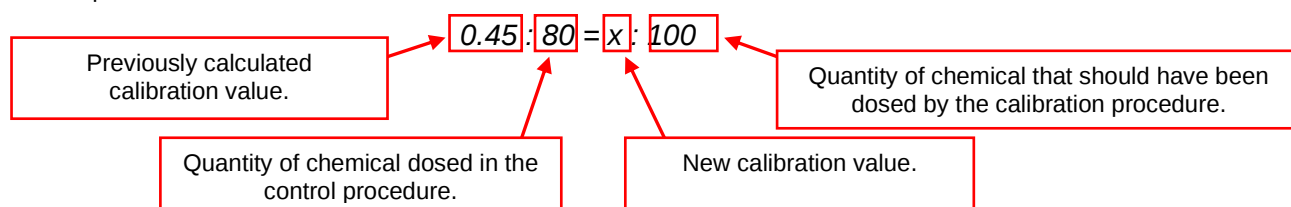
AFTER CALIBRATING THE CHEMICAL PRODUCT, IT IS NECESSARY TO CARRY OUT A RINSING CYCLE WITHOUT TOOLS INSIDE THE CHAMBER.

12.1.2 Control

After calibration, the efficacy of the calibrations must be checked by means of a control procedure:

- Manually activate the dosing device and the timer to start measuring the time.
- When the timer reaches the dosing time measured in the previous calibration procedure, deactivate the dosing device.
- Check that the chemical product level in the graduated cylinder is 100 ml or the same amount dosed in the previous calibration procedure.
- If the chemical product level dosed is correct, the calibration procedure is complete. Then confirm the calibration procedure for the other dosing devices.
- If not, calculate the new calibration value, taking into account the previously calculated calibration value and the quantity of chemical product dosed.

Example:



- Enter the new value in the relative parameter of the doser in the "EQUIVALENCES" section.
- Check the efficacy of the calibration by means of another control procedure.

12.2 Pulse dosing

In order to correctly calibrate the dosing system, check that the chemical product dosing system is completely filled.

12.2.1 Calibration

Enter the menu: **FLOWMETER** → **SETTING** → Insert the 2nd level → **CALIBRATION** password.

Select the flowmeter to be calibrated using buttons **P1** and **P2**.

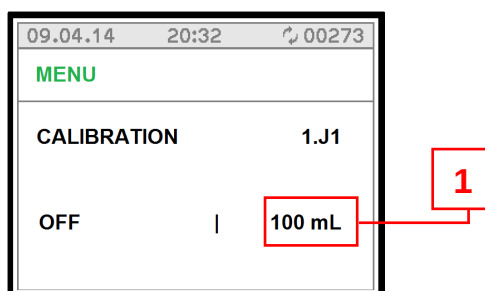
ATTENTION: If the flowmeter is not present, the message “**PROHIBITED**” appears.

Insert the chemical product level gauge into the graduated calibration cylinder and fill it with the chemical up to 250 ml.



Detergent

Once the flowmeter to be calibrated has been selected (see section 11.6) press **START** to start the procedure and **CONFIRM**.



Press **START** when the graduated cylinder level has reached the indicated quantity (**1**). To stop the procedure, press **STOP**.

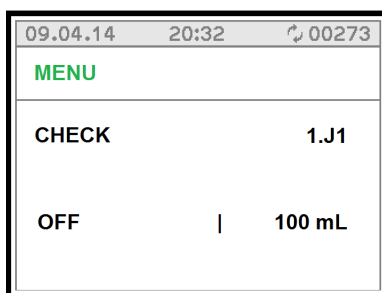


Detergent

12.2.2 Control

After calibration, it is necessary to check the efficacy of the calibration by means of a control procedure.

Enter the menu: **FLOWMETER → SETTING → Insert the 2nd level → CONTROL password.**



Select the chemical flowmeter to be checked and press **START** to start the calibration check.

Once dosing has ended, the level of chemical product in the graduated cylinder should be the same as that shown on the display.



Detergent

If the levels do not correspond, a new calibration needs to be performed.

The quantity of product to be used in the calibration can be changed using parameter 8.17.

AFTER CALIBRATING THE CHEMICAL PRODUCT, IT IS NECESSARY TO CARRY OUT A RINSING CYCLE WITHOUT TOOLS INSIDE THE CHAMBER.

13. CLOCK

- The board is equipped with a real-time clock.
- The time provided will also be used to qualify the event history.

14. EVENT LOG

During the operating cycle, the machine saves all the wash cycle operating data on a dedicated electronic board.

- The board is able to store the fields described below up to a maximum of 200 cycles. For each cycle, the fields will be saved as per the following example:

DATE	START	PROGRAM	MAX °C	HOLDING>85°C	ERRORS
	12.00	Short	93°C	60 seconds	01
	13.05	Standard	94°C	180 seconds	01

- When 95% of the available storage capacity is reached, an alert will be sent to download the log. To remove the message, insert the USB stick in the dedicated port and open the menu. Select the USB menu and download the event log from the machine.
- The various types of blocking alarms will be indicated in the ERRORS section by an alarm code.

15. PC INTERFACE

The board will provide an RS232 communication channel on Modbus protocol.

Through this channel it will be possible to access the event log by setting the printer as follows:

- **baud rate:** 9600 baud, X ON X OFF
- **data bits:** 8bits,
- **parity:** none.

16. ALARM MESSAGES

16.1 Logical description of alarms

During machine operation, the operator is aided by **ALARMS** or **ALARM MESSAGES** shown on the operator panel display informing them of the operating status, possible active errors and any active machine alarms.

The activation of an **ALARM** during the system's operation is indicated to the operator by way of a message that appears on the operator panel.

The alarm that appears on the panel stays active until the root cause is removed. An active alarm stops the wash cycle in progress.

16.2 List of alarm messages

The possible alarms that may occur during a work cycle are shown on the control panel display.

The message shows the number of the alarm that was triggered and its name; the complete list of possible alarm messages is shown below.

