Blue-White®

CHEM-FEED®

Diaphragm Metering Pump

SERIES C2F / C3F

Operating Manual

®

PLEASE READ ENTIRE INSTRUCTION MANUAL PRIOR TO INSTALLATION AND USE.

1.0 Introduction

Congratulations on purchasing Chem-Pro® variable speed Diaphragm Metering Pump. A diaphragm pump is a type of positive displacement pump used for pumping a variety of fluids.

Your Chem-Pro® pump is pre-configured for diaphragm, pump head and fittings that shipped with your metering pump.

Please Note: Your new pump has been pressure tested at the factory with clean water before shipping. You may notice trace amounts of clean water in pump head. This is part of our stringent quality assurance program at Blue-White Industries.

1.1 Available Models

C2F Diaphragm Metering Pump

Max. 166 Strokes Per Minute

No Metal in fluid path

Feed Rate at 0 PSIg			Max Pressure	Connection Type	C2F Model Numbers		
GPH	LPH	ML/Min	PSIg (bar)	Fittings	115V AC	230V AC	220V AC
.067 - 6.7	.254 - 25.4	4.23 - 423	175 (12)	1/2" Male NPT / PVDF	C2F243XVA	C2F253XVA	C2F263XVA
.067 - 6.7	.254 - 25.4	4.23 - 423	175 (12)	1/2" Female NPT / PVDF	C2F243XVB	C2F253XVB	C2F263XVB
.067 - 6.7	.254 - 25.4	4.23 - 423	175 (12)	1/2" Hose Barb / PVDF	C2F243XVC	C2F253XVC	C2F263XVC
.067 - 6.7	.254 - 25.4	4.23 - 423	175 (12)	3/8" Tube compression/ PVDF	C2F243XVD	C2F253XVD	C2F263XVD
.10 - 10	.38 - 38	6.31 - 631	175 (12)	1/2" Male NPT / PVDF	C2F241XVA	C2F251XVA	C2F261XVA
.10 - 10	.38 - 38	6.31 - 631	175 (12)	1/2" Female NPT / PVDF	C2F241XVB	C2F251XVB	C2F261XVB
.10 - 10	.38 - 38	6.31 - 631	175 (12)	1/2" Hose Barb / PVDF	C2F241XVC	C2F251XVC	C2F261XVC
.10 - 10	.38 - 38	6.31 - 631	175 (12)	3/8" Tube compression/ PVDF	C2F241XVD	C2F251XVD	C2F261XVD
.165 - 16.5	.625 - 62.5	10.41 - 1041	175 (12)	1/2" Male NPT / PVDF	C2F242XVA	C2F252XVA	C2F262XVA
.165 - 16.5	.625 - 62.5	10.41 - 1041	175 (12)	1/2" Female NPT / PVDF	C2F242XVB	C2F252XVB	C2F262XVB
.165 - 16.5	.625 - 62.5	10.41 - 1041	175 (12)	1/2" Hose Barb / PVDF	C2F242XVC	C2F252XVC	C2F262XVC
.165 - 16.5	.625 - 62.5	10.41 - 1041	175 (12)	3/8" Tube compression/ PVDF	C2F242XVD	C2F252XVD	C2F262XVD

C3F Diaphragm Metering Pump

Max. 130 Strokes Per Minute

No Metal in fluid path

Feed Rate at 0 PSIg			Max Pressure	Connection Type	C3F Model Numbers		
GPH	LPH	ML/Min	PSIg / bar	Fittings	115V AC	230V AC	220V AC
.262 - 26.2	.99 - 99	16.50 - 1650	150 / 10.3	1/2" Male NPT / PVDF	C3F241XVA	C3F251XVA	C3F261XVA
.262 - 26.2	.99 - 99	16.50 - 1650	150 / 10.3	1/2" Female NPT / PVDF	C3F241XVB	C3F251XVB	C3F261XVB
.262 - 26.2	.99 - 99	16.50 - 1650	150 / 10.3	1/2" Hose Barb / PVDF	C3F241XVC	C3F251XVC	C3F261XVC
.406 - 40.6	1.54 - 154	25.60 - 2560	100 / 6.8	1/2" Male NPT / PVDF	C3F242XVA	C3F252XVA	C3F262XVA
.406 - 40.6	1.54 - 154	25.60 - 2560	100 / 6.8	1/2" Female NPT / PVDF	C3F242XVB	C3F252XVB	C3F262XVB
.406 - 40.6	1.54 - 154	25.60 - 2560	100 / 6.8	1/2" Hose Barb / PVDF	C3F242XVC	C3F252XVC	C3F262XVC

!Chem-Pro® Pumps motor speed is linear over the entire 1% to 100% adjustment range.
!Output versus pressure is nearly linear in all models.
!Feed rates taken in laboratory environment with clean water after 20 minute diaphragm break-in period with a 3 foot (1 meter) suction lift.

Optional Extended Brackets

Stainless Steel extended brackets allow pump to be securely mounted to most any surface; floor, shelf, or skid. Brackets lift pump up 4-1/2 inches (11.43 cm), for easy pump access in hard to reach areas.

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

Model #	Description
72000-380	Extended Mounting Bracket, 1 Pair, SS, 4 SS Screws

2.0 Specifications

Maximum working pressure*:
175 psig (12 bar), *model specific
Note: see individual pump model maximum pressure ratings.

