User's Guide

PHP-800 Series
Variable Speed
Positive Displacement
Diaphragm Metering Pump
Operating Manual

OMEGAnet® Online Service omega.com	Internet e-mail info@omega.com

Servicing North America:

U.S.A.: ISO 9001 Certified
One Omega Drive, Box 4047
Stamford, CT 06907-0047
Tel: (203) 359-1660
FAX: (203) 359-7700
e-mail: info@omega.com

Canada:
976 Bergar
Laval (Quebec) H7L 5A1, Canada
Tel: (514) 856-6928
FAX: (514) 856-6886
e-mail: info@omega.ca

For immediate technical or application assistance:

U.S.A. and Canada: Sales Service: 1-800-826-6342/1-800-TC-OMEGA®
Customer Service: 1-800-622-2378/1-800-622-BEST®
Engineering Service: 1-800-872-9436/1-800-USA-WHEN®

Mexico:
En Español: (001) 203-359-7803
e-mail: espanol@omega.com
FAX: (001) 203-359-7807
info@omega.com.mx

Servicing Europe:

Czech Republic:
Frystatska 184, 733 01 Karvina', Czech Republic
Tel: +420 (0)59 6311899
FAX: +420 (0)59 6311114
Toll Free: 0800-1-66342
e-mail: info@omegashop.cz

Germany/Austria:
Daimlerstrasse 26, D-75392 Deckenpfronn, Germany
Tel: +49 (0)7056 9398-0
FAX: +49 (0)7056 9398-29
Toll Free in Germany: 0800 639 7678
e-mail: info@omega.de

United Kingdom: ISO 9002 Certified
One Omega Drive, River Bend Technology Centre
Northbank, Irlam, Manchester
M44 5BD United Kingdom
Tel: +44 (0)161 777 6611
FAX: +44 (0)161 777 6622
Toll Free in United Kingdom: 0800-488-488
e-mail: sales@omega.co.uk

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Series Comparison:

			External Communications (input)					Output
	Junction Box	DFD (Leak Detection)	FVS** (Flow Verification)	4-20 mA	0-10 VDC	Pulsed*	Batch	Alarm Relay 3 Amp
PHP-800	Optional	✓	✓					✓
PHP-800-ESC	✓	✓	✓	✓	✓	✓	✓	✓

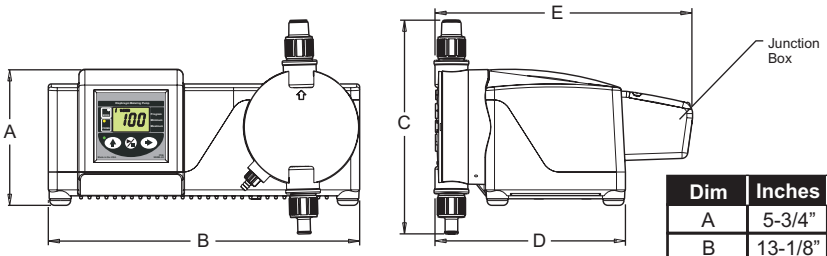
* Also known as Frequency Mode
** Requires Sensor sold separately

1.0 Introduction

Congratulations on purchasing thePHP-800 Series Diaphragm Metering Pump. The pump is designed to inject chemicals into piping systems and is capable of injecting against a high system pressure up to 175 PSI / 12.1 bar*.

2.0 Specifications

Maximum Working Pressure* .....175 psig / 12.1 bar
Maximum Fluid Temperature .....130° F / 54°C
Ambient Temperature Range.....14 to 115°F / -10 to 46.1°C
Output adjustment Range.....1-100% in 0.1% increments
Turn Down Ratio..... 100:1
Duty Cycle .....Continuous
Maximum Viscosity .....1,000 Centipoise
Maximum Suction Lift .....15 ft. water / 4.5 m water
Enclosure Rating.....NEMA 4X / IP66
Power Requirements.....115v, 50/60Hz 1.5 Amp
230v, 50/60Hz 0.7Amp(optional)
Shipping Weight.....29 lb. (approx.)
Dimensions:



Dim	Inches	mm
A	5-3/4”	144.8
B	13-1/8”	332.7
C	9”	228
D	8”	203.2
E	10-3/4”	274.3

3.0 Features

Oversized PVDF double ball valves.
Operator friendly digital touch pad.
– Easy to read Back Lit LCD display
– Display percentage of motor speed
DFD, Built-in Diaphragm Failure Detection system.
Priming / degassing valve built into the pumphead
NEMA 4X and IP66 rated enclosure

* Depending on model selection.

4.0 Unpacking

Your pump package should contain the following:
1 - Metering Pump
1 - 8 foot / 2.4 meter suction tube, clear PVC
1 - foot valve & strainer assembly
1 - Injection fitting with internal back-flow check valve
1 - Mounting hardware kit (two mounting brackets, 4 screws)
1 - 5 Foot / 1.5 meter Priming Tubing
1 - Extra Brush Kit **(located inside motor housing)**

5.0 Installation

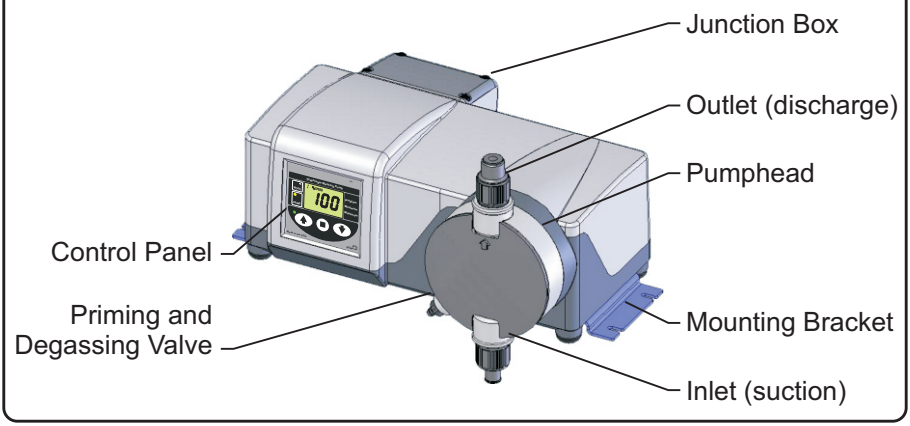
CAUTION: Always wear protective clothing, face shield, safety glasses and gloves when working on or near your metering pump. Additional precautions should be taken depending on the solution being pumped. Refer to MSDS precautions from your solution supplier.

