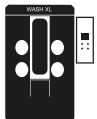




WASH XL

Instructions



All in one wash, rinse and dry
processing unit



Photocentric
WASH XL



1. Machine Details

Manufacturer:

Photocentric Ltd.
Titan House
Titan Drive
Peterborough
PE1 5XN

Machine Reference:

Machine type: 3D Printing Post-processing Wash Cabinet
Machine model: Photocentric WASH XL

Serial Number :

Year of Manufacture :

Machine requirements:

Supply	Connection	Characteristics
Electrical	1Ø N&E (3 wire)	230v, 50Hz
Mains Water Inlet	½" BSP	
Waste water outlet	½" BSP	
Solvent Inlet	½" BSP	
Solvent Outlet	½" BSP	
Compressed Air	½" BSP	

*Installation of electrics is the responsibility of the customer. This should be carried out by a competent electrician.

2. Residual risks



Caution:

External areas around the machine may be wet if rinse fluid leaks from machine.



Caution:

Every precaution should be taken to prevent electrical shocks.



Caution:

Care should be taken when closing doors or barriers.



Caution:

As the wash process includes the use of hazardous chemicals, the operator should be fully trained in handling such hazardous material, taking all relevant precautionary measures.



Advised to wear safety boots to reduce risk of slipping.



Advised to wear safety glasses when working with chemicals. Contact with the eyes can cause severe irritation and/or injury.



Advised to wear safety gloves. Chemicals can cause irritation.



Advised to wear a face mask when removing parts from the wash cabinet. Undissolved resin and excess solvent can still be present in the chamber and become airborne.



CONTENTS	Page		Page
1. MACHINE DETAILS	1	5.3.2 ELECTRICAL UNIT	10
2. RESIDUAL RISKS	2	5.3.3 VIEWING WINDOW WITH RUBBER ARM GAUNTLETS	11
3. MACHINE DESCRIPTION	4	5.3.4 EXTRACTION DUCT	11
3.1 DIMENSIONED DRAWING	4	5.3.5 ADDITIONAL AIR BLOW OFF GUN	11
3.2 GENERAL ARRANGEMENT	5	5.3.6 DOOR COMPLETE WITH SLAM HANDLE AND INTERLOCK	12
3.3 DESCRIPTION	6	6. OPERATION	12
4. INITIAL SETUP	6	6.1 TURNTABLE LOCK	12
4.1 ELECTRICAL/PROCESS CONNECTIONS	6	6.2 OPERATING THE MACHINE FROM STARTUP	13
5. GETTING TO KNOW YOUR MACHINE	7	7. MAINTENANCE SCHEDULE	13
5.1 UNDERSTANDING THE HUMAN-MACHINE INTERFACE (HMI)	7	7.1 DEBRIS BASKET	14
5.1.1 NAVIGATION	7	7.2 PERISHABLE MATERIALS	14
5.1.2 MAIN ACTIVITY/CONTROL PAGE	7	7.3 TURNTABLE BEARING	14
5.1.3 PARAMETER SETTINGS PAGE	8	7.4 REPLACING THE WINDOW GLASS	15
5.1.4 SETTING DRAIN TIME	8	7.5 REPLACING ARM GAUNTLETS	17
5.2 MACHINE INTERNALS	8	8. FAULT FINDING	19
5.2.1 GUNS	8	8.1 SOLVENT LOW	19
5.2.2 TURNTABLE	9	8.2 RINSE FULL	19
5.2.3 FILTRATION	9	8.3 PRESSURE LOW FAULT	19
5.3 MACHINE EXTERNALS	10	9. DRAIN PROCESS FLOW DIAGRAMS	20
5.3.1 PROCESS FLUID CONNECTIONS	10		