Maximum Fluid temperature (excluding pump tubes):
130° F (54° C)
Note: see individual pump tube assembly maximum temperature ratings.

Maximum fluid viscosity:
1,000 Centipoise

Maximum suction lift:
15 ft. Water, 0 psig (4.5 m, 0 bar)

Ambient Operating Temperature
14°F to 115°F (-10°C to 46°C)

Ambient Storage Temperature
-40°F to 158°F (-40°C to 70°C)

Operating Voltage:
115VAC/60Hz, 1ph (1.5 Amp Maximum)
230VAC/60Hz, 1ph (0.7 Amp Maximum)
220VAC/50Hz, 1ph (1.0 Amp Maximum)
240VAC/50Hz, 1ph (1.0 Amp Maximum)

Power Cord Options:
115V60Hz = NEMA 5/15 (USA)
230V60Hz = NEMA 6/15 (USA)
220V50Hz = CEE 7/VII (EU)
240V50Hz = AS 3112 (Australia/New Zealand)

Motor:
Brushed DC, 1/8 H.P.

Duty cycle:
Continuous

Motor speed adjustment range 100:1:
1.0% - 100% motor speed (1.3 to 130 RPM)

Motor speed adjustment resolution:
0.1% increments

Accuracy:
+/- 2% of full scale
Repeatability +/- 0.5%

Display
Backlit LCD, UV resistant.

Keypad
Four button positive action tactile switch keypad.

Enclosure:
NEMA 4X (IP66), Powder coated aluminum.
Maximum overall dimensions:
C2 models: 11-3/4"W x 7-3/4"H x 10-3/4"D (298W x 197H x 274D mm)
C3 models: 13-1/8"W x 9"H x 10-3/4"D (333W x 228H x 274D mm)

Approximate shipping wt:
C2 models: 24 lb. (10.9 Kg)
C3 models: 29 lb. (13.1 Kg)

2.1 Materials of construction

Wetted components:

Pump Head Assembly:
Pump Head: .....PVDF
Adapter Connections: .....PVDF
Valve Cartridges: .....PVDF
Valve Balls: .....Ceramic
Valve Ball Seats: .....TFE/P Tetrafluorethylene/propylene
Static Seals: .....TFE/P (optional EP)
Diaphragm: .....PVDF, Flex-A-Prene®

Injection / Back-flow Check valve:
Body & insert: .....PVDF
Check Ball: .....Ceramic
Spring: .....Hastelloy C-276
O-ring seals: .....TFE/P (optional EP)

Foot Valve / Strainer:
Body & Adapter: .....PVDF
Check Ball: .....Ceramic
Spring: .....Hastelloy C-276
O-ring seals: .....TFE/P (optional EP)
Filter screen: .....PVDF

Suction Tubing: .....Clear PVC (if supplied)

Discharge Tubing
3/4" x 1/2" Tube connections: ....Not supplied
1/4" x 3/8" Tube connections: ....Natural Polyethylene (LLDPE)

Non-Wetted components:

Enclosure:
413 Aluminum (Polyester powder coated)

Pump Head Cover:
413 Aluminum (Polyester powder coated)

Cover Screws:
300 Series Stainless Steel

DFD System Sensor pins:
Hastelloy C-276

Power Cord:
3 conductor, SJTW-A Water-resistant

Mounting Brackets and Hardware:
316 Series Stainless Steel

3.0 Features

Motor driven diaphragm pump offers smooth and quiet chemical dosing. No hard pulses as seen with solenoid driven pumps.

Full stroke every time avoids vapor lock.

Variable speed DC motor.

Rated for continuous duty (24X7).

Exclusive DIAFLEX® Diaphragm guaranteed to last the life of the pump.

PVDF / PTFE / Ceramic pump head components.

Diaphragm Failure Detection (DFD) system. Senses diaphragm failure by detecting chemical in pump head.

Backlit LCD displays motor speed, input signal values, service and alarm status.

CNC precision machined cam and piston for optimum efficiency, unparalleled accuracy, and linearity.

Heavy duty PVDF pump head and valves are standard.

Compatible with Blue-White's output Flow Verification Sensor (FVS) system.

3.1 Agency Listings

This pump is ETL listed to conforms to the following:
UL Standard 778 as a motor operated water pump
CSA Standard C22.2 as process control equipment

This pump complies to the Machinery Directive 98/37/EC, BS EN 60204-1, Low Voltage Directive 73/23/EC BS EN 61010-1, EMC Directive 89/336/EC, BS EN 50081-1/BS EN 50082-1.

Symbol	Explanation
	WARNING, risk of electric shock
	CAUTION, refer to users' guide
	GROUND, PROTECTIVE CONDUCTOR TERMINAL

Enclosure Rating:

NEMA 4X: Constructed for either indoor or outdoor use to provide a degree of protection to personnel against incidental contact with enclosed equipment; to provide a degree of protection against falling dirt, rain, sleet, snow, windblown dust, splashing water, and hose-directed water; and that will be undamaged by external formation of ice on enclosure.

IP66: No ingress of dust; complete protection against contact. Water projected in powerful jets against enclosure from any direction shall have no harmful effects.

4.0 Installation

CAUTION ⚠	Risk of chemical overdose. Be certain pump does not overdose chemical during backwash and periods of no flow in circulation system.
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 solution being pumped. Refer to MSDS precautions from your solution supplier.
CAUTION ⚠	All diagrams are strictly for guideline purposes only. Always consult an expert before installing metering pump on specialized systems. Metering pump should be serviced by qualified persons only.