5.1 Mounting Location

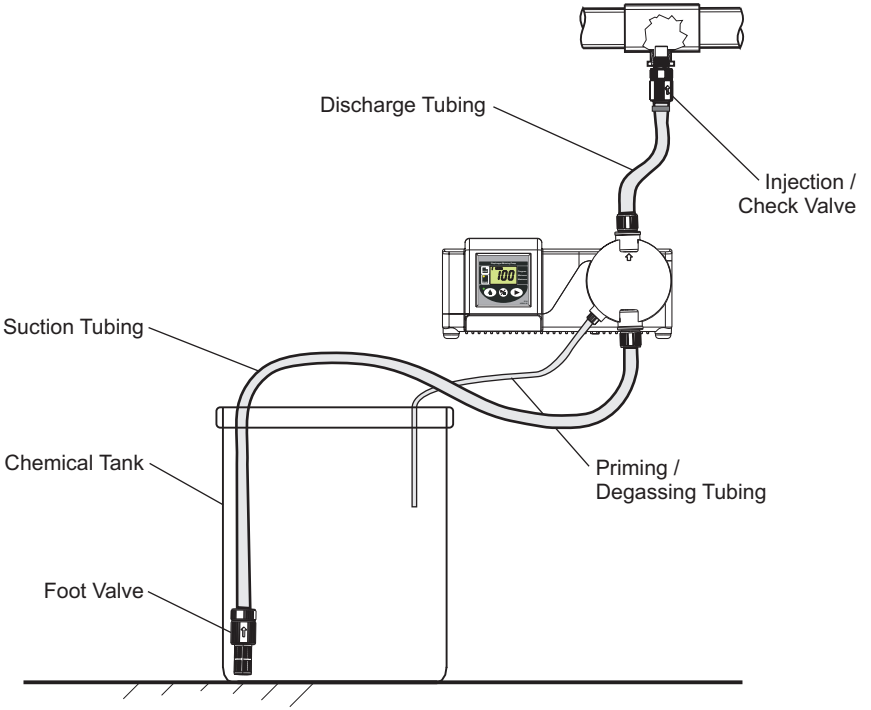
Choose an area located near the chemical supply tank, chemical injection point, and electrical supply. Install the pump where it can be easily serviced.

- Mount the pump to a secure surface using the enclosed hardware.
- Mount the pump close to the injection point. Keep the inlet (suction) and outlet (discharge) tubing as short as possible. Longer discharge tubing increases the back pressure at the pump head.
- Your solution tank should be sturdy. Keep the tank covered to reduce fumes. Do not mount the pump directly over your tank. Chemical fumes may damage the unit. Mount the pump off to the side or at a lower level than the chemical container.
- Be sure your installation does not constitute a cross connection with the drinking water supply. Check your local plumbing codes.

Parts Locator



Typical Installation



Note: *All diagrams are strictly for guideline purposes only. Always consult an expert before installing the pump into specialized systems. The pump should be* ***serviced by qualified persons only.***

Extended Brackets

Model Number PHP-800-MB

Stainless Steel extended brackets allow the pump to be securely mounted to most any surface; floor, shelf, or skid. The brackets lift the pump up 4-1/2 inches (11.43 cm), allowing you to easily connect the suction side of the pump to your solution.

- Raise metering pump 4-1/2 inches (11.43 cm) off the ground or a surface.
- Made out of tough Stainless Steel.
- Provides a stable mounting surface.

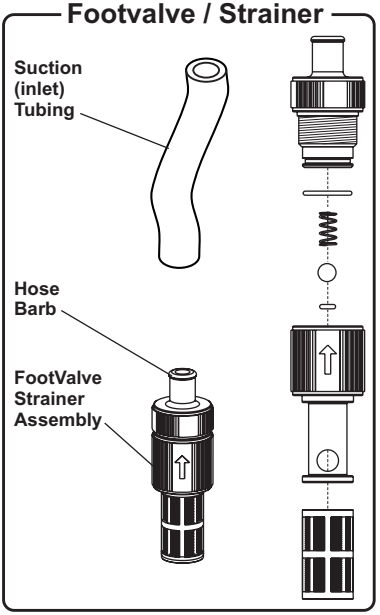
Model #	Description
PHP-800-MB	Extended Mounting Bracket, 1 Pair, SS, 4 SS Screws

5.2 How To Install the Tubing and Fittings

CAUTION: Proper eye and skin protection must be worn when installing and servicing the pump and fittings.

- **Suction (Inlet) Tubing**
  Locate the inlet fitting of the pump head. Push the clear suction tubing onto the fitting barb.

- **Footvalve / Strainer**
  Trim the inlet end of the suction tubing so that the strainer will rest approximately two inches from the bottom of the solution tank. This will prevent sediment from clogging the strainer. Press the strainer's barbed fitting into the end of the tube. Drop the footvalve / strainer into the solution tank.

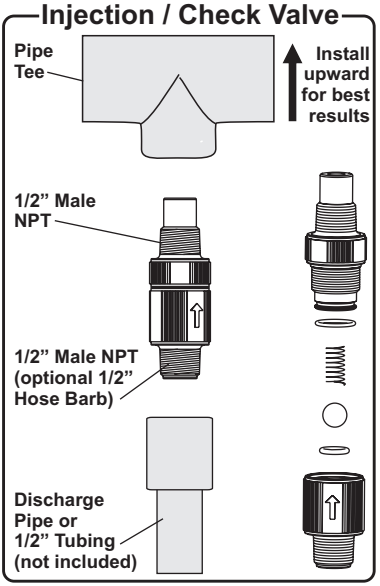


- **Injection / Check Valve Fitting Installation**
  The Injection / Check valve fitting is designed to install directly into 1/2" female pipe threads. This fitting will require periodic cleaning, especially when injecting fluids that calcify such as sodium hypochlorite.
  Install the Injection / Check valve directly into the piping system. **To prevent trapped gasses, install the fitting in an upward direction.** Use Teflon thread sealing tape on the pipe threads.

  At high pressures, Omega recommends using a threaded connection.

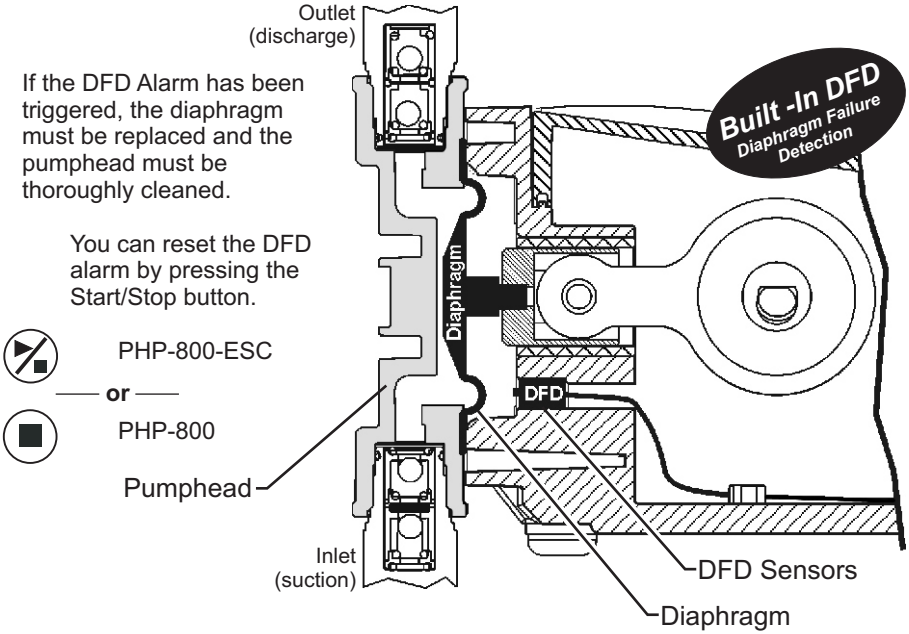
  Injection / Check Valve is available with 1/2" Male NPT or 1/2" Hose Barb. This is based on the outlet connection selected for the pump.

