

LavoWare Pro Series



INSTRUCTION MANUAL

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SAFETY:

-  **Make sure that the pressure at the rinse aid injection point is not higher than 40PSI.**
-  **Check that the suction hoses are inserted in the correct product.**
-  **Use a multimeter to check all the electrical connections on the LavoWare Pro. Applying the incorrect voltage could permanently damage the equipment. Lavo's Warranty does not cover mistakes with electrical connections. Do not connect to power supplies subject to widely fluctuating voltages and/or peaks of current. When making electrical connections, refer to the wiring diagram in this manual.**
-  **Check the voltage on the main power supply and make sure that it is between 80 and 265 VAC.**
-  **CAUTION: LavoWare Pro provides a high voltage at the transformer connection. Always turn off the power supply before doing any maintenance work on the equipment.**
-  **CAUTION: During installation and when making electrical connections, disconnect the power supply to the dishwasher.**
-  **Failure to follow the information provided in this manual could harm people or property, and compromise the way the equipment operates or damage it.**

Introduction

The LavoWare Pro is a versatile dosing system for all of your ware washing needs. The intuitive design allows for dispensing up to 3 chemicals, whether they are all liquid, or a single solid detergent with two liquids. The LCD display enables easy setup and installation. The LavoWare Pro can be used with single rack or conveyor dishwashers.

 **Please read this manual carefully, paying particular attention to the warnings and cautions related to the installation procedures. Always apply the necessary safety procedures, including the use of adequate personal protective equipment for your face, eyes, hands and clothing.**

 **Before proceeding with installation, read this manual and select the relevant operating mode:**

1. Review the package contents, technical specifications, and the operating principles.
2. Connect the plumbing, mechanical and the electrical connections.
3. Program the dispenser according to your application demands.

Check the contents of your package:

QTY	Check	Description
1		LavoWare Pro
2 or 3		Foot valves
1		Detergent injector
1		Rinse Injector
1		Sanitizer injector (3 Product)
1		Conductivity probe with wiring
1		Mounting Hardware: 2 screws, anchors, bracket
1		Conductivity probe installation kit (Optional)
3		Phoenix Connectors

Technical Specifications

Power-supply requirements	100-240 VAC (24 VAC: using additional optional module) 50/60 Hz
Signal Voltage:	24-240 VAC or 160-240 VAC
Consumption	20W
Fuse	1.6A
Detergent Pump Flow	0.25 to 2.4 GPH
Rinse Pump Flow	.5GPH @ 40PSI
Sanitizer Pump Flow	.5GPH @ 40PSI
Conductive Probe Range	0 mS to 10 mS
Inductive Probe Range	1 mS to 50 mS
Case Rating	IP 65

Installation

Attach the equipment to a wall near the dishwashing machine (using the wall anchors supplied in the pack). It is best to keep the appliance at a height that is within 5 ft. of the chemical container. Make sure to follow all applicable legal regulations related to electrical and plumbing connections to make sure that the system is compliant. Refer to the wiring diagrams for the dishwashing machine when making electrical connections. Make sure all power is disconnected prior to starting the installation.

CAUTION: Do not install the equipment near steam outlets as this could cause a short circuit, resulting in permanent damage to the equipment.

Installing the LavoWare Pro near the steam vents of the dishwasher may cause the LavoWare Pro circuit board to overheat, which could cause damage or result in operating problems.

MOUNTING THE DISPENSER

- Find a suitable position for installing the LavoWare Pro
- Use the brackets and material supplied for installation.
- Using the bracket as a drilling template, mark out the position of the holes.
- Use a drill to make the holes in the wall.
- Put the wall anchors in the holes.
- Fix the brackets in position (flat side against the wall with the holes at the bottom), using the screws provided.
- Insert the bracket you have just fixed to the wall in its housing in the back of the LavoWare Pro. (Fig. 1).
- To open the LavoWare Pro, unscrew the upper screws on the front cover by $\frac{1}{4}$ turn, and hold the cover until it is fully open.