4.1 Mounting Location

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

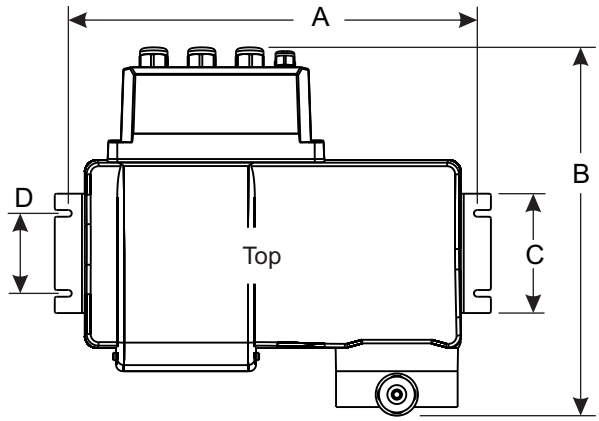
316SS Mounting brackets are included. Mount pump to a secure surface using enclosed mounting hardware.

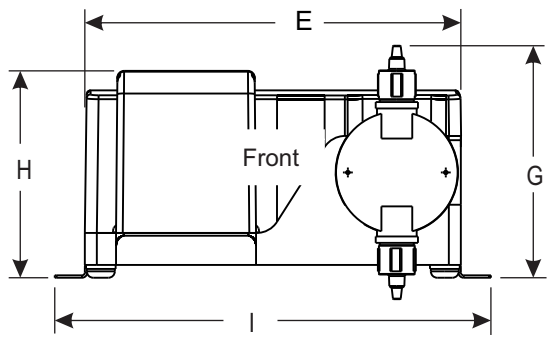
Mount pump close to injection point. Keep inlet (suction) and outlet (discharge) tubing as short as possible. Longer discharge tubing increases back pressure at pump head.

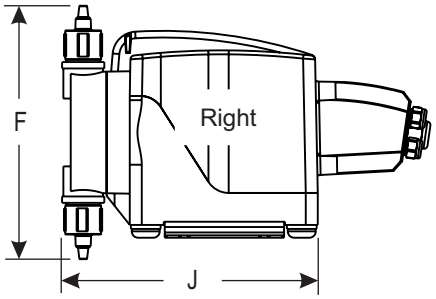
Important! Install a back flow prevention check valve at discharge side of pump to prevent system fluid from flowing back through pump during pump maintenance. **Important!**

A pressure relief valve is recommended at discharge of pump.

4.2 Dimensions







C2 Dimensions		
Dim	Inches	cm
A	14.1”	32.5
B	11.5”	29.2
C	3.7”	9.5
D	2.5”	6.4
E	13.1”	29.9
F	7.9”	20.1
G	7.3”	18.4
H	6.5”	16.4
I	15”	34.6
J	8”	20.3

C3 Dimensions		
Dim	Inches	cm
A	14.1”	35.8
B	12”	30.5
C	3.7”	9.5
D	2.5”	6.4
E	13.1”	33.2
F	9”	22.9
G	7.8”	19.8
H	6.5”	16.4
I	15”	38
J	8”	20.3

Note:
Optional Extended Bracket adds 4.5” (11.43cm) to overall height (dimension G and H). See page 3 for details.

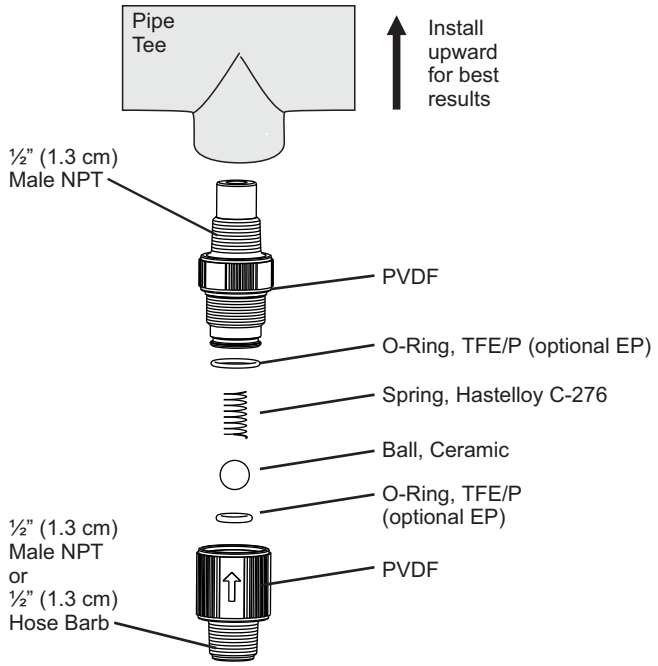
4.3 Installing Injection Fitting and Strainer

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

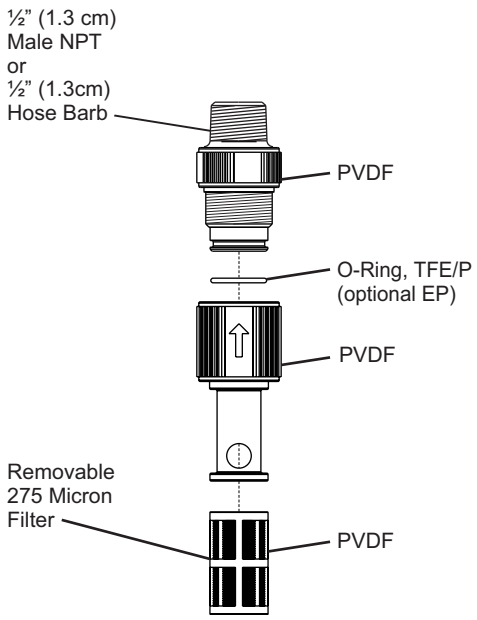
CAUTION This Pump Has Been Evaluated for Use with Water Only.