3. Machine Description

3.1 Dimensioned Drawing

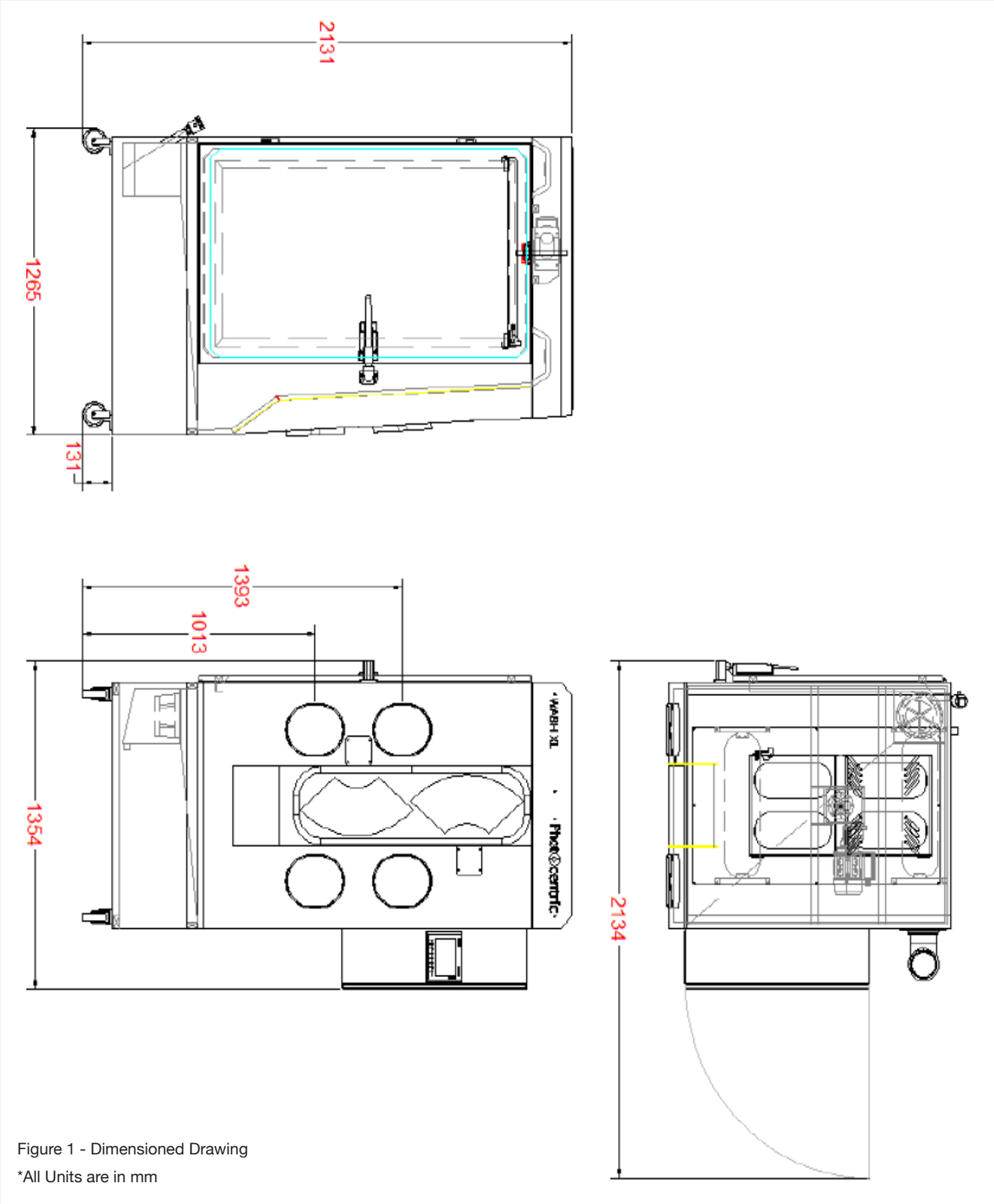
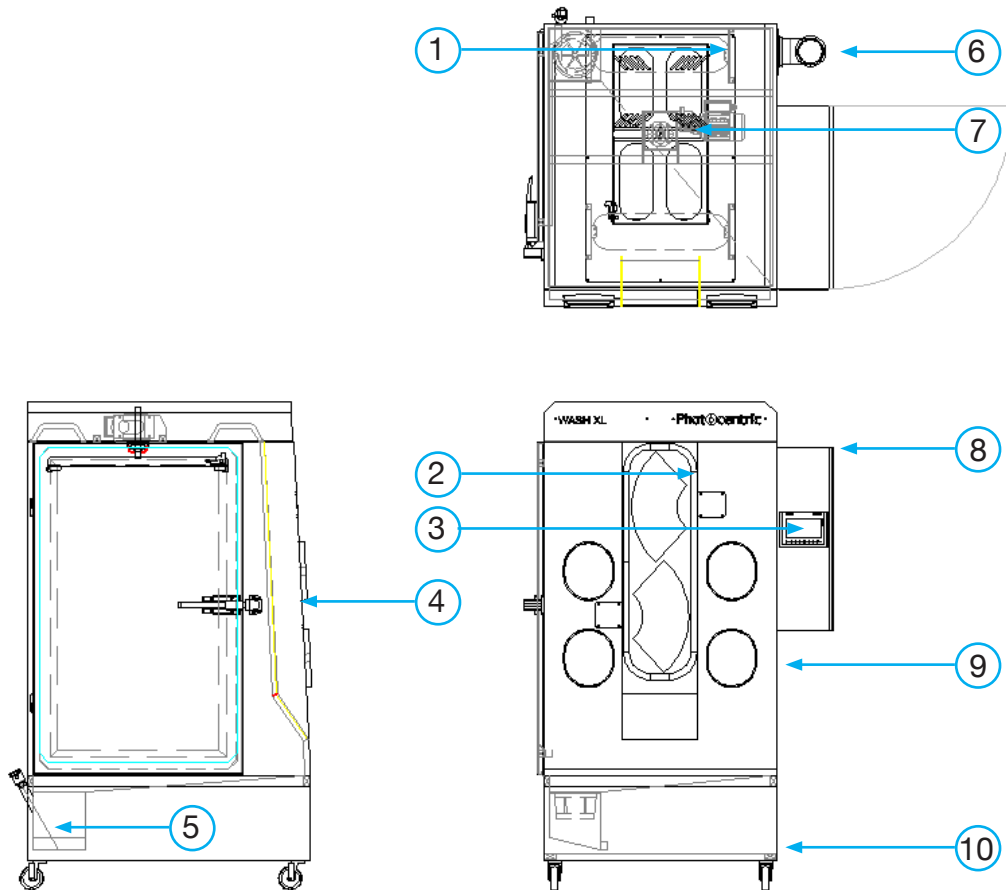


Figure 1 - Dimensioned Drawing

*All Units are in mm



3.2 General Arrangement



Index	Description
1	Roof Lights 2
2	Viewing window c/w window wipers
3	Operator Control panel: HMI, Turntable speed, wiper, E-stop and reset 4
4	Left-side opening door c/w slam handle and interlock 5
5	Debris Basket
6	Extraction Duct
7	Motorized inverted build plate turntable
8	Electrical control box
9	Elliptical Arm Gauntlets
10	Wheels for easy mobility

3.3 Description

Post-processing (washing and curing) is an essential step in creating items with stereolithography (SLA) LCD 3D printing. After the part is printed it needs to be rinsed with a solvent to remove the excess resin coating the part.

The Photocentric Wash XL is designed to work in conjunction with the Liquid Crystal Titan printer and the Cure XL. After a part is printed, the build plate is removed from the printer on the transfer platform and placed in the Wash XL on the motorized turntable that is suspended from the roof of the machine (figure 10). The motion is operated using a foot pedal. It is then manually washed to remove the excess resin with a cleaning solvent cycle. This process is followed by a manual rinse cycle with water to remove the excess solvent. An air gun is then used to blow off the excess water.

