



TECHNICAL NOTES

Document #BBTS-FECD-1209

Problem: How can the facility setup an Ethernet connection to the BetterBuilt Washers to allow the factory to remotely connect to the Washer and troubleshoot?

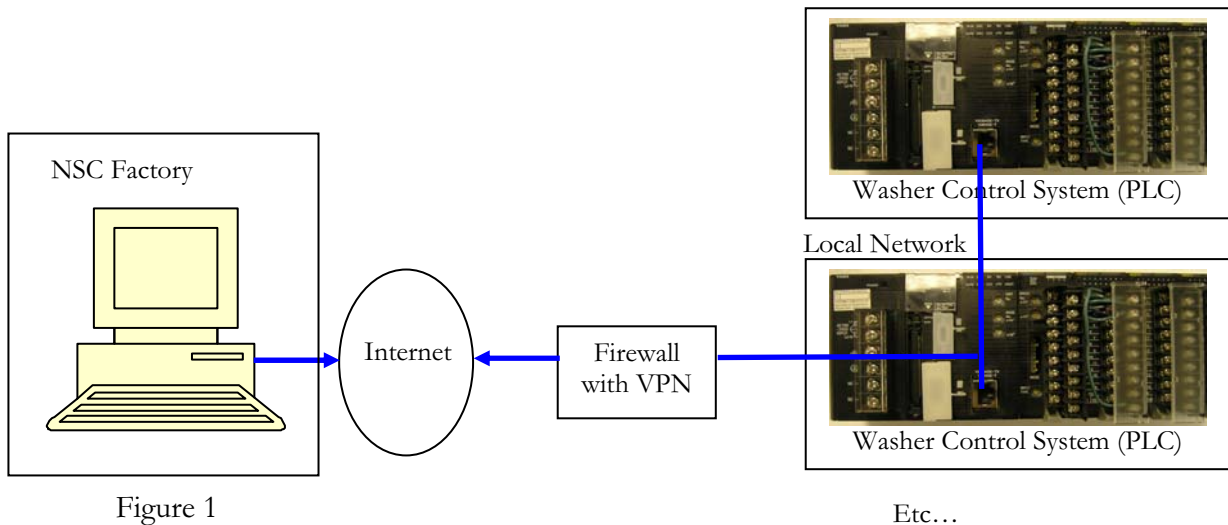
Requirements: Ethernet compatible PLCs (have to be ordered with the Washer and setup with correct IP addresses).
VPN or Port forwarding routers or external IP addresses.

Northwestern Systems Corp (NSC) has the capability to remotely connect from the factory via Ethernet to the PLC controls of the washer in a facility. There are three options for configuring this to work; this document will explain both processes, the information and steps required for a facility to allow this to be done.

OPTION 1 – VPN (Virtual Private Network)

NSC provides factory remote access to the washer's control system for troubleshooting purposes through an Ethernet connection via the Internet as shown in Figure 1. In order for this feature to be operate via VPN (Virtual Private Network), the facility must configure the VPN and allow Northwestern Systems Corporation the access rights to join the VPN:

- The IP address, and Subnet mask will be for the washer's PLC controller must be provided from the network administrator. Note that the facility will be responsible for the Ethernet connection to the PLC, and the IP address for the PLC has to be a static address.
- Any internal routing requirements, Gateway, and passwords must be provided to NSC.
- If the facility is unable to provide any of the above information before shipment, a factory programmer will have to be on site to connect to the facility's network system. That cost will be extra to the project.





OPTION 2 – PORT FORWARDING ROUTERS

NSC provides factory remote access to the washer's control system for troubleshooting purposes through an Ethernet connection via the Internet as shown in Figure 2. In order for this feature to be operate via port forwarding routers, the facility must provide the following:

- The IP address, and Subnet mask will be for the washer's PLC controller must be provided from the network administrator. Note that the facility will be responsible for the Ethernet connection to the PLC, and the IP address for the PLC has to be a static address.
- The LAN IP address (or internal address) and the WAN IP address of the router must be provided to NSC.
- The router must be configured to “port forward” or “virtual server” in order to allow traffic (communication) from the factory computer through to the washer control system:
 1. Open the configuration software of the router¹.
 2. Create an entry for port forwarding. The entry when setting the port forwarding should represent the serial number² of the washer. The name is arbitrary.
 3. Set the Public and Private Port Numbers to 9600. Also set both TCP and UDP.
 4. Set the IP Address to be the same as the washer's PLC controller address.
 5. If there is more than one washer PLC controller, the facility would create a new port forwarding configuration and set the Port Number to 9610 and configure to the next PLC IP Address.
 6. Increment the Port Numbers by 10 for each additional PLC controller.
 7. Provide all Port Numbers and its associated PLC controller's IP address to NSC.
- If the facility is unable to provide any of the above information before shipment, a factory programmer will have to be on site to connect to the facility's network system. That cost will be extra to the project.
- If interfacing with the Better Built Remote Data Transfer System (BBRDTS), the first three octets of the IP address must be identical, and all devices required in this system must share the same Subnet mask. For future information on the BBRDTS please contact Northwestern Systems Corp and request the Tech Sheet on this feature.

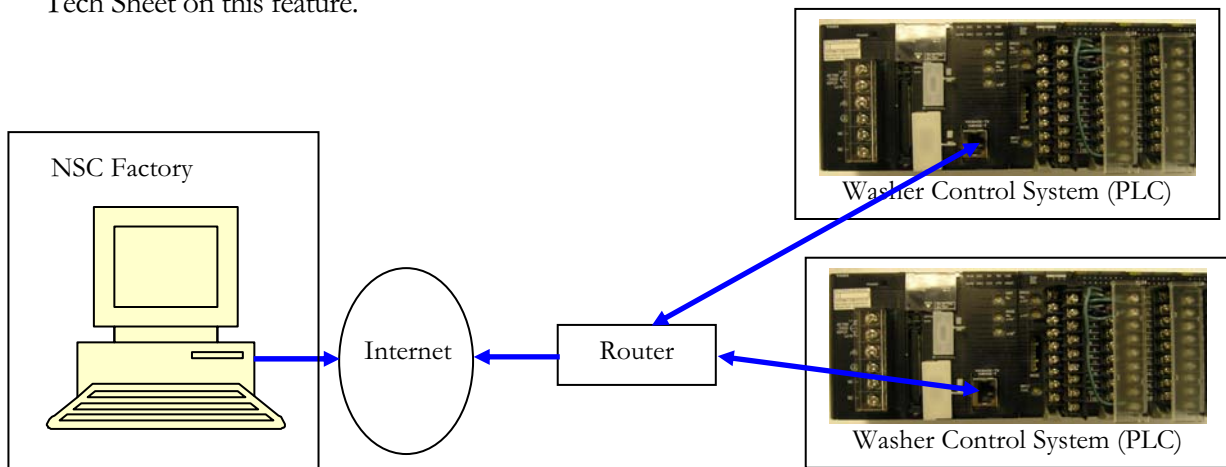


Figure 2

¹ Contact facility IT department or Network Administrator to have this configured.

² Serial number of each washer is identified on the rating plate.



OPTION 3 – EXTERNAL IP ADDRESS

NSC provides factory remote access to the washer's control system for troubleshooting purposes through an Ethernet connection via the Internet as shown in Figure 3. In order for this feature to be operate via an external IP address, the facility must provide the following:

- The IP address, Subnet mask, and default gateway for the washer's PLC controller must be provided from the network administrator. Note that the facility will be responsible for the Ethernet connection to the PLC, and the IP address for the PLC has to be a static address.
- IP address of the PLC controller must be an external IP address that any computer can address.
- If more than one Washer, the external IP address must be unique for each PLC controller.
- If the facility is unable to provide any of the above information before shipment, a factory programmer will have to be on site to connect to the facility's network system. That cost will be extra to the project.
- If interfacing with the Better Built Remote Data Transfer System (BBRDTS), the first three octets of the IP address must be identical, and all devices required in this system must share the same Subnet mask. For future information on the BBRDTS please contact Northwestern Systems Corp and request the Tech Sheet on this feature.

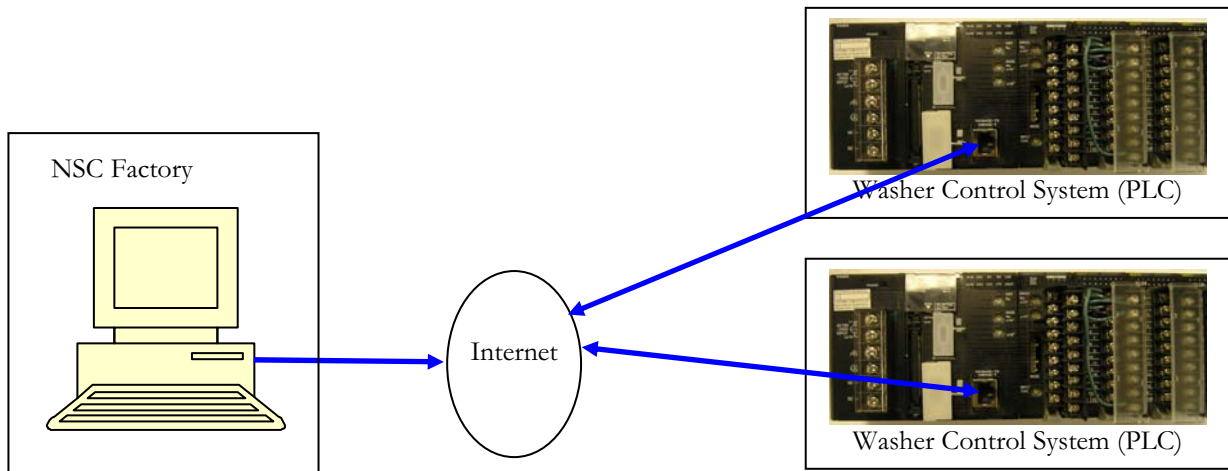


Figure 3

Etc...

NOTE: Northwestern Systems Corp reserves the right to make changes to this system without notice. Facilities should contact Northwestern Systems Corp to discuss in detail their requirements and how it will interface with this system.

If you have any further questions or concerns please contact the Engineering Department at (604) 777-9988. Thank you.



TECHNICAL NOTES

Document #BBTS-RWEC-0314

Problem: The facility would like to connect their exhaust system to the D/G400 or R600 series washer's exhaust duct.

Requirements: Omron PLC Control system (as supplied by Northwestern Systems Corp.).
Manual for the washer.

In a non close-loop exhaust system, the D/G400 or R600 series washers requires a direct connection to the exhaust duct of the washer. In most cases, the exhaust connection is on the top of the washer located near the soiled side door. In order to connect the facility's exhaust controls so that it will operate when the washer exhaust, follow the instructions below.

- ◆ In the appendix section of the manual, locate the Processor Output Layout sheet.

Northwestern Systems Corp
#280 - 4811 Milling Way
Richmond, BC

DATE: July 2001
PHONE: (604) 279-0855
FAX: (604) 279-0853

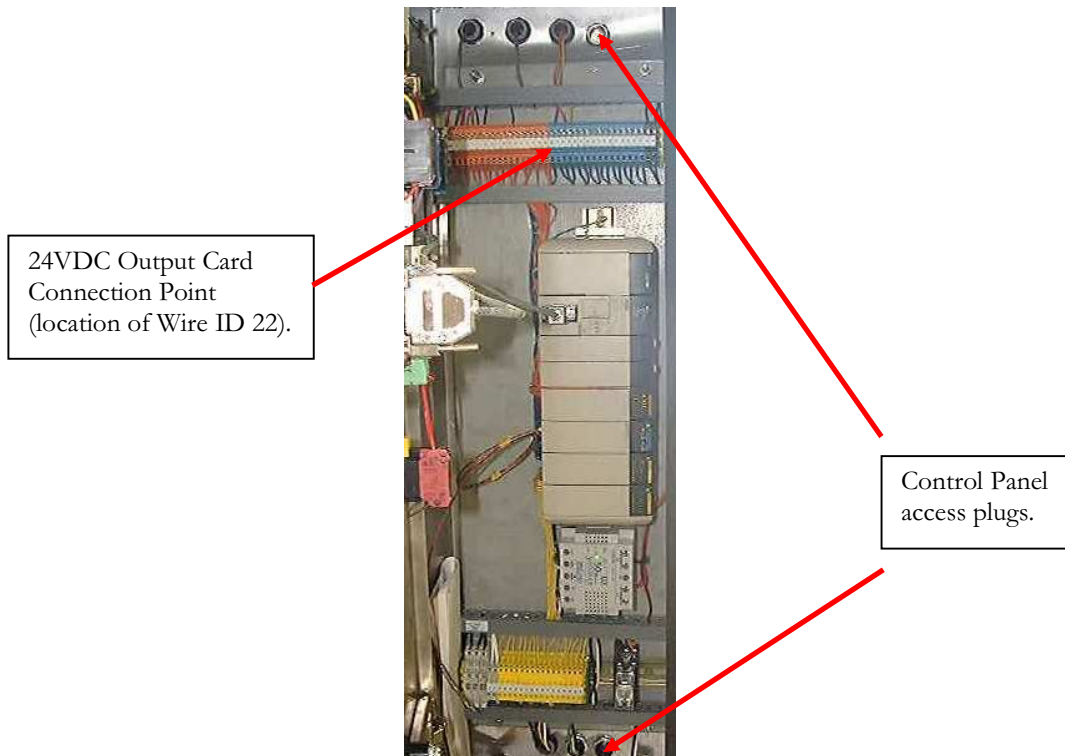
NORTHWESTERN C-500 PROCESSOR OUTPUT LAYOUT

MODEL # C-550	CUSTOMER: Georgia Southern University	SERIAL # 520-0901-371089
TCB # N-1089	PROJECT: Georgia Southern University	AGENT: Equinix

OMRON CQM1H-CPU51 PROCESSOR (some options not present on all models)

Output Address	Output	USED	COLOUR	Wire ID
102.00	24VDC OUTPUT CARD (RELAY)			
102.01	Power Drain Valve	YES		16
102.02	HX Steam Valve	NO		17
102.03	Clean Side Door Valve	NO		18
102.04	Soiled Side Door Valve	NO		19
102.05	Not Used	NO		20
102.06	Power Operated Vent	YES		21
102.07	Exhaust Defegest Timer	NO		22
102.08	Stop Light	NO		23
102.09	Start Light	NO		24
102.10	Exhaust Light	NO		25
102.11	Door Light	NO		26
102.12	Clean Side Door Signal	NO		27
102.13	Soiled Side Door Signal	NO		28
102.14	Not Used	NO		29
102.15	Not Used	NO		30
103.00	24VAC OUTPUT CARD (RELAY)			
103.01	Main Wash Pump Motor	YES		31
103.02	Blower Motor Desap/Dye/Steam Supply	NO		32
103.03	Stmp Heating Solenoid / Stmp Exhaust Controller	YES		33
103.04	Dye Exhaust Controller	NO		34
103.05	Main Tank Fill Solenoid	YES		35
103.06	Cold Fill Solenoid	NO		36
103.07	DI Fill Solenoid	NO		37
103.08	Drain Cool Down Solenoid	YES		38
103.09	Desap/Dye Solenoid	NO		39
103.10	Wash 1 Pump	NO		40
103.11	Wash 2 Pump	YES		41
103.12	Wash 3 Pump	NO		42
103.13	Wash 4 Pump	YES		43
103.14	Rinse 4 Pump	NO		44
103.15	Hotfill Fill Solenoid	YES		45

- ◆ From the Processor Output Layout sheet, locate the “Power Operated Vent (POV)” Supply connection point. It should be located in the **24VDC OUTPUT CARD (RELAY)** section, and should be identified as Wire ID 22. If any information on the sheet conflicts with the information given contact the factory and ask for the Engineering Department.
- ◆ Once the connection point has been identified and confirmed from the Processor Output Layout sheet, open the front access control panel, and locate Wire ID 22. The terminal connection should be a blue terminal, located at the top of the low voltage section (see picture below). Each terminal block inside the control panel is identified, correspondingly with the Wire ID number.



- ◆ The facility’s control exhaust signal can be taken from the POV Signal (Wire ID 22) from the washer’s control system. The signal can be taken out of the control panel through one of several control panel access plugs. It is recommended that any signal be taken out from the closest access plug so that there are no wires running through the washer’s control system.

Note: The exhaust control signal is 24VDC and must not be used to power anything. It must be only used as a control signal; eg. Connected to a 24VDC control relay.

If there are any questions or problems in following these procedures please contact Northwestern Systems Corp’s Engineering Department 1-888-553-0855. Thanks.



TECHNICAL NOTES

Document #BBTS-RCPS-0110

Problem: The chemical supplier wants to install their chemical pumps and needs a control signal from the washer.

Requirements: Omron PLC Control system (as supplied by Northwestern Systems Corp.).
Manual for the washer.

When chemical pumps are not supplied with the washer, the chemical supplier requires a control signal from the washer to inform the chemical pump to inject chemicals into the wash at the appropriate time. The chemical supplier must follow the instructions below for the washer to control the injection of the chemicals into the washer.

- ◆ In the appendix section of the manual, locate the Processor Output Layout sheet.

Northwestern Systems Corp.
6280 - 4811 Waring Way
Richmond, BC

DATE: July 1991
PRO ME: (604) 279-0275
FAX: (604) 279-0280

NORTHWESTERN R600 PROCESSOR OUTPUT LAYOUT

MODEL # R-420	CUSTOMER: CVT Therapeutic Inc.	SERIAL #: 420-1001-M1082
TCB # M-1982	PROJECT: CVT Therapeutic Inc.	AGENT: Lab Equipment Co.

OMRON CQM1H-CPU21 PROCESSOR (some options not present on all models)	
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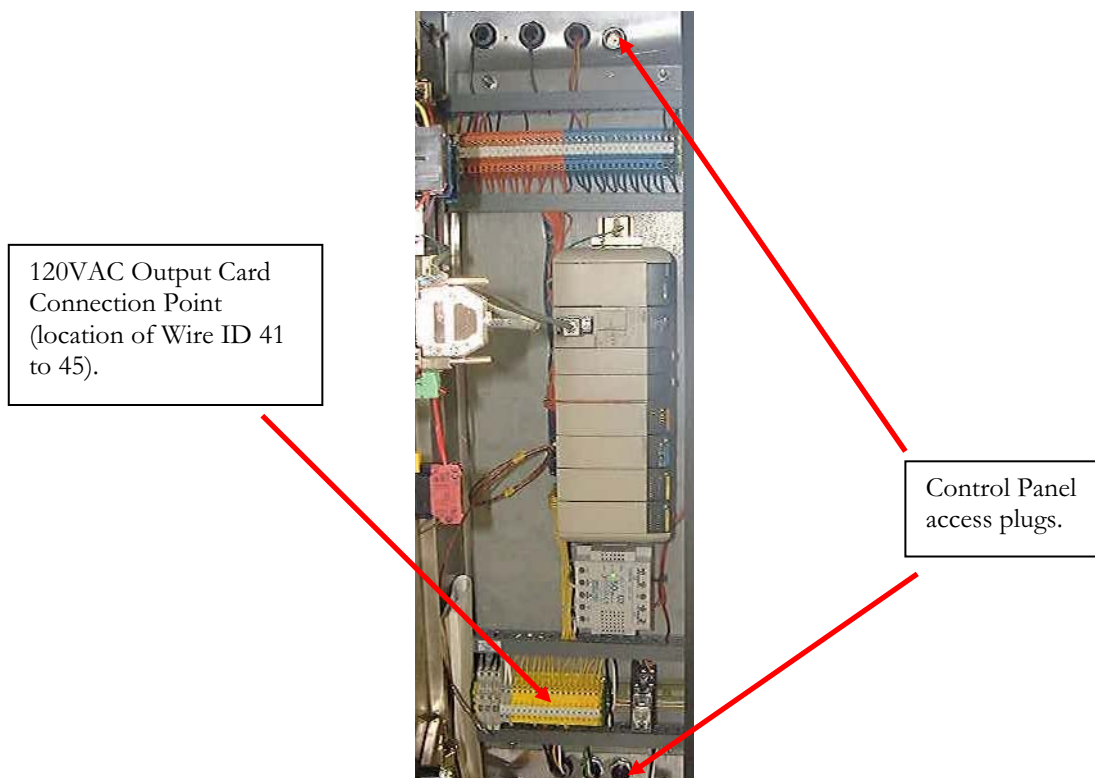
Output Address	Output	USED	COLOUR	Wire ID
24VDC OUTPUT CARD (RELAY)				
101.00	Power Drain Valve	YES	PURPLE	16
101.01	HX Steam Valve	YES	BLUE	17
101.02	Gravity Drain Valve	YES	WHITE	18
101.03	Left Side Aqua-Pipe Valve	YES	YELLOW	19
101.04	Right Side Aqua-Pipe Valve	YES	ORANGE	20
101.05	Cart Lock Valve	YES	BROWN	21
101.06	Power Operated Vent	NO		22
101.07	External Detergent Timer	NO		23
101.08	Frame 10108	NO		24
101.09	Stop Light	YES	ORANGE	25
101.10	Start Light	YES	WHITE	26
101.11	External Light	YES	GREEN	27
101.12	Sequence Valve	NO		28
101.13	Solled Side Door Open Signal	NO		29
101.14	Clean Side Door Open Signal	NO		30
101.15	Frame 10115	NO		31
120VAC OUTPUT CARD (RELAY)				
102.00	Main Wash Pump Motor	YES	BROWN	32
102.01	Blower Motor / Drier Steam Supply or Contactor	YES		33
102.02	Sump Heating Solenoid / Sump Element Contactor	YES		34
102.03	Dryer Element Contactor	NO		35
102.04	Hot Water Fill Solenoid	YES		36
102.05	Cold Fill Solenoid	NO		37
102.06	DI Fill Solenoid	NO		38
102.07	Drain Cool Down Solenoid	YES		39
102.08	Detergent Solenoid	YES		40
102.09	Chemical Pump 1	YES		41
102.10	Chemical Pump 2	YES		42
102.11	Chemical Pump 3	YES		43
102.12	Chemical Pump 4	NO		44
102.13	Chemical Pump 5	NO		45
102.14	Water Column Fill Solenoid	NO		46
102.15	Frame 10215	NO		47
Output				

Wire ID

120VAC
Output
Section

R600 Request

- ◆ From the Processor Output Layout sheet, locate the Chemical Pump 1, Chemical Pump 2, Chemical Pump 3, Chemical Pump 4, and Chemical Pump 5 connection points. It should be located in the **120VAC OUTPUT CARD (RELAY)** section, and should be identified as Wire ID 41, 42, 43, 44, and 45. If any information on the sheet conflicts with the information given contact the factory and ask for the Engineering Department.
- ◆ Once the connection point has been identified and confirmed from the Processor Output Layout sheet, open the front access control panel, and locate Wire ID 41, 42, 43, 44, and 45. The terminal connection should be a yellow terminal, located at the bottom of the low voltage section (see picture below). Each terminal block inside the control panel is identified, correspondingly with the Wire ID number. If any information on the sheet conflicts with the information given contact the factory and ask for the Engineering Department.
- ◆ In a typical factory setting program Chemical Pump 1 is used for chemical injection into Wash 2 (Detergent Wash), while Chemical Pump 2 is used for chemical injection into Wash 4 (Acid Wash), and Chemical Pump 3 is used for chemical injection into Wash 5 (Acid Neutralization Wash). If the facility requires a different configuration or setup as the typical factory setting described please contact the factory and ask for the Engineering Department.



- ◆ If the typical factory setting is desired, then the chemical supplier can connect the Chemical Pump 1 control signal (Wire ID 41) to the Detergent Pump. The Chemical Pump 2 control signal (Wire ID 42) can be connected to the Acid Pump. Finally, the Chemical Pump 3 control signal (Wire ID 43) can be connected to the Acid Neutralization Pump. The control signals can be taken out of the control panel through one of several control panel access plugs. It is recommended that any control signals be taken out from the closest access plug so that there are no wires running through the washer's control system.

Notes: The pump control signal is 120VAC and must not be used to power anything. It must be only used as a control signal; eg. connected to a 120VAC control relay.
Theses instructions are for a typical chemical pump installation for connection of a Detergent Pump, Acid Pump, and/or Acid Neutralization Pump to Wash 2, Wash 4, and Wash 5 of the cycle. Customization to the specific need of the facility can be done. However, please consult Northwestern Systems Corp's Engineering Department first.

If there are any questions or problems in following these procedures please contact Northwestern Systems Corp's Engineering Department 1-888-553-0855. Thanks.



TECHNICAL QUESTIONS / SOLUTIONS

Document #BBTS-PGCI-0112

Problem: How to Program Chemical Injection Time on BetterBuilt Washer

Requirements: Omron PLC Control System (as supplied by Northwestern Systems Corp.)
O&M Manual for the washer
Chemical Pumps



WARNING PERSONAL INJURY AND/OR EQUIPMENT DAMAGE!
Only fully qualified service personnel should make repairs and adjustments to this equipment. Maintenance done by inexperienced, unqualified personnel or installation for unauthorized parts could cause personal injury, invalidate the warranty, or result in costly damage.

INSTALLATION

For chemical pump installation, please refer to the following tech sheets:

Washer	Tech Sheet
G300 Series Glassware Washers	BBTS-RCPS-0110_ChemicalProcessSignal
D400 Series Decontaminator Washers	
G400 Series Glassware Washers	
C500 Series Cage and Bottle Washer	
R600 Series Cage and Rack Washer with no side storage tanks	

The following programming information is only valid for the above washers.

For T200 Series Tunnel Washer, please refer to BBTS-TCPS-0810_TunnelWasherChemicalProcessSignal.

For R600 Series Tunnel Washer with Side Storage Tanks, please refer to BBTS-RCIS-0210_ChemicalR600withTank

For R700 Series Cage and Rack Washer, please refer to BBTS-IPRW-0112_ChemicalSystemR700

PROGRAMMING

Cycle 1-8 Modification

With the power **OFF/ON** switch in the **ON** position, press the **EMERGENCY STOP** button on the main control panel. The operator interface will display:



Touch any portion of the operator interface. The operator interface will display:

CYCLE DATA MODIFICATION

PASSWORD: ****

STATUS:

CYCLE DATA

MODIFY DESCRIPTION

Select the Password selection and enter the appropriate password.

NOTE: There are ten possible passwords, and one master password. Consult with the Facility supervisor for the password to be used. Default master password is 1234.

When the correct Password has been entered and accepted, the following screen will be displayed.

CYCLE DATA MODIFICATION

ENTER PASSWORD: 0000

STATUS: **Enter Password**

CYCLE DATA

Time/Temperature Parameters Cycle Parameters

MODIFY DESCRIPTION

Adjustment and Calibration Cycle Description

NOTE: Not all selections shown will be available. The level of access to the cycle data is dependent on the access rights given by the Facility supervisor.

With the appropriate password, access to the **Time/Temperature Parameters** will be made available. Press the **Time/Temperature Parameters** button.

A popup list of cycle selection will be displayed:

"Cycle 1 Parameters"

"Cycle 2 Parameters"

"Cycle 3 Parameters"

"Cycle 4 Parameters"

"Cycle 5 Parameters"

"Cycle 6 Parameters"

"Cycle 7 Parameters"

"Cycle 8 Parameters"

"End of Week Settings"

"Common Parameters"

Select the Cycle 1 Parameters.

The Cycle 1 Time Parameters will be displayed.

CYCLE 1 - TIME PARAMETERS	
Cycle Steps	Chemical Injection
Wash 1: 0000Sec	Wash 1: 0000Sec
Wash 2: 0000Sec	Wash 2: 0000Sec
Wash 3: 0000Sec	Wash 3: 0000Sec
Wash 4: 0000Sec	Wash 4: 0000Sec
Wash 5: 0000Sec	Wash 5: 0000Sec
Rinse 1: 0000Sec	Rinse 4: 0000Sec
Rinse 2: 0000Sec	
Rinse 3: 0000Sec	Pulsing Time
Rinse 4: 0000Sec	RHS Pulsers: 0000Sec
Exhaust: 0000Sec	LHS Pulsers: 0000Sec
	CartLock: 0000Sec
PREVIOUS	NEXT
GOTO	PRINT SCREEN

For all time based injection, chemical injection time is based on the following formula:

$$Time(sec) = \frac{SumpCapacity(Gal) \times Concentration(oz / Gal)}{PumpFlowRate(oz / min) \times \frac{1min}{60sec}}$$

Refer to the equipment drawing for sump capacity.

For all conductivity based injection (equipment with storage tanks), the system will automatically signal the conductivity system once the cycle step is active.

Note all time parameters must be set at minimum 1 second. A '0' value for a time parameter will not be allowed.

To setup the appropriate chemical pump, press GOTO, Cycle Data Modification, Cycle Parameter button, and select Cycle 1. Press Next to reach the following screen:

CYCLE 1 - PROGRAM LAYOUT PARAMETERS			
	FILL	PUMP	PH
WASH 1:	0	0	OFF
WASH 2:	0	0	OFF
WASH 3:	0	0	OFF
WASH 4:	0	0	OFF
WASH 5:	0	0	OFF
RINSE 1:	0	----	OFF
RINSE 2:	0	----	OFF
RINSE 3:	0	----	OFF
RINSE 4:	0	0	OFF

CYCLE 1
UNPROTECTED

CARTLOCK
OFF

AQUA PULSING
OFF

PREVIOUS
NEXT
GOTO
PRINT
SCREEN

Under “Pump”, enter the appropriate pump number. Chemical pump numbering is based on the setup from the installation tech sheet.

Note:

- 0 = No chemical injection
- 1 = Inject with Chemical Pump 1
- 2 = Inject with Chemical Pump 2
- 3 = Inject with Chemical Pump 3
- 4 = Inject with Chemical Pump 4
- 5 = Inject with Chemical Pump 5

Repeat for cycle 2-8.

If there are any questions or problems in following the above procedure, please contact Engineering at Northwestern Systems Corp. at 1-888-553-0855.



 **650 GP**
CAGE WASHER

Instructions For Use



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Technical Support

For technical support, call +39 0332 967 01 or send an e- mail to info@iwtsrl.it



PREFACE

Dear Customer,

These Instructions for Use are aimed at providing the user with all the information and safety standards required for the correct and safe installation, use and maintenance of the equipment you have purchased.

Keep the Instructions in an easily accessible place, known by the Installer, the operator, the supervisor and the service technician who should carefully read them to have a clear understanding of the installation, use, and maintenance procedures as well as hazardous applications to avoid.

These instructions are an integral part of the equipment and should follow it, even in the event of a change of ownership, until final decommissioning.

In order to receive technical assistance, spare parts or optional extras not required on order, contact IWT and give the equipment serial number, version, and year of manufacture (see label on the equipment).

COMPANY CONFORMITY TO ENVIRONMENTAL POLICIES


At IWT both our production facilities and our end products reflect our commitment towards environmental policies in terms of:

- compliance with the principles and contents of current laws and regulations concerning the environment;
- reduction of the environmental impact deriving from our activities, maintaining the right balance between environmental, social and economic responsibilities;
- on-going quest for innovative applications in order to reduce the environmental impact deriving from waste materials, energy consumption and to improve the use of natural resources and raw materials.
- preventive evaluation of the environmental impact of new plants and processes and improvement of existing ones using all possible and economically sustainable solutions to increase our environmental performances.
- incentivitation and co-responsibility of employees towards this policy by means of adequate training
- use of effective tools to communicate principles and goals of such an environmental policy to our dealers during meetings and training courses;
- defining during the design and development of new products the correct use and dismantling instructions to minimize environmental impact.



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SECTION 1 – GENERAL INFORMATION

1. TECHNICAL SPECIFICATIONS

1.1 TECHNICAL DATA



The following Technical Data refer to standard machinery and are to be considered indicative.

Refer to the machinery layout approved by the customer for accurate and specific information on the Technical Data of the purchased machinery.

IWT reserves the right to modify the specifications to improve the product at any time.

MANUFACTURER'S DETAILS		
IWT s.r.l. Via Galliani, 68B 21020 CASALE LITTA (VA) ITALY Tel. +39 0332 96701 / Fax +39 0332 945441 Email: info@iwtsrl.it		
DIMENSIONS		9LAV_651GP/9LAV_652GP
OVERALL DIMENSIONS	WIDTH	1970mm
	DEPTH	1153mm
	HEIGHT	2311mm
USABLE WASH AREA DIMENSION	WIDTH	1350mm
	DEPTH	900mm
	HEIGHT	740mm

OUTLET CHARACTERISTICS	
Wash/rinse	50mm
Water max. flow rate	1,5 l/s (0,4gallons/s)
Exhaust	180mm (round pipe)
Max flow rate	600 m ³ /h (353cfm)
Static pressure	590 Pa
Max ductwork resistance	196 Pa
CAPACITY	
Wash tank	135 l
Boiler	30 l
WEIGHT	
Stand alone	700kg
Operating	870kg
Weight on each foot	145kg



POWER SUPPLY 9LAVR651GP/9LAVR652GP		
400V/50Hz 3-phases+neutral+earth		
	Washing pump 7,5kW	Washing pump 4kW
Rated power (kW)	38,5 kW	35 kW
Rated current (A)	59,8 A	53.4 A

POWER SUPPLY 9LAVV651GP/9LAVV652GP		
400V/50Hz 3-phases+neutral+earth		
	Washing pump 7,5kW	Washing pump 4kW
Rated power (kW)	8,5 kW	5 kW
Rated current (A)	16.9 A	10.1 A

WATER UTILITY	9LAVR651GP/9LAVR652GP Hot water	9LAVV651GP/9LAVV652GP Cold water
Connection	Ø ¾" G	
Supply Temperature	From 50°C to 60°C	From 15°C to 60°C
Dynamic pressure	2-3 bar	
Max. Hardness	150ppm CaCO ₃	
Consumption	20 l/cycle	
Supply flow rate	3000 l/h	

COMPRESSED AIR UTILITY	
Connection	Ø ½" G
Dynamic pressure	6 bar
Min flow rate	12,9 l/min at 6 bar
Consumption	3,6 l/cycle at 6 bar

STEAM UTILITY	9LAVV651GP/9LAVV652GP
Connection	Ø ¾" G
Dynamic pressure	3-5 bar
Quality	Filtered and dry
Min flow rate	90 Kg/h
Consumption	2.5 Kg/cycle

CONDENSE RETURN UTILITY	9LAVV651GP/9LAVV652GP
Connection	Ø ½" G



POWER SUPPLY 9LAVR651GP/9LAVR652GP		
480V/60Hz 3-phases+earth		
	Washing pump 7,5kW	Washing pump 4kW
Rated power (kW)	38,5 kW	35 kW
Rated current (A)	55,7 A	51,2 A

POWER SUPPLY 9LAVV651GP/9LAVV652GP		
480V/60Hz 3-phases+earth		
	Washing pump 7,5kW	Washing pump 4kW
Rated power (kW)	8,5 kW	5 kW
Rated current (A)	17,4 A	11,8 A

WATER UTILITY	9LAVR651GP/9LAVR652GP Hot water	9LAVV651GP/9LAVV652GP Cold water
Connection	Ø ¾" NPT	
Supply Temperature	From 122°F to 140°F	From 59°F to 140°F
Dynamic pressure	29-43 PSI	
Max. Hardness	150ppm CaCO ₃	
Consumption	5,3 gallons/cycle (35 gallons initial fill)	
Supply flow rate	792 gallons/h	

COMPRESSED AIR UTILITY	
Connection	Ø ½" NPT
Dynamic pressure	87 PSI
Min flow rate	3,4 gallons/min
Consumption	0,95 gallons/cycle

STEAM UTILITY	9LAVV651GP/9LAVV652GP
Connection	Ø ¾" NPT
Dynamic pressure	43-72 PSI
Quality	Filtered and dry
Min flow rate	198 lbs/h
Consumption	5,5 lbs/cycle

CONDENSE RETURN UTILITY	9LAVV651GP/9LAVV652GP
Connection	Ø ½" NPT



ON BOARD COMPACT AIR COMPRESSOR		
	400V/50Hz 3-	480V/60Hz
Quantity	# 1	# 1
Dynamic pressure	8 bar	10 bar
Min flow rate	106l/min	120l/min
Max noise level	67dB(A)	
Installed power	1,05kW – 4.8A	1,8kW – 3.1A

NOISE LEVEL AT OPERATOR WORKPLACE
< 70 dB(A)

STANDARD MACHINE VERSIONS	
9LAVR651GP	Cage Washer (1 door) - Electric heating with exhaust fan and flat universal loading basket
9LAVR652GP	Cage Washer (2 doors) - Electric heating with exhaust fan and flat universal loading basket
9LAVV651GP	Cage Washer (1 door) - Steam heating with exhaust fan and flat universal loading basket
9LAVV652GP	Cage Washer (2 doors) - Steam heating with exhaust fan and flat universal loading basket
OPTIONAL FEATURES	
9LAVPDP01	Additional dosing pump for neutralisation
9LAVPDP02	Additional dosing pump for rinse aid or sanitising product
9LAVPD0P3	Additional dosing pump for acid wash as alternative to alkaline
9LAST801	Board mounted printer for data registration
9LAV65WP	Washing pump 7,5kW (upgraded for rabbit cage application)
9LAV65AC	On board compact air compressor
9LAV6WDCSE	Water discharge control system (cooling and pH control)
9LAV65SMGP	Dismountable version
9LAVVFC	Additional Volt Free Contact (VFC)
9LAV65RDP	Basic remote dosing pump support (suitable up to 2 pumps) including s/s shelf, Ebox derivation, up to 15 m (49,2 ft) long detergent pipe & wire.
9LAV65RDP1	Dosing pump support extension kit for each additional dosing pump (further than basic) including s/s shelf extension, up to 15 m (49,2 ft) long detergent pipe & wire



OPERATING ENVIRONMENTAL REQUIREMENTS

The machinery electrical equipment has been designed to perform under the following conditions:

Indoor use.

Altitude up to 1000m.

Environment Temperature: 15°C to 35°C.

Maximum relative humidity: 80% for temperatures up to 30°C.

Mains supply voltage fluctuations up to $\pm 10\%$ of the nominal voltage.

Transient over voltages typically present on the mains supply (OVERVOLTAGE CATEGORY II as per IEC 60364-4-443).

Atex classification: not classified (environment not affected by presence of explosive atmosphere).

TABLE 1 – TECHNICAL DATA



1.2 COMPLIANCE TO DIRECTIVES

2006/42/EC	Directive 2006/42/EC of the European Parliament and of the Council on machinery.
2004/108/EC	Directive 2004/108/EC of the European Parliament and of the Council on the approximation of the laws of the Member States relating to electromagnetic compatibility.
2006/95/EC	Directive 2006/95/EC of the European Parliament and of the Council on the harmonisation of the laws of Member States relating to electrical equipment designed for use within certain voltage limits.
UNI EN ISO 12100:2010	Safety of machinery General principles for design Risk assessment and risk reduction.
UNI EN ISO 13732-1	Ergonomics of the thermal environment – Methods for the assessment of human responses to contact with surfaces – Part 1: Hot surfaces.
EN 60204-1	Safety of machinery - Electrical equipment of machines - Part 1: General requirements.
EN 13857	Safety of machinery – Safety distances to prevent hazard zones being reached by upper and lower limbs.
ISO 11201	Acoustics - Noise emitted by machinery and equipment - Measurement of emission sound pressure levels at a work station and at other specified positions - Engineering method in an essentially free field over a reflecting plane (ISO 11201:1995).

1.3 DECLARATION OF CONFORMITY

The machine described in this manual is manufactured according to the applicable machine standards and displays the CE marking. The machine technical documentation includes the declaration of conformity in compliance with EU directives.

1.4 IDENTIFICATION LABEL POSITIONING

The identification plate is mounted on the electrical switchboard and displays the information hereunder:

- Name and address of the manufacturer;
- Machinery type and serial number;
- Year of manufacture.

1.5 RESPONSIBILITY OF THE CUSTOMER

Unless otherwise specified in the contract conditions, the Client shall supply:

- Electrical supply (3-phases with neutral + earth + isolator) in the vicinity of the machine.
- Socket and plug compliant to standards in force in the country where installation takes place.
- Cold water or hot water and steam (only for steam heated machines) supply complete with cut-off valve to isolate the machine from the rest of the equipment (see approved layout for details).
- Filters for the water supply and, (only for steam heated machines) steam supply pipe.
- Steam condensate outlet with relevant cut-off valve (only for steam heated machines).
- Siphoning outlet system for the washing water.
- Thermal insulation for the steam supply piping and the steam condensate outlet external to the machine (only for steam heated machines).
- All partition walls necessary for the division between clean and dirty areas (only for double door machines)
- Any required apertures between floors.
- Temperature controlled room (between 15°C and 35°C).



NOTE: For details on supplies, outlets, etc. see Table 1 – Technical Data.

1.6 ELECTRICAL CONNECTIONS

The machinery is set to work with the voltage and frequency level specified at the time of order and therefore it only accepts the percentage variations which are standard in the country of installation.

The connection of the machinery must include a suitable switch mounted on the wall socket and an EARTH connection compliant to regulations in force in the country where the unit is installed.



To protect the equipment and the Operator from any short circuit or earth leakage, and to facilitate the isolation of the equipment during maintenance, the machinery is to be connected to a power supply that complies with standards in force in the country where the machinery is installed and with an appropriate earth leakage protection.

IWT disclaims all responsibility for personal or material damage resulting from:

- **Missing or defective earth connection**
- **Lack of installation of suitable protections**

1.7 SPARE PARTS AND TECHNICAL ASSISTANCE

In order to conform to the terms and duration of the Warranty and to ensure perfect inter-changeability, only original IWT spare parts are to be used.

Requests for Technical Assistance should be addressed to IWT or the authorized Dealer.

1.8 UNAUTHORISED MODIFICATIONS

No modifications to the machinery or its components are to be made without written permission from IWT.

Unauthorised modifications could cause changes to the original functioning and consequently:

- All forms of warranty regarding the machinery will be null and void.
- The washing and/or sanitary results may not conform to the required standards.

1.9 DECOMMISSIONING / DISPOSAL AND FINAL DISMANTLING

The machines are manufactured with non-polluting materials and therefore can be dismantled without contravening any of the EU regulations currently in force.

Follow the prescriptions of the Country where the machine is dismantled for the disposal of parts and equipment.

IWT has worked closely with its suppliers to eliminate hazardous materials from its products. There are instances, however, where it has not yet been possible to completely eliminate all such materials. Consequently, special care must be applied to the disposal and / or recycling of some components.

DO NOT dispose of WASTE ELECTRIC AND ELECTRONIC EQUIPMENT as unsorted municipal waste.

Waste electric and electronic equipment is to be collected and disposed of separately in specialised treatment facilities in compliance with EU legislation and any laws and regulations in force in the country where the machinery is installed.

1.9.1 DISPOSAL OF OTHER MATERIALS

DO NOT dispose of plastic or metallic material as unsorted municipal waste. Any plastic material is to be collected and disposed of separately in compliance to any law and regulation in force in the country where the machinery is installed.

Dispose of waste water, detergents and any chemical product used to wash items in compliance with laws and regulations in force in the country where the machine is installed.

Contact IWT to have detailed specifications and procedures on how to disassemble the machinery.

1.10 SPECIFIC TERMINOLOGY

Here is a list of terms used in this manual:

DIRTY (or LOADING) SIDE

Side of the washing chamber where items to be washed are introduced into the washer.

CLEAN (or UNLOADING) SIDE

Side of the washing chamber where washed items are unloaded from the washer.

CLEAN ZONE

Dedicated area in which concentration of species specific contaminants is controlled and which is constructed and used to minimise the introduction, generation and retention of contaminated particles inside the zone.

DIRTY ZONE

Area in which concentration of species specific contaminants is not controlled.

OPERATOR

Person trained and appointed to carry out normal operating cycles, to clean the machine and to carry out routine maintenance without the need of a special key or safety password.

SUPERVISOR

Person trained and appointed to carry out settings and tasks that may require the use of a special key or safety password (supervisor's level password).

SERVICE TECHNICIAN

Trained service engineer entitled to carry out extraordinary maintenance tasks or repairs that require a detailed knowledge of the machine with the use of a special key or safety password (Service Technician level password).

AUTHORISED SERVICE TECHNICIAN

IWT Service Engineer or Authorised Service Engineer.

PPE

Personal Protective Equipment



2. SERIES 650GP WASHER - INTENDED USE



IWT Series 650GP is a compact cabinet washer designed to clean and disinfect soiled plastic cages, lids and other miscellaneous items.

The tall chamber featured on the 650GP series, combined with the powerful, thorough coverage is also suitable for washing larger items such as rabbit and guinea pig cages with no need to dismantle and remove the intermediate washing kit as required by the two-level cabinet washers.

2.1 WORKING PRINCIPLE

1. **WASHING** - is carried out with heated recycled water coming from the wash tank and is the longest phase in the cycle. The quantity of wash water replaced during each cycle depends on the quantity of water used for the rinse phase. Water used for the rinse phase is piped to the wash tank causing a similar volume of water to overflow. This water takes away any floating debris and emulsified grease. Large particles removed from washed items are trapped by three horizontal filters. Detergent is added directly into the tank by a dosing pump. Wash water is heated and kept at the set washing temperature by the heating elements.
2. **DRIPPING** - time needed to drain items inside the chamber after the wash cycle, it may be set according to items to be washed.
3. **NEUTRALISATION** - performed by injecting a specific product into the rinse circuit at the end of the dripping phase. The neutralising solution is added by a dedicated dosing pump and is injected under pressure directly into the feed pipe system of the rinse jets.
4. **RINSING** - carried out immediately after the dripping phase, it uses clean, hot water coming from the rinse boiler.



NOTE: The duration of the washing cycle is fundamental for the effectiveness of the cleaning.

Washing temperature should be $>40^{\circ}\text{C}$ since at lower temperatures detergents may become too foamy.

Use only chlorine-free products with high antifoaming properties.



2.2 HAZARDOUS AND IMPROPER APPLICATIONS

Here is a list of some hazardous applications that should be avoided:

- Do not allow operation by inexperienced or untrained personnel.
- Do not run the system without protective panels.
- Do not wash items with cavities that could trap water.
- Do not wash small objects that might not be held in place during the cycle.
- Do not use detergents without having read the relevant safety data sheet.
- Do not run the system in an environment which is not compliant with the Environmental Requirements outlined in the Technical Data (see Table 1 for reference).
- Do not house the system in an explosive environment.
- Do not carry out cycles with animals inside the washing chamber.
- Do not operate the system with components or accessories other than those specifically designed and supplied by IWT.