½" (1.3cm) I.D. Wetted Connection Models; Injection Fitting and Strainer

Discharge Injection Fitting / Check Valve)

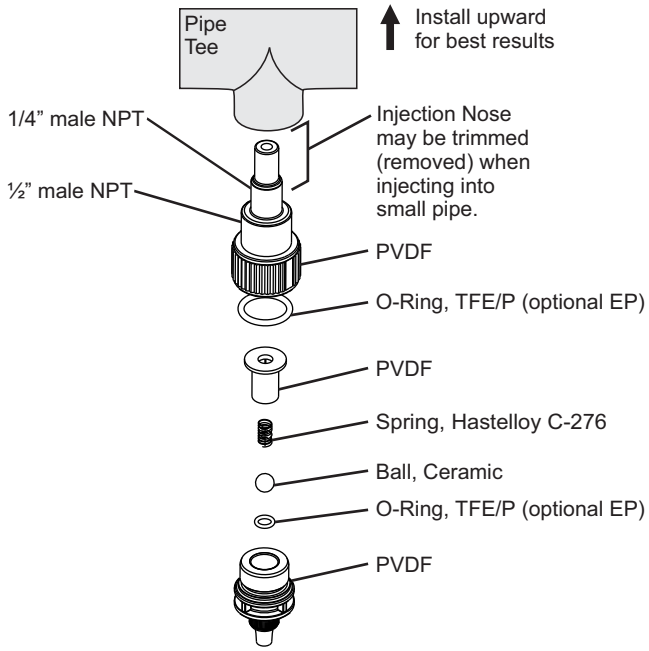


Suction Strainer

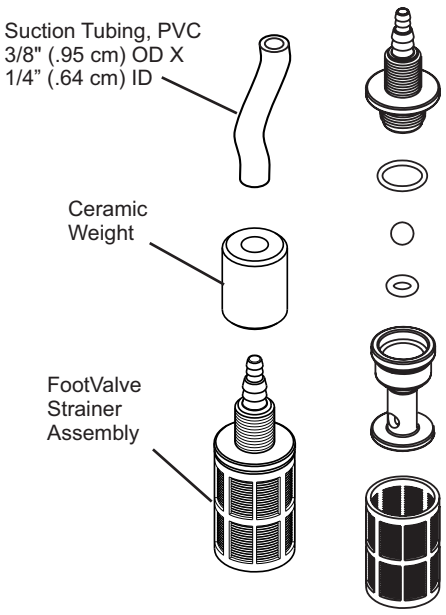


1/4" (.64cm) I.D. Tube Wetted Connection Models; Injection Fitting and Strainer

Discharge Injection Fitting / Check Valve



Suction Tubing and Strainer



5.0 Power Connections

WARNING Risk of electric shock – cord connected models are supplied with a grounding conductor and grounding-type attachment plug. To reduce risk of electric shock, be certain that it is connected only to a properly grounded, grounding-type receptacle.

WARNING Electrical connections and grounding (earthing) must conform to local wiring codes. Be certain that a grounding conductor is connected to terminal T11-1 located in wiring compartment.

WARNING Risk of electric shock - Disconnect electricity before removing wiring compartment cover.

Be certain to connect pump to proper supply voltage. Using incorrect voltage will damage pump and may result in injury. Voltage requirement is printed on pump serial label.

Input power: 115VAC 50/60 Hz 1.5 amp or 230/240VAC 50/60 Hz 0.7 amp.

Power switch located in Junction Box.

Use voltage your power cord is rated for.

Cord connected models are supplied with a ground wire conductor and a grounding type attachment plug (power cord). To reduce risk of electric shock, be certain that power cord is connected only to a properly grounded, grounding type receptacle.

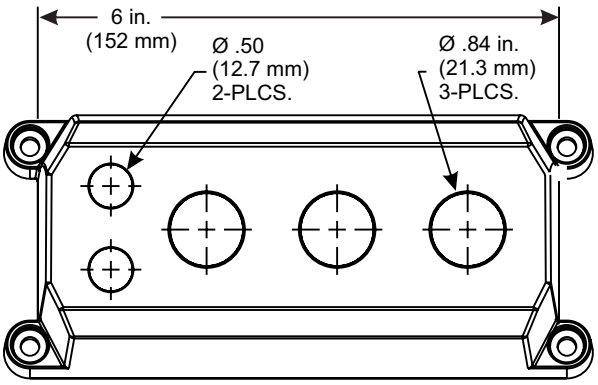
Permanently connected models must be properly grounded. Be certain that a grounding conductor is connected to terminal T11-1 located in wiring compartment.

Never strap control (input / output) cables and power cables together.

Power Interruption: This pump has an auto-restart feature which will restore pump to operating state it was in when power was lost.