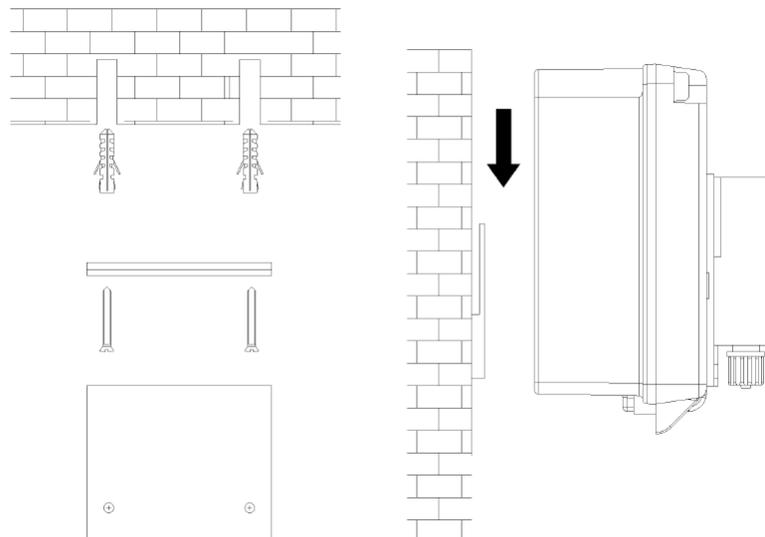
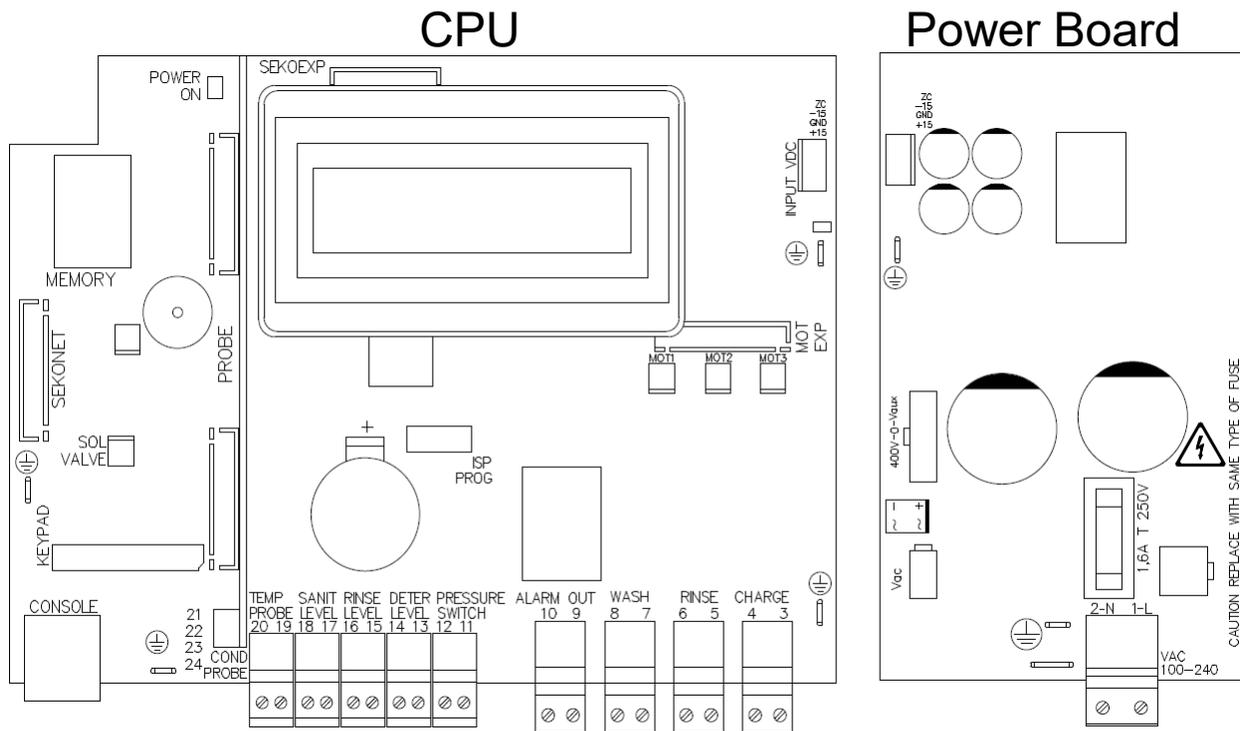


Fig. 1

CB Diagram



Signal	Type of Signal	Connection	Type
Power Supply	VAC (24 or 115-230)	LN (1-2)	INPUT
Charge SIGNAL	VAC (24 or 115-230)	CHARGE (3-4)	INPUT
Rinse SIGNAL	VAC (24 or 115-230)	RINSE (5-6)	INPUT
Wash SIGNAL	VAC (24 or 115-230)	WASH (7-8)	INPUT
Alarm output	Dry contact	ALARM OUT (9-10)	OUTPUT
Pressure switch	Dry contact	PRESSURE SWITCH (11-12)	INPUT
Detergent level	Dry contact	DETER LEVEL (13-14)	INPUT
Rinse aid level	Dry contact	RINSE LEVEL (15-16)	INPUT
Sanitizer level	Dry contact	SANIT LEVEL (17-18)	INPUT
Temperature probe	PT100	TEMP PROBE (19-20)	INPUT
Conductivity probe	VDC (0-5V)	COND PROBE (21-22)	INPUT
Inductive probe	VDC (0-5V)	COND PROBE (21-22-23-24)	INPUT
Console interface	VDC (0-5V)	CONSOLE	INLET-OUTLET
External memory	VDC (0-5V)	MEMORY	INLET-OUTLET
Keypad	VDC (0-5V)	KEYPAD	INPUT
Solenoid valve piloting	VDC (0-5V)	SOL VALVE	OUTPUT
Detergent piloting	VDC (0-5V)	MOT1	OUTPUT
Rinse aid piloting	VDC (0-5V)	MOT2	OUTPUT
Sanitizer piloting	VDC (0-5V)	MOT3	OUTPUT

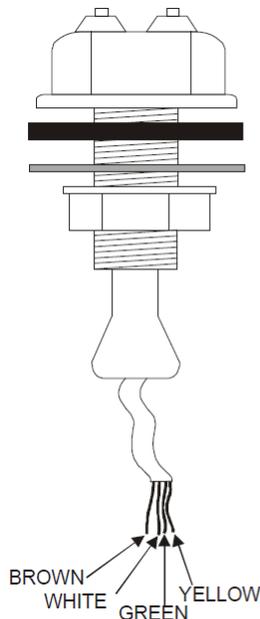
CAUTION: LavoWare Pro provide high voltage at the transformer connection. Always switch off the power supply before doing any maintenance work on the appliance.

Use a multimeter to check all the electrical connections on the LavoWare Pro. Applying the incorrect voltage could permanently damage the dispenser and such damage is not covered by the warranty. Do not connect to power supplies subject to widely fluctuating voltages and/or peak currents. When making any electrical connections, refer to the wiring diagram in this manual.

All wiring must be carried out in compliance with local regulations for electrical connections.

Probe Installation

Connect the wires for the probe to the terminals **19, 20, 21 and 22**, with the coloring as follows:



- BROWN WIRE – **TERMINAL 19**
- WHITE WIRE – **TERMINAL 20**
- GREEN WIRE – **TERMINAL 21**
- YELLOW WIRE – **TERMINAL 22**

The system with this connection recognizes that the temperature sensor PT 100 is not connected and the LavoWare Pro automatically compensates the temperature at 77°F .