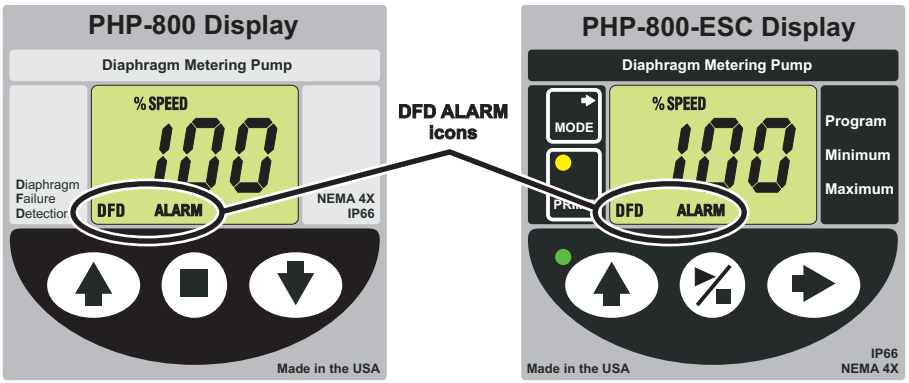
  Keep discharge (outlet) tube as short as possible.



5.3 DFD (Diaphragm Failure Detection)

The Pump includes DFD sensors built directly into the pump. Although it doesn't happen often, diaphragm failure can occur. The DFD sensors will detect the chemical behind the diaphragm caused by diaphragm failure. The pump will then shut down and energize an internal 3 amp relay. You can wire the 3 amp relay to an alarm, SCADA system, backup pump, or nothing at all.





If the DFD Alarm is triggered, the DFD and ALARM icons will begin flashing.

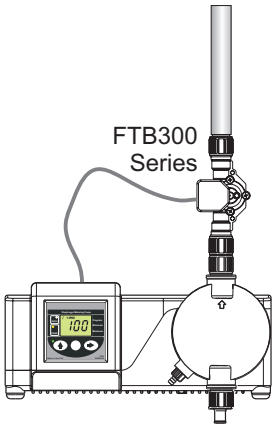
Note: The DFD system will not reset until you have removed all traces of chemical from behind the diaphragm.

5.4 Flow Verification System - (sensor and adaptor Fittings sold separately)

The Pump is equipped with a *Flow Verification System* which is designed to stop the pump and provide a contact closure output in the event the sensor does not detect flow during pump operation. This could indicate a clogged injection fitting, empty chemical solution tank, loose tubing connection, etc.
To allow the pump to clear any gasses that may have accumulated during stopper operation (such as with chlorine), an alarm delay time value from 1-255 seconds must be programmed (An alarm delay value of 000 seconds disables the system).

Install the FTB 300 Series Flow Sensor (sold separately) - The Flow Verification Sensor should be installed on the outlet (discharge) side of the pump head valve.
Connect the red/white, black, and white wires from the sensor to the red, black,

Contact Closure Alarm Output - A contact closure output (relay) is provided with the system. The relay can be configured for normally open (factory default) or normally closed operation by properly positioning the connector plug on the circuit board .



6.0 External Input / Output Signal Connection

SIGNAL INPUT/OUTPUT WIRE COLOR CODES

INPUT TYPE	WIRE COLOR CODE
ALARM RELAY connect 2-conductor plug to either normally open (NO) (factory default) or normally closed (NC) side of receptacle. 3 AMP MAX @ 125VAC (24VDC)	**PURPLE** & **PURPLE**
FLOW VERIFICATION SENSOR (FVS)	**RED/WHITE (+** 20VDC) **BLACK (-)** **YELLOW** (signal)

6.1 How To Operate The Pump

Operation

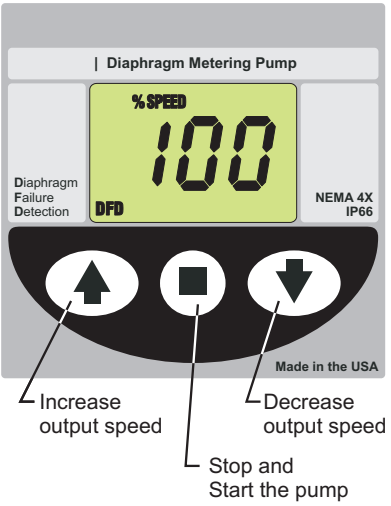
The Pump is a powerful yet simple to operate metering pump.

To **start the pump**, press the Start / Stop button

To **increase the output**, press the Up button

To **decrease the output**, press the Down button

To **stop the pump**, press the Start / Stop button



Priming the Pump

To **prime the pump**, press the Up button and the Start / Stop button at the same time. The pump will run in prime mode for 60 seconds at 100% output.

To **stop priming** before the 60 seconds, press the Start / Stop button.

7.0 External Input/Output Signal Connection

The pump will accept a variety of external control input signals: 4-20mA, 0-10VDC, TTL, CMOS, AC Sine waves, contact closures, Hall Effect, NPN. The 4-20mA and 0-10 VDC loops must be powered. Two types of frequency inputs, AC sine waves (magnetic coils type outputs) and Digital Square waves (Hall Effect signals, contact closures), are acceptable.

All wiring connections are to be made inside of the junction box located on the side of the Pump. liquid-tite connectors are supplied and should be used for the external signal cables. The signal input wires are color coded to the type of signal being used.

SIGNAL INPUT/OUTPUT WIRE COLOR CODES

INPUT TYPE	WIRE COLOR CODE
4-20 mA	**BLUE (+) (non-powered)** & **BLACK (-)**
0-10 VDC	**ORANGE (+) (non-powered)** & **BLACK (-)**
AC sine wave, TTL, CMOS	**WHITE (+)** & **BLACK (-)**
CONTACT (10v @ 2 mA max) HALL EFFECT, NPN	**RED (+)** & **WHITE (-)**
ALARM RELAY connect 2-conductor plug to either normally open (NO) (factory default) or normally closed (NC) side of receptacle. 3 AMP MAX @ 125VAC (24VDC)	**PURPLE** & **PURPLE**
FLOW VERIFICATION SENSOR (FTB300)	**RED/WHITE (+** 20VDC) **BLACK (-)** **YELLOW** (signal)
MOTOR ON SIGNAL 5-20V DC open collector output closed while motor is energized	**BROWN (+)** & **BLACK (-)**

PADDLEWHEEL SENSOR SIGNAL INPUT WIRING

PADDLEWHEEL SENSOR TYPE	PUMP INPUT WIRE COLOR CODE
HALL EFFECT SENSOR	**RED (+ 20VDC)** **BLACK (-)** **WHITE (signal)**
AC SINE WAVE SENSOR	**WHITE (+)** **BLACK (-)**

7.1 How To Operate The Pump

Operation

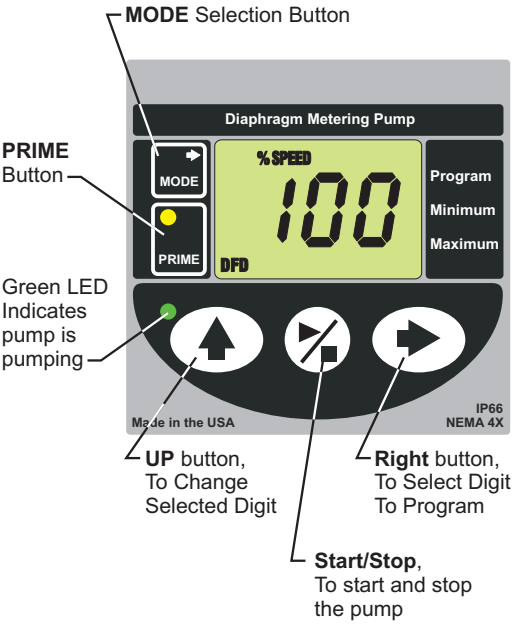
MODE button is used to select the mode you would like to run the pump in. See below for more **MODE** information.