Note: *When in doubt regarding your electrical installation, contact a licensed electrician.*

WIRING COMPARTMENT COVER



POWER CORD OPTIONS

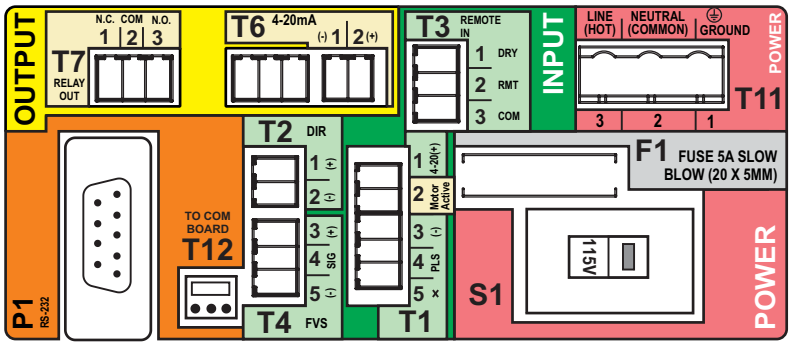
Four power cord plug types available.
Power cord length is 6 feet (3.83 meters)

115V 60Hz NEMA 5/15 (USA) max: 125V AC	230V 60Hz NEMA 6/15 (USA) max: 250V AC	240V 50Hz CEE 7/VII (EU) max: 250V AC

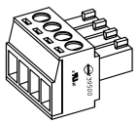
Included cable and conduit connectors:

QTY.	DESCRIPTION
Qty: 2	.50 Inch (12.7 Mm) Liq-tight Hole Plugs (mat'l = Neoprene), Pre-installed
Qty: 2	.875 Inch (22.2 Mm) Liq-tight Hole Plugs (mat'l = Neoprene), 2 Pre-installed
Qty: 2	.50 Inch (12.7 Mm) Liq-tight Connectors For Pass Thru Cords (mat'l = Nylon) Acceptable Cable Diameter .118 To .255 Inch (3.0 To 6.5 Mm), Not Installed
Qty: 2	.875 Inch (22.2 Mm) Liq-tight Connectors For Pass Thru Cords (mat'l = Nylon) Acceptable Cable Diameter .200 To .395 Inch (5.1 To =10.0 Mm), 1 Pre-installed With Power Cord Models
Qty: 1	Metallic Liq-tight Connectors For .50 Inch Flexible Conduit (mat'l = Die Cast Zinc), Not Installed

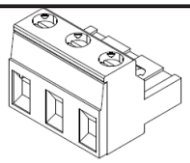
5.1 Wiring Terminals and I/O Schematics



WARNING Risk of electric shock - All wiring must be insulated and rated 300V minimum.



Terminals T1 Thru T8
Plug type
16 - 24 AWG



Power Input Terminal T11
Plug type
14 - 30 AWG

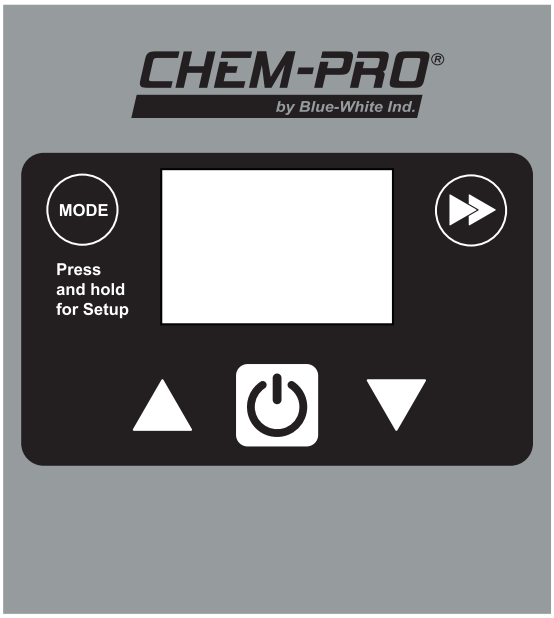
Shielded cables should be used on all input signal wires.

FUNCTION	TERM	PIN #	RATING	ELECTRICAL SP.	BLOCK DIAGRAM
INPUT: FVS SYSTEM (FLOW VERIFICATION SENSOR) FV SENSOR ONLY	T4	3	(+) POSITIVE		BLUE-WHITE FVS SENSOR — RED (+), BARE, BLACK (-) → T4 FVS: PWR (+), SIGNAL, GND (-)
	T4	4	SIGNAL		
	T4	5	(-) NEGATIVE		
INPUT: FVS SYSTEM (FLOW VERIFICATION SENSOR) FS or FP MICRO-FLO FLOW METER ONLY					BLUE-WHITE MICRO-FLO FLOWMETER PULSE OUTPUT — SIGNAL, NEGATIVE (-) → T4 FVS: PWR (+), SIGNAL, GND (-)
	T4	4	SIGNAL		
	T4	5	(-) NEGATIVE		
INPUT: REMOTE START / STOP (DRY CONTACT C.)	T3	1	(+) POSITIVE	NO VOLTAGE	**NOTE:** USE ONLY DRY CONTACT FOR REMOTE S/S WHEN USING 4-20mA INPUT — OPEN CIRCUIT IMPEDANCE MUST BE GREATER THAN 50K OHM → T3 REMOTE IN
	T3	2	(-) NEGATIVE		
INPUT: REMOTE START / STOP (WET CONTACT C.)	T3	2	(+) POSITIVE	6 TO 30 VOLT DC 1 AMP MAX.	EXTERNAL DEVICE 6 TO 30V DC → T3 REMOTE IN
	T3	3	(-) NEGATIVE		
OUTPUT: RELAY, 3 AMP	T7	1	NORM. CLOSED	Form C 3 AMP MAX AT 250 VAC, 3 AMP MAX AT 30 VOLT DC	SWITCH LOAD 3 AMP MAX @ 250V AC 3 AMP MAX @ 30V DC — NC, C, NO → T7 RELAY OUT
	T7	2	COMMON		
	T7	3	NORM. OPEN		
INPUT: POWER	T11	1	GROUND	115V OR 230V AC MANUAL SWITCH 50 / 60 HZ 100W	AC VOLTAGE → T11 POWER; SWITCH FROM 115V TO 230V → S1 POWER VOLTAGE SWITCH
	T11	2	NEUTRAL		
	T11	3	LINE (HOT)		
FUSE	F1	N/A	5 AMP	5A SLOW BLOW (20 X 5MM)	

