

DEMA 813 PROBELESS DEMAMasterTM INSTALLATION INSTRUCTIONS



Models:
DM-813-PLLL-1T
DM-813-PDLL-1T
DM-813-PLLL-2T
DM-813-PDLL-2T

System Overview

The DEMA DEMAMaster probeless series is designed for long reliable use with simplicity in mind for both the installer and user. The system is based on the reliable DEMA peristaltic pump. The pumps are installed in a heavy plastic housing with a sealed cover that uses a Lexan[®] label with visible function indicators.

Pumps are available with three different motor/gear box speeds, 15, 60, and 105 RPM.

There are micro controllers housed in the unit that control the operation of the pumps. The detergent pump is controlled by a set of DIP switches that can be arranged to supply a selected amount of detergent based on door counts or time depending on the application. The rinse aid is set by a potentiometer that controls the speed of pump and can be delayed up to 12 seconds. In addition, the probeless detergent board has the ability to keep track of time and deliver a new initial charge when in the door mode.

The DEMAMaster is supplied with a transformer mounted in housing that allows primary voltage hook up of 120, 208 or 240 at 50/60Hz.

Please read all instructions before proceeding with the DEMAMaster installation.

Dishroom Room Survey

A complete survey of the dish machine sight should be completed before the DEMAMaster installation.




1. Locate the power connection points on the dish machine. This power must be 120, 208 or 240 volts 50/60Hz.

Note: When installing a DEMAMaster probeless on a door operated dish machine, keep in mind that the detergent control will need to recognize door openings based on power “on” and “off” to the DEMAMaster. In addition, all installations will require that the rinse control recognize the dish machine rinse cycle.

2. Select location to mount the DEMAMaster on a wall that will allow access to the chemical product containers and the chemical product feeds points on the dish machine. The DEMAMaster should be kept away from moisture releasing machinery and from water being splashed directly on the unit.
3. Mount the DEMAMaster on a wall by use of the supplied hanger. Use appropriate wall anchors when mounting on dry wall.

Electrical Installation

This product is designed only to be used as described in this instruction sheet. Adhere to all warnings and cautions identified in this document.

	<p>WARNING: Electrical and grounding installation of DEMA products must comply with electrical codes and regulations established by national, city, county, parish, provincial or other agencies. It is possible that electrical codes and regulations require that a certified electrical contractor or engineer perform the electrical installation. For questions, contact a certified electrician.</p> <p>DISCONNECT ALL ELECTRICAL POWER TO THE DISPENSER AND THE APPLIED MACHINE WHEN SERVICING- FOLLOW LOCKOUT / TAGOUT PROCEDURES.</p>
	<p>WARNING: Installations must conform to all local and national plumbing codes and use approved backflow prevention and pressure relief devices where required.</p> <p>ALWAYS DISCONNECT DISPENSER FROM WATER SOURCE WHEN DISPENSER IS NOT IN USE.</p>
	<p>Always read SDS for all chemicals used and follow personal protective guidelines.</p>

1. ***BEFORE GOING ANY FURTHER, ALL ELECTRICAL POWER MUST BE TURNED OFF TO THE DISH MACHINE AND ANY OTHER CIRCUIT THAT IS TO BE USED FOR THIS INSTALLATION. LOCKOUT AND TAG PROCEDURES SHOULD BE OBSERVED WHEN INSTALLING THIS DEVICE. NEVER OPEN THE DEMAMASTER UNLESS POWER HAS BEEN TURNED OFF. SIGNALS MAY BE PRESENT FROM DISH MACHINE, EVEN WITH THE POWER TURNED OFF. ONLY USE ELECTRICAL CODE APPROVED INSULATED WIRING AND ELECTRICAL FIXTURES WITH THIS INSTALLATION.***

Note: The DEMAMaster is equipped with 1 or 2 transformers depending on the model. If there are 2 transformers, the detergent control will be powered by one while the rinse aid control, will be powered by the other.

If the DEMAMaster is equipped with 1 transformer, both the detergent and rinse control, will be powered by the same transformer. In this case it will be necessary to wire the unit so that the rinse aid control will only run during the rinse cycle. This can be done via a pressure switch, which should be wired to the DEMAMaster terminal block connections labeled “pressure switch”.

