user manual

DM-500

warewash dispenser

HYDRO

a DOVER company

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index

1.00 overview

Safety Precautions

WARNING! Please read precautions thoroughly before operation. Meet all applicable local codes and regulations.

THANK YOU FOR YOUR INTEREST IN OUR PRODUCTS
Please use this equipment carefully and observe all warnings and cautions.

WEAR	protective clothing and eyewear when dispensing chemicals or other materials or when working in the vicinity of all chemicals, filling or emptying equipment, or changing metering tips.
ALWAYS	observe safety and handling instructions of the chemical manufacturer. direct discharge away from you or other persons or into approved containers. dispense cleaners and chemicals in accordance with manufacturer's instructions. Exercise CAUTION when maintaining your equipment. reassemble equipment according to instruction procedures. Be sure all components are firmly screwed or latched into position.
KEEP	equipment clean to maintain proper operation.
NOTE	if the unit is used to fill a sink, or the discharge hose can be placed into a sink, the unit must mounted be so the bottom of the cabinet is above the overflow rim of the sink.

1.01 Package Contents

DM-500 Warewash Dispenser (part number varies by model)

- DM-500 Dispenser
  (Part number varies by model)
- Quick Start Guide (P/N HYD10099668)
- Accessory Kit: Mounting hardware, injection fittings, and tubing
  (Part number varies by model)
- Pump Squeeze Tubes (not installed)
  Detergent pump uses Santoprene® tubes as standard
  Rinse pump uses silicone tubes as standard
  (Part numbers vary by model)

1.02 Operation

The DM-500 is a globally versatile, dual product dispenser used to supply detergents and rinse aid into automatic dish machines. Designed with simplicity in mind, the unit can be installed in minutes and requires no programming; all settings can be configured using potentiometers that control the time or speed of dosing (depending on the model). The unit has the reliability and accuracy you expect from Hydro Systems Co. at an economic price point.

NOTE! The DM-500 is intended for use in industrial applications. It is not suitable for domestic use, and it must not be used outside of its intended use. The product must only be used for commercial dish washing operations. The manufacturer waives any responsibility arising from incorrect usage or transportation.

1.03 General Specifications

Category	Specification	
Electrical	90 to 260 VAC at 50/60Hz	
Chemical Temperature Rating	Intake chemicals should be at room temperature	
Regulatory Approvals (CE)	89/336/CEE	Regarding "Electromagnetic Compatibility" and the subsequent modifications to 92/31/CEE, 93/68/CEE, 93/97/CEE
	73/23/CEE	Regarding "Low Voltages", and the subsequent modifications to 93/68/CEE, 2002/95/CE, 2002/96/CE, 2003/108/CE "RoHs and WEEE Directive"
Regulatory Approvals (UL / CSA)	UL 778:ed6-2016 CSA C22.2 No.108:14	Standard for Motor-Operated Water Pumps Liquid Pumps
Cabinet Material	Front: Polypropylene - Rear: Polypropylene	
Environmental	Pollution: Degree 2, Temperature: 50° to 104° F (10° to 40° C), Maximum Humidity: 95% Relative	
Dimensions	9.2 in (235mm) High x 9.3 in (237mm) Wide x 5.4 in (137.5mm) Depth	

1.00 overview (continued)

1.04 Model Numbers and Features

Pump Build Options:

Adjustment Combos: 2TV = 2 Adjustments: Time + Speed
2TT = 2 Adjustments: Time + Time

Flow Rates: 017 = 17 ml per minute
067 = 67 ml per minute
100 = 100 ml per minute

Pump Pressure: 1 = 1 bar (14.5 psi)
3 = 3 bar (43.5 psi)

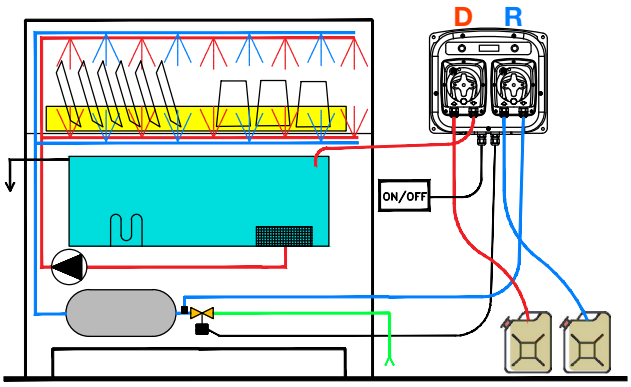
Tube Material: SA = Santoprene®
SI = Silicone