6.0 How to Operate Chem-Pro® - Control Pad

Press and release
Press UP arrow to increase pump speed (output) in Manual Operation.
To increase value while in programming mode.

Press and release
Press DOWN arrow to decrease pump speed (output) in Manual Operation.
To decrease value while in programming mode.



Press and release
To Stop pump at any time.

Press and release
To Start pump.
To begin listening (reacting) to external signal, such as Remote Start/Stop.

Press and hold
To enter programming mode.
- Remote Start/Stop setup
- FVS (flow verification sensor) setup

Press and release
To save setting while in programming mode.
To move to **next** selection while in programming mode.

Press and release
To prime pump (60 seconds) – See page 17

Time-out - Chem-Pro® pumps have a time-out setting of approximately 20 seconds while in configuration menu. If built-in timer exceeds 20 seconds without a button being pressed, then pump will exit configuration menu. Changes will only be saved after START | STOP button is pressed and released.

7.0 Set Remote Start / Stop

Used to remotely start and stop pump using a dry contact closure signal.
When activated; CLOSE = START and OPEN = STOP.

Set to NO = Remote Start / Stop is disabled
Set to Yes = Remote Start / Stop is enabled

Can be used with external foot pedal, PLC, contact closure or other similar external devices.

Default setting = No (disabled)

Step 1

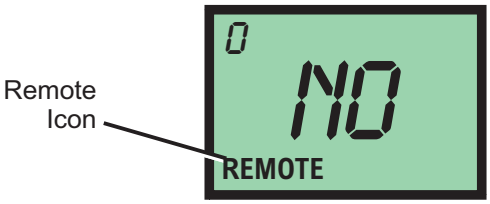
Press and release STOP button

Note: Cannot enter programming mode while pump is running.

Step 2

Press and hold START | STOP button until 'Remote' icon begins flashing.
Default setting 'NO' will also be visible when entering remote start / stop setup.

Note: If 'YES' had been selected previously, then 'YES' will be displayed on screen.



Step 3

Press and release DOWN arrow to change setting to 'YES.'
To change setting back to 'NO' press and release UP arrow.

Step 4

After you've made your selection, press and release START | STOP button. This saves your setting.
You can now modify FVS setting (see next page) or you can exit Setup by pressing and holding START | STOP button for a few seconds until you return to Run screen.

Running pump with Remote Start / Stop enabled, 'REMOTE' icon will always be visible on lower left side of screen.
Pump will display 'STBY' (standby) if pump is in stop mode via contact closure signal. **Please use caution in this mode, pump can start at anytime. If you must perform maintenance to pump, press and release STOP button.**

7.1 Set FVS (flow verification system)

Flow verification sensor sold separately.

Flow verification system is designed to stop pump in an event sensor does not detect flow during pump operation. Indicating an empty chemical tank, clogged injection fitting, loose tubing connection, etc.

To allow pump to clear any gasses that may have accumulated over time, an alarm delay time value from 1 to 255 seconds must be programmed.

Note: An alarm delay of 000 seconds disables FVS system.

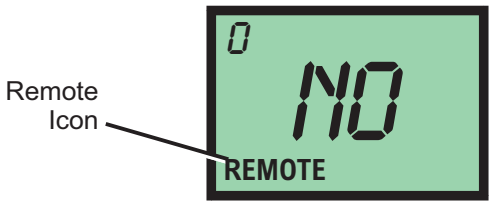
Step 1

Press and release STOP button

Note: Cannot enter programming mode while pump is in running.

Step 2

Press and hold START | STOP button until 'Remote' icon begins flashing.
This indicates that you've entered Setup menu.

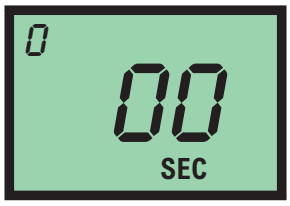


Step 3

Press and release START | STOP button to scroll through menu until you see FVS icon.
If you pass FVS screen, continue to press and release START | STOP button until FVS icon appears.

Step 4

FVS icon will appear for 1 second, followed by numbers.
These numbers indicate delay time setting for FVS.
Select a delay time in seconds. Delay time is amount of time pump will wait to receive a pulse from sensor until an alarm is triggered.
A delay time of 00 deactivates FVS feature.



