TECHNICAL SPECIFICATIONS FOR PLUSHER WDS 18 SERIES INSTRUMENT WASHER DISINFECTORS

PRODUCT

PLUSHER WDS 18 series instrument washer disinfectors are offered with single or double door formation with vertical sliding door and in free standing configuration as a fully automatic washer disinfector. Special manual or automatic transport carts can be used to ease the trolleys loading and unloading operations. 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. Water is heated by heating elements at the bottom of the chamber. Thanks to the LCD (70x50) graphic touch display located on both sides, 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.

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To assure fast & efficient disinfection, washer disinfectors have pre-set programs for different kinds of equipment with different specifications.

APPLICATION

PLUSHER WDS 18 series washer disinfectors are used in general-purpose washing and disinfection in hospitals, laboratories and dental clinics for surgical instruments, anesthesia equipment glassware, laboratory bottles and flasks, utensils, dental equipment and MIS instruments

OVERALL

Device is designed without any PVC Lexan printed labels on the panel in order to reduce the risk of infection. Brand marking is done by logo placed behind tempered glass panel. Also manual controls are omitted from front panel design. Door system is secured through double level tempered glass. Firm fixing is done with suspension legs, which also enables leveling in non-flat surfaces. In order to assure exact disinfection all dosing pumps (up to 5 where 2 are standard) are equipped with a flow meter and sensor. Up to 4 cans of 5 L detergents can be stored inside the base of device with a collection dip tray to prevent accidental spills while loading.

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JET MODIFICATION

It is possible to have JET modification which reduces cycle times up to 50% with installation of additional pre-heating & fast charging tanks for water connections. There may be up to three boilers can be installed on top of the machine. The first boiler is for the disinfection phase, the second boiler is for the hot washing phases and the third boiler is for cold water. The boilers greatly reduce water heating times for the washing and disinfection phases. When the machine is turned on, the hot water fills boiler 2 to prepare it for the hot washing phases.

During the drying phase, demineralized water is used to exchange heat with the steam coming from the machine, condensing it. In this way, demineralized water enters the boiler 1 already preheated (of 20°C circa), in order to consume less energy to further heat it up to 90°C at the beginning of the successive program, when it will used during the disinfection phase.

When the machine gets to the hot washing phases, the second boiler releases hot water directly in the washing chamber. The third boiler is used for cold water. It reduces the time needed to charge cold water for the cold washing phases, further increasing time saving.

The first two boilers have two level probes to control water, a temperature probe sand a safety thermostat each. The third boiler only needs two level probes.

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DIMENSIONS & CAPACITY*

Specifications	PLUSHER WDS 18			
Reference No.	311014	311015	311016	311017
Door Formation	1	1	2	2
Door Configuration	Automatic	Automatic	Automatic	Automatic
Device Formation	Self Standing			
JET Modification	○	●	○	●
Volume **(L)****	450			
DIN Capacity	18 DIN baskets in 6 Levels			
Loading Height **(mm)**	855			
Chamber Width **(mm)**	680	680	680	680
Chamber Depth **(mm)**	730	730	730	730
Chamber Height **(mm)**	780	780	780	780
Device Width **(mm)**	1000	1000	1000	1000
Device Depth **(mm)**	900	900	900	900
Device Height **(mm)**	1950	2300	1950	2300
Weight **(kg)**	460	495	460	495

* All values are rounded.
** Approximate capacity in brut is given for volume.

● Standard
○ Optional

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POWER & FLOW RATES

Specifications	PLUSHER WDS 18	
Reference No.	311014 311016	311015 311017
Washing Pump	0,8 kW + 0,7 kW	0,8 kW + 0,7 kW
Drying Pump	2,2 kW	2,2 kW
Chamber Heating	18 kW	18 kW
Boiler Heating	N/A	6 kW x 2
Air Heating	7 kW	7 kW
Various Utilities	100 W	100 W
Total Power	30 kW	42 kW
Fan Flow Rate	300 cbm/h	300 cbm/h
Washing Pump Flow Rate	626 L/min + 400 L/min	626 L/min + 400 L/min

DOOR FORMATION

Both single and double door formations are available for all models. Interlocking system prevents opening of both doors at the same time for safety. Door at the clean side can be only opened after cycle is successfully completed.

DOOR CONFIGURATION

- Automatic Vertical Sliding Door – Available for all models.

Automatic vertical sliding door models have a hidden optical sensor for opening and closing doors behind the logo on the control panel. A separate safety system prevents door movement in case of an obstacle. All automatic vertical sliding door models are equipped with emergency stop and main power switch.

