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## **WASHING AND DISINFECTING MACHINE FOR MEDICAL INSTRUMENTS**

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**TIVA8 – 1M** is equipped with a flap door that is manually opened and closed.

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The device is equipped with an electrically heated filtered air system.

Air is forced inside the washing chamber by a powerful air pump for the drying phase and passes through an efficient steam condensing system when leaving the washing chamber.

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This instrument washer can be equipped with a trolley recognition system (optional) which only allows specific programs to be started, depending on the tray that is being inserted. This ensures that all instruments are washed with care.

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Water is heated by heating elements at the bottom of the chamber. This process can be speeded up using a boiler (only Speed Cycle version) to heat purified water for the disinfection phase while the machine is carrying out previous washing phases.

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Thanks to the LCD (70x50) graphic touch display, it is possible to choose the desired program or to enter the device programming menu. The LCD display also shows the current state of the machine, using animated graphics that appear on it.

Thanks to its ergonomic handle, you can easily open and close the door without having to push it vigorously.

The 5 L detergent containers are inserted in the lateral cabinet (optional) of the machine (max 4 containers)

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## Technical Characteristics



### HIGH QUALITY STAINLESS STEEL

The washing chamber is made of stainless steel AISI 316 while the chassis is made of stainless steel AISI 304.



### DOUBLE GLASS DOOR

The door is made of two layers of tempered glass, that allow to see inside the washing chamber during operation.



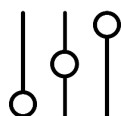
### COLD WATER SOFTENER SYSTEM

This system softens the cold water that enters the chamber, in order to reduce the formation of limescale inside the machine. Cold water passes through resins, reducing its limescale content. The device automatically regenerates the resins after a certain amount of performed programs (depending on the hardness of the water). To regenerate the resins, water passes through a bowl filled with salt and then through the resins, thus regenerating them. This process takes place when the right program starts.



### CHEMICAL PRODUCTS FLOWMETERS

The dosing of the chemical products can be made measuring time or controlled by flowmeters. If the flowmeters do not feel the chemical liquid passing, an alarm will be displayed after few seconds, informing the operator that no liquid has entered the washing chamber.



### CHEMICAL PRODUCTS LEVEL

The device is equipped with sensors inside the liquid canisters that constantly monitor the level of the liquids. When a product is nearly consumed, an alarm will be displayed on the LCD monitor.

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## Technical Characteristics

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### HEPA H14 FILTER

This filter blocks fine dust in the air with a 99.995% efficiency. Moreover, not to damage the filter itself, a prefilter is placed before it, to block bigger particles, in order not to clog the HEPA filter. A pressure switch, placed behind the HEPA filter, tells the machine if the filter is clogged, thus generating a dedicated alarm that signals the clogging. If this is the case the HEPA filter must be replaced.



### WATER HEATING

Water in the tank is heated by 3 resistors (total 5.25 kW) with tri-phase connection (standard). Two independent PT1000 probes constantly monitor the temperature inside the washing chamber.

### BOILER (SPEED CYCLE)

The speed cycle version comes with a boiler on the washing chamber's side. This boiler is used during the disinfection phase, greatly reducing the disinfection phase's time. The boiler is loaded at the beginning of the cycle with demineralized water. This water is then further heated up to 85° for the disinfection phase and it is released inside the chamber when needed. The boiler is equipped with two level probes to monitor the water level, a temperature probe and a safety thermostat.



### PRINTER

The printer can be placed on top of the machine (TIVA8 – 1M) or on the side of the washing chamber (TIVA8 – WD – 1M ; TIVA8 – HS – 1M). The printer prints a ticket reporting the program that was completed, the time required to carry it out and the temperatures that were reached in each phase. It also indicates whether or not chemicals were used, their quantities and any alarms that may have taken place.

### WASHING TROLLEY RECOGNITION

The machine is able to understand whether a trolley is inserted or not. In fact, it is impossible to start a program if there are no trolleys in the washing chamber. The trolley recognition application must be added in order to recognize the type of trolley that is inserted. This application allows the machine to recognize the type of trolley being inserted. Therefore, when a trolley is inserted the machine automatically suggests which programs to use for that type of trolley. It is also possible to start a program which is not suggested by the machine. Properly setting the trolley recognition parameters can also disable programs which are not recommended for that type of trolley.

