Series **C3F** and **C3V**

Variable Speed
Positive Displacement Diaphragm Metering Pump
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### Series Comparison:

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<th>Junction Box</th>
<th>DFD (Leak Detection)</th>
<th>FVS** (Flow Verification)</th>
<th>4-20 mA</th>
<th>0-10 VDC</th>
<th>Pulsed*</th>
<th>Batch</th>
<th>Alarm Relay 3 Amp</th>
</tr>
</thead>
<tbody>
<tr>
<td>C3F</td>
<td>Optional</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>C3V</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

* Also known as Frequency Mode  
** Requires Micro-Flo Sensor sold separately
1.0 Introduction

Congratulations on purchasing the C3 Diaphragm Metering Pump. The C3 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 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
Shipping Weight ........................29 lb. (approx.)
Dimensions:

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.
5.0 Installation

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.

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.
5.0 Installation

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.

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.

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 72000-380

Blue-White’s 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.

<table>
<thead>
<tr>
<th>Model #</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>72000-380</td>
<td>Extended Mounting Bracket, 1 Pair, SS, 4 SS Screws</td>
</tr>
</tbody>
</table>
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, Blue-White 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 C3 pump.

  **Keep discharge (outlet) tube as short as possible.**
5.3 DFD (Diaphragm Failure Detection)

The C3 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 has been triggered, the diaphragm must be replaced and the pumphead must be thoroughly cleaned.

You can reset the DFD alarm by pressing the Start/Stop button.

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 FVS - Flow Verification System - (sensor sold separately)

The C3 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 FVS system).

Install the FVS Flow Sensor - The Flow Verification Sensor (FVS) 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, and yellow wires located in the pump’s junction box.

Contact Closure Alarm Output - A contact closure output (relay) is provided with the FVS 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.

<table>
<thead>
<tr>
<th>Sensor Model Number</th>
<th>Maximum PSI / BAR</th>
<th>Adapter</th>
<th>Operating Flow Range mL/min</th>
<th>Operating Flow Range GPH (US)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FV-400-1V</td>
<td>150 / 10.3</td>
<td>½&quot; barb</td>
<td>300-3000</td>
<td>4.8-47.5</td>
</tr>
<tr>
<td>FV-500-1V</td>
<td>150 / 10.3</td>
<td>½&quot; barb</td>
<td>500-5000</td>
<td>7.9-79.3</td>
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<tr>
<td>FV-600-1V</td>
<td>150 / 10.3</td>
<td>½&quot; barb</td>
<td>700-7000</td>
<td>11.1-111</td>
</tr>
<tr>
<td>FV-400-2V</td>
<td>150 / 10.3</td>
<td>½&quot; M/NPT</td>
<td>300-3000</td>
<td>4.8-47.5</td>
</tr>
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<td>FV-500-2V</td>
<td>150 / 10.3</td>
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</tr>
<tr>
<td>FV-400-3V</td>
<td>150 / 10.3</td>
<td>½&quot; F/NPT</td>
<td>300-3000</td>
<td>4.8-47.5</td>
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<tr>
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The C3 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 FVS system).

- (sensor sold separately)

Install the FVS Flow Sensor - The Flow Verification Sensor (FVS) 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, and yellow wires located in the pump's junction box.

### Sensor Model Number

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<thead>
<tr>
<th>Operating Flow Range</th>
<th>GPH (US)</th>
</tr>
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<tbody>
<tr>
<td>11.1-111</td>
<td>300-3000</td>
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<tr>
<td>4.8-47.5</td>
<td>700-7000</td>
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<th>Maximum PSI / BAR</th>
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</tr>
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</table>

### Signal Input/Output Wire Color Codes

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

6.0 C3F External Input / Output Signal Connection

**SIGNAL INPUT/OUTPUT WIRE COLOR CODES**

<table>
<thead>
<tr>
<th>INPUT TYPE</th>
<th>WIRE COLOR CODE</th>
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<tbody>
<tr>
<td>ALARM RELAY</td>
<td>PURPLE &amp; PURPLE</td>
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<td>connect 2-conductor plug to either normally open (NO) (factory default) or normally closed (NC) side of receptacle. 3 AMP MAX @ 125VAC (24VDC)</td>
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<tr>
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<td>RED/WHITE (+ 20VDC) BLACK (-) YELLOW (signal)</td>
</tr>
</tbody>
</table>
6.1 How To Operate The C3F

**C3F Series Operation**

The C3F 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 C3F**

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 primming** before the 60 seconds, press the Start / Stop button.
7.0 C3V External Input/Output Signal Connection

C3V 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 C3V. 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