Regulatory Approvals: CE = CE
UL = UL

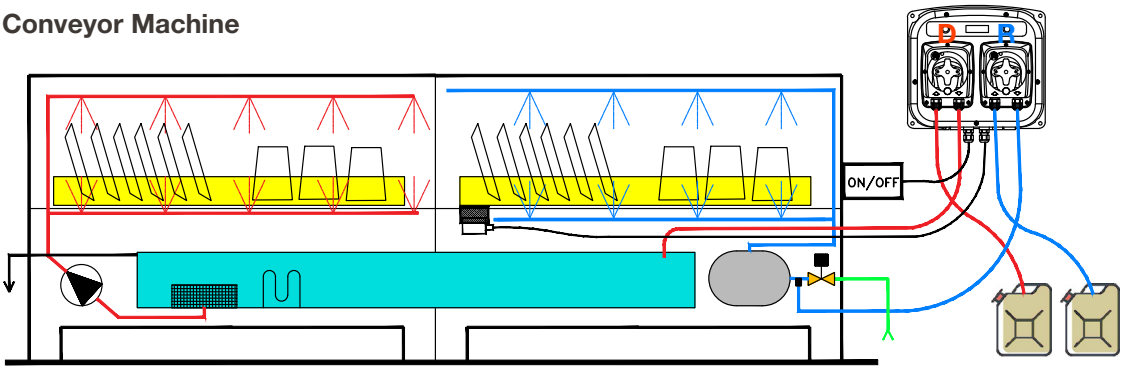
Build Example:	HYD	DM500MP	2TV	100	1	SA	2TV	017	3	SI	UL
Model Builder:	**Hydro Prefix**	**Base Model**	**Adjust. Combo**	**Pump Flow Rate**	**Pump Pressure**	**Tube Matl.**	**Adjust. Combo**	**Pump Flow Rate**	**Pump Pressure**	**Tube Matl.**	**Regulatory & Electrical Approvals**
			Detergent Pump				**Rinse Pump**				
Standard UL Model											
HYDDM500MP 2TV1001SA2TV0173SIUL	HYD	DM500MP	2TV	100	1	SA	2TV	017	3	SI	**UL**
Standard CE Model											
HYDDM500MP 2TV1001SA2TV0173SICE	HYD	DM500MP	2TV	100	1	SA	2TV	017	3	SI	**CE**

Installation Examples:

Door Machine



Conveyor Machine



2.00 installation

2.01 Site Survey & Installation Requirements

WARNING! This product is intended to be installed by experienced installers, in accordance with all applicable electrical and plumbing codes.

- Unit must not be installed near areas that suffer excess temperature changes, direct sunlight, frost or moisture of any kind.
- Area must be free of high levels of electrical noise.
- Ensure the unit can be mounted in an accessible position above the height of the required discharge location.
- Unit must be mounted on a suitable wall, that is flat and perpendicular to the floor.
- The unit location should be well lit for any maintenance and free of high levels of dust / air particulates.
- Scheduled maintenance should be carried out on the dispenser at least once per year.

2.02 Wall Mount

1) Choose an installation location that is:
   - Within 1.5m (4.5 ft.) of the product containers.
   - At a reasonable height above the wash tank on the dish machine that allows for easy maintenance access.
   - Away from any direct sources of steam, water spray, and high temperatures.
   - Close enough to the dish machine electrical control panel to allow dispenser wiring without use of an external junction box (not provided) wherever possible.

2) Use provided holes in the corners of the DM-500 cabinet as a drilling template in a suitable mounting location.

3) Wall anchors are provided, please ensure they are appropriate to the wall/surface being mounted to.

4) Attach the DM-500 directly to the mounting surface with the hardware provided.

2.03 Mechanical Installation

Installing the Rinse Injection Fitting

1) Install the rinse injection fitting to conform to local plumbing codes.