Step 5

After you've made your selection, press and release START | STOP button. This saves your setting.
Press and hold START | STOP button to exit Setup menu and return to runtime screen.

Time-out - Chem-Pro pumps have a time-out setting of 20 seconds while in configuration menus. If built-in timer exceeds 20 seconds without a button being pressed, then pump will exit configuration menu. Changes will only be saved after RIGHT arrow button is pressed and released.

7.1 Set FVS (flow verification system) - Continued

Flow Verification Sensor is designed to give you two installation options.

Sensor can be installed:

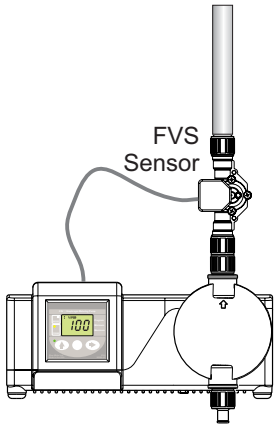
- Directly onto pumphead of Chem-Pro® pump, discharge side.
- Anywhere on discharge side of Chem-Pro® pump.

Wiring for sensor can be connected directly to a Chem-Pro® pump. Pump will stop pumping if sensor detects no flow. A relay will then close allowing for remote alarm indication or initiation of a back-up pump. **Install FVS Flow Sensor -** Flow Verification Sensor should be installed on inlet (suction) side of pump tube.

When installing directly onto pump 3/8" tube discharge fitting:

Sensor includes a PVC tubing insert, located inside sensors female thread connection, that is designed to seal sensor onto pump tube adapter. Thread sensor onto pump tube until tubing insert is snug against pump tube fitting - do not over-tighten.

Sensor Model Number	Published Flow Range	Actual Working Range with Chem-Pro® Pump
	ML/Min	ML/Min
FV-100	30-300	30-200
FV-200	100-1000	50-900
FV-300	200-2000	100-1800
FV-400	300-3000	300-3000
FV-500	500-5000	500-5000
FV-600	700-7000	700-7000



Confirm FVS flow range - Flow Verification Sensor (FVS) will only function within its operating range. See chart for available ranges.

NOTE: If pump output is less than 30 ml/min, sensor will not detect chemical and a signal will not be sent to pump, resulting in an alarm condition.

NOTE: For low viscosity (water-like) fluids only. Consult factory if attempting to use with viscous fluids.

8.0 Manual Operation

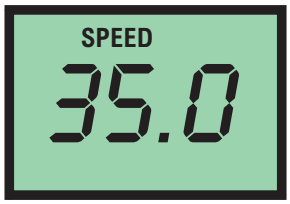
Used to manually control speed of pump.

Use UP and DOWN arrows to adjust speed while pump is running.

To select exact run speed, follow steps below.

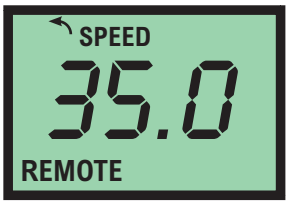
Runtime Screen Shot 1

Displays motor speed percentage.
Pump Running in Manual Operation



Runtime Screen Shot 2

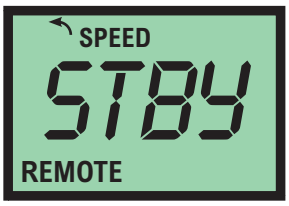
Displays motor speed percentage.
Pump Running in Manual Operation with Remote Start / Stop enabled (see page 11).



Runtime Screen Shot 3

Displays 'Stand-By' status with Remote start/stop enabled and waiting for signal to start.

Caution, pump can start up at anytime in this condition. Press STOP button before performing maintenance.



With pump operating in manual operation, pump speed can be changed at anytime by using UP or DOWN arrows during operation.