COD. ALARM	MESSAGE DISPLAYED	DESCRIPTION
1	elec.interruption	Indicates the interruption to the electrical power supply when it is restored (P3.04= END OF CYCLE).
2	l. door open	Loading side door has opened or/and was unlocked during the cycle under way
4	l.d. locked op.	Loading side door is open and locked (inconsistency).
7	l.d. not locked	Triggered in the following possible situations (loading side door): a) the door was not locked within the set time P6.14 . b) the door was opened when the door had started locking
9	l.d. not unlocked	The loading door was not unlocked before the set time P6.13 .
11	no cold	The tank was not filled with cold water within the set time (time P6.05 for level check or no new impulse for more than P6.11 for flowmeter check).
12	no hot	The tank was not filled with hot water within the set time (time P6.06 for level check or no new impulse for more than P6.11 for flowmeter check).
13	no demineral.	The tank was not filled with demineralised water within the set time (time P6.07 for level check or no new impulse for more than P6.11 for flowmeter check). For demineralised water filling in the boiler (if present), the check is via the level switch (+filling delay) with reference to time P6.07 .
14	no c.h. water	The cold + hot water filling level was not reached within the set time P6.08 (Level check).
15	no c.d. water	The cold + demineralised water filling level was not reached within the set time P6.09 (Level check).
16	no h.d. water	The hot + demineralised water filling level was not reached within the set time P6.10 (Level check).
17	no prod.dos.1	The product associated with doser 1 (detergent) is finished (if enabled as an alarm by parameter P3.06). Diagnostics (controlled doser pump active): - pressure switch status if pressure switch present; - no new impulse for more than the set time P6.12 if flowmeter dosing or timed dosing with flowmeter redundancy.
18	no prod.dos.2	The product associated with doser 2 (neutralising agent) is finished (if enabled as an alarm by parameter P3.06). Diagnostics (controlled doser pump active): - pressure switch status if pressure switch present; - no new impulse for more than the set time P6.12 if flowmeter dosing or timed dosing with flowmeter redundancy.

COD. ALARM	MESSAGE DISPLAYED	DESCRIPTION
19	no dos.prod. 4	The product associated with doser 4 (soda ash) is finished (if enabled as an alarm by parameter P3.06). Diagnostics based on (with activated dosing pump): pressure switch disabled if time-based dosage (1.5 s reading delay); no new impulse for more than time P6.12 in the case of flowmeter dosing.
20	no prod.dos.3	The product associated with doser 3 (lubricant) is finished (if enabled as an alarm by parameter P3.06). Diagnostics (controlled doser pump active): - pressure switch status if pressure switch present; - no new impulse for more than the set time P6.12 if flowmeter dosing or timed dosing with flowmeter redundancy.
23	Drain timeout	Triggered if after a settable discharge solenoid valve (or pump) activation time, the tank level is still active (tank not emptied); the timeout refers to: - parameter P6.03 for drainage without water input. - parameter P6.04 for drainage with water input (rinsing).
24	Fan	Diagnostics active if P6.19 is not zero, for the following situations: - the fan pressure switch is inactive, having sent a command to turn the fan on at maximum speed; - the fan pressure switch is active, having sent a command to turn the fan off. The pressure switch reading is subject to the delay P6.19.
25	Min drying °C	The air temperature did not reach the min limit set by parameter P7.13 during drying (or did not reach the drying setpoint when the value of the latter is less than P7.13).
26	Max prewash °C	The tank temperature has risen above the maximum limit P7.14 during the prewash phase.
27	Lim tank probe °C	The temperature in the wash tank exceeds the limit 102°C (operating limit to protect against overheating).
28	Lim air probe °C	The air temperature exceeds the limit 162°C (operating limit to protect against overheating).
29	Lim boiler probe °C	The boiler temperature exceeds the value 100°C (operating limit to protect against overheating). In the 3S model with canister1 present, it refers to the canister1 water probe.
30	Tank probe	Fault in wash tank temperature probe 1 (regulation probe)
31	Probe 2 tank	Fault in wash tank temperature probe 2 (redundancy probe).
32	Air probe	Fault in air temperature probe (drying probe).
33	boiler probe	Fault in boiler temperature probe. In the 3S model with canister1 present, it refers to the canister1 water probe.
34	temp. control	Triggered when P3.02=YES, only during the treatment phase and if all the following conditions are satisfied: - the wash tank temperature is greater than the limit set by P7.12; - the wash tank probe 2 differs from probe 1 by an absolute value greater than the maximum limit set by P7.11; - the heating element in the tank is inactive (the heating elements in the tank are off or steam heating is inactive); conditions (a, b, c) are continuously present for more than 30 s.
35	serial1 loading	Interruption in communication on serial connecting the base board to the lcd keypad (loading side)
39	no tank heat.	During <u>electrical</u> tank heating (tank heating element 1 on) the temperature increased by less than 1°C during the set time P6.01 .
41	no boiler heat.	During <u>electrical</u> boiler heating (boiler heating element on) the boiler temperature increased by less than 1°C during the set time P6.02. In the 3S model with canister1 present, it refers to the water1 canister, with electric or steam heating.
45	Capacitor pump	The max steam condenser level is active (also the minimum): probable steam condenser/discharge pump fault

COD. ALARM	MESSAGE DISPLAYED	DESCRIPTION
46	pump	The wash pump pressure switch is closed with the pump set to on, or is open with the pump set to off (the diagnostics with the pump set to on are bypassed during water filling and during active discharge).
47	error flow.1	The flowmeter for the chemical additive 1 signals surplus impulses above the limit P7.21 with the doser pump set to off.
48	error flow.2	The flowmeter for the chemical additive 2 signals surplus impulses above the limit P7.21 with the doser pump set to off.
49	flow error 4	The flowmeter for the chemical additive 4 (soda ash) signals surplus impulses above the limit P7.21 , with doser pump set to off.
50	error flow.3	The flowmeter for the chemical additive 3 signals surplus impulses above the limit P7.21 with the doser pump set to off.
55	conduct. probe	Conductivity probe fault.
56	conductivity	The conductivity value exceeds the maximum limit P7.19 .
60	TIME	In the treatment phase, the thermoregulation timeout (equal to 30 min) which began to count the first time the temperature in the wash tank reaches the set point + 0.5°C (with the water supply completed and any gradual chamber cooling concluded) has expired. Notifies an undefined situation of permanence in the phase for the following possible reasons: - temperature fluctuations above/below the set point due to a structural defect in the flue; - incorrect chemical input temperature setting (>than thermoregulation set point)
67	ALARM	Configuration error.
65	Door limit switch	For machine with CV_EV, it is tripped in the following circumstance: with the door open drive on, the open door limit switch did not switch in the active and inactive state sequence within the maximum time P6.15 . For machine with BM Door, it is tripped in the following circumstances. The maximum hot air vent opening is not reached within the maximum time P6.15 (the overrun limit switch did not switch to the active state within said time during the vent opening movement after door unlocking). - The door lock and unlock limit switches with the arm drive off are both active or both inactive (inconsistency) for more than 2 s. - The door fully open limit switch and the door engaged micro-switch are both active (inconsistency). - With the arm drive in closing for repositioning, the arm did not fully retract within the maximum time P6.15 With the arm drive in opening for repositioning, the arm did not re-position within the maximum time P6.13 (maximum unlocking time). With the arm drive off and with vent opening and arm repositioning complete, the overrun micro-switch is at active level with the door unlocked, or at inactive level with the door closed (engaged) and locked (delay time 2 s).
100	CAN serial	Diagnostics active if P1.19 is not zero Interruption of communication on the Can bus serial between the master board and the Can/Ethernet gateway for interfacing to the supervisor (diagnostics carried out with the machine in Wait status)