2) The injection fitting is designed to fit global needs. It should thread directly into a 1/8" NPT (North America) or a BSP (Global) female threaded connection. As an alternative to the threaded connection a barb fitting adapter is also included.

3) If the machine's rinse plumbing is thin-wall pipe, use a saddle clamp with the 1/8" threaded hole.

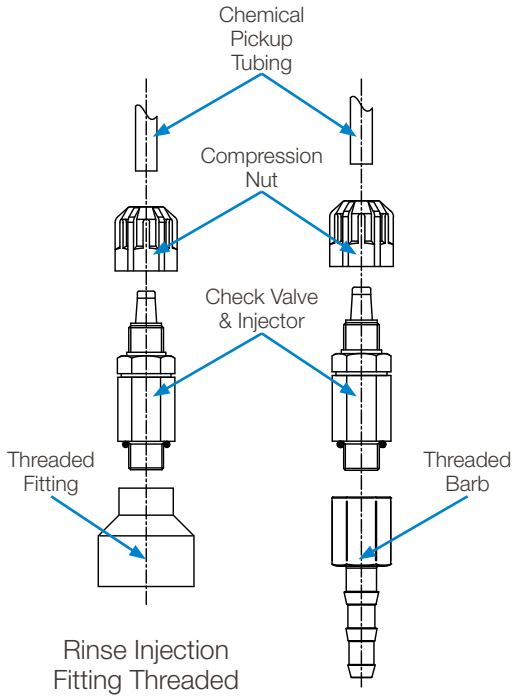
4) If the machine already has a tapped hole to accommodate the fitting, skip to Step 8

5) Choose a location for the rinse injection fitting that is downstream from the vacuum breaker and at the proper height per local plumbing codes. This point is either into the pressurized rinse line or upstream of the booster heater for the rinse water..

6) To create the threaded connection at your selected location, drill a 9mm (11/32") hole in the rinse plumbing at the injection location.

7) Tap the hole drilled in step 6 with a 1/8" tap (NPT or BSP depending on the region)

8) Install the injection fitting. Use thread sealant to ensure a leak-free assembly.



Rinse Injection Fitting Threaded

Rinse Injection Fitting Barbed

2.03 Mechanical Installation (continued)

Installing the Detergent Injection Fitting

1) When choosing a mounting locating, make sure that the detergent infection fitting will be:
   - Above the water level of the filled wash tank.
   - Discharging detergent directly into the wash tank and not on top of any shelf areas or other obstacles that could prevent detergent from falling directly into the wash tank.

2. Previously punched holes may be suitable but always confirm that the fitting is correctly placed. 10mm (3/8") holes are common in Europe and 22mm (7/8") holes are common in North America. If an appropriate hole is present, go to step 4.

3. If a hole is not available already, drill a 10mm (3/8") hole at the center of your chosen detergent injection location on the dish machine tank.

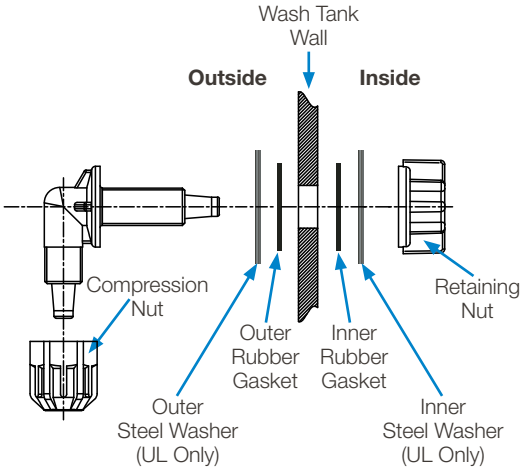
4. Remove the retaining nut from the supplied detergent injection fitting and gather the gaskets and washers supplied with the unit.

5 a. For a 10mm (3/8") hole insert the detergent injection fitting, with a rubber gasket, into the hole you drilled earlier.

b. For a 22mm (7/8") hole insert the detergent injection fitting, with a large rubber gasket backed by a large stainless steel washer.

6. From the inside of the machine install a second rubber washer, stainless backing washer if using a 22mm (7/8") hole, and the retaining nut. Tighten finger-tight, then snug using a wrench.

