Lititz Precision Products

FREEDOM

Ultrasonic Parts Cleaner

Operating Instructions

Introduction

The Freedom ultrasonic small parts cleaner has been designed to be the ultimate in small parts cleaning systems. It features 5 cleaning/rinsing jars, 5 ultrasonic stations, and costs thousands of dollars less than other machines in the marketplace. It allows the user the "Freedom" to do other tasks while the cycle is running.

The Freedom is designed and manufactured and assembled in the USA with USA components and materials. Videos of the Freedom are available on our web site: www.LititzPP.com. Operating instructions and other technical information may be found on our web site under "Documentation"

The Freedom features:

10 user-programmable cleaning cycles

Ultrasonic on/off for each station

Programmable agitate strength and time for each station.

Programmable dryer time

Fully automatic operation

End-of-cycle audible alarm

Polymer non-scratch baskets

Four-line digital display

120 or 240 VAC available

Multi- language (English, Spanish, French, German) operation (220 VAC models only).

Front panel transducer frequency tuning.

Durable metal construction

Made in USA

Machine Setup

Remove the Freedom from it's carton and place upright. It is recommended that the packing materials be saved for future transport of the machine. **Please note that the index table is removable. Keep the Freedom upright at all times unless the index table has been removed.** There is no need to remove the table now, but desired, simply remove the jars (see below) and lift the table off of its center shaft.

Place the Freedom on a level surface. Remove the packing material that is in and around the jar cover. Plug the supplied cord into the power entry on the left rear of the machine, and then into a grounded wall receptacle. The required voltage and current is listed on the rear of the machine. Turn on the machine using the switch located on the power entry module. The "Freedom" splash screen will appear for 5 seconds. To exit from this screen before five seconds, press any button.

The main screen shows 4 options:

Program/Edit a program- Creates a completely new cleaning program or modifies an existing cleaning program

Go Home- Goes to the home position. Note that this is not the load/unload position.

Run a program- Starts a cleaning cycle.

Manual Move- Allows the operator to manually move the index table and lift axis. Note that under certain circumstances options are limited to prevent crashes.

Remove Jars

Press and release button 2 that corresponds to “Go Home”. Wait for the Freedom to go to its home position and stop. Manually lift the jar cover, remove all jars and all packing materials.

Note: The index table ***may*** now be lifted off the Freedom as needed in the future, for cleaning and maintenance. For this reason, keep the Freedom upright at all times unless the index table is removed.

Fill each jar to the level between the two frosted fill arrows, with commercially available cleaning and rinsing solution.

We recommend that the jars be utilized as follows:

Position 1, Jar 1: Pre-clean

Position 2, Jar2: Clean

Position 3, Jar 3: 1st rinse

Position 4, Jar 4: 2nd rinse

Position 5, Jar 5: 3rd rinse

Install the jars in the index table. Twist and apply firm pressure to make sure that they are flat against the index table. The manual move command may be used to lower the jar cover if a cleaning cycle is not planned. Press “Manual Move”. Then “Down”, stopping at the desired position. Then “Cancel”.

Entering Programs

The Freedom has memory for 10 programs. The user may select various parameters for each of the programs. Parameters are:

Agitate time for each of the 5 jars

Agitate strength for each of the 5 jars

Ultrasonic ON/OFF for each jar.

Drying time

NOTE: a time of zero in any agitate time causes that station to be skipped. If all 5 agitate times are set to zero, the program will be a “Dry Only” program.

Program numbers 1-10 have been entered from the factory, but may be modified by the user.

Following is a table of the factory presets:

Program #	1	2-9	10 (Dry only)
Agitate Time Position 1	3minute	5 minutes	0
Agitate Strength Position 1	Medium	Fast	-
Ultrasonic Position 1	On	On	-
Agitate Time Position 2	3 minute	5 minutes	0
Agitate Strength Position 2	Medium	Fast	-
Ultrasonic Position 2	On	On	-
Agitate Time Position 3	3 minute	5 minutes	0
Agitate Strength Position 3	Medium	Fast	-
Ultrasonic Position 3	On	On	-
Agitate Time Position 4	3 minute	5 minutes	0
Agitate Strength Position 4	Medium	Fast	-
Ultrasonic Position 4	On	On	
Agitate Time Position 5	3 minute	5 minutes	0
Agitate Strength Position 5	Medium	Fast	-
Ultrasonic Position 5	On	On	-
Dry Time (Position 6)	6 minutes	8 minutes	9 minutes
Total cycle time	31	43	11

To input a program, from the main screen, press the “Make or edit a program” button. Follow the prompts to modify (as needed) an existing program, or create an entirely new program. At the end of the process press save and, if creating a new program, select a program number (1-10) to store the program by using the up and down buttons.