4. Initial Setup

4.1 Electrical/Process Connections

Before the machine can be operated, it must be setup, this involves;

- Connect mains water to its appropriate inlet (figure 4).
- Connect the rinse water outlet (figure 4) to its corresponding IBC tank.
- Connect the solvent inlet and outlet (figure 4) to their corresponding IBC tanks.
- Details on inlet/outlet connections can be found in the Machine Details section.
- Connect the water and solvent sensor levels to corresponding locations on the electrical box.
- Connect the electrical unit to a single-phase power supply (figure 6), this must be carried out by a qualified electrician.
- Connect the compressed air pipe to the “main air inlet” which is the inlet to the water trap filter, this is located on the right-hand side of the electrical unit (figure 5). Ensure the pressure set to 6-8 bar.



Figure 3
Isolator switch



Figure 4
Process fluid connections



Figure 5
Compressed Air Inlet



Figure 6
Single-phase Electrical Connection





5. Getting to know Your Machine

5.1 Understanding the Human-Machine Interface (HMI)

5.1.1 Navigation

The navigation buttons allow you to switch between the different pages on the HMI:

Function	Button	Description
F2		-Activity/control page
F3		-Parameter settings

5.1.2 Main Activity/control page

Figure 7 shows the main activity page; it has four buttons:

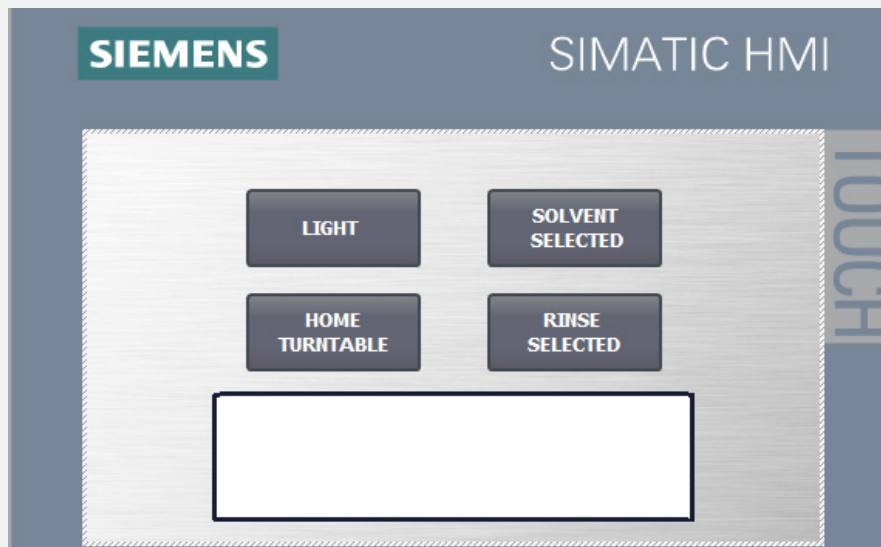


Figure 7
HMI home screen

- The LIGHT button turns the lighting in the cabinet and on the logo, on and off.
- The SOLVENT SELECTED button starts the solvent rinse cycle, the door will lock, and it will allow the solvent gun to be used.
- The HOME TURNTABLE button will rotate the turn table to the home/zero position, another way to achieve this is to double-tap on the foot pedal in quick succession.
- The RINSE SELECTED button works in the same way as SOLVENT SELECTED, the door will lock, and it will allow the rinse gun to be used.
- The white box is a message screen that will tell the operator if there are any faults with the unit.
- When the buttons are pressed they will light up green, showing that the function has been activated.

5.1.3 Parameter Settings Page

Figure 8 shows the page with the drain times displayed.

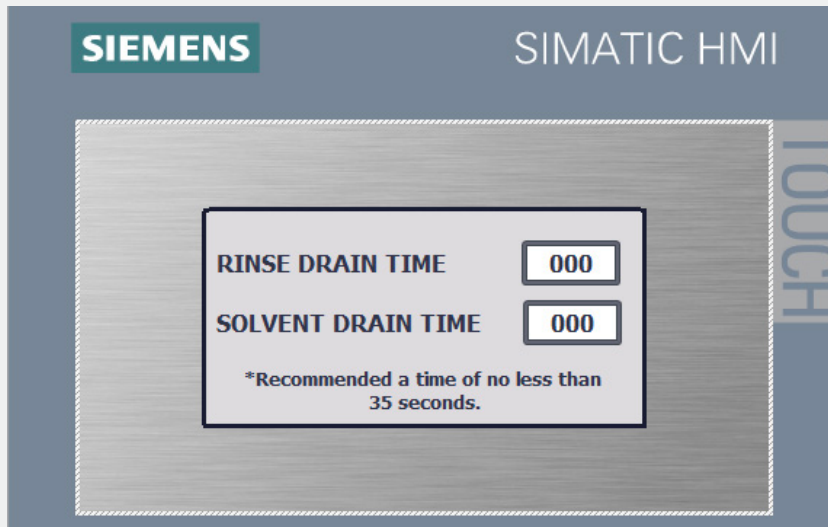



Figure 8
Drain time selection

5.1.4 Setting Drain Time

Before the machine can be used, it must be programmed to know how long to drain for after each cycle, to do this;

1. Press the  button below the HMI.
2. Using the screen in the HMI shown in figure 8, Set a desired drain time for both solvent and rinse cycles.

To do this, tap the boxes and set desired times for both solvent cycle and rinse cycles.