CAUTION! Do not over-tighten the plastic retaining nut.



90° (Right Angle) Detergent Injection Fitting

(CE model shown)

Installing the Rinse and Detergent Supply and Discharge Tubes

1) Install the included PVC pump supply tube (4mm ID, 6mm OD) into the chemical container using the foot filter with screen and weight to position the tube at the bottom of the container.

2) Route the other end of the included PVC pump supply tubes from supply containers to the inlet sides (left) of each respective pump. Slip the tube fully through the compression nut into fitting and tighten.

3) Route pump discharge tubes to the outlet sides (right) of each respective pump. Slip the tube fully through compression nut into fitting and tighten.

4) Route the other end the pump discharge tube to the appropriate injection fitting (see the injection fitting installation instructions on previous page for more detail). Slip the tube fully through the compression nut onto fitting nipple and tighten.

NOTE: Try to keep both the supply and discharge hoses as straight as possible, avoiding all unnecessary bends.

2.00 installation (continued)

2.04 Electrical Installation

Installing the Detergent and Rinse Supply Signal Wiring

WARNING! Before performing any work on the DM-500, you must disconnect the power supply voltage of the dish machine.

CAUTION! Verify that electrical grounding is functional and complies with local regulations. Verify that the rated values of the pump are compatible with those of the power supply. Never install the pump directly in parallel with inductive loads (e.g. motors/solenoid valves). If necessary, use an isolating relay.

NOTE: All electrical connections must either be in the dish machine control circuit panel or an external junction box. The dispenser is pre-wired with a multi-conductor electrical cable that may need to be run through a conduit to the location where hard-wired connections are made on the dish machine. If this is the case use approved water tight conduit that meets local and national codes

All DM-500 models will have two pairs of signal/power wires that need to be connected to the dish machine.

Using the tables below, connect the signal wires to a compatible voltage source.

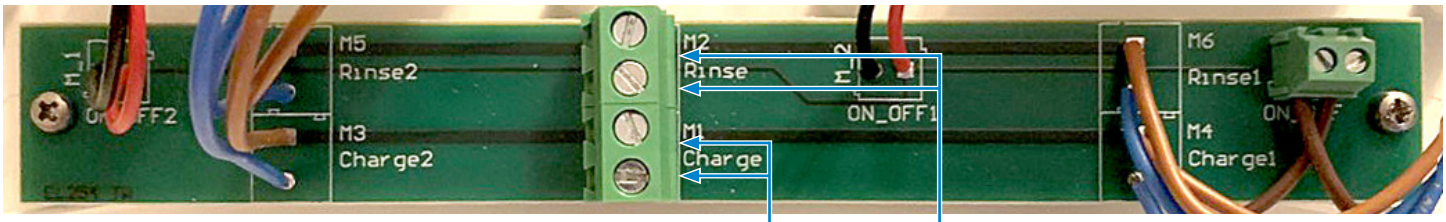
Initial Charge Signal

Wire Color	Circuit Voltage	Function
Brown	90 to 260 VAC at 50/60Hz	Connect to dish machine on/off switch; to trigger an initial charge upon power up.
Blue	90 to 260 VAC at 50/60Hz	Connect to dish machine on/off switch; to trigger an initial charge upon power up.

Rinse Signal

Wire Color	Circuit Voltage	Function
Brown	90 to 260 VAC at 50/60Hz	Connect to dish machine rinse solenoid; to trigger detergent and rinse aid dosing for each rack.
Blue	90 to 260 VAC at 50/60Hz	Connect to dish machine rinse solenoid; to trigger detergent and rinse aid dosing for each rack.

Signal wires should be routed through the appropriate conduit or cable gland in the bottom of the DM-500 to the signal board shown below. The signal board can be accessed by removing the five Phillips head screws and lifting the front cover to reveal the unit internals. The Initial Charge signal should be wired to the two screw terminals marked **M1 Charge** and the Rinse signal to the two screw terminals marked **M2 Rinse**. Polarity of these connections does not matter.



Rinse Signal Connections

Initial Charge Signal Connections

2.05 Setting Dosing Parameters

Each DM-500 unit has two pumps, one for detergent (left side, facing the unit) and one for rinse (right side, facing the unit) as shown.