DESCRIPTION OF MODEL ALERTS

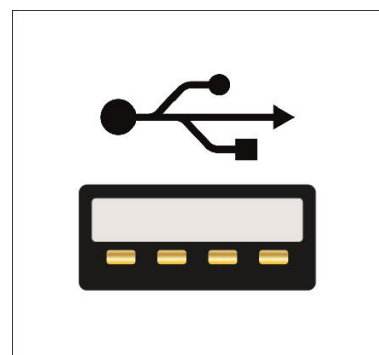
MESSAGE DISPLAYED	DESCRIPTION
press start	The machine is ready to start a wash cycle in the machine Stand-by status (in the case of 2 doors, the loading door must have been opened and closed at least once after the end cycle ok).
no prod.dos.1	The product associated with dosing pump 1 (detergent) is finished (if enabled as an <u>alert</u> by parameter P3.06). Diagnostics based on (with activated dosing pump): • pressure switch disabled if time-based dosage (1.5 s reading delay); • no new impulse for more than the time P6.12 if dosing by flowmeter. For flowmeter dosing it can be set as a <u>pre-alert</u> that the product is nearly finished (reserve level), based on the level switch status: • level switch inactive (4.0 s reading delay).
no prod.dos.2	The product associated with dosing pump 2 (neutralising agent) is finished (if enabled as an <u>alert</u> by parameter P3.06). Diagnostics based on (with activated dosing pump): • pressure switch disabled if time-based dosage (1.5 s reading delay); • no new impulse for more than the time P6.12 if dosing by flowmeter. For flowmeter dosing it can be set as a <u>pre-alert</u> that the product is nearly finished (reserve level), based on the level switch status: • level switch inactive (4.0 s reading delay).
no prod.dos.3	The product associated with dosing pump 3 (soda ash) is finished (if enabled as an <u>alert</u> by parameter P3.06). Diagnostics based on (with activated dosing pump): • pressure switch disabled if time-based dosage (1.5 s reading delay); • no new impulse for more than the time P6.12 if dosing by flowmeter. For flowmeter dosing it can be set as a <u>pre-alert</u> that the product is nearly finished (reserve level), based on the level switch status: • level switch inactive (4.0 s reading delay).
no prod.dos.4	The product associated with doser4 (lubricant) is finished (if enabled as an <u>alert</u> by parameter P3.06). Diagnostics based on (with activated dosing pump): • pressure switch disabled if time-based dosage (1.5 s reading delay); • no new impulse for more than the time P6.12 if dosing by flowmeter. For flowmeter dosing it can be set as a <u>pre-alert</u> that the product is nearly finished (reserve level), based on the level switch status: • level switch inactive (4.0 s reading delay).
salt loading	Warning to load salt after a certain number of water softening resin regenerations defined in P7.27 (for configured regeneration, that is P7.26 > 10).
pressure probe	The analogue probe used to measure the wash pump pressure has an error (probe fault). (This probe only contributes to the cycle pressure graph).
- door open -	Indicates that (at least) one door is open.
wait	Generic warning informing the operator of the need to wait before sending any new commands (keys will have no effect during the wait time). Triggered for example during the movement of door locks, during programme deletion/pasting operations or history cancellations etc.
PRINTING IN PROGRESS	Timed warning when an attempt is made to start the cycle with the start key, in Standby or in Cycle mode after a manual interruption, while the graph is being printed (the printout must finish before starting the cycle).
NO DISINFECTION	The cycle in progress was manually interrupted (with the stop key). (Shown on the top row of the display).
Wait for supervisor	The cycle data is being downloaded by the supervisor and it is necessary to wait to start a new cycle

DESCRIPTION OF LOG EVENTS

EVENT	MESSAGE DISPLAYED	DESCRIPTION
From 1 to 100	SAME AS LIST OF ALARMS	(See list of alarms)
90	OK	Cycle successfully completed.
91	NO DISINFECTION	The cycle was interrupted.

17. USB PORT

The control panel has a USB port allowing the machine to be programmed and data to be saved.



17.1.1 Programming

Simply insert the USB stick in the port and turn the control panel off and on again.

A message will appear to install the new files, offering a choice between APPEND (add only the new parts) or OVERWRITE (delete the existing files and install the new ones).

It is possible to program:

- Parameters;
- Cycles;
- FW control panel;
- Language;

17.1.2 Data saving

Insert the USB stick in the dedicated port and enter the menu and select the USB menu; the following information and files can be downloaded from the machine:

- Cycles;
- Parameters;
- Historical data;
- Maintenance register;

After selecting the information to be downloaded, press the **START** button.

The cycle and parameter files can be used to program another machine or as a back-up of the machine.

17.1.3 Saving data during the cycle

To save data at the end of every washing cycle, leave the USB stick inserted and follow the procedure:

- Set the parameters P 1.4 to 3 and P 1.5 to YES.
- Start the wash cycle;
- At the end of the wash cycle, the machine creates a file containing the samplings of the temperature probes and of any pressure probes.

A TXT file is associated with each file containing the data structure illustrated below.



00036G.TXT

The file *****G.TXT contains:

NOTE: ***G.TXT is automatically saved at the end of each wash cycle.**

End user : *****
Model : EW1
Machine : 01234
Work station : 0
Software : 7.01
Operator :

INSTRUMENT 1 : TL001
Serial Number
Model
Brand

B 3 SoloDISINF Record: 00028
.....
START: 19/07/13 h: 08:36

Information relating to the operator, the machine and the instrument.

Information about the wash cycle

Number of samples.

n°
0001
0002
0003
0004
0005
0006

mm:ss
0:00
0:05
0:10
0:15
0:20
0:25

°C(1)	°C(2)	Bar
32.0	32.5	----
31.9	32.3	----
31.8	32.2	----
31.8	32.2	----
31.8	32.2	----
31.8	32.2	----

Value of the data sampled by the probes.

Sampling time for each individual sample.

Information relating to the operator, the machine and the instrument.

Information about the wash cycle

Value of the data sampled by the probes.



00036C.TXT

The file *****C.TXT contains:

NOTE: To save the file ***C.TXT, insert the USB stick in the dedicated port, enter the menu, select the USB menu and download the historical information from the machine.**

Information about the machine, the operator and the tool.

