Operation Manual for
VP 548-US Ultrasonic Wash Station

Introduction

This is the user manual for the ***VP 548-US*** ultrasonic wash station. This wash station is designed for cleaning plastic tips, needles and pins used in liquid handling applications. It has a standard SBS microplate footprint and is designed to fit on the deck of most liquid handling robots. It uses high frequency ultrasound to generate an oscillating cavitation field in a liquid bath. This is an effective means of removing organic material that is attached to hard surfaces. The ***VP 548-US*** is equipped with a weir system to provide a constant level of wash liquid and to prevent overflows.

Safety

1. Do not attempt to open the ultrasonic tank (which contains the ultrasonic generator) or control and pump unit. There are high voltages present and there are no user serviceable parts.

2. Water is an effective cleaning agent in an ultrasonic bath. You may add to this a surfactant or a miscible organic solvent. The solution must be at least 50% water.

Note: The tank has not been tested with a range of organic solvents. Operators MUST ensure that the use of solvents in the wash station has been sufficiently investigated such that a hazard is not caused. Operators must also ensure that the solvent mixture does not damage tubing, electrical cables or fittings. V&P recommends that water should be used wherever possible. V&P accepts no responsibility for damage or loss if solvents other than water are used.

3. Do not allow the ultrasonic wash station to operate continuously for more than 30 minutes.

4. Do not attempt to operate the ultrasonic tank when empty or partially full.

5. Do not operate if the base of the ultrasonic wash tank has been immersed in liquid.

6. Do not operate in a hazardous environment or where flammable vapor exists. The ultrasonic wash station is not rated or certified to work in hazardous environments.

7. Clean carefully only with water and detergent. Ensure all electrical parts and connections are kept dry.

8. Do not place fingers in the ultrasonic wash station when it is operating.

9. The unit is designed to operate at ambient temperatures up to +40°C.

Installation

Figure 1 below shows the parts that are included with the VP 548-US.