CAUTION: STRIP THE BLACK WIRE AND CONNECT TOGETHER THE TWO WIRES INSIDE, AND CONNECT THEM TO THE RELEVANT TERMINAL.

CAUTION: THE COLOR CODING MUST BE FOLLOWED CLOSELY, SO AS NOT TO CAUSE FALSE MEASUREMENTS OR TO NULLIFY READINGS TAKEN.

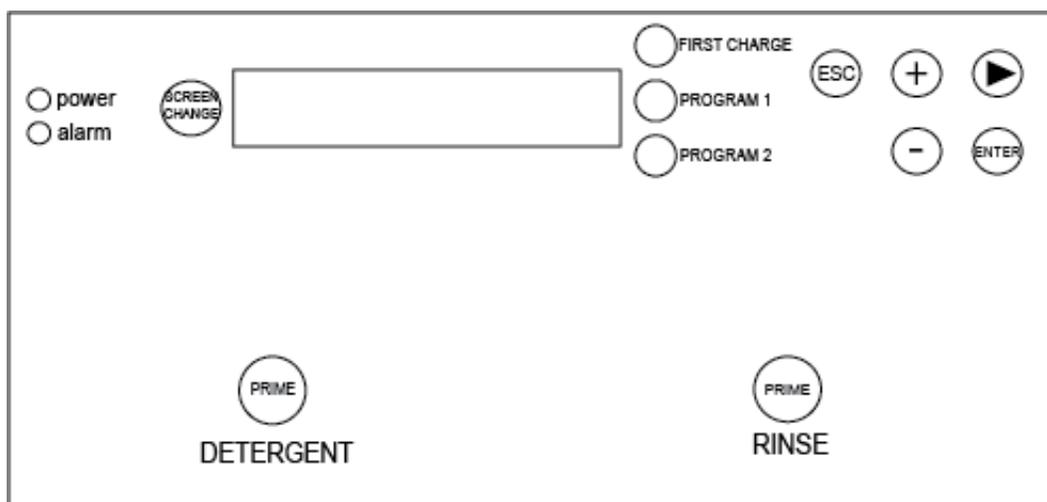
Electrical connection for the level probes (optional)

Connect the detergent level probe wires to the DETER LEVEL 13-14 terminal on the circuit board.

Connect the rinse aid level probe wires to the RINSE LEVEL 15-16 terminal on the circuit board.

Connect the descaler level probe wires to the SANIT LEVEL 17-18 terminal on the circuit board

Functionality



Key	Function
First charge	This is needed when you want to dose the detergent during the first charge without connecting the cable to the charge solenoid valve.
Detergent pump priming	When this key is pressed the detergent pump starts to run for 60 seconds with a counter on the display that indicates the time. If you wish to stop the pump before the 60 seconds have passed, press the key again.
Rinse aid pump priming	When this key is pressed the rinse pump starts to run for 60 seconds with a counter on the display that indicates the time. If you want to stop the pump before the 60 seconds have passed, press the key again.
Sanitizer pump priming	When this key is pressed the sanitizer pump starts to run for 60 seconds with a counter on the display that indicates the remaining time. If you want to stop the pump before the 60 seconds have elapsed, press the key again.
Screen Change	This key is used to modify the display mode.
ESC key	This is used to exit the menu being used and go to the one on the next level up
UP key (+)	This key is used to increase letters and numbers when setting the parameters
NEXT key (+)	When this key is pressed the sanitizer pump starts to run for 60 seconds with a counter on the display that indicates the remaining time. Once it reaches zero the pump stops. If you wish to stop the pump before the 60 seconds have passed, press the key again.
DOWN key (-)	This key is used to decrease letters and numbers when setting the parameters.
ENTER key	This key is used to confirm the modifications to the settings just modified or to proceed
Program 1	This key is used to select the Program 1 during manual activation mode
Program 2	This key is used to select the Program 2 during manual activation mode
Descal key	This key is used to activate the Descal mode (only in 3 pump version)

LED	Description
GREEN LED	The LED is switched on permanently when the LavoWare Pro is powered

Menu Tree

MENU TREE

Below are the options that will be available once you access the system, from left to right.