PRIME button is used to prime the pump. The pump will run at full speed for 60 seconds.
To stop the priming function before the 60 seconds, press the **Start/Stop** button.

UP button is used to change the selected digit.

Start/Stop button is used to Start and Stop the pump.

RIGHT button is used to select the digit to program.



Modes

MODE 0 = DFD (Diaphragm Failure Detection) On/Off
FTB300 flow verification system 0 = OFF, 1-255 Seconds = ON
Please Note: You will not see the FVS icon or be able to configure the FVS unless an FVS sensor is wired to the PHP-800

MODE 1 = Manual Adjustment, 1 - 100% (external input disabled)

MODE 2 = 4-20 mA input

MODE 3 = 0-10 VDC input

MODE 4 = Frequency input (Hz), also known as pulse input
Frequency (Hz) mode is commonly used in proportional feed systems. Pump can be wired to a paddlewheel flowmeter, ultrasonic flowmeter, or any type of high frequency flowmeter. Pump will smoothly speed up and slow down based on frequency signals. Range = 1 - 1000 Hz

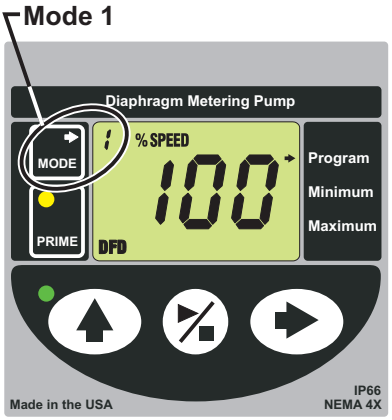
MODE 5 = Batch
Batch mode can be used with water meters, contact closure switch, and other single pulse or low pulse equipment.
In Batch mode, the pumps' 'motor speed' and 'on time' is configured to be initiated by a single pulse or multiple pulses (up to 1,000 pulses). In MODE 5 the pump 'motor speed' is fixed (1 - 100%) for a specified amount of 'on time' (0.1 - 199.9 seconds or 0.1 - 199.9 minutes).

Tip! To View current Input value From an external source

Press and hold the **UP** button to toggle from current pump speed output to current Input value.

7.2 OPERATING MODE 1 - Output adjusted manually

In this mode, the pump's motor speed is adjusted manually using the front panel touch pad. The motor speed can be adjusted from 0-100%.



- ***Set the pump for mode 1.***

Press the **MODE** button until ***MODE 1*** is shown on the LCD display.

The ***%SPEED*** icon will light.

The large ***LCD*** will indicate the currently programmed percentage of speed.

- ***Enter the programming mode.***

Press and **MODE** button for more than two seconds.

A blinking ***ARROW*** will point to the word **PROGRAM** indicating the program mode has been activated.

Press the **Right** button to select the digit to program. The digit will blink when selected.

Press the **UP** button to change the selected digit.

Repeat until all digits are programmed.

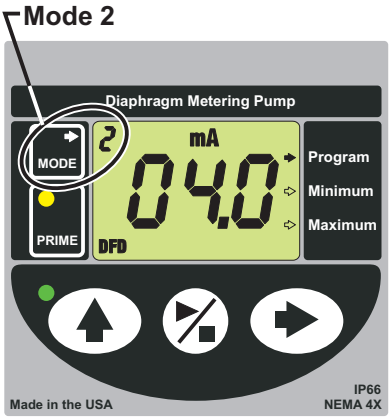
To exit the programming mode, press the **MODE** button for more than two seconds.

The arrow next to the word **PROGRAM** will disappear.

✓ ***NOTE:*** If while in the program mode no buttons are pressed within 20 seconds, the circuitry will automatically return to the run mode, without saving changes.

7.3 OPERATING MODE 2 - 4-20 mA input Mode

In this mode, the pump's motor speed is adjusted automatically based on the value of the 4-20 mA input signal. Any motor speed can be assigned to either the minimum or maximum milliamp input values.



- ***Set the pump for mode 2.***

MODE

Press the **MODE** button until ***MODE 2*** is shown on the LCD display.

The ***%SPEED*** or ***mA*** icon will light depending on the current display setting.

Press and hold the **UP** button to toggle from current pump speed output to current Input **mA** signal.

The large ***LCD*** will indicate the current motor speed or the current mA input value.

- ***Enter the programming mode.***

MODE

While ***MODE 2*** is displayed, press the **MODE** button for more than two seconds.
Blinking ***ARROW's*** will point to the words **PROGRAM** and **MINIMUM** indicating the program mode is activated and the minimum value is ready to be programmed. The ***% SPEED*** icon will blink indicating the percentage of speed is ready to be programmed.

- ***Enter the motor speed at the minimum mA input signal value.***

Press the **RIGHT** button to select the digit to program. The digit will blink when selected.

Press the **UP** button to change the selected digit. Repeat until all digits are programmed.

MODE

Press the **MODE** button. The ***% SPEED*** icon will stop blinking and the ***mA*** icon will blink indicating the minimum mA value is ready to be programmed. The currently programmed minimum value is shown on the ***LCD***.

- ***Enter the minimum mA input signal value.***

Note: this value must be less than the maximum mA input signal value.

Press the **RIGHT** button to select the digit to program. The digit will blink when selected.

Press the **UP** button to change the selected digit.

Repeat until all digits are programmed.

Press the **MODE** button. The ***mA*** icon will stop blinking and the ***% SPEED*** icon will blink. The ***ARROW*** next to the word **MAXIMUM** will blink indicating the maximum value is ready to be programmed. The currently programmed maximum motor speed value is shown on the ***LCD***.

- ***Enter the motor speed at the maximum mA input signal value.***

Press the **RIGHT** button to select the digit to program. The digit will blink when selected.

Press the **UP** button to change the selected digit.

Repeat until all digits are programmed.

Press the **MODE** button. The ***% SPEED*** icon will stop blinking and the ***mA*** icon will blink indicating the maximum mA value is ready to be programmed. The currently programmed maximum value is shown on the ***LCD***.

- ***Enter the maximum mA input signal value.***
  Note: this value must be greater than the minimum mA input signal value.

Press the **RIGHT** button to select the digit to program. The digit will blink when selected.

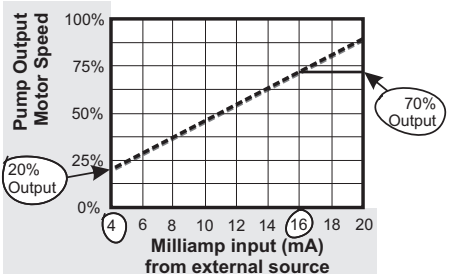
Press the **UP** button to change the selected digit.

Repeat until all digits are programmed.