2. Connect the power to the DEMAMaster. The DEMAMaster will accept 120VAC, 208VAC or 240VAC 50/60Hz. The detergent control is normally wired to something that is common to the pump operation, thus signaling a wash cycle. The rinse control is normally wired to something that is common to the rinse solenoid valve, thus signaling a rinse cycle. Some dish machines may have a terminal block setup for power for both detergent and rinse, see schematic or owners manual of the dish machine to determine if this option is available.

3. Locate the power terminal block inside the DEMAMaster enclosure. There will be 2 when there are 2 transformers. Connect “hot” or “live” wire to the terminal labeled “line”. Connect the “return line” to the appropriate terminal block position based on supply voltage. The “earth ground” wire must be connected to the terminal block by use of the grounding clip (supplied in installation kit). The power line should be secured by use of a proper electrical fitting through access hole in DEMAMaster enclosure. The power line must also be secured properly between the dish machine or power source and DEMAMaster.

Note: When wiring is completed the DEMAMaster should feed detergent based on door counts or time depending on type of machine (door or conveyor). The rinse aid should feed only during the rinse cycle. It may be necessary to use a pressure switch to signal the rinse aid feed. Evaluate the application for requirements to assure proper operation.

Tubing Connections

Included in the installation kit is a roll of low-density polyethylene (LDPE) tubing that can be used to connect from the chemical container, to the pump, and from the pump to the injection fittings on the machine.

Measure the length of the tubing needed on the suction side from the chemical container to the pump and cut the tubing to proper length. Install the tubing into the pickup tubes (Grey PVC) through the compression nut, and tighten the nut. Route the tubing to the suction side of the pump. An arrow on the faceplate indicates the flow direction. Push the tubing into the pump squeeze tube approximately 1/2-3/4" (15-20mm). Secure the tubing with a tie wrap around the squeeze tube. Use the same procedure on the outlet of the squeeze tubing and route the LDPE tubing to the injection point of the machine. Cut off all excess tubing and keep tubing away from hot surfaces and sharp edges to prevent damage or leakage.

See Detergent and Rinse Tubing Connections below for specific information concerning discharge tube connection.

Detergent Tubing Connections

Included with the kit is a bulkhead fitting that will accept the discharge of the detergent at the machine. There are two fittings depending on the model. If the DEMAMaster has a detergent pump, then the fitting will have a 1/4" compression fitting that will accept the 1/4" LDPE pump discharge tubing. If the unit has a solenoid valve then the fitting will have a barb fitting designed for a 5/8" I.D. tube. A 7/8" diameter hole will need to be cut above the waterline in the side of the dish machine wash tank to accommodate the bulkhead fitting. The bulkhead fitting should not be located above the concentration probe.

When using the detergent pump simply run the tubing from the outlet of the pump to the 1/4" compression fitting on the bulkhead fitting.

When using the solenoid valve run the 1/4" LDPE tubing from the 1/4" compression fitting on the outlet of the valve to the siphon breaker for the solid bowl or powder feeder.

Rinse Tubing Connections

Note: A check valve is included in the installation kit. The procedure below describes the installation of this check valve. Other hardware may be needed to complete the installation properly.

Install 1/4" compression by 1/8" NPT rinse injection check valve into the rinse input water between the vacuum breaker and the final rinse arm. Drill an 11/32" hole and tap to 1/8" NPT. When installing to copper pipe or tubing use saddle clamps.

Connect the 1/4" OD poly tubing between the 1/4" rinse check valve and the discharge side of the peristaltic rinse squeeze tubing. Use a plastic tie to hold the 1/4" polypropylene tubing into the peristaltic squeeze tube.

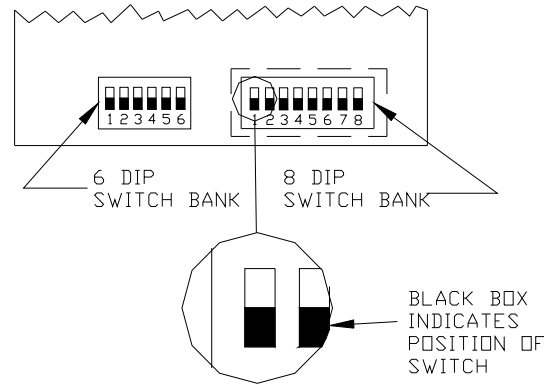
Detergent and Rinse Calibration

Detergent

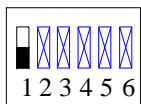
Prior to calibration the system must be primed. The system is primed when the chemical is dispensing from the injection point into the dish machine tank. This can only be done while power is being supplied to the probeless detergent board. By pressing the button on the front cover labeled "detergent prime" the pump will run. Simply press and hold until the pump and tubing has been primed.