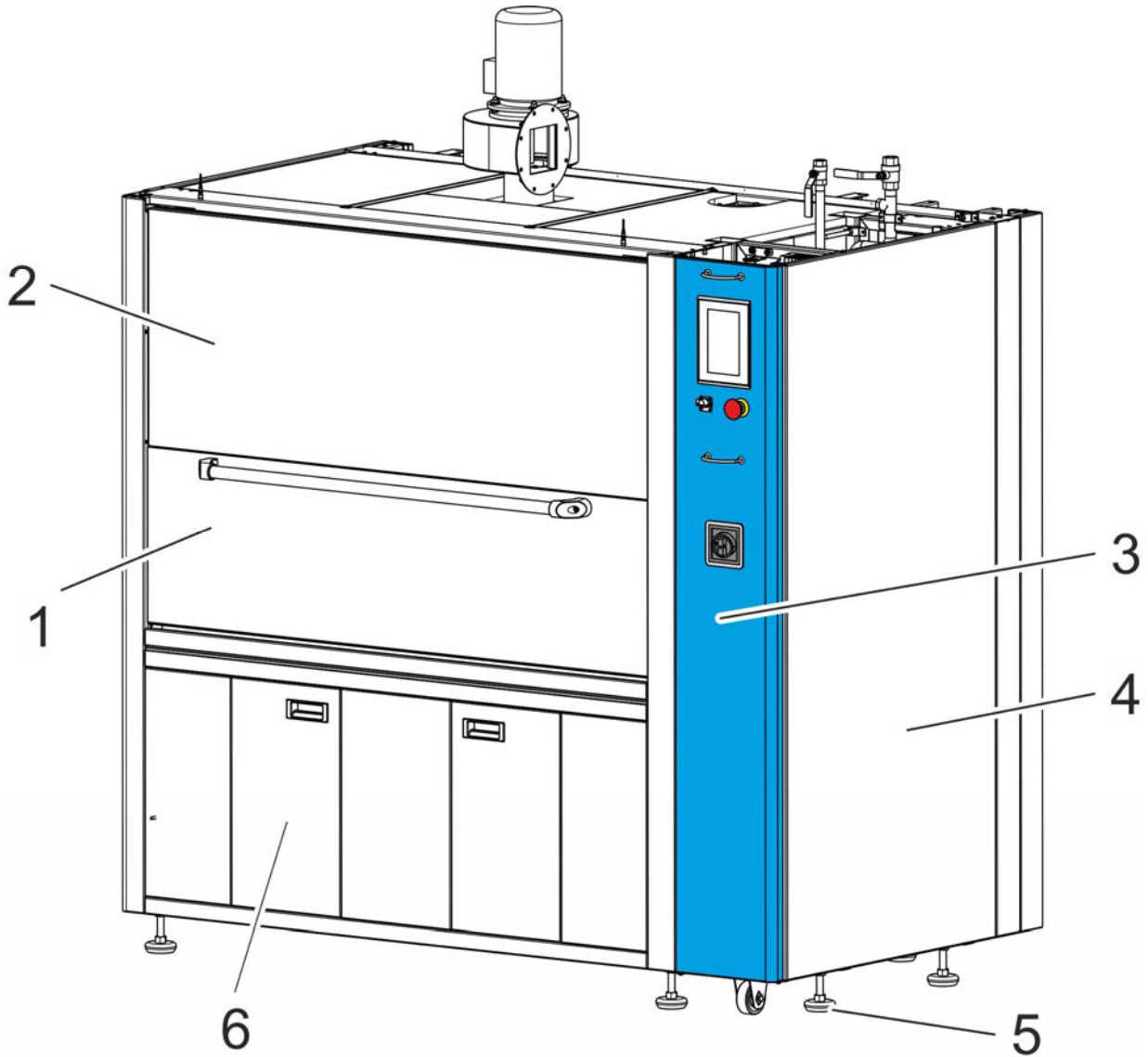


IWT disclaims all responsibility for any use other than the intended use stated in this chapter. In case of doubt please contact IWT.



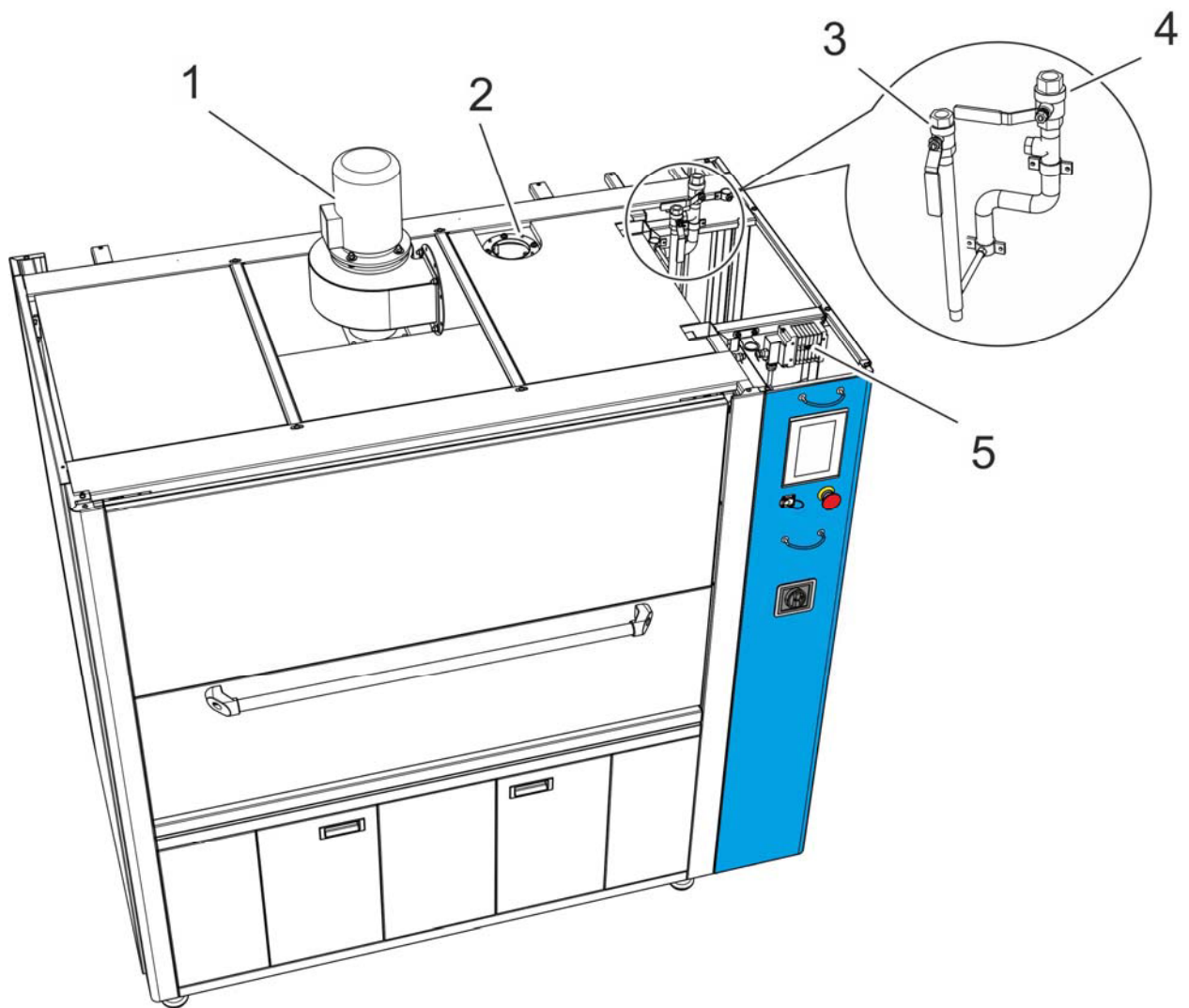
2.3 MAIN FEATURES

2.3.1 SINGLE DOOR CONFIGURATION



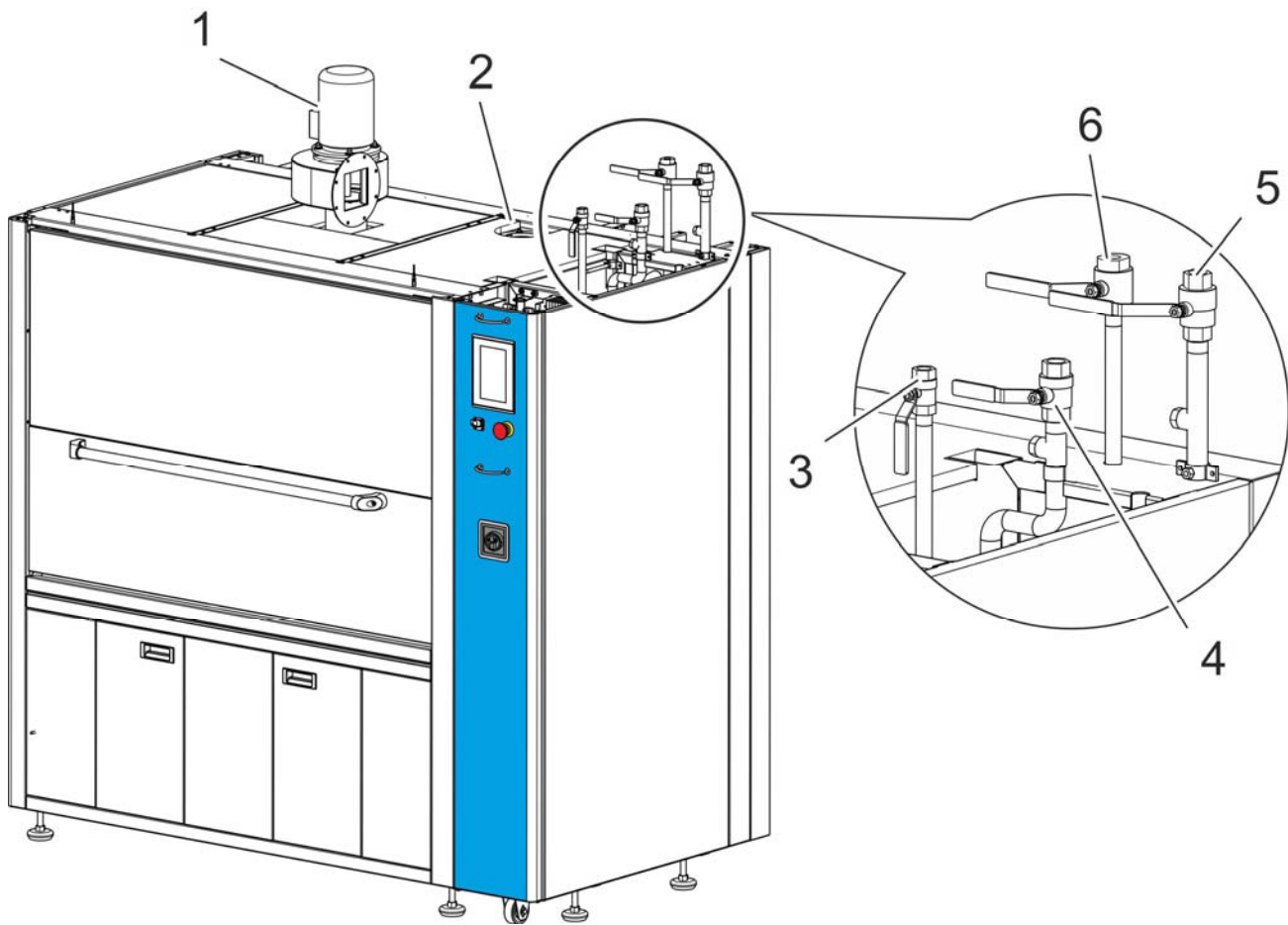
PICTURE 1 – SERIES 650GP WASHER MAIN FEATURES

1. Lower hinged door and worktop with sliding guides
2. Upper sliding door
3. Roll-out electrical switchboard with control panel
4. AISI 304 stainless steel main structure
5. Adjustable feet
6. Service compartment



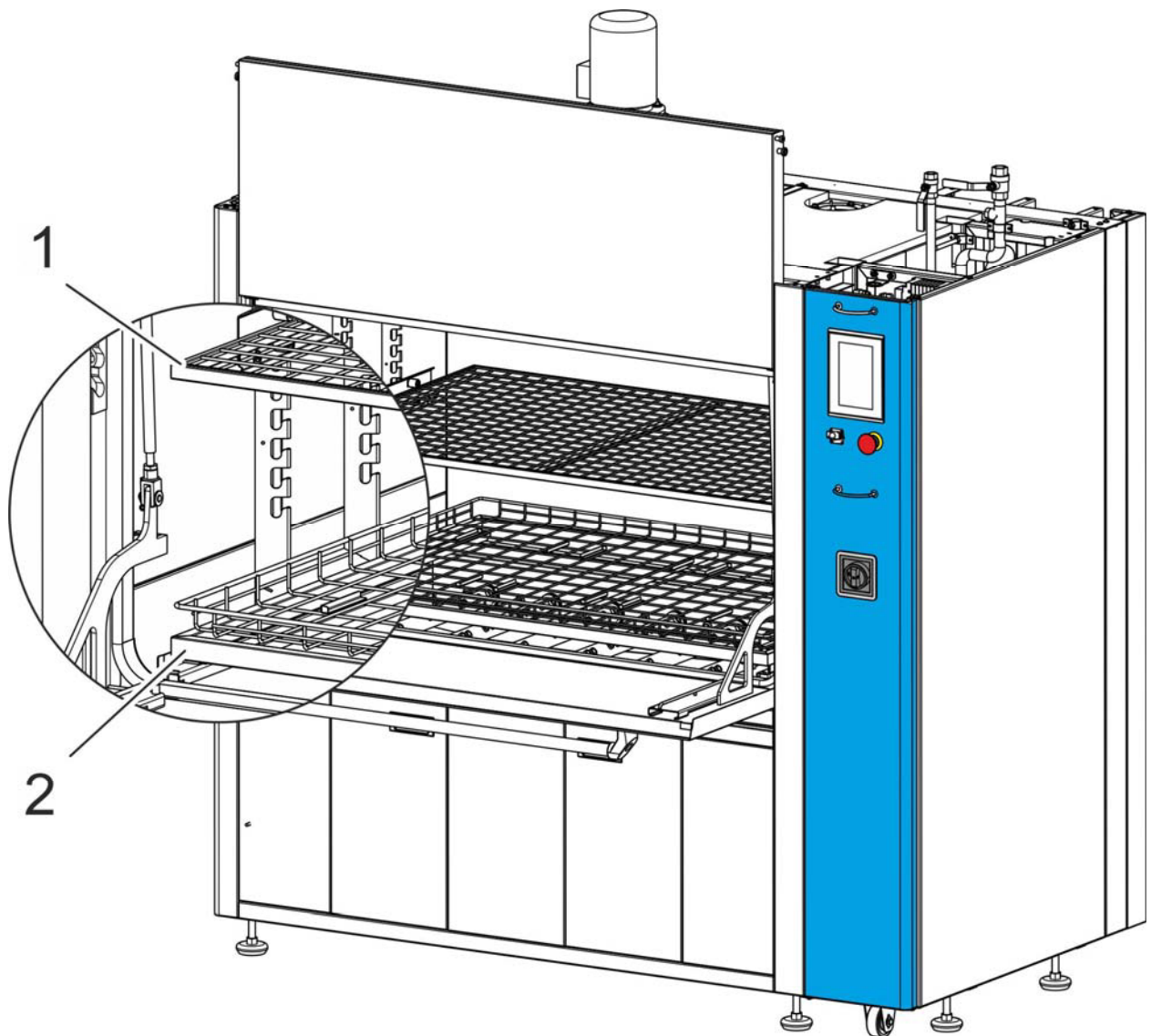
PICTURE 2 – SERIES 650GP WASHER MAIN FEATURES – ELECTRICAL HEATED

1. Extraction fan
2. Air vent
3. Compressed air inlet (all models without on board-compact air compressor)
4. Water inlet
5. Pneumatic valves



PICTURE 3 – SERIES 650GP WASHER MAIN FEATURES – STEAM HEATED

1. Extraction fan
2. Air vent
3. Compressed air inlet (all models without on board-compact air compressor)
4. Water inlet
5. Steam inlet
6. Condensation outlet

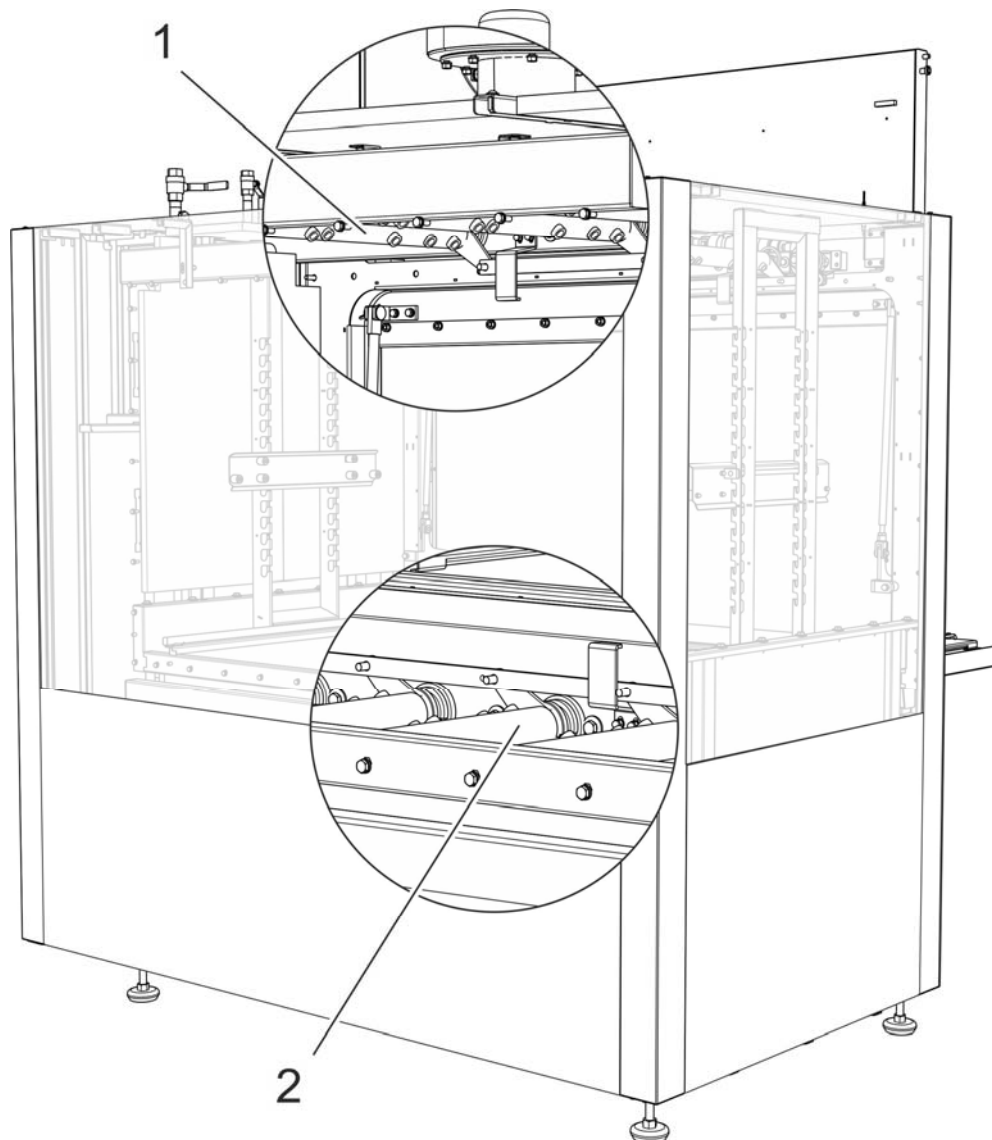


PICTURE 4 – SERIES 650GP WASHER MAIN FEATURES

1. Level 1 stainless steel mesh tray
2. Level 2 stainless steel mesh tray



2.3.2 WASH CHAMBER

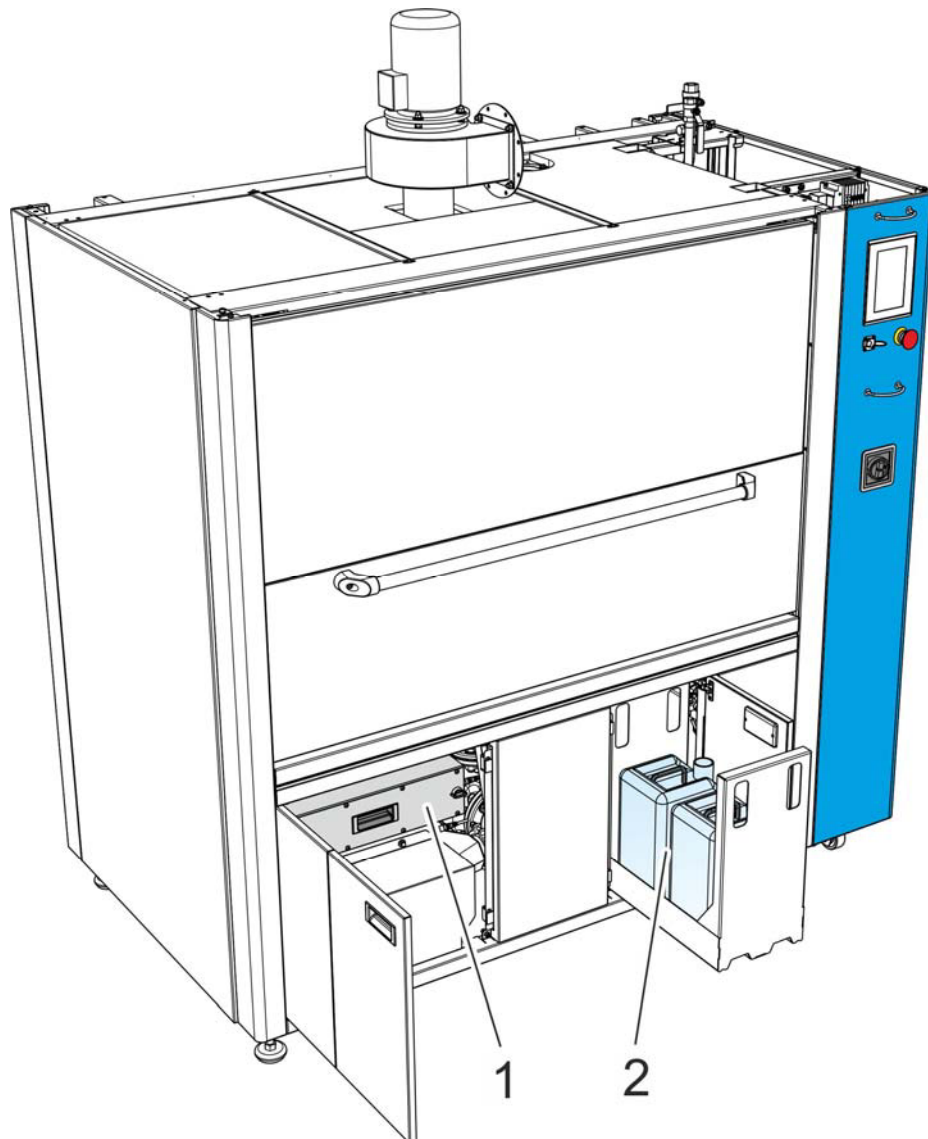


PICTURE 5 – SERIES 650GP WASH CHAMBER MAIN FEATURES

1. Upper arms with stainless steel wash and rinse water nozzles
2. Lower arms with stainless steel wash and rinse water nozzles

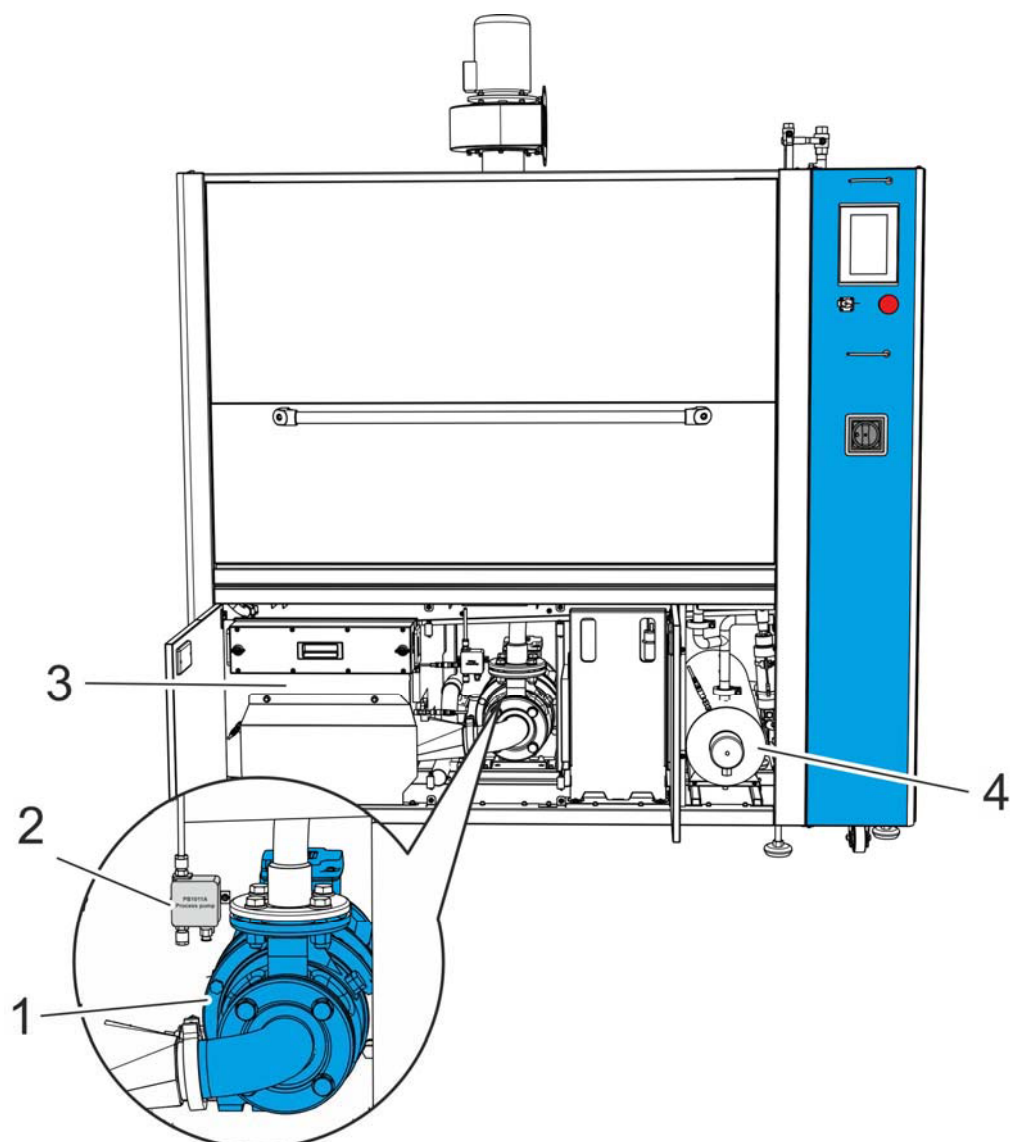


2.3.3 SERVICE COMPARTMENT MAIN FEATURES



PICTURE 6 – SERIES 650GP SERVICE COMPARTMENT MAIN FEATURES 1

1. Filter drawer
2. Detergent dosing tanks



PICTURE 7 – SERIES 650GP SERVICE COMPARTMENT MAIN FEATURES 2

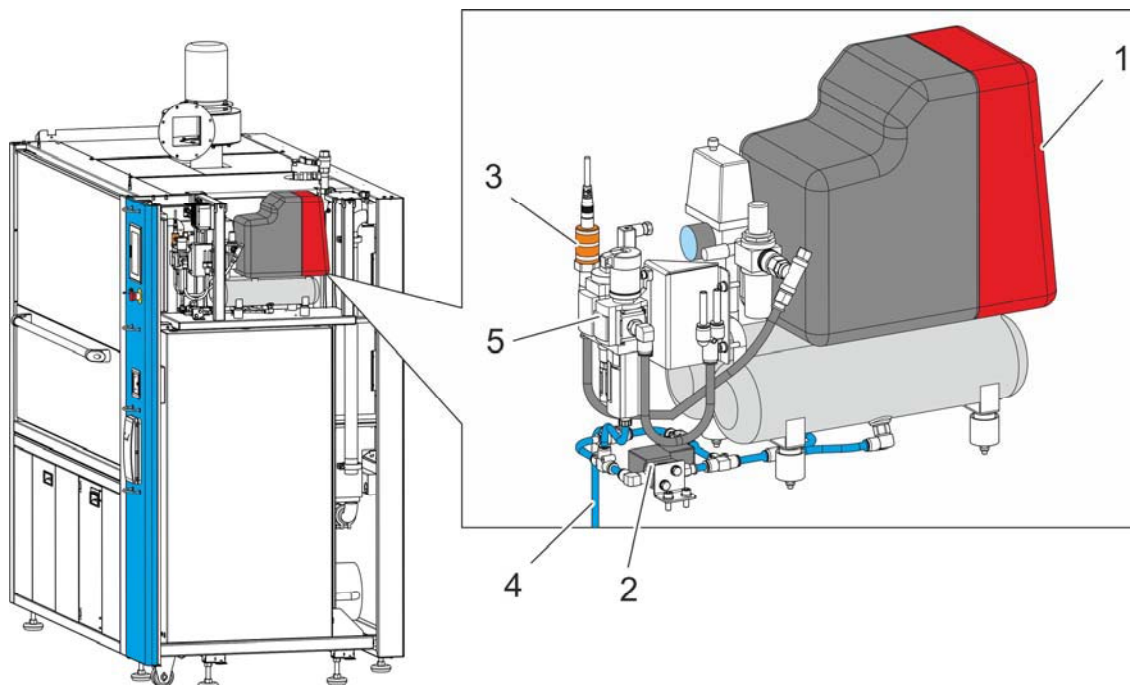
1. Washing pump
2. Detergent dosing pump
3. Wash tank
4. Rinse boiler



2.3.4 ON BOARD COMPACT AIR COMPRESSOR MAIN FEATURES (OPTIONAL)

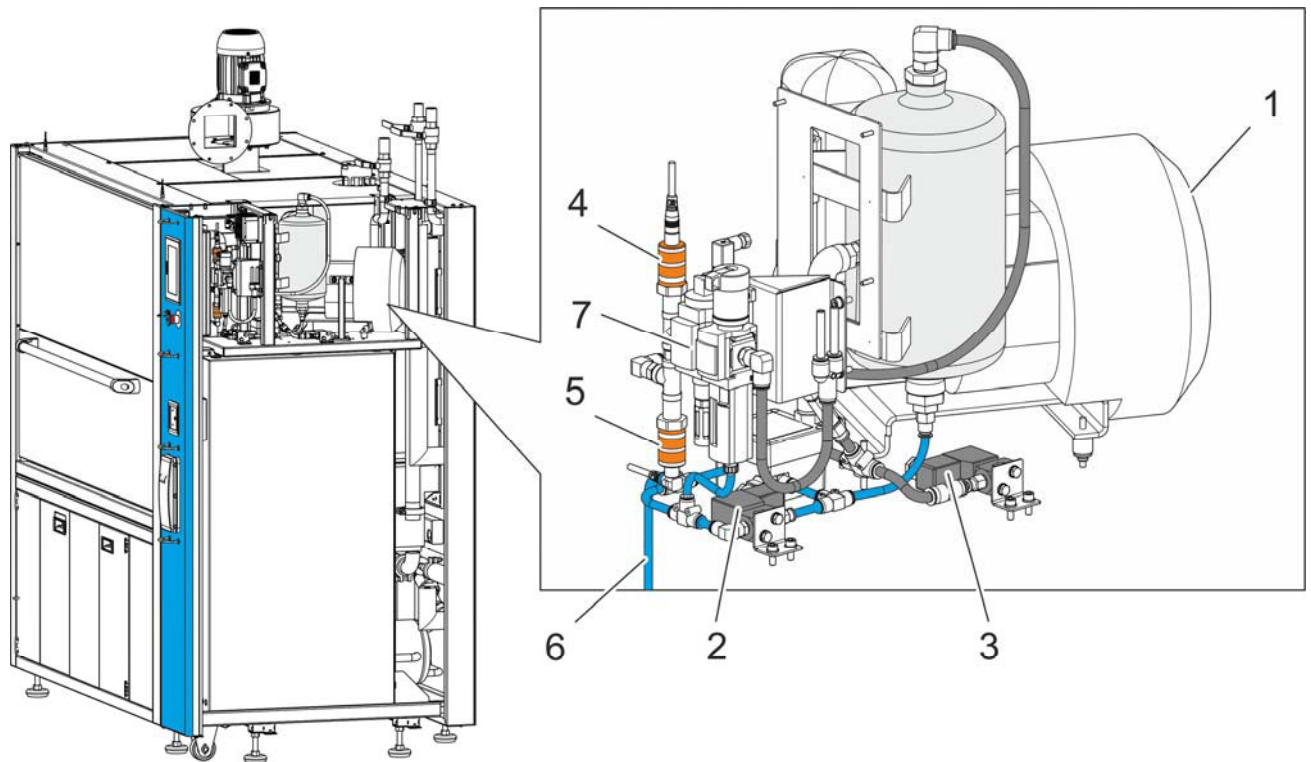
The compressor unit is supplied with an automatic condense drain device.

The compressor unit drains the circuit automatically during the cycle and whenever the commands are disabled.



PICTURE 8 – SERIES 650GP ON BOARD COMPACT AIR COMPRESSOR MAIN FEATURES (400V/50HZ VERSION)

1. Compressor unit (P&ID ref. 419).
2. Solenoid valve 2/2 24VDC 1/8" with quick connection (P&ID ref. 110).
3. Pressure switch (P&ID ref. 741)
4. Drain pipe.
5. Service unit



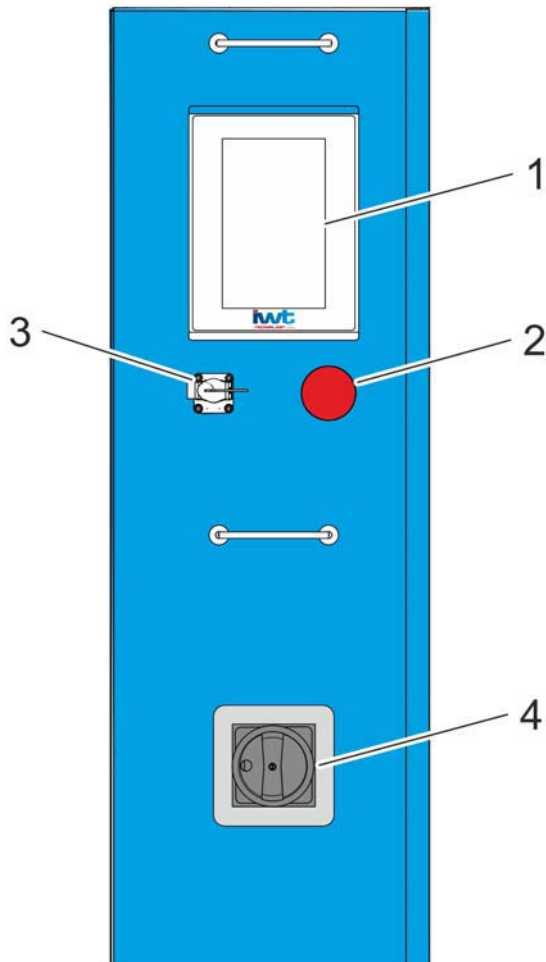
PICTURE 9 – SERIES 650GP ON BOARD COMPACT AIR COMPRESSOR MAIN FEATURES (480V/60HZ VERSION)

1. Compressor unit (P&ID ref. 419).
2. Solenoid valve 2/2 24VDC 1/8" with quick connection (P&ID ref. 110).
3. Solenoid valve 2/2 24VDC 1/8" with quick connection (P&ID ref. 159).
4. Pressure switch. (P&ID ref. 741)
5. Pressure switch (P&ID ref. 741/2)
6. Drain pipe.
7. Service unit



2.4 INSTRUMENTATION AND CONTROLS

2.4.1 CONTROL PANEL



1. **TOUCHSCREEN**- user-friendly interface that allows the user to set and carry out up to five different wash cycles, to monitor parameters and alarms and to simplify service procedures.
2. **EMERGENCY PUSHBUTTON**
3. **USB PORT**
4. **POWER ON/OFF SWITCH**

PICTURE 10 - CONTROL PANEL MAIN FEATURES



2.4.2 DOUBLE DOOR CONFIGURATION WASHERS – CLEAN SIDE CONTROL PANEL

The configuration of the double door washer assumes the loading area is at the front of the machine and the unloading area at the rear .

1. **Alarm signal light** it shows whenever an alarm is triggered by the system.
It blinks whenever a warning is triggered by the system.
2. **Start Cycle** signal light pushbutton: Press to start pre-set cycle.

Light state	Meaning
Steady green light on	Cycle running
Green light off	Stand-by
Fast blinking green light	Cycle booked
Slow blinking green light	Cycle accomplished

3. **Open/close Door** signal light pushbutton –
Press once to open the door.
Keep pressed a few seconds to close and lock door.

Light state	Meaning
Steady white light on	Clean side door open or unlocked
White light off	Both doors closed or locked
Blinking white light	Dirty side door open or unlocked

4. **Emergency pushbutton**



NOTE: The positioning of lights and buttons in the control panel may vary according to machine configuration/customer needs. Functions do not change.



1



2



3



4



3. SAFETY PRECAUTIONS

3.1 SAFETY NOTES

The following words and symbols are used in order to explain safety procedures.



- This symbol is used in safety messages and on labels when there is an imminently hazardous situation which, if not avoided, may result in death, serious injury or serious damage to the machinery. These safety messages also describe how the hazard can be avoided.



- This symbol is used to explain any procedures which, if performed incorrectly, could cause damage to the equipment or potential problems that might shorten the operating life of the machine.



NOTE - Annotations are made for information which requires specific consideration on any procedures, but for which there is no risk of damaging the machinery. Pay special attention to all Safety Warnings given throughout the instructions.
For any doubts regarding safety, contact IWT.

3.2 GENERAL PRECAUTIONS

This machine is only intended for specialized applications and is to be used by authorised and qualified personnel only.

Only use the machine for its intended purpose. Any other use, conversion or modification is dangerous.

The manufacturer cannot be held responsible for damage caused by improper use of this machine.

This machine complies with current safety requirements. Improper use of the machine can lead to personal injury and material damage.

Follow all the precautions, procedures and safety measures prescribed by the standards in force to safeguard personnel and animal health and read the User's manual before using the machinery.

Before using the machine the user must have a clear understanding of the positioning and functions of the commands.



Do not use the machinery without protection panels

Do not carry out modifications that might alter the performance or the machinery working conditions.

If the machinery is used in a manner that is not specified by the manufacturer, the protection provided by the equipment may be impaired.

Do not use the machinery in an explosive environment.

3.3 PERSONAL PROTECTIVE EQUIPMENT

When running and servicing the machinery, operators must wear personal protective equipment as prescribed in directives and standards in force in the country where the system is installed to safeguard personal health and safety.

Should some detergent or disinfectant come into contact with the skin, wash immediately with abundant running water.

3.4 ENVIRONMENTAL RISKS

The machine and its operating principle do not represent any risk for the environment.



Do not release harmful substances into the environment.

It is recommended to follow laws and regulations in force in the country where the machine is installed in terms of waste disposal whenever a component is replaced.

3.5 SAFETY MEASURES

The system is equipped with the following safety devices in order to protect both operators and maintenance personnel and to disable the machine in the event of component failure:

- **General safety switch installed on the electrical power cabinet.**
- Emergency push button on each of the control panels.
- Manual operations and modifications are only allowed via the Supervisor's password.
- **Safety sensors:** mounted on the doors that interrupt the washing cycle if one of the doors is accidentally opened.
- **Protection panels:** covering all the electromechanical equipment and pipework at high temperature that could cause danger of scalding.
- **Solenoid valves for fluids normally closed:** In the event of a power cut, solenoid valves isolate the machine from water and compressed air.



Do not open the door when the machine is working!



3.6 RESIDUAL RISKS

3.6.1 THERMAL HAZARD

This washer reaches very high temperatures. Take care when unloading the unit. Let baskets and inserts cool before touching them and wear suitable heavy duty gloves when unloading washed items.

Any water which may remain in containers will be very hot and must be emptied into the wash chamber.

The heating elements become extremely hot during use.

Do not touch the heating elements during or directly after the end of a program.

Let the heating system, hot water and steam pipework cool before servicing the washing chamber.

3.6.2 CHEMICAL HAZARD

Before use, read the detergent data sheets.

Take care when handling liquids such as detergents, disinfectants or neutralizing agents. These may contain irritating or corrosive ingredients. Wear protective gloves and goggles.

The manufacturer's safety conditions must be observed for all chemical agents.

Avoid inhaling detergents. If swallowed, they can cause burning in the mouth and throat or inhibit breathing.

Only use cleaning agents formulated for special processes and approved by IWT for use with this machine.

Use of unsuitable cleaning agents could adversely affect the components of the machine.

Never use a water hose or a high pressure hose to clean the outside of machine or the areas surrounding it.

Only use the product for the application described by the manufacturer to avoid any material damage or the occurrence of strong chemical reactions.

The machine is designed only for operation with water and additive cleaning agents.

Do not allow any remains of acids or solvents, particularly hydrochloric acid or chloride solutions, to get into the wash cabinet.

The presence of any solvents should be minimized.

To prevent corrosion damage, ensure that solutions or steam containing hydrochloric acid do not come into contact with the steel casing of the machine.

3.6.3 DETERGENT CONTAINER GENERAL STORAGE INSTRUCTIONS

Keep detergent containers away from heat, sparks and flame.

Store them in a cool, dry and ventilated place.

Store them upright in their original closed containers.

When not in use, keep them securely closed.

Carefully read the manufacturer's label and MSDS (Material Safety Data Sheet) for information on safe storage.

3.6.4 DETERGENT CONTAINER GENERAL HANDLING INSTRUCTIONS

Handling instructions may differ from one product to another, make sure you read the MSDS (Material Safety Data Sheet) of each product before handling it.

Pay due attention when handling chemicals. Keep containers securely closed during handling.

Appropriate protective clothing should be worn to prevent contact with clothing, skin, membranes and eyes.

If the detergent container is too heavy or too big to be handled by hand, place it securely on a transport trolley to minimize the chance of spills.

When used, place detergent containers only in a well-ventilated area.

Never place containers in areas such as hallways, doorways or next to moving equipment where the chance of spills is likely.



Under certain conditions of hazard classification of the chemicals, the user needs to provide appropriate containers for suction lance housing to avoid possible vapour spreading in the working area.









3.6.5 HANDLING

Loaded trays and baskets are very heavy; use both hands when handling them.
Be careful when sorting items with sharp pointed ends. If possible, place the pointed end downwards.
Do not sit or lean on the open door. Injury or machine damage could result.
The special inserts should only be used for their specific applications.



3.6.6 SAFETY SIGNS AND NOTICES ON THE MACHINERY

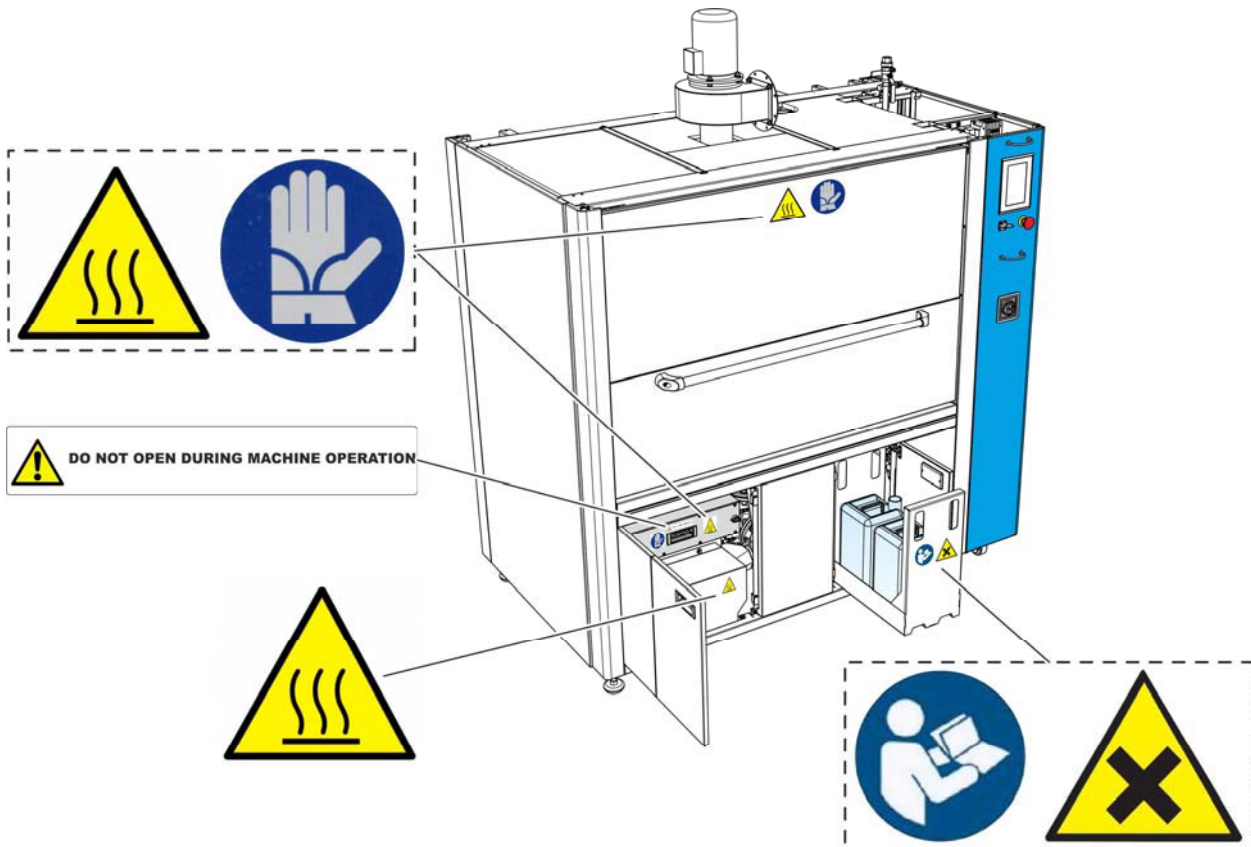
Where risks remain despite all the measures adopted or in the case of potential risks which are not evident, an appropriate, readily understandable pictogram is used to warn the operator.