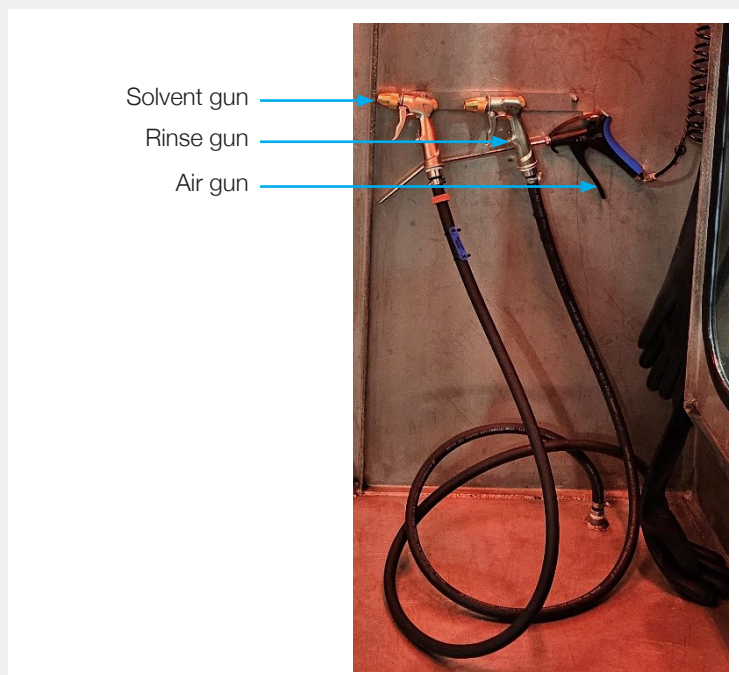
It is important to set a time no less than 35 seconds to guarantee the system will be fully drained before the commencement of the next cycle.

3. Press the button to go back to the main menu.

5.2 Machine Internals

5.2.1 Guns

The wash chamber has 3 guns that are used to clean the prints (situated on the right-hand side wall of the chamber); a solvent gun, a water rinse gun, and an air gun (figure 9). The solvent gun has a red band on the hose to distinguish it from the rinse gun.





5.2.2 Turntable

The inverted turntable situated on the ceiling has rails that fit the platform transfer unit and hold the print platform for Titan (figure 10), it includes a spring-loaded lock to secure the build plate when it is fully located. The turntable is actuated via a foot pedal at the base of the machine. Tap twice to return turntable to the home/zero position.



Figure 10 - Inverted Motorized Turntable

5.2.3 Filtration

There is a removable debris basket situated in the base of the wash chamber (figure 11). This will collect any solid lumps of plastic debris from entering the system and damaging the pump. It should be emptied regularly. Guidance on maintenance can be found in the “Maintenance Schedule” section.



Figure 11
Debris Basket

5.3 Machine Externals

5.3.1 Process Fluid Connections

Figures 12 and 13 show the connections for the process fluids (water, solvent, compressed air), they are situated on the rear panel of the machine. There is a mains water inlet, a wastewater outlet which drains into its own IBC, an inlet and outlet for the solvent which go to another separate IBC, and a compressed air inlet. Details of connections can be found in the “Machine Details” section. Schematics for the mechanism behind the drainage system can be found in the “Drain Process Flow Diagrams” section.



Figure 12 - Process fluid connections

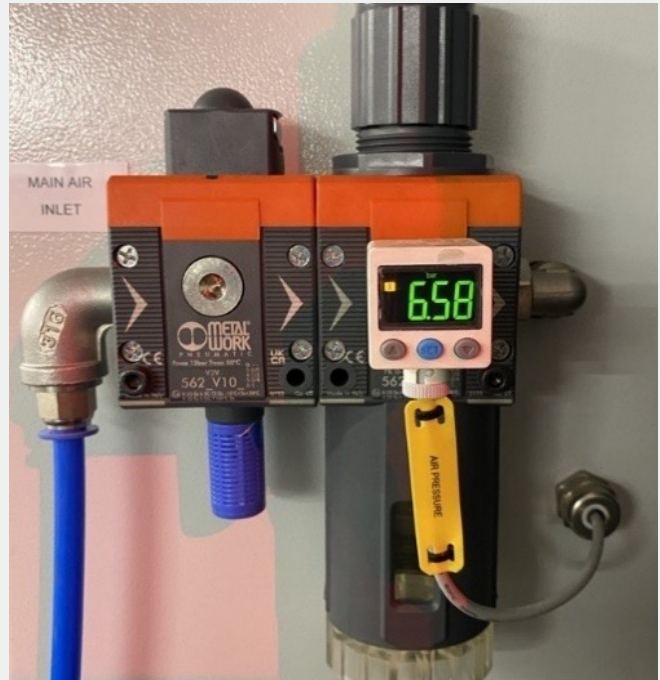


Figure 13 - Compressed Air Connection

5.3.2 Electrical Unit

Figure 14 shows the interior of the electrical control unit.

Any maintenance carried out on this unit must be completed by a qualified electrician.

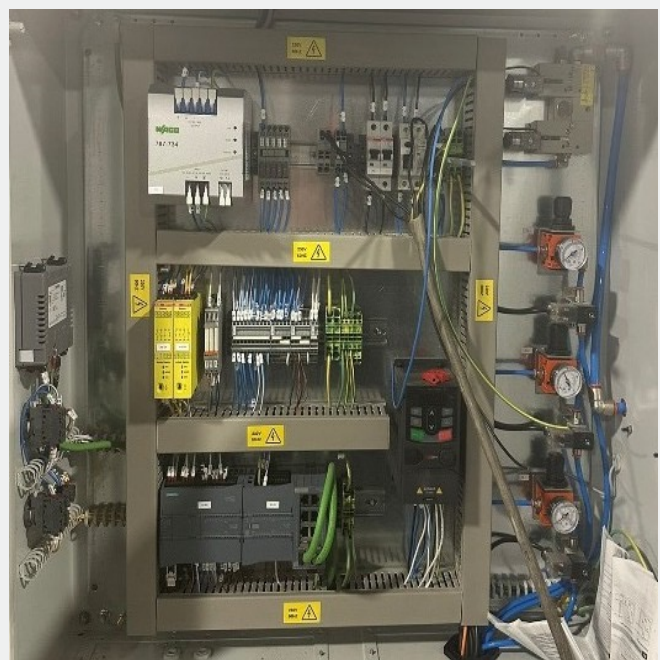


Figure 14 - Electrical control unit internals



5.3.3 Viewing window with rubber arm gauntlets

Figure 15 shows the front of the machine, it includes a large viewing window complete with wipers. Two sets of elliptical rubber arm gauntlets allow for easy access to the entire platform being washed.