Press the mode button. Programming is complete.

To exit the programming mode, press the **MODE** button for more than two seconds. The **PROGRAM** arrow will disappear.

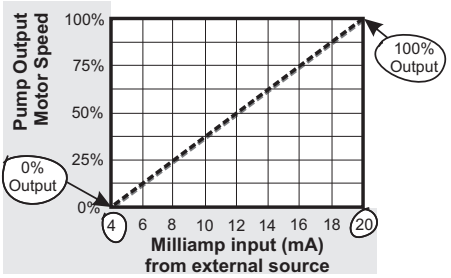
Mode 2 Programming Examples



Example 1

4 mA will result in a pump output of 20.0%

16 mA will result in a pump output of 70.0%



Example 2

4 mA will result in a pump output of 0.0%

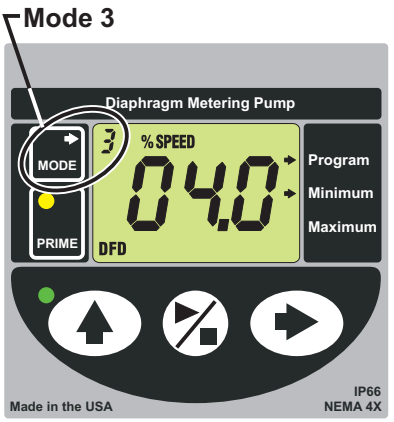
20 mA will result in a pump output of 100.0%

Tip! To View current Input value

Press and hold the **UP** button to toggle from **current pump speed** output to **current Input value**.

7.4 OPERATING MODE 3 - 0-10 VDC Mode

In this mode, the pump's motor speed is adjusted automatically based on the value of the 0-10VDC input signal. Any motor speed can be assigned to either the minimum or maximum DC input signal values.



- ***Set the pump for mode 3***.

Press the **MODE** button until ***MODE 3*** is shown on the LCD display.

The ***% SPEED*** or ***VDC*** icon will light depending on the current display setting.

Press and hold the **UP** button to toggle from current pump speed output to current **VDC** Input value.

The large ***LCD*** will indicate the current motor speed or the VDC input value.

- ***Enter the programming mode.***

While ***MODE 3*** is displayed, Press and hold the **MODE** button for more than two seconds.
Blinking ***ARROW's*** will point to the words **PROGRAM** and **MINIMUM** indicating the program mode is activated and the minimum value is ready to be programmed. The ***% SPEED*** icon will blink indicating the percentage of speed is ready to be programmed.

- ***Enter the motor speed at the minimum VDC input signal value.***

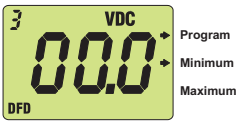
Press the **RIGHT** button to select the digit to program. The digit will blink when selected.

Press the **UP** button to change the selected digit.

Repeat until all digits are programmed.

Repeat until all digits are programmed.

- Press the **MODE** button. The ***% SPEED*** icon will stop blinking and the ***VDC*** icon will blink indicating the minimum VDC value is ready to be programmed. The currently programmed minimum value is shown on the ***LCD***.



Enter the minimum VDC input signal value.
Note: this value must be less than the maximum VDC input signal value.

Press the **RIGHT** button to select the digit to program. The digit will blink when selected.

Press the **UP** button to change the selected digit. Repeat until all digits are programmed.

- Press the **MODE** button. The ***VDC*** icon will stop blinking and the ***% SPEED*** icon will blink. The ***ARROW*** next to the word **MAXIMUM** will blink indicating the maximum value is ready to be programmed. The currently programmed maximum motor speed value is shown on the ***LCD***.

- ***Enter the motor speed at the maximum VDC*** igit.
- ***input signal value.***

Press the **RIGHT** button to select the digit to program. The digit will blink when selected.

Press the **UP** button to change the selected digit.

Repeat until all digits are programmed.

Press the **MODE** button. The ***% SPEED*** icon will stop blinking and the ***VDC*** icon will blink indicating the maximum VDC value is ready to be programmed. The currently programmed maximum value is shown on the ***LCD***.

- ***Enter the maximum VDC input signal value.***
  Note: this value must be greater than the minimum VDC input signal value.

Press the **RIGHT** button to select the digit to program. The digit will blink when selected.

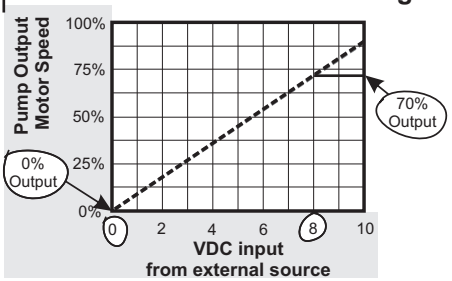
Press the **UP** button to change the selected digit.

Repeat until all digits are programmed.

Press the **MODE** button. Programming is complete.

To exit the programming mode, press and hold the **MODE** button for more than two seconds. The **PROGRAM** arrow will disappear..

Mode 3 Programming Examples

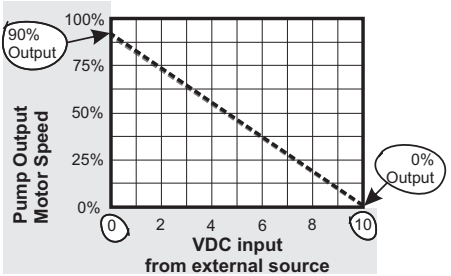


Example 1

0 VDC will result in a pump output of 0.0%

8 VDC will result in a pump output of 70.0%

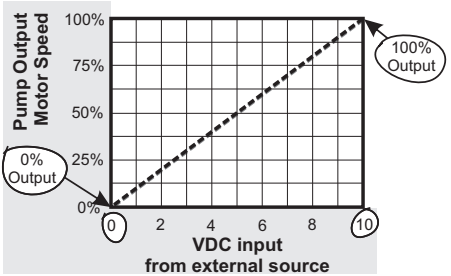
Continued - Mode 3 Programming Examples



Example 2

0 VDC will result in a pump output of 90%

10 VDC will result in a pump output of 0.0%



Example 3

0 VDC will result in a pump output of 0.0%

10 VDC will result in a pump output of 100.0%

Tip! To View current Input value

Press and hold the **UP** button to toggle from current pump speed output to current Input value.

7.5 OPERATING MODE 4 - Frequency (Hz) Mode

Also known as Pulse Input. In this mode, the pump's motor speed is adjusted automatically based on the frequency (Hz) of the input signal. Any motor speed can be assigned to either the minimum or maximum Hz input signals.

- ***Set the pump for mode 4.***

MODE

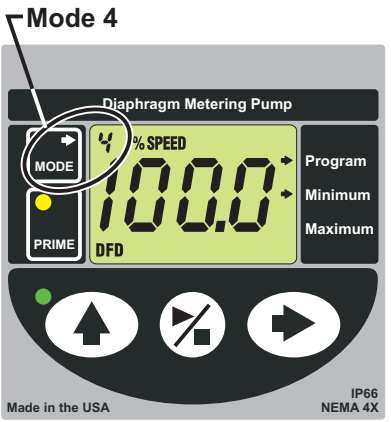
Press the MODE button until ***MODE 4*** is shown on the LCD display.

The ***% SPEED*** or ***Hz*** icon will light depending on the current display setting.