The following safety signs and notices are positioned on the machinery in order to warn the operator of possible dangers.

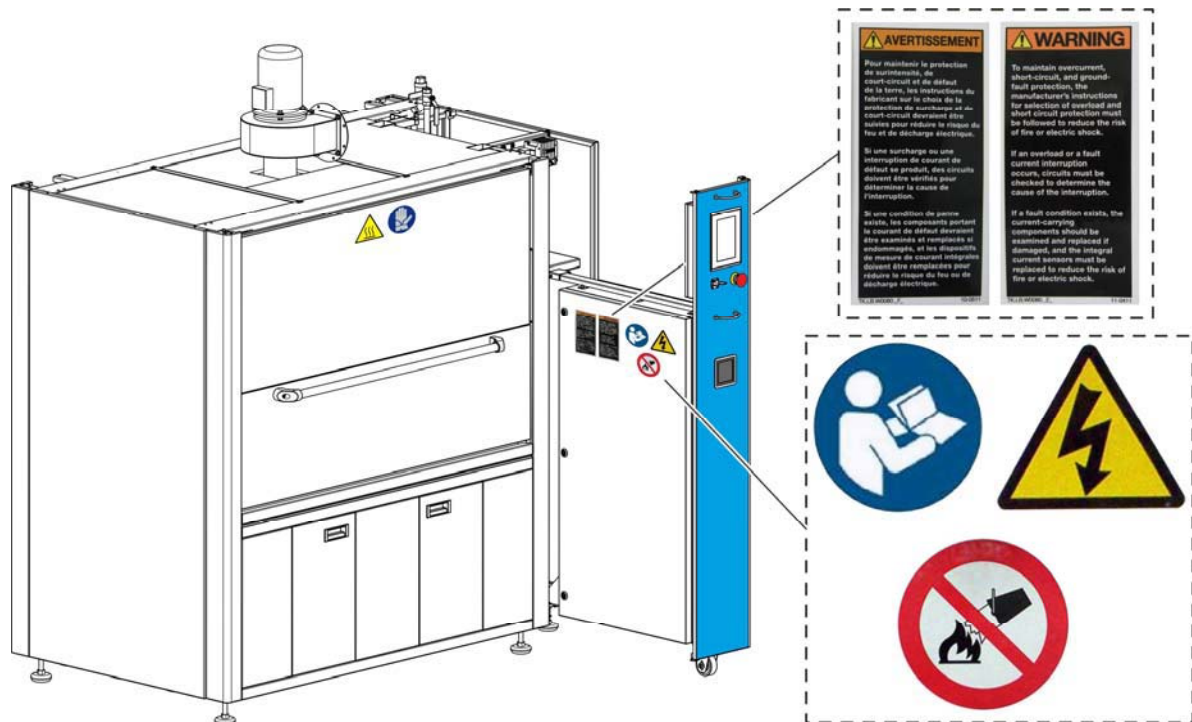
SAFETY SIGN	MEANING	POSITION
	Danger: electrical hazard. Do not operate on live equipment. <ul style="list-style-type: none"> • Specific authorisation required • Not less than two persons must operate in dangerous conditions Do not work without the necessary precautions.	Electrical cabinet
	Do not extinguish fires with water	Electrical cabinet
	Read Instructions Manual	Electrical cabinet Detergent tank vane
	Warning: overcurrent, short-circuit, ground-fault protection	Electrical cabinet (only for UL machine version)
	Warning: chemical irritants	Detergent tank housing
	Wear heavy duty gloves	Door Filter panel



	Danger: Hot Surfaces	Door Filter panel
 DO NOT OPEN DURING MACHINE OPERATION	Warning: Do not open during machine operation	Filter panel



PICTURE 11 SERIES 650GP ELECTRICAL BOX WASHER



PICTURE 12 SERIES 650GP ROLL-OUT ELECTRICAL BOX WASHER



SECTION 2 - OPERATING INSTRUCTIONS

1. HANDLING AND TRANSPORTATION

1.1 PACKAGING

The machine and its accessories are shipped as agreed in the order, usually disassembled in wooden crate.



NOTE: Check items weights on the packing list before handling.



DISPOSE OF THE PACKAGING IN COMPLIANCE WITH LAWS AND REGULATIONS IN FORCE IN THE COUNTRY WHERE THE SYSTEM IS INSTALLED.

1.2 HANDLING

The handling of the machinery and of its separate accessories must be carried out by trained personnel using a forklift truck with a sufficient load capacity to handle the various items.



Special attention must be paid during transport operations. Use a forklift truck when the machine is packed. Transport the crate in upright position as indicated on the packaging.

It is advisable to transport the crated machine as close to the site where it is going to be installed as possible before removing the packaging.

When handling the crate with the forklift make sure the forks are positioned so as to maintain the load stable and balanced. Lift the crate as little as possible in order to avoid tilting.

1.3 INCOMING INSPECTION

After delivery, open each package to check that the machine is still intact.

If the machine has been mishandled, dented or damaged, alert the shipping company and the Technical Assistance Service immediately; otherwise, transport the machine to the site where it is to be installed.

1.4 STORAGE

The machinery is designed for indoor use only.

If the machinery is not to be used immediately, leave it in the original packages and store it in an environment compliant with the requirements specified hereunder:

STORAGE ENVIRONMENTAL REQUIREMENTS

Indoor storage only

Sheltered from direct exposure to sunlight


Temperature: 5 – 50°C

Humidity: 30 – 90 %



If the machinery has been moved, packed and stored, after a period of use (e.g. if there is a change of laboratory or plant), contact the technical assistance or the distributor in order to have accurate and precise instructions on how to put it back into service.

2. PUTTING THE MACHINERY INTO SERVICE

2.1 INSTALLATION SITE MINIMUM REQUIREMENTS

WATER SUPPLY	WATER INLET CONNECTION	3/4" G
	QUALITY	150ppm CaCO3 HARDNESS
	DYNAMIC PRESSURE	min 2 max 3 bar pressure
 It is advisable to provide a filter to prevent sand or shavings from entering the valves.		



It is advisable to use a high pressure flexible hose to connect the end of the pipe to the water inlet in order to absorb all shocks caused by the closure of the valves		
DRAIN	MINIMUM FLOOR DRAIN DIAMETER	Ø 100 mm
	WASHER DRAIN	Ø 50 mm
	Waste water coming from the system is to be discharged into a dedicated floor drain. The building drain is to be equipped with a trap so as to avoid possible return of unpleasant smells.	
	 Make sure the outlet pipe slope slightly towards the sump pit of the building and put a trap on the outlet to avoid possible return of unpleasant smells For detailed specifications concerning the drain, refer to the approved layout. The customer is responsible for complying to national wastewater regulations.	
EXTRACTION FAN	DUCT DIAMETER	180mm
	MAX. DUCTWORK RESISTANCE	20mm H ₂ O
	 A higher duct resistance will require the installation of a remote fan. The ductwork must be waterproof with all joints sealed against condensate leakage and be heat resistant up to 90°C.	
MINIMUM DISTANCE FOR MAINTENANCE PURPOSE	MINIMUM CLEARANCE IN FRONT OF THE MACHINE	1000mm
	MINIMUM CLEARANCE ON THE RIGHT HAND SIDE OF THE MACHINE – with NON roll-out electrical box	1000mm
	CEILING	500 mm
ELECTRICAL CONNECTIONS	<p>The machinery is set to work with the voltage and frequency level specified at the time of order and therefore it only accepts the percentage variations which are standard in the country of installation.</p> <p>The connection to an EARTH compliant with regulations in force in the country where the unit is to be installed is compulsory.</p> <p>To protect the equipment and the Operator from any short circuit or earth leakage, and to facilitate the isolation of the equipment during maintenance, the machinery is to be connected to a power supply that complies with standards in force in the country where the machinery is installed and with an earth leakage protection ≥ 300 mA type B.</p> <p>IWT disclaims all responsibility for personal or material damage resulting from:</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Missing or defective earth connection <input checked="" type="checkbox"/> Lack of installation of suitable protections 	



2.2 INSTALLATION PROCEDURE



SAFETY MEASURES

- Access to the Installation area is allowed to IWT authorized technicians only.
- The handling and installation of the system is to be carried out by at least 2 trained technicians.
- Connection of power supplies, utilities and outlets is to be carried out by qualified and authorised personnel only.
- Before separating the “dirty” area from the “clean” area with panels, connect all supplies and outlets.
- Before connecting the water supply and steam supply, clean the inside of each pipe and remove any particles and metal shavings.
- Do not lift the loads more than necessary.
- When handling the machinery with the forklift ensure the forks are positioned so as to maintain the load stable and balanced.
- Always stand clear of suspended loads.
- During installation, operation of the machinery without protective panels is allowed to IWT authorized service technicians for the time needed for servicing purposes only.



PERSONAL PROTECTIVE EQUIPMENT

Wear PPE in compliance with laws and regulations in force in the country where the system is being installed.



TOOLS AND EQUIPMENT

To install the machine the following tools and equipment are necessary:

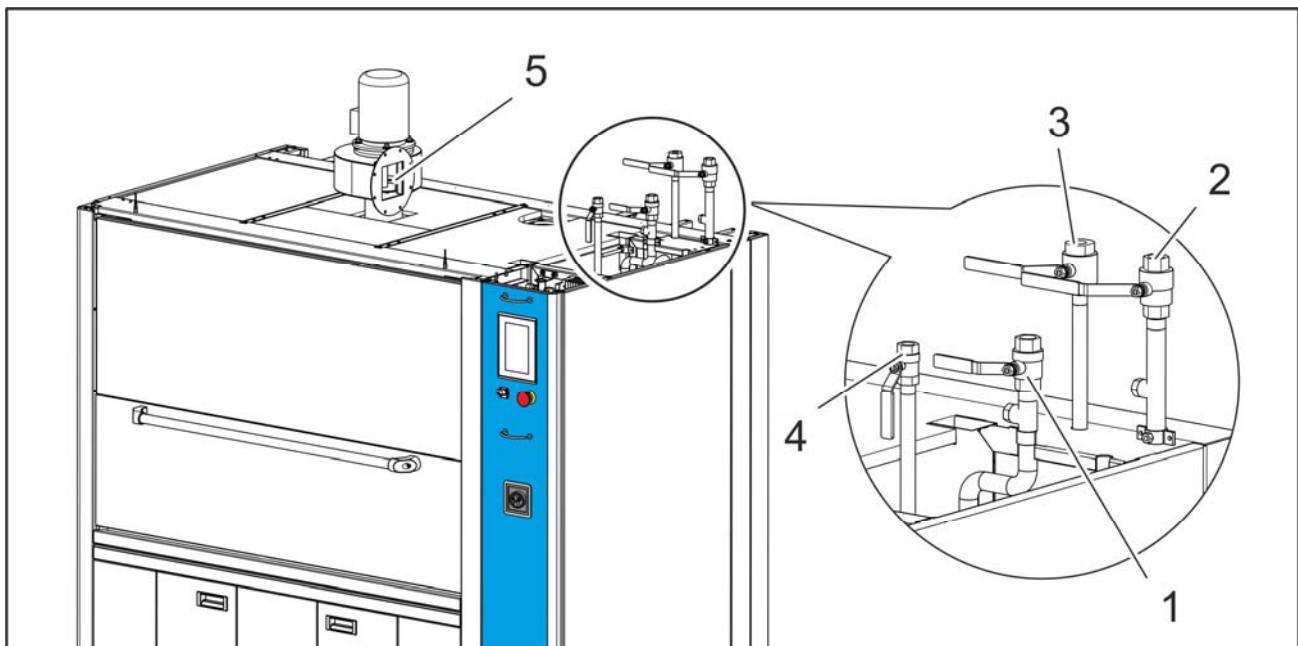
- Tool case with all basic tools (screwdrivers, wrenches, etc.).
- Fork lift truck with lifting capacity at least 20% higher than the weight of the packaged machinery or, alternatively, chain hoist/*crane with a sufficient capacity to lift the machinery.
- Safety ladder.



Refer to the approved layout and Table 1 – TECHNICAL SPECIFICATIONS for references on the dimensions of the washer inlet pipes and drain.

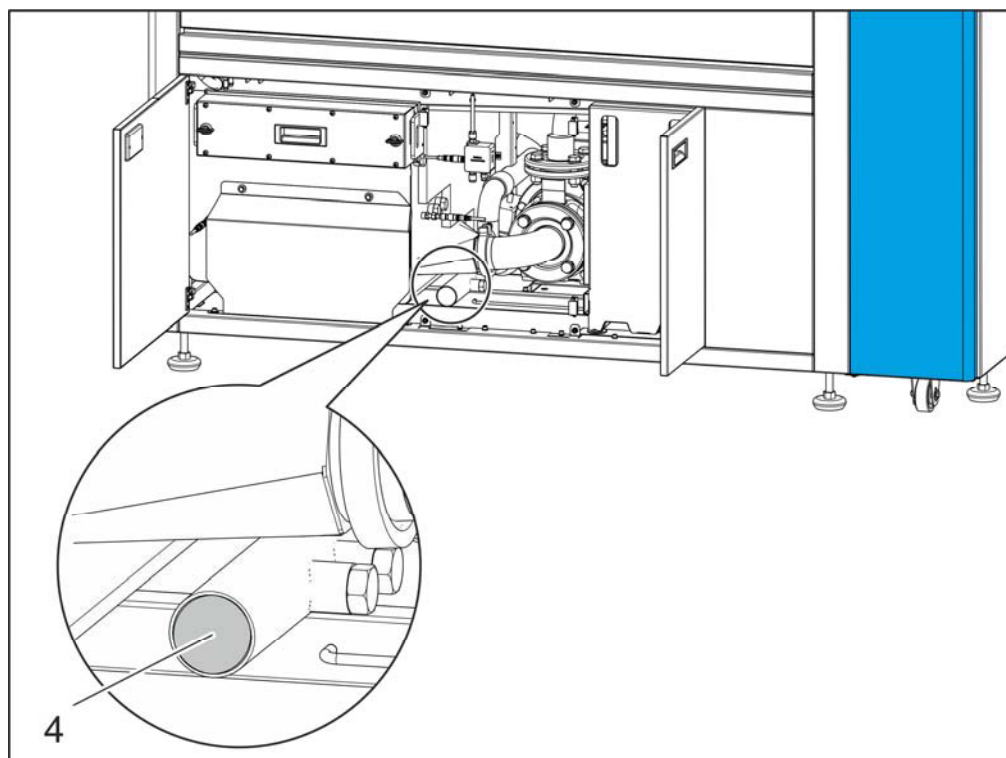


- Take the crate to installation site, using a fork lift.
- Uncrate the washer and remove any loose components.
- Place the washer in the installation site and centre it with respect to the aperture in the dividing wall between the “clean” area and the “dirty” area (double door configuration only).
- Adjust the washer feet until the machine is levelled, then tighten the locking nuts.
- Connect the washer water inlet (1) to the mains inlet by means of a high pressure flexible hose.
- Connect the steam inlet (2) and return pipe (3) to the mains steam supply (on steam-heated washers only).
- Connect the compressed air inlet (4) to the mains supply.
- Connect the extraction fan (5) outlet to the building exhaust air ductwork, then connect the fan to the electrical cables provided on the top of the machine





- Open the washer front service compartment panel and connect the waste water outlet (4) to the mains drain.



2.2.1 ELECTRICAL CONNECTIONS



Refer to the electrical diagram for any detailed specifications about the electrical connections.

PROCEDURE:

- If the washer is equipped with the roll-out electrical switchboard, unlock it and pull it out of its housing, if the washer is equipped with a standard electrical switchboard, remove the side panel.
- Connect the mains supply cables to the main switch and PE (Protection Earth).
- After the connection, check that the motor rotates in the correct direction.
- If the rotational direction does not correspond to that indicated on the pump impeller, cut off the electrical supply with the external switch and switch around two of the three phases of the main switch in the electrical cabinet.
- Do not check the rotational direction of the pump. Use the Phase Sequence Tester.
The correct phases must be: L1 – L2 – L3

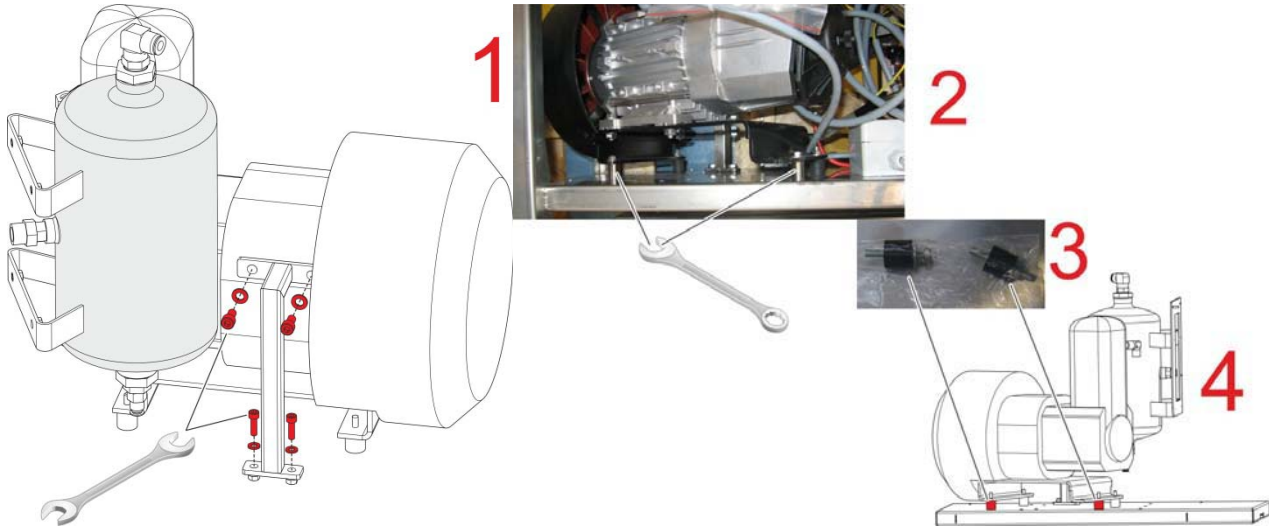


In order to check the direction of rotation of the pumps it is necessary to work with the electrical cabinet open and with the voltage supply on. This check is to be carried out by authorised and qualified personnel ONLY.



2.2.2 MACHINE WITH ON BOARD COMPACT AIR COMPRESSOR (OPTIONAL – APPLICABLE ONLY TO AMERICAN VERSION)

Before using the cage washer, remove the fixing kit from the air compressor.



The air compressor is fitted with a fixing kit to avoid any possible damage to the interior during transport. Before using the system, it is imperative that the fixing kit is removed and the two anti-vibration buffers are assembled again.



DISPOSE OF THE PACKAGING IN COMPLIANCE WITH LAWS AND REGULATIONS IN FORCE IN THE COUNTRY WHERE THE SYSTEM IS INSTALLED.

2.3 CHECKOUT BEFORE START-UP

Before starting up the machine, carry out the following operations:

1. temperature reading checkout and adjustment, if necessary.
2. cycle customization (see software manual).



3. GETTING STARTED

3.1 PRELIMINARY OPERATIONS*

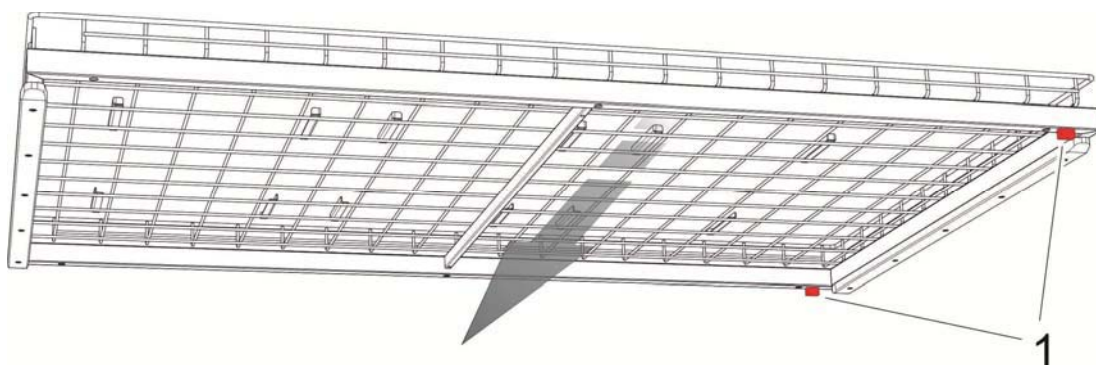


Wear heavy duty gloves when loading and unloading items to avoid burns and whenever handling detergents.

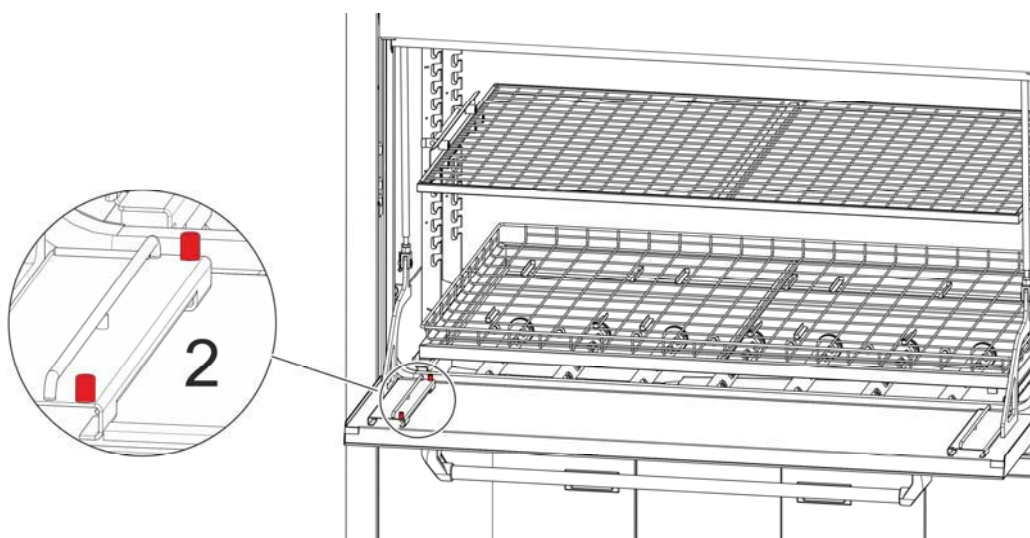
1. Put the wash detergent suction pipe into the detergent drum
2. Put the disinfectant and/or neutralising solution suction pipe into the disinfectant drum (optional) and check the pump dosage (see SECTION 4 – SERVICE MANUAL for reference).
3. Carry out the Cycle Phases settings (see SECTION 3 – SOFTWARE MANUAL for reference)
4. Check that the filter has been positioned correctly and the filter housing is properly closed.
5. Check that the emergency pushbutton is released
6. Open utilities (water, steam, compressed air - where applicable) isolation valves

3.1.1 HOW TO LOAD TRAY INTO THE CHAMBER

Slide level 1 tray into the wash chamber as illustrated in the picture, ensuring that the two stoppers (1) on the tray are on the right hand side.



Ensure the two stoppers on the tray are opposite the ones (2) on the hinged door.



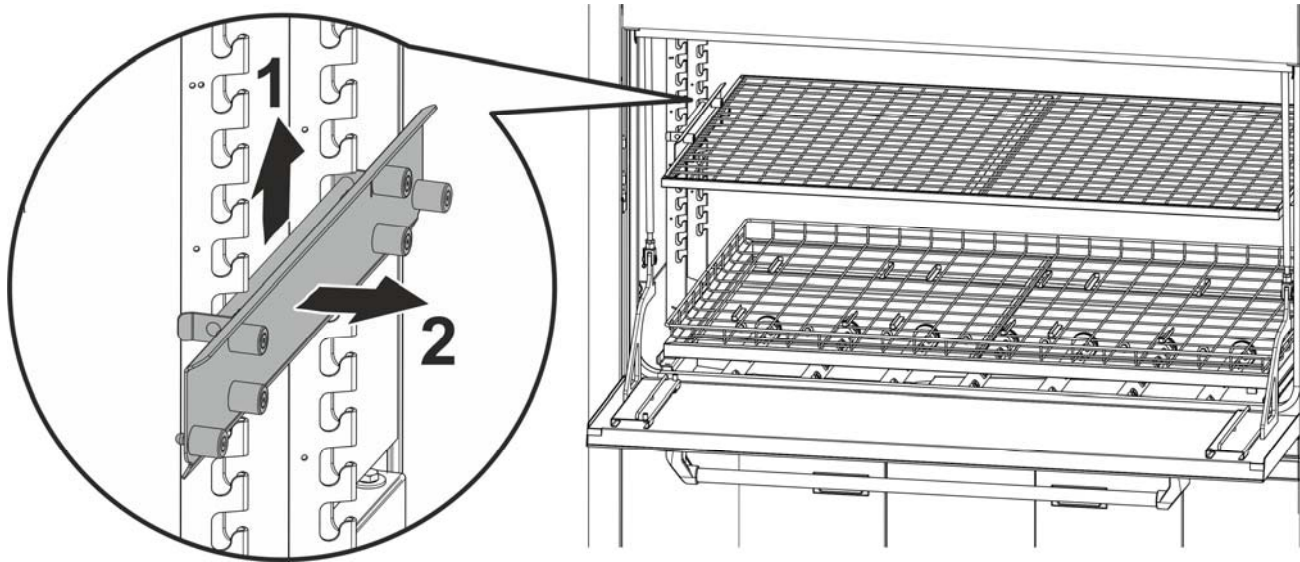
Do not rotate the crate!

* See SECTION 3 - "Software Manual" - for reference on the various screen and procedures related to settings.



3.1.2 HOW TO ADJUST THE WASH CHAMBER TRAY RUNNERS

Manifold: from 72 mm (grid min position from the wire mesh tray) to 632 mm (grid max position from the wire mesh tray).



The setting of the runners is simple and can be easily performed by the operator provided he takes due care of the alignment of the runners. Follow the indications given below in order to move and position the runners correctly:

- Lift (1) and extract (2) the guides.
- Raise or lower the guides to the most suitable height.
- Check that guides are properly aligned.
- Insert the grid.



3.2 NORMAL RUNNING

GENERAL INFORMATION

The machine is equipped with an electric door lock. The door can only be opened when the electrical supply to the machine is turned on, and the

button  has been pressed.

To open the door, tap the "Door" symbol for a few seconds, then grip the handle and open the door.

To close the door, lift the door upwards and push it until it clicks shut.



SAFETY PRECAUTIONS

- Use both hands to open/close the machine doors and during loading/unloading operations.
- Wear appropriate PPE during loading/unloading operations.
- Since washed items may be hot, wear heavy duty gloves during unloading operations.




NOTE:

- Load items so that water will cover all surfaces. This ensures that they will be properly cleaned.
- Do not place items to be cleaned inside of other pieces, where they may be concealed.
- Deep-based items should be placed at an angle to allow water to run off easily.
- Tall, narrow pieces should be placed in the centre of the basket for best water coverage.
- Wash arms must not be blocked by items that are too tall or hang through baskets.

PROCEDURE

- Turn on the power on safety switch on the main control board.



- As soon as the system displays the Home Page, tap  to acknowledge the alarm.

- Tap .


- Tap  to open the cycle page.






- Keep  pressed for a few seconds to open the washer doors (in double door configuration washers, this operation is carried out on the dirty side).
- Load the items to be washed with the open side facing downwards so as to avoid water trapping.
- Slide the tray inside the chamber and close the door.
- The system will automatically lock it into position as soon as the machine starts the cycle.
- Tap  from the cycle page to open the **RECIPE CHOICE PAGE**.



- Tap the desired cycle icon to select the recipe.
- Tap  to return to Main Page.



- Tap  to start the cycle.


 If the machine has already reached operating conditions (detergent levels and temperature reached, no active alarms, doors closed), the cycle will start immediately, if the washer is not ready yet, and the cycle will automatically start as soon as operating conditions are reached.



3.2.1 AT THE END OF THE CYCLE

- The touch screen displays the “CYCLE ACCOMPLISHED”.



- Tap  to open the door and unload items.



3.3 SELF START-UP


With the Series 650 washer it is possible to set a self-start-up cycle.

At a pre-set time (with the washer switched on) the system will automatically start-up: tanks will be filled (if they are empty), and water heated

without the  button being pressed.

- Turn on the power on safety switch on the main control board.
- Gain access to Supervisor pages
- Select SELF START
- Tap **SELF START-UP** in the Supervisor Main Page



- Touch the time numerical field and enter the starting time.
- Tap the icon corresponding to the desired day of the week.
- Tap the box to confirm. It will turn to 
- Leave the washer switched on.

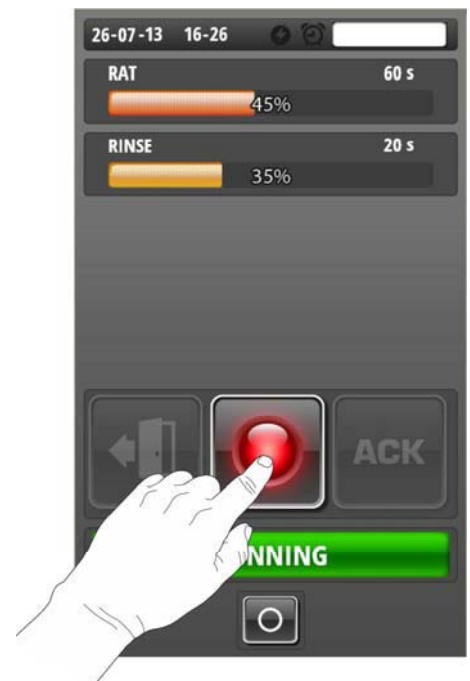


When the self-start function is active, the button  and the Home Page controls are disabled.



3.4 HOW TO ABORT/STOP THE CYCLE

To abort the wash cycle, tap  in the main page for a few seconds.








3.5 HOW TO START THE MACHINE AFTER AN EMERGENCY PUSHBUTTON HAS BEEN PRESSED

Whenever an emergency push button has been pressed, the whole system is halted.



To start-up the system again, solve the emergency situation and then release the emergency push button.

- Acknowledge the alarm by tapping 
- Tap .
- Tap  to start the cycle.






3.5.1 ALARMS AND WARNINGS

Fault conditions are reported to the operator by means of warning messages on the touch-screen.



- Tap  to acknowledge the alarm.
- Tap  to go to the Main Page.



- Tap  in the Main Page to view the latest alarms recorded with FIFO logic by the system; the screen displays the Alarm log page.



- Tap + to check when the alarm has been solved.

As soon as the alarm condition has been solved and the alarm acknowledged, the cycle may be started up again.



SECTION 3 – SOFTWARE MANUAL

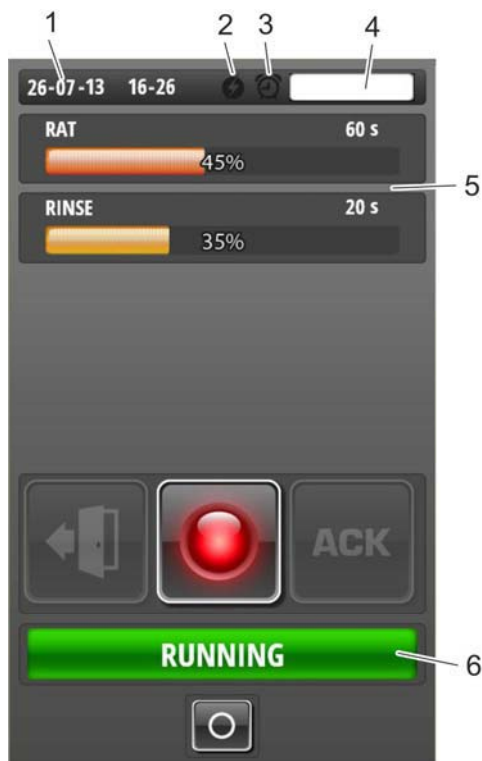
The touch screen allows the user to access any function and improves and simplifies all setting procedures enhancing the flexibility of the system.

Three different level passwords define the boundary between:

- Users, who can acknowledge any relevant information in real time.
- Supervisors who are entitled to modify the unit configuration and carry out settings.
- Service personnel.

1. OPERATOR LEVEL CONTROLS



1.1 HOME PAGE



The Home page displays the following information:

1. Current data and time
2. Green power mode
3. Self- start-up
4. User name
5. Cycle status banner
6. System status



To	Do this
Enable controls	Tap 
Open or close the doors	Tap 
Acknowledge the alarm	Tap 
Go to the next page	Tap 












1.2 THE MAIN PAGE

To open the Main Page, tap **START** in the Home Page.
 The main page displays information about cycle and machine status.




The Main page displays the following information:

1. Help page
2. Password setting page (numerical keypad)

To	Do this
Open Help page	Tap 
Open password setting numerical keypad	Tap 
Open recipe selection page	Tap 
Open special cycle choice page	Tap 
Open recipe data page	Tap 
Open P&ID page	Tap 
Open Alarm log page	Tap 
Open Cycle counter page	Tap 
Open Consumption Log page	Tap 




1.3 HELP PAGE

The Help page is displayed whenever the user taps  on the Main Page. The Help Page displays a list of all the icons used on the interface.




Tap  on the Main Page to open The Help Page.



Tap  to return to the previous page.



1.4 THE PASSWORD ENTRY PAGE

The password Page is displayed whenever the user taps  on the Main Page.



The screen will display the numeric keypad.



Enter the password.

Tap  to confirm.

Tap  to exit.



1.4.1 CYCLE SELECTION PAGE


Tap  in the Main Page to open the Cycle Selection Page.



The screen will display **RECIPE CHOICE** page, where it is possible to choose among five customised cycles

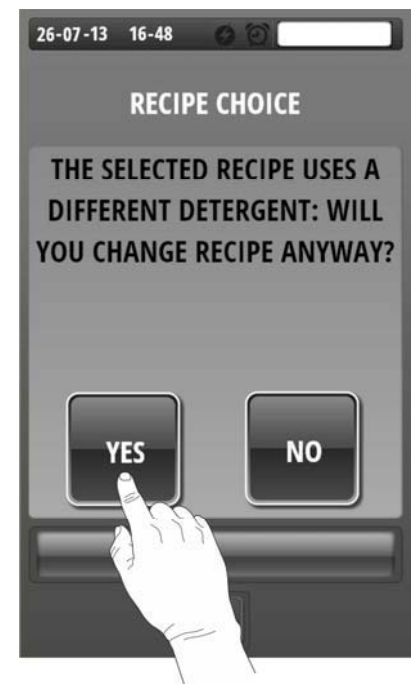





To	Do this
Select one of the five cycles	Tap the corresponding icon (DEFAULT1 DEFAULT 2 , etc.)
Go back to the previous page	Tap 



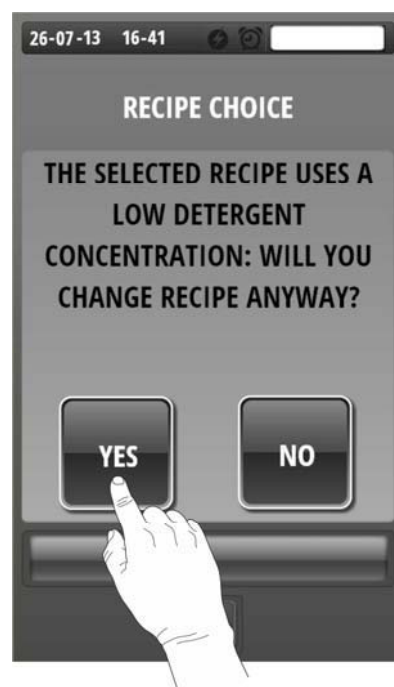
At the end of a washing cycle, whenever the new selected recipe uses a detergent different from the one used in the last accomplished cycle, the screen will display the following warning:




To	Do this
Load the selected recipe	Tap YES
To abandon	Tap NO
Go back to the previous page	Tap 



At the end of a washing cycle, whenever the new selected recipe uses a detergent concentration lower from the one used in the last accomplished cycle, the screen will display the following warning:



To	Do this
Load the selected recipe	Tap YES
To abandon	Tap NO
Go back to the previous page	Tap 

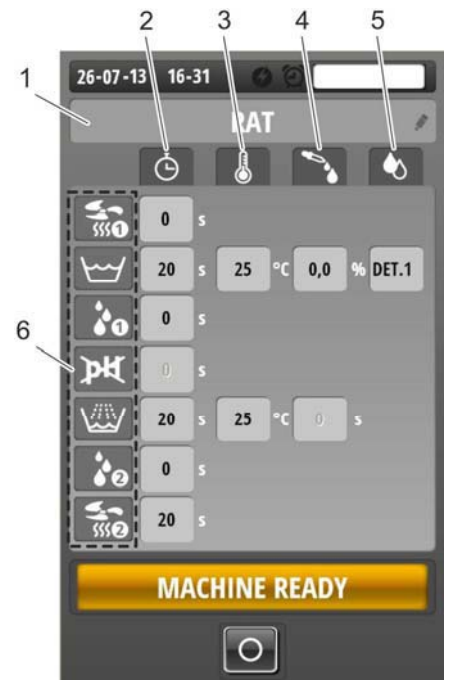


1.4.2 CYCLE PAGE

Tap  in the Main Page, to open the Cycle Recipe Data Page, where data of the selected recipe are displayed.







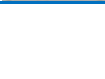



The following information is displayed:



1. Recipe name
2. Phase time
3. Phase temperature
4. Detergent percentage
5. Detergent type
6. Cycle phases




	Exhaust phase 1 (phase time)
	Washing phase (phase time/temperature/detergent percentage/detergent type)
	Dripping phase 1 (phase time)
	Neutralisation phase (phase time)
	Rinse phase (phase time/temperature)
	Dripping phase 2 (phase time)
	Exhaust phase 2 (phase time)

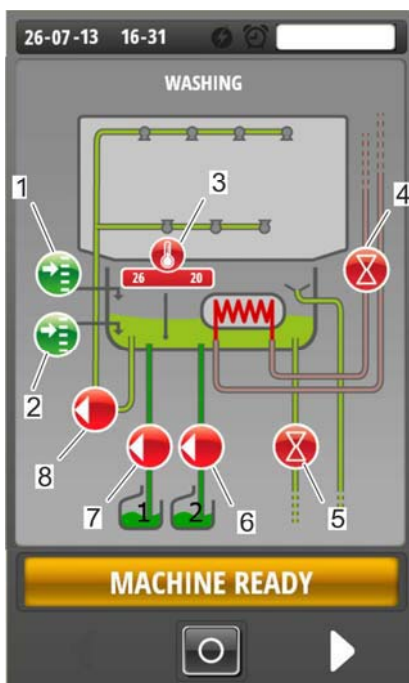
To	Do this
Go back to the previous page	Tap 



1.4.3 STATUS PAGE

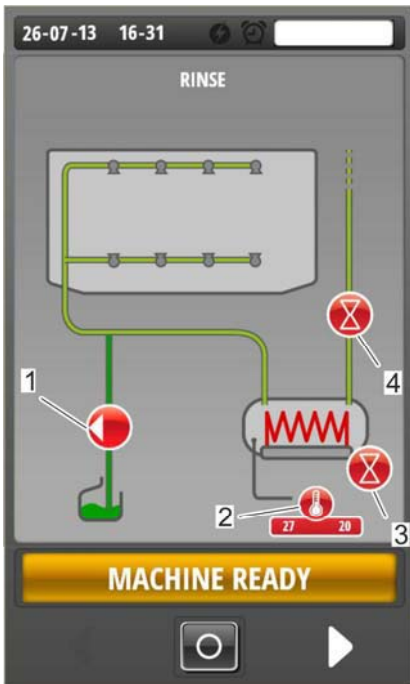


Tap  in the Main Page, to open the Status Page, where the state of the main electrical components during the various phases of the cycle is displayed.



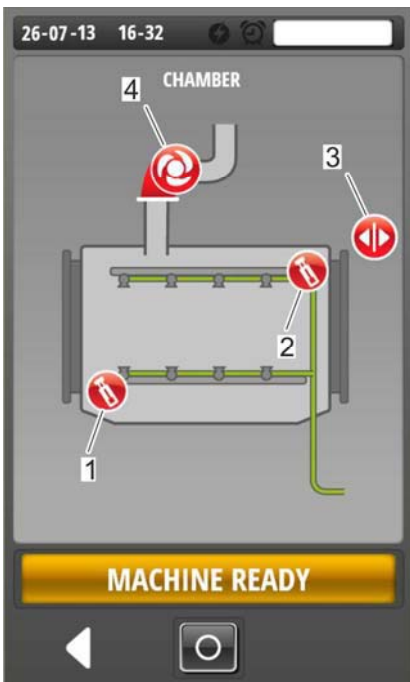
Steam heated cage washer

1. Washing tank maximum level sensor
2. Washing tank minimum level sensor
3. Washing tank temperature probe
4. Steam pneumatic valve
5. Tank drain pneumatic valve
6. Second dosing pump (option)
7. First dosing pump
8. Washing pump



Steam heated cage washer

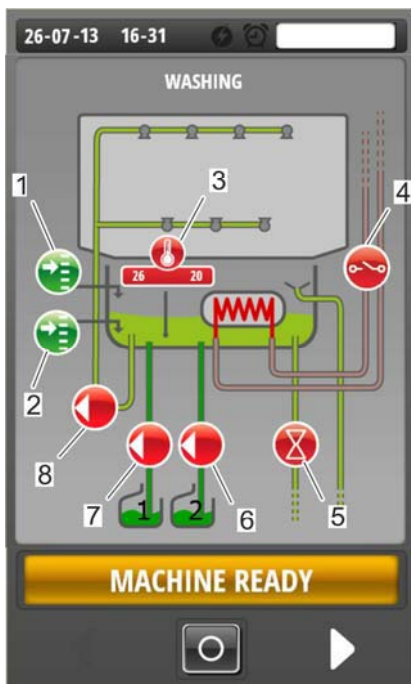
1. Rinse aid dosing pump (option)
2. Rinse tank temperature probe
3. Steam pneumatic valve
4. Rinse water pneumatic valve



Steam heated cage washer

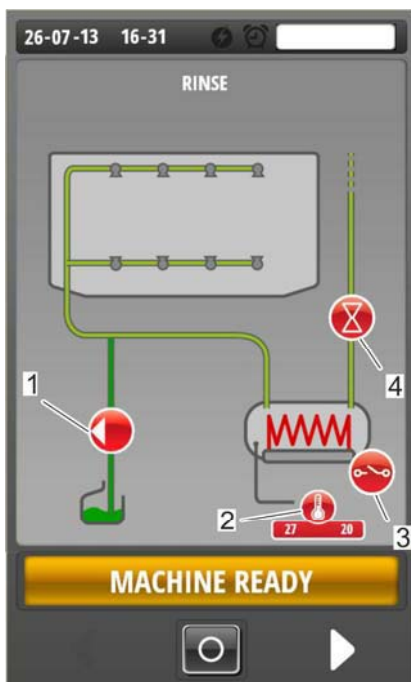
1. Arm movement pneumatic cylinder
2. Arm movement pneumatic cylinder
3. Door lock pneumatic cylinder
4. Exhaust fan

To	Do this
Go back to the previous page	Tap
Move to the next page	Tap
Go back to the main page	Tap



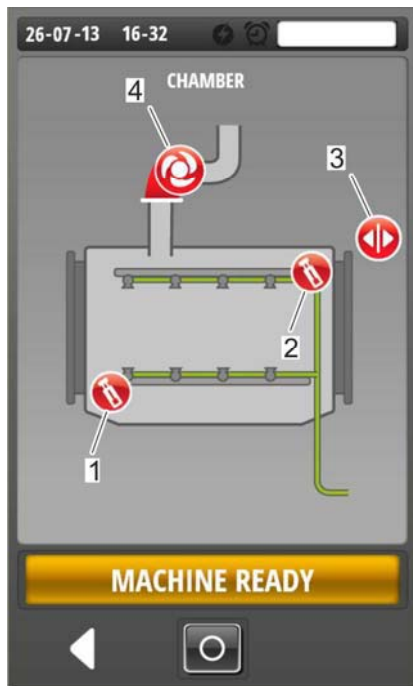
Electrical heated cage washer

1. Washing tank maximum level sensor
2. Washing tank minimum level sensor
3. Washing tank temperature probe
4. Heating element
5. Tank drain pneumatic valve
6. Second dosing pump (option)
7. First dosing pump
8. Washing pump






Electrical heated cage washer

1. Rinse aid dosing pump (option)
2. Rinse tank temperature probe
3. Heating element
4. Rinse water pneumatic valve



Electrical heated cage washer

1. Arm movement pneumatic cylinder
2. Arm movement pneumatic cylinder
3. Door lock pneumatic cylinder
4. Exhaust fan

To	Do this
Go back to the previous page	Tap 
Move to the next page	Tap 
Go back to the main page	Tap 




1.4.4 DRAIN CYCLE PAGE

To open the Drain Cycle Page, tap  in the Main Page for a few seconds.



The screen will display the Special Cycle page.




Tap  to select the drain cycle.



Tap  to return to Home Page.

The screen will display:




Tap  to start draining machine tank.



1.4.5 ALARM AND ALARM LOG PAGE

The Home Page displays the alarms triggered by the system.




Tap  to acknowledge the alarm.



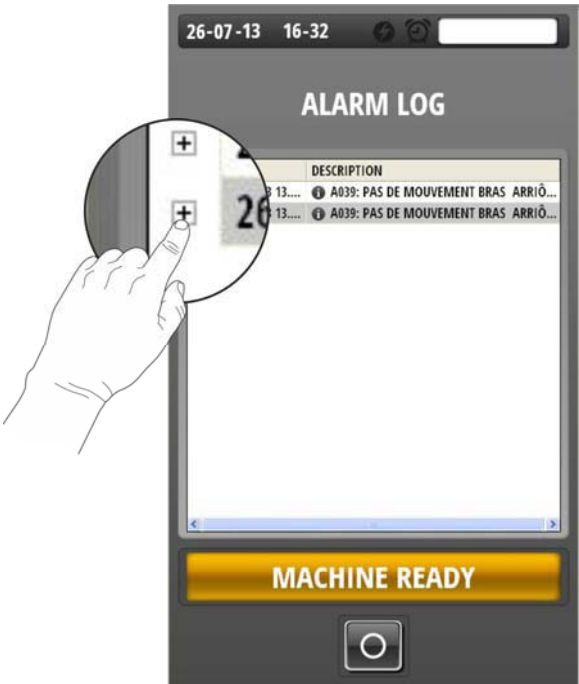
Tap  to return to Main Page



Tap  to open the Alarm LOG Page.