Each pump has a priming button and under each pump cover are potentiometers used to set the dosing time or speed.

In general, the detergent pumps utilize a Santoprene squeeze tube and the rinse pump a Silicone squeeze tube.

The details for setting the Dosing parameters, for each of the most popular models, is described on the following pages.

UL Model Shown

2.05 Setting Dosing Parameters (continued)

Standard UL Model

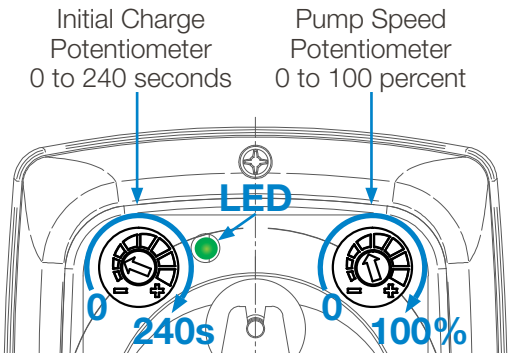
HYDDM500MP**2TV1001SA2TV0173SIUL**

This model is primarily used in North America. The initial charge and rinse signals are not pre-wired on this model and must be routed through housing via the ½" female conduit fitting in the base of the unit to comply with local regulations.

Detergent Pump

Connect the initial charge signal cable to the main power supply for the dish machine. When the signal is activated by powering the machine on, the pump will run for the time programmed (0 to 240 seconds) on the upper left potentiometer. After the initial charge has run, the signal should remain on to continue powering the dispenser. To dose another initial charge, the dish machine's power must be cycled.

To dispense a top-up dose of detergent during the rinse cycle of each rack, connect the rinse signal cable to the appropriate terminal in the dish machine or directly to the rinse solenoid. When the signal is activated, the pump will run at a programmable speed (0%-100%) using the right potentiometer. The pump will run at this speed for the duration that the signal is present. For this model, when the detergent pump runs at max speed, the flow rate specification is 3.4 oz/min (100 ml/min).



D2TV Initial Charge Time and Pump Speed

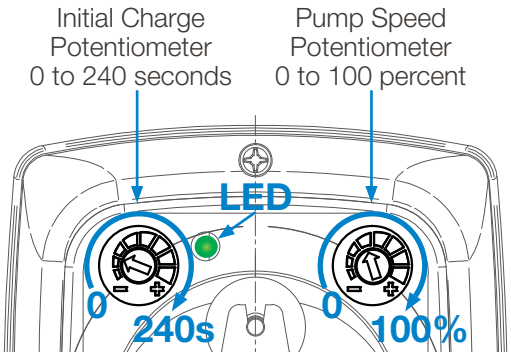
Rinse Pump

Similarly, the left potentiometer on the rinse pump will control the run time during the initial charge.

In most applications, the operator will want to minimize the rinse-aid dispensed during an initial charge, so the left potentiometer should be turned fully counterclockwise.

When the rinse signal is activated, the pump will run at a programmable speed (0%-100%) set by using the right potentiometer. **The pump will run at this speed for the duration that the rinse signal is present.**

For this model, when the rinse-aid pump runs at max speed, the flow rate specification is 0.6 oz/min (17 ml/min).



R2TV Initial Charge Time and Pump Speed

Standard CE Model

HYDDM500MP**2TV1001SA2TV0173SICE**

This model is primarily used in Europe and Asia Pacific.

The initial charge and rinse signals are pre-wired on this model, meaning the operator does not have to open the housing to wire the initial charge and rinse signals to the signal board.

CE Model Shown

2.00 installation (continued)

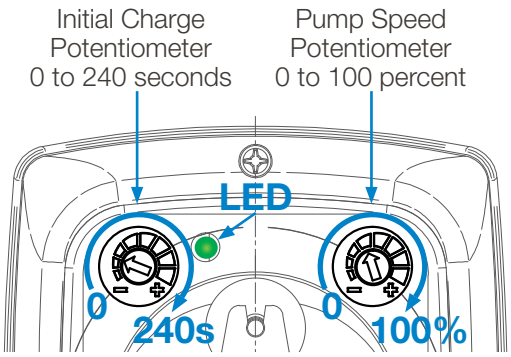
2.05 Setting Dosing Parameters (continued)

Standard CE Model (continued)

Detergent Pump

Connect the initial charge signal cable to the main power supply for the dish machine. When the signal is activated by powering the machine on, the pump will run for the time programmed (0 to 240 seconds) on the upper left potentiometer. After the initial charge has run, the signal should remain on to continue powering the dispenser. To dose another initial charge, the dish machine's power must be cycled.