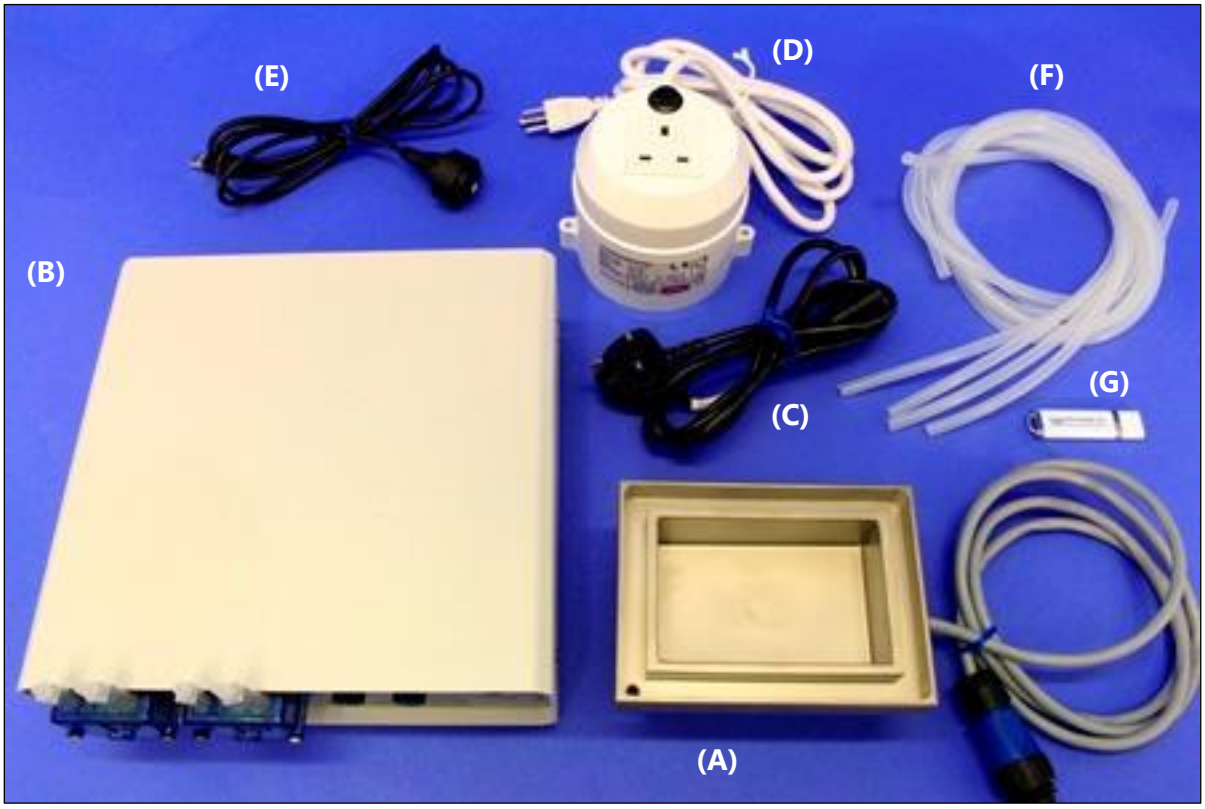


Figure 1.

Parts included in the VP 548-US High Performance Ultrasonic Wash Station:

(A) Ultrasonic Tank
(B) Control and Pump Unit
(C) Power Cord (220/240VAC, 50-60Hz)
(D) Power Converter from 115VAC to 220/240VAC
(E) USB Computer Connection Cable
(F) Tubing to fill and drain Ultrasonic Tank
(G) USB memory stick with software