Information about the washing cycle.

Program information for each washing phase.

End user : *****
Model :
Machine : 13146
Work station : 0
Software : 7.00
Operator :

B20 PREWASH Record: 00015
.....
START: 05/06/13 h: 16:10

-> chemical load h: 16:10
T1= 35.2°C T2= 35.1°C

-> 1: drain h: 16:11
T1= 35.1°C T2= 35.0°C

-> 2: prewashing h: 16:16
T1= 24.5°C T2= 24.5°C

-> 3: drain h: 16:17
T1= 24.6°C T2= 24.6°C

STOP: 05/06/13 h: 16:17
END CYCLE: OK

Information about the machine, the operator and the tool.

Program information for each washing phase.

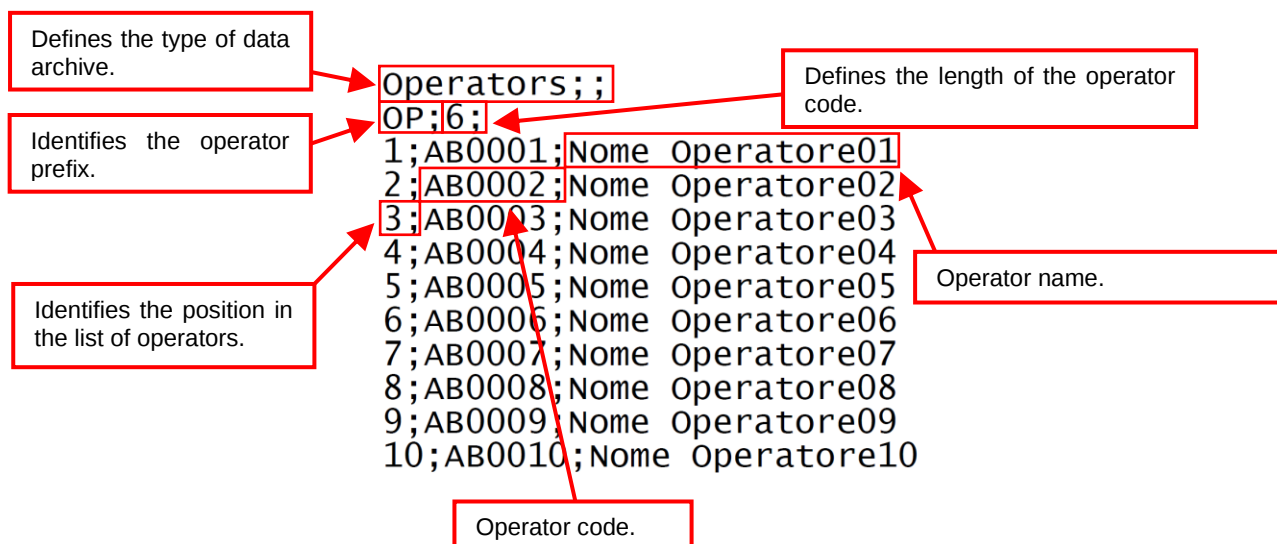
17.1.4 Operator archive management

The operator archive in the machine memory can be saved on a separate file following the procedure below:

Insert a USB stick in the dedicated port.

Enter the menu: **USB → OPERATORS → Insert 3rd level password → USB EXPORT → Press START**

The downloaded file is named "OPERATxxxxx.CSV", where "xxxxx" indicates a generic optional name and is structured as follows:



FIELD	CONSTRAINTS
Type of data archive	None
Operator prefix	Length = 2 Permissible characters: 0...9 numeric digits, "A...Z" English alphabet upper-case letters, "a..z" English alphabet lower-case letters, " " space, "-" minus sign, "." point.
Operator code length	Between 1 and 8 (inclusive)
Operator position in list	Must be in sequential order (Maximum number of operators = 60)
Operator code	Permissible characters: 0...9 numeric digits, "A...Z" English alphabet upper-case letters, "a..z" English alphabet lower-case letters, " " space, "-" minus sign, "." point.
Operator name	Length ≤ 16 (can be empty) Permissible characters: 0...9 numeric digits, "A...Z" English alphabet upper-case letters, "a..z" English alphabet lower-case letters, " " space, "-" minus sign, "." point.

The operator archive can be uploaded by inserting a USB stick in the dedicated port and opening the menu: **USB → OPERATORS → Insert 3rd level password → USB IMPORT → Press START**

ATTENTION	
	- It is recommended to use a text editor to modify the operator archive management file (e.g. Notepad). - If the file has an operator with a zero value in the "OPERATOR CODE" field (no characters), the file is considered finished on the element before the operator with a zero operator code and all subsequent elements are ignored. - If the file contains values outside the above constraints, the file is considered incorrect. During the import phase, the first row with the error is shown on the display.

18. MAINTENANCE

18.1 General recommendations on maintenance

The machine was built only and exclusively for the washing and thermal disinfection of medical instruments, trays and objects normally used in medical studios, hospital wards, assisted living centres, etc. and is therefore subject to continuous contact with aggressive detergents and contaminated instruments.

For this reason, it is necessary to provide some useful instructions for the operators who will be performing its maintenance.

Personnel in charge of maintenance in normal working conditions is not exposed to risks provided they work in safe conditions, using the appropriate means of protection.

In order to work safely the maintenance technician must:

- Carefully comply with the instructions set forth in this manual.
- Use safety devices appropriately and with care and the group and individual safety gear provided in the workplace.
- Take special care and precautions when repairing or replacing mechanical parts (e.g. discharge pump etc.) on broken-down machines that have not completed the thermal disinfection cycle.

Maintenance operations of the machine described in this manual can be divided into "**Routine Maintenance Operations**" and "**Extraordinary Maintenance Operations**".

GENERAL GUIDELINES:

MACHINE STATUS:

The machine must be de-energised with the dedicated safety device in the OFF position.

The person performing the task must ensure that there is no-one around the machine during this operation.

SAFETY SYSTEMS TO BE ADOPTED:

The operation must be carried out in compliance with the standards governing the use of the disinfectant substances used (see technical information for the product being used), in compliance with the standards concerning contact with parts of the machine which may be contaminated by pathogenic materials and with use of suitable PPE.

18.1.1 Maintenance Request

After a certain period of time or number of cycles, depending on parameter **P6.48**, the machine will send the '**MAINTENANCE**' alert. This alert does not affect normal use of the machine.

The maintainer however must intervene in the shortest possible time in order not to compromise the correct operation of the machine.

To reset the maintenance request alert, proceed as follows:

1. Carry out general machine maintenance;
2. Enter the menu:

UTILITIES → MAINTENANCE → Insert 3rd password level → MAINTENANCE REGISTER → Press START.