The **Alarm Log Page** displays al the alarms triggered by the machine in FIFO logic together with time and date when they occurred.



Tap **+** to check when the alarm has been solved.

To	Do this
Go back to the Main Page	Tap 



1.4.6 CYCLE COUNTER PAGE



To open the Cycle Counter Page, tap 



This page displays:

1. Number of washing cycle carried out by the machine.
2. Number of the drain cycle carried out by the machine.



To	Do this
Save cycle data on USB key	Tap 
Go back to the Main Page	Tap 



1.4.7 CONSUMPTION LOG PAGES

To open the Consumption Log Pages, tap

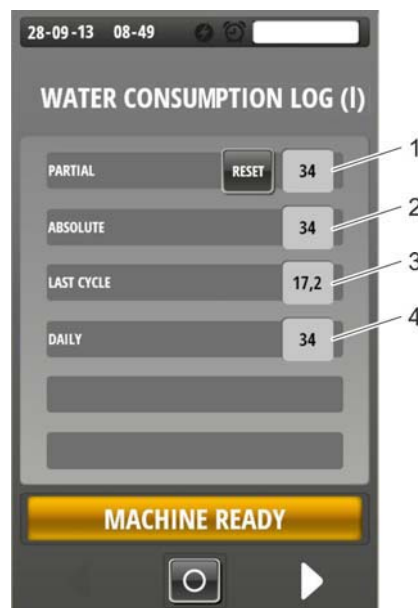


The following Consumption Log Pages will be displayed:



- Water consumption log (l)
- Power Consumption log (kW)
- Detergent 1 consumption log (ml)
- Detergent 2 consumption log (ml) – optional
- Neutralizer consumption log (ml) – optional
- Rinse aid consumption log (ml) –optional

The following data will be displayed:

1. Partial consumption of the machine
2. Absolute consumption of the machine
3. Last cycle consumption the machine
4. Daily cycle consumption the machine

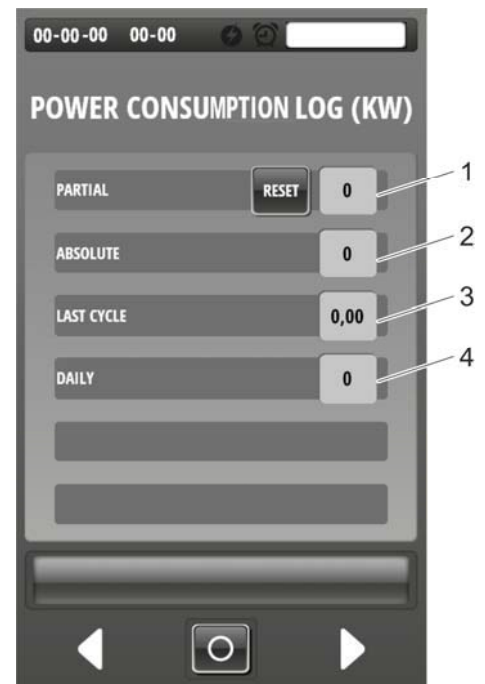








To	Do this
Move to the next page	Tap 
Reset the partial consumption of the machine	Tap 
Go back to the main page	Tap 

The following data will be displayed:

1. Partial consumption of the machine
2. Absolute consumption of the machine
3. Last cycle consumption the machine
4. Daily cycle consumption the machine

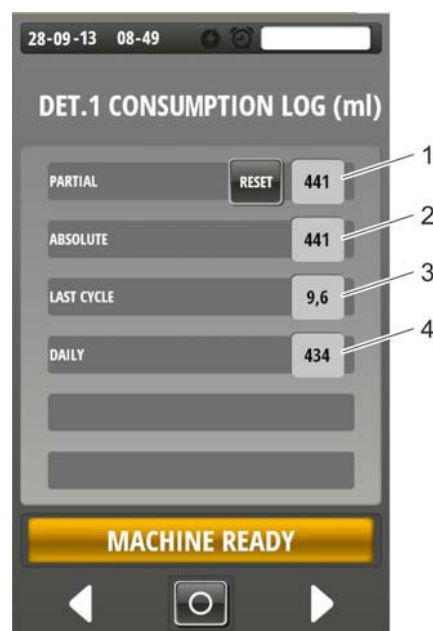






To	Do this
Move to the next page	Tap 
Go back to the previous page	Tap 
Reset the partial consumption of the machine	Tap 
Go back to the main page	Tap 



The following data will be displayed:

5. Partial consumption of the machine
6. Absolute consumption of the machine
7. Last cycle consumption the machine
8. Daily cycle consumption the machine







To	Do this
Move to the next page	Tap 
Go back to the previous page	Tap 
Reset the partial consumption of the machine	Tap 
Go back to the main page	Tap 

The following data will be displayed:

1. Partial consumption of the machine
2. Absolute consumption of the machine
3. Last cycle consumption the machine
4. Daily cycle consumption the machine

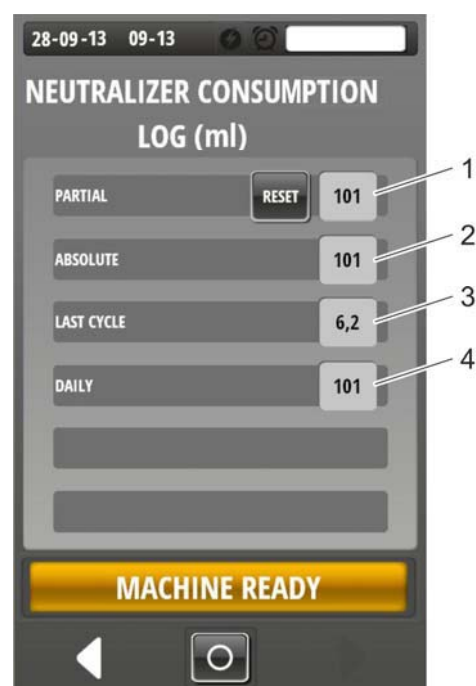







To	Do this
Move to the next page	Tap 
Go back to the previous page	Tap 
Reset the partial consumption of the machine	Tap 
Go back to the main page	Tap 

The following data will be displayed:

1. Partial consumption of the machine
2. Absolute consumption of the machine
3. Last cycle consumption the machine
4. Daily cycle consumption the machine



To	Do this
Go back to the previous page	Tap 
Reset the partial consumption of the machine	Tap 
Go back to the main page	Tap 



2. SUPERVISOR'S LEVEL PAGES

The Supervisor's setting pages allow to manage the settings related to the operating cycle parameters.

To access the Supervisor's pages, tap  set on the Main Page:



The system will display the numeric keypad.



Enter the Supervisor's password and tap  to confirm.



2.1 SUPERVISOR'S SETTING PAGE 1

From the Supervisor's pages the user can manage cycle recipe, special recipe, change date and time settings and enable/disable machine options , self-start up, user password management.




To	Do this
1. Access cycle recipe	Tap
2. Access special cycle recipe	Tap
3. Set machine enabling	Tap
4. Set machine time	Tap
5. Set machine language	Tap
6. Set machine Self Start-Up	Tap
7. Access user password page	Tap
Go back to Home Page	Tap



2.2 RECIPE CYCLE MANAGEMENT

From this page it is possible to set up to five different cycles.

- Tap  on the Supervisor's home page to open the **Recipe Modification Page**.



To customize recipe parameters, tap the relevant recipe name and select it.



The screen will show the recipe page where the complete cycle parameter can be customized.
The following parameters are displayed:










1. Phase time
2. Phase temperature
3. Detergent percentage
4. Detergent type
5. Recipe name
6. Cycle phases



To access Supervisor Help page, tap





	Exhaust phase 1 (phase time)
	Washing phase (phase time/temperature/detergent percentage/detergent type)
	Dripping phase 1 (phase time)
	Neutralisation phase (phase time)
	Rinse phase (phase time/temperature/detergent time)
	Dripping phase 2 (phase time)
	Exhaust phase 2 (phase time)







To	Do this
Modify recipe name	Tap the relevant field (5) and enter the new recipe name.
Modify cycle temperature (Washing/rinse/)(C°)	Tap the relevant fields (1) and enter the new values.
Modify detergent percentage (%) for the washing phase/time for the rinse phase	Tap the relevant field (3) and enter the new value.
Modify detergent type	Tap the relevant field and select the desired detergent type (4)



Tap  to move to second **Recipe Management Page**.



To	Do this
Save the new parameters	Tap  to confirm
Re-load the original recipe	Tap  to exit
Go back to the previous page	Tap 
Go back to the main page	Tap 



2.2.1 WASHING CYCLE SETTINGS

The complete setting for cycle is provided in the following table:

Standard washing cycle


Washing	120 s	55°C - 131°F
Dripping	10 s	
Rinse	20 s	82°C – 179°F°
Extraction	60 s	

Temperature driven washing cycle

Washing	120 s	85°C - 185°F
Dripping	10 s	
Rinse	20 s	85°C – 185°F°
Extraction	90 s	



2.3 SPECIAL CYCLE MANAGEMENT

Tap  on the Supervisor's home page to open the **Special Cycle Management Page**.

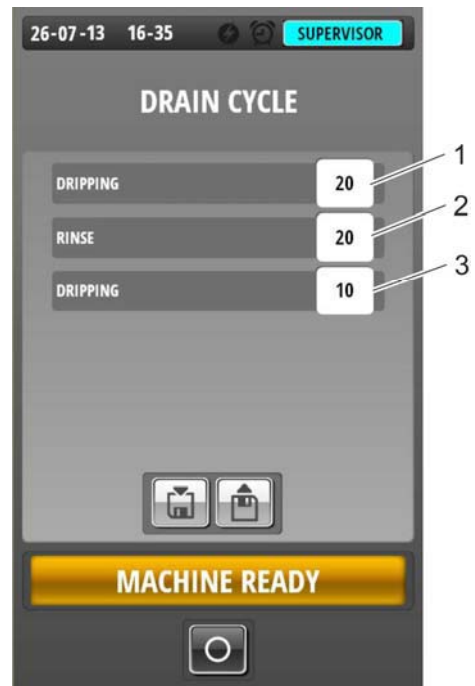


The screen will display the Special Cycle Page.

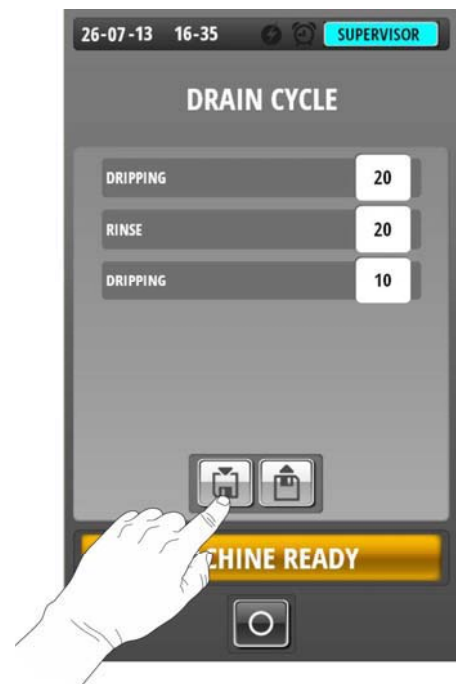
Tap  to access **Drain Cycle Page**.






The screen will display the **Drain Cycle Page**.




To	Do this
Modify dripping time 1	Tap the relevant fields (1) and enter the new values.
Modify chamber rinse time	Tap the relevant field (2) and enter the new value.
Modify dripping time 2	Tap the relevant fields (3) and enter the new values.

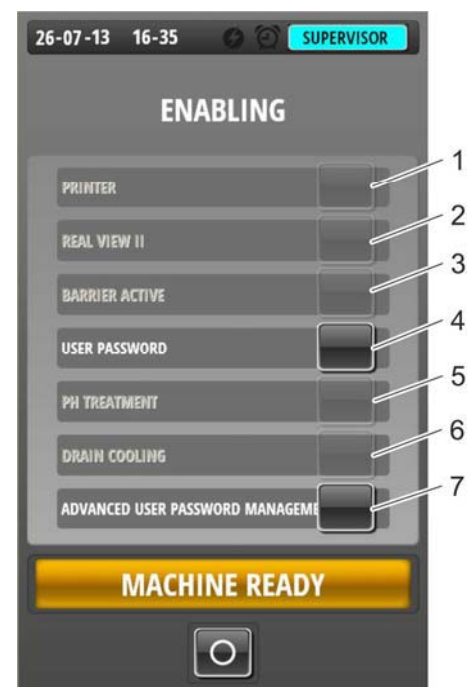





Save the new parameters	Tap  to confirm
Re-load the original recipe	Tap  to exit
Go back to the main page	Tap 

2.4 ENABLING PAGE

To open the Enabling Page, tap  in the Supervisor Main Page.
From this page it is possible to enable machine features and configuration.



To	Do this
Enable Printer	Tap the relevant icon (1)
Enable Real View 2	Tap the relevant icon (2)
Enable Barrier	Tap the relevant icon (3)
Enable User Password	Tap the relevant icon (4)
Enable pH treatment	Tap the relevant icon (5)
Enable Drain Cooling	Tap the relevant icon (6)
Enable Advanced User PW management – up to 10 users	Tap the relevant icon (7)
Go back to the Main Page	Tap  if the Self Start-Up Cycle has not been set.



2.5 DATE AND TIME SETTING PAGE

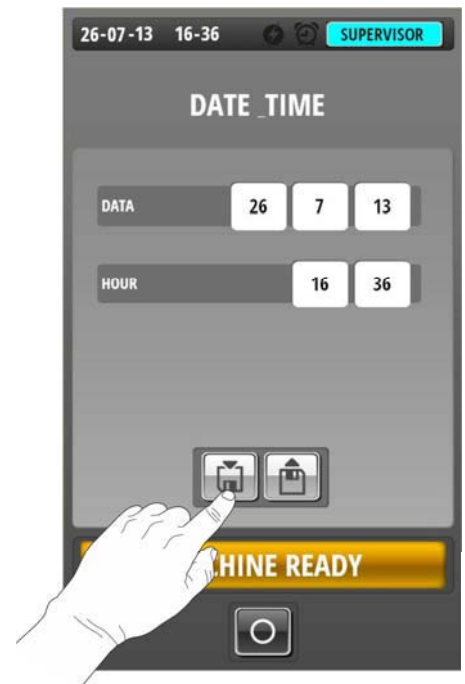
To change date settings, tap  Supervisor Main Page.






The screen will display the **Day_Time Page**.



To	Do this
Modify date	Tap the relevant fields (1) and enter the new date (DD-MM-YY).
Modify time	Tap the relevant field (2) and enter the new hour (mm-ss).



Save the new date/time	Tap  to confirm
Re-load the original date/time	Tap  to exit
Go back to the main page	Tap 



2.6 LANGUAGE SETTING PAGE

To change language, tap  Supervisor Main Page.



The screen will display the **Language Page**.
Tap the desired language icon to set the new system language





2.7 SELF START-UP PAGE


To open the Self Start-up Page, tap  in the Main Page.



The screen will display the Self-Start Up page





To	Do this
Set the desired self start-up day and time.	Tap the icon that corresponds to the chosen day of the week, then tap the time numerical field and enter the desired start-up time on the numerical keypad.
Go back to the home page.	Tap  if the Self Start-Up Cycle has not been set.

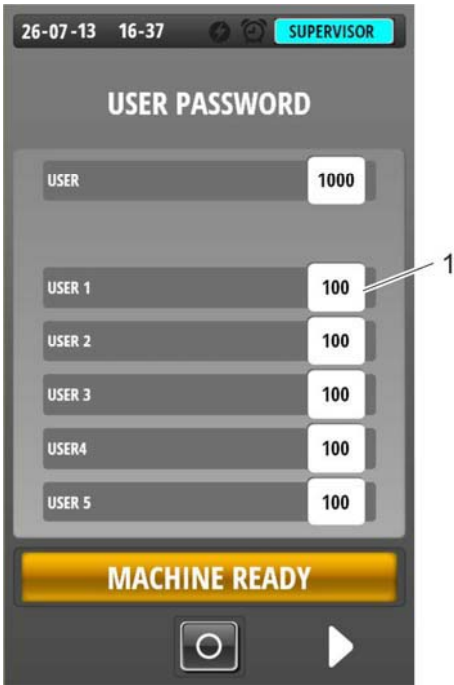


2.8 USER PASSWORD SETTING PAGE

To access User Password Setting Page, tap .





The screen will display the **User Password Page**.





To	Do this
Modify user Password	Tap the relevant fields (1) and enter the new value.



To	Do this
Move to the next page	Tap 
Go back to the main page	Tap 



To	Do this
Go back to the previous page	Tap 
Go back to the main page	Tap 



3. MAINTENANCE TECHNICIAN'S LEVEL PAGES

From these pages it is possible to carry out maintenance settings.

To access the Maintenance's pages, tap  set on the Main Page:



The system will display the numeric keypad.












Enter the Maintenance's password and tap  to confirm.



3.1 MAINTENANCE'S SETTING PAGE

From the Supervisor's pages the user can manage cycle recipe, special recipe, change date and time settings and enable/disable machine options, self-start up, user password management and machine manual commands.



To	Do this
1. Access cycle recipe	Tap 
2. Access special cycle recipe	Tap 
3. Set machine enabling	Tap 
4. Set machine Self Start-Up	Tap 
5. Set machine language	Tap 
6. Access machine maintenance pages	Tap 
7. Access user password page	Tap 
8. Set machine time	Tap 
Go back to Main Page	Tap 

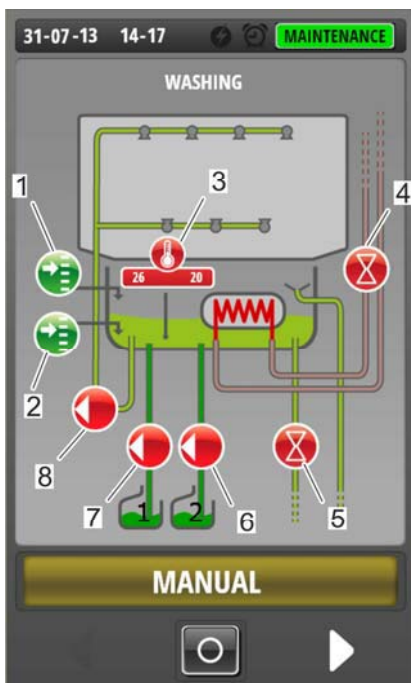


3.1.1 MANUAL PAGES

To access the Maintenance's pages, tap  set on the Main Page :

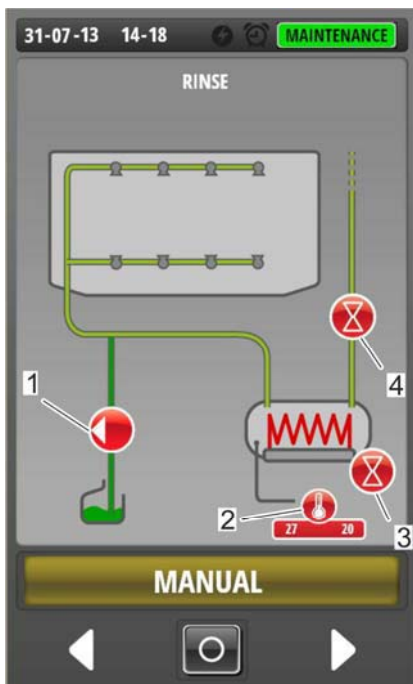


The screen will display machine maintenance pages.



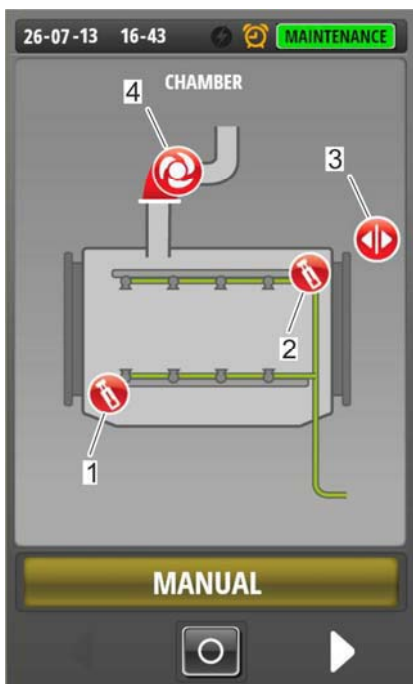
Steam heated cage washer

1. Washing tank maximum level sensor
2. Washing tank minimum level sensor
3. Washing tank temperature probe
4. Tap to enable steam pneumatic valve
5. Tap to enable tank drain pneumatic valve
6. Tap to enable second dosing pump (option)
7. Tap to enable first dosing pump
8. Tap to enable washing pump






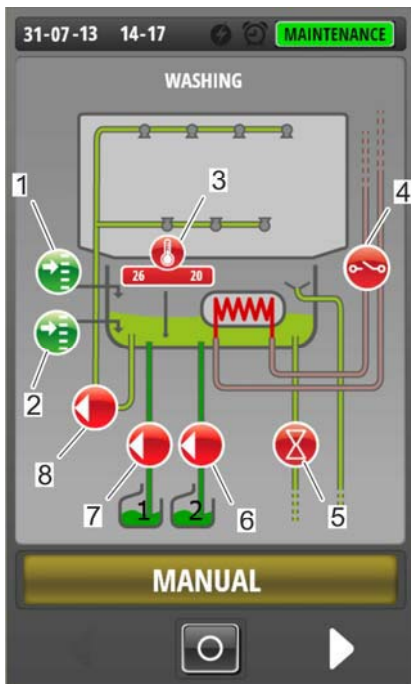
Steam heated cage washer

1. Tap to enable the rinse aid dosing pump (option)
2. Rinse tank temperature probe
3. Steam pneumatic valve
4. Rinse water pneumatic valve



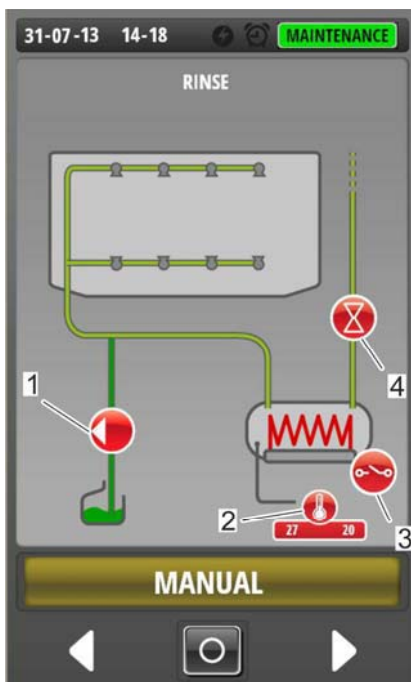
1. Tap to enable the arm movement pneumatic cylinder
2. Tap to enable the arm movement pneumatic cylinder
3. Tap to enable the door lock pneumatic cylinder
4. Tap to enable the exhaust fan

To	Do this
Go back to the previous page	Tap 
Move to the next page	Tap 
Go back to the Main page	Tap 



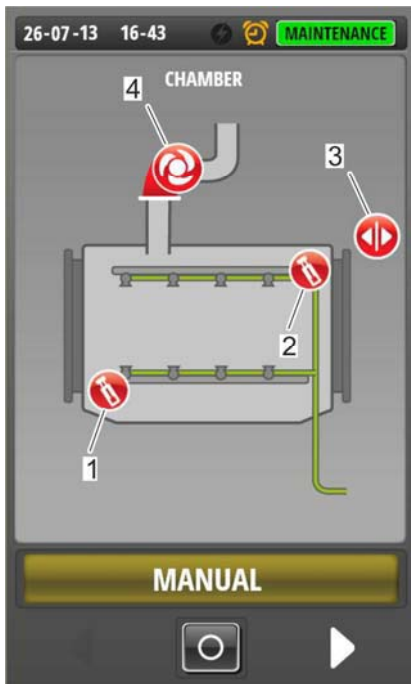
Electrical heated cage washer

1. Washing tank maximum level sensor
2. Washing tank minimum level sensor
3. Washing tank temperature probe
4. Heating element
5. Tap to open/close tank drain pneumatic valve
6. Tap to enable the second dosing pump (option)
7. Tap to enable the first dosing pump
8. Tap to enable the washing pump






Electrical heated cage washer

1. Tap to enable the rinse aid dosing pump (option)
2. Rinse tank temperature probe
3. Heating element
4. Tap to open/close the rinse water pneumatic valve



Electrical heated cage washer

1. Tap to enable the arm movement pneumatic cylinder
2. Tap to enable the arm movement pneumatic cylinder
3. Tap to enable the door lock pneumatic cylinder
4. Tap to enable the exhaust fan

To	Do this
Go back to the previous page	Tap 
Move to the next page	Tap 
Go back to the Main page	Tap 



SECTION 4 – SERVICE MANUAL

1. GENERAL INFORMATION

1.1 GLOSSARY OF SYMBOLS USED IN THE PROCEDURES

Symbols are used throughout the following paragraphs to draw attention on critical operations, tools and equipment needed to carry out the procedure, personal protective equipment etc.:



- GENERAL DANGER/WARNING/CAUTION



- PERSONAL PROTECTIVE EQUIPMENT REQUIRED TO CARRY OUT THE MAINTENANCE PROCEDURE



- RESPONSIBILITY



- TOOLS AND EQUIPMENT NEEDED TO CARRY OUT THE PROCEDURE



- REFERENCES

1.2 PRECAUTIONS

1.2.1 PERSONNEL

The maintenance of the machine is to be carried out by authorised and expressly trained personnel only, who must have a detailed knowledge of this manual.

Service Technicians must follow all safety measures and precautions specified for personal health and safety, in particular apparel must comply with the safety requirements in force in the country in which the machine is installed.



When servicing the machine, the Service Technician must display warning signs which clearly indicate that the machine is being serviced.

Be sure the pressure of the compressed air circuit has been released before servicing the machine.

Let the water in the tanks cool down before servicing.

Keep unauthorised people away from the operating area and the equipment when servicing the machine.

1.2.2 CLEANING AND DISINFECTION

Cleaning must be carried out when the machine is switched off.

Before cleaning the machine, the operator must read the detergent solution technical specifications and have a clear understanding of all safety precautions to be followed when handling the product.



Do not use liquid or steam jets near electrical components.

Do not service the machine until the steam supply pipework and condensed steam outlet are completely cold.

Do not use any product containing chlorine to clean stainless steel surfaces!

Do not clean the site where the system is installed with chemicals.

Let the washer cool before servicing.



1.2.3 PERSONAL PROTECTIVE EQUIPMENT

When running and servicing the machine, operators and technicians must wear personal protective equipment as prescribed in directives and standards in force in the country where the machine is installed to safeguard personal health and safety.

When handling detergent and disinfectant solutions, operators must wear personal protective clothing as well as protective goggles with side panels to protect against spurts of concentrated fluid.

When servicing the machine, operators and technicians must wear gloves and safety anti-slip shoes..

1.3 RESPONSIBILITIES



To SERVICE the machine it is necessary to perform checks at different levels.

The following symbols are used to describe who is appointed to carry out specific servicing tasks:



Password

Servicing procedures identified by this symbol may be safely performed by a trained OPERATOR who has no access to the Safety key or



Servicing procedures identified by this symbol may be safely performed by a trained SUPERVISOR (Safety key or Password required)



required)











Servicing procedures identified by this symbol may be safely performed by a trained SERVICE TECHNICIAN (Safety key or Password



Servicing procedures identified by this symbol may only be performed by IWT AUTHORISED SERVICE ENGINEERS.



2. MAINTENANCE SCHEDULE

TASK	Responsibility	Every day	1500 cycles	Every 6 months	Every year	As needed
External surfaces cleaning		✓				
Filters cleaning		✓				
Wash chamber cleaning		✓				
External surfaces limestone scaling						✓
Wash chamber limestone scaling						✓
Rust stains removal from stainless steel surfaces						✓
Check the wash and rinse nozzles			✓			
Check the arm gaskets				✓		
Check the pump priming						✓
Check temperature controller calibration					✓	



Maintenance and cleaning must be carried out more frequently if the water used has hardness higher than 150 ppm CaCO_3 .

2.1 WHEN NEEDED

The above-mentioned schedule provides general guidelines when the unit is used in standard conditions.

The maintenance schedule depends on a number of factors such as the setting of the unit, the flow rate, the kind of procedures performed and so on. Routine maintenance, like cleaning the equipment should be carried out when necessary, according to conditions of use.



3. MAINTENANCE PROCEDURES

3.1 HOW TO CLEAN THE MACHINE



The following procedure may be safely performed by a trained operator.



Appropriate detergent for stainless steel surfaces.



Laboratory SOPs

Laws and regulations on personal health and safety in force in the country where the machine is installed.



IMPORTANT: PROPER CLEANING EXTENDS THE LIFESPAN OF THE MACHINE.

To avoid damaging stainless steel surfaces:

DO NOT use steel wool or brushes made of other metals or alloys (e.g. common steel, aluminium, brass, etc.) or tools previously used to clean other metals or alloys.

Stainless steel wool and brushes may be used since they do not affect the surface, but it is necessary to operate carefully to avoid scratches. On polished finishes rub or wipe in the direction of the polish lines.

AVOID contact of ferrous materials with stainless steel surfaces.

AVOID contact with any product containing chlorine.

DO NOT use hydrochloric acid (HCl), Sodium hypochlorite (bleach) on stainless steel surfaces. Avoid contact with hydrochloric acid vapours (e.g. due to floor cleaning)

DO NOT use nitric acid.

DO NOT use abrasive powder detergents.

Test products on a small hidden or non-critical area before cleaning.

De-ionized water may be used to prevent limestone scaling.

After cleaning dry stainless steel surfaces carefully to prevent any limestone scaling.

DO NOT use oily rags or greasy cloths to wipe the surfaces.

CAREFULLY READ AND FOLLOW THE SAFETY DATA SHEET INSTRUCTIONS BEFORE USING ANY CHEMICAL PRODUCT AND TAKE DUE PRECAUTIONS WHEN HANDLING IT.



Wear adequate personal protective equipment in compliance with your Laboratory SOPs and with laws and regulations in force in the country where the machine is installed in terms of personal health and protection (Heavy duty gloves and safety antislip shoes).

EXTERNAL SURFACES

- Wipe the surfaces with a soft cloth dampened with a product specifically recommended for stainless steel surfaces.
- Rinse the surface with clean demineralised water.
- Wipe dry with a clean soft cloth.

WASH CHAMBER

- Open the machine front door.
- Remove the three horizontal filters.
- Drain the washer.
- As soon as the tank is empty, flush the inside of the tank with water and convey any solid debris towards the drain.
- Remove the filter from the pump intake and, if necessary, clean it.
- Put the horizontal filters back into their housing.
- Check the washing nozzles and, if necessary, clean them.
- Close the door.



3.1.1 HOW TO REMOVE LIMESTONE SCALING



The following procedure may be safely performed by a trained operator.



Non-abrasive product specifically designed to remove limestone scaling from stainless steel surfaces.

Soft cloth or soft sponge

Demineralised water



Laboratory SOPs

Laws and regulations on personal health and safety in force in the country where the machine is installed.

CAREFULLY READ AND FOLLOW THE SAFETY DATA SHEET INSTRUCTIONS BEFORE USING ANY CHEMICAL PRODUCT AND TAKE DUE PRECAUTIONS WHEN HANDLING IT.



When de-scaling do not use chlorine-based products.

After de-scaling rinse with abundant clean water to remove all residues of the product used to descale the washer.



Wear adequate personal protective equipment in compliance with your Laboratory SOPs and with laws and regulations in force in the country where the machine is installed in terms of personal health and protection (Heavy duty gloves and safety antislip shoes, safety goggles).

EXTERNAL SURFACES

- Wipe the surfaces with a soft cloth dampened with a product specifically recommended to remove limestone scaling from stainless steel surfaces.
- Rinse the surface with clean demineralised water.
- Wipe dry with a clean soft cloth.

WASH CHAMBER

- Drain the washer.
- Place the alkaline detergent intake pipe inside a tank filled with water.
- Fill the machine.
- Open the machine door.
- Pour 5l of descaling product into the washing tank.
- Close the door.
- Run a few washing cycles.
- Leave the machine switched ON for two hours.
- Drain the water from the washing tank.
- Put the alkaline detergent intake pipe back into its container.
- Close the drain valve.



3.2 HOW TO REMOVE RUST STAINS FROM STAINLESS STEEL SURFACES



The following procedure may be safely performed by a trained operator.



Cream detergent specifically designed for stainless steel surfaces.

Soft cloth or soft sponge.

3M Scotch-Brite™ abrasive pad.

Passivating or pickling product specific for stainless steel surfaces.



Laboratory SOPs

Laws and regulations on personal health and safety in force in the country where the machine is installed.



CAREFULLY READ AND FOLLOW THE SAFETY DATA SHEET INSTRUCTIONS BEFORE USING ANY CHEMICAL PRODUCT AND TAKE DUE PRECAUTIONS WHEN HANDLING IT.



Wear adequate personal protective equipment in compliance with your Laboratory SOPs and with laws and regulations in force in the country where the machine is installed in terms of personal health and protection (Heavy duty gloves and safety antislip shoes).

- Apply a cream detergent specifically designed for stainless steel surfaces.
- Gently rub the surface with a soft damp cloth.
- Rinse carefully with clean demineralised water.
- Wipe dry with a clean soft cloth.
- If the stain is still present, remove the residual stain with a 3M Scotch-Brite™ abrasive pad. Be careful not to rub out the inscribed coordinates (if present).
- Rinse carefully with clean demineralised water.
- Wipe dry with a clean soft cloth.
- If none of these solutions work, it might be necessary to apply a passivating or pickling product specific for stainless steel.



3.3 HOW TO CLEAN THE HORIZONTAL FILTERS



The following procedure should be performed by a trained operator.



Tool box



Laboratory SOPs



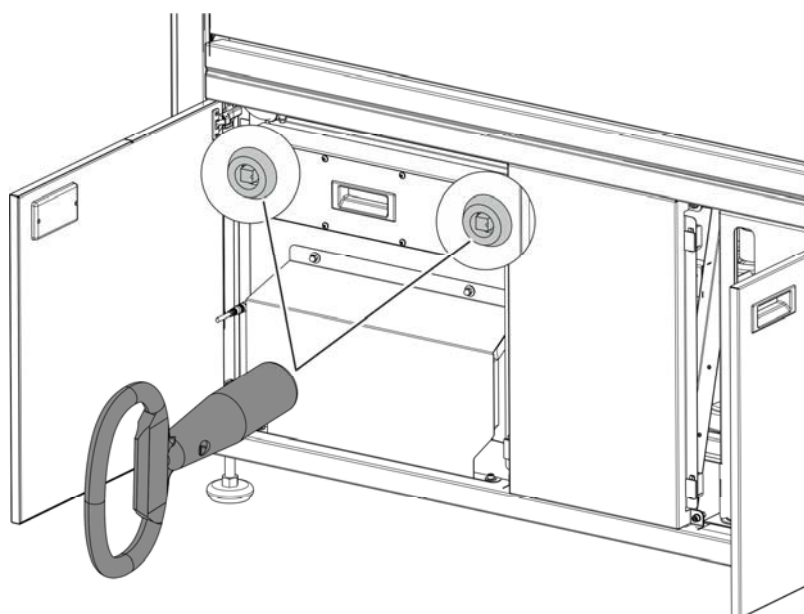
Laws and regulations on personal health and safety in force in the country where the machine is installed.

CAREFULLY READ AND FOLLOW THE SAFETY DATA SHEET INSTRUCTIONS BEFORE USING ANY CHEMICAL PRODUCT AND TAKE DUE PRECAUTIONS WHEN HANDLING IT.

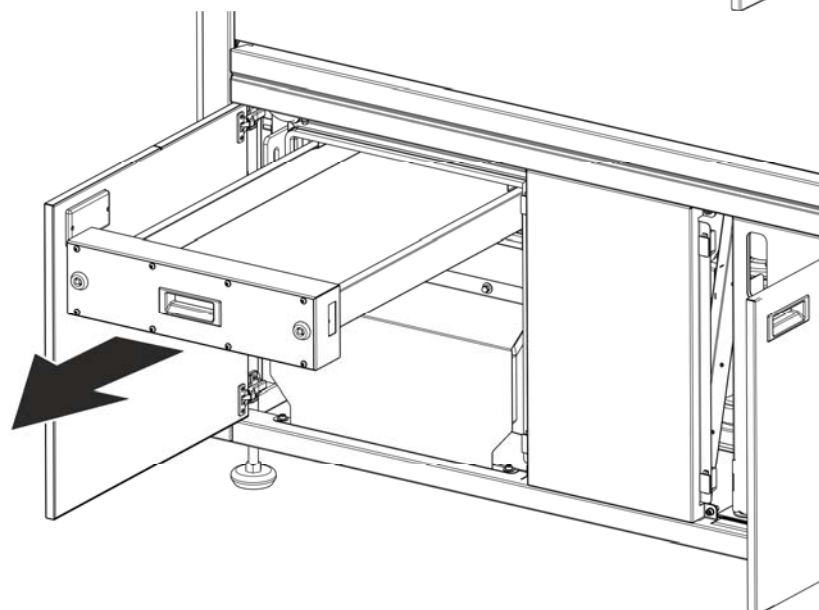


Wear adequate personal protective equipment in compliance with your Laboratory SOPs and with laws and regulations in force in the country where the machine is installed in terms of personal health and protection (Heavy duty gloves and safety antislip shoes).

- Switch off the machine
- Open the filter housing door.



- Remove the horizontal filter.
- Flush the filter with water and, if necessary, remove the soil by means of a stainless steel brush.
- Put the horizontal filter back into its position.
- Close the filter housing door.





3.4 HOW TO CLEAN THE WASH AND RINSE NOZZLES



The following procedure should be performed by a service technician.



Tool box



Laboratory SOPs

Laws and regulations on personal health and safety in force in the country where the machine is installed.



CAREFULLY READ AND FOLLOW THE SAFETY DATA SHEET INSTRUCTIONS BEFORE USING ANY CHEMICAL PRODUCT AND TAKE DUE PRECAUTIONS WHEN HANDLING IT.

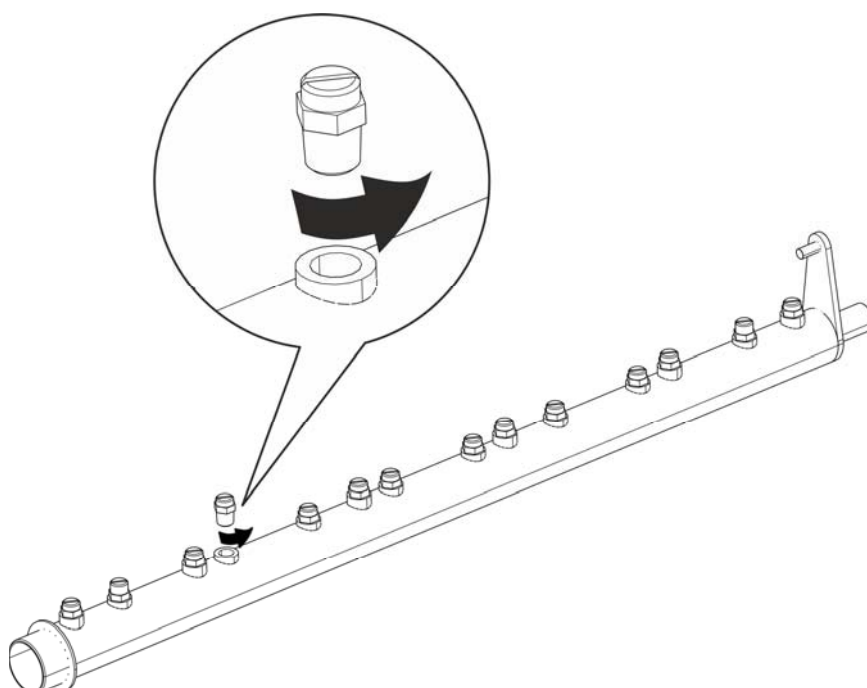


Wear adequate personal protective equipment in compliance with your Laboratory SOPs and with laws and regulations in force in the country where the machine is installed in terms of personal health and protection (Heavy duty gloves and safety antislip shoes).

PROCEDURE:



- From the Home page keep pressed for a few seconds to open the wash chamber door.
- Switch off the machine.
- Unscrew the clogged nozzle.
- Remove any obstructions from the jets using a sharp object and flush the nozzle under running water.
- Re-mount the nozzle on the washing arm.



Assemble the nozzles following the original position and orientation in order to maintain the original water pattern.



3.5 HOW TO REMOVE THE THE OSCILLATING ARMS FROM THE WASHING CHAMBER



The following procedure should be performed by a service technician.



Tool box



Laboratory SOPs

Laws and regulations on personal health and safety in force in the country where the machine is installed.




CAREFULLY READ AND FOLLOW THE SAFETY DATA SHEET INSTRUCTIONS BEFORE USING ANY CHEMICAL PRODUCT AND TAKE DUE PRECAUTIONS WHEN HANDLING IT.

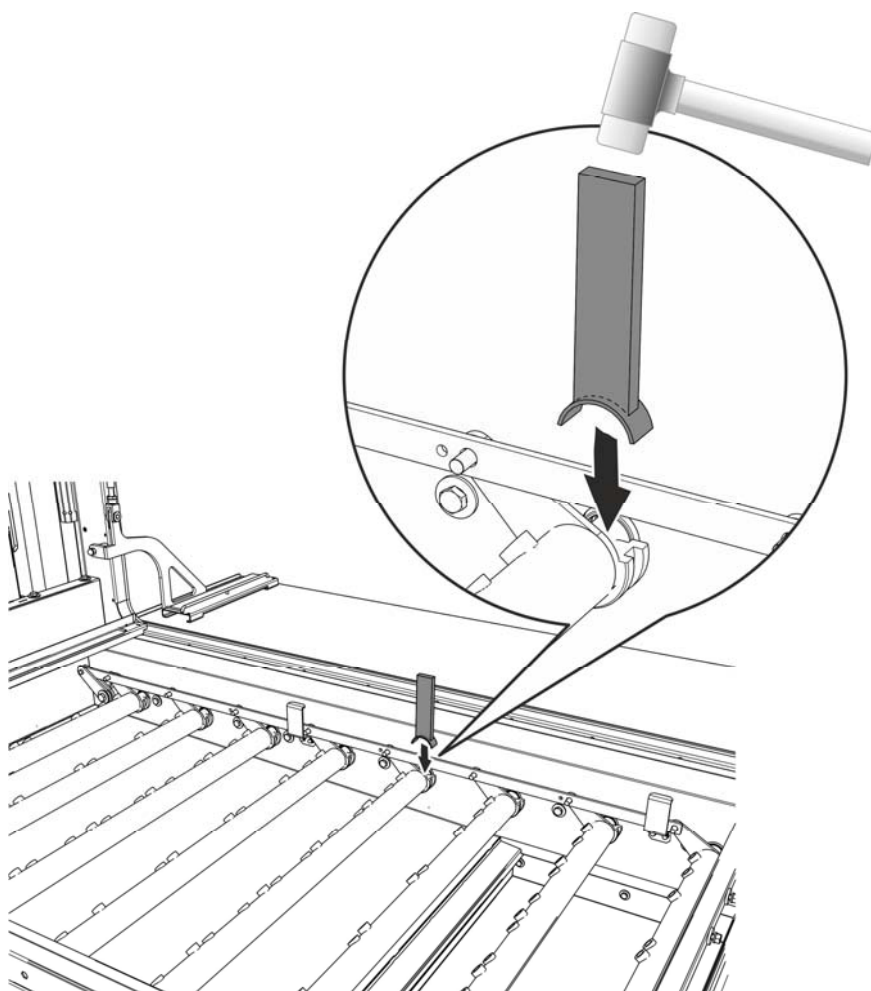
LET THE WASHER COOL BEFORE SERVICING!



Wear adequate personal protective equipment in compliance with your Laboratory SOPs and with laws and regulations in force in the country where the machine is installed in terms of personal health and protection (Heavy duty gloves and safety antislip shoes).

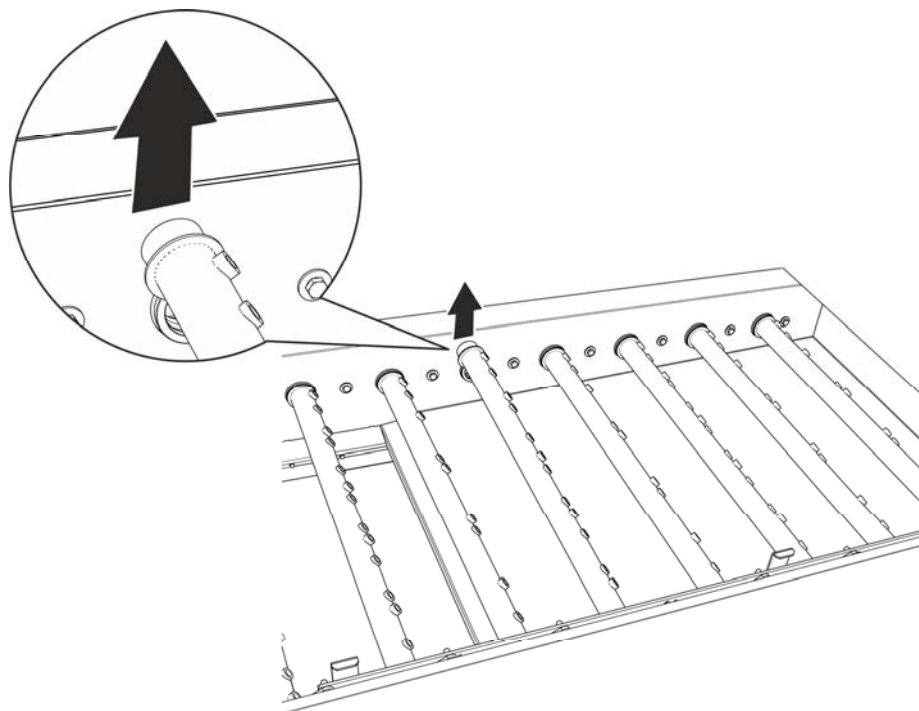
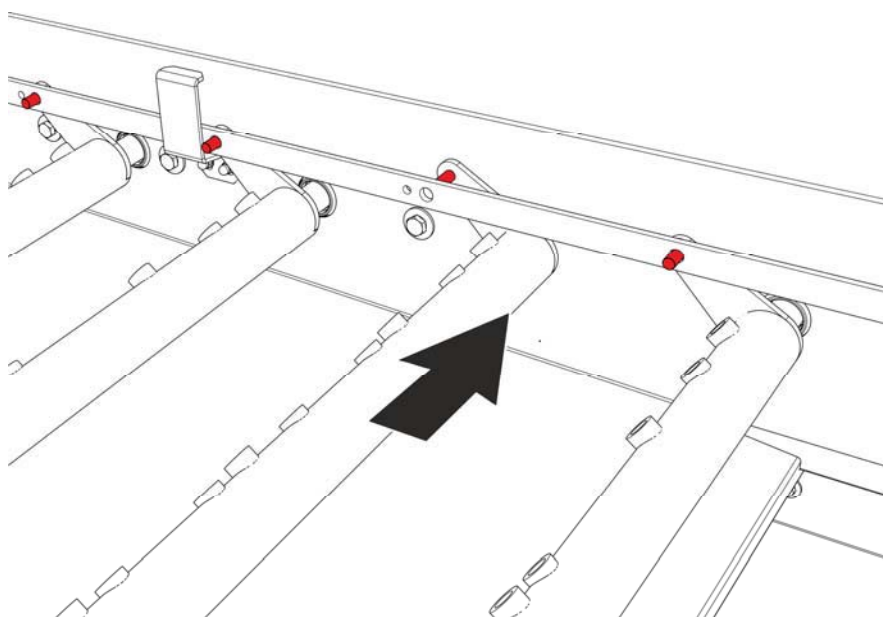
PROCEDURE:

- From the main page keep  pressed for a few seconds to open the wash chamber door.
- Switch off the machine.
- Remove the spacer by using a rubber hammer.