To access the programming menu

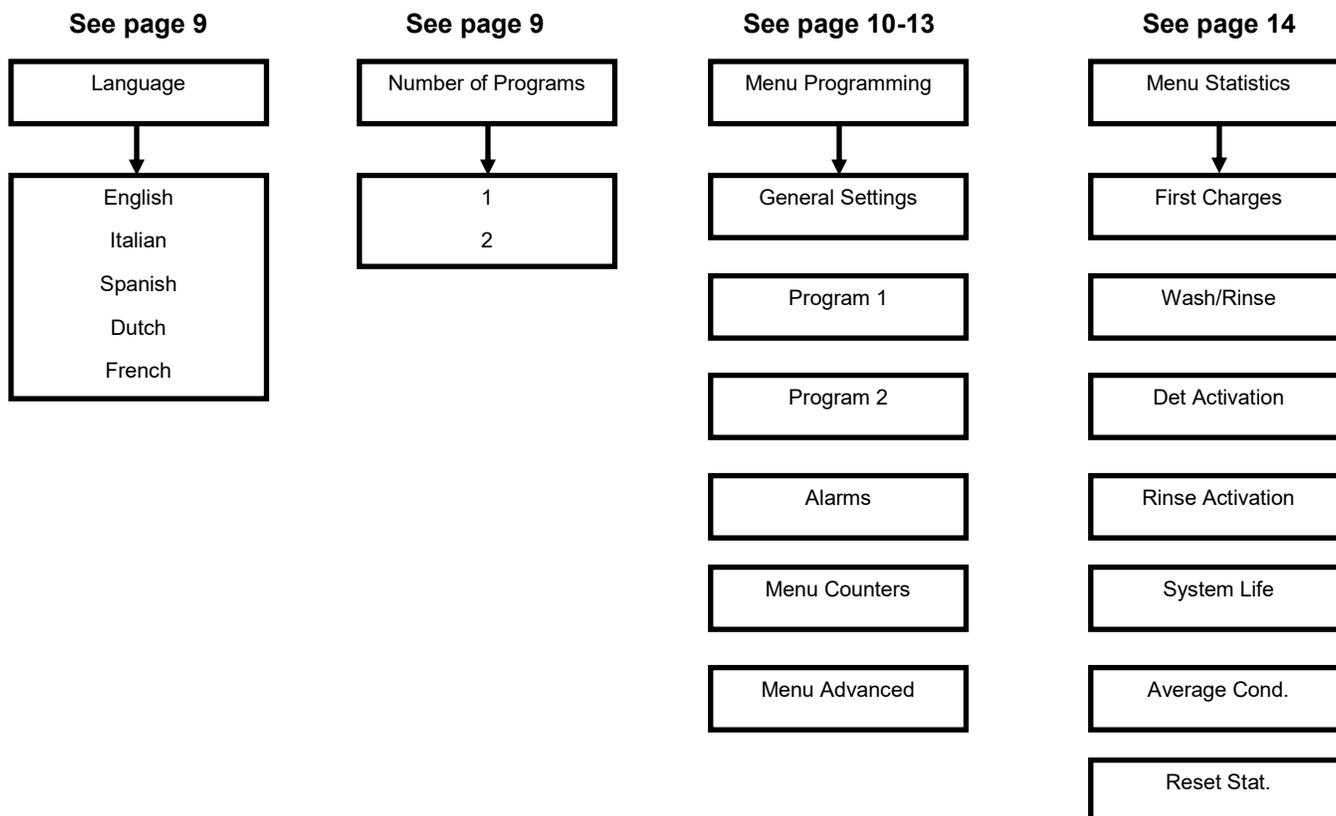
Hold "Enter" -> Enter Password" (Factory default is 0000)

"+" to advance the menu

"-" to go back in the menu

"Enter" to select

"Esc" to back up a menu



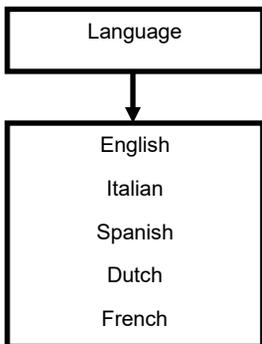
Language & Programs

PROGRAMMING BEGINS HERE

To access the programming menu

- Hold “Enter” -> Enter Password” (Factory default is 0000)
 - “+” to advance the menu
 - “-” to go back in the menu
 - “Enter” to select
 - “Esc” to back up a menu

MENU 1: SELECTING THE LANGUAGE

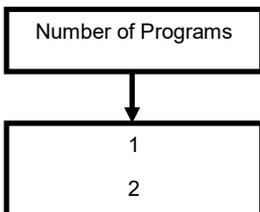


The language menu gives you the ability to select the primary language for the dispenser.

To select a language:

1. Press enter
2. Use the “+” and “-” to toggle between languages
3. Press enter again to select the language.

MENU 2: SELECTING THE NUMBER OF PROGRAMS

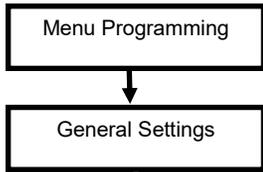


Selecting the number of programs allows you to have a dispenser that has multiple forms of operation, for example, probe or probeless. The dispenser allows you to allow the end user to select the mode of operation or to do it automatically.

To select a language:

1. Press enter
2. Use the “+” and “-” to toggle between the number of programs (1 or 2)
3. Press enter again to confirm the number of programs.

Menu: Programming



1. Press ENTER to access the menu
2. Use the "+" and "-" to toggle between options
3. Press enter again to confirm the selection.
4. **Press "ESC" to move back to the former menu.**

Dishwasher

Select whether your dish machine is a single rack or conveyor. Follow the chart below for the dish machine you are working with.

SINGLE TUB

Single Tub
Select Voltage

SV Rinse
Select Voltage

Wash Pump
Select voltage range

TUNNEL

SV Charge
Select Voltage

SV Rinse
Select Voltage

Wash Pump
Select Voltage

NOTE: WASH PUMP ONLY SHOWS IF YOUR CONDUCTIVITY IS SET TO Yes.
If you run in TIME mode, you will skip the conductivity menu below.

NOTE: CONDUCTIVITY BAND ONLY SHOWS IF YOUR CONDUCTIVITY IS SET TO YES.
If you run in TIME mode, you will skip the conductivity menu below.