18.2 Procedure for routine maintenance

Routine maintenance actions concern all those operations aimed at keeping the various parts of the machine clean and functional and must be carried out periodically (see summary table in paragraph 18.3) or when it is deemed necessary, having noted that the wash cycle has been carried out incorrectly.

Since these are simple cleaning operations, they are normally performed by the "Machine Operator" on his/her full responsibility.

18.3 Routine maintenance summary table

The following is a summary of the various routine maintenance operations with the frequencies of intervention, the personnel involved in the single operation and the reference to the specific intervention card.

Each single intervention is described in more detail in the individual reference cards.

Even if the supply water contains little limescale, the high temperature can lead to the formation of residues that may cause problems with the heating element, clog the nozzles, compromise the correct washing cycle and prevent the disinfection temperature from being reached.

For these reasons it is advisable to periodically carry out all the cleaning operations described below.

SUMMARY TABLE OF ROUTINE MAINTENANCE OPERATIONS

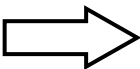
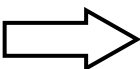
Steelco thermal disinfectors	Maintenance task	Who?	DS 500 CDL	Every 1000 hours or once per year (whichever comes first)*	First and second maintenance (every...)		Time(min.)	
	Frequency	Operator/service		[months]	12	24		Activities
Camera filters	Every day	OP	x				5	Remove filters and clean
Spray arms	Every week	OP	x				5	Check the rotation of the spray arms. Open the caps and clean the inside. Check the nozzles and clean if necessary.
Spray arms	Every	S	x	12	x	x	5	Check that the bushing is inserted in the spray arms. If necessary, replace the inserted parts
Water solenoid valve	Every	S	x	12	x	x	3	Check for any leaks, if necessary, remove them and clean the membrane
Water solenoid valve filters	Every	S	x	12	x	x	10	Check, clean and replace if necessary
Drying pre-filter	Every	S	x	12	x	x	10	Replace
Drying HEPA filter	Every	S	If present	12	x	x	5	Replace
Temperature probes	Every	S	x	12	x	x	10	Clean the sensors and check the temperature during the cycle using the external probe
Heating elements in chamber	Every	S	x	12	x	x	2	Check the gaskets and sealing strength. Absorption elements.
Door gasket	Every	S	x	12	x	x	15	Check the door gasket and replace it if necessary
Chemical dosers	Every	S	x	12	x	x	5	Check the condition of the internal hose and for any leaks. Replace the internal hose if necessary.
Doser connecting hoses	Every	S	x	12	x	x	4	Check for collision, initial leak or hardening and replace the hose if necessary.
Chemical floats	Every	S	x	12	x	x	4	Check and clean the suction filter.
Recirculating pump	Every	S	x	12	x	x	5	Look for any water leaks from the rotating arm seal.
Drain pump	Every	S	x	12	x	x	3	Look for any leaks and remove and clean the membrane sealing area
Pressure switches	Every	S	x	12	x	x	10	Empty the chamber. Disconnect the hose at the pressure switch and blow compressed air into it.

Machine cleaning	Every	S	x	12	x	x	10	Clean the machine inside and out. In manual mode, fill with water, add some vinegar to remove the limescale deposits and run the wash pump for a few minutes. Then drain and rinse.
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NOTE:

Routine maintenance works must be carried out at the intervals indicated in the table; it is nonetheless advisable to perform individual cleaning operations whenever deemed necessary.

Note. In the case in which the machine requires substitution of one or more components, refer to the manufacturer's spare part list.

	If the supply water contains a lot of limescale, we recommend periodically carrying out a general check and cleaning the appliance.
	Pay attention to the heating elements and thermostat bulbs.

ATTENTION:

- The machine is not protected against water jets, and it is therefore not advisable to use pressure-operated cleaning systems.
- We recommend contacting your cleaning products provider, in order to obtain detailed indications concerning the periodic disinfection of the machine.
- The machine is fitted with a safety thermostat that blocks the power supply to the heating element in the event of overtemperature.

Before restarting the appliance, the problem must be eliminated.

Every 12 months

- **Clean and if necessary, replace the membranes of the solenoid valves;**
- **Check the cleanliness and condition of the thermostat probes.**
- **Replace the membrane hose in the dosing pump.**

Even if the supply water contains little limescale, the high temperature may lead to the formation of residue. This, in addition to potentially causing problems for the heating element, can also obstruct the nozzles, thus compromising proper washing and making it difficult to reach the tank disinfection temperature.

WARNING

TO ENSURE THE CHEMICAL PRODUCT DOSING PUMPS ARE ALWAYS IN PERFECT WORKING ORDER, CHECK THAT THE MEMBRANE HOSES ARE NOT DAMAGED. MAINTENANCE SHOULD BE CARRIED OUT EVERY THREE MONTHS.

CLEANING THE WASHING CHAMBER DISCHARGE FILTERS

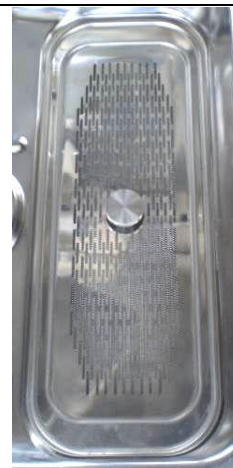
M1

Worker: **Ac**

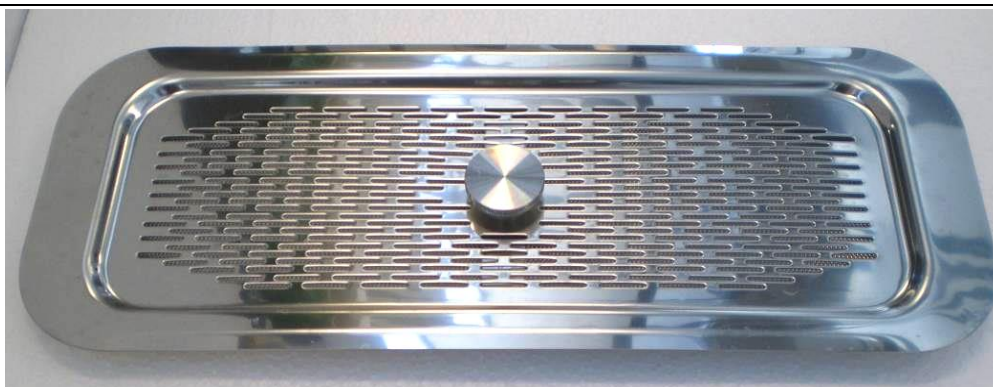
Frequency of intervention: **every week**

METHOD OF INTERVENTION: clean the washing chamber discharge filters as described below:

- Open the access door to the cleaning chamber and extract the basket.
- Take the discharge water filter unit out of the washing chamber.