- Pull the washing arm gently towards the front of the wash chamber (1) to release the rear end, then move the arm towards the rear side of the chamber and slide the arm pin out of its housing (3).
- Tilt the rear side of the arm upwards (2) and remove the washing arm.

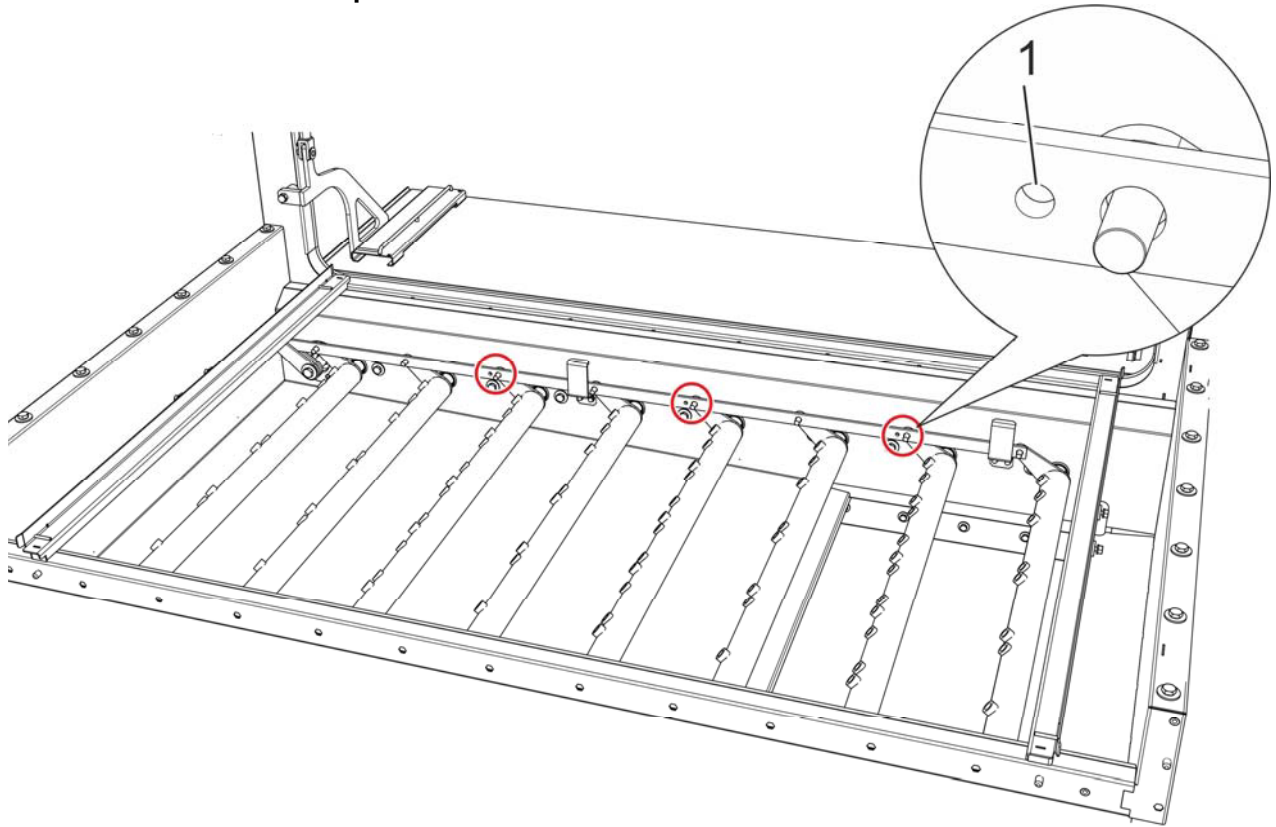




- Proceed in reverse mode to fit the arms back in their original position.



The holes "1" show the position of the 14 nozzle arms.





3.6 PUMP PRIMING



The following procedure should be performed by a service technician.



Tool box, flexible plastic hose.



Laboratory SOPs

Laws and regulations on personal health and safety in force in the country where the machine is installed.

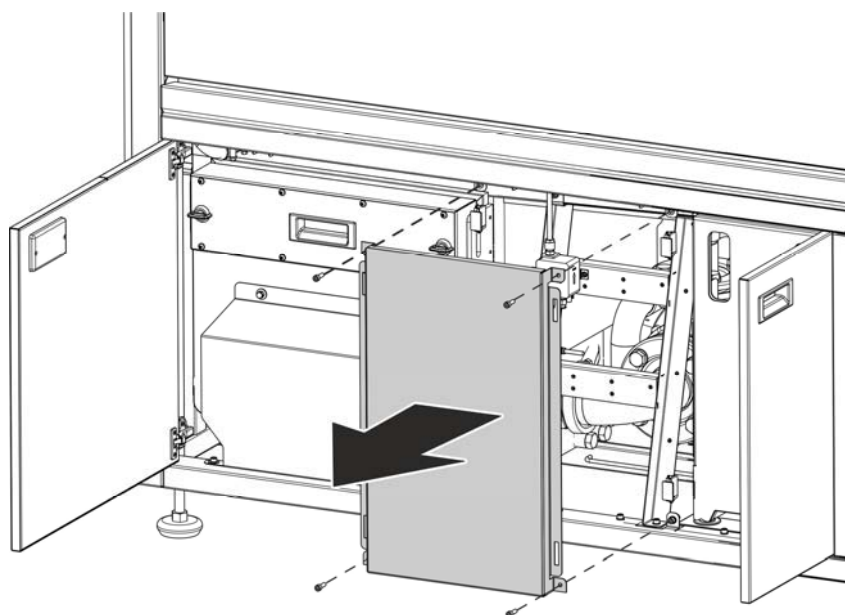


CAREFULLY READ AND FOLLOW THE SAFETY DATA SHEET INSTRUCTIONS BEFORE USING ANY CHEMICAL PRODUCT AND TAKE DUE PRECAUTIONS WHEN HANDLING IT.

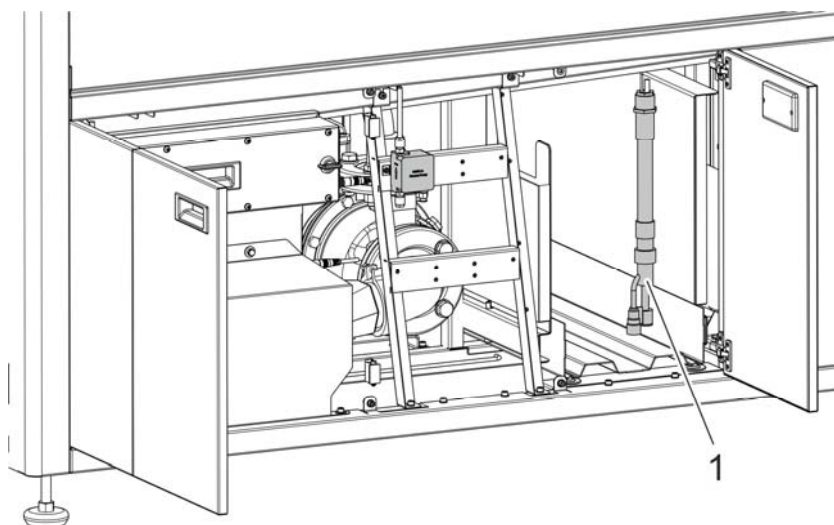


Wear adequate personal protective equipment in compliance with your Laboratory SOPs and with laws and regulations in force in the country where the machine is installed in terms of personal health and protection (Heavy duty gloves and safety antislip shoes).

- Open and remove the front inspection panel to gain access to the service compartment.

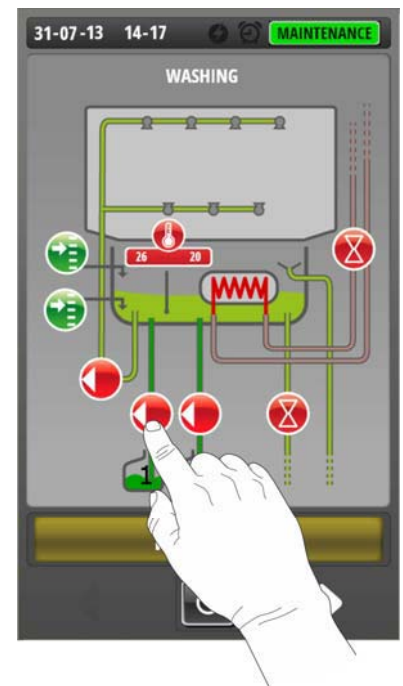


- Put the detergent level suction valve (1) inside the detergent drum.

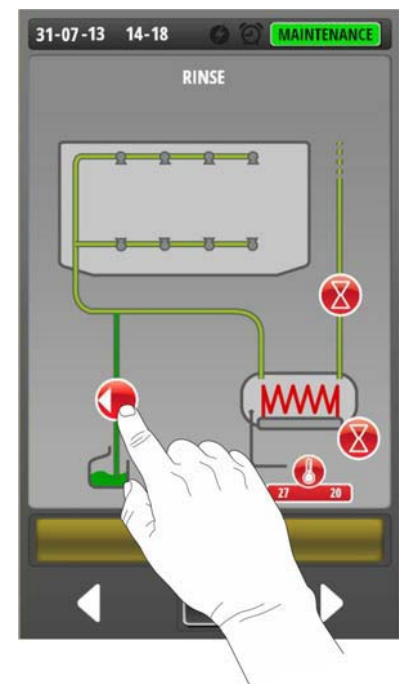




- Gain access to Washing Circuit Manual Mode Page.
- Tap the corresponding dosing pump symbol to start the dosing pump.



- Gain access to Rinse Circuit Manual Mode Page.
- Tap the corresponding dosing pump symbol to start the dosing pump (optional).



- Close the protection panel.



3.7 HOW TO CALIBRATE THE TEMPERATURE PROBES



The following procedure should be performed by a service technician.



Tool box



Laboratory SOPs

Laws and regulations on personal health and safety in force in the country where the machine is installed.

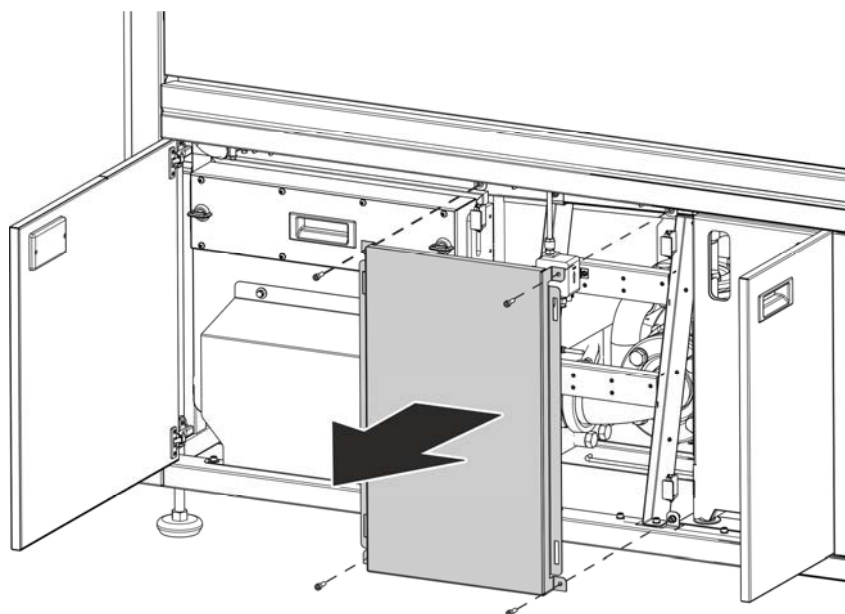


CAREFULLY READ AND FOLLOW THE SAFETY DATA SHEET INSTRUCTIONS BEFORE USING ANY CHEMICAL PRODUCT AND TAKE DUE PRECAUTIONS WHEN HANDLING IT.

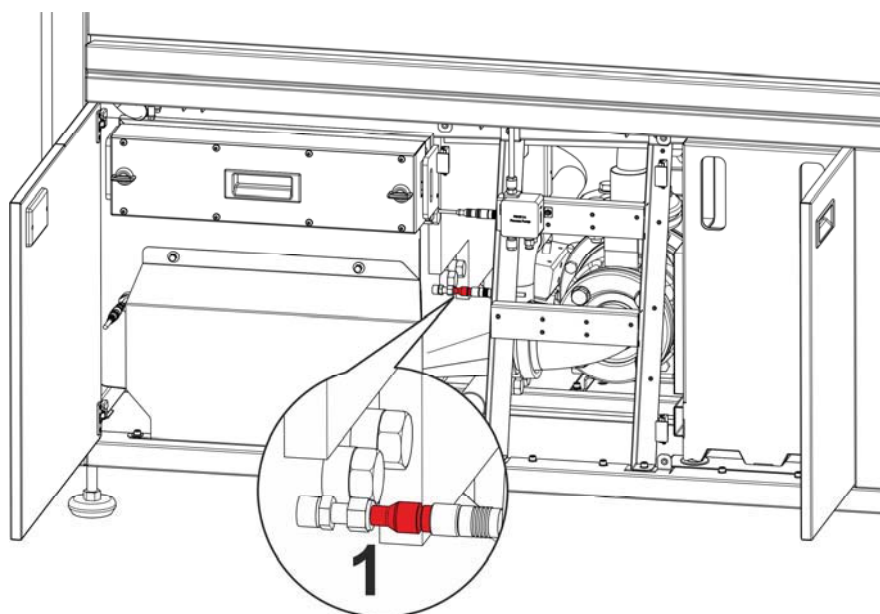


Wear adequate personal protective equipment in compliance with your Laboratory SOPs and with laws and regulations in force in the country where the machine is installed in terms of personal health and protection (Heavy duty gloves and safety antislip shoes).

- Open the washer front panels to gain access to the service compartment.



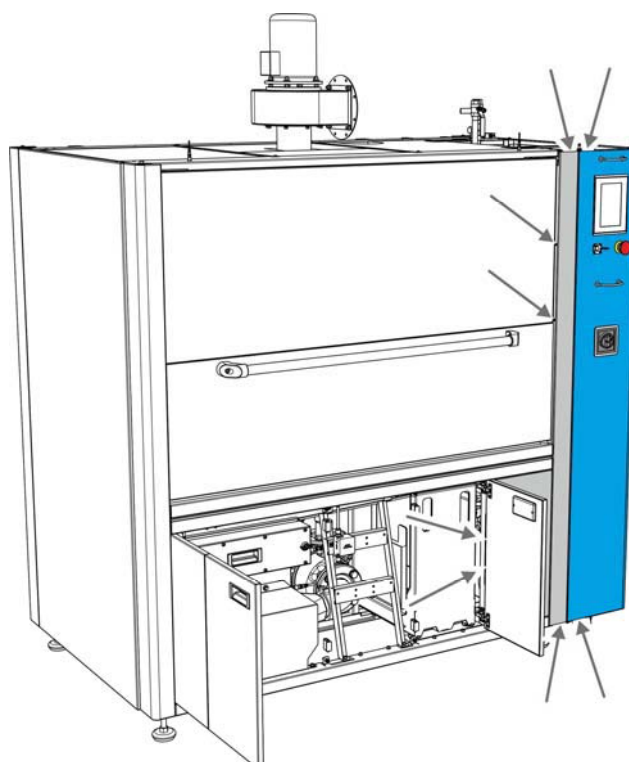
- Remove the panel



WASHING TANK TEMPERATURE PROBE (1) CALIBRATION CHECKOUT

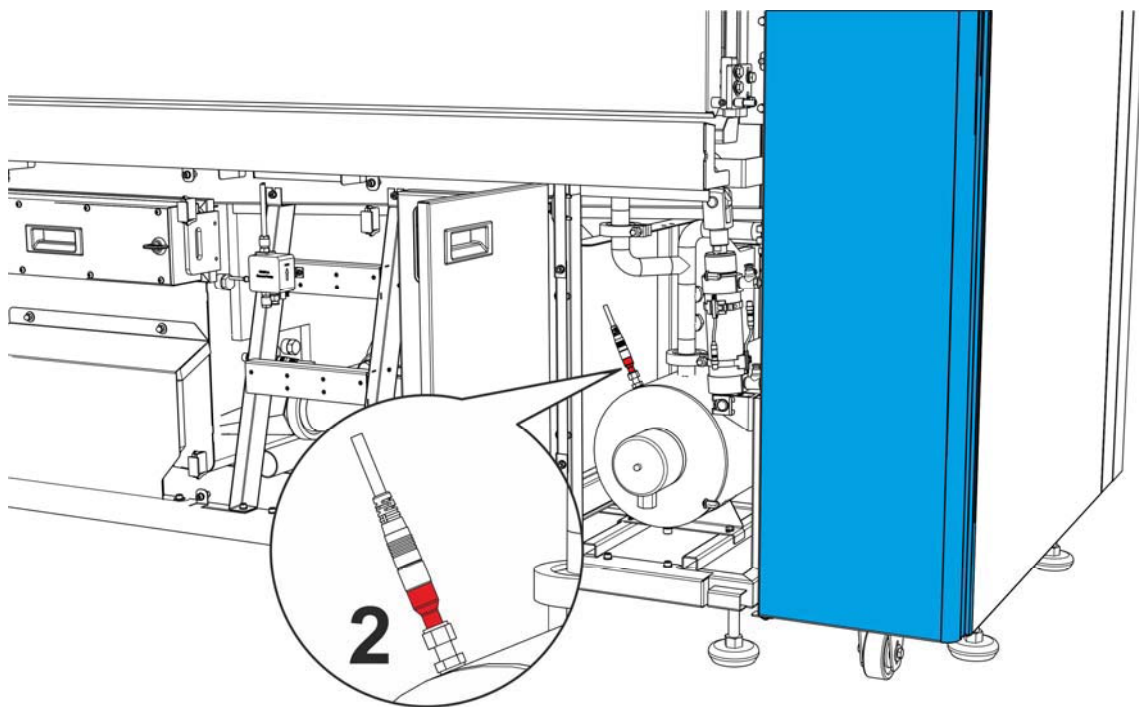
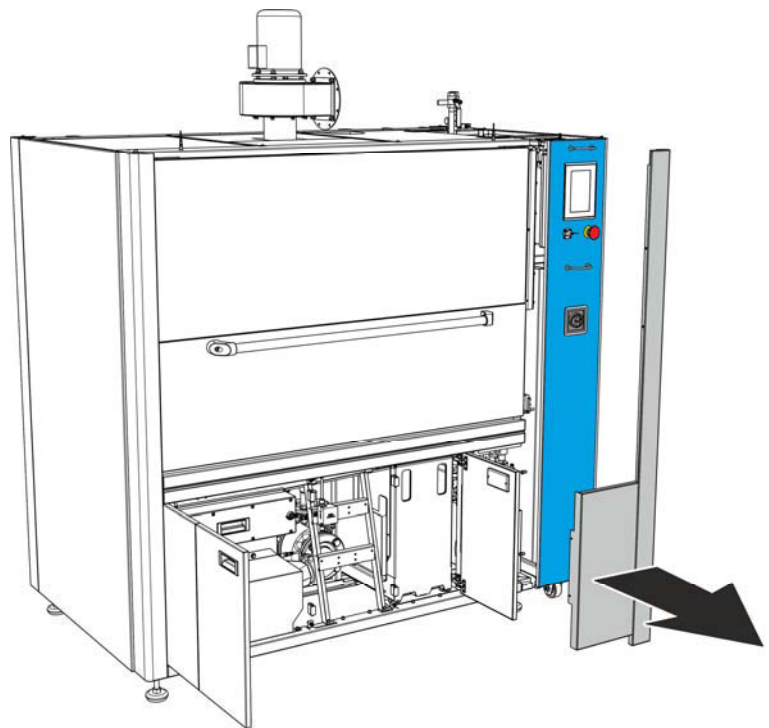
- Prepare a tank with a sample water bath at 60°C.
- Measure the sample bath temperature using a calibrated thermometer.
- Unscrew the wash tank temperature probe (P&ID ref. 711W) from its housing and put it inside the sample water tank.
- Check the calibrated thermometer and the probe reading are aligned.
- If they are not aligned, contact IWT – Calibration must be carried out by an authorised Service Engineer.

- Unscrew the eight screws





- Remove the panel



RINSE BOILER TEMPERATURE PROBE (2) CALIBRATION CHECKOUT

- Prepare a tank with a sample water bath at 82°C.
- Measure the sample bath temperature using a calibrated thermometer.
- Unscrew the boiler temperature probe (P&ID ref. 711R) from its housing and put it inside the sample water tank.
- Check the calibrated thermometer and the probe reading are aligned.
- If they are not aligned, contact IWT – Calibration must be carried out by an authorised Service Engineer.



3.8 HOW TO OPEN THE ELECTRICAL SWITCHBOARD FOR SERVICING THE WASHER



The following procedure is to be performed by a trained and authorized service engineer.



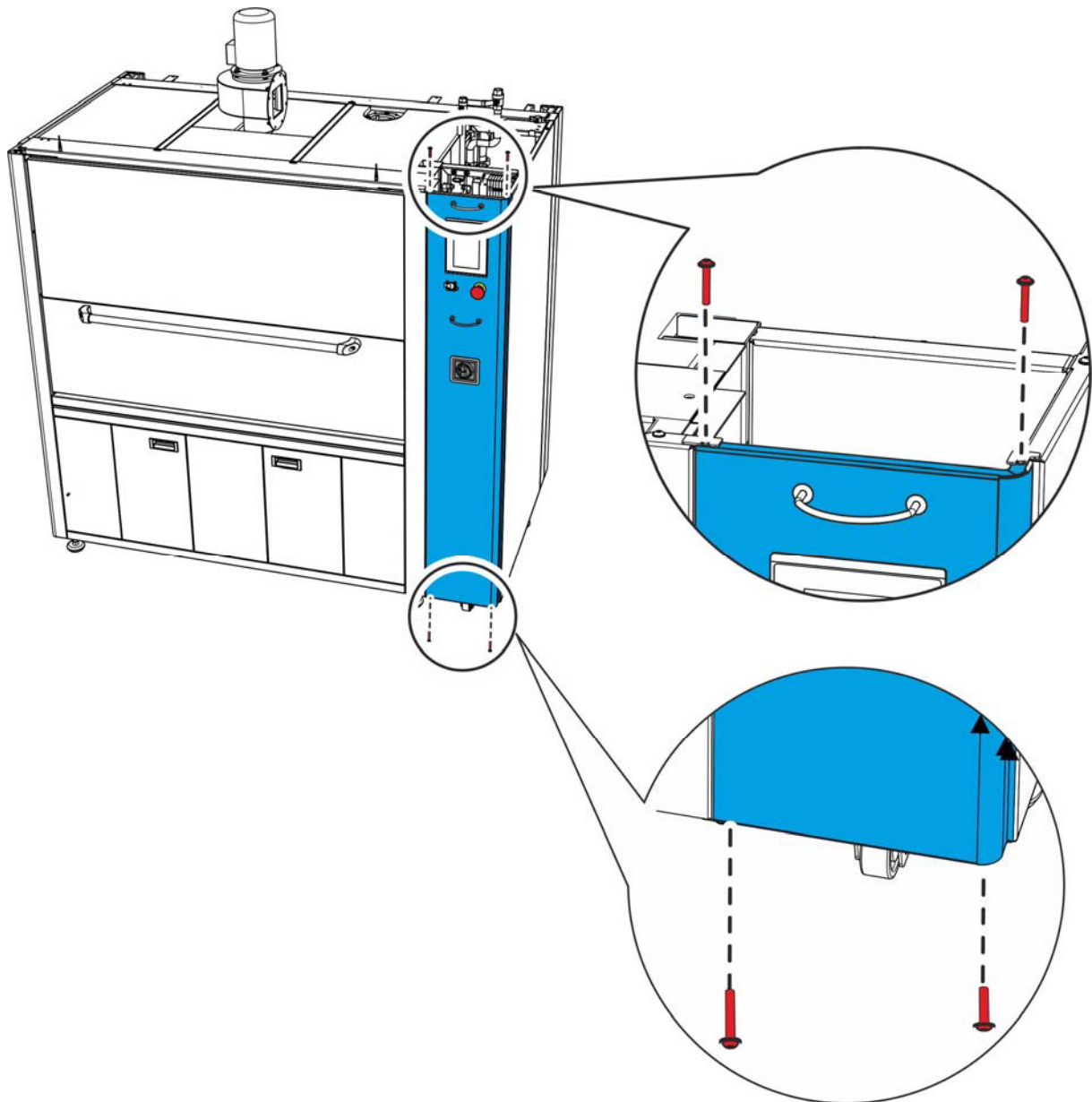
Pay due attention when working on live electrical equipment!

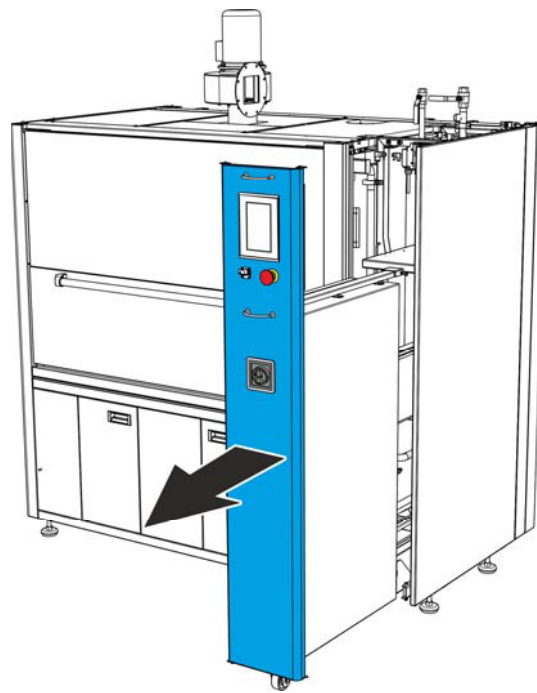
Only trained and authorized technicians are allowed to operate on live electrical equipment.



Wear adequate personal protective equipment in compliance with Laboratory SOPs and with laws and regulations in force in the country where the machine is installed in terms of personal health and protection (safety shoes).

- Unscrew the electrical cabinet and draw it out of its housing.







4. TROUBLESHOOTING

The machine is equipped with a Microprocessor able to detect most of the anomalies that might occur during the normal running of the machine.

Anomalies are displayed on the screen while an acoustic signal sounds whenever there is a dangerous fault and the machine is automatically halted until the problem has been solved (e.g. emergency pushbutton pressed, motor overload etc.).



For any anomalies not listed in the following pages, contact IWT.

4.1 PRECAUTIONS

Any servicing intervention on the system is to be carried out by authorised and expressly trained personnel only, who must have a detailed knowledge of this manual.

Service engineers must follow all safety measures and precautions specified for personal health and safety, in particular apparel must comply with the safety requirements in force in the country in which the system is installed.

When running and servicing the system, operators must wear protective apparel as prescribed in directives and standards in force in the country where the system is installed to safeguard personal health and safety.

Before servicing the system, the Service Technician must display warning signs which clearly indicate that the system is being serviced.

Keep unauthorised people away from the operating area and the equipment when servicing the system.

SEE THE ELECTRICAL DIAGRAM FOR REFERENCE.

4.2 ALARMS RAISED BY THE SYSTEM



Some of the messages listed hereunder could be relevant to optional features not included in the purchased machine: in this case, they will never be triggered by the system.

Whenever a fault that triggers an alarm occurs, the system immediately halts the cycle.

ALARM CODE	ALARM TEXT	CAUSE	SOLUTION
A000	Commands not enabled	Commands not enabled	Enable commands
A001	Loss of air pressure	Air leakage from main compressed air supply Air leakage from compressed air pipes	Check interception valve Check main compressed air supply Check compressed air line circuit
A002	Overload protection	Overload protection tripped	Check motor Check overload protection
A003	Remote I/O not running	Remote I/O system is not running. Ethercat network I is fault	Check remote I/O system
A004	Emergency button pressed	One of the emergency devices have been pressed	Check and release all emergency devices
A005	BMS missing	Enabling from building management system missing	Check building management system
A010	Washing tank – levels fault	Wash tank level sensors faulty	Check level sensors
A011	Washing tank –level lost during cycle	Wash tank minimum level lost during washing phase. Minimum level sensor faulty Leakage from the machine	Check level sensor Check the machine for possible leakages



ALARM CODE	ALARM TEXT	CAUSE	SOLUTION
A012	Washing tank – Filling time out	The maximum filling time of the wash tank is elapsed but the level has not been reached.	Check the relevant tank filling valve. Check the water supply condition.
A013	Washing tank – Low temperature	Temperature probe faulty Heating resistance damaged	Check temperature probe Check heating resistance
A014	Washing tank – High temperature	Temperature probe faulty Heating resistance damaged	Check temperature probe Check heating resistance
A015	Washing tank – Heating element fault	Wash heating resistance faulty (machine electrical heated) Wash heating resistance damaged (machine electrical heated) Steam missing (machine steam heated)	Check heating resistance (machine electrical heated) Substitute heating resistance (machine electrical heated) Check steam valve (machine steam heated)
A016	Washing tank – Temperature sensor fault	Wash temperature probe faulty Wash temperature controller faulty Wash temperature probe damaged	Check temperature probe
A017	Washing tank – Heating time out	The maximum heating time of the wash tank is elapsed but the temperature level has not been reached.	Check the conditions of the steam supplied (pressure and temperature). Check that the steam valve on the heat exchanger line works properly. If necessary replace it. Check that the temperature sensor in washing tank works properly. If necessary replace it.
A023	Rinse heating element – Low temperature	Temperature probe faulty Heating resistance damaged	Check temperature probe Check heating resistance
A024	Rinse heating element tank – High temperature	Temperature probe faulty Heating resistance damaged	Check temperature probe Check heating resistance
A025	Rinse heating element – Heating element fault	Rinse heating resistance faulty (machine electrical heated) Rinse heating resistance damaged (machine electrical heated) Steam missing (machine steam heated)	Check heating resistance (machine electrical heated) Substitute heating resistance (machine electrical heated) Check steam valve (machine steam heated)
A026	Rinse heating element – Temperature sensor fault	Rinse temperature probe faulty Rinse temperature probe damage	Check temperature probe



ALARM CODE	ALARM TEXT	CAUSE	SOLUTION
A027	Rinse heating element – Heating time-out	The maximum heating time of the rinse tank is elapsed but the temperature level has not been reached.	<p>Check the conditions of the steam supplied (pressure and temperature).</p> <p>Check that the steam valve on the heat exchanger line works properly. If necessary replace it.</p> <p>Check that the temperature sensor in wash 1 works properly. If necessary replace it.</p>
A030	Loading door open during cycle	Door is not closed Door is not locked	Close the door
A031	Loading door not locked	Locking piston fault Sensor fault	Check locking piston Check sensor
A032	Unloading door open during cycle	Door is not closed Door is not locked	Close the door
A033	Unloading door not locked	Locking piston fault Sensor fault	Check locking piston Check sensor
A038	Arms not in left position	Arms movement blocked Arms movement faulty	Check arm movement cylinder
A039	Arms not in right position	Arms movement blocked Arms movement faulty	Check arm movement cylinder
A040	Drain clogged	Drain is clogged Check drain	Unclog drain
A050	Detergent 1 level too low	Detergent1 drum empty Detergent drum level sensor fault	Substitute detergent 1 drum Check level sensor
A051	Detergent 2 level too low	Detergent 2 drum empty Detergent drum level sensor fault	Substitute detergent 2 drum Check level sensor
A052	Neutralizer level too low	Neutralizer drum empty Neutralizer drum level sensor fault	Substitute neutralizer drum Check level sensor
A053	Rinse aid level too low	Rinse aid drum empty Rinse aid drum level sensor fault	Substitute rinse aid drum Check level sensor
A054	Drain neutralizer: detergent 1 low level	Drain neutralizer 1 drum empty Drain neutralizer 1 drum level sensor fault	Substitute drain neutralizer 1 drum Check level sensor
A055	Drain neutralizer: detergent 2 low level	Drain neutralizer 2 drum empty Drain neutralizer 2 drum level sensor fault	Substitute drain neutralizer 2 drum Check level sensor
A060	Dr. W. not running	Alarm from Dr.Weigert. Tank disabled or in alarm.	Enable the tank or investigate the alarm cause.
A061	DR. W – Detergent 1 level low	DR. W Detergent1 drum empty DR. W Detergent drum level sensor fault	Substitute DR. W detergent 1 drum Check level sensor



ALARM CODE	ALARM TEXT	CAUSE	SOLUTION
A062	DR. W – Detergent 2 level low	DR. W Detergent 2 drum empty DR. W Detergent drum level sensor fault	Substitute DR. W detergent 2 drum Check level sensor
A063	DR. W – Neutralizer level low	DR. W - Neutralizer drum empty DR. W- Neutralizer drum level sensor fault	Substitute DR. W - neutralizer drum Check level sensor
A064	DR. W – Rinse aid level low	DR. W - Rinse aid drum empty DR. W - Rinse aid drum level sensor fault	Substitute DR. W - rinse aid drum Check level sensor
A069	Real View II – Buffer full	Real view buffer memory full	Check communication between Personal Computer and Real View



4.3 MAIN SWITCH DOES NOT SWITCH THE MACHINE ON

CAUSE	SOLUTION
There is no power supply from the building	Check presence of power supply
The main switch is faulty	The main switch has to be replaced: servicing by a service technician is needed
One of the protection panels is missing	Replace the protection panel

4.4 THE SYSTEM DOES NOT START

CAUSE	SOLUTION
The commands are disabled	Enable the commands by touching "Power IN" button on the touch screen so that it commutes to "Power ON"
An Emergency pushbutton is pressed	Check the machine to eliminate the dangerous situation. When safety conditions are restored, release the emergency pushbutton, acknowledge the relevant alarm and enable the commands. Then restart the machine.
The drain is open	Close the drain

4.5 CYCLE DOES NOT START

CAUSE	SOLUTION
One of the doors is open	Close the door
The commands are disabled	Enable the commands by touching "Power IN" button on the touch screen so that it commutes to "Power ON"
The machine is not ready	The washing water hasn't reached the pre-set temperature. If the machine is not ready, the cycle will be booked and will start as soon as it is ready. Check washing temperature settings. Check heating elements efficiency. Check the heating elements.

4.6 FOAM DURING WASHING PHASE AND PUMP CAVITATION

CAUSE	SOLUTION
Too much detergent is used during cycle	Check detergent concentration, the detergent dosage flow rate and the detergent dosage scale. Check the detergent concentration advised in the detergent data sheet. Servicing by a service technician is needed.
Washing temperature is too low	Check that washing temperature is set above 40°C
Detergent is not suitable for re-circulating use	Use an appropriate detergent with high anti-foam characteristics.
Filter clogged	Check filters



4.7 OVERLOAD

CAUSE	SOLUTION
Fault to one of the motors	Check which protection has tripped. Check motor function. Check motor current draw rate. Check the resistance of the three coils of the faulty motor. Contact IWT

4.8 NEFFECTIVE RINSING

CAUSE	SOLUTION
Main water pressure too low	Check main water dynamic pressure

4.9 WATER LEAKAGE FROM THE JETS

CAUSE	SOLUTION
Water valve dirty	Clean water valve

4.10 NOISY WASHING PHASE

CAUSE	SOLUTION
There is too much detergent	Check detergent concentration
Horizontal filters clogged	Check horizontal filters

4.11 FOAM DURING WASHING PHASE

CAUSE	SOLUTION
Washing temperature too low	Check washing temperature is above 40°C
Detergent not suitable for re-circulating use	Use an appropriate detergent with high anti-foam properties
Detergent concentration too high	Check detergent concentration advised in detergent technical sheet

4.12 MACHINE DOES NOT DISPENSE DETERGENT

CAUSE	SOLUTION
Dosage unit is no longer primed with detergent (dosage pump rather noisy)	Prime dosage unit
Dosage set time is 0	Check dosage concentration
Dosage unit potentiometer in position OFF	Set potentiometer at 100%

4.13 PUMP CAVITATE

CAUSE	SOLUTION
Too much detergent	Check detergent concentration
Washing temperature too low	Check washing temperature is above 40°C
Detergent not suitable for re-circulating use	Change detergent with one with high anti-foam properties
Filters clogged	Check filters



4.14 LEAKAGE TRIP SWITCH TURNS THE MACHINE OFF

CAUSE	SOLUTION
Current dispersion towards earth, from an electrical component	Check in which phase of the cycle the leakage trip is triggered and locate the faulty component. Contact IWT



5. ANNEX – ONLY FOR UL MACHINE VERSION

5.1 HOW TO KEEP THE ELECTRICAL SWITCHBOARD POWERED WHILE SERVICING THE WASHER.



The following procedure is to be performed by a trained and authorized service engineer.



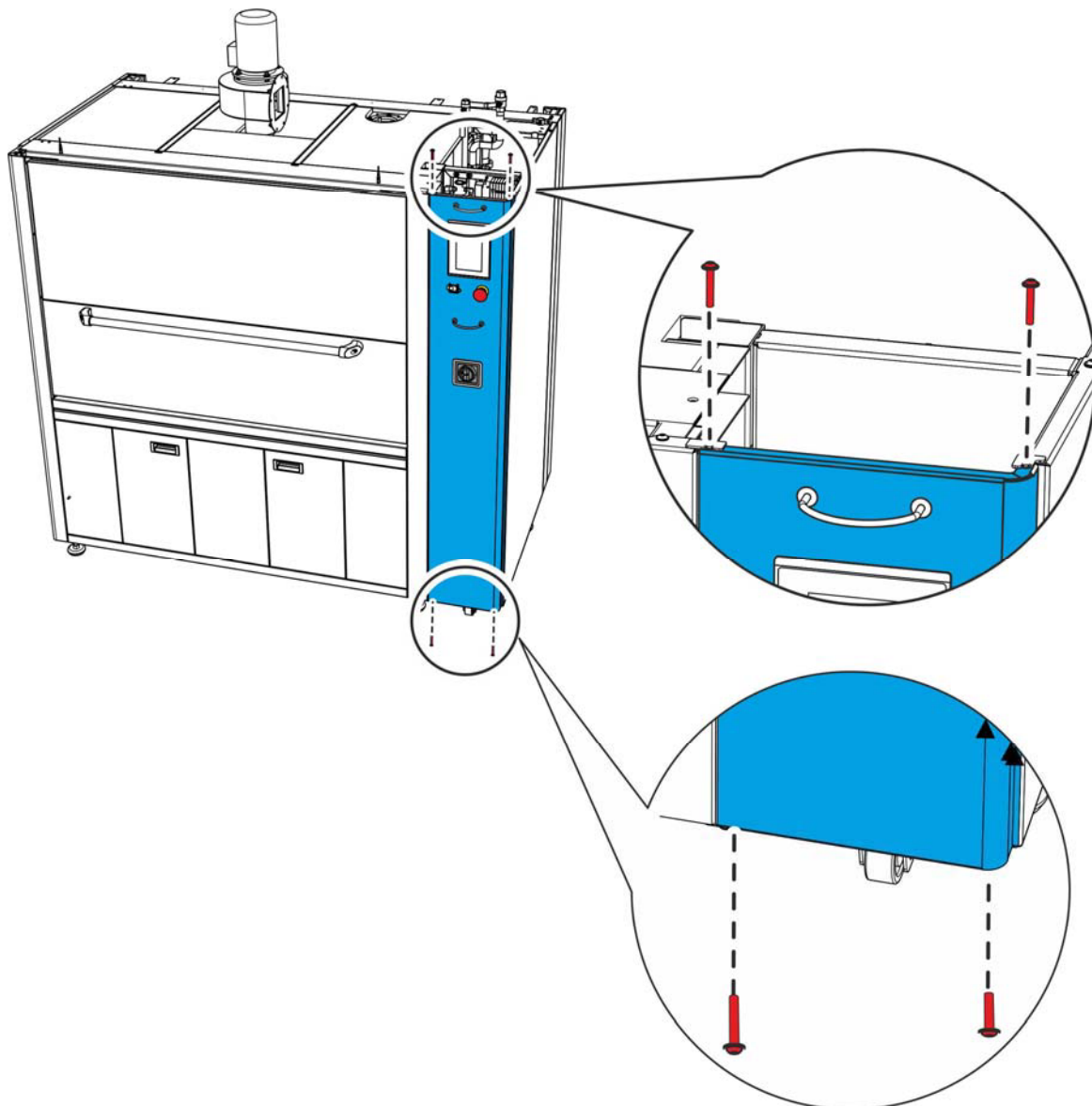
Pay due attention when working on live electrical equipment!

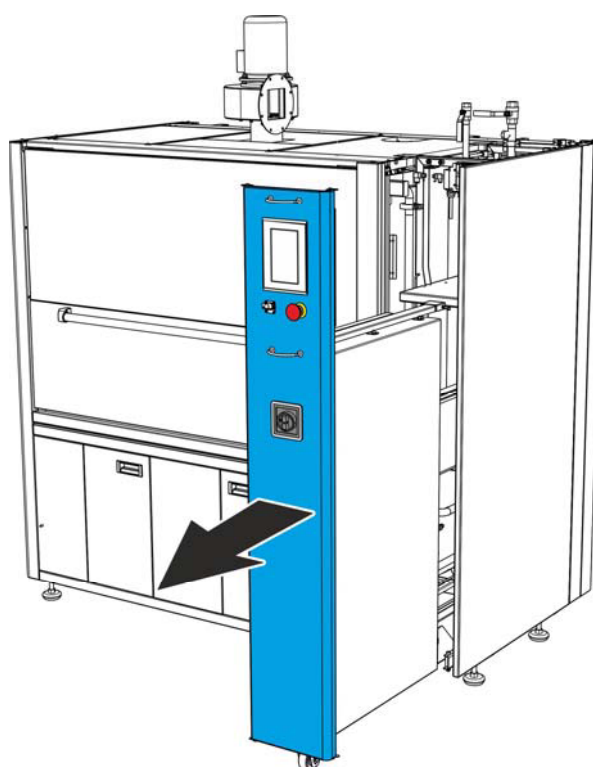
Only trained and authorized technicians are allowed to operate on live electrical equipment.



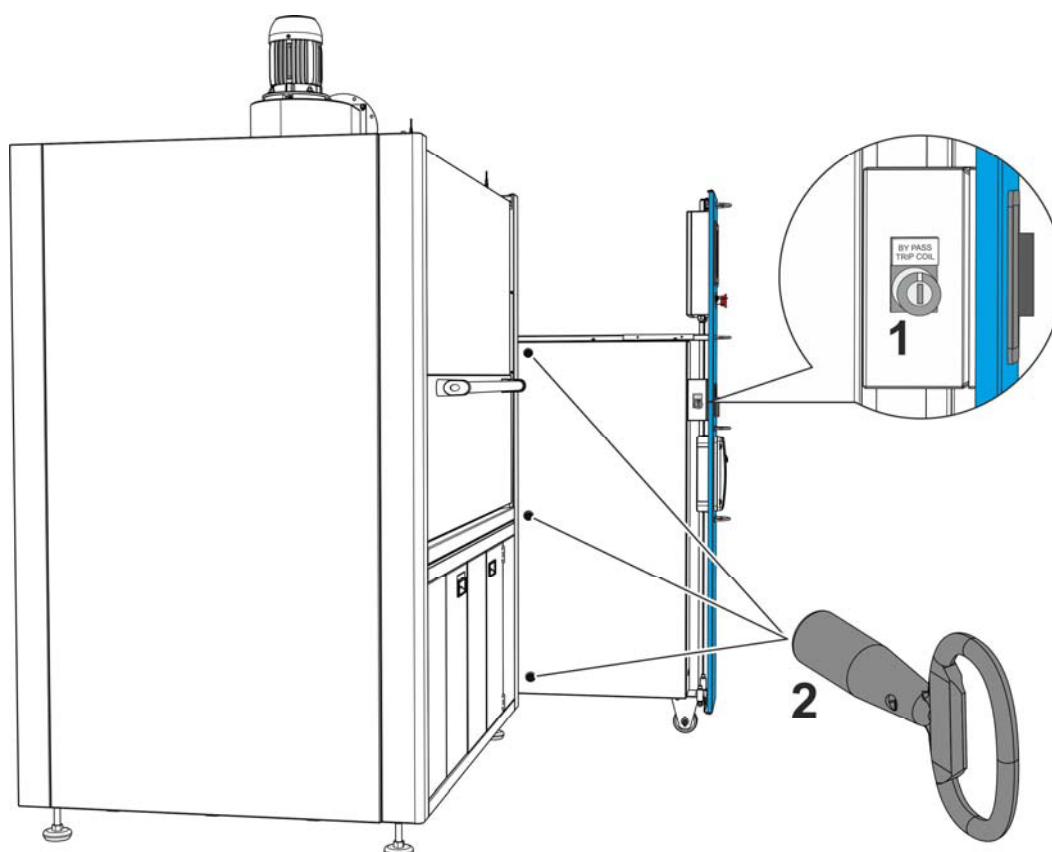
Wear adequate personal protective equipment in compliance with Laboratory SOPs and with laws and regulations in force in the country where the machine is installed in terms of personal health and protection (safety shoes).