SERVICE ACCESS

A distance of minimum 80 cm is required for effective maintenance & service on front side.

- Front Service – Standard in all models.

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VOLTAGE SUPPLY

Specifications	PLUSHER WDS 18			
Reference No.	311014 311016		311015 311017	
Voltage **(V)**	200/208	400	200/208	400
Phase	3~	3N~	3~	3N~
Frequency **(Hz)**	50/60	50	50/60	50
Installed Power **(kW)**	28,8		34,8 (1 Boiler) 40,8 (2 Boilers)	
Absorbed Power **(kW)**	19,6		21,3	
Absorbed Current **(A)**	56,6	28,3	61,5	30,8
Main Switch **(A)**	63	40	70	40

- 400 VAC ±10% - 50 Hz – 3 Phase
  - 380 VAC ±10% - 60 Hz – 3 Phase
  - 230 VAC ±10% - 50 Hz – 3 Phase
  - 220 VAC ±10% - 60 Hz – 3 Phase
  - 200/208 VAC ±10% - 50/60 Hz – 3 Phase

INSTALLATION CONNECTIONS

- Cold Water Connection
  - Connection : ¾" NPT* (Building Side : Shut-off valve ¾")
  - Pres. / Temp. : Min. 3 bar – Max 7 bar / 5°C – 15°C
- Hot Water Connection
  - Connection : ¾" NPT* (Building Side : Shut-off valve ¾")
  - Pres. / Temp. : Min. 3 bar – Max 7 bar / 45°C – 60°C
- Drain Trap Connection
  - Connection : DN(Ø) 40 mm
  - Features : Corrosion & heat (93°C) resistant
- Air Flow Pipe Connection
  - Connection : Ø 60 mm
  - Temp. Average : 70°C – 90°C (Short term max.)
  - R.H. Average : 80 – 100% (Short term max.)
  - Purified Water Connection (Standard in JET.)
    - Connection : ¾" NPT* (Building Side : Shut-off valve ¾")
    - Pres. / Temp. : Min. 3 bar – Max 7 bar / 5°C – 15°C
  - Steam Connection
    - Connection : ½"
    - Pres. / Temp. : Min. 4 bar – Max. 6 bar / ~ 150°C

* NPT: Male pipe thread

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CONSUMPTION RATES & JET CYCLE FLOW

JET modification models have a separate boiler in standard in order to speed up cycle times. Process of boilers is as below:

- Boiler 1 (For purified water):
  This application reduces the time of the disinfection phase. When a program starts, the boiler is filled with purified water, heated during the first phases of the program. During the disinfection phase, the washing chamber is filled with preheated water from the boiler, greatly reducing water heating times.
- Boilers 2 (For warm water – can be only applied with Boiler 1):
  This application reduces the time of the disinfection phases and of the washing phases too. When a program starts, warm water is filled, heated during the first phases of the program. During the washing and disinfection phases, the washing chamber is filled with preheated water from the boilers, greatly reducing water heating times.
- Boiler 3 (For cold water – can be only applied with Boiler 2):
  This application reduces the time of the cold washing phases. This third boiler reduces the time needed to charge cold water into chamber during the cold washing phases, further increasing time saving.

Specifications	PLUSHER WDS 18
Main Water Pressure	20 L/min, 2 – 5 bar
Cold Water Consumption / Cycle	50 L
Hot Water Consumption / Cycle	100 L
Demineralised Water Consumption / Cycle	50 L
Chamber Exhaust Air Flow Rate	270 cbm/h
Heat Loss	800 Kcal – 900 h/W
Noise	62 dB(A)
Working Temperature	5 – 30°C
Max. Ambient Humidity	90%
Ambient Atmospheric Pressure	>0,8 ATM

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DISPLAY LANGUAGES & DOCUMENTATION

PLUSHER WBS 18 series have 5 options for display language:

- English
- Turkish
- French
- Spanish
- German
- Other (Translations to be made!)

Documentation can be presented in 2 languages:

- English
- Turkish
- French
- Spanish
- German
- Other (Translations to be made!)

QUALITY AND CERTIFICATION

PLUSHER WDS 18 series instrument washer disinfectors are manufactured according to Medical Devices Directive 93/42/EEC. PLUSHER WDS 18 series instrument washer disinfectors are manufactured according to device standard EN ISO 15883-1, -2. All processes across TBT are certified according to Quality Management System EN - ISO 9001, Quality Management System for Medical Devices EN ISO 13485 & Quality Management System for Environmental Management EN ISO 14001.