To dispense a top-up dose of detergent during the rinse cycle of each rack, connect the rinse signal cable to the appropriate terminal in the dish machine or directly to the rinse solenoid. When the signal is activated, the pump will run at a programmable speed (0%-100%) using the right potentiometer. The pump will run at this speed for the duration that the signal is present. For this model, when the detergent pump runs at max speed, the flow rate specification is 3.4 oz/min (100 mL/min).



D2TV Initial Charge Time and Pump Speed

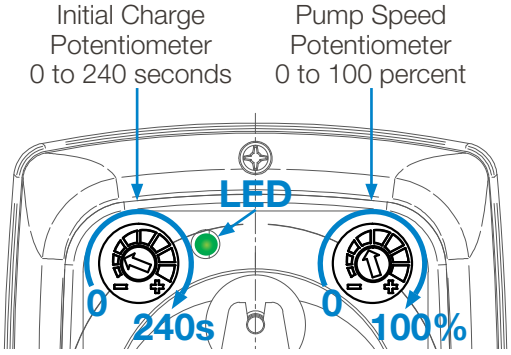
Rinse Pump

Similarly, the left potentiometer on the rinse pump will control the run time during the initial charge.

In most applications, the operator will want to minimize the rinse-aid dispensed during an initial charge, so the left potentiometer should be turned fully counterclockwise.

When the rinse signal is activated, the pump will run at a programmable speed (0%-100%) set by using the right potentiometer. **The pump will run at this speed for the duration that the rinse signal is present.**

For this model, when the rinse-aid pump runs at max speed, the flow rate specification is 0.6 oz/min (17 ml/min).



R2TV Initial Charge Time and Pump Speed

3.00 operation

3.01 Priming the Pumps

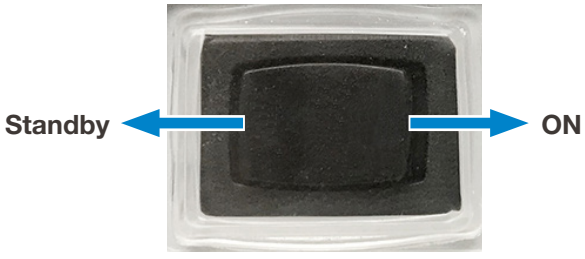
All DM-500 models have two prime buttons (one each for the Detergent and Rinse Aid pump) that can be used to prime the inlet and outlet tubing. To use the prime buttons, however, the initial charge signal connected to the dish machine main power must be active (e.g. the dispenser must have power). Additionally, the power/stand-by switch on the bottom of the dispenser must be set to standby mode.

Power/Standby Switch Operation

Found on the bottom of pump body, the switch has 2 positions:

Switch to: Right The pump is active (ON). The pump runs normally. If no signal is present, the pump's LED will be off.

Switch to: Left The pump is in standby (OFF). The pump's LED will be flashing orange

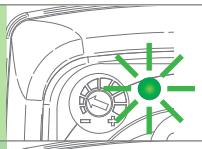
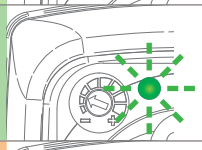
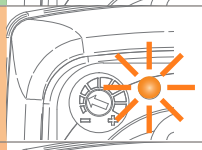
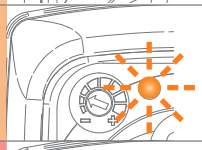
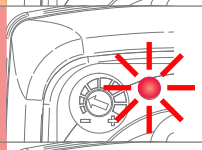
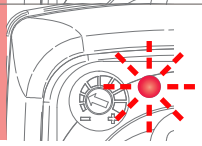


DM-500 Power / Standby Switch

3.00 operation (continued)

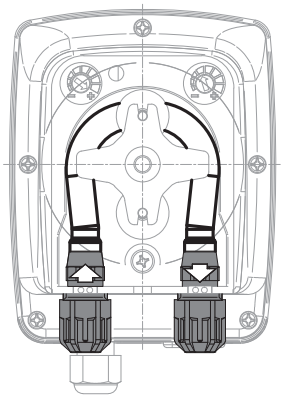
3.02 LED Pump Status Indicators

All DM-500 models have two LED indicators (one each for the Detergent and Rinse Aid pump). The color and states for each condition are described below.