- Unscrew the threaded pin and remove the cover from the discharge water filter basket.



- Clean the discharge water filter basket, removing any build-ups formed during the various wash cycles.
- Remove the filter on the washing chamber drain and clean any build-ups and incrustations.



- Refit the clean filter on the washing chamber drain.
- Refit the discharge water filter basket cover and secure it in position with the relative threaded pin.
- Refit the discharge water filter unit in the washing chamber.

CLEANING THE WASHING CHAMBER THERMOSTAT PROBE

M2 Worker: **Is** Frequency of intervention: **6 months**

METHOD OF INTERVENTION: clean the washing chamber thermostat probe as described below:

- Open the access door to the cleaning chamber and extract the basket.
- Check the washing chamber thermostat probe and clean any build-ups or limescale with a damp cloth and suitable detergent.

Pay attention not to damage or move the probes.

CLEANING THE SPRAY ARMS

M3 Worker: **Ac** Frequency of intervention: **every week**

METHOD OF INTERVENTION: clean the spray arms as described below:

- Open the door to the washing chamber and extract the basket
- Unscrew the pin securing the two spray arms and remove them from the chamber.



- Unscrew the cap at the rear part of the nozzle and remove it.



- Thoroughly clean and remove any scaling from the spray arm nozzles using suitable detergents.
- Refit the caps on the ends of the spray arms, making sure the gasket is correctly positioned and in good condition (otherwise replace it).
- Refit the spray arms on the machine, securing them with the fixing pin previously removed.

DISINFECTING AND CLEANING THE WASHING CHAMBER

Worker: **Ac**

Frequency of intervention: **1 week or when it is necessary to**

METHOD OF INTERVENTION:

Run a no-load wash cycle with the basket present to disinfect the inside of the chamber. This will ensure the complete disinfection of the washing chamber, basket and water circuits.

If it is not possible to run a no-load cycle, it is recommended to sanitise the machine as described:

- Open the door to the chamber and check that no equipment, trays or instruments have been left on the wash basket.
- Spray the inside of the washing chamber with a disinfecting product compatible with stainless steel surfaces, and which has the following active ingredients:
 - Quaternary ammonium salts
 - or
 - chlorhexidine digluconate - ammonium chloride - isopropyl ethyl alcohol
- All internal parts involved in the operation must be covered.

The product approved by STEELCO for cleaning and disinfecting the chamber is called "STEELCO Surface Cleaner Disinfectant".



ATTENTION

Follow the instructions on the product's technical file regarding time frames and method of use.

Always check the product's technical data sheet and its compatibility with the materials to be cleaned.

The application of the disinfectant in the chamber must be performed on cold surfaces, to avoid the creation of hazardous fumes.

We recommend contacting your cleaning products provider, in order to obtain detailed indications concerning the periodic sanitisation of the machine.

CLEANING THE EXTERNAL BODY OF THE MACHINE

Worker: **Ac**

Frequency of intervention: **every week**

INTERVENTION METHOD FOR CLEANING THE EXTERNAL BODY:

With the aid of a moist cloth, thoroughly clean the outer casing of the machine using only neutral detergent. Avoid using abrasive products and any type of solvent and/or diluent.

METHOD FOR CLEANING THE LABEL:

Use a soft cloth to clean the surface of the label.
Use only water or isopropyl alcohol.
Do not use abrasive cleaners or solvents of any kind.

METHOD OF INTERVENTION FOR CLEANING THE CONTROL PANEL:

Clean the control panel using
only a soft cloth and a cleaning product for plastic materials.

LIMESCALE REMOVAL TREATMENT

Worker: **Ac**

Frequency of intervention: **when necessary**

METHOD OF INTERVENTION:

Use a descaling agent (vinegar is recommended) during a no-load cycle with cold water (normally every week, unless the water quality requires daily use to prevent the accumulation of limescale and subsequent clogging of the water jets).

Follow the instructions on the product's technical file regarding the amount of product to use. If vinegar is used, use a quantity of 0.5 litres.

The descaling product must be poured into a container of the same size, placed on an empty loading basket.

Use a program with ambient water temperature, without an active drying cycle.



ATTENTION

Even if the supply water contains little limescale, the high temperature may lead to the formation of residue. This, in addition to potentially causing problems for the heating element, can also obstruct the nozzles, thus compromising proper washing and making it difficult to reach the tank disinfection temperature.

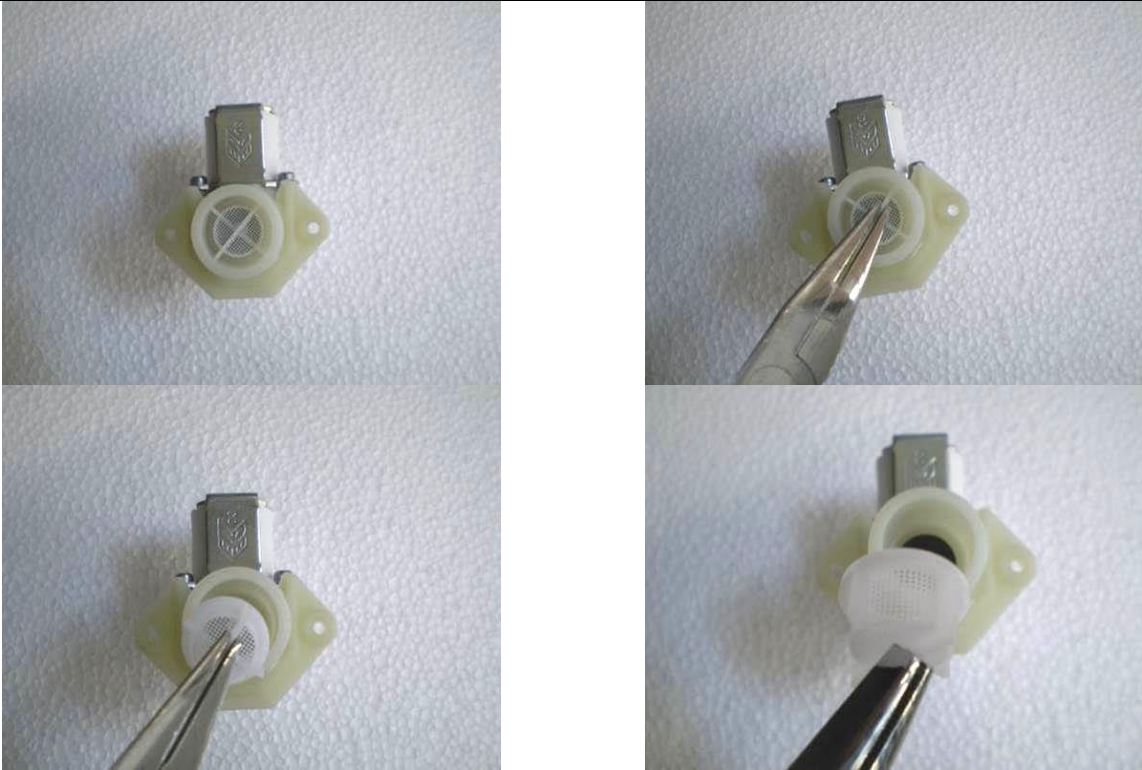
18.4 Procedure for extraordinary maintenance

All "extraordinary maintenance operations" must be performed by qualified and competent staff only.