Press and hold the **UP** button to toggle from current pump speed output to current **Hz** Input value.

The large ***LCD*** will indicate the current motor speed or the Hz input value.

- ***Enter the programming mode.***



While ***MODE 4*** is displayed, press and hold the **MODE** button for more than two seconds.

Blinking ***ARROW's*** will point to the word **PROGRAM** and **MINIMUM** indicating the program mode is activated and the minimum value is ready to be programmed. The ***% SPEED*** icon will blink indicating the percentage of speed is ready to be programmed.

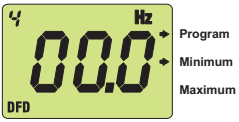
- ***Enter the motor speed at the minimum Hz input signal value.***

Press the **RIGHT** button to select the digit to program. The digit will blink when selected.

Press the **UP** button to change the selected digit.

Repeat until all digits are programmed.

Press the **MODE** button. The ***% SPEED*** icon will stop blinking and the ***Hz*** icon will blink indicating the minimum Hz value is ready to be programmed. The currently programmed minimum value is shown on the ***LCD***.



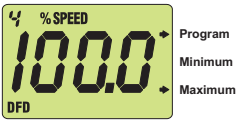
- ***Enter the minimum Hz input signal value (to the nearest 10 Hz).***
  Note: this value must be less than the maximum Hz input signal value.

Press the **RIGHT** button to select the digit to program. The digit will blink when selected.

Press the **UP** button to change the selected digit.

Repeat until all digits are programmed.

Press the **MODE** button. The ***Hz*** icon will stop blinking and the ***% SPEED*** icon will blink. The ***ARROW*** next to the word **MAXIMUM** will blink indicating the maximum value is ready to be programmed. The Currently programmed maximum motor speed value is shown on the ***LCD***.



- ***Enter the motor speed at the maximum VDC input signal value.***

Press the **RIGHT** button to select the digit to program. The digit will blink when selected.

Press the **UP** button to change the selected digit.

Repeat until all digits are programmed.

Press the **MODE** button. The ***% SPEED*** icon will stop blinking and the ***Hz*** icon will blink indicating the maximum Hz value is ready to be programmed. The currently programmed maximum value is shown on the ***LCD***.

Enter the maximum Hz input signal value (to the nearest 10 Hz).
Note: this value must be greater than the minimum Hz input signal value.

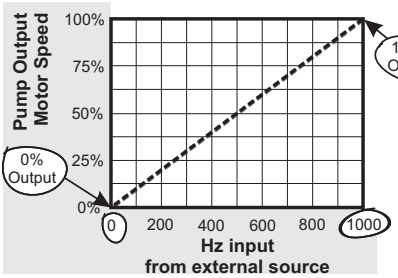
Press the **RIGHT** button to select the digit to program. The digit will blink when selected.

Press the **UP** button to change the selected digit.

Repeat until all digits are programmed..
Press the **MODE** button. Programming is complete.

To exit the programming mode, press and hold the **MODE** button for more than two seconds. The **PROGRAM** arrow will disappear.

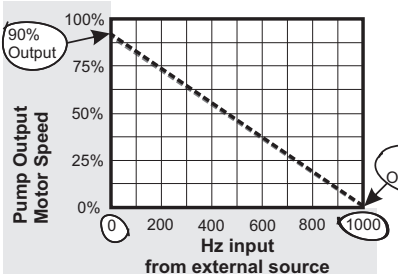
Mode 4 Programming Examples



Example 1

0 Hz will result in a pump output of 0.0%

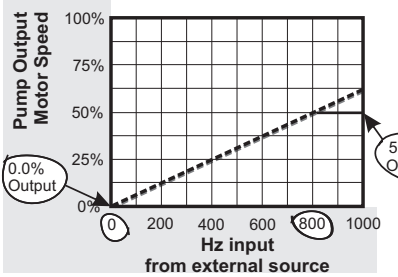
1000 Hz will result in a pump output of 0.0%



Example 3

0 Hz will result in a pump output of 90.0%

1000 Hz will result in a pump output of 0.0%



Example 3

0 VDC will result in a pump output of 0.0%

800 Hz will result in a pump output of 50.0%

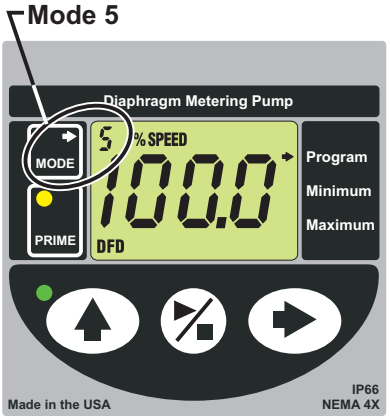
Tip! To View current Input value

Press and hold the **UP** button to toggle from current pump speed output to current Input value.

7.6 OPERATING MODE 5 - Batch Mode -

In this mode, the pump's 'motor speed' and 'on time' is configured to be initiated by a single pulse or up to 1,999 pulses.
You will configure the pump in the following order:

a. Select the **% SPEED**.
(1% to 100%)
b. Select the pump **ON** time.
(0.1 to 199.9 and select units: seconds (**SEC**) or minutes (**MIN**)
c. Select the amount of pulses to receive to trigger the pump.
(1 pulse up to 1999 pulses)



- ***Set the pump for mode 5***.

Press the MODE button until ***MODE 5*** is shown on the LCD display.

The ***% SPEED*** and ***Hz*** icon will light.

The large ***LCD*** will indicate the current motor speed or the Hz input value.

- ***Enter the programming mode.***

While ***MODE 5*** is displayed, press and hold the **MODE** button for more than two seconds.
Blinking ***ARROW's*** will point to the word **PROGRAM** and **MINIMUM**
A blinking ***ARROW*** will point to the word **PROGRAM** and the ***% SPEED*** icon will blink indicating the program mode is activated and the ***% SPEED*** value is ready to be programed.

- ***Enter the motor speed***. (1% to 100%)

Press the **RIGHT** button to select the digit to program. The digit will blink when selected. (Moves to the next digit to the right.)

Press the **UP** button to change the selected digit.

Repeat until all digits are programmed.

Press the **MODE** button. The ***% SPEED*** icon will stop blinking and the ***SEC*** or ***MIN*** icon will blink indicating the pump **ON-time** value is ready to be programmed.

- ***Enter the pump ON-time***. (0.1 to 199.9 seconds or minutes)

Press the **RIGHT** button to select the digit to program. The digit will blink when selected. (Moves to the next digit to the right.)

Press the **UP** button to change the selected digit.

Repeat until all digits are programmed.

Once all the digits are programmed, press the **RIGHT** arrow to then select between SEC (seconds) and MIN (minutes).

Use the **UP** arrow to scroll through SEC and MIN.

Press the **MODE** button. The ***SEC*** or ***MIN*** icon will stop blinking and the ***Hz*** icon will blink indicating the number of pulses is ready to be programmed.

- ***Enter the number of pulses to trigger the batch.*** (1 to 1999 pulses)

Press the **RIGHT** button to select the digit to program. The digit will blink when selected. (Moves to the next digit to the right.)

Press the **UP** button to change the selected digit.
Repeat until all digits are programmed.

Press the **MODE** button. Programming is complete.