Note: *If Detergent Prime button is held less than 5 seconds, the pump will run for the amount time that has been set for initial charge or until button is pushed again.*

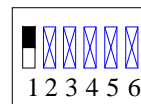
The detergent set up involves the use of the DIP switches on the pro-bless detergent control board. There are a bank of 6 and a bank of 8 switches located directly on the control board. The detergent concentration should be setup so that the desired level of concentration is maintained while the dish machine is being used. The concentration can be tested by use of a titration test kit (DEMA P/N 81-53), not included.



1. Door or Conveyor mode: **6 DIP Switch Bank, Switch 1**



OFF = Door Mode











ON = Conveyor Mode

2. Initial Charge Time: Sets the amount of Initial Charge based on time. See table below for the P switch configuration.

0		1 MIN		1 MIN 50 SEC	
5 SEC		1 MIN 5 SEC		1 MIN 55 SEC	
10 SEC		1 MIN 10 SEC		2 MIN	
15 SEC		1 MIN 15 SEC		2 MIN 5 SEC	
20 SEC		1 MIN 20 SEC		2 MIN 10 SEC	
25 SEC		1 MIN 25 SEC		2 MIN 15 SEC	
30 SEC		1 MIN 30 SEC		2 MIN 20 SEC	
35 SEC		1 MIN 35 SEC		2 MIN 25 SEC	
40 SEC		1 MIN 40 SEC		2 MIN 30 SEC	
45 SEC		1 MIN 45 SEC		2 MIN 35 SEC	
50 SEC					
55 SEC					



















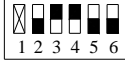













3A. Dead Cycle Count – Door Mode Only

Sets the amount of wash cycles (door operations) that will take place before a recharge will occur. See table below for DIP switch configuration. **Example:** If the Dead Cycle Count is set to 3, there will be three wash cycles where no detergent will be added. On the 4th cycle a recharge will occur.









0 CYCLES		4 CYCLES	
1 CYCLE		5 CYCLES	
2 CYCLES		6 CYCLES	
3 CYCLES		7 CYCLES	

3B. Dwell Time Setting – Conveyor Mode Only

Sets the amount of time between a charge and a recharge and recharges. See table below for DIP switch configuration. **Example:** Dwell Time is set for 1 min 30 sec. After the probeless control supplies an initial charge or a recharge, 1 minute and 30 seconds must expire before the next recharge will occur.

0		3 MIN		5 MIN 30 SEC	
15 SEC		3 MIN 15 SEC		5 MIN 45 SEC	
30 SEC		3 MIN 30 SEC		6 MIN	
45 SEC		3 MIN 45 SEC		6 MIN 15 SEC	
1 MIN		4 MIN		6 MIN 30 SEC	
1 MIN 15 SEC		4 MIN 15 SEC		6 MIN 45 SEC	
1 MIN 30 SEC		4 MIN 30 SEC		7 MIN	
1 MIN 45 SEC		4 MIN 45 SEC		7 MIN 15 SEC	
2 MIN		5 MIN		7 MIN 30 SEC	
2 MIN 15 SEC		5 MIN 15 SEC		7 MIN 45 SEC	
2 MIN 30 SEC					
2 MIN 45 SEC					




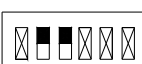
4. Recharge Time: Sets the amount of recharge based on time. See table below for DIP switch configuration.

1 SEC		5 SEC	
2 SEC		6 SEC	
3 SEC		7 SEC	
4 SEC		8 SEC	

5. Initial Charge Clock

This feature is adjustable as shown below while in door mode only. When the unit is in the conveyor mode the initial charge clock defaults to 1 hour.