- Leave the washer powered.
- Unscrew the electrical cabinet and draw it out of its housing.





- Turn the shunt coil defeat spring return lock switch clockwise with one hand and unlock and open the electrical switchboard panel with the other hand.





- Keeping the return lock switch engaged with one hand, press the black button inside the electrical board with the other



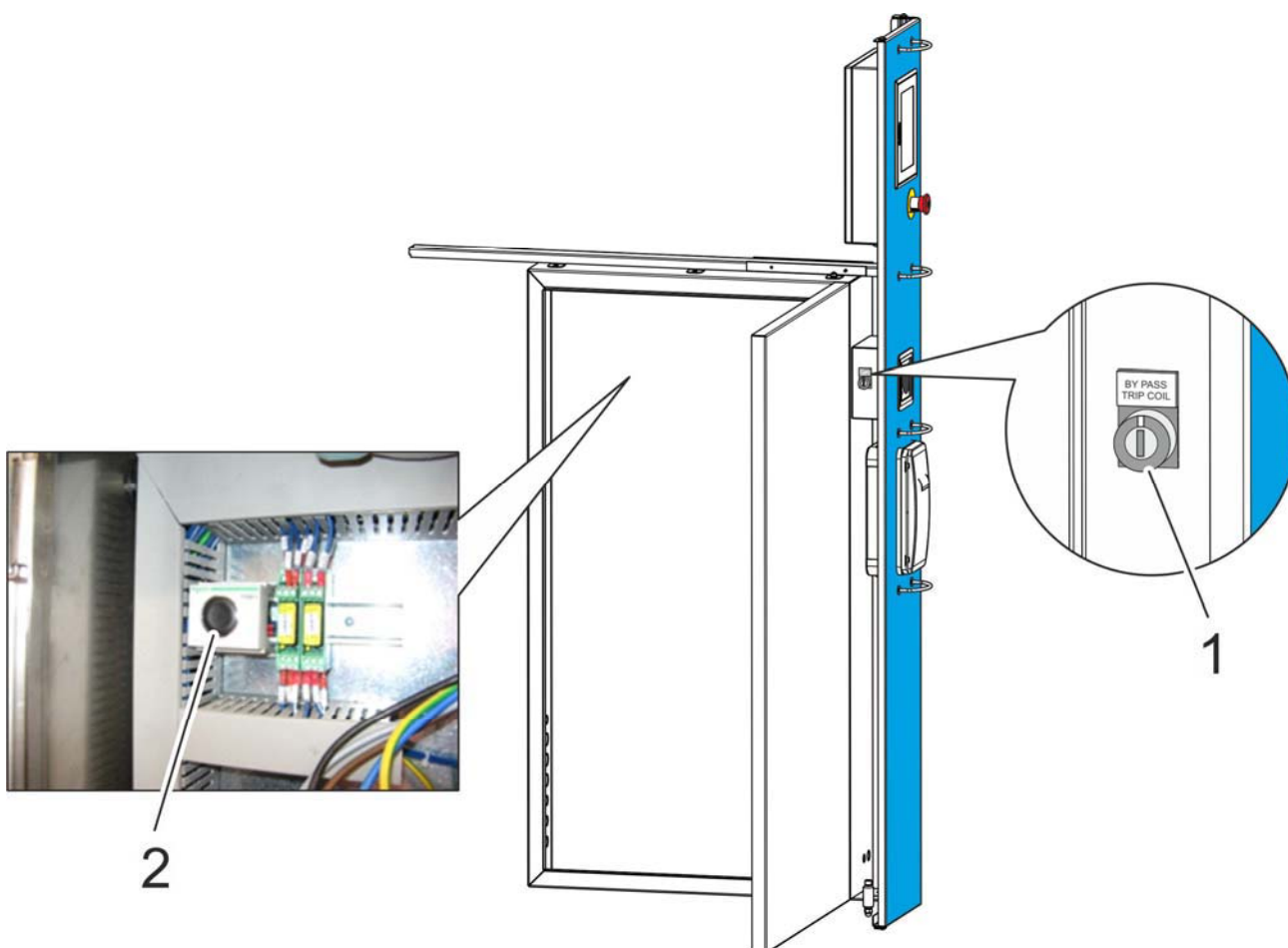
- After servicing, lock the electrical switchboard panels back into position to reset the system to its original state.



5.2 HOW TO POWER THE ELECTRICAL SWITCHBOARD WHEN ITS DOOR IS OPEN.

To test the machinery electrical function after servicing and power the electrical switchboard when it is open, follow the procedure hereunder:

- Keep the spring return lock switch, on the electrical switchboard, engaged with one hand (picture below, n.1) and turn on the washer (POWER ON switch on the washer main control panel).
- Keeping the return lock switch engaged with one hand, press the black button inside the electrical board (picture below, n.2) with the other.



To reset the system to its original state, lock the electrical switchboard panel back into position.

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ISO-9001:2000 - Cert. n° 3406/1

SECTION 116140 - ANIMAL M CAGE AND RACK SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Work includes providing Animal M Cage and Rack System (CAG-0x, RCK-0x, TBS-xx) complete with factory installed wiring and services.
- B. Division 22, 23, and 26 Sections for connection service utilities at indicated points.
- C. General commissioning requirements.

1.3 SUBMITTALS

- A. Provide complete detailed shop drawings and product information for all components.

1.4 COORDINATION

- A. Coordinate installation with mechanical, plumbing, electrical and other trades.

1.5 WARRANTY

- A. Warranty Animal Rack System (RCK-0x) to be free from defective materials poor performance and workmanship for 10 years.

1.6 PLASTIC WARRANTY:

- A. TECNIPLAST H-TEMP™ Polysulfone (PSU) caging is unconditionally guaranteed for 3 years from the stamped date. This plastic is highly resistant, it can be autoclaved at 134°C/273°F. Considering an average of 1 autoclaving cycle per week, the 3 years of warranty are comparable to at least 150 cycles.

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- B. TECNIPLAST X-TEMP™ Polyphenylsulfone (PPSU) caging is unconditionally guaranteed for 8 years from the stamped date. This plastic is highly resistant, it can be autoclaved at 134°C/273°F. Considering an average of 1 autoclaving cycle per week, the 8 years of warranty are comparable to at least 400 cycles.

PART 2 - PRODUCTS

2.1 SYSTEM REQUIREMENTS

- A. Manufacturer: Subject to the requirements, Basis of Design Manufacturer: Individual Ventilated Cages Tecniplast and products listed in Part 2- Products, or comparable products by the following manufacturers;
 - 1. Allentown, Inc.
 - 2. Animal Care Systems
- B. Auto Watering System: The rack assembly and cages shall incorporate an auto watering system with stainless steel tubing and connections. This assembly shall connect to the installed building animal watering system at connection points already designated and installed – refer to animal watering submittal for extent of building animal watering system. Provide all necessary hoses and connections for a fully functioning and programmable animal watering system including but not limited to programming, controls, valves, electronics and associated diagnostics connected to building management system (BMS). Provide all necessary component and connections to allow for localized flushing and rack tubing flush (AWF-01) during sanitation.
- C. Sanitation: Provide rack assembly and cages sized to be accommodated by the installed Rack Washer CWH-03 and Cage/Bottle Washer BWH-03.

2.2 FABRICATION

- A. Aero 70 (RCK-01) and Aero 140 (RCK-02) with Easy Flow AHU (TBS-xx):
 - 1. This system provides sterile air (HEPA filtered H14) to individually ventilated cages (GM500) (CAG-0x). Air is distributed to main horizontal plenum (supply and exhaust). The plenum air is pressurized and then distributed uniformly into the system of vertical plenums supplying each cage with air through a supply and exhaust air nozzle. The nozzle is not invasive and holds the cage air valve opened when the cage is properly docked, preventing any possibility of cross contamination. The air valve is in top of the cage which features an airflow design to avoid short cut between supply and exhaust. This allows air to be properly conveyed from the rear part of the cage to the front and then down at animal level removing gaseous pollutants that may have hazardous effects on animal health. Air speed in a GM500 cage is < 0.2 m/sec. The system features an average level of MUP < 0.189 ng/cm³ even during positive mode. The ventilated rack draws cage air directly from the top of the cage removing airborne particulate into the macro environment. For additional protection the cage is sealed with a soft silicone gasket between cage top and body.

2. The Aero 70 system features a single sided rack (RCK-01) which holds 10 rows with 8 cages in each row for a total of 70 cages (CAG-01) per rack (RCK-01). Racks do not exceed 81 1/2" in height and 21" in depth or 59 1/2" wide.
3. The Aero 140 system features a double sided rack (RCK-02) which holds 10 rows with 8 cages in each row for a total of 140 cages (CAG-02) per rack (RCK-02). Racks do not exceed 82 1/2" in height and 35" in depth or 59 1/2" wide.
4. The Aero rack features rounded corners for safer handling, 60% reduction in welds and use of stainless steel blasting, elimination of stainless steel uprights to increase the visibility and 10% reduction in the use of stainless steel. Decrease in the amount of force needed to move the rack by 8 Newton's. The Aero rack allowed Tecniplast to reduce our CO² footprint by 60% with each rack and using 40% more recyclable material.
5. The rack is designed to hold a stainless steel automatic reverse "S" auto watering system. Each drinking valve has a "quick disconnect" for easy removal and cleaning. All components are washable and can be processed in an autoclave. The design of the cage guarantees an automatic stop and lock in place on the IVC rack providing a positive locking for the air and auto watering valves when required. For auto watering a silicone buffer will be mounted on the quick disconnect valve in order to create a sealing against the cage water grommet. Available options are flat cage tops and environmental enrichments such as the mouse loft.

2.3 OPERATION

- A. Cages can operate in positive or negative pressure mode. To switch from positive to negative touch a button on the display of the air handling unit. Both supply and exhaust air are always HEPA filtered for maximum protection of both animals and room occupants. Cage visibility is guaranteed via the flip up plastic card holder and the half wire bar positioned in the back for easy access to the animals.

2.4 AIR FLOW AND RACK SYSTEM

- A. HEPA filtered air is delivered at 75 air changes per hour to each IVC via a standalone air handling unit (AHU) which features a HEPA filter (H14) on both supply and exhaust. Our HEPA filters are certified by a factory DOP leakage test on both supply and exhaust modules of the AHU. The AHU delivers clean sterile air to the stainless steel delivery plenum system terminating in the individual non invasive air nozzles. Air is delivered and exhausted to each cage by air valves positioned in the top of the cage. The supply air valve is separated from the exhaust air valve with a plastic baffle that sends air from the back of the cage to the front. The removal of cages does not affect the distribution of air to the remaining cages. The main horizontal supply and exhaust plenums of the rack are sealed by a silicone connection which assures an air tight rack. All of the plenums are vertically oriented on the rack to allow a natural passage of water assuring a clean/sanitized air circuit. The rack assembly consists of a tubular frame 1" x 3/4" rectangular shape on a 1" x 1" base with plastic runners. The runners feature an automatic stop and lock mechanism and a red plastic visual indicator to demonstrate when cages are properly docked. Each rack has column and row coordinates on plastic mounted to the rounded stainless steel framing. The entire assembly is mounted on autoclavable 5" diameter ball bearing heavy duty casters with nylon fiberglass reinforced wheels, with two (2) brakes.

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ANIMAL M CAGE AND RACK SYSTEM

- B. Each rack(RCK-01) shall be equipped with 70 Green Line Sealsafe plus housing assemblies (CAG-01) and each RCK-02 shall be equipped with 140 Green Line Sealsafe plus housing assemblies and each assembly consists of 70 (RCK-01) and 140 (RCK-02) of the following:
1. Either H-Temp™ Polysulfone or X-Temp™ Polyphenylsulfone mouse cages totaling 77 square inches which allows housing of up to 5 adult mice (GM500SU or GM500PFS) with a silicone gasket for sealing.
 2. Half wire bar lid with a built in food hopper (GM500LID)
 3. Cage top featuring an external depression for water bottle, a 0.2 micron microbiological filter and a supply and exhaust valve for air ventilation. Bottle flap is made of stainless steel and is self-closing, assuring either bio containment or exclusion.
 4. Water bottle with silicone O-ring for easy sealing of the stainless steel cap.
 5. Stainless steel AISI 316 water cap.
 6. Autoclavable plastic card holder able to flip up and stay horizontal.
 7. Stainless steel rack structure AISI 304 with plastic runner, cage coordinates and visual indicator. Model number and serial number tag.
 8. (4) 5" diameter nylon reinforced fiber glass castors, fully autoclavable (2 with brakes and 2 without).
 9. When auto watering is required the cage base features a stainless steel grommet with a self-closing flap.

2.5 EASY FLOW AIR HANDLING UNIT

- A. The Easy Flow AHU is designed as a compact unit made up of a supply module housed on the upper side of the unit, and an exhaust module housed on the lower side of the unit. The supply module takes the air from the environment. The air passes through a pre-filter that retains any rough environmental dust and then through an H14 HEPA filter that releases a continuous supply of sterile air to the rack positive plenum, connected to the unit via a flexible connection. The positive plenum of the rack supplies filtered air to the vertical plenums and then to each cage. Low velocity HEPA filtered air is delivered to the cage top level through a valve when docked in position on the rack. The cage valve diffuser and the baffle direct the air along the top to the front of the cage and finally down creating a gentle backflow that removes heavy gasses such as ammonia (NH₃) and carbon dioxide (CO₂) and its way back to the exhaust. Exhaust air is then conveyed through a flexible connection to the exhaust module where a pre-filter retains the rough dirt like bedding and food dust or animal hair. Pre-filtered air is then pulled through a H14 HEPA filter, where it becomes sterile before being conveyed to the exhaust pipe and released into the environment. Set and monitor parameters via the touch screen.
- B. Standalone air handling unit for multi racks linking and control to include the following:
1. Stainless steel frame, sides and rear made of AISI 304 with standalone stainless steel ball bearing casters and nylon fiberglass reinforced wheels
 2. Front panel constructed of plastic
 3. Microprocessor control board with push button control interface on the following; type of cage and number of cages
 4. EasyFlow comes standard with 75 ACH and can only be changed by certified technician
 5. Main ON/OFF switch

6. Supply and Exhaust portions of the unit assemblies offers:
7. Single fan module
8. HEPA and Pre-filter
9. Silicone adaptor to supply air to multiple racks
10. Serial number and an individual operating manual with quality control certificate release form the factory
11. Temperature and humidity sensor
12. Alarm connection for building management software
13. Exhaust port 3.5" diameter for thimble connection
14. DOP test certification for HEPA filters both supply and exhaust

C. Easy Flow Technical Data

1. 230Vac 50/60 Hz
2. 115Vac 60 Hz
3. 100Vac 50/60 Hz
4. Power consumption (typical running): 0.2 KVA
5. Maximum current consumption: .75 A
6. Noise Level is < 50dbA
7. Weight is 80 kg. or 176 lbs.
8. Nominal Overall Dimensions: 18.5" x 25.75" x 75.5"

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Install Animal M Cage and Rack System according to Shop Drawings and manufacturer's written instructions. Install plumb, level, and aligned. Securely attach access panels but provide for easy removal and secure reattachment.
- B. Comply with requirements of Divisions 11, 22, 23 and 26 Sections for factory installation of laboratory gas service fittings, piping, electrical devices, and wiring. Install according to Shop Drawings and manufacturer's written instructions.

3.2 FIELD QUALITY CONTROL

- A. Field Test: Upon completed installation, provide independent certification tests. Field test shall be compared to results of factory controlled tests which accompany the operators manual.

3.3 ADJUSTING AND CLEANING

- A. Adjust moving parts for smooth operation.
- B. Repair or remove and replace defective work as directed on completion of installation.
- C. Clean finished surfaces, touch up as required; and remove or refinish damaged or soiled areas to match original factory finish.

END OF SPECIFICATION

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ANIMAL M CAGE AND RACK SYSTEM
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SECTION 116141 - ANIMAL R CAGE AND RACK SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Work includes providing Animal R Cage and Rack System (CAG-2x, RCK-2x, TBS-xx) complete with factory installed wiring and services.
- B. Division 22, 23, and 26 Sections for connection service utilities at indicated points.
- C. General commissioning requirements.

1.3 SUBMITTALS

- A. Provide complete detailed shop drawings and product information for all components.

1.4 COORDINATION

- A. Coordinate installation with mechanical, plumbing, electrical and other trades.

1.5 WARRANTY

- A. Warranty Animal R Rack System (RCK-2x) to be free from defective materials poor performance and workmanship for 10 years.

1.6 PLASTIC WARRANTY:

- A. TECNIPLAST H-TEMP™ Polysulfone (PSU) caging is unconditionally guaranteed for 3 years from the stamped date. This plastic is highly resistant, it can be autoclaved at 134°C/273°F. Considering an average of 1 autoclaving cycle per week, the 3 years of warranty are comparable to at least 150 cycles.

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ANIMAL R CAGE AND RACK SYSTEM

- B. TECNIPLAST X-TEMP™ Polyphenylsulfone (PPSU) caging is unconditionally guaranteed for 8 years from the stamped date. This plastic is highly resistant, it can be autoclaved at 134°C/273°F. Considering an average of 1 autoclaving cycle per week, the 8 years of warranty are comparable to at least 400 cycles.

PART 2 - PRODUCTS

2.1 SYSTEM REQUIREMENTS

- A. Manufacturer: Subject to the requirements, Basis of Design Manufacturer: Individual Ventilated Cages Tecniplast and products listed in Part 2- Products and warranties 1.5 and 1.6, or comparable products by the following manufacturers;
 - 1. Allentown, Inc.
 - 2. Animal Care Systems
- B. Auto Watering System: The rack assembly and cages shall incorporate an auto watering system with stainless steel tubing and connections. This assembly shall connect to the installed building animal watering system at connection points already designated and installed – refer to animal watering submittal for extent of building animal watering system. Provide all necessary hoses and connections for a fully functioning and programmable animal watering system including but not limited to programming, controls, valves, electronics and associated diagnostics connected to building management system (BMS). Provide all necessary component and connections to allow for localized flushing and rack tubing flush (AWF-01) during sanitation.
- C. Sanitation: Provide rack assembly and cages sized to be accommodated by the installed Rack Washer CWH-03 and Cage/Bottle Washer BWH-03.

2.2 FABRICATION

- A. 2GR35CP (RCK-21) and 2GE70CP (RCK-22) with Smart Flow AHU (TBS-xx):
 - 1. This system provides sterile air (HEPA filtered H14) to individually ventilated cages (GR900) (CAG-2x). Air is distributed to main horizontal plenum (supply and exhaust). The plenum air is pressurized and then distributed uniformly into the system of vertical plenums supplying each cage with air through a supply and exhaust air nozzle. The nozzle is not invasive and holds the cage air valve opened when the cage is properly docked, preventing any possibility of cross contamination. The air valve is in top of the cage which features an airflow design to avoid short cut between supply and exhaust. This allows air to be properly conveyed from the rear part of the cage to the front and then down at animal level removing gaseous pollutants that may have hazardous effects on animal health. Air speed in a GR900 cage is < 0.2 m/sec. The system features an average level of MUP < 0.189 ng/cm³ even during positive mode. The ventilated rack draws cage air directly from the top of the cage removing airborne particulate into the macro environment. For additional protection the cage is sealed with a soft silicone gasket between cage top and body.

2. The 2GR35CP system features a single sided rack (RCK-21) which holds 7 rows with 5 cages in each row for a total of 35 cages (CAG-21) per rack. Racks do not exceed 77" in height.
3. The 2GR70CP system features a double sided rack (RCK-22) which holds 7 rows with 5 cages in each row for a total of 70 cages (CAG-22) per rack. Racks do not exceed 77" in height.
4. The rack is designed to hold a stainless steel automatic reverse "S" auto watering system. Each drinking valve has a "quick disconnect" for easy removal and cleaning. All components are washable and can be processed in an autoclave. The design of the cage guarantees an automatic stop and lock in place on the IVC rack providing a positive locking for the air and auto watering valves when required. For auto watering a silicone buffer will be mounted on the quick disconnect valve in order to create a sealing against the cage water grommet. Available options are flat cage tops and environmental enrichments.

2.3 OPERATION

- A. Cages can operate in positive or negative pressure mode. To switch from positive to negative touch a button on the display of the air handling unit. Both supply and exhaust air are always HEPA filtered for maximum protection of both animals and room occupants. Cage visibility is guaranteed via the flip up plastic card holder and the half wire bar positioned in the back for easy access to the animals.

2.4 AIR FLOW AND RACK SYSTEM

- A. HEPA filtered air is delivered up to 80 air changes per hour to each IVC via a standalone air handling unit (AHU) which features a HEPA filter (H14) on both supply and exhaust. Our HEPA filters are certified by a factory DOP leakage test on both supply and exhaust modules of the AHU. The AHU delivers clean sterile air to the stainless steel delivery plenum system terminating in the individual non invasive air nozzles. Air is delivered and exhausted to each cage by air valves positioned in the top of the cage. The supply air valve is separated from the exhaust air valve with a plastic baffle that sends air from the back of the cage to the front. The removal of cages does not affect the distribution of air to the remaining cages. The main horizontal supply and exhaust plenums of the rack are sealed by a silicone connection which assures an air tight rack. All of the plenums are vertically oriented on the rack to allow a natural passage of water assuring a clean/sanitized air circuit. The rack assembly consists of a tubular frame 1" x 3/4" rectangular shape on a 1" x 1" base with plastic runners. The runners feature an automatic stop and lock mechanism and a red plastic visual indicator to demonstrate when cages are properly docked. Each rack has column and row identification laser printed in the stainless steel. The entire assembly is mounted on autoclavable 5" diameter ball bearing heavy duty casters with nylon fiberglass reinforced wheels, with two (2) brakes.
- B. Each rack (RCK-21) shall be equipped with 35 Green Line Sealsafe plus housing assemblies (CAG-21) and each (RCK-22) rack shall be equipped with 70 Green Line Sealsafe plus housing assemblies and each assembly consists of 35 (RCK-21) and 70 (RCK-22) of the following:

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ANIMAL R CAGE AND RACK SYSTEM

1. Either H-Temp™ Polysulfone or X-Temp™ Polyphenylsulfone rat cages totaling 140 square inches which allows housing of up to 5 adult rats (GR900SU or GR900PFS) with a silicone gasket for sealing.
2. Half wire bar lid with a built in food hopper (GR900LID)
3. Cage top featuring an external depression for water bottle, a 0.2 micron microbiological filter and a supply and exhaust valve for air ventilation. Bottle flap is made of stainless steel and is self closing, assuring either bio containment or exclusion.
4. Water bottle with silicone o-ring for easy sealing of the stainless steel cap.
5. Stainless steel AISI 316 water cap.
6. Autoclavable plastic card holder able to flip up and stay horizontal.
7. Stainless steel rack structure AISI 304 with plastic runner, cage coordinates and visual indicator. Model number and serial number tag.
8. (4) 5" diameter nylon reinforced fiber glass castors, fully autoclavable (2 with brakes and 2 without).
9. When auto watering is required the cage base features a stainless steel grommet with a self closing flap.

2.5 SMART FLOW AIR HANDLING UNIT

A. The Smart Flow AHU is designed as a compact unit made up of a supply module housed on the upper side of the unit, and an exhaust module housed on the lower side of the unit. The supply module takes the air from the environment. The air passes through a pre-filter that retains any rough environmental dust and then through an H14 HEPA filter that releases a continuous supply of sterile air to the rack positive plenum, connected to the unit via a flexible connection. The positive plenum of the rack supplies filtered air to the vertical plenums and then to each cage. Low velocity HEPA filtered air is delivered to the cage top level through a valve when docked in position on the rack. The cage valve diffuser and the baffle direct the air along the top to the front of the cage and finally down creating a gentle backflow that removes heavy gasses such as ammonia (NH₃) and carbon dioxide (CO₂) and its way back to the exhaust. Exhaust air is then conveyed through a flexible connection to the exhaust module where a pre-filter retains the rough dirt like bedding and food dust or animal hair. Pre-filtered air is then pulled through a H14 HEPA filter, where it becomes sterile before being conveyed to the exhaust pipe and released into the environment. Set and monitor parameters via the touch screen.

B. Smart Flow

1. Stand alone air handling unit for multi racks linking and control to include the following:
 - a. Stainless steel frame, sides and rear made of AISI 304 with stand alone stainless steel ball bearing casters and nylon fiberglass reinforced wheels
 - b. Front panel constructed of plastic
 - c. Microprocessor control board with touch screen
 - d. Main ON/OFF switch
 - e. Supply and Exhaust portions of the unit assemblies offers:
 - f. Single fan module
 - g. HEPA and Pre-filter
 - h. Silicone adaptor to supply air to multiple racks

- i. Serial number and an individual operating manual with quality control certificate release form the factory
- j. Temperature and humidity sensor
- k. Alarm connection for building management software
- l. Exhaust port 3.5" diameter for thimble connection
- m. DOP test certification for HEPA filters both supply and exhaust

C. Smart Flow Technical Data

- 1. 230Vac 50/60 Hz
- 2. 115Vac 60 Hz
- 3. 100Vac 50/60 Hz
- 4. Power consumption (typical running): 0.2 KVA
- 5. Maximum current consumption: .75 A
- 6. Noise Level is < 50dbA
- 7. Weight is 80 kg. or 176 lbs.
- 8. Nominal Overall Dimensions: 18.5" x 25.75" x 75.5"

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Install Animal R Cage and Rack System according to Shop Drawings and manufacturer's written instructions. Install plumb, level, and aligned. Securely attach access panels but provide for easy removal and secure reattachment.
- B. Comply with requirements of Divisions 11, 22, 23 and 26 Sections for factory installation of laboratory gas service fittings, piping, electrical devices, and wiring. Install according to Shop Drawings and manufacturer's written instructions.

3.2 FIELD QUALITY CONTROL

- A. Field Test: Upon completed installation, provide independent certification tests. Field test shall be compared to results of factory controlled tests which accompany the operators manual.

3.3 ADJUSTING AND CLEANING

- A. Adjust moving parts for smooth operation.
- B. Repair or remove and replace defective work as directed on completion of installation.
- C. Clean finished surfaces, touch up as required; and remove or refinish damaged or soiled areas to match original factory finish.

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ANIMAL R CAGE AND RACK SYSTEM

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END OF SPECIFICATION
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ANIMAL R CAGE AND RACK SYSTEM
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SECTION 115360 – ANIMAL WATERING SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide a complete, operational and tested auto-flushing or equivalent Animal Watering System.
- B. Section Includes the following Specification Sections:
 - 1. 115361 “Stainless Steel Room Distribution System”
 - 2. 115362 “Automated Dual-Purpose Flush Station”
 - 3. 115363 “Chlorine Injector Station”
 - 4. 115364 “Pressure Reducing Station”
 - 5. 115365 “Central Management System”
- C. Section Includes the following Drawings:
 - 1. 5200-8579-300.1 Automated Watering System Piping Layout
 - 2. 5200-8579-351 Automated Watering System Piping Details
 - 3. 5200-8579-352 Automated Watering System Piping Details
 - 4. 5800-8579-300.1 Pulse System Layout
 - 5. 5800-8579-351 Pulse System Details
 - 6. 5810-8579-301.1 Pulse System Equipment Cabling Schematic
- D. Related Sections:
 - 1. Division 06 Section "Rough Carpentry"
 - 2. Division 22 & 23 Sections for service utility connections
 - 3. 230905 “Facility Monitoring System”
 - 4. 260500, “General Requirements, Electrical Work”.
 - 5. 260519, “Wires and Cables (600 Volts and Less)”.
 - 6. 260526, “Grounding”.
 - 7. 260529, “Hangers and Supports for Electrical Systems”.
 - 8. 260533, “Raceways and Fittings”.
 - 9. 260553, “Identification for Electrical Systems”.
 - 10. 262726, “Wiring Devices”.
 - 11. 262813, “Fuses”.
- E. Related Drawings:
 - 1. AQ-0Be Basement Plan – Area E
 - 2. AQ-0Bf Basement Plan – Area F
 - 3. A5-87 Keynote Schedule

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ANIMAL WATERING SYSTEM
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1.2 PERFORMANCE REQUIREMENTS

- A. Comply with referenced specifications and drawings.

1.3 SUBMITTALS

- A. Comply with all referenced specification requirements. Provide all key system components for review.

1.4 QUALITY ASSURANCE

- A. Source Limitations for Animal Watering System: Obtain from a single manufacturer.
- B. Complying with reference Specifications.
- C. Product Standards: complying with reference Specifications.
- D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- E. Preinstallation Conference: Conduct conference at Project site.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect finished surfaces during handling and installation with protective covering of suitable material.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install system components until building is enclosed, wet work and utility roughing-in are complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

1.7 COORDINATION

- A. Coordinate layout and installation of system.

1.8 EXTRA MATERIALS

- A. Furnish extra material as required.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide system by one of the following:
 - 1. Edstrom Industries
 - 2. Rees Scientific
 - 3. SE Lab Group (Systems Engineering)

2.2 MATERIALS

- A. Complying with reference Specifications.

2.3 FABRICATION

- A. Complying with reference Specifications.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of animal watering system.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install animal watering system according to Shop Drawings and manufacturer's written instructions. Install level, plumb, and true; shim as required, using concealed shims, and securely anchor to building. Securely attach components.
- B. Provide all system programming, start-up and comprehensive Owner training all by factory-authorized system representatives.

3.3 FIELD QUALITY CONTROL

- A. Field test installed animal watering system according to referenced specifications.

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3.4 ADJUSTING AND CLEANING

- A. Adjust system as recommended by manufacturer.
- B. Clean finished surfaces; touch up as required; and remove or refinish damaged or soiled areas to match original factory finish, as approved by Architect.

END OF SECTION 115360
MH

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ANIMAL WATERING SYSTEM
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LETTER OF TRANSMITTAL

June 10, 2014

Page 1 of 1

TO: Mechanical Piping & Plumbing Corp 13235 Prospect Dearborn MI 48126, USA Attn: Larry Kolasa 313-791-7015	P.O. No: 2009	E.I. No: 31661
	RE: Revised Submittal Shop Drawings for the Pulse Automated Animal Watering System at Wayne State University	

WE ARE SENDING YOU:

- | | | |
|---|---|---|
| <input checked="" type="checkbox"/> Attached | <input type="checkbox"/> Under separate cover via | |
| <input type="checkbox"/> Prints | <input type="checkbox"/> Plans | <input type="checkbox"/> Specifications |
| <input checked="" type="checkbox"/> Shop Drawings | <input type="checkbox"/> | <input type="checkbox"/> Samples |

COPIES	DRAWING NO.	REV	DESCRIPTION
1	5200-8579-300.1	C	Automated Animal Watering System Layout (Plumbing)
1	5200-8579-351	C	Automated Animal Watering System Detail Sheet (Plumbing)
1	5200-8579-352	B	Automated Animal Watering System Detail Sheet (Plumbing)
1	5800-8579-300.1	C	Pulse System Layout
1	5800-8579-351	B	Pulse System Detail Sheet
1	5810-8579-300.1	B	Pulse System Equipment Cabling Schematic
1	5820-8579-001.1	A	Pulse PCCX I/O Box (PCCX-001) Connections
1	5820-8579-001.2	A	Pulse PCCX I/O Box (PCCX-001) Connections
1	5820-8579-001.3	A	Pulse PCCX I/O Box (PCCX-001) Connections


THESE ARE TRANSMITTED:

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|--|---------------------------------------|--|---|
| <input checked="" type="checkbox"/> For Approval | <input type="checkbox"/> For Your Use | <input checked="" type="checkbox"/> As Requested | <input type="checkbox"/> For Review and Comment |
| <input type="checkbox"/> Other: _____ | | | |

REMARKS: Enclosed please find one (1) complete electronic copy of our revised shop drawings.

COPIES TO: Project File

Sincerely,

Barton Malow/Brinker WSU MBRB Project 6160 Cass Ave. Detroit, MI 48202		 A Joint Venture
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
REVIEWED FOR SUBMISSION		
BY	SSzeles	DATE 6/11/2014
SUBMITTAL#	SP#448.1	SPEC 115360

BY



Todd Schmidt
Project Manager
Edstrom, Inc.

SECTION 115361 - STAINLESS STEEL ROOM DISTRIBUTION SYSTEM

PART 1 - GENERAL

1.1 GENERAL

- A. The stainless steel room distribution system (RDS) is a water delivery piping system designed specifically for an animal automated drinking water system. The system operates normally at a low pressure of 3-5 psi (21-34 kPa, .21-.34 bar) in the animal rooms, but is subjected to pressures up to 55 psi (379 kPa, 3.79 bar) in the supply header.
 - 1. This specification applies to the receiving, handling, storage, and installation of stainless steel tubing and fittings for an animal drinking water system.
 - 2. Furnish all materials in accordance with this specification and manufacture in accordance with applicable codes and standards.
 - a. ANSI/ASTM Standard A450 stainless steel tubing
 - 3. Purchase the complete piping system from a single manufacturer. Factory cut and fabricate tubing to system designed lengths, electropolish and passivate and then cap and/or seal in a bag and suitably box for shipping protection. Individually bag each fitting and suitably box for shipping protection.
 - 4. Inspect shipping cartons upon delivery for damage and material cleanliness. Report promptly to the manufacturer any damaged material.
 - 5. Handle tubing to avoid bending or damage. Keep materials clean and free from grease and oil. Store all tubing and fittings in their original package until ready to use.
 - 6. Store all system material in an area segregated from other construction material. Choose a location inside a building protected from any corrosive atmosphere. Limit access to protect against physical damage, loss and contamination.

1.2 OPERATION

- A. Distributes water from a pressure reducing station (PRS) into and around each animal room and to flush drain points. The system operates normally at a low pressure of 3-5 psi (21-34 kPa, .21-.34 bar), but is subjected to flushing pressures up to 15 psi (103 kPa, 1.03 bar). Distribution header piping pressure rating is 75 psi (517 kPa, 5.17 bar) maximum. The system uses stainless steel piping/fitting design to allow mechanical dismantling for repair or replacement of individual components. Soldered, brazed or adhesive bonded joints are not permitted. Electropolish externally and passivate all water contact surfaces to attain a uniform oxide inactive surface film.

PART 2 - PRODUCTS

2.1 PRODUCTS

A. ROOM DISTRIBUTION PIPING AND FITTINGS

1. Stainless steel welded tubing
 - a. 0.50 in. (12.70 mm) OD x 0.035 in. (0.89 mm) wall
 - b. 316L grade stainless steel
2. Electropolish/passivation process
 - a. Electropolish in 135° F (57° C) solution of 65% phosphoric - 35% sulfuric acid
 - b. Passivate in 105° F (41° C) solution of 20% citric - 80% water
 - c. Final rinse with 125° F (52° C) Reverse Osmosis water to remove all chemical residues
 - d. Electropolish externally and passivate to a finish of 64 RA or better after all fabrication and welding
3. Coupling, elbow, tee fittings
 - a. Clean Fitting or equivalent sanitary type
 - b. 316L grade stainless steel
 - c. ID: 0.43 in. (10.92 mm) to exactly match tubing ID
 - d. Electropolish externally and passivate in accordance with 3.1.B to a finish of 64 RA or better after all fabrication and welding
 - e. Joint Seal
 - 1) High grade FDA approved silicone
 - 2) Seal edge width: 0.05 in. (1.27 mm)
 - 3) ID: 0.43 in. (10.92 mm) for flush internal joint
 - f. Ferrule: 316 Stainless Steel
 - g. Retainer hex nut: 303 stainless steel
4. Interconnect Station (I/C) Assembly
 - a. Prefabricated piping assembly with a Quick Disconnect (QD)/half coupling fitting welded to one end
 - b. Clean Fitting connection or equivalent sanitary type
 - c. QD Type: Industry Standard 1/4 in. universal style socket
 - d. Design characteristics in accordance with 3.1.C with base fitting of QD welded at branch port
 - e. QD base fitting

- 1) 316L grade stainless steel
- 2) Fitting length of 1.03 in. (26.16 mm) from tubing ID to QD seal
- f. QD components
 - 1) 316L grade stainless steel
 - 2) QD Seal: High grade FDA approved silicone
- g. Electropolish externally and passivate in accordance with 3.1.B to a finish of 64 RA or better after all fabrication and welding
- h. Deburr open end of pipe to make it clean fitting ready for field assembly
5. Pipe/Coupler Assembly
 - a. Prefabricated piping assembly with a half coupling fitting welded to one end
 - b. Clean Fitting connection or equivalent sanitary type
 - c. Design characteristics in accordance with 3.1.C
 - d. Deburr open end of pipe to make it clean fitting ready for field assembly
 - e. Electropolish externally and passivate in accordance with 3.1.B to a finish of 64 RA or better after all fabrication and welding
- B. Interconnect Station (I/C)
 1. Located in each animal room as shown on drawings and/or to adequately accommodate manifold connection for mobile or stationary racks or kennel/pen arrangements
 - a. I/C Connection: Edstrom I/C Assembly with universal style QD socket for hose connection
 - b. Use Pipe/Coupler assembly for all piping runs not requiring I/C connections
- C. Detachable Kynar Recoil Hose (RH)
 1. Animal rack water supply hose assembly which can be detached from the room piping for sanitization or during periods of non-use.
 - a. Tubing coil: Black PVDF (Kynar) [3/8 in. OD x 1/4 in. ID (9.53 mm OD x 6.35 mm ID), NSF standard 61, FDA grade, chlorine tolerance of 0.5 to 50 ppm]
 - b. Extended Reach: 6 feet (1829 mm)
 - c. Autoclavability: Maximum temperature of 250° F (121° C)
 - d. Quick disconnect couplings - Universal style
 - 1) QD plug on upper end
 - 2) QD socket on lower end
 - 3) 316L grade stainless steel
 - 4) Electropolish externally and passivate in accordance with 3.1.B to a finish of 64 RA or better on all machined water contact surfaces

- 5) QD Seal: High grade FDA approved silicone
 - 6) Push lock barb connection
2. Stainless steel spring supports [3 in. (76 mm) long] both ends.
- D. Solenoid Flush Valve
 1. Solenoid valve located down stream from the water supply rack connection points at the terminating end of each room distribution piping run for Room Distribution Flushing or in the flush drain header at each rack location for On-Line Rack Flushing
 - a. Body Material: Electro-polished 316L grade stainless steel
 - b. Input power: 24 VDC, 0.5 amp
 - c. Watertight junction box connection with screw connectors
 - d. Coil: Epoxy encapsulated one piece
 - e. Ports: 3/8 in. FPT F. Diaphragm: Teflon
- E. Rack Flush Recoil Hose
- F. Animal rack flush hose/check valve/fitting assembly that connects the terminating point of the rack manifold to the drain header. QD plug on lower end of hose to plug into supply line/recoil hose QD socket when rack position is vacant.
 1. Tubing coil: Black PVDF (Kynar) [3/8 in. OD x 1/4 in. ID (9.53 mm OD x 6.35 mm ID), NSF standard 61, FDA grade, chlorine tolerance of 0.5 to 50 ppm]
 2. Extended Reach: 6 feet (1829 mm)
 3. Autoclavability: Maximum temperature of 250° F (121° C) D. Hose Fittings
 - a. Swivel nut with o-ring seal on upper end
 - b. QD plug on lower end – Universal style
 - c. 316L grade stainless steel - wetted parts
 - d. Electropolish externally and passivate in accordance with 3.1.B to a finish of 64 RA or better on all machined water contact surfaces
 - e. Push lock barb connection
 4. Stainless steel spring supports [3 in. (76 mm) long] both ends
 5. Check Valve
 - a. Polypropylene body
 - b. Silicone O-ring seal
 - c. Stainless steel spring
- G. Distribution Header Piping
 1. Supply water piping to pressure reducing station(s) and other equipment as required. All piping and fittings used shall be 316L stainless steel.
 - a. SS piping sized to handle flow rates

- 1) 1.25 in. OD x 0.049 in. wall (31.75 mm OD x 1.24 mm wall)
- 2) 1.0 in. OD x 0.065 in. wall (25.40 mm OD x 1.65 mm wall)
- 3) 0.75 in. OD x 0.035 in. wall (19.05 mm OD x 0.89 mm wall)
- 4) 0.5 in. OD x 0.035 in. wall (12.70 mm OD x 0.89 mm wall)

2. Fittings

- a. Clean joint type - 0.5 in. (12.70 mm) and 0.75 in. (19.05 mm) OD

3. Compression type - 1 in. (25.40 mm) or larger OD C. Installation and mounting

- a. This piping shall be mounted to a suitable support structure with appropriate mounting hardware as required
- b. Piping shall be installed at a uniform height to minimize rises and drops

H. Capabilities And Features

1. Stainless steel tubing and fittings to be passivated for use in tap water, water containing chlorine 0-10 ppm with a minimum 5.0 pH or higher, or water acidified to a minimum 2.6 pH
 - a. Edstrom Clean Fitting design provides a consistent, smooth, inside diameter conduit for unobstructed water flow throughout the system piping.
 - b. Edstrom Clean Fitting seal design assures that no cracks or crevices exist between edge of tubing and mating fitting shoulder when fitting is fully assembled
 - c. Pocket created by the QD port in the I/C Assembly to be less than 2-1/2 tubing diameters long to allow for water exchange during flushing and to minimize the opportunity for microbial growth

PART 3 - EXECUTION

3.1 EXECUTION

- A. Perform installation with factory certified technicians on the Clean Fitting system or prequalify/train on-site technicians with factory authorized personnel. Instruct on all aspects of cutting tube, deburring, tube bending and Clean Fitting assembly.
- B. Fabrication
 1. Factory debur ends of cut tubing so it is ready to assemble into the Clean Fitting
 2. Make field cuts with a stainless steel tubing cutter supplied by the system manufacturer and used only on stainless steel and chamfer outside and inside edges per assembly instructions 4230-MI4166 to remove any burrs.
 3. Make square cuts to accurate lengths and assemble joints tightly.
 4. Use tube bending whenever possible for corners and offsets with a bender supplied by system manufacturer and used only on stainless steel.

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AUTOMATED DUAL-PURPOSE FLUSH STATION

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C. Installation And Mounting

1. Attach tubing to the wall, ceilings or other suitable support structure with 18 GA stainless steel clamps and other appropriate brackets. Use stainless steel mounting hardware.
2. Provide a 2-hole clamp at each I/C station within 2 in. (51 mm) of the QD fitting to provide adequate rigidity and support. Provide one-hole clamps at all other mounting points where suitable support can be attained. Space clamps uniformly not exceeding 36 in. (914 mm) maximum.
3. Provide plastic stand-off spacers under each clamp for wall mounting applications to mount piping off the wall by 1/2 in. (12.70 mm) with plastic screw anchors and stainless steel self tap screws #10 x 1-1/2 in. (38.10 mm).
4. Install the entire piping system at a consistent level to the extent possible at an approximate height of 96 in. (2438 mm) to 102 in. (2591 mm) above the floor. Limit any rises and drops.
5. Provide a stainless steel wall plate on each side of the wall for wall break penetrations. Use silicone sealant to affix the plate to the wall and to make an air tight seal around the pipe. Avoid any mechanical joints inside walls. Do not use wall sleeves.
6. There shall be no exposed piping or tubing in the Vivarium Corridors. Locate all piping, tubing and services above accessible ceilings or within walls as appropriate.

END OF SECTION

SECTION 115362 - AUTOMATED DUAL-PURPOSE FLUSH STATION

PART 1 - GENERAL

1.1 GENERAL

- A. The Automated Dual-Purpose Flush Station (DPFS) shall be a panel assembled, self-contained unit designed for wall-mounting. It shall provide filtered water at approximately 17 psi (117 kPa, 1.17 bar) for flushing mobile rack manifolds or a method to internally flush and air evacuate up to two detachable recoil hoses at one time.
 - B. The rack manifold flushing is accomplished by connecting the poly recoil hose with a stainless steel quick disconnect socket to the manifold inlet and opening the drain valve(s). The recoil hose flushing procedure involves connecting one or two hoses to the flush station manifolds, flushing them with water and then evacuating the hoses with compressed air.
1. Model 6400 – Automated Flush Station with GP Controller and stainless steel wetted components. (DPFS)
 - a. Regulatory Compliance: ETL listed, conforms to UL Std 73, certified to CAN/CSA Std C22.2 No. 68, CE
 2. Approximate overall dimensions: 25 in. W x 25 in. H x 7 in. D (635 mm W x 635 mm H x 178 mm D)
 3. Required Utilities by Others:
 - a. Water:
 - 1) Provide and make final connection to the appropriate facility water supply - 60 psi (414 kPa, 4.14 bar) maximum, 40 psi (276 kPa, 2.76 bar) minimum, 1.5 gpm (5.7 L/min) minimum
 - b. Electrical:
 - 1) Provide and make final connection (2 connection points) to 120 VAC, 50/60 Hz, GFCI power (120 Watts)
 - c. Compressed Air:
 - 1) Provide and make final connection to regulated, clean, oil-free compressed air – 4 cfm (cubic feet per minute) [113 L/min(liters per minute) 60 psi (414 kPa, 4.14 bar) maximum, 15 psi (103 kPa, 1.03 bar) minimum

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AUTOMATED DUAL-PURPOSE FLUSH STATION

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d. Drain:

- 1) Provide and make final connection to suitable drain within 15 pipe feet (4572 mm) of unit.
- 2) Drain pipe height not to exceed 45 in. (1143 mm) above finished floor

PART 2 - PRODUCTS

2.1 OPERATION

- A. Routine flushing operation, using house potable water, along with a Chlorine Injector Station (CIS) in the feedwater line to the flush station shall eliminate bacterial growth. The same feedwater is used for both manifold and recoil hose flushing. The compressed air is used for recoil hose flushing only and needs to be clean and oil free. The DPFS is an automated flush station equipped with a GP Controller with user-settable times which control two solenoid valves. This permits the flush sequence to be completed by just pushing one button. The GP Controller has both 2-cycle and 4-cycle operation. Two-cycle operation has the capabilities to control the length of a plain water flush and air evacuation. Four-cycle operation is selected when chlorine injection station is incorporated to sequence through 4 timed steps: chlorinated water initial flush, soak period, plain water second flush, and air evacuation.