Loading Parts

Remove the polymer baskets from the machine spindle by grasping the adaptor by it’s knurled surface to prevent rotation. Lift and rotate the basket cage clockwise to release the basket cage and baskets from the machine spindle.

Place the parts to be cleaned in the supplied baskets. The smallest parts should be placed in fine mesh thimble baskets (not supplied). Reinstall the baskets and lid in the basket cage and then install in the basket/cage assembly in the Freedom by lifting and rotating counter-clockwise.

Cleaning Parts

Press the “Run Program” button and select the desired program. The Freedom will complete the program and sound an audible beep at the end of cycle. The display will read “Cycle Completed”.

Transducer Tuning

The resonant frequency of the ultrasonic transducer must be matched to the ultrasonic power supply. During assembly and final testing, Lititz Precision Products takes great care in this procedure. There can be some drift in this setting due to age, excessive heating and other factors that affect the transducer assembly.

To tune the transducer, enter the “manual” mode from the startup screen. Manually index the table and lower the transducer assembly until the transducer nose is immersed in fluid. The fluid must touch the stainless “nose” of the transducer. Turn off the machine using the side power switch. Depress the 3rd button on the front panel while powering on the machine with the power switch, which is located on the left rear panel on the power entry module. Release the buttons after the display backlight illuminates. The “Tuning” screen will appear. Adjust the frequency of the system using the + and – buttons until the desired ultrasonic action is achieved. Press save and then exit and the setting will be saved. The nominal resonant frequency is approximately 38,000 Hz.

Language

The default language is English. Spanish, German and French may also be selected for 220 VAC machines being exported from the USA. To change the language, first turn off the machine using the switch on the power entry module. Then, depress the fourth button on the front panel, while powering on the machine with the power switch, which is located on the left rear side on the power entry module. Release the button after the display backlight illuminates. The “language” screen will appear. Select the desired language by pressing the appropriate button on the front panel. After a few seconds, the Freedom will automatically advance to its startup display with the selected language displayed.

Power Failure

In case of power failure during a cleaning cycle, the lift may be raised manually. Disconnect the power cord at the power entry. Remove the 4 screws holding the front cover plate. Turn the white encoder ring manually to raise the basket. Replace the front cover plate using the same short screws that were removed.

Troubleshooting

Symptom	Possible fault	Remedy
No machine operation, display blank	No power at receptacle	Plug into a powered receptacle
	Cord loose in power entry	Insert firmly
	Power switch off	Press switch to “ON”

	Blown main fuse in power entry of machine	Replace fuse located In power entry (left side of machine)
No ultrasonic action, display normal	Fluid levels too low	Raise fluid level to proper level
	Internal ultrasonic fuse blown	Contact Lititz Precision
	Transducer not tuned properly	Tune transducer
Won't run a program	No program times entered	Enter program
No dryer heat, display normal	Internal dryer fuse blown	Contact Lititz Precision
	110/220 threshold set too low	Adjust 110/220 threshold. Contact LPP for special access.
Dryer too hot	Dryer fan blocked	Unblock dryer fan
Lift overcurrent- up or down. LC-UP or LC-DN on display	Lift blocked/Clutch slipping	Remove blockage using manual move command
	Lift current set too low	Raise up or down current limit. Contact LPP for special access.
	Lift safety clutch slipping.	Contact LPP for clutch adjusting information.
Index overcurrent-forward or reverse. LC-IF or LC-IR on display.	Index blocked	Remove blockage using manual move command
	Index current limit set too low.	Raise forward or reverse current limit. Contact LPP for special access.
	Lift cltch slipping	Lift jammed. Remove jam.
Line 1 Line 2 On Display Line 3 Line 4	Poor quality AC supply current. LCD ready flag delayed	Contact Lititz Precision

Technical Specifications

Weight: 75 Pounds (31 Kg)

Power requirements: 120 VAC or 240 VAC 50 or 60 Hz selected. 6.3 amps max.

