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

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**TIVA10** can be equipped with one or two (pass-through model) doors that are manually opened and closed.

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On one side the trolley is loaded with the soiled instruments (decontaminated room), while on the other side (clean room) the trolley with the cleaned and disinfected instruments is removed at the end of the wash program. Special manual transport carts can be used to ease the trolleys loading and unloading operations.

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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 an (optional) boiler 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 located on both sides of the **TIVA - 10**, 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.

The door, thanks to its ergonomic handle, is easy to open and close, without having to push it hard.

5 liter liquid detergent drums are placed inside the base of the device (max. 4 drums).

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## Technical Characteristics



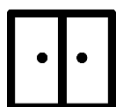
### STAINLESS STEEL QUALITY

The chamber is made of stainless steel AISI 316, the frame is made of stainless steel AISI 304.



### GLASS DOORS

Doors are made of 2 panes of tempered glass to allow users to see inside the chamber during a program.



### DOUBLE-DOORS SYSTEM

**TIVA-10** is designed with two interlocked doors: one to load the trolleys and the other, placed on the back, to unload the trolleys. The machine does not allow the two doors to be unlocked simultaneously but only one door at a time. The door in the unloading zone can be opened only when a cycle has been successfully completed.



### COLD WATER SOFTENER

This system “softens” cold water that enters the chamber in order to reduce scale formation in the device’s plumbing circuit. Cold water passes through resins that reduce the scale. **TIVA-10** automatically regenerates the resins after they have been used several times (depending on the water hardness). The regeneration process consists of letting water pass through a bowl containing salt and then through the resins. This process is carried out before the start of the selected program.



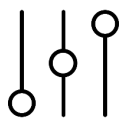
### FLOWMETERS FOR CHEMICALS

The chemicals dosing can be regulated based on time (with the peristaltic pumps) or volume (flowmeters). **TIVA-10** performs both controls. If flowmeters does not detect the passage of the liquid, after a few seconds an alarm will be triggered and appear on the display to notify the user of failure to supply the liquid to the chamber.

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## Technical Characteristics

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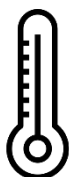
### CHEMICALS LEVEL

**TIVA – 10** equipped with sensors positioned on the chemicals suction nozzles. These warn the user when the liquid level is getting low with a warning signal on the LCD display.



### HEPA H14 FILTER

This type of filter stops fine dust present in the air with an efficiency of 99.995%. A prefilter that stops larger particles of dust in to prevent HEPA clogging protects the filter itself. A pressure switch (pressure sensor), placed after the HEPA filter triggers an alarm when the filter is clogged. In this case, the filter must be replaced.



### CHAMBER WATER HEATING

Water in the chamber is heated by 3 heating elements (total 10.5kW) with three-phase connection (standard). An optional coil, carrying hospital facility steam at approximately 150°C can be added to the heating elements at the bottom of the chamber. This speeds up the times required to heat water. It is also possible to use only the coil, excluding the heating elements. Two independent PT1000 temperature sensors constantly monitor the temperature in the chamber.



### PRINTER

The printer is located on the “clean side” (for double-doors TIVA), where trays are unloaded at the end of a program. The printer prints a receipt that contains information such as the performed program, the time required to carry out the program, the temperatures that were reached in each phase and a time/temperature graph of the program. It also indicates whether or not chemicals were used, their quantities and any alarms that may have taken place during the cycle.

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## Technical Characteristics

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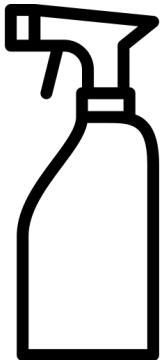
### WASHING TROLLEY RECOGNITION

The standard TIVA- 10 is able to understand if a trolley is inserted. In fact it is impossible to start a program if there are no trolleys in the washing chamber. The tray recognition application must be added in order to recognize the type of trolley that is inserted. This application allows TIVA - 10 to recognize the type of trolley that is inserted. Therefore when a trolley is inserted the machine automatically recommends which programs to use for that type of trolley. It is also possible to activate a program which is not recommended by the device. Properly setting the trolley recognition parameter also makes it possible to disable programs which are not recommended for that type of trolley.

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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 device's door: this has two large glazed windows for inspecting inside during washing. Standard TIVA - 10 is also equipped with a pressure switch (pressure sensor). Other sensors can also be added for each spray arm for greater monitoring capacity. The following section explains the two monitoring systems.