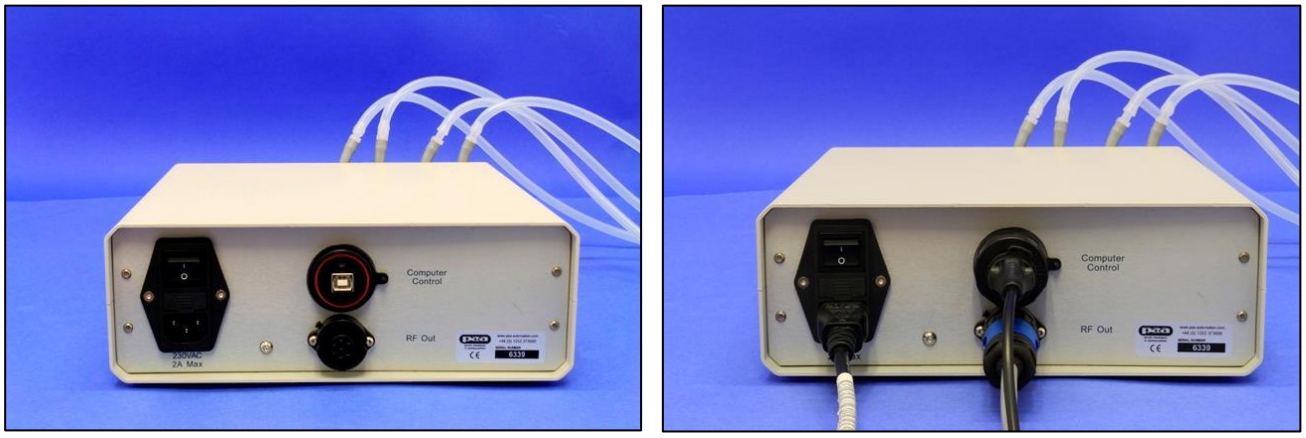


Figure 2. Rear panel connections

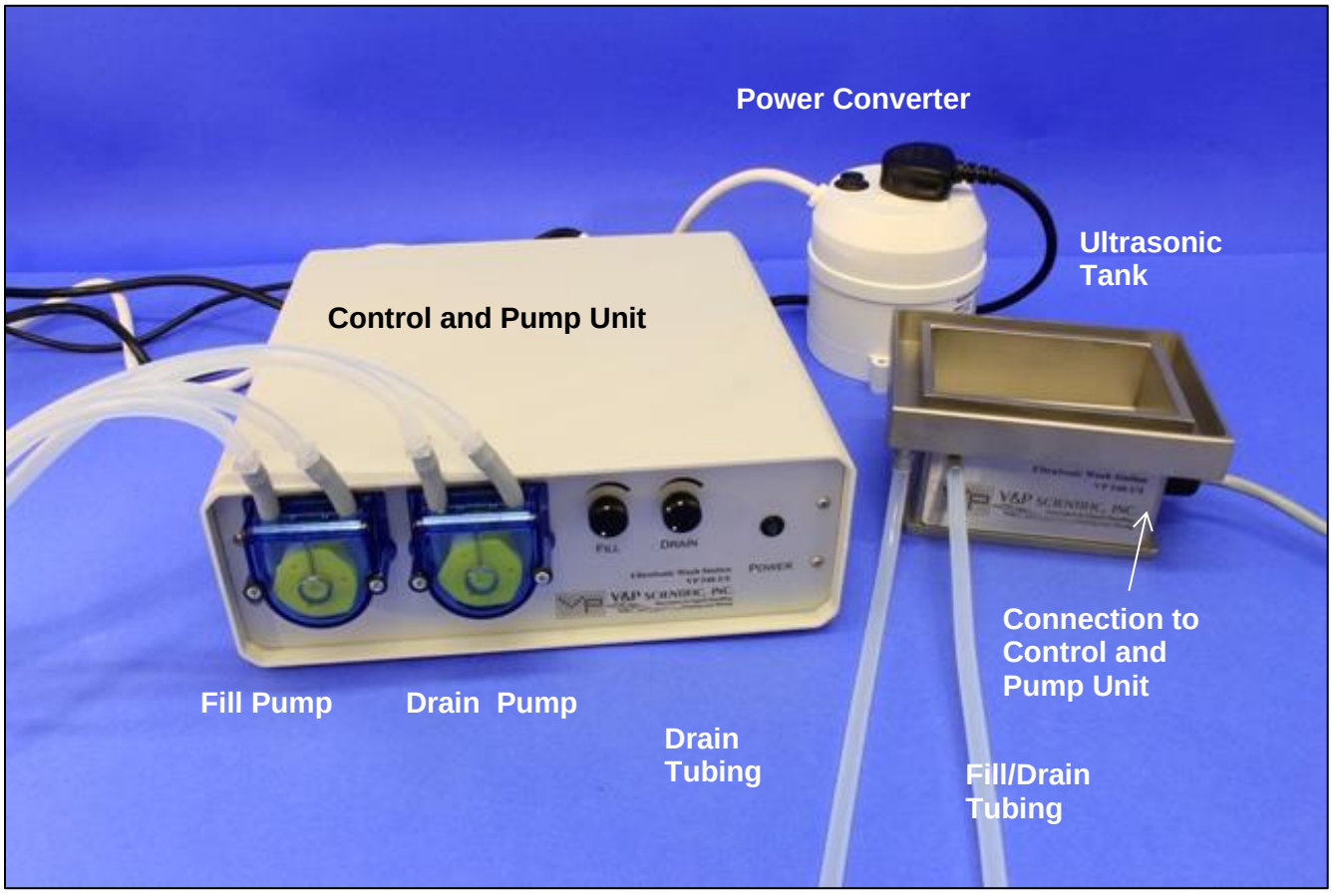


Figure 3. Front panel connections: Control and Pump Unit to Ultrasonic Tank

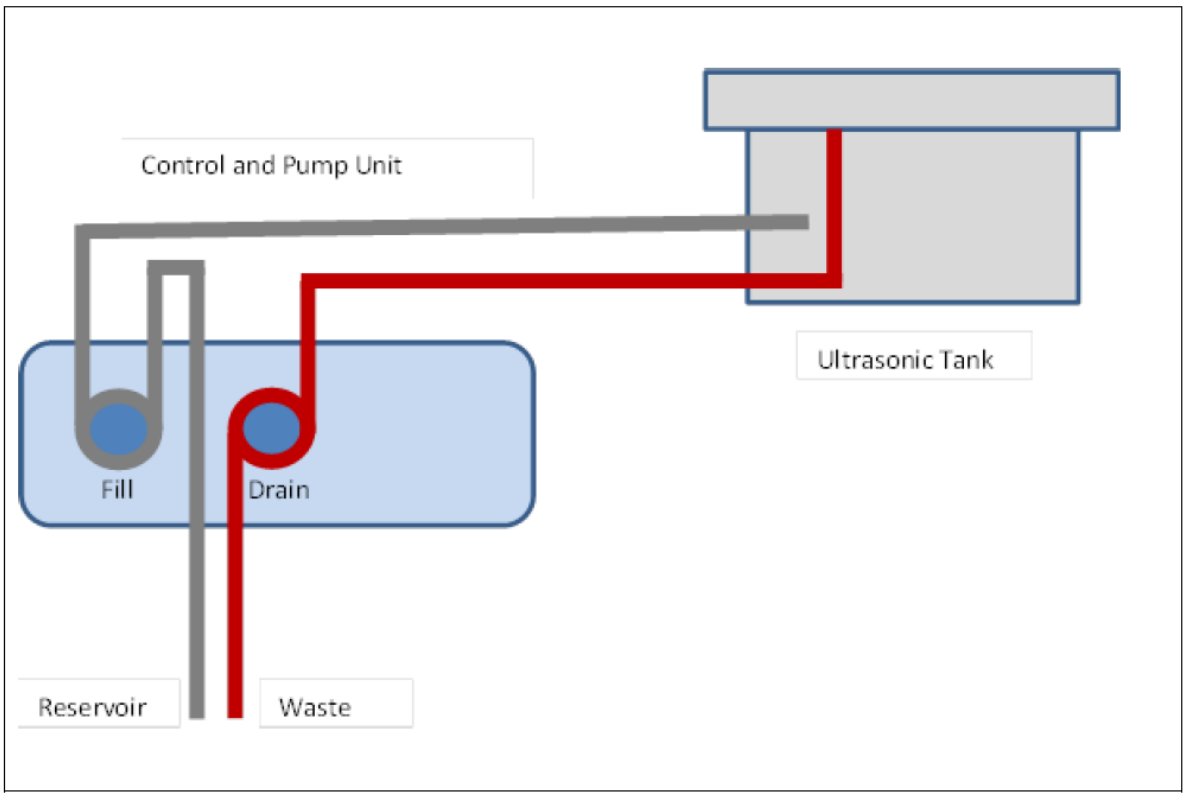


Figure 4. Fill and drain tubing connections.

Connect the fill and drain tubing as shown in Figure 4.
Tubing material must be compatible with the cleaning liquids used.
Ensure that the tubing is connected to the pumps correctly – both pumps operate in normal operation in a clockwise direction. Pump 1 (the fill pump) can be operated in reverse to empty the tank.

Connect the USB socket at the back of the unit to a compatible computer, see Figure 5.
The Control and Pump Unit should be connected to an AC power outlet 220-240 Vac 50/60 Hz with a power rating of at least 150 VA.

Mount the ultrasonic tank on the deck of the liquid handling station (or similar position).
Ensure that the liquid handling robot is able to lower pins/tips into bath without impacting the bath sides.

Ensure the drain pump rate is greater than the inlet pump rate (front panel controls).
It is advisable to fully test the pumps and drainage system at this stage.

The Control and Pump Unit must be installed in a dry environment within 2m of the ultrasonic tank in a dry location.

Operation

Ensure that the bath is primed and full of liquid before use.
Water is an effective cleaning agent. A surfactant will increase the efficiency of the cleaning.
A cleaning time of 15 to 30 seconds is normally required to remove lightly soiled organic material from a tip. For heavily soiled tips a longer cleaning time may be used. However, do not operate the bath for more than 30 minutes continuously.
It is advisable to flush the tank regularly to avoid cross-contamination.
Ensure there is adequate drainage from the weir outlet to avoid overflows.