CONSTRUCTION

- Chamber : AISI 316 L stainless steel.
- Door(s) : AISI 304 stainless steel & double layer tempered glass.
- Panels : AISI 304 stainless steel.
- Frame : AISI 304 stainless steel.
- Frame Closing : AISI 304 stainless steel. (Optional. Available only on double door formation.)

Areas with heat contact are insulated.

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AIR FILTER & DRYING SYSTEM

A pre-filter is used to eliminate fine dust from entering intake air circuit. A H14 class HEPA filter with 99,995% efficiency is used to filter air entering the chamber for drying instruments. Air for drying is forced to chamber through spray arms after passing through a HEPA H14 filter for operational safety. Heated air is given in pulses in order to maximize drying efficiency while protecting valuable instruments from harm. System is checked with a pressure sensor to find out possible leaks and control pressure. This system prevent extreme condensation and steam condense inside chamber is given away through condensers. Temperature of drying air can go up to 130^{o}C. Condensed air is used to heat up air incoming in order to save energy.

DOSING PUMPS & CHEMICAL LEVELS

In order to assure quality disinfection each PLUSHER WDS 18 is equipped with 2 dosing pumps with flow meters in standard and has ability to increase number of dosing pumps up to 5.

- Neutralizer detergent pump with flow meter for proper dosing of product
- Alkaline detergent pump with flow meter for proper dosing of product
- Lubricant pump or Rinse Aid Pump
- Disinfectant pump with flow meter for proper dosing of product
- Rinse Aid pump with flow meter for proper dosing of product

The chemicals dosing can be regulated based on time (with the peristaltic pumps) or volume (flow meters). PLUSHER WDS 18 performs both controls. If flow meters 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. PLUSHER WDS 18 is equipped with sensors positioned on the chemicals suction nozzles in order to warn the user when the liquid level is getting low with a warning signal on the LCD display.

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. PLUSHER WDS 18 automatically regenerates the resins after they have been used several times (depending on 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.

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WATER HEATING & CONTROL SYSTEM

Water in the chamber is heated by 3 heating elements (total 18 kW) with three-phase connection, located at the bottom of chamber in standard. It is possible to add an optional steam system; carrying hospital facility steam at approximately 150°C to the heating elements at the bottom of the chamber. This hybrid steam-electric system speed up the times required to heat water and provides faster cycle times. It is also possible to use only the steam system without electrical heating elements.

Two independent PT1000 temperature sensors constantly monitor the temperature in the chamber. The results are monitored for any abnormalities for providing feedback to operator and service technicians.

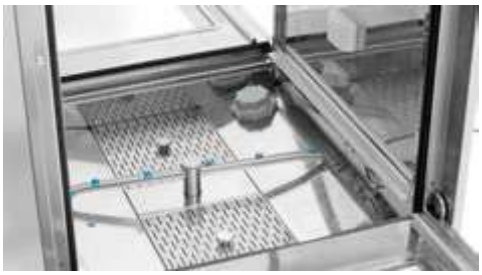
TROLLEY RECOGNITION SYSTEM

PLUSHER WDS 18 identifies if a trolley is inserted or not so it is not possible to start a cycle without inserting a trolley. Trolley recognition system provides a second level of identification to recognize the type of trolley that is inserted. Therefore when a trolley is inserted to the machine, it 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. This prevents the risk of using programs that do not guarantee proper washing of instruments

SPRAY ARM MONITORING

WARNING: *Trolley recognition system must be included in system in order to install 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(s) for inspecting inside during washing. Standard PLUSHER WDS 18 is equipped with a pressure sensor. Other sensors can also be added for each spray arm for greater monitoring capacity. On the standard PLUSHER WDS 18, a pressure switch is installed to monitor the pressure level in the plumbing system, triggering an alarm if this pressure is not high enough for the functioning of the spray arms. This application uses special sensors to monitor the frequency of spray arms rotation. The rate of rotation will be continuously monitored on the display, and an alarm is triggered in the event a spray arm is blocked, in order to guarantee that the load is correctly washed.



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 PLUSHER WDS 18 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 than 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

WARNING: *Demineralized water connection must be included in system in order to install conductivity probe monitoring.*

This application monitors whether rinse water is pure prior to disinfection, meaning that the µS (micro- Siemens) value measured by the probe is lower than the value that is set for the type of water being used. If, after the rinse phase, system detects any impurity in the washing chamber, a further rinsing phase will be started, to ensure optimum washing. If, after some additional rinse phases, the impurities remain, an alarm will be triggered, warning the user to check the washing quality.