A summary table of possible extraordinary maintenance interventions is detailed below; if the machine in your possession should show a functional anomaly such as to require extraordinary maintenance, you are invited to contact the distributor/dealer.

18.5 Summary table of extraordinary maintenance interventions

Please refer to the scheduled maintenance module table.

CLEANING THE COLD WATER INLET FILTERS		
M4	Worker: Is	Frequency of intervention: 6 months or when necessary
METHOD OF INTERVENTION: clean (or replace) the water solenoid seat filter as described below:		
• Close the water supply tap • Loosen and completely unscrew the water supply hose • Remove the filter inside the water supply hose connection and clean it, removing any incrustation or build-ups by immersing it in a container filled with water (or suitable descaling products in the event of limescal deposits).		
		

CLEANING THE DRYING SYSTEM PRE-FILTER (IF PRESENT)

M5

Worker: **Is**

Frequency of intervention: **100 hours**

METHOD OF INTERVENTION: clean (or replace) the drying system filter as described below:

- Remove the screws from the drying system filter protective cover and remove it from the machine.



- Remove the pre-filter from its seat and clean it of any dust deposits; if the pre-filter is unusable, replace it with a new filter having the same characteristics.



- Carefully refit the clean (or new) pre-filter in its seat and secure it in position with the previously removed protective cover screws.



CLEANING THE DRYING HEPA FILTER (IF PRESENT)

M5

Worker: Is

Frequency of intervention: **300 hours**

METHOD OF INTERVENTION: clean (or replace) the drying system filter as described below:

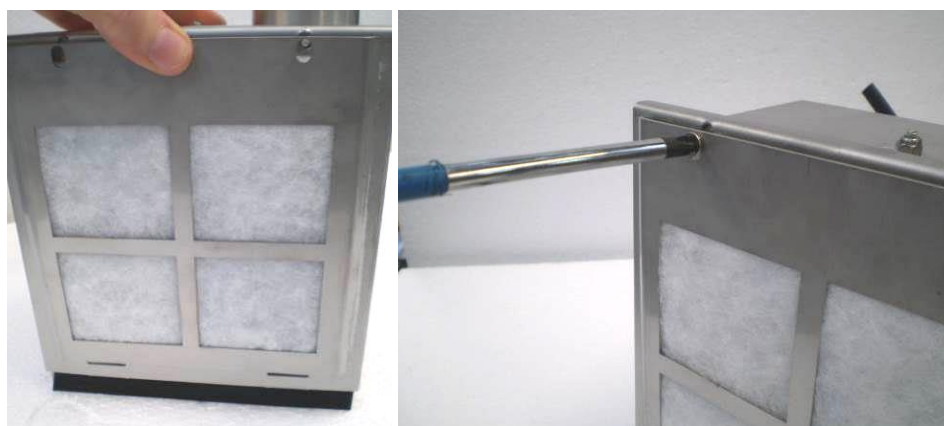
- Remove the screws from the drying system filter protective cover and remove it from the machine.



- Remove the pre-filter and HEPA filter: replace it with another filter of the same type.



- Replace the pre-filter in its seat with care. Use the screws to secure the previously removed front protective cover.



REPLACING THE CHEMICAL PRODUCT DOSER MEMBRANE HOSE

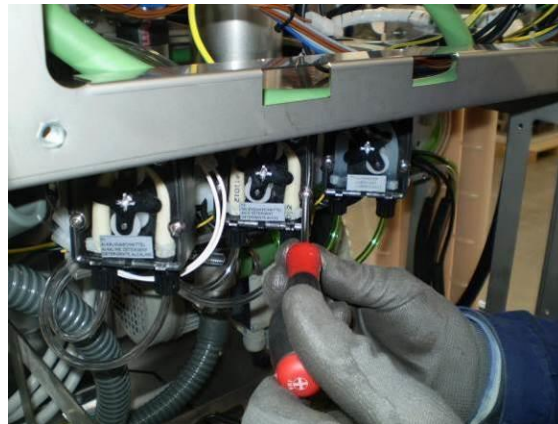
M6

Worker: **Is**

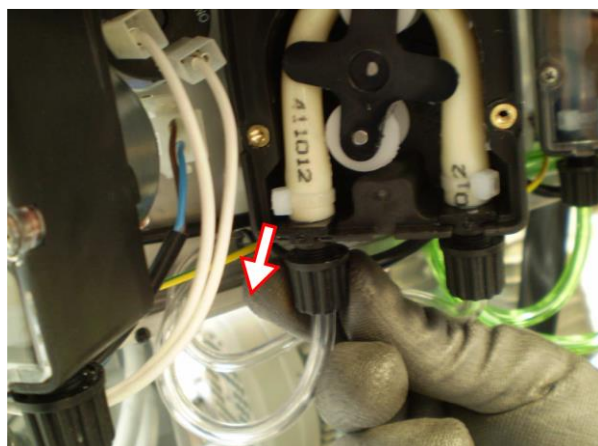
Frequency of intervention: **from 3 to 6 months**

METHOD OF INTERVENTION: replace the chemical product dosing pump membrane hose as described below:

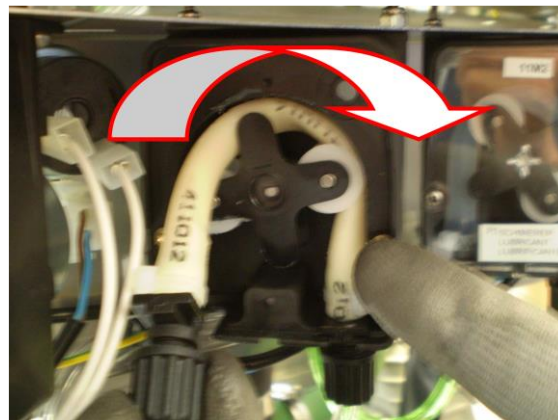
1. Remove the machine's closing panel, removing the relative locking screws.
2. Access the chemical product dosing pump and, using a tool, remove the rotor protection.