Conductivity
Yes/No

Program Activation

Rinse Duration
Continue or set a time

Conductivity
Band % = 80/20

Password1
Admin Password

Password2
End User Password

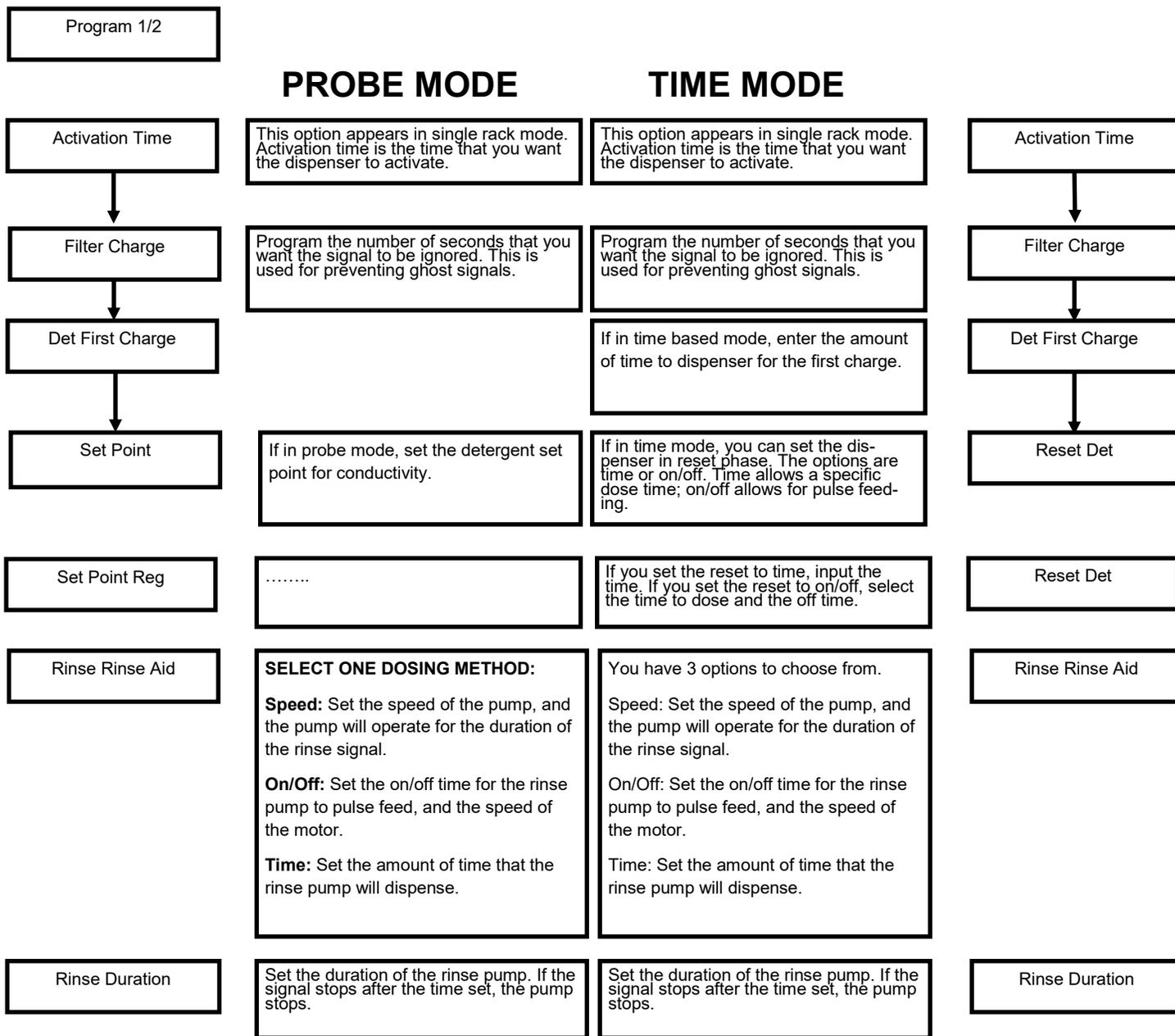
Select if the program will be manually activated or automatically activated by signal.

Continue will run for the duration of the signal. If you set a time, the rinse pump will run for the time set.

Press ESC to go back to the main menu. Press + to access Program 1 and/or 2.

Programming continued on the next page.

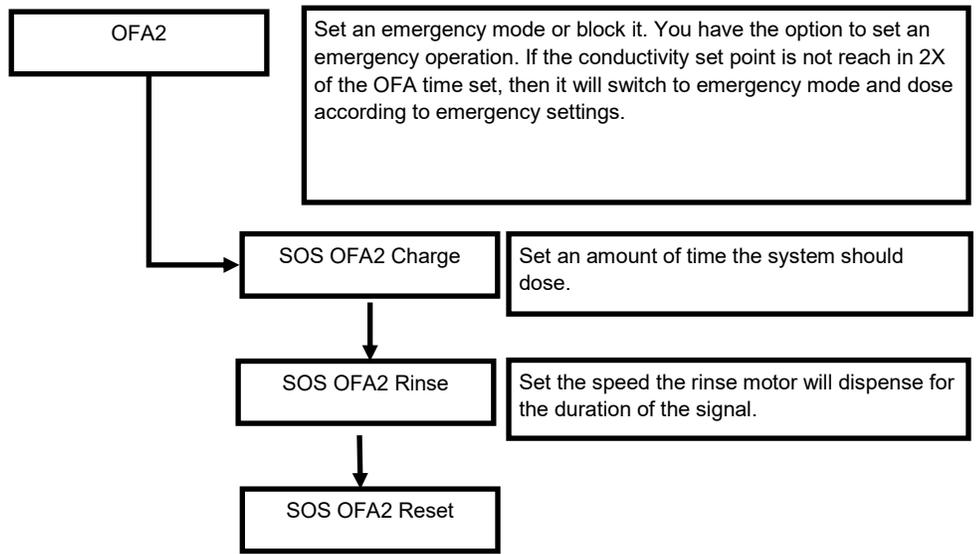
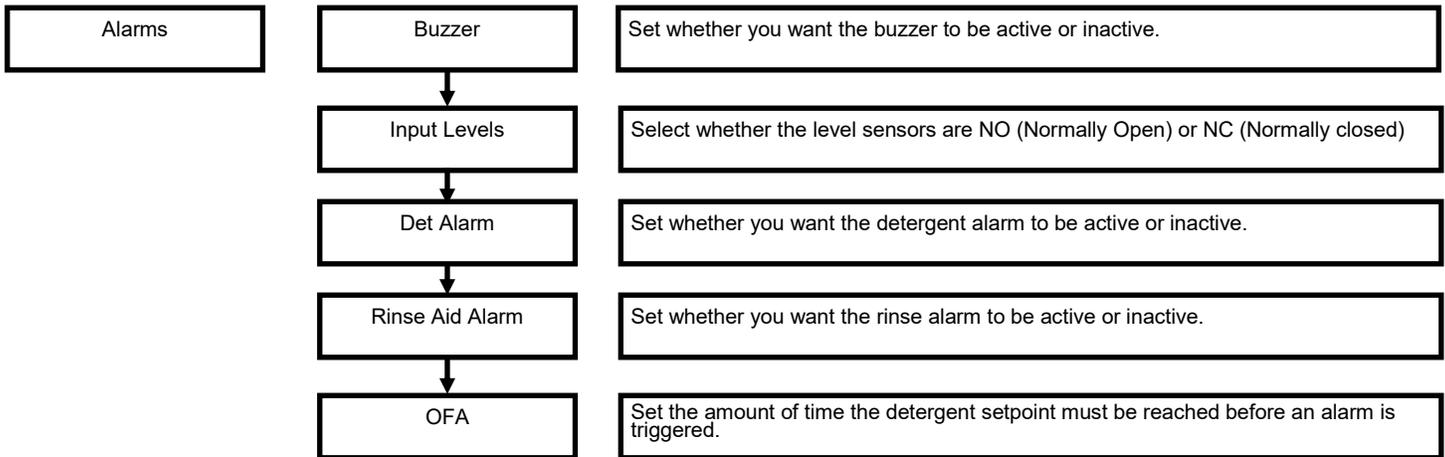
Menu: Program 1 (and 2)