This feature is used to provide an initial charge after a set amount of time expired without using the DEMAMaster. See the table below for the DIP switch configuration. **Example:** *Initial Charge Clock is set for 2 hours. If no power has been supplied to the probeless control for at least 2 hours, the probeless control will provide an initial charge the next time power is supplied.*

15 MIN	
2 HOURS	
3 HOURS	
4 HOURS	

Note: *The DEMAMaster probeless board is designed with a 5 second delay when powered up. This means that the detergent pump or valve will not operate until continuous power is supplied to the board for at least 5 seconds.*

Rinse Aid Calibration

Prior to calibration the system must be primed. The system is primed when the chemical has filled the tubing up to the injection point. On the rinse side this can only be done during the time the rinse solenoid is active. On the front cover there is a button called prime. By depressing this, the pump will run at maximum speed. This may have to be done several times to ensure the chemical has filled up the entire tubing system.

1. Put the pick up tube into a measuring cylinder and fill with chemical to an easily read level.
2. Set the pump speed according to the chemical manufacturer's recommendations e.g. (2 oz/10 seconds). Calculation = $2\text{oz} \times 6 = 12\text{oz}/\text{min}$. 12 oz divided by the capacity of the pump per revolution (1.5)=8 revolutions per minute or $8/6=1.4$ revolutions per 10 seconds (the rinse cycle).
3. Check level again and fill to mark if necessary and let pump run for at least five cycles and check the amount being injected. This will automatically compensate for back pressure, (pressure loss in tubing and etc.).
4. At this point the system is ready for operation.
5. The rinse delay may be set, by adjusting the potentiometer labeled "rinse delay" on the rinse board. A 0-12 second delay may be set.
6. There are 18 seconds of rinse limit available when the "rinse limit" jumper is in the on position. When the jumper is in the off position, there is no rinse limit. This means that the rinse pump will run through the entire rinse cycle, when jumper is in the off position.

Sanitizer Calibration

Prior to calibration the system must be primed. The system is primed when the chemical has filled the tubing up to the injection point. On the rinse side this can only be done during the time the rinse solenoid is active. On the front cover there is a button labeled "Sani Prime". By depressing this, the pump will run at maximum speed. This may have to be done several times to ensure the chemical has filled up the entire tubing system.