3. Pull the membrane hose out of the dosing pump base.



4. Manually rotate the rotor clockwise until the membrane hose is completely extracted from the dosing pump.



ATTENTION: the rotor of the dosing pump rotates clockwise only!!!

5. Position the chemical product supply hose vertically to facilitate the flow of chemical product from the membrane hose in the dosing circuit, avoiding spillage during replacement.



6. Loosen the hose clamps and disconnect the chemical product supply hoses from the membrane hose attachments.

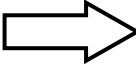


7. Replace the membrane hose with another of the same type (see spare parts list supplied by the manufacturer).

8. Reinsert the membrane hose from the dosing pump by manually operating the rotor.	9. Refit the rotor protection using a screwdriver.
 ATTENTION: the rotor of the dosing pump rotates clockwise only!!!	

CLEANING OF THE CHEMICAL PRODUCTS DOSING PUMP		
M6	Worker: Is	Frequency of intervention: from 3 to 6 months
METHOD OF INTERVENTION: clean the chemical product dosing pump as described below:		
- Remove the closing panel of the rear part of the machine, removing the relative locking screws. - Access the chemical product dosing pump and, using a tool, remove the rotor protection. - Loosen the hose clamps and disconnect the chemical product supply hoses from the membrane hose attachments. - Manually rotate the rotor clockwise until the membrane hose is completely extracted from the dosing pump. - Apply an even layer of silicone grease on the newly removed membrane tube before reassembling it on the dosing pump, performing the previously described operations in reverse order.		

CLEANING THE SURFACES OF THE SAFETY SIGNS		
	Worker: Is	Frequency of intervention: 1 year
METHOD OF INTERVENTION:		
Clean the surface of the safety signs with water or isopropyl alcohol using a cloth.		

	ATTENTION
	Use specific descaling products, avoid the use of highly corrosive products.
	AFTER-SALES SERVICE
	Should your machine not work properly even after ordinary maintenance has been carried out, contact the Technical Support Centre of reference, describing the fault and giving the machine model and serial numbers.

19. PROBLEMS – CAUSES – SOLUTIONS

19.1 Introduction

This chapter includes possible problems which may occur during machine operation, along with their cause and solution. All components, if not identified by specific figures, are referred to by the attached assembly drawings.

Should the inconveniences continue or take place frequently even after having carried out all the instructions stated in this chapter, please contact the Technical Support Centre of reference.

19.2 Problems - Causes - Solutions

I. MACHINE DOES NOT START:

- C. Circuit breaker de-activated.
- R. Bring it into the working position "ON".
- C. Machine start switch de-activated.
- R. Press the start button.

I. THE WASH CYCLE DOESN'T START ON COMMAND:

- C. The door has not been closed or locked correctly.
- R. Check that the door is closed and that the micro-switch is properly activated.
- C. Micro-switch failure.
- R. Check its operation and replace it if necessary.
- C. No detergent in tank.
- R. Turn the machine off and fill the tank.

I. THE MACHINE DOES NOT REACH THE SET TEMPERATURE FOR THE SELECTED WASH CYCLE:

- C. The washing chamber thermostat probe is dirty or covered with limescale.
- R. Clean the washing chamber thermostat probe, carrying out the routine maintenance described in chapter 18 (Sheet M2) of this manual.

I. THE WASH CYCLE IS NOT CARRIED OUT PROPERLY:

- C. The spray arm nozzles are clogged by build-ups or limescale.
- R. Clean the spray arms, carrying out the routine maintenance described in chapter 18 (Sheet M3) of this manual.
- C. An insufficient amount of water is fed to the wash cycle.
- R. Make sure the water supply to the machine reaches the right pressure and that there are no points of obstruction.
- C. Not enough water is being fed to the wash cycle.
- R. Completely close the water system connection tap upstream of the machine and clean the filter as described in chapter 18 (sheet M1) of this manual.

I. THE DETERGENT LOADING PHASE DOES NOT TAKE PLACE CORRECTLY:

- C. Chemical products dosing pump not very efficient.
- R. Perform the routine maintenance described in chapter 18 (Sheet M6) of this manual.
- C. Chemical products dosing pump broken.
- R. Contact the relative After-Sales Service and request the intervention of a **Ta** (Authorised workshop technician) to repair or replace the pump.

I. THE MACHINE DOES NOT PERFORM DRYING:

- C.** The air filter in the drying system is dirty or clogged.
- R.** Clean the filter, carrying out the routine maintenance described in chapter 18 (Sheet M5) of this manual.
- C.** The drying system fan is not working.
- R.** Check the electrical connections of the drying system motor.
- R.** Contact the relative After-Sales Service and request the intervention of a **Ta** (Authorised workshop technician) to repair or replace the motor.

20. DECOMMISSIONING

20.1 Instructions for disassembly of the machine

For demolition and subsequent disposal of your machine, proceed as follows:

- Disconnect the machine from the power mains, water supply and drainage systems. With the machine isolated from the power supply, check that the water circuit is not pressurised.
- Consult the body in charge of recording and certifying the demolition of the machine, in accordance with the provisions of the laws in force in the country where the machine is installed.
- Drain, store, and subsequently dispose of any substances such as oils and grease still remaining in the lubrication tanks, in accordance with the law
- Disassemble the machine, taking care to divide the materials that compose it according to their chemical nature (iron, aluminium, bronze, plastic, etc...).
- Ensure that the floor where the machine or any parts of it are placed is made of washable materials, non-absorbent, and provided with adequate drainage to protect against accidental oil leaks or rust.
- These drains must carry any leakage to watertight collection containers.
- Cover the machine or parts of it with insulating covers to prevent rain or humidity from damaging the structure through oxidation or rust.

Following the provisions of the law in force in the country of installation and use of the machine, dispose of all materials and substances resulting from its disassembly.

20.2 Machine disposal



- For disposal of the device please contact the manufacturer or distributor.
- Do not dispose of these devices as mixed solid municipal waste but collect them separately.
- The reuse or the correct recycling of EEE is useful to preserve the environment and human health itself.
- In accordance with European Directive WEEE 2012/19/EC, specific collection centres are available where waste electrical and electronic equipment can be delivered to, and it is also possible to return the equipment to the distributor upon purchase of new equivalent equipment.
- The public administration and the producers of AEE are committed to facilitating the processes of reuse and recovery of WEEE through the organisation of collection activities and through the use of appropriate design measures.
- The law punishes anyone who illegally disposes of WEEE with appropriate sanctions.