To exit the programming mode, press and hold the **MODE** button for more than two seconds. The **PROGRAM** arrow will disappear.

Tip! To View current Input value

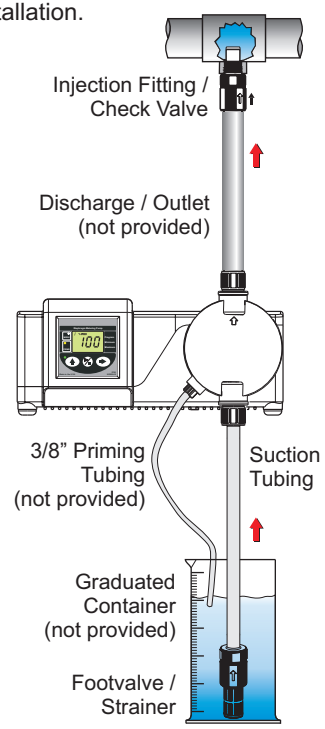
Press and hold the **UP** button to toggle from current pump speed output to current Input value.

CAUTION: Always wear protective clothing, face shield, safety glasses and gloves when working on or near your metering pump. Additional precautions should be taken depending on the solution being pumped. Refer to MSDS precautions from your solution supplier.

8.0 Measuring the Pump's Output - Volumetric Test.

This volumetric test will take into account individual installation factors such as line pressure, fluid viscosity, suction lift, etc. This test is the most accurate for measuring the injector's output in an individual installation.

1. Be sure the Injection Fitting and Footvalve / Strainer are clean and working properly.
2. Fill a large graduated cylinder with the solution to be injected.
3. With the pump installed under normal operating conditions, place the suction tubing with the Footvalve / Strainer installed in the graduated cylinder.
4. Push 3/8" tubing onto the priming valve. Place the other side of the 3/8" tubing in the solution tank. Make sure the priming valve is closed by turning the valve to the right.
5. Run the pump until all air is removed from the suction line and the solution enters the discharge tubing.
   If the pump does not easily prime, loosen the priming valve 1 - 2 turns counter clock wise. Once the air is removed close the priming valve.
6. Remove the suction tubing from the graduated cylinder and refill the graduated cylinder if necessary. Note the amount of solution in the graduated cylinder.



7. Place suction tubing with the Footvalve / Strainer installed back into the graduated cylinder.
8. Run the injector for a measured amount of time. A longer testing time will produce more accurate results.
9. Remove the suction tubing from the graduated cylinder. Measure the amount of chemical injected.

Example:

During your 1 minute calibration period, say the Chem-Pro pumped 1000 Milliliters in 1 minute.

1 US Gallon = 3.785 Liters = 3785 Milliliters

$$\left(\frac{1000\ \text{ML/Min}}{3785}\right) 60 = 15.85\ \text{GPH (US gallons per hour)}$$

60 — Minutes per hour

3785 — Milliliters in a US gallon

Note: All diagrams are strictly for guideline purposes only. Always consult an expert before installing the pump into specialized systems. The pump should be **serviced by qualified persons only.**

9.0 How to Maintain the Pump

CAUTION: Proper eye and skin protection must be worn when installing and servicing the pump.

9.1 Routine Inspection and Maintenance

The pump requires very little maintenance. However, the pump and all accessories should be checked regularly. This is especially important when pumping chemicals. Inspect all components for signs of leaking, swelling, cracking, discoloration or corrosion. Replace worn or damaged components immediately. Cracking, crazing, discoloration and the like during the first week of operation are signs of severe chemical attack. If this occurs, immediately remove the chemical from the pump. Determine which parts are being attacked and replace them with parts that have been manufactured using more suitable materials. The manufacturer does not assume responsibility for damage to the pump that has been caused by chemical attack.

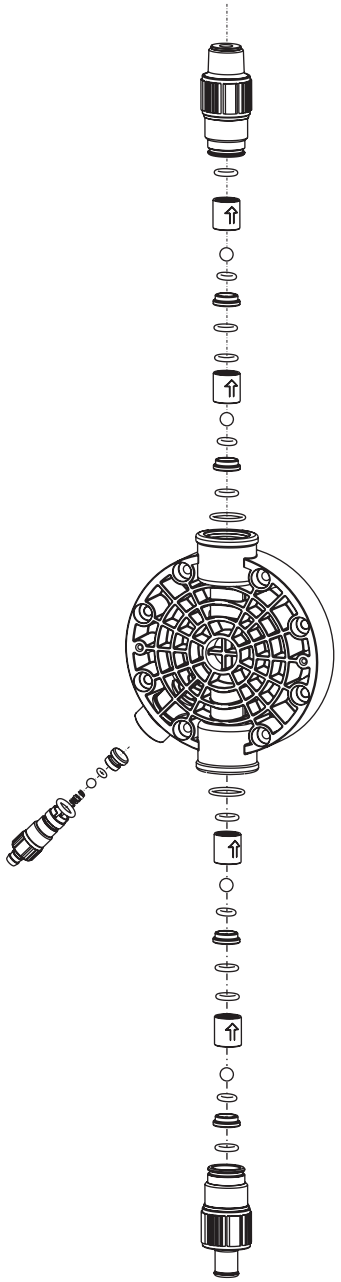
Brush Kit Life Cycle over 3,000 hours of continuous use.(Part number 72000-378)

9.2 How to Clean the Pump

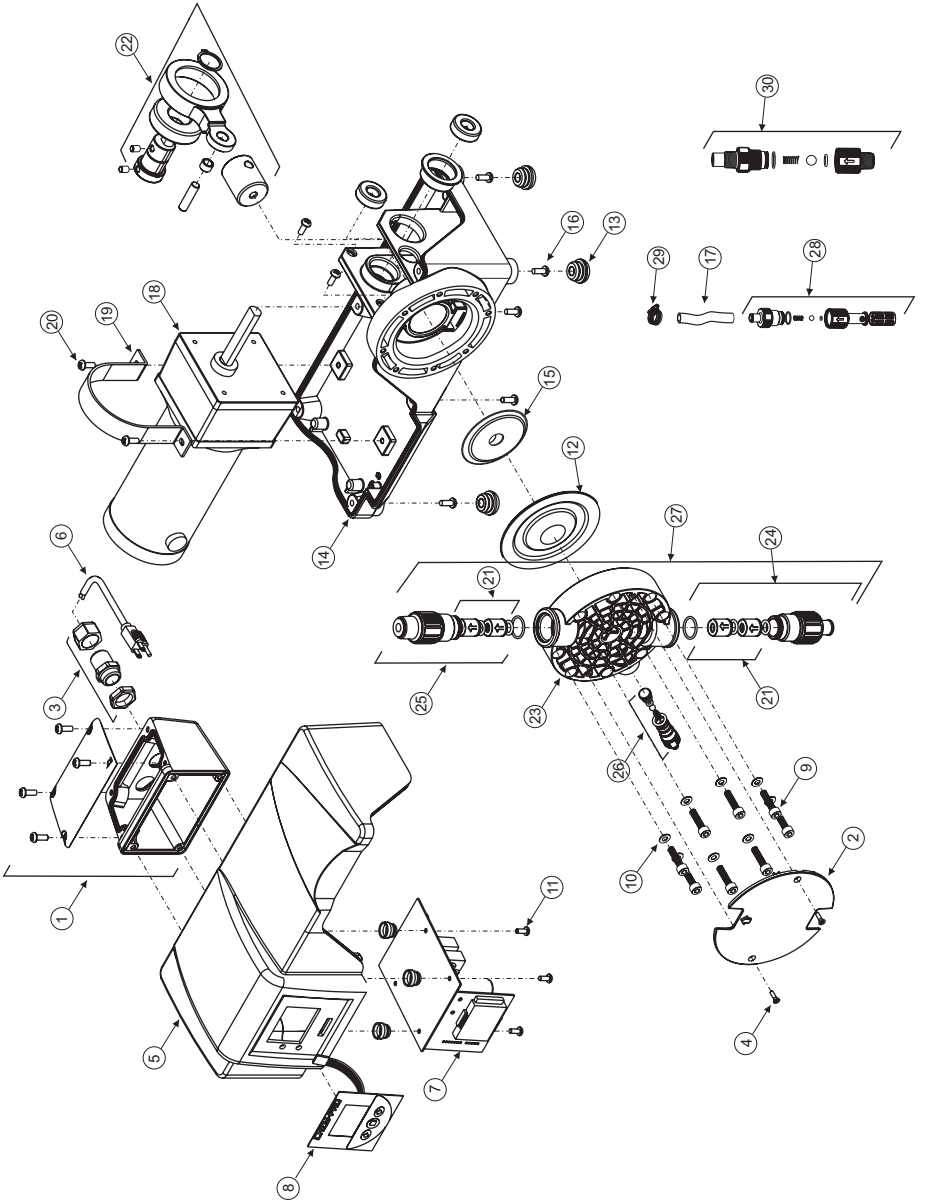
The pump will require occasional cleaning, especially the Injection fitting, the Footvalve / Strainer, and the pump head valves. The frequency will depend on the type and severity of service.