LED Color	Fixed or Flashing		Indication
Green	Fixed		You should not see the LED display as fixed green. (If you see the LED display as fixed green please contact Product Support at Hydro Systems)
	Flashing		The pump is running a top-up/rinse dose correctly. The frequency of the flashing is proportional to speed of pump rotation.
Orange	Fixed		The pump is powered ON but not dosing.
	Flashing		The pump is switched into the STANDBY mode.
Red	Fixed		The pump is in an alarm state or is jammed. Please contact Hydro Product Support.
	Flashing		The pump is running an initial charge dose correctly or is priming when in standby mode. The frequency of the flashing is proportional to speed of pump rotation.

4.00 service parts

Category	Part No.	Description
Replacement squeeze tubes with compression fittings (packs of 10).		
	HYD10099124	10-Pack Santoprene®
	HYD10099125	10-Pack Silicone
Installation Kits Pickup / discharge tubing, foot filter, weight, injection fittings, mounting bracket and hardware		
	HYD10099142	CE Detergent Install Kit
	HYD10099143	CE Rinse Install Kit
	HYD10099144	UL Detergent Install Kit
	HYD10099145	UL Rinse Install Kit



DM-500
Squeeze Tube

Install Kit
(Typical)

5.00 maintenance

5.01 Maintenance (Required)

The DM-500 is designed to require minimal setup and ongoing maintenance. The routine maintenance tasks include:

- Check the pump tube's condition and replace as needed to maintain delivery performance
- Clean the unit cabinet with a damp cloth
- Check the foot strainer and clean it to remove any crystallized product or accumulated dirt.
- Ensure that there are no impurities in the suction and delivery tubes. These may damage the pump tube or cause anomalies in the flow rate.
- Titrate the wash tank solution to verify that unit is holding accurate concentration.

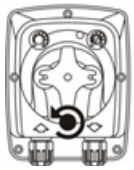
5.02 Pump Tube Replacement

NOTE! When changing pump tubes, be sure to match the correct tube material to the pump. Santoprene® tubes are standard for detergent pumps. Silicone tubes are used for rinse pumps.

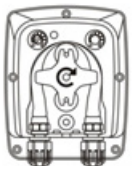
Replace pump tubes at regular maintenance intervals, well before the tube fails and ruptures. If the tube does rupture, clean all product from the pump housing with a damp cloth.

- Remove the pump front screw using a 7mm (5/16") hex head driver and detach the pump cover.
- Take out the old tube with compression fittings. Start by rotating the rotor so that the rollers are oriented in an 12/6 o'clock position.
- Starting on the left side, slide the plastic fitting out from the pump. Slowly rotate the pump rotor clockwise while pulling the tube out from the pump race.

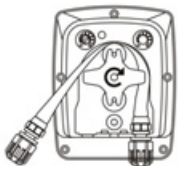
Removing the old tube.



Remove the front cover



Align rollers at "12 and 6"

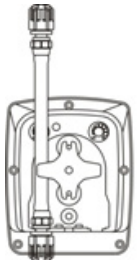


Rotate pump while removing tube

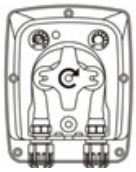
Pump ready for new tube

- Insert the new tube with compression fittings from left side of pump, with pump rollers oriented in an 12/6 o'clock position.
- Slide the compression fitting into place and route the tube vertically into the pump race.

Installing the new tube.



Install compression fitting, route tube up



While turning rotor install tube in race

Attach front cover and tighten screw

- Slowly turn the spinner clockwise, as you position the pump tube into place.
- When finished reinstall the pump cover and front screw.