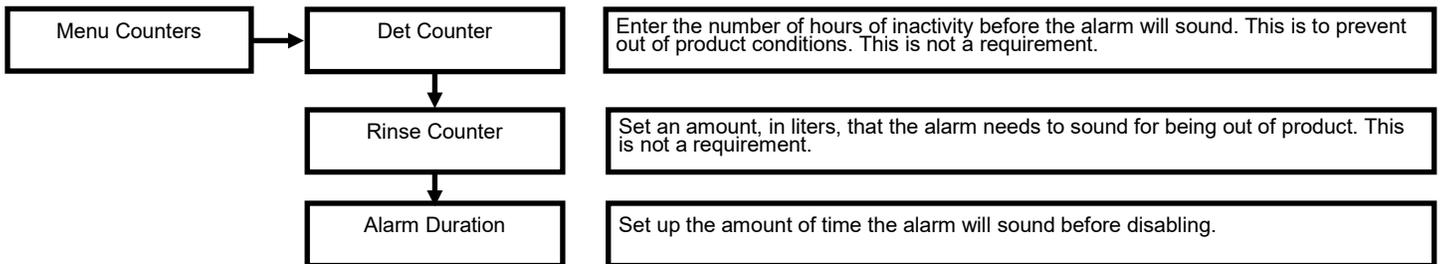
Press ESC to go back to the main menu. Press + to access ALARMS menu

Programming continued on the next page.

Menu: Program 1 and Counters



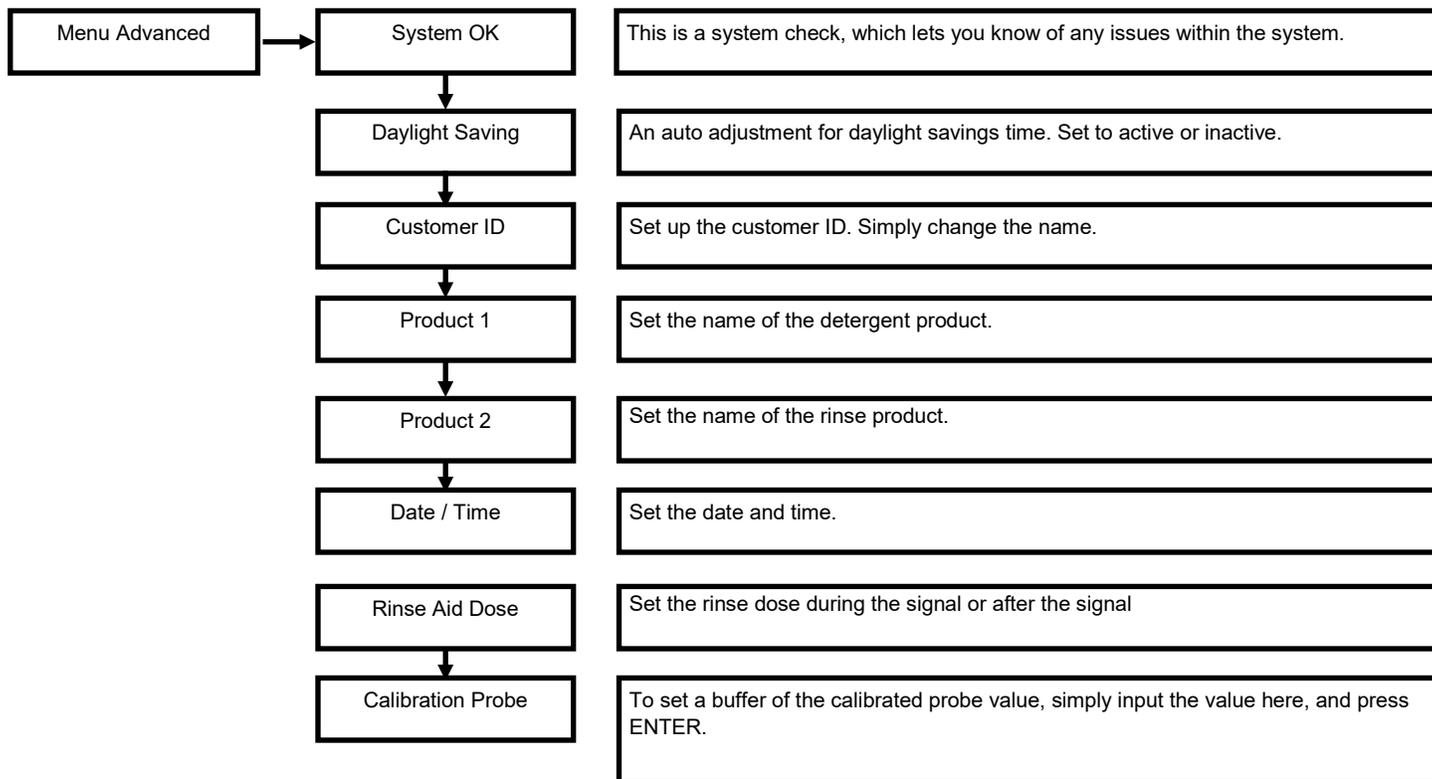
Press ESC TWICE to go back to the main menu. Press + to access Menu Counters