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## Technical Characteristics

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### SPRAY ARM MONITORING

The first way to check if the spray arms are rotating is for the user to look through the machine's door: this has two large glazed windows for inspecting inside during washing. Every machine is also equipped with a dedicated pressure switch (pressure sensor). Other sensors can also be added to each spray arm to enhance monitoring capacity. The following section explains the two monitoring systems.

In order for the spray arms to properly rotate there must be enough pressure in the machine's plumbing system. A pressure sensor is installed to monitor the pressure in the machine's pipelines. If pressure drops, possibly causing the spray arms to stop, an alarm appears on the display. Another monitoring system is to install an application on the machine consisting of a sensor for each spray arm that checks whether the spray arm is rotating or is blocked. The machine is also able to detect if a spray arm is rotating slower than it should. If every spray arm is working properly, the display shows two green dots, one for each arm. If one spray arm rotates slower, then the dot on the display referring to that spray arm turns orange, without stopping the program. If the spray arm is blocked the system generates an alarm signal to make sure that the instruments are washed properly. A blocked spray arm may be caused by dirt in the arm or, more frequently, by instruments inside the carts that are not properly positioned, blocking the spray arm.

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### CONDUCTIVITY PROBE

This application monitors whether rinse water is pure prior to disinfection, meaning that the  $\mu\text{S}$  (micro- Siemens) value measured by the probe is lower than the value that is set for the kind of water being used.

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### WASHING CHAMBER LIGHT

A spotlight can be installed inside the washing chamber for greater visibility during washing and for greater safety during trolleys loading and unloading procedures. This application includes a switch, installed in the peristaltic pump panel, that can turn the washing chamber light on at any time. The spotlight consists of a LED, granting great illumination with low energy consumption.

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### DRAIN COOLING

Throughout some program phases, during drainage, the machine discharges hot water at a temperature of roughly 90°C. The drain cooling application lowers the temperature of the discharged water to avoid heat damage to drain pipelines by automatically introducing cold water into the washing chamber during the drainage phase.

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## Technical Characteristics

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### STEAM CONDENSING SYSTEM

The machine is equipped with a performing steam condensing system. This system starts to operate when steam starts forming inside the machine, during the disinfection phase. Steam is condensed inside a manifold to prevent it from exiting the washing chamber. This system also starts to operate to reduce steam releasing during the drying phase, when the temperature in the washing chamber is very high.

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### DRYING

Forced air is introduced into the washing chamber during the drying phase, pushed by a blower pump through a set of heating elements that heat it up to 130°C. Air, like water, exits from the spray arm nozzles at a temperature of 110 ° in order to dry evenly both all the instruments.

The drying phase takes place in a “smart” way: at the start, when the temperature inside the washing chamber is very high, air is pushed into the washing chamber with less force and at intermittent intervals to avoid the release of a great mass of steam formed in the washing chamber. Subsequently, when most of the steam has been diminished by the “steam – condensing” system, air is pushed with greater force and constantly in order to complete the drying phase. A pressure switch (pressure sensor) is installed to check for air leaks and make sure that the right pressure is constantly present inside the ducts carrying air to the washing chamber. An alarm signal on the display alerts the user of any air leak that may occur.

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## Technical Characteristics

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### TOUCHPAD KEYBOARD WITH GRAPHIC DISPLAY

The operator interacts with the machine with a touch-screen panel placed in the upper section of the machine. This keyboard can be used to carry out these procedures:

- Quick selection of the 3 main programs using the 1, 2, 3 keys;
- Selection of one of the 40 programs loaded in the machine (this 40 programs

include some free programs that can be set according to the customer needs) using the P+ key;

- Start a program by pressing the “Start” key;
- Reset an alarm using the “Reset” key;
- Enter machine programming mode using the “PRG” key;
- Enable or disable the drying phase in a program that includes this phase.