6.00 troubleshooting

6.01 Troubleshooting Table

Problem	Cause	Solution
1. Dead unit - No LEDs illuminated	a. No incoming main electrical power	• Check wiring from dish machine. • Check for power at dish machine connection.
	b. Bad PC board	• If board has failed, replace the DM-500 unit.
2. No chemical dispensing.	a. No signal received	• Check signal wiring to dish machine. • Check that dish machine is sending a signal.
	b. Unit is not primed	• Prime the unit by using the Priming position of the power switch, or by activating the appropriate signal to run the pump.
	c. Power switch is in the wrong position	• Confirm the power switch is in the I (ON) position
	d. Pump tube is damaged or worn	• Replace pump tube as needed.
	e. Foot filter is clogged, or incorrectly positioned	• Remove the foot filter and clean as needed. • Check to insure the weight is installed correctly and the filter is positioned at the bottom of the container.
	f. Clogged delivery tube or bad connection of tubing or fitting	• Check and tighten all connectors. • Replace tubing and fittings as needed.
3. Excessive or inadequate chemical consumption	a. Incorrect pump wiring	• Check wiring from dish machine.
	b. Clogged delivery tube or bad connection of tubing or fitting	• Check and tighten all connectors. • Replace tubing and fittings as needed.
	c. Worn pump tube	• Replace pump tube as needed.

7.00 Specifications

7.01 Specifications

(*Specifications subject to change without notice.*)

Category		Specification
Size		9.3 in (235 mm) High x 9.3 in (237 mm) Wide x 5.2 in (132 mm) Depth
Weight		3.5 lbs (1.6 kg)
Power Rating		90 to 260 VAC at 50/60 Hz up to 50 mA
Flow Rate (at full speed)		Detergent Pumps: 100 ml/min (3.4 oz/min)
		Rinse Pumps: 17 ml/min (0.57 oz/min) or 100 ml/min (3.4 oz/min) depending on model
Duty Cycle		20 hours on, 4 hours off
Regulatory Approvals		
CE	89/336/CEE 72/23/CEE	Regarding “Electromagnetic Compatibility” and the subsequent modifications 92/31/CEE, 93/68/CEE and 93/97/CEE Regarding “Low Voltages”, and the subsequent modification 93/68/CEE, 2002/95/CE, 2002/96/CE and 2003/108/CE “RoHs and WEEE Directive”
UL CSA	778:ed6-2016 C22.2 No.108:14	Standard for Motor-Operated Water Pumps Liquid Pumps
Wetted Parts: Material of Construction		
Chemical Pickup “Foot Filter”		Polypropylene
Chemical Pickup Tubing		Santoprene® (Detergent and Rinse models)
Pump Squeeze Tube		Santoprene® (Silicone is available on request.)
Pump Discharge Tubing		PVC for Detergent models / Polyethylene for Rinse models
Injection Fitting(s)		Polypropylene
Environmental Specifications		
Temperature		50° to 104° F (10° to 40° C)
Humidity		95% relative humidity, maximum
Indoor Installation		Approved for indoor use only. Must not be installed outdoors.

8.00 warranty

8.01 Limited Warranty

Seller warrants solely to **Buyer** the Products will be free from defects in material and workmanship under normal use and service for a period of one year from the date of completion of manufacture. This limited warranty does not apply to (a) hoses; (b) and products that have a normal life shorter than one year; or (c) failure in performance or damage caused by chemicals, abrasive materials, corrosion, lightning, improper voltage supply, physical abuse, mishandling or misapplication. In the event the Products are altered or repaired by **Buyer** without **Seller's** prior written approval, all warranties will be void.
No other warranty, oral, express or implied, including any warranty of merchantability or fitness for any particular purpose, is made for these products, and all other warranties are hereby expressly excluded.

Seller's sole obligation under this warranty will be, at **Seller's** option, to repair or replace F.O.B. **Seller's** facility in Cincinnati, Ohio any Products found to be other than as warranted.

8.02 Limitation of Liability

Seller's warranty obligations and **Buyer's** remedies are solely and exclusively as stated herein. **Seller** shall have no other liability, direct or indirect, of any kind, including liability for special, incidental, or consequential damages or for any other claims for damage or loss resulting from any cause whatsoever, whether based on negligence, strict liability, breach of contract or breach of warranty.