- Inspect and replace the pumphead valves as required.
- When changing the diaphragm, the pump head chamber and pump head cover should be wiped free of any dirt and debris.
- Periodically clean the injection / check valve assembly, especially when injecting fluids that calcify such as sodium hypochlorite. These lime deposits and other build ups can clog the fitting, increase the back pressure and interfere with the check valve operation.
- Periodically clean the suction strainer.
- Periodically inspect the air vents located under the motor housing and in the back on the rear housing cover. Clean if necessary.

PUMP HEAD AND VALVE EXPLODED VIEW



Replacement Parts Drawing



PARTS LIST

Item	Part No.	Description	Qty.
1.	71000-583	J-Box w/ Cover	1
2.	90001-158	P-Head Cover	1
3.	90008-035	Liquid Tight Connector (large)	1
	90008-199	Liquid Tight Connector (small)	1
4.	90011-081	Screw P-Head Cover SS	2
5.	71000-584	Cover housing model (std.)	1
	71000-585	Cover housing model (ESC)	1
6.	71000-175	Power Cord,115v	1
	71000-176	Power Cord,220v	1
	71000-177	Power Cord,230v	1
7	72000-382	Controller Kit model (Std.) 115V	1
	72000-383	Controller Kit model (Std.) 230V	1
	72000-384	Controller Kit model (esc) 115V	1
	72000-385	Controller Kit model (esc) 230V	1
8.	90012-287	Label Overlay model (std)	1
	90012-289	Label Overlay model (deluxe)	1
9.	90011-181	Screw P-Head SS # 10-32 x 1.25L	8
10.	90011-094	Washer SS #10 screw	4
11.	90011-180	Screw Nylon #8-32	4
12.	90003-560	Diaphragm TFE/Hypalon	1
13.	90003-561	Bumper Feet	4
14.	71000-588	Frame Housing Assy.	1
	- Includes	TFD Sensor	
		Bearings	
		Bumper Feet	
15.	76001-347	Backup Washer Diaphragm	1
16.	90011-115	Screw for housing 10-32x.50L SS	10
17.	76000-361	Tubing Suction .75” OD x .50” ID x 8ft	1
18.	70002-276	Motor 130RPM	1
	70002-277	Motor 62RPM	1
19.	90008-367	Clamp Heat Sink	1
20.	90011-182	Screw #10-32 x .31 SS	2
21.	20000-194	Kit 4 cartridge insert Viton	4
	20000-195	Kit 4 cartridge insert EP	4
22.	71000-573	Cam .06’ S/A complete	1
	71000-574	Cam .10’ S/A complete	1
23.	90002-258	Pump Head molded PVDF	1
24.	70001-347	Cart. Valve Assy. .50T Viton	1
	70001-348	Cart. Valve Assy. .50T EP	1
25.	70001-349	Cart. Valve Assy. .50 Male NPT/Viton	1
	70001-350	Cart. Valve Assy. .50 Male NPT/EP	1
	70001-351	Cart. Valve Assy. .50 Female NPT Viton	1
	70001-352	Cart. Valve Assy. .50 Female NPT EP	1
26.	70001-353	Primer Valve Assy. Viton	1
	70001-354	Primer Valve Assy. EP	1
27.	70001-356	Kit Head Complete .50T & .50M/NPT Viton	1
	70001-357	Kit Head Complete .50T & .50M/NPT EP	1
	70001-358	Kit Head Complete .50T & .50F/NPT Viton	1
	70001-359	Kit Head Complete .50T & .50F/NPT EP	1
28.	71000-575	Foot Valve Assy. Viton	1
	71000-576	Foot Valve Assy. EP	1
29.	90008-043	Clamp #5 SS	1
30.	71000-579	Injection Valve Assy. Viton	1
	71000-580	Injection Valve Assy. EP	1

NOTES

WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of **13 months** from date of purchase. OMEGA's WARRANTY adds an additional one (1) month grace period to the normal **one (1) year product warranty** to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product.

If the unit malfunctions, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective, it will be repaired or replaced at no charge. OMEGA's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of having been damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components in which wear is not warranted, include but are not limited to contact points, fuses, and triacs.

OMEGA is pleased to offer suggestions on the use of its various products. However, OMEGA neither assumes responsibility for any omissions or errors nor assumes liability for any damages that result from the use of its products in accordance with information provided by OMEGA, either verbal or written. OMEGA warrants only that the parts manufactured by the company will be as specified and free of defects. OMEGA MAKES NO OTHER WARRANTIES OR REPRESENTATIONS OF ANY KIND WHATSOEVER, EXPRESSED OR IMPLIED, EXCEPT THAT OF TITLE, AND ALL IMPLIED WARRANTIES INCLUDING ANY WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED. LIMITATION OF LIABILITY: The remedies of purchaser set forth herein are exclusive, and the total liability of OMEGA with respect to this order, whether based on contract, warranty, negligence, indemnification, strict liability or otherwise, shall not exceed the purchase price of the component upon which liability is based. In no event shall OMEGA be liable for consequential, incidental or special damages.

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RETURN REQUESTS/INQUIRIES

Direct all warranty and repair requests/inquiries to the OMEGA Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OMEGA'S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

FOR **WARRANTY** RETURNS, please have the following information available BEFORE contacting OMEGA:

1. Purchase Order number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

FOR **NON-WARRANTY** REPAIRS, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA:

1. Purchase Order number to cover the COST of the repair,
2. Model and serial number of the product, and
3. Repair instructions and/or specific problems relative to the product.

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