5.3.4 Extraction Duct

Figure 16 shows the extraction duct that is used to extract any vapour produced during the process. In order to reduce odour from entering the immediate environment this duct should be connected to an appropriate external filtration system

5.3.5 Additional air gun

In addition to the internal air gun the machine also includes an external air gun (figure 17), to enable the operator to blow off any excess water left after rinsing.



Figure 15 - Front View



Figure 16 - Extraction Duct



Figure 17 - External air gun

5.3.6 Door with slam handle and interlock

Figure 18 shows the door on the left-hand side of the machine. To ensure that the door doesn't open during the rinse cycles, the door is fitted with a slam handle (blue) and an interlock (yellow).

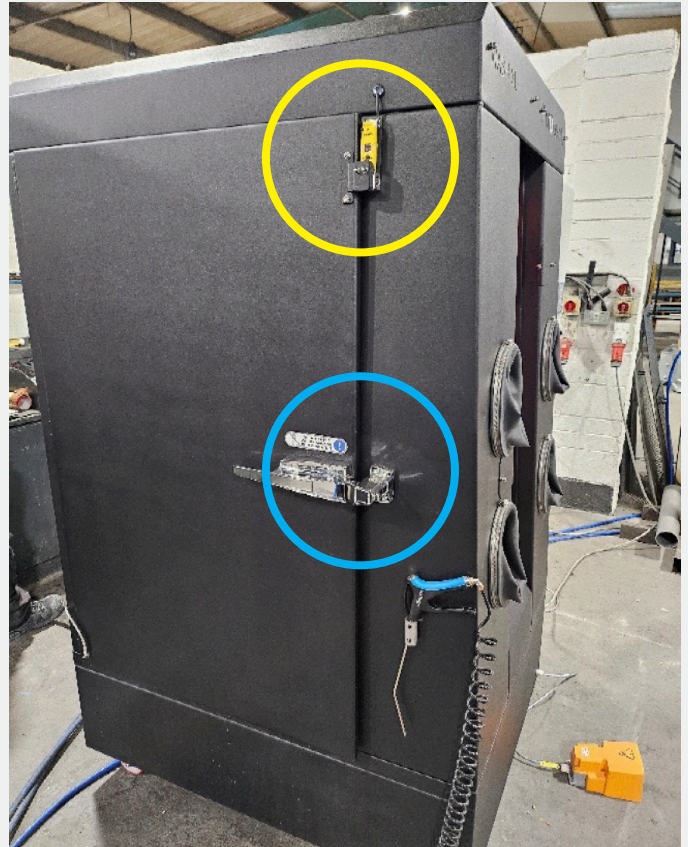


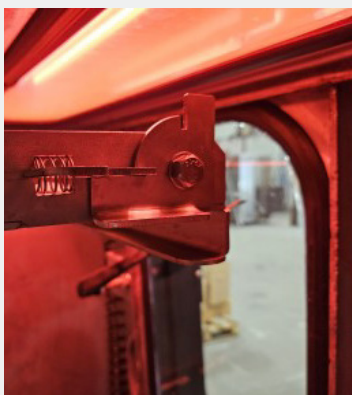
Figure 18
Machine door

6. Operation

6.1 Turntable Lock

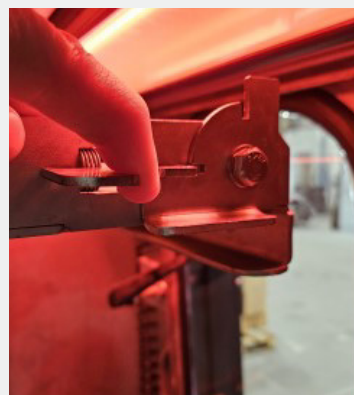
The build plate is securely locked onto the turntable using a spring-loaded lock, figure 19 shows how it is locked/unlocked.

It is essential this lock is used to prevent the platform from sliding out of the frame when it's rotating.



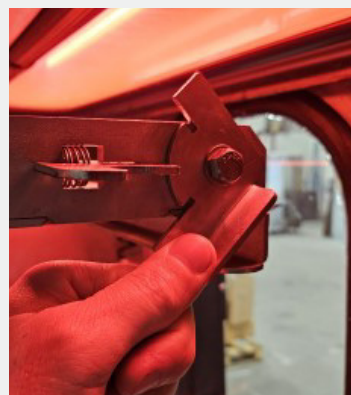
1

Lock in "Open" position.



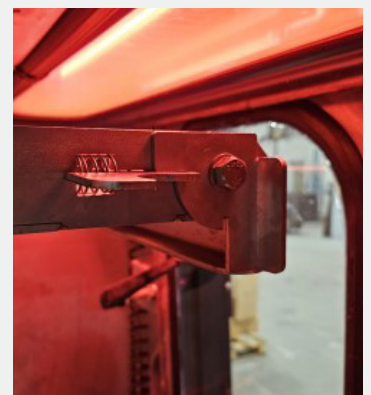
2

Spring pulled back to release cam



3

Cam is rotated into "Closed" position



4.