All ultrasonic cleaning devices produce a level of audible noise while operating. This is within safe limits. The noise level may be reduced by operating the cleaning bath within an enclosure and ensuring the unit is switched off while not actually in the process of cleaning.
Observe safety instructions at the front of this manual.

Verification of Operation

The operation of the ultrasonic cleaning system may be verified by the use of 'Load Test Strips', which are coated with a pre-applied soil, printed on both sides. The strip is placed within a holder and simulates soiling on surgical instruments described in BS2745 and prEN15883.
We recommend the use of Browne STF Load Check (ref 2315). These strips are readily available from a number of suppliers.
The coating is a red colored material, the removal of which is easily observed.
Follow the manufacturer's instructions.

Specifications

- Ultrasonic tank capacity 400ml
- Ultrasonic tank constructed of stainless steel
- Maximum operating temperature 40º C
- Maximum continuous operation 30 minute
- RF operation (ultrasound frequency) ~40 kHz
- Power supply input 220/240Vac, 50-60Hz
- Power requirements <150 VA

Operating with Tip Wash Executable File

Copy the executable Overlord.TipWashUltra.exe to your computer. A folder called TipWash would be an ideal location for it. It does not need to be installed.
Microsoft .NET Framework 4.0 needs to be installed on your computer, if not already installed. This can be downloaded or installed from the memory device supplied with ***VP 548-US***. Click on **dotNetFx40_Full_x86x84** to install it.
You will also need to install a device driver DLL. This is also supplied on the accompanying memory device. Click on **CDM V2.08.30 WHQL Certified**, which is contained within a folder of the same name, to install it.

For detailed instructions on using Overlord.TipWashUltra.exe refer to the supplied help file **Overlord.TipWasherUltra.chm**. A brief summary is included below.

First time of use you will be prompted for the available COM port.