In order for the spray arms to rotate there must be adequate pressure in the device's plumbing system. A pressure sensor is installed to monitor the pressure in plumbing pipelines. If pressure drops, and consequently there is the possibility that the spray arms may stop, the sensor shows an alarm on the display. Another monitoring system is to install an application on the device consisting of a sensor for each spray arm that checks if the spray arm rotates or is blocked. This way TIVA- 10 can detect if a spray arm is blocked or it is rotating slower than normal. During normal operation the display shows two green balls that mean that the spray arm is rotating properly. If one spray arm rotates slower then the ball on the display that refers 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, if the instruments inside the carts are not properly positioned and hamper rotation by 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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## Technical Characteristics

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### CHAMBER LIGHT

A spotlight may be installed inside the washing chamber for greater visibility during washing and for greater safety during tray loading and unloading procedures. This application includes a switch, installed in the peristaltic pump panel, to turn the chamber light on at any time the user desires. The spotlight consists of a LED which gives a large amount of illumination with low energy consumption.

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### DRAIN COOLING

In some program phases, during drainage, **TIVA - 10** drains hot water at a temperature of approximately 90°C. This application is used to reduce the temperature of the discharged water to avoid heat damage to drain pipelines. This is done by automatically introducing cold water into the chamber during the drainage phase.

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### STEAM CONDENSING SYSTEM

The device is equipped with an effective steam condensing system. This system starts to operate during the disinfection phase, when steam starts forming inside AWD655, to prevent steam from exiting from the washing chamber, condensing it inside a manifold. This system also starts to operate to reduce release of steam during the drying phase, when the temperature in the 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 in order to uniformly dry both instruments and trays. The drying phase takes place in a “smart” way: at the start, when the temperature inside the chamber is very high, air is pushed into the chamber with less force and at intermittent intervals to avoid releasing a great mass of steam formed in the washing chamber. Subsequently, when most of the steam has been abated by the “steam – condensing” system, air is pushed with greater force and constantly in order to carry out the drying phase. A pressure switch (pressure sensor) is installed to check for air leaks and make sure there is the right pressure inside the ducts carrying air to the chamber. Any air leaks are indicated by an alarm signal on the display.

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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;
- Entering TIVA - 10 programming mode using the PRG key;
- Enable or disable the drying phase in a program that includes this phase.

The color graphics display continuously shows the state of the machine displaying animated graphics and texts. The display also shows the temperatures of the two probes positioned in the 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 located on the main board, to connect the machine to a bar code device for traceability of the instruments.

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### USB PORTS

A USB port is located 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. Another USB port can be used to upload/download programs, firmware and messages to/from the device using a USB flash drive.

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## Technical features

TECHNICAL FEATURES		TIVA10 – 1M / TIVA10 – 2M
Peso Weight	Kg	245
Width / Depth / Height	mm	680/700/1850
Load height (4 level trolley 8DIN)	mm	845
Main water pressure	Bar – l/min	2 - 5 bar - 10Lt /Min
Capacity washing pump	L/Min	620
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	24
Hot Water consumption for standard cycle	L	48
Demineralized water consumption for standard cycle	L	24
Drain trap (Corrosion-proof and 93°C resistant pipe)	DN (Ø)	40mm
Chamber exhaust air connection	Ø	60mm
Chamber exhaust air flow rate	Mc/h	120
Heat loss	Kcal/h - W	600-700
Noise	dB(A)	56
Working temperature	°C	5-30
Max humidity of usage environment	%	90
Atmospheric pressure of usage environment	ATM	>0.8

## Power and flow rates

	Voltage	Frequency	Installed power	Maximum absorbed power	Absorbed Current	Main Switch
TIVA10 – 1M TIVA10 – 2M	200/208V 3N~	50/60 Hz	16.7 kW	11.4 kW	35A	40A
	400V 3N~	50 Hz	16.7 kW	11.4 kW	16.5A	20A
	380V 3N~	60 Hz	16.7 kW	11.4 kW	19A	20A
	220V 3~	60 Hz	16.7 kW	11.4 kW	33A	40A
	230V 3~	60 Hz	16.7 kW	11.4 kW	32 A	40A

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

TIVA10 – 1M	TIVA10 – 2M
1 display card with LCD	2 display cards with LCD
Single door with window	Double door with window



## Electrical features

POWER AND FLOW RATES	TIVA10 – 1M TIVA10 – 2M
Washing pump power	0.8 kW
Drying pump power	0.8 kW
Chamber heating element power	10.5 kW
Total Power	16.7 kW
Air heating element power	4.5 kW
Various utilities power	100 W
Fan flow rate	150 m <sup>3</sup> /h
Washing pump flow rate	626 l/min

CHAMBER SPECIFICATION	TIVA10 – 1M TIVA10 – 2M
Volume	265 L
Height	780 mm
Width	560 mm
Depth	585 mm