Lock in "Closed" position



6.2 Operating the machine from Startup

1. Using the Touch Screen HMI, activate the roof light by tapping the “LIGHT” button (figure 7)
2. Open the spring-loaded lock on the roof turntable (figure 19).
3. Remove the completed platform from the printer with the print attached by using Titan platform handler
4. Slide the platform into the channels of the turntable and pull the handler back (figure 19).
5. Close the spring-loaded lock. (figure 19)
6. Shut the door, ensuring the slam handle has locked shut. (figure 18)
7. Select SOLVENT SELECTED (figure 7), while activated the door is locked.
8. Rotate the foot pedal to get access to all sides of the part. Depending on size and parts complexity the wash step time can vary from 10-20 minutes.
9. Excess resin is removed from the part by spraying with the solvent gun (figure 7). The gun will only be active if SOLVENT SELECTED is selected and illuminated green in the HMI.
10. De-select SOLVENT SELECTED (figure 7)
11. Machine will automatically drain for the duration selected.
12. Select RINSE SELECTED (figure 7), while activated the door is locked.
13. Solvent is rinsed off the part with water from the rinse gun (figure 9). The gun will only be active if RINSE SELECTED is selected and illuminated green in the HMI. Depending on size and parts complexity the rinse step time can vary from 3-5 minutes.
14. De-select RINSE SELECTED (figure 7).
15. Machine will automatically drain for the duration selected.
16. Dry off any remaining water on the part using the internal air gun (figure 9).
17. Double tap the foot pedal to return the turntable to its ZERO position.
18. Open the door and use the external air gun (figure 17) to thoroughly dry the part.
19. Transfer platform to the CURE XL for curing by using Titan platform handler

7. Maintenance Schedule

Area	Frequency	Reference
Solvent IBC change over	After 170-200 use	
Debris Basket	After each use	7.1
Door Seals	Depends on usage	7.2
Turntable Bearing	After each use	7.3
Window Glass	Depends on usage	7.4
Arm Gauntlets	Depends on usage/application	7.5

7.1 Solvent IBC change

The IBC of solvent is recommended to be changed over after around 170- 200 washes or when the hydrometer reading reaches 1.00.

To see how to perform the hydrometer reading refer to Resin Cleaner 30 TDS.

7.2 Debris Basket

The debris basket, shown in figure 20 will catch any plastic debris and excess

undissolved resin that is washed off the part during the rinse cycles. This basket will need to be cleaned after each use to minimize the risk of solid material entering the system/ pump.

7.3 Perishable Materials

The door seals must be inspected regularly to ensure they haven't been damaged. The seals may need to be replaced periodically after heavy use.

Similarly, the rubber arm hole gauntlets must be inspected regularly for any signs of wear and tear and replaced if necessary, instructions are in section 7.5.

7.4 Turntable Bearing

The turntable bearing should be inspected for wear or debris build up and cleaned as required.



Figure 20
Debris Basket



Figure 21
Turntable bearing.

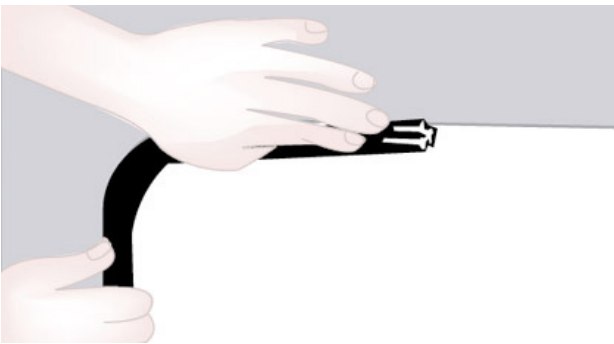


7.5 Replacing the window glass

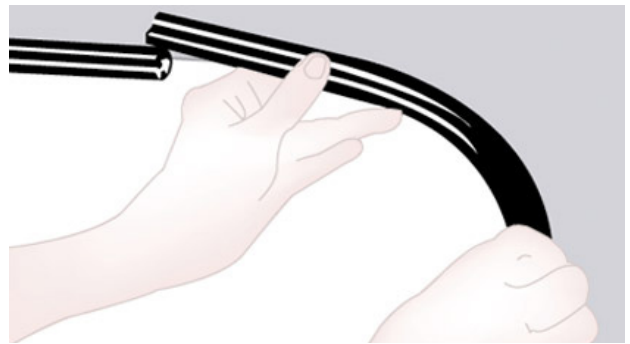
In time the glass in the window may become frosted and visibility inside the chamber will be impaired. In this case you will need to replace the glass. Contact support@photocentric.co.uk to order replacement parts.

To remove the old glass, remove the inner bead from the window seal and the glass will pass out easily.

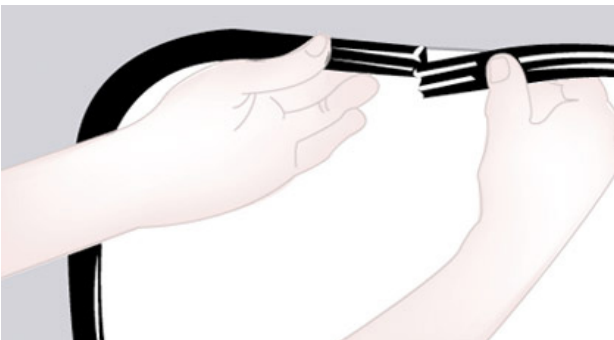
Changing the glass is a simple procedure described below. When ordering your first replacement window, it is recommended that the hook tool (WDR tool No73) is purchased from us to make the seal replacement quicker.