The color graphics display immediately shows the state of the machine by displaying animated graphics and texts. The display also shows the temperatures of the two probes positioned in the washing chamber and the probe of the drying air temperature as well as disinfection value A0, the time remaining to terminate the program and the number of the program that has been started.

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### ALARCHECK SYSTEM

This system helps understanding why an alarm has taken place and suggests how to deal with it without having to refer to the manual. In fact, when an alarm is triggered, the error number appears at the top of the display with an image that shows the error in the central part of the display along with an acoustic signal alert the operator. After a few seconds, a message appears that explains the possible causes that may have led to the alarm.

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### RS232 PORT

A RS232 port is geared on the mainboard that allows uploading programs from a PC into the machine and, vice versa, uploading the programs installed from the machine to the PC. It is also possible to copy the last alarms that took place in the machine onto the PC. This port also allows connecting a barcode scanner to the machine for instruments traceability.

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## Technical features

TECHNICAL FEATURES		TIVA8 – 1M	TIVA8 – WD – 1M TIVA8 – HS – 1M
Peso Weight	Kg	125	160
Width / Depth / Height	mm	600/650/860	900/650/860
Load height (4 level trolley 8DIN)	mm	246	246
Main water pressure	Bar – l/min	2 - 5 bar - 10L /Min	2 - 5 bar - 10L /Min
Capacity washing pump	L/Min	400	400
Cold water connection	DN °C °F	12 (½”) – 15 (¾”) G-M 5°-15° Max 7	
Hot water connection	DN °C °F	12 (½”) – 15 (¾”) G-M 45°-60° Max 7	
demineralizzata Purified water connection	DN °C °F	12 (½”) – 15 (¾”) G-M 5°-15° Max 7	
Facility steam connection	DN °C °F	½ G 150° / 3 – 5	
Cold Water consumption for standard cycle	L	15	15
Hot Water consumption for standard cycle	L	30	30
Demineralized water consumption for standard cycle	L	15	15
Drain trap (Corrosion-proof and 93°C resistant pipe)	DN (∅)	40mm	40mm
Chamber exhaust air connection	∅	50mm	50mm
Chamber exhaust air flow rate	Mc/h	120	120
Heat loss	Kcal/h - W	600-700	600-700
Noise	dB(A)	56	56
Working temperature	°C	5-30	5-30
Max humidity of usage environment	%	90	90
Atmospheric pressure of usage environment	ATM	>0.8	>0.8
Single door with window 1 display card with LCD		+	+

## Power and flow rates

	Voltage	Frequency	Installed power	Maximum absorbed power	Absorbed Current	Main Switch
TIVA8 – 1M TIVA8 – WD – 1M	400V 3N~	50 Hz	8.3 kW	6 kW	8.7A	16A
	230V 1N~	50 Hz	8.3 kW	6 kW	26A	30A
	220V 3~	60 Hz	8.3 kW	6 kW	14A	16A
	380V 3N~	60 Hz	8.3 kW	6 kW	10A	16A
TIVA8 – HS – 1M	400V 3N~	50 Hz	8.3 kW	7.9 kW	11.4 A	16A
	380V 3N~	60 Hz	12.8 kW	7.9 kW	13 A	16A
	220V 3~	60 Hz	12.8 kW	7.9 kW	23 A	16A

Thermal disinfection with heating elements in the chamber that heat the water to approximately 92°C



## Electrical features

POWER AND FLOW RATES	TIVA8 – 1M TIVA8 – WD – 1M TIVA8 – HS – 1M
Washing pump power	0.7 kW
Drying pump power	0.3 kW
Chamber heating element power	5.25 kW
Boilers heating element power	4.5 kW
Air heating element power	2 kW
Various utilities power	100 W
Fan flow rate	150 m <sup>3</sup> /h
Washing pump flow rate	400 l/min

Thermal disinfection with heating elements in the chamber that heat the water to approximately 92°C

CHAMBER SPECIFICATION	TIVA8 – 1M TIVA8 – WD – 1M TIVA8 – HS – 1M
Volume	165 L
Height	600 mm
Width	550 mm
Depth	500 mm