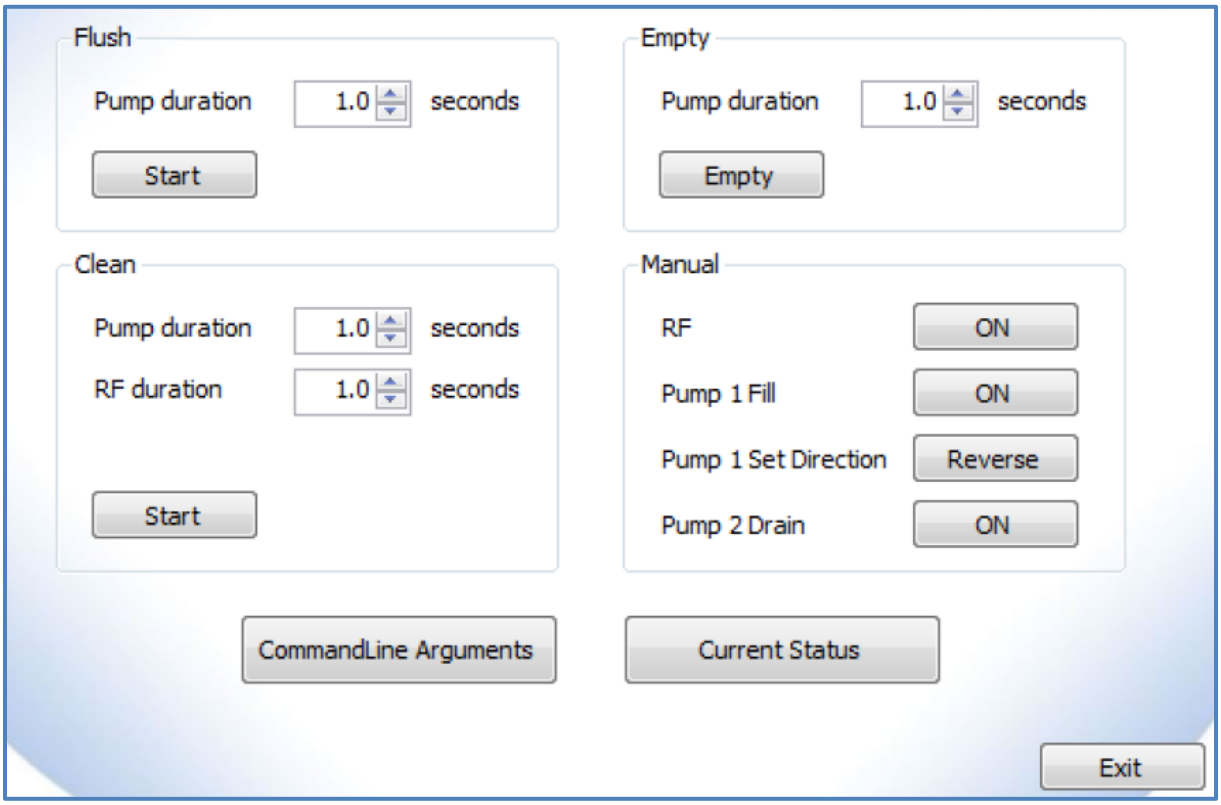
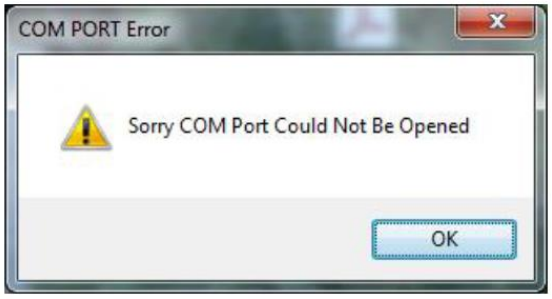


Figure 5. User Interface

It provides low level (Manual) control and three higher level functions (Flush, Clean and Empty).
The manual controls enable each element of the VP 548-US; the ultrasonic power (RF), the fill and empty pumps.
The fill pump can be reversed to empty the tank. Caution: this could lead to contaminating the clean wash liquid reservoir, if this has not been removed.
Flush: operates both pumps and allows the tank to be primed and flushed with clean wash liquid.
Clean: primes and flushes the tank with clean wash liquid and then operates the ultrasonic generator for a defined number of seconds.
Empty: pumps out contaminated wash liquid via the fill pump. Be sure not to contaminate clean wash liquid with liquid that has been used for cleaning.