1- To ease the fitting of the strip it is advisable to lubricate the rubber and glass using a soap / water mix. Make sure that the rubber mould joins at the top of the machine as shown



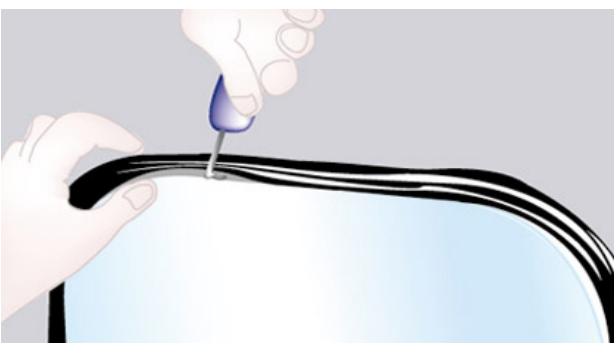
2- If a new moulded rubber seal is fitted be careful to use a piece longer than required so you can trim the last 25mm or so to suit



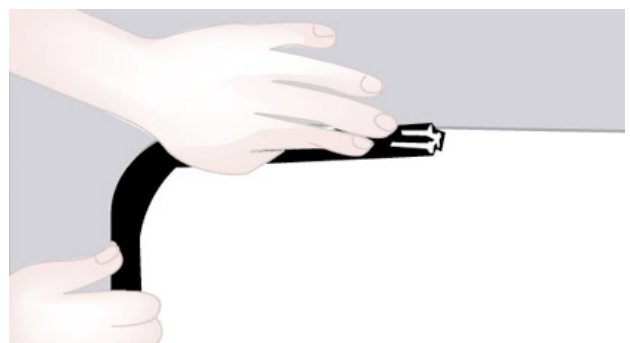
3- When trimmed the join should be a tight fit and compressed slightly



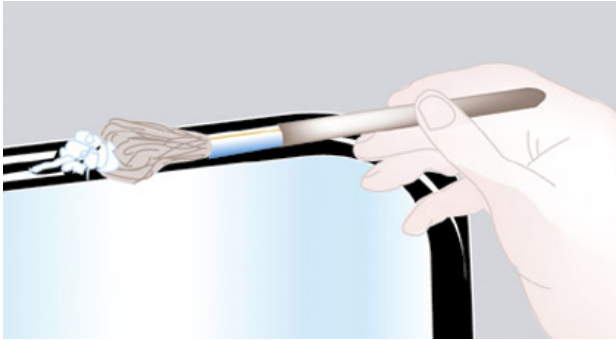
4- Drop the replacement window into the bottom corner first at a slight angle and proceed as far a possible without force



5- Using the hook tool (WRD73) lift the lip of the seal allowing the glass to slip into position, apply more soap / water if required



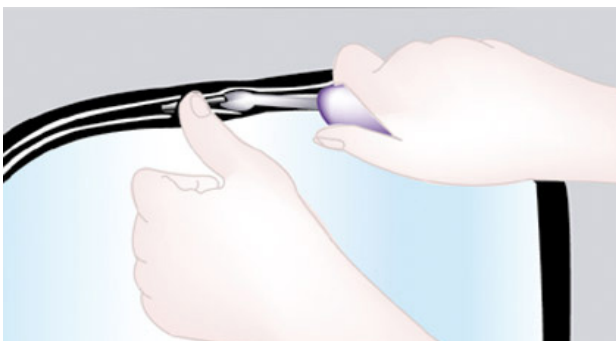
6- The WRD73 tool enables the glass channel to be opened, centralise the window within the seal.



7- Once the main seal and glass are fitted you need to apply the retaining bead, again push soap/water into the seal to make it easier



8- Push bead through handle of tool (WDR73) as shown and through the eye at the end of the tool



9- Starting at the top of the window start to feed the filter strip into the main seal, the tool will open the main seal to allow the filter to be fed in



10- The tool slides in the channel all the time feeding the filter strip through the handle and eye. Move/twist the tool slightly from left to right will assist the process



11- After making the complete loop the tool is removed, and the trim bead should be cut to length allowing a 2 or 3mm overlap so it is compressed when in place



12- The spur on the handle compresses the overlapping filter strip into the channel ensuring a tight joint seal

Finally check inside the cabinet and make sure the seal is seated correctly before putting wiper/washer back in place.



7.6 Replacing Arm Gauntlets

After many hours of washing, the rubber gauntlets will become worn and split. The frequency of the gauntlet replacement will depend on the frequency of usage of the machine.

Contact suppprt@photocentric.co.uk to order replacement parts.

Gauntlets can be easily changed by following the steps described below.



1- Check gauntlet hand position and insert into cabinet



2- Pull gauntlet up and around armhole starting from the bottom



3- Make sure the gauntlet is even and pushed right up over the armhole ring



4- Push jubilee clip over gauntlet



5- Tighten the jubilee clip, removing any slack but allowing for adjustment



6- Make sure the jubilee clip is pushed back over the ring under the gauntlet



7- Tighten jubilee clip



8- Check around armhole for issues



8. Fault Finding

If there is a fault with the machine, the following message (figure 22) will appear on the HMI, below is a list of possible reasons for this message and the appropriate remedies.

Figure 22
Fault message



8.1 Solvent Low

The level of solvent in the IBC will reduce over time, a level transmitter will feed information to the control unit that the solvent is running out and the HMI will prompt the operator.

To clear the fault, check the level in the solvent tank and then refill if necessary.

8.2 Rinse Full

The tank containing the rinse water has reached the float indicating it has reached maximum capacity.

To clear the fault, check the water level in the rinse tank, and if it is at capacity swap it with an empty IBC. Usually after 50 times of use, you need to swap the rinse IBC.

8.3 Pressure Low Fault

This fault will happen if the compressed air in the machine drops below 5 bar pressure.

To clear check the air supply on the digital pressure gauge, check compressed air lines to ensure there are no kinks/ obstructions that may lead to loss of air flow.