<table>
<thead>
<tr>
<th>INPUT TYPE</th>
<th>WIRE COLOR CODE</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-20 mA</td>
<td>BLUE (+) (non-powered) &amp; BLACK (-)</td>
</tr>
<tr>
<td>0-10 VDC</td>
<td>ORANGE (+) (non-powered) &amp; BLACK (-)</td>
</tr>
<tr>
<td>AC sine wave, TTL, CMOS</td>
<td>WHITE (+) &amp; BLACK (-)</td>
</tr>
<tr>
<td>CONTACT (10v @ 2 mA max)</td>
<td>RED (+) &amp; WHITE (-)</td>
</tr>
<tr>
<td>Hall Effect, NPN</td>
<td>PURPLE &amp; PURPLE</td>
</tr>
<tr>
<td>FLOW VERIFICATION SENSOR (FVS)</td>
<td>RED/WHITE (+ 20VDC)</td>
</tr>
<tr>
<td></td>
<td>BLACK (-)</td>
</tr>
<tr>
<td></td>
<td>YELLOW (signal)</td>
</tr>
<tr>
<td>MOTOR ON SIGNAL</td>
<td>BROWN (+) &amp; BLACK (-)</td>
</tr>
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### PADDLEWHEEL SENSOR SIGNAL INPUT WIRING

<table>
<thead>
<tr>
<th>BLUE-WHITE PADDLEWHEEL SENSOR TYPE</th>
<th>PADDLEWHEEL SENSOR WIRE COLOR CODE</th>
<th>PUMP INPUT WIRE COLOR CODE</th>
</tr>
</thead>
<tbody>
<tr>
<td>MODEL FH HALL EFFECT SENSOR</td>
<td>RED (+) BLACK (-)</td>
<td>RED (+ 20VDC) BLACK (-)</td>
</tr>
<tr>
<td></td>
<td>WHITE (signal)</td>
<td>WHITE (signal)</td>
</tr>
<tr>
<td>MODEL FC AC SINE WAVE SENSOR</td>
<td>RED (+) BLACK (-)</td>
<td>WHITE (+) BLACK (-)</td>
</tr>
</tbody>
</table>
7.1 How To Operate The C3V

C3V Series 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.

- **DOWN** button is used to select the digit to program.

C3V Modes

**MODE 0** = DFD (Diaphragm Failure Detection) On/Off
FVS (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 C3 pump.

**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).
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 the 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 DOWN 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.**

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.

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

**Enter the programming 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 DOWN 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 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 DOWN 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 DOWN 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 DOWN 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%
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.

  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 DOWN 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 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 DOWN 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 input signal value.**

Press the DOWN 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 DOWN 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

<table>
<thead>
<tr>
<th>Pump Output</th>
<th>Motor Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>25%</td>
<td>25%</td>
</tr>
<tr>
<td>50%</td>
<td>50%</td>
</tr>
<tr>
<td>75%</td>
<td>75%</td>
</tr>
<tr>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

**Example 1**

0 VDC will result in a pump output of 0.0%

8 VDC will result in a pump output of 70.0%
Enter the motor speed at the minimum Hz input signal value.
Press the DOWN 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 DOWN 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 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 DOWN button to select the digit to program. The digit will blink when selected.
Press the UP button to change the selected digit.

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.**
  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.
  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 **DOWN** 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 **DOWN** 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 **DOWN** 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 **DOWN** button to select the digit to program. The digit will blink when selected.
- Press the **UP** button to change the selected digit.
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. 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 programmed.

Enter the motor speed. (1% to 100%)
Press the DOWN 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 DOWN 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.

**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%
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 DOWN 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 DOWN 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.
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.

**MODE**

**PRIME**

Program

Minimum

Maximum

Blue-White Ind.

IP66

NEMA 4X

**Suction**

Tubing

Discharge / Outlet

(not provided)

Graduated

Container

(not provided)

Injection Fitting / Check Valve

3/8” Priming Tubing

(not provided)

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 primming 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 primming 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.