Press ESC to go back to the main menu. Press + to access Menu Advanced

Programming continued on the next page.

Menu: Advanced



Press ESC to go back to the main menu. Press + to access Menu Statistics. Starting on the next page, you will see all of the definitions for each menu option.

Menu: Statistics

MENU	DEFINITION
First Charges Prog1 0	If in timed mode, this allows you to see the number of first charges dosed for Program 1.
First Charges Prog2 0	If in timed mode, this allows you to see the number of first charges dosed for Program 2.
First Charges Totals 0	If in timed mode, this is the sum of first charges for Program 1 and 2.
Wash/Rinse Prog1 0	If in conveyor mode, this is the sum of number of times the signal has activated the detergent and rinse pump for program 1.
Wash/Rinse Prog2 0	If in conveyor mode, this is the sum of number of times the signal has activated the detergent and rinse pump for program 2.
Wash/Rinse Totals 0	If in conveyor mode, this is the sum of number of times the signal has activated the detergent and rinse pump for program 1 and 2.
Det Activation P1 0h 0m 0s	If in conveyor mode, this is the sum of number of time in hours, minutes, and seconds, the signal has been activated for the detergent pump for program 1.
Det Activation P2 0h 0m 0s	If in conveyor mode, this is the sum of number of time in hours, minutes, and seconds, the signal has been activated for the detergent pump for program 2.
Det Activation Total 0h 0m 0s	If in conveyor mode, this is the sum of number of time in hours, minutes, and seconds, the signal has been activated for the detergent pump for program 1 and 2.
Rinse Activation P1 0h 0m 0s	If in conveyor mode, this is the sum of number of time in hours, minutes, and seconds, the signal has been activated for the rinse pump for program 1.
Rinse Activation P2 0h 0m 0s	If in conveyor mode, this is the sum of number of time in hours, minutes, and seconds, the signal has been activated for the rinse pump for program 2.
Rinse Activation Tot 0h 0m 0s	If in conveyor mode, this is the sum of number of time in hours, minutes, and seconds, the signal has been activated for the rinse pump for program 1 and 2.
System Life 0d 0h 0m	This is the total amount of time the system has been in use in days, hours, and minutes.
Average Cond 0 mS	The average conductivity shows the average conductivity for the dish washer.
Reset Stat. Press Enter	Reset statistics allows you to reset all of the statistics for the dispenser.

DISPLAY

DISPLAY MODE

Press the **SCREEN CHANGE** key to change the front screen.

System SYSTEM OK

This screen will constantly check the system to make sure there are no faults. If there are any faults, the alert will display

Prog1 Normal Automatic

Program 1 and 2 will allow you to see the mode of operation, and the condition. It will either show automatic or manual depending on programming.

Det Rinse OFF OFF
--

Detergent and Rinse will show On or Off depending on whether or not there is a signal being received.

SP=99SkU 99.9MS CD=86SkU 91.9MS
--

SP is the Set Point and the tolerance set in the programming.

CD is the conductivity rating and the average tank conductivity.

Temperature 25° C 77° F

Temperature shows the current temperature.

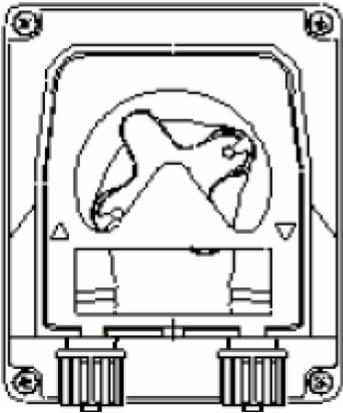
Counters Det / Rinse 1h 1L

Counters will allow you see the total time the detergent has been activated, and the total amount of rinse aid that has been dispensed in liters.

Maintenance

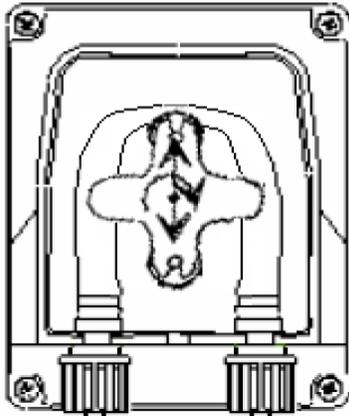
REPLACING THE SQUEEZE TUBE ON THE PERI. PUMP

1



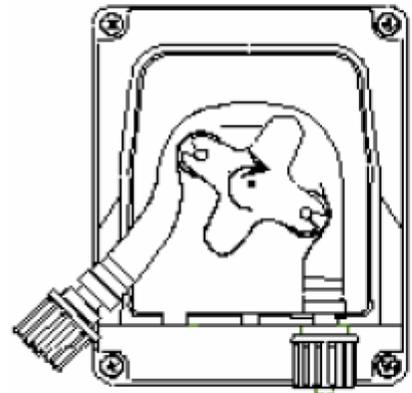
Remove the four screws.
Release the cover by lifting
the left connector

2



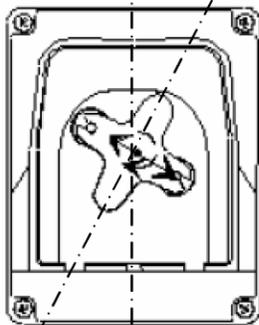
Position the roller vertically,
turning it in a clockwise di-
rection.