ENERGY SAVING WITH 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 device, 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. Generated condenses are used to save energy by heating air given inside and water supply in order to maximize energy saving.

DRAIN SYSTEM

In some program phases, during drainage, PLUSTEAM WDS 18 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.

An additional wall drain pump should be added optionally to drain system where drain of installation place is higher than 300 mm in order prevent problems.

It is possible to add optional Total Emptiness System (T.E.S.) to PLUSHER WDS 18 which will drain the remaining water inside pumps for preventing any possible remains of water.

LED LIGHT INSIDE CHAMBER

A spotlight may be installed inside the washing chamber for greater visibility during washing and for greater safety during tray loading and unloading procedures and can be activated during cycle as well. 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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DOCUMENTATION

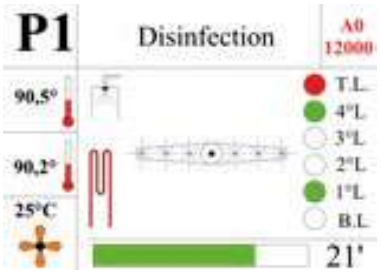
A RS232 port is located on the main board, to connect the machine to a bar code device for traceability of the instruments.

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.

The printer is located on the “clean side” (for double door formations), 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. It is possible to have a printer on dirty side as well for double door formations.

CONTROL SYSTEM & SCREEN

Control system is operated through a programmable microprocessor for automated operation. Software includes 40 programs which 10 are standard and 30 are customizable by operator. Touch panel with 70x50 screen provides necessary information on cycle and malfunctions. Quick selection of the 3 main programs using the 1, 2, 3 keys;



- Selection of one of the 20 programs loaded on the device (there are several standard programs and many more can be set);
- Program starting pressing the START key;
- Alarm resetting using the RESET key;
- Entering basic programming mode using the SETTINGS key;
- Entering advanced programming mode using the SERVICE key;
- Enabling/disabling the drying phase with DRY button.

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.

Control system is also connected with self diagnosis function as well. This system helps the user understands why an alarm has taken place and suggests what to do without having to refer to the manual. When an alarm is triggered, an acoustic signal sounds; the error number appears on the display, together with an image that shows the error in the central part of the display. After a few seconds, a message appears, showing the possible causes that may have led to the alarm.

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OPTIONAL FEATURES & ACCESSORIES

It is possible to customize devices with special programs, configuration or trolleys to be made according to need. PLUSHER WDS 18 series include wide range of optional features. Below are optional features:

- 2nd Boiler For JET Modifications To Pre-Heat Warm Water
- 3rd Boiler For JET Modifications To Charge Cold Water
- Integrated Water Softener
- Demineralized Water Supply Connection
- Integrated Water Softener & Demineralized Water Connection
- Additional Peristaltic Pump For Lubricant Or Rinse Aid
- Additional Peristaltic Pump For Disinfectant
- Additional Peristaltic Pump For Rinse Aid
- Hybrid Heating System: Steam-Electric
- Integrated Printer On Clean / Dirty Side
- Automatic Magnetic Washing Trolley Recognition System
- Spray Arm Monitoring
- Conductivity Sensor For Advanced Washing
- Washing Chamber Led Light
- Wall Drain System
- Total Emptiness System (T.E.S.)
- Frame Closing

Standard accessories for PLUSHER WDS 18 series are as below. Customized accessories are available upon request through wide range of inserts and trays available:

- 2 Level Washing Trolley For 6 DIN Baskets
- 3 Level Washing Trolley For 9 DIN Baskets
- 4 Level Washing Trolley For 12 DIN Baskets
- 5 Level Washing Trolley For 15 DIN Baskets
- 6 Level Washing Trolley For 18 DIN Baskets
- Container Washing Trolley
- Mini Invasive Surgery Washing Trolley
- Anesthetic Washing Trolley
- Shoe Washing Trolley
- Jar (Cylindrical Vessel) Washing Trolley
- Injection Washing Trolley
- Big Objects Washing Trolley
- 3 Level Washing Trolley For Biberon
- Lab. Glassware Washing Trolleys
- Release Trolley

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PACKING

PLUSHER WDS 18 series instrument washer disinfectors are foam supported in critical parts like screen(s) at first. Protective foam and device is rounded by a bubble wrap. Finally it is placed on a pallet and cased with a multi layer carton box or wooden crate (optional) in order to stand against possible damages during transport.

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