Ultrasonic frequency: 38 KHz Nominal.

Jar Capacity: 16 Ounces (500 ml). 64mm diameter baskets. 40mm total height.

Dimensions: 16” wide, 17” deep, 27” high (41 cm, 43 cm, 69 cm)

Languages: English, Spanish, French, German (on exported 220 VAC machines)

Vent Fan

A 4” (10 cm) duct may be used to vent the Freedom outside. The optional adaptor may be attached to the rear on the Freedom using its pressure sensitive adhesive. Contact Lititz Precision for more information.

Parts and service

Please contact the following for any service parts, or to order optional parts and accessories.

Lititz Precision Products

Lititz PA USA

www.LititzPP.com

Time Machine Repair-Dale Sutton

New Jersey USA

www.TimeMachineRepair.com

Addendum

Configuration Screens

The code for entering the “Configuration” screens will be divulged on a need to know basis. These screens govern the internal operation of the machine. Changes may affect the safety of the machine operator, and or the physical machine. Please contact the factory on how to access this information.

Following are the screens available and their associated functions. Each successive screen may be accessed by pressing the “Up” or the “Down” button. In general, the “DEFAULT” indicates the factory recommended setting. The “E2” indicates the currently stored value in the E-Squared (EEPROM) of the processor. “Go to command” (GotoCmd) allows changes in that particular screen. “Exit Configuration” (ExitCfg) returns you to normal machine operation.

110 VAC Heater PWM (Pulse Width Modulation) setting. Default is 80%. This changes the heater power while the machine is operation on 110 VAC. See “Set Line Volt Threshold” below.

220 VAC Heater PWM (Pulse Width Modulation) setting. Default is 18%. This changes the heater power while the machine is operation on 220 VAC. See “Set Line Volt Threshold” below.

Low Speed Agitate Ramp Time. Elapsed time in seconds that it takes for the agitate to accelerate from 0 RPM to “Low Speed Amplitude” (see Low Speed Amplitude screen below). Also the time to decelerate from “Low Speed Amplitude” speed to 0 RPM.

Low Speed Agitate Amplitude. The motor speed as a percent of full speed (1350 RPM). A setting of 40 for example, sets the maximum speed of the agitate motor at 40% of 1350 = 540 RPM

Medium Speed Agitate Ramp Time. Elapsed time in seconds that it takes for the agitate to accelerate from 0 RPM to “Medium Speed Amplitude” (see Medium Speed Amplitude screen below). Also the time to decelerate from “Medium Speed Amplitude” speed to 0 RPM.

Medium Speed Agitate Amplitude. The motor speed as a percent of full speed (1350 RPM). A setting of 40 for example, sets the maximum speed of the agitate motor at 40% of 1350 = 540 RPM

High Speed Agitate Ramp Time. Elapsed time in seconds that it takes for the agitate to accelerate from 0 RPM to “High Speed Amplitude” (see High Speed Amplitude screen below). Also the time to decelerate from “High Speed Amplitude” speed to 0 RPM.

High Speed Agitate Amplitude. The motor speed as a percent of full speed (1350 RPM). A setting of 40 for example, sets the maximum speed of the agitate motor at 40% of 1350 = 540 RPM

Spinoff Ramp Time. The time in seconds that it takes for the agitate motor to go from 0 RPM to the “Spinoff Amplitude”.

Spinoff Amplitude. The speed of the spinoff. The motor speed as a percent of full speed (1350 RPM). A setting of 40 for example, sets the maximum speed of the motor at 40% of 1350 = 540 RPM

Dry Ramp Time. The time in seconds that it takes for the agitate motor to go from 0 RPM to the “Dry Amplitude”.

Dry Amplitude. The speed of the dryer. The motor speed as a percent of full speed (1350 RPM). A setting of 40 for example, sets the maximum speed of the motor at 40% of 1350 = 540 RPM

Agitate Motor Tests. Allows the testing of the agitate ramp times and amplitude without leaving the configuration screens. The best method is to power on the Freedom and use the manual move keys to lower the basket to the agitate height. Turn off the machine. Power on the machine in the “Machine Configuration” mode. Modify the agitate settings. Test the settings. Repeat as required.