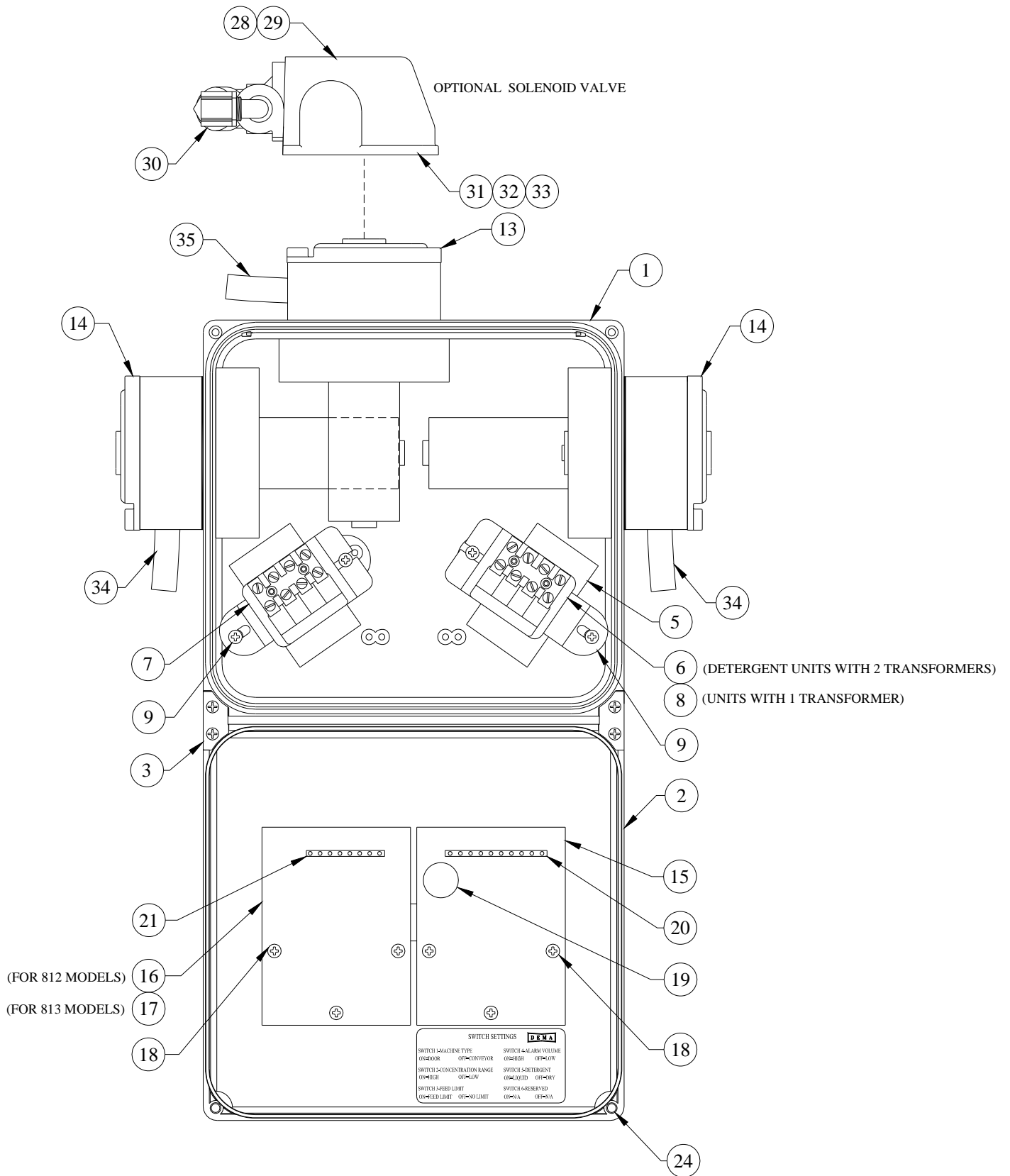
1. Put the pick up tube into a measuring cylinder and fill with chemical to an easily read level.
2. Set the pump speed according to the chemical manufacturer's recommendations e.g. (2 oz/10 seconds). Calculation = $2\text{oz} \times 6 = 12\text{oz}/\text{min}$. 12 oz divided by the capacity of the pump per revolution (1.5)=8 revolutions per minute or $8/6=1.4$ revolutions per 10 seconds (the rinse cycle).
3. Check level again and fill to mark if necessary and let pump run for at least five cycles and check the amount being injected. This will automatically compensate for back pressure, (pressure loss in tubing and etc.).
4. At this point the system is ready for operation.

DEMAMaster Operation

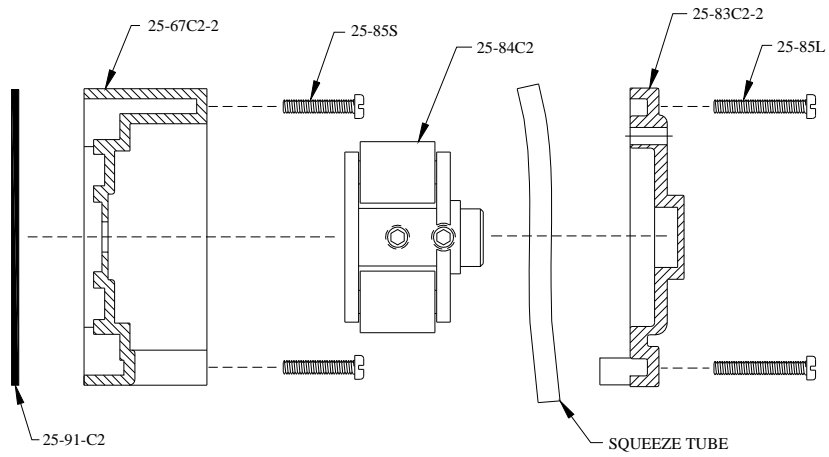
The user of the DEMAMaster only needs to perform the following:

- Monitor the level of the detergent and rinse aid products.
- When changing the detergent or rinse aid products, prime the pump by pressing and holding the "Detergent Prime" or "Rinse Prime" button until the pump and lines are primed.
- If dish machine tank is emptied and refilled, an initial charge can be delivered by pressing the "Detergent Prime" button for less than 5 seconds.
- The clock will deliver an initial charge if the unit is not powered up for the amount of time that has been programmed into the initial charge clock. *Example: The dish machine is turned off at the end of a shift, at the start of a next shift the DEMAMaster will deliver an initial charge when powered up, providing that the initial charge clock has expired.*