1000 ML/Min

60 = 15.85 GPH (US gallons per hour)

Milliliters in a US gallon

Minutes per hour

**Example:**

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

**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 primming 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 primming 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.

\[
\text{1 US Gallon} = 3.785 \text{ Liters} = 3785 \text{ Milliliters}
\]

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

**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.

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

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<td>TFD Sensor</td>
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<td>Bumper Feet</td>
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<td>15.</td>
<td>76001-347</td>
<td>Backup Washer Diaphragm</td>
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<td>16.</td>
<td>90011-115</td>
<td>Screw for housing 10-32 x .50L SS</td>
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<td>17.</td>
<td>76000-361</td>
<td>Tubing Suction C3 .75” OD x .50” ID x 8ft</td>
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<td>18.</td>
<td>70002-276</td>
<td>Motor 130RPM</td>
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<td>70002-277</td>
<td>Motor 62RPM</td>
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<td>90008-367</td>
<td>Clamp Heat Sink</td>
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<td>90011-182</td>
<td>Screw #10-32 x .31 SS</td>
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<td>20000-194</td>
<td>Kit 4 cartridge insert C3 Viton</td>
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<td>20000-195</td>
<td>Kit 4 cartridge insert C3 EP</td>
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<td>22.</td>
<td>71000-573</td>
<td>Cam .06” C3 S/A complete</td>
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<td>71000-574</td>
<td>Cam .10” C3 S/A complete</td>
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<td>23.</td>
<td>90002-258</td>
<td>Pump Head C3 molded PVDF</td>
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<td>70001-347</td>
<td>Cart. Valve Assy. .50T Viton</td>
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<td>70001-348</td>
<td>Cart. Valve Assy. .50T EP</td>
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<td>70001-349</td>
<td>Cart. Valve Assy. .50 Male NPT/Viton</td>
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<td>70001-350</td>
<td>Cart. Valve Assy. .50 Male NPT/EP</td>
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<td>70001-351</td>
<td>Cart. Valve Assy. .50 Female NPT Viton</td>
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<td>70001-352</td>
<td>Cart. Valve Assy. .50 Female NPT EP</td>
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<td>Primer Valve Assy. Viton</td>
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<td>70001-354</td>
<td>Primer Valve Assy. EP</td>
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<td>27.</td>
<td>70001-356</td>
<td>Kit Head Complete C3 .50T &amp; .50M/NPT Viton</td>
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<td>70001-357</td>
<td>Kit Head Complete C3 .50T &amp; .50M/NPT EP</td>
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<td>70001-358</td>
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<td>70001-359</td>
<td>Kit Head Complete C3 .50T &amp; .50F/NPT EP</td>
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<td>28.</td>
<td>71000-575</td>
<td>Foot Valve Assy. Viton</td>
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<td>71000-576</td>
<td>Foot Valve Assy. EP</td>
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<td>Injection Valve Assy. Viton</td>
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<td>71000-580</td>
<td>Injection Valve Assy. EP</td>
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LIMITED WARRANTY

Your new pump is a quality product and is warranted to be free of defects as set down in this policy. All parts, including rubberized goods, and labor are covered under warranty for 90 days from the date of purchase. Parts, excluding rubberized goods, are covered under warranty for 24 months from the date of purchase. Warranty coverage does not include damage to the pump that results from misuse, carelessness, abuse or alteration. Only the repair or the replacement of the pump is covered. Blue-White Industries does not assume responsibility for any other loss or damage.

Warranty status is determined by the pump’s serial label and the sales invoice or receipt. The serial label must be on the pump and the pump must be accompanied by the sales invoice or receipt to obtain warranty coverage. The warranty status of the pump will be verified by Blue-White or a factory authorized service center.

Please be advised; injection and metering devices are not intended as a means of treating water to render it suitable for human consumption. When used as hypochlorinators, they are meant to destroy bacteria and algae contamination, before its removal by filtration. Acid and soda injectors are used for PH control (balance). Blue-White injectors are factory tested with water only for pressure and performance. Installers and operators of these devices must be well informed and aware of the precautions to be taken when injecting various chemicals - especially those considered hazardous or dangerous.

Should it become necessary to return an injector for repair or service, you must attach information regarding the chemical used as some residue may be present within the unit which could be a hazard to service personnel. Blue-White Industries will not be liable for any damage that may result by the use of chemicals with their injectors and its components. Thank you.

PROCEDURE FOR IN WARRANTY REPAIR

Carefully pack the pump to be repaired, include the foot strainer and injection/check valve fitting. Enclose a brief description of the problem as well as the original invoice or sales receipt showing the date of purchase. The receipt will be returned with the unit. Prepay all shipping costs. COD shipments will not be accepted. Warranty service must be performed by the factory or an authorized service center. Damage caused by improper packaging is the responsibility of the sender.

Users of electrical and electronic equipment (EEE) with the WEEE marking per Annex IV of the WEEE Directive must not dispose of end of life EEE as unsorted municipal waste, but use the collection framework available to them for the return, recycle, recovery of WEEE and minimize any potential effects of EEE on the environment and human health due to the presence of hazardous substances. The WEEE marking applies only to countries within the European Union (EU) and Norway. Appliances are labeled in accordance with European Directive 2002/96/EC.

Contact your local waste recovery agency for a Designated Collection Facility in your area.
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