Agitate Height. Sets the vertical position of the agitate axis during the agitate portion of the automatic cleaning cycle. The setting is in “ticks”. There are four ticks of the encoder for each revolution of the lead screw. The pitch of the lead screw is .370 inches. Therefore, one tick = . 092” (2.35mm).

Spinoff Height. Sets the vertical position of the lift axis during the spinoff portion of the automatic cleaning cycle.

Dry Height. Sets the vertical position of the lift axis during the dry portion of the automatic cleaning cycle.

Lid Height. Sets the vertical position of the lift axis during the Load/Unload portion of the automatic cleaning cycle.

Index Forward Threshold. Sets the current limit for the index axis in the forward direction. The first 200 milliseconds are ignored to allow the motors to come up to speed. The ADC is a number that is proportional to the actual current used, and corresponds to the AVG ADC Lift & Index value

(see below). The threshold must be set higher than the AVG ADC Lift & Index Value. Please note that because the current of the index motor varies considerably throughout each revolution, extra head room is needed for this axis. Following are the correlations between the ADC and the motor current.

- 100 Ma ADC Count: 163
- 125 Ma ADC Count: 204
- 150 Ma ADC Count: 245
- 175 Ma ADC Count: 286
- 200 Ma ADC Count: 327
- 225 Ma ADC Count: 368
- 250 Ma ADC Count: 409
- 275 Ma ADC Count: 450
- 300 Ma ADC Count: 491
- 400Ma ADC Count: 655
- 500 Ma ADC Count: 819

Index Reverse Threshold. Sets the current limit for the index axis in the backward direction. The first 200 milliseconds are ignored to allow the motors to come up to speed. The ADC value is a number that is proportional to the actual current used, and corresponds to the AVG ADC Lift & Index value (see below). The threshold must be set higher than the "AVG ADC Lift & Index Value". Please note that because the current of the index motor varies considerably throughout each revolution, extra head room is needed for this axis.

Lift Up Threshold. Sets the current limit for the lift axis in the up direction. The first 200 milliseconds are ignored to allow the motors to come up to speed. The ADC value is a number that is proportional to the actual current used, and corresponds to the "AVG ADC Lift & Index" value (see below). The threshold must be set higher than the "AVG ADC Lift & Index"

Lift Down Threshold. Sets the current limit for the lift axis in the down direction. The first 200 milliseconds are ignored to allow the motors to come up to speed. The ADC value is a number that is proportional to the actual current used, and corresponds to the "AVG ADC Lift & Index" value (see below). The threshold must be set higher than the AVG ADC Lift & Index

Set Ultrasonic Frequency. Sets the resonant frequency of the ultrasonic transducer.

Set Beeper On/Off. Allows the beeper to be disabled. Originally used for our internal testing and machine evaluation during "Set Run Continuous" (see below), we have left this in as an operating option.

Set Run Continuous. Allows the Freedom to run a program continuously and repeat this program pausing for 30 seconds between each cycle. Originally used for our testing and machine evaluation "Set Run Continuous" has been left in the configuration screen as an operating option.

Set Line Volt Threshold. This sets the threshold for 110/220-volt operation. It is set as follows: The machine is powered up under 110 VAC. The number is noted. The machine is powered up under 220 VAC. The number is noted. The threshold should be set (as close as possible) to the average of the 110 and 220 values. This only affects the dryer duty cycle. A machine operating with the threshold set incorrectly could have very low heat level when running on 110 VAC or could

blow the internal heater fuse located in the upper electronics cabinet on the processor board when running on 220 VAC.

AVG ADC Lift & Index. This screen shows the average current values since the machine was new, or since the values were last manually reset on the configuration screen.

System Status. Shows the hardware (PCB) revision, software revision and indicates whether the machine is sensing 110 or 220 volt. See “Set Line Voltage Threshold” above.

Reset Factory Defaults. CAUTION. **This resets ALL settings back to their factory defaults**. All user programs, currents, frequencies, amplitudes, times, heights etc. will be reset. USE WITH CAUTION to avoid a lot of unnecessary work.