2.2 OPERATING PARAMETERS

- A. Water Supply Pressure: 40-60 psi (276-414 kPa, 2.76-4.14 bar)
- B. Water Supply Flow: 1.5 gpm minimum (5.7 L/min)
- C. Compressed Air Pressure (regulated): 15 psi (103 kPa, 1.03 bar) minimum, 60 psi maximum (414 kPa, 4.14 bar)
- D. Compressed Air Flow: 4 cfm (cubic feet per minute) [113 L/min (liters per minute)]
- E. Electrical: 120VAC 50/60 HZ GFCI 120 watts (two connection points)

PART 3 - EXECUTION

3.1 PRODUCTS

- A. Panel
1. Size: Approximately 25 in. W x 25 in. H (635 mm W x 635 mm H)
 2. Material: Stainless steel, 300 series, 18 gauge

B. Wetted Components

1. Piping, Fittings, Valves, etc.

- a. Piping: .50 in. (12.70 mm) OD Tubing - 316L stainless steel
- b. Fittings: Thread/Compression Type - 316L stainless steel
- c. Valves: Solenoid operated - stainless steel, 115 VAC, 50/60 Hz, normally closed - pilot operated type
- d. Check Valve: Stainless steel 3/8 in. FPT ports
- e. Quick Disconnects: Stainless steel, Universal Style, Ball Check Quick Disconnect plug
- f. Recoil Hose: Polyurethane Tubing - 95 Duro, FDA Grade, 10 ft. (3050 mm) Reach
- g. Air Inlet Connection: Flange with swivel nut for 1/2 in. MPT adaptor
- h. Water Inlet Connection: 1/2 in. (12.70 mm) OD stainless steel tubing for use with
- i. Clean Joint fitting
- j. Drain Connection: Clean Joint fitting with 15 ft. (4570 mm) of stainless steel drain piping
- k. Filter screen: 50 mesh stainless steel

2. Pressure Regulator - High Capacity, 316 stainless steel construction

- a. Materials: 316 stainless steel wetted parts
- b. Diaphragm: 6 in. diameter, high-grade silicone material
- c. Ports: 1/2 in. MPT inlet, 3/8 in. FPT outlet
- d. Pressure Capacity: 75 psi (517 kPa, 5.17 bar) inlet, 17 psi (117 kPa, 1.17 bar) outlet
- e. Flow: 12 gpm (45 Lpm) at 15 psi (103 kPa, 1.03 bar)

C. Control Panel

1. Regulatory Compliance:

- a. ETL listed, conforms to UL Std 508, certified to CAN/CSA Std C22.2 No. 14, CE

2. Enclosure: NEMA 12, Size: 10-1/2 in. H x 8-1/2 in. W x 5 in. D (267 mm H x 216 mm W x 127 mm D), 304 stainless steel

3. Electrical Requirements: 120 VAC, 50/60 Hz, Single Phase, 120 watts with ground fault interrupter (GFI Circuit) required (must be hard wired – 2 connection points)

4. GP Controller Features

- a. Start and reset buttons
- b. 32-character liquid crystal display (LCD)
- c. Power and alarm indicator lights
- d. Audible alarm with silence button
- e. Keypad with dome switches
- f. Selectable 2-cycle and 4-cycle flush modes
- g. Cycle Settings:

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- 1) Flush 1: Pre-set to 2 minutes, range 1-9 minutes
- 2) Soak (4-cycle only): Pre-set to 30 minutes, range 1-99 minutes
- 3) Flush 2: (4-cycle only): Pre-set to 2 minute, range 1-9 minutes
- 4) Air Evacuation (recoil hoses only): Pre-set to 30 seconds, range 1-99 seconds

D. Shipping

1. Boxed:

- a. Dimensions: 43 in. x 27 in. x 22 in. (1092 mm x 686 mm x 559 mm)
- b. Weight: ~70 lbs (31.75 kg)

2. Boxed on Pallet:

- a. Dimensions: 48 in. x 40 in. x 28 in. (1219 mm x 1016 mm x 711 mm)
- b. Weight: ~120 lbs (54.43 kg)

END OF SECTION

SECTION 115363 - CHLORINE INJECTOR STATION

PART 1 - GENERAL

1.1 GENERAL

- A. The Chlorine Injector Station (CIS) shall be a panel assembled self-contained unit designed for wall mounting. It will provide chlorinated water for the Edstrom Recoil Hose Flush Station Model 5480, Automated Dual-Purpose Flush Station Model 6400, and other applications where the water flow rate is constant.
- B. The unit shall include a metering pump, a 4-gallon (15 liter) tank, a flow switch, a mixing chamber, electrical controls and wall mounting hardware. All components shall be compatible with either tap water or purified water supply.
 - 1. Model 302: Chlorine Injection Station for use with Automated Dual Purpose Flush Station Model 6400 (7300-6400-301) with a GP Controller to provide control functions (P/N 7130-6574-304).
 - a. Regulatory compliance: ETL listed, conforms to UL Std 73, certified to CAN/CSA Std C22.2 No. 68
 - 2. Approximate overall dimensions: 38 in. H x 35 in. W x 10 in. D (965 mm H x 889 mm W x 254 mm D).
 - 3. Required Utilities by Others:
 - a. Water:
 - 1) Provide and make final connection to the appropriate facility water supply 40 psi (276 kPa, 2.76 bar) minimum, 60 psi (414 kPa, 4.14 bar) maximum, 4 gpm (15 L/min) minimum.
 - b. Electrical: (Model 301 only)
 - 1) Provide and make final connection to 120 VAC, 50/60 HZ, GFCI power (120 watts).
 - 4. Required Chemicals by Others:
 - a. Provide 1 gallon (4 liters) of bleach solution at station start-up 5.25% or 6.15% sodium hypochlorite.

1.2 OPERATION

- A. The Chlorine Injector Station (CIS) is designed to mix a sodium hypochlorite solution into the water flow. When water flow is detected by the flow switch, the metering pump will start injecting the chlorine solution. The pump will keep operating until water flow stops. This eliminates the danger of excessive chlorination.
- B. The stand alone CIS is controlled with a pump controller. A “plain water/chlorinated water” selector switch on the front of the pump controller lets you turn off the chlorine injection pump.
- C. The GP controlled CIS is controlled by an external GP Controller on a Recoil Hose Flush Station Model 5480 or Automated Dual-Purpose Flush Station Model 6400.
- D. The 5.25% or 6.15% sodium hypochlorite (Household Bleach) solution is stored in a 4 gallon (15 liter) polyethylene tank.

PART 2 - PRODUCTS

2.1 OPERATING PARAMETERS

- A. Water Supply Pressure:
 - 1. 60 psi (414 kPa, 4.14 bar) maximum
 - 2. Recoil Hose Flushing - 40-60 psi (276 kPa, 2.76 bar – 414 kPa, 4.14 bar)
- B. Water Supply Flow: 4.0 gpm (15 L/min) minimum
- C. Water Supply Temperature: 40-120°F (4-49°C)
- D. Chlorine Concentration: 0-20 ppm, adjustable ranges
- E. Treatment capacity per tank: Half full tank will treat approximately 1350 gallons (5110 liters) of water at 20 ppm.

PART 3 - EXECUTION

3.1 EQUIPMENT AND COMPONENTS

- A. Panel
 - 1. Size: Approximately 23.5 in. H x 35 in. W (597 mm H x 889 mm W)
 - 2. Material: 300 series 18 gauge stainless steel with pre-punched holes for mounting screws

B. Piping, Fittings, Valves, Etc.

1. Piping: 1/2 in. (12.70 mm) OD Tubing – 316 stainless steel
2. Fittings: Thread/Compression Type – 316 stainless steel
3. Ball Valve: 3/8 in. FPT – 316 stainless steel
4. Inlet Connection: Flange with swivel nut for 1/2 in. MPT adaptor
5. Outlet Connection: 1/2 in. (12.70 mm) OD compression fitting

C. Flow Switch

1. Activation Flow Rate: .25 gallons/minute (.95 liters/minute) minimum
2. Construction: PVC with hermetically sealed switch
3. Electrical Rating: 120 Volts AC, 50/60 Hz, (.5 amps maximum), normally closed

D. Mixing Chamber

1. Construction: Polypropylene with 3/8 in. NPT ports
2. Mixing Tube: PVC Pipe

E. Chlorine Injection Pump/Tank

1. Solution metering pump
 - a. Positive displacement, diaphragm type with stroke length and frequency
 - b. Construction: Glass fiber reinforced thermoplastic
 - c. Electrical Rating: 120 volts AC, 50/60 Hz, 1.0 Amp
2. Solution Tank
 - a. Capacity 4 gallon (15 liter)
 - b. Size 12 in. H x 6 in. W x 12 in. D (305 mm H x 152 mm W x 305 mm D)
 - c. Material Polyethylene

F. Junction Box - For Model 302

1. Enclosure: Weatherproof 2-gang switch box. Aluminum
2. Electrical requirements: Must be powered from Edstrom GP Controller on Recoil Hose Flush Station Model 5480 or Automated Dual-Purpose Flush Station Model 6400
3. Controls: Must be controlled by Edstrom GP Controller on Recoil Hose Flush Station Model 5480 or Automated Dual-Purpose Flush Station Model 6400

G. Shipping

1. Boxed:
 - a. Dimensions: 43 in. x 27 in. x 22 in. (1092 mm x 686 mm x 559 mm)
 - b. Weight: ~70 lbs (31.75 kg)

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2. Boxed on Pallet:

- a. Dimensions: 48 in. x 40 in. x 28 in. (1219 mm x 1016 mm x 711 mm)
- b. Weight: ~120 lbs (54.43 kg)

END OF SECTION

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CHLORINE INJECTOR STATION

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SECTION 115364 - PRESSURE REDUCING STATION

PART 1 - GENERAL

1.1 GENERAL

- A. The Pressure Reducing Station (PRS) provides the regulation required for optimal drinking valve performance in an automated watering system for laboratory animals. It is designed to provide filtered, potable, chlorinated, acidified or purified water at the recommended operating pressure of 3-4 psi (21-28 kPa, 0.21-0.28 bar). The PRS panel assembly contains high and low stainless steel pressure regulators and can switch from low to high pressure for flushing. Flushing is performed automatically to enhance the water quality by bringing fresh water into the piping. In addition, the pressure station monitors pressure and flow in the watering system.

PART 2 - PRODUCTS

2.1 OPERATION

- A. The PRS is a compact assembly with a stainless steel cabinet and sub-assembly. The PRS shall be 8550 Series PRS flush mounted by Edstrom. On the front of the PRS are two doors with spring-loaded latches, to provide easy access during installation or servicing.
- B. Prior to water entering the room distribution system (RDS) piping in the animal rooms, it travels through the PRS, which contains two stainless steel pressure regulators. The water is first regulated down from house pressure to 15 psi (103 kPa, 1.03 bar) as it goes through the high pressure regulator. Water then passes through the low pressure regulator, with a resulting water pressure of 3-4 psi (21-28 kPa, 0.21-0.28 bar).
- C. When it is time to flush the RDS piping, the PRS will switch from low to high pressure. The high pressure regulator is used for this purpose and is set at 12-15 psi (83-103 kPa, .83-1.03 bar). Solenoids are activated in sequence to perform the flushing.
- D. A control module with digital display is mounted on the cabinet door for easy visibility. The display shows the current pressure reading as well as additional information about the PRS. The PRS includes a flow switch to monitor the flow of water and a pressure transducer to monitor water pressure. The pressure transducer senses the animal watering system pressure for high pressure condition above 7.5 PSI (52 kPa, .52 bar) or low pressure condition below 1.5 PSI (10 kPa, .10 bar). The flow rate actuation for the flow switch is 80+/-20 mL/minute. When the flow or system pressure are outside of their specific range for a period of time longer than the setting of the alarm delay, the system will alarm to notify personnel of an irregular flow or high/low pressure condition within the watering system.

- E. The PRS works in conjunction with the automated watering system controller to automate flushing of the RDS piping and rack manifolds and provide monitoring of the watering system with alarming capabilities.

PART 3 - EXECUTION

3.1 PRODUCTS

A. Enclosure/Panel

All parts shall be constructed of 18 gauge 300 series stainless steel, except back panel of 16 gauge, with commercial satin finish on all exposed surfaces. The two gasketed doors shall have stainless hinges at each side to swing open and provide full access to all components

1. Recessed Back Box: 16 in. H x 25 in. W x 6.5 in. D (406 mm H x 635 mm W x 165 mm D)
2. Recessed Door Frame: 17.5 in. H x 26.5 in. W (445 mm H x 673 mm W)

B. Display/Interface Module

Door mounted with digital readout of system pressure and LED indicators for function status

1. Enclosure- ABS plastic, water resistant
2. 3-Character Display with pressure reading in psi, kPa/bar
3. Signal outputs for digital or network system connections
4. Output: 24 vdc to solenoid valve
5. Inputs: Pressure transducer, flow switch
6. LED Indicators: High and low pressure, flow, solenoid power and service
7. Plug-in cable connectors

C. Wetted Components

1. Piping, Fittings, Valves, etc.
 - a. Piping: 1/2 in. (12.70 mm) O.D. Tubing- 316L stainless steel
 - b. Fittings: Thread/Clean Joint Compression- 316L stainless steel
 - c. Shut-off Valve: Ball Valve- 316 stainless steel
 - d. Flexible Hose: Teflon hose with stainless steel braid cover
 - e. Inlet Connection: Clean Joint Fitting - 1/2 in. (12.70 mm) Tube x 1/2 in. MPT
 - f. Outlet Connection: Flexible Hose with Clean Joint Fitting for 1/2 in. (12.70 mm) Tube
2. Water Filter- 5 in. Housing standard (other options available)
 - a. Screen: 50 mesh stainless steel (unfiltered models only)

3. Pressure Regulator- High flow design
 - a. Materials- wetted parts
 - 1) 316 stainless steel
 - 2) Diaphragm: Silicone, 6 in. (152 mm) diameter
 - 3) Seat: Silicone
 - b. Ports: 1/2 in. MPT inlet, 3/4 in. MPT outlet
 - c. Pressure capacity: 75 psi (517 kPa, 5.17 bar) maximum inlet
 - d. Low Pressure Unit:
 - 1) Range: 2-8 psi (14-55 kPa, 0.14-0.55 bar) adjustable outlet
 - 2) Standard setting: 3 psi (21 kPa, .21 bar)
 - 3) Flow rate: 10 gpm @ 3 psi (38 Lpm @ 21 kPa, 0.21 bar) setting
 - e. High Pressure Unit
 - 1) Range: 4-17 psi (28-117 kPa, .28-1.17 bar) adjustable outlet
 - 2) Standard setting: 15 psi (103 kPa, 1.03 bar)
 - 3) Flow rate: 14 gpm @ 10 psi (53 Lpm @ 69 kPa, 0.69 bar) setting
4. Pressure Transducer (CE Approved)
 - a. Range: 0-25 psi (0-172 kPa, 0-1.72 bar) .25 psi (1.72 kPa, .02 bar) accuracy
 - b. 316 stainless steel wetted parts
5. Flow Switch - Non-Adjustable (UL Recognized)
 - a. Wetted materials: Ryton-R4 and 316 stainless steel
 - b. Flow rate actuation of switch: 80 +/- 20mL/min.
 - c. Switch Function: N.O. (normally open with no flow)
 - d. Switch Rating: SPST 0.17 amp at 120 Volts AC
6. Solenoid Valve - Normally closed (UL Listed)
 - a. Body Material: Electro-polished 316L grade stainless steel
 - b. Input power: 24 VDC, 0.5 amp
 - c. Watertight junction box connection with screw connectors
 - d. Coil: Epoxy encapsulated one piece
 - e. Ports: 3/8 in. FPT
 - f. Diaphragm: Teflon

END OF SECTION

SECTION 115365 - CENTRAL MANAGEMENT SYSTEM

PART 1 - GENERAL

1.1 GENERAL

- A. The Central Management System (CMS) shall be a computer-based data management; monitoring and control system specifically designed for research laboratory facilities and critical environments. The basis of design shall be the Pulse Central Management System by Edstrom.
- B. The system provides secure, real-time, data collection along with centralized alarm notification.
- C. The modular System design allows for addition of features, devices, and sensors to meet the changing needs of the facility. Scalable functionality includes: control and monitoring of watering, and monitoring of temperature, humidity, airflow, and pressure differential.
- D. The Pulse System shall consist of: a user interface (UI) software application (Pulse Software) running on a computer workstation (PC – Pulse Computer), and the Pulse Central Controller (PCC(X)), which is connected to sensors and control devices.
- E. The PC receives a data package consisting of system configuration, firmware pack and language pack(s) from an Edstrom Software application (PCM – Pulse Customer Manager) used internally by Edstrom Engineers to generate and manage customer specific configurations. The PC utilizes the System configuration package in the Pulse Software, and also sends the same out to the PCC(X) that will execute the functions of the system. The Pulse Web Application is designed to support multiple PCC(X)'s. One system (PC) can be hooked up to 20 PCC(X)'s.
- F. The PCC(X) is connected to sensors and control devices. Data outputs and inputs are processed in the PCC(X) that locally stores a limited history for the system. The PCC(X) transfers live data and historical data back to the PC. PCC(X) data storage locally is at least 7 days without transferring to the PC.
- G. The Pulse computer and all other networked devices must have dedicated IP Addressing to mitigate communication issues. It is preferable that all Edstrom network devices reside in the same address space and/or virtual LAN. Contact Edstrom Industries for other networking considerations.

1.2 Required Utilities provided by Others

- A. Computer Requirements for CMS provided by Spec. Section 23 09 05:
 - 1. 8GB RAM (memory)
 - 2. 120 GB hard drive space
 - 3. Microsoft Windows Win7 Pro/Enterprise/Ultimate SP3 [64-bit OS] or Windows Server 2008
 - 4. Adobe Reader

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5. Microsoft Office 2010 (if reports are needed in Excel format)
6. CPU: i7 processor (2.2 GHz, 6MB L3 Cache)
7. CD-RW drive (DVD-RW drive recommended)
8. Available USB 2.0 port
9. Network Adapters: Provide one 100Base-T (1000Base-T recommended) adapters
10. A TCP/IP connection to the PC, which includes specifying a static IP address, IP subnet mask (customer network), IP gateway address, and DNS (domain name server)
 - a. Note: A second TCP/IP connection to the PC including network adapter is required if the PCC(X) is on a private network and not on the customer's network. In addition, to receive Email notifications, SMTP traffic must be routed from the private network to a SMTP server.
11. Remote access software (customer provided) to allow service of System by Edstrom authorized personnel via VPN (Ethernet). If this is unavailable, a second dedicated analog telephone line for the PCC(X) will be provided which must conform to specifications outlined in: Bellcore TR-NPL-000275: Notes on the BOC Intra-LATA Networks, 1986.
12. The following TCP ports are utilized by the System to allow use of the web-based interface by end-users, and for PCC(X) communication to the PC:
 - a. Default: HTTP (8080)
13. The following programs will be included with the Pulse installation:
 - a. JAVA Runtime Engine (JRE)
 - b. Glassfish (JAVA application server)
 - c. PostgreSQL (database application)
 - d. Pulse
 - e. Note: Use of software versions other than listed may cause conflicts on the PC
14. The system will support the following Internet browser application:
 - a. Microsoft Internet Explorer v9.x (Note: The system will also work with other browsers like Firefox 15.0 and Chrome 21, but our recommended and supported browser is IE 9).
15. The IP address and TCP port of a customer SMTP Server (required for Email options and Server notifications). Allow TCP Port 25 - outgoing for Email traffic from the Pulse Computer
16. Recommended - User should have a procedure to move backups out of the Pulse System and into a different storage media

B. Pulse Central Controller X (PCCX) Panel

1. Provide 100 - 240 VAC , 50/60 Hz (130 Watts) and make final connection to optional Uninterruptible Power Supply (UPS), or provide dedicated emergency power circuit
2. Provide wire and make connection between UPS and controller (if applicable)
3. Provide one dedicated analog telephone line which must conform to specifications outlined in: Bellcore TR-NPL-000275: Notes on the BOC Intra-LATA Networks, 1986. If remote (VPN)

access to the Pulse System is not available, a second dedicated analog telephone line for the PCCX must be provided

4. A TCP/IP connection to the PCCX Panel which includes specifying a static IP address

C. Pulse Network Sensor Devices

1. Provide 100 - 240 VAC 50/60 Hz (300 Watts) and make final connection to Edstrom-supplied power supply unit as required.

D. Pulse Remote Alarm Indicator (RAI-604)

1. Provide 100 - 240 VAC 50/60 Hz (20 Watts) single phase outlet

PART 2 - PRODUCTS

2.1 OPERATION

- A. Pulse is specifically designed to aid in the data management and monitoring of facilities and laboratories. Pulse is unique in its ability to provide several facility management tools in one easy-to-use integrated system.
- B. Point-Based Configuration – In a point-based configuration, sensors connect to a Pulse Central Controller and its attached Pulse I/O Panel. The Pulse Central Controller is then connected to the Pulse computer. The point-based configuration adapts to any monitoring situation but is especially well suited to monitoring rooms/cubicles, refrigerators, and freezers.
- C. Pulse keeps accurate records of the many data parameters, including analog parameters (like temperature and humidity) and digital parameters (like solenoids). Data readings are taken at user-defined intervals and stored in the System. This data can be later used in reports for verification of environmental conditions. If a parameter is critical, Pulse can notify staff various ways via email, phone notification, or pager. For light monitoring; alarming and notification are enabled at this time. Light Control is not part of this release.

PART 3 - EXECUTION

3.1 SYSTEM COMPONENTS

- A. Provide Uninterruptible Power Supply (UPS) For Central Controller Panel

1. Enclosure – surface mounted in accessible location
 - a. NEMA 4 painted or stainless steel 15 in. W x 15 in. H x 6 in. D (381 mm W x 381 mm H x 152 mm D)

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2. Power input and output
 - a. Input power: 120 VAC 60 Hz (North America) 230 VAC 50 Hz 800 VA (Europe)
 - b. Output power: 120 VAC 60 Hz (North America) 230 VAC 50 Hz (Europe) 510 Watt
 - c. Screw terminal connectors
3. Capacity
 - a. Supports one (1) Pulse Central Controller Panel
4. Environmental parameters:
 - a. Temperature: 32-110° F (0-43° C)
 - b. Relative humidity: 20-90% RH, non-condensing
5. Regulatory Compliance:
 - a. 120 VAC 60 Hz (North America) ETL Listed, Conforms to UL 61010-1, FCC47 CFR PT 15-B, Certified to CAN/CSA STD C22.2 NO.61010-1, CE
 - b. 230 VAC 50 Hz (Europe) CE

B. Power Supply for Pulse Network Monitoring Devices

1. Enclosure – surface mounted in accessible location
 - a. NEMA 4 painted steel or stainless steel 10 in. W x 12 in. H x 6 in. D (254 mm W x 305 mm H x 152 mm D)
2. Power input and output
 - a. Input power: 100 - 240 VAC, 50/60 Hz, 300 Watts
 - b. Output power: 24 VDC, 240 Watts, (2 - 5 Amp circuits)
 - c. Screw terminal connectors
3. Capacity
 - a. The number of Mod bus Panels and Lon Network Modules supported by a single Power Supply is a function of the type of Panels, type of Modules, and the distance these loads are from the Power Supply.
 - b. For a typical installation that includes AW - Automated Watering and EM - Environmental Monitoring, one Power Supply will support six rooms
4. Environmental parameters:
 - a. Temperature: 32-110° F (0-43° C)
 - b. Relative humidity: 20-90% RH, non-condensing

5. Regulatory Compliance: ETL Listed, Conforms to UL 61010-1, FCC47 CFR PT 15-B, Certified to CAN/CSA STD C22.2 NO.61010-1, CE

C. Power Supply for User Interface Touchscreen

1. Enclosure - surface mounted in accessible location
 - a. NEMA 12 painted steel 10 in. W x 12 in. H x 6 in. D (254 mm W x 305 mm H x 152 mm D)
2. Power input and output
 - a. Input power: 100-240 VAC, 50/60 Hz, 120 Watts
 - b. Output power: 12 VDC, 100 Watts, Class 2 Energy limited
 - c. Terminal block screw connectors
3. Capacity
 - a. One Power Supply per Touchscreen
4. Environmental parameters:
 - a. Temperature: 32-110° F (0-43° C)
 - b. Relative humidity: 20-90% RH, non-condensing
5. Regulatory Compliance
 - a. ETL Listed, Conforms to UL 61010-1, FCC47 CFR PT 15-B, Certified to CAN/CSA STD C22.2 NO.61010-1, CE

D. Pulse Central Controller X (PCCX - With I/O, Power Supply, And 5-Port Ethernet Switch)

1. Enclosure
 - a. Surface mount painted steel or stainless steel enclosure 20 in. W x 20 in. H x 6 in. D (508 mm W x 508 mm H x 152 mm D)
 - b. Mount in accessible location
2. Input power: 100 – 240VAC, 50/60 Hz, 130 Watts to optional Uninterruptible Power Supply (UPS), or provide emergency power circuit
3. Input/Outputs
 - a. 1 network interface to monitor up to 62 Lon network sensors
 - b. 1 RS485 interface input for up to 50 wireless sensors
 - c. Analog inputs 4-20ma, 0-20ma - maximum 64 inputs
 - d. RTD temperature inputs (-250 to 850°C range) - maximum 32 inputs
 - e. Digital inputs to monitor dry contact switches – maximum 64 inputs

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- f. Digital outputs to control 24VDC solenoid valves for Room and Rack flushing – maximum 64 digital outputs
 - g. Remote alarm contact to alert building automation system or any remote device when Pulse Central Controller detects any alarm condition
 - 1) 24VDC @ 10 Amps
 - h. 5-port Ethernet switch
 - 1) DIN rail mount TS 35
 - 2) 5 - RJ45 ports
 - 3) Data rate – 10BASE-T or 100BASE-TX
 - 4) TCP/IP connection to PCC or I/O panel which includes specifying a static IP address
4. Communications
- a. 10/100BaseT Ethernet Web User Interface
 - 1) 5 port internal Ethernet switch
 - b. 56K V.90 modem Web User Interface
 - c. Speech notification modem to call out when alarms occur
 - d. Mod bus to communicate with I/O Panels
 - e. Lonworks to communicate with Lon Network Devices
5. Environmental parameters:
- a. Temperature: 32-110° F (0-43° C)
 - b. Relative humidity: 10-90% RH, non-condensing
6. Regulatory Compliance: ETL Listed, Conforms to UL 61010-1, FCC47 CFR PT 15-B, Certified to CAN/CSA STD C22.2 NO.61010-1, CE
- E. Pulse Remote Alarm Indicator (RAI-604)
It provides alarm signals, both audible and visual, and transmit signal to Building Automation System or any remote device when Pulse Central Controller detects any alarm condition.
- 1. Inputs
 - a. N.C. Relay Signal (Dry Contact)
 - b. Quantity: 4 maximum
 - 2. Output: N.C. / N.O. relay, rated 1 amp @30VDC
 - 3. Audible Signal: Buzzer
 - 4. Visual Signal: Red Indicator
 - 5. Switches:

- a. Acknowledge – Push Button
- b. Reset – Rocker Type
- 6. Power Input: 100-240VAC 50/60 Hz, 20 Watts
- 7. Power Output: 9-12 VDC, 6 Watts
- 8. Enclosure: 2-gang junction box; 2 in. (51 mm) deep
- 9. Environmental parameters:
 - a. Temperature: 32-110° F (0-43° C)
 - b. Relative humidity: 10-90% RH, non-condensing
- 10. Regulatory Compliance: ETL Listed, Conforms to UL 61010-1, FCC47 CFR PT 15-B, Certified to CAN/CSA STD C22.2 NO.61010-1, CE

3.2 SYSTEM COMMUNICATIONS AND CABLING

Applicable cabling required for specified communications to interconnect components of modular design system.

A. Communication Types

- 1. Mod bus – Pulse Central Controller (PCC) Panel to I/O panels.
- 2. Lonworks – Pulse Central Controller (PCC) Panel to Lon network devices
- 3. Digital – I/O terminal block to devices
- 4. Analog – I/O terminal block to devices
- 5. 0-20 mA or 4-20 mA – Pulse Input terminal to devices
- 6. AC or DC Voltage – Power supply to Pulse I/O box and network devices
- 7. Ethernet – Pulse Computer (PC) to facility network and Pulse Central Controller (PCC) panel.
Pulse Central Controller (PCC) panel to Touchscreen
- 8. Wireless – I/O terminal block to wireless devices

B. Cabling

- 1. Refer to system layout drawings for types and routings
- 2. General Specifications
 - a. PVC jacketed standard (plenum rated optional)
 - b. Stranded copper conductors
 - c. Shielded (when applicable)
- 3. Cable types – conductor quantity and sizes (use as applicable)
 - a. Control - 2 conductor, 18 AWG
 - b. 4 to 20mA – 2 conductor, 22 AWG, shielded with ground wire
 - c. RTD – 3 conductor with shield, 22 AWG
 - d. Mod bus – Twisted pair- 1 pair, 22 AWG, shielded with ground wire, 150 OHM \pm 15 %, Operating capacitance < 30 pF/m

- e. Lonworks - Twisted pair- 1 pair, Level IV 22 AWG
- f. Ethernet - Cat5e

3.3 DIRECT CONNECT CONTROL DEVICES

Direct connect control devices are used with the Pulse I/O panels. A direct connect control device requires dedicated wiring from the device to the Pulse I/O input and output terminals. Pulse can operate devices individually or all at the same time dependent on application requirement. Power consumption of connected devices cannot exceed 0.5 Amp at a time. Outputs need to be staggered utilizing the settings page in the Pulse System

A. Solenoid Valve

Open to flush watering distribution system supply, systems

1. Watering distribution system supply flush valves
 - a. Body material: 316 stainless steel
 - b. Input power: 24 VDC 0.5 amp
 - c. Watertight junction box connector with spade or screw connectors
 - d. Coil: epoxy encapsulated one piece
 - e. Ports: 3/8 in. FPT
 - f. Diaphragm: Buna - N

3.4 NETWORK CONTROL DEVICES

A. Pressure Reducing Station Module (PRS)

1. Provides interface between Pulse Central Controller and Pressure Reducing Station monitoring sensors and for control power to solenoid valve in the station.
2. Enclosure-ABS plastic water resistant
3. Processor and Communications
 - a. 8 bit microprocessor
 - b. 1 output: 24VDC to solenoid valve
 - c. Inputs: pressure transducer, flow switch
 - d. LED indicator lights: high and low pressure, flow, power and service
 - e. LED display indicates actual water pressure reading
 - f. Plug in screw connectors requiring no tools for disassembly
4. Environmental parameters:
 - a. Temperature: 32-110° F (0-43° C)
 - b. Relative humidity: 10-90% RH, non-condensing
5. Regulatory Compliance: ETL Listed, Conforms to UL 61010-1, FCC47 CFR PT 15-B, Certified to CAN/CSA STD C22.2 NO.61010-1, CE

3.5 CAPABILITIES AND FEATURES

Overall system operations offer the following capabilities based on hardware selected.

A. User Interface

Pulse system incorporates standard user interface options available both at the Pulse Central Controller and remotely via web. User interface facilitates daily interaction operations and reporting functions. These operations available to the user vary based on the interface selected and are summarized below:

1. Web interface

- a. Ability to traverse through defined locations.
- b. View live data values with applicable units for each location.
- c. Graph representation of point activity along with defined thresholds.
- d. Alarm counter indicator displays number of current alarms on Pulse.
- e. View current alarms and alerts.
- f. Acknowledge alarms.
- g. View alarm and alert point information.
- h. Ability to schedule and email reports [Alarm, Audit, Trend, Event, User, Settings and Configuration] with the ability to schedule reports.
- i. User settings allow for alarm templates for alarm type with a maximum of ten per type.
- j. AW flushing per zone with a maximum of 8 zones.
- k. Event notification templates with a maximum of 10 per point type.
- l. Set trend rates for each collection point.
- m. Set units for monitoring points in the system.
- n. A maximum of 20 controllers can be added per Pulse System.
- o. Pulse uses English as the default language. Currently we have language support for Japanese, German and French.
- p. Define and view graphical representation of a facility along with point and information (Navigator).
- q. User defined passwords

2. Pulse Central Controller interface

- a. Ability to traverse through defined locations.
- b. View live data values with applicable units for each location.
- c. Graph representation of point activity along with defined thresholds.
- d. Alarm counter indicator displays number of current alarms on Pulse.
- e. View current alarms and alerts.
- f. Acknowledge alarms.
- g. View alarm and alert point information.
- h. Local control of devices

B. Data Collection

1. Display data from connected hardware including panels and sensors at least four (4) times per minute

2. Monitor communication between hardware and Pulse Central Controller as an alert condition. Utilize user defined alert notification method to control system response to communication losses

C. Automated Watering – Automated Monitoring and Flush Control

1. Allow user programmable room flush length ranging from 1 minute to 4 minutes
2. Allow user programmable rack flush length ranging from 15 seconds to 4 minutes
3. Allow user programmable rack fill length from 1 to 15 minutes
4. Control system flushing with user defined start times of 1 minimum in 72 hours
5. Allow establishment of up to 8 flush zones
6. Control flush sequences so no more than one point is flushing in each zone simultaneously
7. Allow control of individual room/rack solenoids locally or from web user interface
8. Store flush events indicating flush success or failure of all flush operations at Pulse Central Controller and web user interface
9. Begin alarm notification process when pressure/flow sensors indicate flush sequence has failed or when a high or low pressure or flow condition is detected
 - a. Delay start of alarm notification on flow and pressure using alarm delays to accommodate normal animal drinking activity
 - b. Allow delayed alarm clearing on flow and pressure using clear delays
10. Allow programmable bleed time on a per Pressure Reducing Station basis

D. Alarm Detection and Notification

1. Handle all alarms generated by the system with a common alarm notification interface consisting of alarm notification methods.
2. Show current alert and alarm conditions in centralized alarms folder from which user can acknowledge alarms and view current conditions
3. Allow system response to alert and alarm conditions to be defined by alert and alarm notification methods and user set-ups
 - a. Allow user defined label to identify alarm method throughout system
 - b. Allow user to distinguish between alert and alarm conditions
 - c. Provide e-mail notification
 - 1) Send alert or alarm messages to designated e-mail address via SMTP
 - 2) A maximum of five (5) email addresses per notification template
 - 3) Construct list of users to notify via e-mail by direct entry of e-mail addresses
 - 4) Provide message format to include location date, time, and alarm condition
 - 5) E-mails are repeated at a user defined rate
 - 6) SSL/TLS enabled email servers are not supported
 - 7) Voice Notification
 - 8) Voice callout allows user to hear alarm message from the Pulse Central Controller
 - 9) Voice callout provides spoken information of alerts and alarm conditions via telephone

- 10) Voice callout allows user to acknowledge alarm condition with a valid PIN
- 11) Voice callout provides an ordered list of users to call for each alarm method
- d. Allow ten (10) alarm notification methods to be defined per point type
- e. Allow alarm notification methods to be assigned to more than one alarm condition for standardized response
- f. Allow changes in the settings of the alarm notification method to be propagated immediately to all affected parameters
- 4. Provide acknowledgment provisions of alarm conditions
 - a. Stop the alarm notification process and record name of user taking responsibility for the alarm, and date/time of acknowledgement at the Pulse Central Controller and web interface
- 5. Record and store information about alarm conditions as events including:
 - a. Alarm start
 - b. Alarm transition
 - c. Alarm clear
 - d. Alarm acknowledge, include name of the user acknowledging the alarm
 - e. Alarm for analog parameter to include the current reading associated with the alarm condition as part of the alarm event
- 6. System health notification – notification via email, system OK or alarm at up to three (3) user defined times.
- 7. User and Role Management: Pulse has the ability to add and manage Users. (Note: Customers have to work with Edstrom technicians to get this feature enabled)

E. Reporting

- 1. Standard Reports
 - a. Alarm Report
 - b. Audit Report
 - c. Trend Report
 - d. Event Report
 - e. Configuration Report
 - f. User Report
 - g. Settings Report
- 2. Date range customizable for each report with the exception of User Report and Configuration Report. They will always display the current status regardless of selection.
- 3. Time of day customizable - 24 or 12 hour format
- 4. Ability to generate Reports using specific parameters (ex: Locations, Point types, etc.)
- 5. Provides users the option to include Graphs within Reports (HLA and Trend).
- 6. Allow users to schedule Reports and email them.

WAYNE STATE UNIVERSITY PROJECT NO.: 2011-10087-000
 MULTIDISCIPLINARY BIOMEDICAL RESEARCH BUILDING WSU PROJECT NO.: 211-121168

CENTRAL MANAGEMENT SYSTEM
 115365 - 11

F. Pulse Diagnostic Tool

1. Allows Users to capture diagnostic logs for Pulse Server.
2. Allows user to capture diagnostic logs from the Pulse Central Controller(s).
3. Allows user to create a database backup to be sent for analysis.

G. Alarm Notes (not available for touchscreen users)

Alarm Notes is a purchasable feature that allows user to enter corrective action information (pre-defined or user entered text) to Alarms and Alerts.

1. Allows user to enable or disable Alarm Notes feature.
2. Allows the user to enter pre-defined notes to be appended to Alarms.
3. Provides the user the flexibility of choosing between Pre-defined Notes and User entered text.
4. Allows the user the ability to manage (force) users to enter Alarm Notes.

H. Users and Roles II (not available for Touchscreen users)

1. Users and Roles II is a purchasable feature that allows the user to create and manage Roles.
2. Allows the user to add users to Roles.
3. Allows the user to manage access to features (ex: Reports and Navigator), locations and points.

Note: Users and Roles II is an extension of the Users and Roles feature that is currently available.

END OF SECTION



HARLEY ELLIS DEVEREAUX

26913 Northwestern Highway Suite 200
Southfield, Michigan 48033-3476 | USA
tel 248.262.1500 | fax 248.262.1515
harleyellisdevereaux.com

Transmittal

Date: April 8, 2014
To: Dan Lyons
Barton Malow/Brinker
6160 Cass Avenue
Detroit, Michigan 48202
From: Shannon Shackelford
Project: Multi-Disciplinary Biomedical Research Building
Wayne State University
Detroit, Michigan
Project No: 2011-10087-000
Owner Project No:
Sent Via: Electronic – Via Prolog Converge
For your: Use/Records
Distribution:

Enclosed Please Find:

Quantity	Description
	<u>Product Data/Shop Drawings – APPROVED AS NOTED</u>
1	CWH-03 - Cage and Rack Washer

Message:

BM Submittal Package No. 416

Harley Ellis Devereaux Log No. 116130-1A

Received by: _____ **Date:** _____

☐ If checked, please return a signed copy to Harley Ellis Devereaux.

If enclosures are not as noted, please inform us immediately.

Transmittal.doc (Revised 01-08)

\\DET-HAR-FILE01\STUDIO PROJECTS\IS&T\WAYNE STATE UNIVERSITY\2011-10087-000 MBRB\CONST\SHOPDRAW\LABELS AND TRANS\TRANSMITTAL (2).DOC



HARLEY ELLIS DEVEREAUX

SUBMITTAL LABEL

26913 Northwestern Highway Suite 200
 Southfield, Michigan 48034-3476 | USA
 tel 248.262.1500 | fax 248.262.1515
 harleyellisdevereaux.com


PROJECT NO: 2011-10087-000

PROJECT	Multi-Disciplinary Biomedical Research Building Wayne State University Detroit, Michigan
DATE	March 25, 2014
CONTRACTOR/SUPPLIER	Barton Malow Company
DESCRIPTION	Product Data/Shop Drawings CWH-03 - Cage and Rack Washer BM Submittal Package No. 416
SPECIFICATION NO.	116130

COMMENTS

CM provide submittal to WSU to review accessories.

Provide dry contact for monitoring by BAS.
 Coordinate utility rough-in requirements with all trades.



Submittal

HARLEY ELLIS DEVEREAUX

Review of shop drawings, product data and / or samples is for conformance with the design concept and with the information given in the Contract Documents. This review does not relieve the Contractor of responsibility for any deviation from the Contract Documents. Refer to the Contract Documents relative to submittals for clarification of Contractor responsibility.

INTERNAL USE ONLY	Discipline	Reviewer	Date	Remarks
	Architectural / Design			
	Structural			
	Civil / Site			
	Mechanical	KGP	3 / 28 / 14	AAN
	Electrical	BEN	28 March, 2014	AAN
	Interiors			

SELECTION *

Final Action for Contractor:

By * **S. Rihacek** Date * **4/7/2014**

☐ **Approved (APP)**
 Work May Proceed

☒ **Approved as Noted (AAN)** * Proceed on Basis of Revised Information Noted

☐ **Submittal Not Requested (SNR)**

☐ **Not Approved (NA)***
 Work Shall Not Proceed Based on Information Submitted. Resubmit.

☐ **Provide as Specified (PAS)**
 Works Shall Not Proceed Based on Non-Specified Information Submitted. Resubmit.

2011-10087-000 Item No. * 116130-1A

THE FOLLOWING ITEMS REQUIRE FINAL COORDINATION W/ APPROPRIATE TRADE: THE DESIGN HW & CW IS 1 1/2". THIS MODEL ONLY REQUIRES 1" DIA. (25 GPM, 40 TO 60 PSI). THE DESIGN PROVIDES 1/2" @ 90 PSI CA. THIS MODEL REQUIRES ONLY 1/4" AT 40 TO 60 PSI. THIS MAY REQUIRE A REGULATOR. THE DESIGN PROVIDES 12" DIA. CONNECTION FOR EXHAUST. PROVIDE TRANSITION TO THIS UNITS SHAPE. PROVIDE CLARIFICATION FOR THE POWER OPERATED VENT. PROVIDE NECESSARY UNIONS, ARRESTORS AND VALVE PER MANUFACTURERS WRITTEN REQUIREMENTS. NOTE: THE ABOVE ITEMS ARE NOT TO BE CONSIDERED TO BE ALL-INCLUSIVE COORDINATION ITEMS; REFER WITHIN SUBMITTAL FOR ADDITIONAL COORDINATION ITEMS.

Submittal Packages

Detailed Package Tracking Log

Wayne State - MBRB

6160 Cass Ave.
Detroit, MI 48202

Project # 120494

Tel: Fax:

0416-116130-0	FEC-CWH-03 Submittal	Closed	No
---------------	----------------------	--------	----

Author Company	Contact	Author Package #	Trade	Importance
Farnell Equipment Company	Diane Hannah		Cage and Rack Washer	Normal

Items											
Number	Rev	Description	Resp Company	Due	Rec'd	+/-	Returned	Sch'd Del	Actual Del	Status	Closed
116130-001	0	Shop Drawings for Cage & Rack Washer	FAREQU		3/10/2014					Sent	No
116130-002	0	Product Information for Cage & Rack Washer	FAREQU		3/10/2014					Sent	No

Reviewers							
From Company	To Company	Sent Date	Due Date	Rec'd Date	+/-	Action	Sent For
Barton Malow/Brinker	Harley Ellis Devereaux	3/22/2014	4/5/2014		-14		Review

Package Notes:	Reviewer's General Comments:
----------------	------------------------------



Farnell Equipment Co.

BUILDING LABORATORIES. BUILDING THE FUTURE. SINCE 1937
LABORATORY FURNITURE • FUME HOODS • ENVIRONMENTAL ROOMS

2950 Todd Street, Troy, MI 48084
P.O. Box 1186, Troy, MI 48099


PH: 248-643-8890 FX: 248-643-9472
<http://www.farnell-equipment.com>

LETTER OF TRANSMITTAL

TO: Ms. Amanda Mulak
BARTON MALOW/BRINKER
6135 Woodward Avenue
Detroit, MI 48202

DATE: 3/10/2014 JOB NO. 214065W

REFERENCE:
116130-001, 002, 003

Barton Malow/Brinker WSU MBRB Project 6135 Woodward Ave. Detroit, MI 48202		 A Joint Venture
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
REVIEWED FOR SUBMISSION TO ARCHITECT		
BY	A. MULAK	DATE 3/22/2014
SUBMITTAL#	PKG #416	SPEC 116130

WE ARE SENDING YOU THE FOLLOWING VIA: UPS

1/set	CWH-03 Cage and Rack Washer drawings and product information
-------	--

<input checked="" type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>

FOR APPROVAL
FOR YOUR USE
AS REQUESTED
FOR REVIEW AND COMMENT
FOR BIDS DUE

<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>

APPROVED
APPROVED AS NOTED
RETURNED FOR CORRECTIONS
COLOR SELECTION
FIELD DIMENSIONS VERIFICATION

REMARKS

Please forward for approval.

cc.:

If attachments are not as shown above
please notify our offices.

Diane Hannah



March 7th, 2014

Diane Hannah

Farnell Equipment Company
2950 Todd
Troy, MI
48084

Attention: **Diane Hannah**
248-643-8890 x 117

Subject: Wayne State University
R630 Cage & Rack Washers

Reference: Purchase Order # 13299-B
BetterBuilt Project # N4503

Dear Diane,

We would like to thank you for the purchase order and the opportunity to provide our Equipment.

Enclosed are the following documents for your review and approval.

- Submittal Letter.
- Copy of Order Acknowledgement.
- Project specific data specifications sheet.
 - Highlighted items denote included optional features for this project
- Submittal Drawing.
- Technical Notes on the following items:
 - [BBTS-FECD-1209_PLCFactory Ethernet Connection.pdf for facility IT department reference]
 - [BBTS-RWEC-0314_WasherExhaustConnectivity.pdf for general contractor reference]
 - [BBTS-RCPS-0110_ChemicalProcessSignal.pdf for chemical supplier reference]
 - [BBTS-PGCI-0112_How to Program Chemical Injection Time.pdf for chemical supplier reference]

Please review and return one signed electronic copy to us with any comments your may have by March 25th, 2014. The equipment is estimated to ship from our factory during the month of July 2014. Failure to return a signed copy of these submittals by the above date will affect schedule and the delivery date of the equipment.

Approval Drawing Notes:

All the information required to install and final connect the equipment is provided in the approval drawings. Some of the key information include:



- Service utility requirements as listed from Items 1 to Items 7 are provided at the bottom center of the drawing. These utilities requirements must be strictly adhere to for proper operation of the equipment. The service ranges are specific to dynamic requirements.
- Electrical voltage needs to be selected and provided with the approval drawing sent back to the factory.
- Please confirm pit dimensions and grout pads requirements. Refer to the drawing for the exact locations of the grout pads. Grout pads to support the washer are by others and must be provided prior to equipment installation.
- Please reference and review the General Notes information in the drawing.
- Please reference and review the various options included with this project.