DEMAMaster ASSEMBLY



Replacement Parts			
Item No.	DEMA Part No.	Qty Required	Description
1	81-2	1	DEMAMaster Double Control Box
2	81-5	1	DEMAMaster Double Control Box Lid
3	81-6	1	Hinge and Screw Kit
4	81-1	1	Mounting Bracket Kit
5	80-70	1	Transformer 40VA
6	81-10-1	1-Qty Model No. ends 1T 2 Qty Model No. ends 2T	Terminal Block & Bracket Assy. (Detergent, units with 2 transformers)
7	81-10-2	1	Terminal Block & Bracket Assy. (Rinse, units with 2 transformers)
8	81-10-5	1	Terminal Block & Bracket Assy. (units with 1 transformer)
9	44-116-1	2 / Transformer	# 8 x ½ HI-LO Screw (mounting transformer)
10	81-35	1 / Transformer	Fuse Holder
11	81-34-16	1 / Transformer	Fuse 1A, 250V
12	81-36-2	1 / Transformer	Blue Wire Nut
13	80-59-60	1	60 RPM Gear/motor
14	80-59-15	1 / Rinse and 1 / Sanitizer	15 RPM Gear/motor
15	80-77-1	1	Pro-bless Detergent Control (circuit board for controlling detergent)
16	80-69-5	1 (for 812 Models)	Rinse Control Board (circuit board for controlling rinse)
17	80-69-6	1 (for 813 Models)	Rinse & Sanitizer Control Board (circuit for controlling rinse and sanitizer)
18	81-20-2	3 / control board	# 4 HI-LO Screw (mounting circuit boards)
19	80-99	1	Coin Cell Battery (CR2032)
20	81-13-6	1	Modular Connector 6 pole (for Pro-bless Detergent Control Board)
21	81-13-8	1	Modular Connector 8 pole (for Rinse and/or Sanitizer Control Board)
22	81-94-1	2 (1 transformer units)	18 AWG Orange Wire – 8” long
23	81-94-2	1 (1 transformer units)	18 AWG Orange Wire – 10” long
24	81-29-2	2	Captive Screw
25	81-47-1	1	Hole Plug
26	L604	1	Caution Label – Electrical
27	L605	1	Caution Label - Chemical
28	44-125	1	Solenoid Cover
29	44-116-1	1	Cover Screw
30	44-123-4	1	Solenoid Valve-Detergent (Dry Feed Models)
31	44-124-2	2	Solenoid Mounting Screw
32	44-29	2	Lock Washer
33	44-90	2	Hex Nut
34	25-65RE-11	2	Squeeze Tube - Rinse
35	25-65CE-11	1	Squeeze Tube - Detergent



C2 PUMP ASSEMBLY

C2 Pump Parts	
Part No.	Description
25-91-C2	C2 Pump Head Gasket
25-67C2-2	C2 Pump Head
25-84C2	C2 Roller Block (2 roller)
25-83C2-2	C2 Face Plate
25-85S	#10-32 X 1 3/4" Machine Screw
25-85L	#10-32 X 2 1/4" Machine Screw
25-C2D	C2 Pump Head Kit (kit includes C2 Pump parts listed above)

Return Policy

No merchandise may be returned for credit without DEMA Engineering Company's written permission. Return Merchandise Authorization (RMA) number required in advance of return.

Warranty

DEMA products are warranted against defective material and workmanship under normal use and service for one year from the date of manufacture. This limited warranty does not apply to products that have a normal life shorter than one year or failure and damage caused by chemicals, corrosion, improper voltage supply, physical abuse or misapplication. Rubber and synthetic parts such as "O"-rings, diaphragms, squeeze tubing and gaskets are considered expendable and are not covered under warranty. This warranty is extended only to the original buyer of DEMA products. If products are altered or repaired without prior approval of DEMA, this warranty will be void.

Defective units or parts should be returned to the factory with transportation prepaid. If inspection shows them to be defective, they will be repaired or replaced without charge. F.O.B. factory DEMA assumes no liability for damages. Return merchandise authorization number to return units for repair or replacement must be granted in advance of return.