When trouble shooting, inspect the machine in the following order:

- 1) Rinse Tank
- 2) Solvent Tank
- 3) Pneumatics

9. Drain Process Flow Diagrams

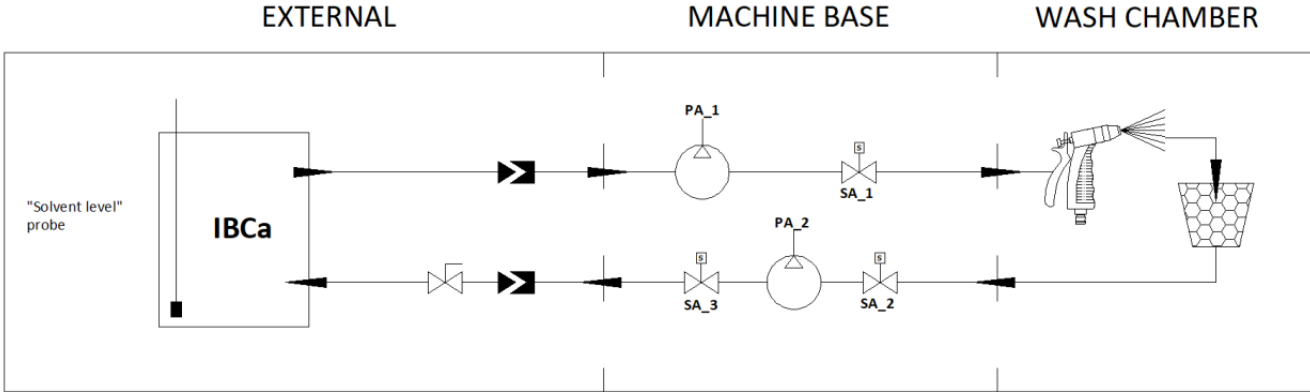


Figure 4 - Solvent drain - Process flow

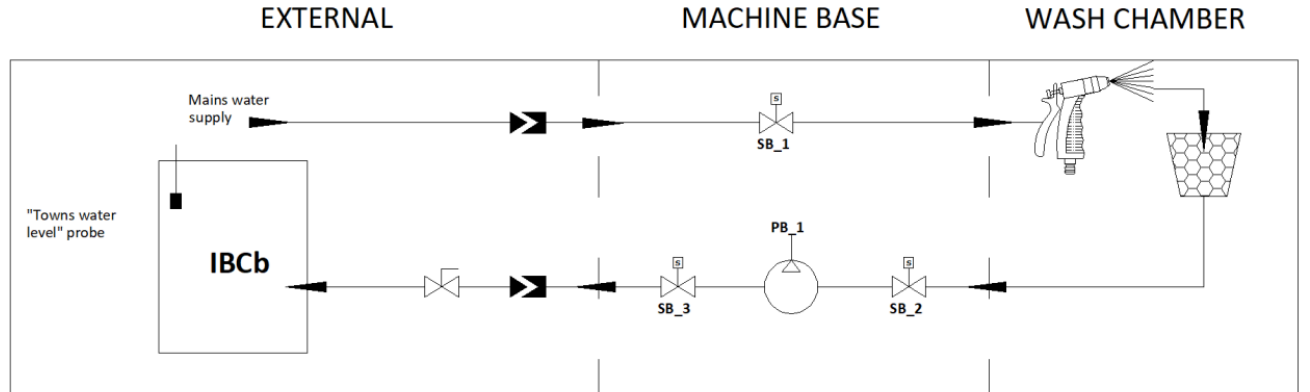
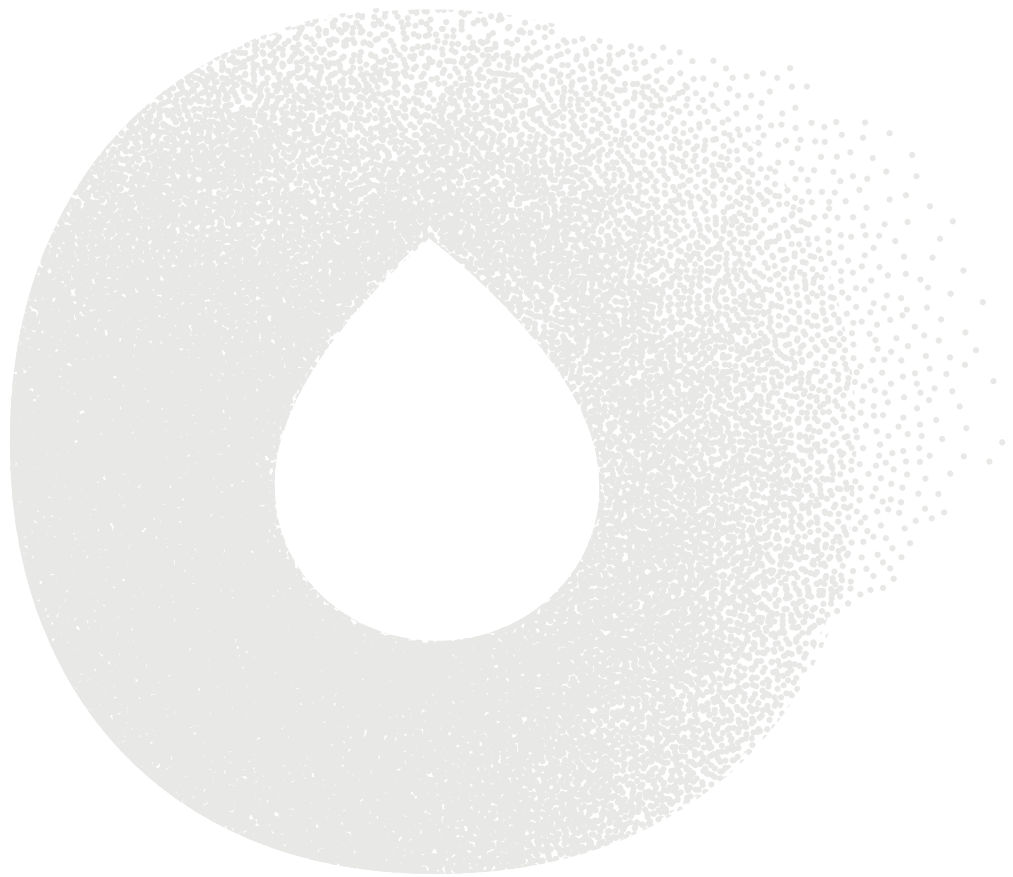


Figure 5 - Towns water drain - Process flow



Photocentric
WASH XL



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