Trouble Shooting
If you get the message:



Delete the file "Overlord.TipWashUltra.ini", run the program again and it will reassign the COM port.

If the bath fails to operate:
1. Check all electrical connections.
2. Check status of blue Power Indicator Light on the Control and Pump Unit. If this is off, check power connections.
4. All repairs are on a return to manufacturer basis.

Operating from the Command Line
The ***VP 548-US*** can be operated from the Windows command line. The command set is as follows:

Overlord.TipWasherUltra.exe

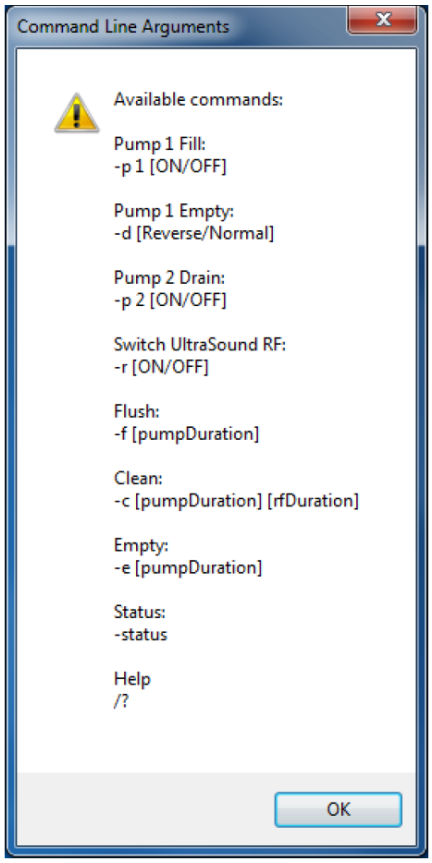


Figure 7 Command Line Arguments

The command line is of the type below. This command switches Pump 2 (Drain) on.

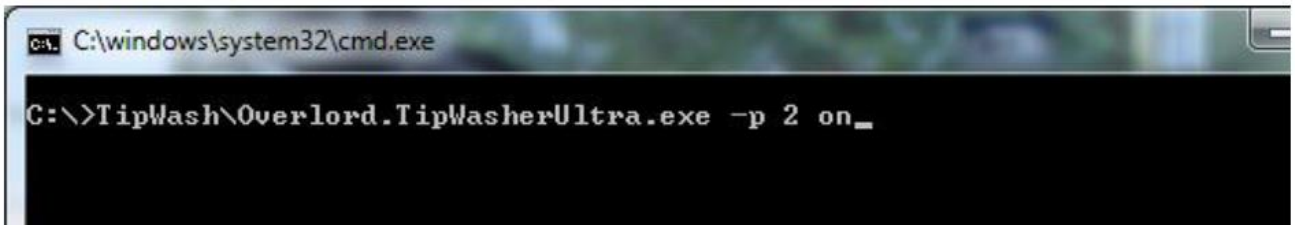


Figure 8. Single Command Line Argument

Note some commands have two parameters see Figure 9 below. This command performs the Clean function – switches Pump 1 (fill) and Pump 2 (Drain) on for 10 seconds, switches them off and then the ultrasound on for 20 seconds.

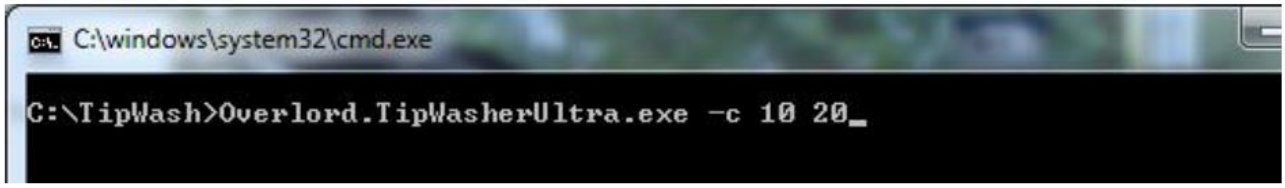


Figure 9. Two Command Line Arguments

Low level command set

	Function	Instruction
1	RF ON	FF 01 01
2	RF OFF	FF 01 00
3	Pump 1 FILL ON	FF 02 01
4	Pump 1 FILL OFF	FF 02 00
5	Pump 1 Set Direction Normal	FF 03 00
6	Pump 1 Set Direction Reverse	FF 03 01
7	Pump 2 DRAIN ON	FF 04 01
8	Pump 2 DRAIN OFF	FF 04 00
9	Status	FF 09 00