PLEASE CONFIRM THE FOLLOWING:

1. That R630 Washer 1A is confirmed to be a Right Hand Service washer (service side and soiled side controls located on the right hand side when facing the washer's soiled side)
Yes, Northern unit.
2. That R630 Washer 1B is confirmed to be a Left Hand Service washer (service side and soiled side controls located on the left hand side when facing the washer's soiled side)
Yes, Southern unit.
3. The required voltage for both R630 Washers 1A and 1B **Design for 480 V, 3 phase operation.**
4. The washer has an Ethernet Connectivity option which allows authorized computer(s) to access the washer for data collection and troubleshooting. Please see the attached tech sheet "BBTS-FECD-1209_PLCFactory Ethernet Connection.pdf". Please confirm the IP address and subnet mask before shipment. Please note If this information is not provided prior to shipment, additional cost will be incurred against the project for a factory technician to travel to site to program the washer's PLC (requiring a change order for all travel expenses). Please refer to the attached tech sheet "BBTS-FECD-1209_PLCFactoryEthernetConnection" and select the facilities preferred Ethernet option, either Option 1, 2 or 3.
5. Please ensure that the floor sink & drain are provided within the Pit as per the requirements on the submittal drawings "R630-0314-N4503-1A" & "R630-0314-N4503-1B". Please note that the overall interior dimensions of the floor sink are 12"L x 12"W x 6" Deep and is to include a 6" dia drain hole. All final drain connections are by others. Please confirm acknowledgment.
6. Please ensure all Pit grout pads are provided completely flat and level. Please confirm acknowledgment.

WSU please provide IP address.

The design provided a 16" x 16" x 12" deep w/ 4" outlet. CM confirm what was provide in field and location.

CM coordinate and acknowledge.



CUSTOMER RESPONSIBILITIES:

The following items are the responsibility of Farnell Equipment Company as per the terms and conditions listed in the order acknowledgement P3926, and your acceptance through your purchase order no. 13299-B. Should you have any questions or comments regarding these items please contact me as soon as possible so that we may resolve any issues.

- ☒ **Existing Unit:** Removal and disposal of the existing unit in the facility will be the responsibility of others than NSC- BetterBuilt.
- ☒ **Connections:** All final connections of the unit to the facility utilities shall be performed by others than NSC-BetterBuilt. Utilities are to be supplied with manual shut off valves, electrical services provided with fused disconnect switches and all exhaust vents supplied with manual dampers.

NSC-BetterBuilt RESPONSIBILITIES:

- ☒ **Existing Unit:** Removal and disposal of the existing unit in the facility will be the responsibility of NSC - BetterBuilt.
- ☒ **Unit Construction:** The equipment will be fully tested, disassembled at the factory, and reassembled on site by NSC-BetterBuilt authorized Technicians. If the use of Skilled Union Tradesmen is required, NSC-BetterBuilt shall provide supervision only and shall not be responsible for the additional cost of Union Personnel.
- ☒ **Freight:** Freight is FOB Job Site.
- ☒ **Unloading of the Delivery Truck:** NSC-BetterBuilt personnel will meet the delivery truck upon arrival at the facility, unload the delivery truck, and set the unit in its designated place for installation preparation.
- ☒ **Demonstration:** NSC-BetterBuilt Service Personnel will provide system checkout and demonstration of the equipment to the Purchaser's Personnel.
- ☒ **Warranty:** The equipment is warranted against defective material and workmanship for 5 years from installation but not to exceed eighteen months from the date of shipment. The facility must ensure that a PM contract is in place for the equipment with a local BetterBuilt authorized service company to ensure that the warranty remains valid.



We appreciate the opportunity to provide BetterBuilt Equipment. If you have any questions, or if we can be of further service in any way, please feel free to contact us accordingly.

Regards,

Alex Middleton, DiplT
Project Coordinator
BetterBuilt - Division of Northwestern Systems Corp
1388 Derwent Way
Delta B.C.
V3M 6C4
PH: 1-888-553-0855 Ext. 264 or (604) 777-9988 Ext. 264
FAX: (604) 777-9910
Email: amiddleton@nsc-betterbuilt.com



R600 SERIES CAGE & RACK WASHERS

PRODUCT DESCRIPTION

The BetterBuilt R600 Series cage and rack washer is the result of modern technology combined with a proven spray design. The R600 Series washers are automatic, heavy duty, single chamber, floor loading, hydro-spray washers. Both single and double door pass through units are available. Units may be floor or pit mounted through one or two walls or installed free standing.

APPLICATION

To clean and sanitize cages, utensils, racks, and bottles used in the care and housing of research animals.

STANDARDS¹

- Certified to UL 61010-1 Ed:2 UL Standard for Safety Electrical Equipment For Measurement, Control, and Laboratory Use by a third party inspection agency - ETL.
- Certified to CSA C22.2 No. 61010-1 Ed:2 Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use by a third party inspection agency - ETL.
- Evaluated and conforms to IEC 61010-1 Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use by a third party inspection agency - ETL.
- Evaluated and conforms to CENELEC EN 61000-6-4 Electromagnetic Compatibility (EMC) – Part 6-4 Generic Standards – by a third party inspection agency - ETL.
- Evaluated and conforms to CENELEC EN 61000-6-2 Electromagnetic Compatibility (EMC) – Part 6-2 Generic Standards – by a third party inspection agency - ETL.
- Evaluated and conforms to IC ICES-003 & FCC CFR47 Part 15/B Report Measurements by a third party inspection agency - ETL.

¹ Steam units only



CHOICE OF MODELS

Model	Chamber W x H x L	Overall W x H x L	Pit W x L x D
R620	42 x 84 x 80" 1067x2134x2032 mm	80.5 x 103 x 84" 2045x2616x2134 mm	87 x 84 x 14.5" 2209x2133x368 mm
R630	48 x 88 x 90" 1219x2235x2286 mm	86 x 114 x 94" 2184x2896x2388 mm	93 x 94 x 14.5" 2362x2387x368 mm
R670	48 x 88 x 130" 1219x2235x3302 mm	89 x 119 x 134" 2261x3023x3404 mm	106 x 134 x 19" 2692x3403x483 mm
R690	48 x 88 x 180" 1219x2235x4572 mm	89 x 119 x 184" 2261x3023x4674 mm	106 x 184 x 19" 2692x4673x483 mm

1.0 STANDARD FEATURES

1.1 Pit Mounted

The standard unit configuration is to be pit mounted flush to the facility's floor.

1.2 Construction - Cabinet

The wash chamber and sump pan including all wetted surfaces are of type 304 stainless steel.

Exterior chamber shall be of double wall construction, insulated with non-hygroscopic rigid insulation, minimum of 1-1/2 inch thick. Panel sections are bolted together along the exterior using type 304 stainless steel fasteners.



R600 SERIES CAGE & RACK WASHERS

1.3 Smooth Sided Chamber Interior

The wash chamber is designed with smooth side wall construction to reduce ledges or corners where gross debris may accumulate. All interior and exterior joints are sealed to prevent leakage from the chamber.

1.4 Manual Swing-out, Hinged Doors

The unit is provided with manually operated, swing out, side hinged, cabinet type door(s) having pressure relief safety latches. A stainless steel threshold plate is provided at each door.

1.5 Construction - Doors

The chamber door(s) shall be of 16 gauge, type 304, #4 finish stainless steel double wall reinforced construction. Each door is provided with one tempered glass window. All doors are insulated with non-hygroscopic rigid insulation, minimum of 1-1/2" inch thick.

1.6 Stainless Steel Chamber Floor Grating

The wash chamber floor is provided with reinforced stainless steel grating to support loaded carts and racks.

1.7 Stainless Steel Pump and Circulatory Piping

The treatment solutions are re-circulated under pressure from a minimum 10 HP (7.5HP on R620 and 20HP for R670/R690) pump with mechanical seal. All wetted surfaces of the pump shall be Type 316L stainless steel and all piping shall be Type 304 stainless steel. The pump motor is totally closed, fan cooled (TEFC) with starter, overload protection, and sealed bearings requiring no lubrication.

1.8 Overlapping Rotary Spray System

The wash/rinse chamber is provided with a stainless steel rotary spinner spray/arm system. Spraying arms are designed and located to maximize spray coverage with an overlapping pattern of wares and spray down of the cabinet interior and to wash the underside of racks.

The spray system includes four (4) rotating and overlapping arms per side, two (2) rotating arms

on the ceiling, and one (1) rotating arm below the floor grating (excluded on the low profile models). A total of eleven (11) rotating spray arms are provided for the standard R620/R630 models. Up to a total of twenty-two (22) rotating spray arms are provided for the R670/R690 models.



Figure 1: Interior of R630

All piping, screens, and other components of the spray system are constructed of Type 304 stainless steel (except wear parts which shall be constructed of Delrin material).

A three piece Delrin/Teflon bushing assembly protects the spray arm hub and axle from wear.

Spray arms are removable for cleaning. Terminal ends of the spray arms have a removable Teflon cap for spray nozzle cleaning and maintenance.

1.9 Adjustable Spray Patterns

For facilities where soiled loads can be more heavily concentrated on one particular side of the load, each program can be customized to take advantage of the washer's capability for custom spraying patterns. Spray emphasis from either side of the wash chamber is adjustable



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for duration and modulation frequency from side to side.

1.10 Treatment Temperature Guarantee

The selected wash and/or rinse treatment periods will not begin timing until the re-circulated wash and/or rinse treatment solution temperature reaches the desired set point assuring a minimum temperature during the treatment period.

Each treatment period can be guaranteed for temperature and time with set points locked in by supervision to insure security.

1.11 Water Conservation System

The operator has the option to either save the final rinse water for the subsequent pre-wash phase of the following cycle or automatically discharge the solution to drain at the end of the cycle.

1.12 Drain Discharge Cool Down System

Cold water is automatically injected into the drain discharge to lower the discharge temperature to below 140°F while discharging to the building drain system.

1.13 Full Drained and Flushed Solution Sump

Following the completion of treatment phases the chamber sump is gravity drained or can be power drained based upon site conditions. The drain line is left open for approximately 3-8 seconds (programmable, factory set to 8 seconds) to allow for a sump flush to drain, eliminating debris and residue carryover.

1.14 Automatic Sump Level Control

The washer is provided with automatic level control for re-circulation sump to insure sump is filled to the proper level before the pump starts. Design prevents over-filling and is included with an overflow to the drain.

1.15 Stainless Steel Automatic Damper

The washer chamber is provided with a stainless steel exhaust vent damper with pneumatic actuator in the exhaust line. An electrical signal to the facility's HVAC system is provided.

1.16 Chemical Injection Ports, Contacts and Fittings

The chamber is provided with five (5) injection ports and electrical signals for optional or owner supplied detergent dispensing and chemical treatment pumps. All penetrations to the washer chamber or staging tanks for detergent, acids or neutralizers are constructed using a stainless steel spigot welded at an angle to the unit's chamber.



Figure 2: Chemical Injection Ports

1.17 Interior Bumper Rails

The washer chamber is provided with internal rub bars/guards to protect the rotary spray arms from damage when the washer is loaded and unloaded.

1.18 Interior Emergency Stop Cable

For operator safety one emergency stop cable is mounted inside the washer and runs the length of the chamber.

1.19 Illuminated Chamber Interior

The interior of the chamber shall be illuminated by exterior mounted compact fluorescent light fixture. Illumination is through a sealed tempered glass window to the interior space.



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1.20 Emergency Stop Button

One emergency stop button is located at the control panel found next to each door.

1.21 Safety Features

Each machine is provided with the following safety features:

- Explosion relief door latches are provided for hinged doors so a person can easily egress from the chamber.
- In the event that either door is opened during the cycle the unit will automatically shut down. The door must be closed before restart can be initiated.
- The chamber interior is provided with a pull cable system mounted along one side of the interior cabinet (optional both sides). The cable is a plastic coated stainless steel braided cable installed inside the full length of the chamber enabling the washer to be immediately stopped from the interior by pulling the cable mechanism. An audible alarm will annunciate upon activation of interior shut down system. The cable pull switch must be reset and cycle power to the washer before restarting.
- Cycle start commands cannot occur unless both doors are fully closed.
- Both load and unload ends of the machine have emergency stop buttons.

1.22 Automatic Multi-Phase Treatment Cycles

The standard treatment cycle consists of the following phases: Pre-Wash, up to 4 Wash phases, up to 3 Rinse phases, Final Rinse, and Exhaust/Dry. All cycle phases can be selected or de-selected with Supervisory access. All cycle phases are adjustable. The cycle once activated is completely automatic. A typical alkaline cycle is as follows:

- **Alkaline Wash**
Hot detergent solution, water retained from the final rinse or fresh domestic hot water controlled at 120° to 160°F, and the preset amount of liquid chemical detergent, the solution is re-circulated for a preset period (0000 to 9999 seconds) and then drained.

○ First Rinse

Fresh domestic hot water controlled at 120° to 190°F is sprayed over the load from the sump and re-circulated for an operator selected time period (0000 to 9999 seconds) and then drained. Once temperature of re-circulating water reaches selected temperature, the timer is engaged and rinse continues until the time expires.

○ Final Rinse

Fresh water is sprayed over the load and re-circulated for a pre-selected time period (0000 to 9999 seconds). Water temperature is adjustable from 60° to 190°F. Final rinse water can either be retained for pre-wash or pumped to drain.

○ Exhaust

Vapor exhaust phase removes hot humid air from the unit's chamber. Selectable time is between 0000 to 9999 seconds.

1.23 Multi-cycle Microprocessor Control System

A microcomputer with 5" touchscreen interface monitors and controls all aspects of the washer cycles and process operations. Standard eight (8) fully adjustable programmed cycles come with the unit. The PLC comes with battery backup of the microcomputer memory in the event of a power failure.



Figure 3: 5" Touch Screen Interface



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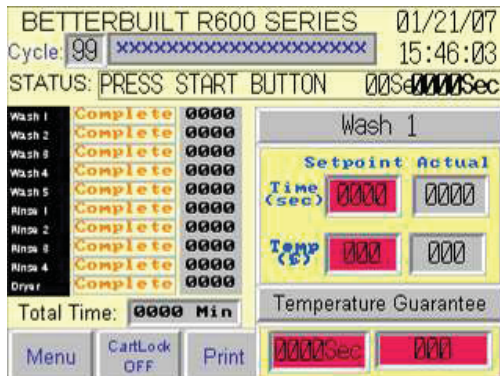


Figure 4: Cycle In-Process Screen

1.24 Multi-Language Support **NEW!**

The Touchscreen is able to display in multiple languages. The languages to be supported are English, French, Chinese, Korean, and Spanish. If there are other languages desired, please contact BetterBuilt Sales Department.

1.25 Program Security

The controls come standard with the “Advanced Adjustable Multi-Tiered Password Protection System”. Cycle programming is set by supervisory personnel to insure process and cycle security. Treatment times, temperature settings, and other key cycle parameters are programmable. A tiered password system is available for incremental access to the various program parameters. As the operator comfort and confidence level increases, supervisory personnel can grant increased security access to specific program parameters.

	Time/ Temp	Cycle Num	Cycle Desc	Adj/ C-1	No. ID	Pass	CYCLE DATA MOD
Password 1	NO	NO	NO	NO	NO	0000	
Password 2	NO	NO	NO	NO	NO	0000	
Password 3	NO	NO	NO	NO	NO	0000	
Password 4	NO	NO	NO	NO	NO	0000	
Password 5	NO	NO	NO	NO	NO	0000	
Password 6	NO	NO	NO	NO	NO	0000	
Password 7	NO	NO	NO	NO	NO	0000	
Password 8	NO	NO	NO	NO	NO	0000	
Password 9	NO	NO	NO	NO	NO	0000	
Password 1	NO	NO	NO	NO	NO	0000	
MASTER	NO	NO	NO	NO	NO	0000	PRINT SCREEN

Figure 5: PROGRAM SECURITY: Supervisor Tiered Password Screen

1.26 Built-in Advanced Diagnostics

The controls feature several advanced diagnostics features beyond competitive systems to include:

- Advanced Alarm and Data Logging
- Advanced Diagnostics
- Advanced Maintenance and Troubleshooting
- Parts List ID and Visual Reference
- Technician Mode Coordinated I/O Charts
- Chemical Pump Priming function

1.27 Advanced Alarm and Data Logging

This program feature provides user friendly alarm log, recovery, and checking screens. Additionally, an alarm popup box with description and possible causes for the fault are integrated into the touchscreens.

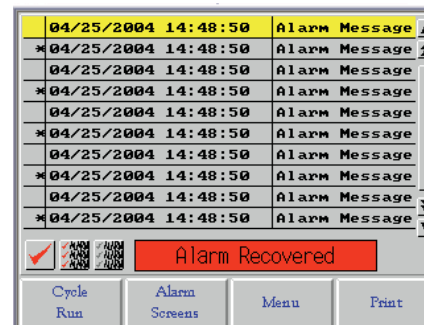


Figure 6: ADVANCED ALARM AND DATA LOGGING: Alarm Log and Recovery Screen

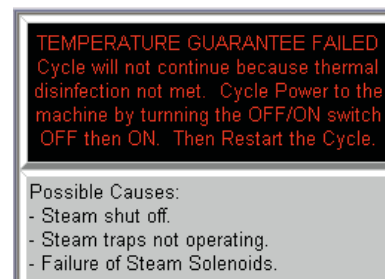


Figure 7: ADVANCED ALARM AND DATA LOGGING: Alarm Message Help Screen



The control program is provided with a graphical P&ID flow chart with real-time integrated service flow and Input/Output Summary screen allowing operators and service personnel quick access to machine function status.



The control program is also provided with an integrated P&ID chart screen with touch cell descriptions and an image based Service View screen with touch cell descriptions, providing operators and maintenance personnel a quick visual reference to parts and their descriptive information.



The control program is provide with a Parts List Identification screen complete with pop up visual reference , symbols, and part # ID to assist operators and maintenance personnel with troubleshooting activities.

Figure 11 : PARTS LIST ID & VISUAL REFERENCE: Parts List ID Screen

In the Service/Technician Mode, Technicians are provided the access to coordinated, color coded descriptive information, I/O status, wire number designations, I/O module color for each of the inputs and outputs of the system.

Figure 12: TECHNICIAN MODE I/O CHART



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1.32 Statistics Mode and ActivPM **NEW!**

The control system is provided with a statistics mode that keeps track of a wide variety of parameters. Parameters such as per Cycle Usage, Total number of Cycles Operated, Hours of Operations, and much more.

GENERAL STATISTICS			
Cycles	OP	PM Sch	
Cycle 1	00000000	00000000	Reset
Cycle 2	00000000	00000000	Reset
Cycle 3	00000000	00000000	Reset
Cycle 4	00000000	00000000	Reset
Cycle 5	00000000	00000000	Reset
Cycle 6	00000000	00000000	Reset
Cycle 7	00000000	00000000	Reset
Cycle 8	00000000	00000000	Reset
PREVIOUS	NEXT	GOTO	PRINT SCREEN

Figure 13: General Statistics Screen

In addition to the recording of general statistics, this mode can be used to forecast a PM (Preventative Maintenance) Schedule, referred to as ActivPM. Each component is actively monitored for usage so that scheduled Preventative Maintenance programs will be more proactive. The control system will alert the maintenance personnel through a data log when each individual component has reached its anticipated life expectancy.

STATISTICS			
24VDC OUTPUT CARD (16-23)	OP	PM Sch	
Main Water Inlet Valve [AV5]	00000000	00000000	Reset
HX Steam Inlet Valve [AV1]	00000000	00000000	Reset
Final Spray Valve [AV6]	00000000	00000000	Reset
Dryer Steam Coil Valve [AV2]	00000000	00000000	Reset
Rinse Inlet Water Valve [AV7]	00000000	00000000	Reset
Rinse Steam Sump Coil Valve [AV3]	00000000	00000000	Reset
Rinse Gravity Drain Valve [BFV]	00000000	00000000	Reset
Wash Inlet Water Valve [AV8]	00000000	00000000	Reset
PREVIOUS	NEXT	GOTO	PRINT SCREEN

Figure 14: Activ PM Screen

1.33 Chemical Pump Priming Function

The control program is provide with a Chemical Pump Priming screen to allow supervisory and chemical agent personnel the ability to pre-program an adjustable time for chemical pump priming during chemical drum change out

procedures. Feature insures that chemical lines are primed with chemical prior to washer operations during the cycle process.

CHEMICAL PRIMING			
CHEMICAL PUMP 1:	OFF	00	00
CHEMICAL PUMP 2:	OFF	00	00
CHEMICAL PUMP 3:	OFF	00	00
CHEMICAL PUMP 4:	OFF	00	00
CHEMICAL PUMP 5:	OFF	00	00
START SCREEN			

Figure 15: CHEMICAL PUMP PRIMING FUNCTION: Chemical Priming Screen

1.34 Non-proprietary Components

All components are non-proprietary and are available from local suppliers or from the factory.



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2.0 CONFIGURATION OPTIONS

2.1 Single or Two Door Pass-Thru

The washer is available in a single door configuration or as a two door pass-thru. The unload end is provided with an operator status interface.

2.2 Left or Right Side Service Access

The unit comes standard with a choice of either left or right side service access.

2.3 Dual Enlarged Viewing Windows *NEW!*

The standard viewing window located in our door is replaced with dual enlarged viewing windows 20" W x 26" H which provide extra visibility into the chamber.

2.4 Low Profile 6" Base

The standard base design is for pit mounting. The washer can be provided with a low profile, 6" high base to accommodate facilities with shallow sump requirements or for floor mounting the unit.

2.5 Barrier Wall Trim to Close Wall Openings

Stainless steel trim strips and flanges are provided for recessed wall openings or at barrier wall enclosures.

2.6 Seismic Anchoring

Washer is provided with seismic anchoring brackets designed in accordance with local seismic codes.

2.7 Automatic Manifold Connection to Accessories

The washer is provided with a floor mounted, manifold coupling system to divert wash/rinse solution through accessory carts. The coupling connection is automatic to the accessory cart when the cart is positioned into the washer. The manifold flange connection is made without manual fastening by the operator.

2.8 Door Interlocks

During loading and unloading of the washer the door interlock provides a secure barrier from potential cross contamination by not allowing pass-thru access from the soiled side to the clean side of the washer.

2.9 Automatic Tilt Floor

For loads with horizontal surfaces which pool water, the automatic tilt floor will elevate on one side thus allowing horizontal surfaces to drain.

2.10 Oscillating Jet Spray System

In lieu of the standard rotary spray arm, the unit is provided with a 110° oscillating spray jet system driven by a pneumatically operated rod less cylinder. System is provided with recirculated spraying.



Figure 16: Oscillating Jet Spray System



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3.0 EQUIPMENT OPTIONS

3.1 Water Supply Temperature Booster

The washer is supplied with an in-line instantaneous steam heat exchanger to raise the temperature of the incoming hot water supply to the desired temperature. The standard unit will raise incoming water temperature from 120°F to 180°F. The optional unit will raise incoming water temperature from 60°F to 180°F.

3.2 Stainless Steel Steam Coil Heating

The wash chamber sump is provided with a steam heated, stainless steel, and tubular sump coil to maintain solution temperature as it re-circulates within the wash chamber.

Both the heat exchanger and sump heating coil are sized adequately to operate with a maximum incoming steam pressure of 60 psig.

The steam coil is designed to ASME Section VIII, Div. 1, Unfired Pressurized Vessel Code.

A bucket trap is provided for the steam water supply temperature booster. A thermostatic steam trap is provided for the steam sump coil.

3.3 Electric Element Sump Heating

The washer is supplied with electric sump heaters, 40Kw total. Incoming hot water supply temperature must be consistent at 185°F for a minimum final rinse temperature of 180°F. (Model R620 and R630 only).

3.4 Internal Double Level Debris Screens

The wash sump is provided with two (2) levels of perforated stainless steel filter screens, one coarse and one fine filter. Filter screens are mounted below the floor grating and above the sump coil heater. Both filter screens are removable for servicing and cleaning.

3.5 External Self-Cleaning Filter *NEW!*

The treatment pump is provided with a self-cleaning debris filter having perforations smaller than the spray arm orifices. The filter is inter-piped with the unit's plumbing system to filter all re-circulated solutions and inter-wired with the unit's controls to automatically flush debris to drain.

3.6 Exhaust Vapor Removal Condenser

A cold water vapor condensing unit is provided to reduce excessive vapor and cool the exhaust air prior to entering the building's exhaust system.

3.7 Stainless Steel Exhaust Fan

The washer is provided with a fan inter-wired with the automatic control system to exhaust residual vapors from the unit to building HVAC. The fan assembly is of stainless steel construction. This option increases the overall height dimensions of the unit.

3.8 Devapormatic Exhaust System

This is a closed loop system which does not require a connection to building HVAC. The system includes a POV, stainless steel blower, duct work attached to the washer and a cold water condenser to reduce excessive vapor and the cool air returning to the chamber.

3.9 Dryer c/w Devapormatic Exhaust System

This system does not require a connection to building HVAC. The system includes a POV, stainless steel blower, duct work attached to the washer, a cold water condenser to reduce excessive vapor, and a steam coil which heats the air returning to the chamber.

3.10 Dryer c/w Vapor Removal Exhaust System

This system requires a connection to building HVAC. It includes a POV, stainless steel blower, duct work attached to the washer, and a steam coil which heats the air returning to the chamber.



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3.11 Automatic Chemical Injection Pumps, Time Based

A time based, volumetric type agent injection system is provided to automatically inject user supplied chemicals/agents into the unit's sump.

3.12 Low Level Chemical Sensors

Low level chemical sensors are provided to signal washer when chemical supply stored in containers is almost empty. One to five low level chemical sensors can be added as required.

3.13 Sample Port

A sample port can be added so that chemical concentration can be monitored during normal operation.

3.14 pH Neutralization for Effluent

Unit is provided with an integral effluent pH neutralization system to adjust effluent pH level within an acceptable range. System comes with a pH probe located within the recirculation piping. During neutralization phase the washer will only proceed to drain if the monitor reading is within the adjustable range.

Note: pH probe may need to be replaced or recalibrated as part of the preventative maintenance program.

3.15 Automatic Watering Rack Flushing System

A quick disconnect hose and fitting is provided to flush automatic watering type cage racks with fresh water during the final rinse phase.

3.16 VHP or CD Gas Capability

The unit is designed to accept fittings and connections for VHP or Chlorine Dioxide decontamination equipment. The user selects their own decontamination equipment; then appropriate fittings and connections are added by our factory technicians. All specifications for decontamination systems must be reviewed with our project managers prior to machine construction and design. This option requires item 3.17 Positive Door Seal System to be included.

3.17 Positive Door Seal System

The unit is provided with an inflatable gasket to completely seal the cabinet door(s). This system is to be used in conjunction with VHP or CD Integration.



Figure 17: Positive Door Seal

3.18 Drain Surge Tank System

The washer is provided with an additional drain tank to allow used wash/rinse solutions to be force drained from the cabinet sump under pump pressure to the Drain Surge Tank. This allows the washer to proceed quickly to the next phase of the cycle. Drain solution is then tempered to below 140°F, then runs from the surge tank to the floor drain under gravity. The option reduces normal process cycles by 5-6 minutes.

3.19 Dedicated Low Volume Drain Pump ^{NEW!}

A dedicated low volume drain pump is used to assist with evacuating the sump without overflowing the floor drain located in the pit.

3.20 Alkaline/Acid Storage Tanks

The BetterBuilt washer is provided with Alkaline and/or Acid Non-Heated Storage Tanks. This option allows the washer to reduce consumption of energy by saving chemical usage, and hot water consumption. Chemical solutions from each load are saved for



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subsequent cycles or drained immediately. A counter keeps track of number of usage to alert operators when to refresh the storage tanks.

3.21 Heated Fill Tank

A steam heated fill tank is provided to allow fresh hot water to flow directly to the washer. This option allows the washer to proceed quickly to the next phase of the cycle by eliminating normal sump fill and charge times.

3.22 Heated Rinse Storage Tank *NEW!*

The washer is provided with a steam heated rinse storage tank. This option allows the washer to lower energy consumption by saving hot water and reducing steam demand. Rinse solution from each load is saved for subsequent cycles or drained immediately. A counter keeps track of usage which alerts the operator when to refresh.

3.23 Chilled Water Drain Cool Down *NEW!*

A facility provided re-circulated chilled water system is used to cool drain water effluent below the required 140°F before discharge to drain. The energy transfer of the chilled water system eliminates the need for cold water injection into the drain line.

3.24 Cold Water Fill *NEW!*

Cold water is used during filling instead of hot water. Feature does not increase steam consumption and will also reduced steam demand. Note: A Heated Fill Tank and Heated Rinse Tank must be included when the Cold Water Fill option is selected.

3.25 Shut-off Valves

Used to isolate steam and water supply line components for maintenance and repair purposes.

3.26 Pressure Gauges

Liquid filled gauges are conveniently installed for monitoring the supply pressure of steam, hot and cold water.

3.27 Temperature Gauges

These gauges monitor hot water supply temperature as well as operational hot water temperature.

3.28 Water Arrestors

Help to prevent water hammering which may cause excessive strain on plumbing components.

4.0 CONTROL SYSTEM OPTIONS

4.1 8" Touch Screen Control Panel

The controls are upgraded from the standard 5" touch screen to the 8" touch screen interface, to monitor and control all aspects of the washer cycles and process operations. The 8" Touch Screen interface allows for printing directly to a user supplied printer using a USB cable. The 8" Touch Screen option is also required with the CCTV Option.

4.2 Stainless Steel Controls Guard

The unit can be provided with stainless steel guard to protect the touch screen and controls from inadvertent damage.



Figure 18: Stainless Steel Control Guard

4.3 Thermal Cycle Data Printer

An integral thermal printer with automatic paper take-up is provided to record all cycle program and in process performance data including data, times, treatment cycle selected, deviations, and alarms for permanent record.



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4.4 Printer Cover

A NEMA 12, IP54 rated plastic printer cover to house both the printer and automatic paper take-up spool. Cover allows for protection of both the printer and take-up spool.



Figure 19: Printer Cover

4.5 RS485 Port for Data Transfer

An RS485 communication port is provided for the transfer of cycle data to a remote computer terminal or printer. [Software integration to interpret data by others]

4.6 Compact Flash Card - Data Collection

The unit can be provided with a compact flash card allowing Supervisors/Managers the ability to download current cycle data directly to the Flash Card and printing this cycle data offline with a PC or laptop station. Data is automatically stored with a date stamp on the file. Cycle data and parameters can be viewed and printed using MS-Excel software. The CF can store roughly 1-2 years of data.



Figure 20: Sample 64MB CF Card

4.7 Compact Flash Card – Program Backup

The unit can be provided with a compact flash card allowing Supervisors/Managers the ability to save the PLC, and current touchscreen program for storage and safe keeping in the event of a PLC or touchscreen failure.

4.8 Ethernet Connectivity to PLC

The unit is provided with the Remote Data Transfer System (BBRDTS) where the data files in the compact flash card can be transferred to a central PC via Ethernet and a windows FTP program. The PLC is connected to the facilities network via Ethernet and the supervisor is able to upload, download, and delete data files from each washer control system from their office PC. This option requires coordination between BetterBuilt Engineering and the Facility's IT Department. A main office PC (by others) and Ethernet connection port (by others) near the equipment is required.

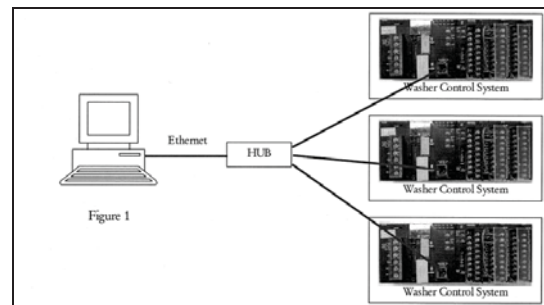


Figure 21: Ethernet /Hub Connection to Equipment PLC Diagram

4.9 Factory Ethernet Connectivity

The unit is provided with an Ethernet connection for remote online diagnostics, software upgrades, and troubleshooting. Factory based service personnel will be able to assist local service remotely identifying system malfunctions and recommendations for repair. This option requires coordination between BetterBuilt Engineering and the Facility's IT Department.

4.10 Touchscreen Ethernet Web Server Connectivity **NEW!**



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The unit is provided with an Ethernet connection to the touchscreen for remote online diagnostics, and troubleshooting. Any approved personnel without any additional software will be able to view the touchscreen parameters right from their PC (by others). The individual will be able to monitor, control, make changes or troubleshoot the operation of the unit. This option requires coordination between BetterBuilt Engineering and the Facility's IT Department.

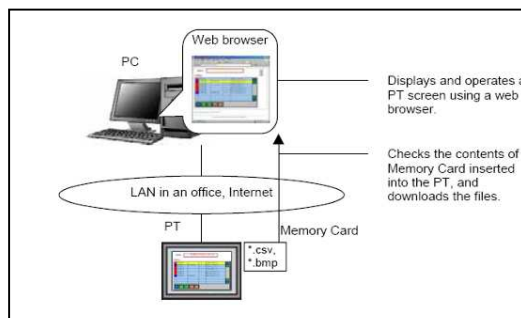


Figure 22: Ethernet /Hub Connection to Equipment Touchscreen Diagram

4.11 Modem

A modem is provided for remote online diagnostics, software upgrades, and troubleshooting. Factory based service personnel will be able to assist local service remotely identifying system malfunctions and recommendations for repair. Dedicated analog phone line required from facility.

4.12 Surge Protection

This device will protect all 120VAC and 24VDC components from electrical transients.

4.13 Closed Circuit TV Camera [CCTV]

The unit can be provided with an integral CCTV Camera system allowing operators on the loading end of the washer to view the unload side wash room area. Up to 4 CCTV Cameras can be integrated into the touch screen controls package. Option requires the 8" touchscreen Interface.



Figure 23: CCTV Camera

4.14 Audible Clean Side Buzzer

The buzzer is mounted on the exterior of the washer in the clean side room. It will sound for an adjustable time period at the beginning of a cycle. The buzzer can also be turned on or off for various alarm conditions.

4.15 Emergency Stop Cable (both sides)

For operator safety an emergency stop cable is mounted inside the washer on both sides and runs the length of the chamber.



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5.0 ACCESSORIES

☐ BWC6 Bottle Washing Cart [#206-50104]

A stainless steel, rotary spray manifold cart is provided for processing of up to ten water bottle baskets, based on basket configuration. The Cart-Lock fitting connection allows operators to engage and disengage the floor mounted manifold connection without manual intervention. Cart requires the optional Automatic Manifold Connection.



Figure 24: BWC6 Bottle Washing Cart

☐ UC6 Universal Cart [#206-50200]

The BetterBuilt cage and pan washing cart is designed to process common sizes of rodent cages and debris pans, holding them in position for thorough spray coverage. The Universal Cart holds 54 standard mouse cage⁽ⁱ⁾ bottoms or 18 standard rat cage⁽ⁱⁱ⁾ bottoms per load.



Figure 25: UC6 Universal Wash Cart

☐ R-4-4 Universal Basket Rack [# 206-50204]

The four level R-4-4 Universal Basket Rack has a unique swing out basket used for washing of soiled rodent cage bottoms, top, or other miscellaneous components. This rack can hold up to 32 standard mouse cage⁽ⁱ⁾ bottoms or 14 standard rat cage⁽ⁱⁱ⁾⁽ⁱⁱⁱ⁾ bottoms per load.



Figure 26: R-4-4 Universal Basket Split Rack



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☐ R-4-8 Universal Basket Rack [# 206-50205]

The four level R-4-8 Universal Basket Rack has a unique swing out basket used for washing of soiled rodent cage bottoms, top, or other miscellaneous components. This rack can hold up to 64 standard mouse cage⁽ⁱ⁾ bottoms or 36 standard rat cage⁽ⁱⁱ⁾⁽ⁱⁱⁱ⁾ bottoms per load.



Figure 27: R-4-8 Universal Basket Rack

☐ R-5-4 Universal Basket Rack [# 206-50207]

The five level R-5-4 Universal Basket Split Rack has a unique swing out basket used for washing of soiled rodent cage bottoms, top, or other miscellaneous components. This rack can hold up to 40 standard mouse cage⁽ⁱ⁾ bottoms or 10 standard rat cage⁽ⁱⁱ⁾⁽ⁱⁱⁱ⁾ bottoms per load.



Figure 29: R-5-4 Universal Basket Split Rack

☐ R-4-10 Universal Basket Rack [# 206-50206]

The four level R-4-10 Universal Basket Rack has a unique swing out basket used for washing of soiled rodent cage bottoms, top, or other miscellaneous components. This rack can hold up to 80 standard mouse cage⁽ⁱ⁾ bottoms or 44 standard rat cage⁽ⁱⁱ⁾⁽ⁱⁱⁱ⁾ bottoms per load.



Figure 28: R-4-10 Universal Basket Rack

☐ R-5-8 Universal Basket Rack [# 206-50208]

The five level R-5-8 Universal Basket Rack has a unique swing out basket used for washing of soiled rodent cage bottoms, top, or other miscellaneous components. This rack can hold up to 80 standard mouse cage⁽ⁱ⁾ bottoms or 30 standard rat cage⁽ⁱⁱ⁾⁽ⁱⁱⁱ⁾ bottoms per load.

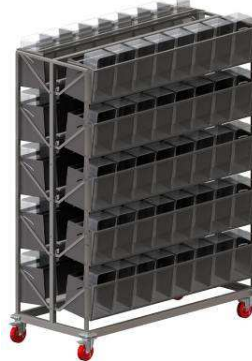


Figure 30: R-5-8 Universal Basket Rack



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☐ R-5-10 Universal Basket Rack [# 206-50209]

The five level R-5-10 Universal Basket Rack has a unique swing out basket used for washing of soiled rodent cage bottoms, top, or other miscellaneous components. This rack can hold up to 100 standard mouse cage⁽ⁱ⁾ bottoms or 40 standard rat cage⁽ⁱⁱ⁾⁽ⁱⁱⁱ⁾ bottoms per load.



Figure 31: R-5-10 Universal Basket Rack

☐ VHS6D Vertical Header System [# 206-50508]

A dedicated stainless steel, spray arm assembly is provided to redirect wash/rinse solutions for the high capacity double sided, cage washing racks. The Vertical Header System couples to the Manifold Connection System. The VHS6D Vertical Header System consists of one (1) center spray arm assembly and two (2) standard VHS6RD Cage Racks.

☐ VHS6D Vertical Header System [# 206-50511]

A dedicated stainless steel, spray arm assembly is provided to redirect wash/rinse solutions for the high capacity double sided, cage washing racks. The Vertical Header System couples to the Manifold Connection System. The VHS6D Vertical Header System consists of two (2) center spray arm assembly interlocked together and four (4) standard VHS6RD Cage Racks.
Note: For R690 model only.



Figure 32: Vertical Header System

☐ VHS6RD Cage Rack [# 206-50402]

One (1) high capacity, stainless steel wash rack is provided to increase washing capacity to 100 standard mouse box cages or 30 rat cages per rack. Optional VHS6 Vertical Header System is required.



Figure 33: VHS-6-RD Cage Rack Shown



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☐ LPR9 Large Processing Rack [# 209-50604]

The LPR9 Large Processing stainless steel rack is designed to accommodate 8 to 12 Guinea pig and Rabbit trays.

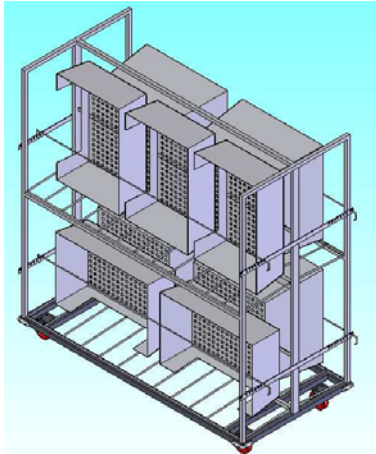


Figure 34: LPR9 Large Processing Rac

☐ ITR6 Interior Tilt Ramp [# 206-50001]

The ITR6 Interior Tilt Ramp feature provides an incline within the washing chamber to facilitate draining of solid shelf type racks and/or racks where standing water potential exist.

☐ PR6 Pan Rack [# 206-50005]

The PR6 stainless steel pan rack is designed to accommodate 3 Rabbit Pans or 2 Primate Pans. The rack hangs onto the side of the Rack Washer protection bar and the washer will be able to wash pans at the same time the cages are being washed.

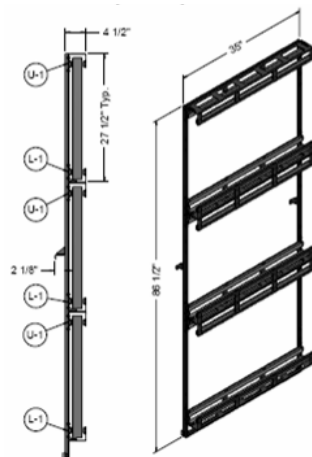


Figure 35: PR6 Pan Rack



R600 SERIES CAGE & RACK WASHERS

6.0 OPTIONS CHECK LIST

Configuration Options

Door(s)

- ☐ Single
- ☐ Two (pass-thru)
- ☐ Door Interlocks
- ☐ Dual Enlarged Viewing Windows

Controls

- ☐ Left Side Services (Washer 1B)
- ☐ Right Side Services (Washer 1A)

Base Type

- ☐ Pit Mounted [standard]
- ☐ 6" Base Pit Mounted
- ☐ Floor Mounted

Installation

- ☐ Freestanding
- ☐ Recessed One Wall
- ☐ Recessed Two Walls
- ☐ Seismic Anchors

Spray Coverage

- ☐ Overlapping Rotary [standard]
- ☐ Oscillating Jet Spray
- ☐ Cart Lock for Accessories
- ☐ Automatic Tilt Floor

Equipment Options

Heating Type

- ☐ Steam – Water Supply Temperature Booster
- ☐ Steam Sump Coil
- ☐ Electric - Heaters for Sump Only
(Model R620 and R630)

Filtration

- ☐ Internal Double Level Debris Screens
- ☐ External Filter

Exhaust / Ventilation

- ☐ POV collar with pneumatic vent damper for
direct connection to HVAC [standard]

- ☐ Exhaust Vapor Removal Condenser
- ☐ Power Exhaust Stainless Steel Fan
- ☐ Devapormatic Exhaust System, closed loop
- ☐ Dryer c/w Devapormatic Exhaust System
- ☐ Dryer c/w Vapor Removal Exhaust System

Chemical /Detergent

- ☐ Pumps Supplied by Chemical Vendor
- ☐ Automatic Chemical Injection Pumps, Time Based
 - ☐ One
 - ☐ Two
 - ☐ Three
 - ☐ Four
 - ☐ Five
- ☐ Low Level Chemical Sensors
 - ☐ One
 - ☐ Two
 - ☐ Three
 - ☐ Four
 - ☐ Five
- ☐ Chemical Sample Port
- ☐ pH Neutralizer Controlled by Microprocessor

VHP or CD Capabilities

- ☐ Provide Connections Only
- ☐ Complete System Supply
- ☐ Pneumatic Door Gasket

Solution Storage / Handling

- ☐ One Chemical Storage Side Tank
- ☐ Two Chemical Storage Side Tanks
- ☐ Power Drain Tank Assembly
- ☐ Dedicated Low Volume Drain Pump
- ☐ Heated Fill Tank
- ☐ Heated Rinse Storage Tank
- ☐ Chilled Water Drain Cool Down
- ☐ Cold Water Filling
- ☐ Automatic Watering Rack Flushing System

Values / Gauges

- ☐ Steam and Water Shut-off Valves
- ☐ Steam and Water Pressure Gauges
- ☐ Hot Water Temperature Gauges
- ☐ Water Hammer Arrestors



R600 SERIES CAGE & RACK WASHERS

Control System Options

Controls

- ☐ 5" Touchscreen [standard]
- ☐ 8" Touchscreen
- ☐ Controls Guard

Documentation/Diagnostics

- ☐ Printer – Thermal
- ☐ NEMA 12, IP54 Protective Cover
- ☐ RS485 Port for Remote Data Transfer
- ☐ Compact Flash Card – Data Collection
- ☐ Compact Flash Card – Program Back-up
- ☐ Ethernet Connection to PLC
- ☐ Ethernet Connection to Factory
- ☐ Touchscreen Ethernet Web Server Connectivity
- ☐ Modem

Safety

- ☐ Surge Protection
- ☐ CCTV - Clean Side
- ☐ Audible Buzzer - Clean Side
- ☐ Interior Emergency Stop Cable - Both sides

Accessories

- ☐ BWC6 Bottle Washing Cart with rotary spray [#206-50104]
 - QTY _____
- ☐ UC6 Universal Wash Cart for large cages and pans [#206-50200]
 - QTY _____
- ☐ R-4-4 Universal Basket Rack [# 206-50204]
 - QTY _____
- ☐ R-4-8 Universal Basket Rack [# 206-50205]
 - QTY _____
- ☐ R-4-10 Universal Basket Rack [# 206-50206]
 - QTY _____

- ☐ R-5-4 Universal Basket Rack [# 206-50207]
 - QTY _____
- ☐ R-5-8 Universal Basket Rack [# 206-50208]
 - QTY _____
- ☐ R-5-10 Universal Basket Rack [# 206-50209]
 - QTY _____
- ☐ VHS6D Vertical Header System with Two Cage Racks [#206-50508]
 - QTY _____
- ☐ VHS6D Vertical Header System with Four Cage Racks [#206-50511]
 - QTY _____
- ☐ VHS6RD Vertical Header Cage Rack [#206-50402]
 - QTY _____
- ☐ LPR9 Large Processing Rack for Guinea pig and Rabbit trays [# 209-50604]
 - QTY _____
- ☐ PR6 Pan Rack for Rabbit and Primate pans [# 209-50005]
 - QTY _____
- ☐ ITR6 Interior Tilt Ramp - lift out [#206-50001]
 - QTY _____



R600 SERIES CAGE & RACK WASHERS

Electrical Options

- ☐ 208VAC, 60 Hz, 3-Phase
- ☐ 240VAC, 60 Hz, 3-Phase
- ☐ 380VAC, 50 Hz, 3-Phase
- ☐ 380VAC, 60 Hz, 3-Phase
- ☐ 415VAC, 50 Hz, 3-Phase
- ☒ 480VAC, 60 Hz, 3-Phase
- ☐ 575VAC, 60 Hz, 3-Phase

Design for 480 volt, 3 phase operation.

ⁱ Standard Mouse Cage Bottom size 7.25"W x 11.5"L x 5"D
or [184mm x 292mm x 127mm]

ⁱⁱ Standard Rat Cage Bottom size 11"W x 17"L x 7.25"D
or [279mm x 432mm x 184mm]

ⁱⁱⁱ Top row of Standard Rat Cages must be positioned
horizontally for load clearance purposes.