3



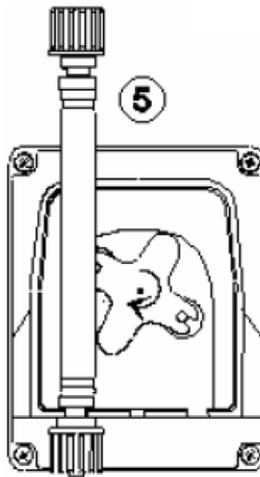
Pull the squeeze tube out in
a clockwise motion.

4



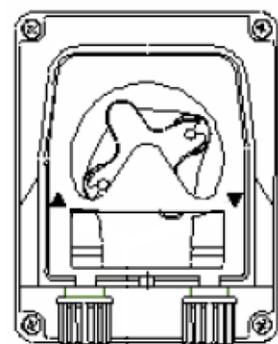
Position the roller at 45°
turning it clockwise.

5



Insert the left connector into
the housing and pass the
hose under the roller, guide
to the right connector.

6



Reposition the cover on the
pump. Replace screws.

Troubleshooting

Problem	Solution
THE POWER SUPPLY LED (power) DOES NOT SWITCH ON	<ol style="list-style-type: none"> 1. Check the fuses. 2. Make sure that the voltage at the circuit power supply terminals is correct. For details on the data plate and the connections diagram, refer to this manual.
ONE OR MORE PUMPS ARE NOT RUNNING	<ol style="list-style-type: none"> 1. Check the terminals on the circuit board for the pump motor for any loose screws or disconnected wires. 2. Check that the voltage on the signal terminals is correct. For details on the data plate, refer to this manual.
EXCESS DETERGENT	<ol style="list-style-type: none"> 1. Check the voltage on the power supply to the system. 2. Check that the concentration set point was set correctly. 3. Make sure that there is no residue or debris on the conductivity or inductive probe that would compromise the correct reading of the concentration in the tank. 4. Check that the dosing time for the detergent pump has not been set at excessively high values.
TOO LITTLE DETERGENT	<ol style="list-style-type: none"> 1. Check the voltage on the power supply to the system. 2. Check that the concentration set point was set correctly. 3. Check the efficiency of the conductivity or inductive probe. 4. Check that the dosing time for the detergent pump has not been set at excessively low values.
EXCESS RINSE AID OR SANITIZER	<ol style="list-style-type: none"> 1. Check for possible chemical product leaks on the delivery line.
TOO LITTLE RINSE AID OR SANITIZER	<ol style="list-style-type: none"> 1. Check that the dosing time or speed for the pump has not been set at excessively high values. 2. Check for possible chemical product leaks on the delivery line.
THE PUMP RUNS TOO SLOWLY	<ol style="list-style-type: none"> 1. Check that the roller block has not seized. 2. Check lubrication of the flexible hose.
PRIMING PUMP LEAKING	<ol style="list-style-type: none"> 1. Check the suction line for holes. 2. Check that the pump's peristaltic hoses are not cracked or punctured.

Terms & Conditions

Company warrants its Goods to be free from material defects in material and workmanship for a period of one year except: i. when Goods have been modified following delivery and/or subject to improper handling, storage, installation, operation, or maintenance unless those modifications have been authorized in writing by Seller. ii. when an item is purchased by Company as a component part of the Goods, except to the extent to which such item or items are covered by the warranty, if any, of the original manufacturer. iii. when an item which is a component part of the product has been furnished by Buyer. iv. no warranty of a component part shall extend beyond the warranty period of the device in which such component part is incorporated. b. There is no implied warranty of merchantability or of fitness for particular purpose and there are no warranties of any nature except as set forth in paragraph 3 herein. Any claim by Buyer made pursuant to Company's warranty must be made in writing. Company shall have the right to inspect the Goods claimed to be defective and shall have the right to determine the cause of such alleged defect. All Goods replaced or repaired by Company under its warranty shall be replaced or repaired F.O.B. Company's facility. Buyer must notify Company, in writing, within fifteen (15) days from receipt of Goods of any obvious defect in the product, or shortages, or Company shall have no obligation to correct such defect. Company shall have the option of re-inspection at Buyer's plant or its own before allowing or disallowing Buyer's claim. Defects that do not impair service shall not be a cause for rejection or recovery under any warranty. Buyer assumes full responsibility for the use and application of the product. Buyer accepts Company's design and material selection and specifications in placing this order unless other specifications are agreed to in writing by both parties prior to the manufacture of Goods by Company. Statements and data relating to Products on Seller's literature and website are not intended to define the performance of the product in actual usage or in combination with other equipment or processes. These statements should not be used by Customer solely as an indication of performance or suitability for specific applications or uses.

THE ABOVE WARRANTIES ARE THE SOLE AND EXCLUSIVE WARRANTIES MADE BY SELLER WITH RESPECT TO ALL PRODUCTS AND SERVICES.

Components and spare parts such as O-rings, squeeze tubes, roller blocks and other plastic components are considered to be wear parts and are not warranted. Seller shall have no warranty or liability for product that was damaged during shipment, product that is not being used in its recommended use, product that is not operated in accordance with the operating manual and procedures, product that was not properly installed, product used in a manner that is inconsistent with its designed purpose, product that is subject to a power surge or similar event, products that fail due to usage of a non Lavo Solutions replacement or spare part or product that was not maintained in accordance with recommended maintenance programs.

For full terms and conditions, please visit:
<http://lavosolutions.com/LAVO-T&C-02-2018.pdf>