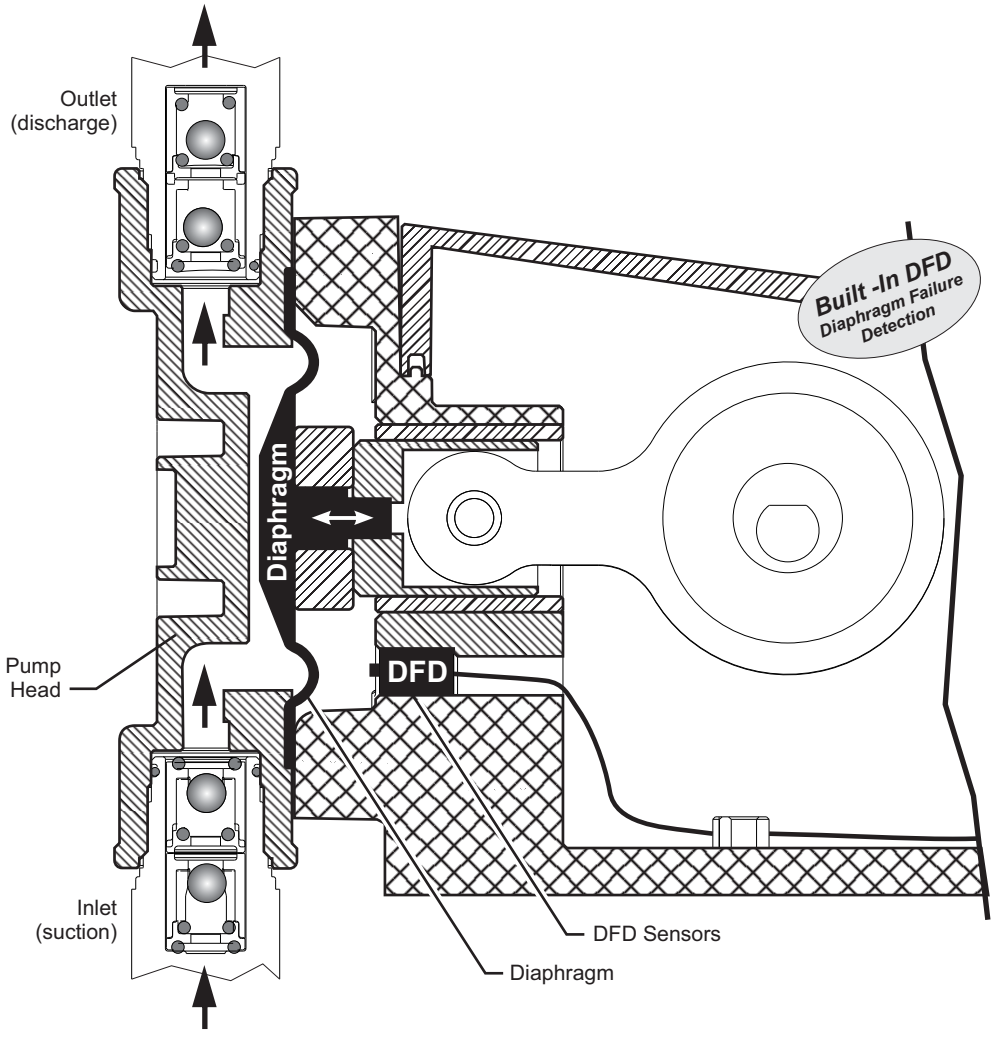
9.0 DFD (Diaphragm Failure Detection)

Chem-Pro® is equipped with a Diaphragm Failure Detection System which is designed to stop pump and provide an output alarm in event diaphragm should rupture and chemical enters pump head. Pump will detect a chemical with a conductivity reading greater than 500 microsiemens. Chemicals with a conductivity of less than 500 microsiemens will not be detected.

This system is capable of detecting presence of a large number of chemicals including Sodium Hypochlorite (Chlorine), Hydrochloric (muriatic) Acid, Sodium Hydroxide, and many others. System will not be triggered by water (rain, condensation, etc.) or lubricants.

If system has detected chemical, pump diaphragm must be replaced and pump head must be thoroughly cleaned. Failure to clean pump head will void warranty.

If DFD alarm occurs, pump will stop, close an alarm output, and screen will flash DFD with an alarm icon.



10.0 Alarm Relay

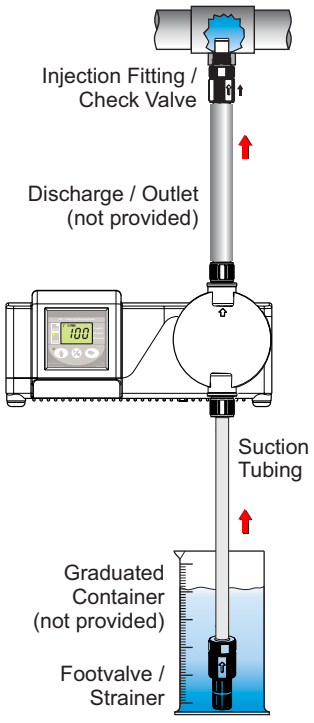
Pump has a built in 3 amp alarm output relay. Relay is pre-configured to energize on diaphragm failure detection (DFD) and on Flow Verification Sensor (FVS).

A Flow Verification Sensor must be installed and configured for relay to trigger on no-flow conditions. See page 9 for wiring details.

11.0 Volumetric Test - Measuring Chem-Pro's Output

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

1. Be sure Injection Fitting and Footvalve / Strainer are clean and working properly.
2. Fill a large graduated cylinder with solution to be injected.
3. With pump installed under normal operating conditions, place suction tubing with Footvalve / Strainer installed in graduated cylinder.
4. Run pump until all air is removed from suction line and solution enters discharge tubing.
5. Remove suction tubing from graduated cylinder and refill graduated cylinder if necessary. Note amount of solution in graduated cylinder.
6. Place suction tubing with Footvalve / Strainer installed back into graduated cylinder.
7. Run injector for a measured amount of time. A longer testing time will produce more accurate results.
8. Remove suction tubing from graduated cylinder. Measure amount of chemical injected.



Example:

During your 1 minute calibration period, say 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 pump into specialized systems. Pump should be **serviced by qualified persons only.**

12.0 Pump Maintenance

CAUTION ⚠	Prior to service, pump clean water through pump and suction / discharge line to remove chemical.

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 solution being pumped. Refer to MSDS precautions from your solution supplier.

12.1 Routine Inspection and Maintenance

Pump requires very little maintenance. However, pump and all accessories should be checked weekly. 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 during first week of operation are signs of severe chemical attack. If this occurs, immediately remove chemical from pump. Determine which parts are being attacked and replace them with parts that have been manufactured using more suitable materials. Manufacturer does not assume responsibility for damage to pump that has been caused by chemical attack.

Brush Kit Life Cycle over 3,000 hours of continuous use. A spare brush kit is located inside of pump housing.

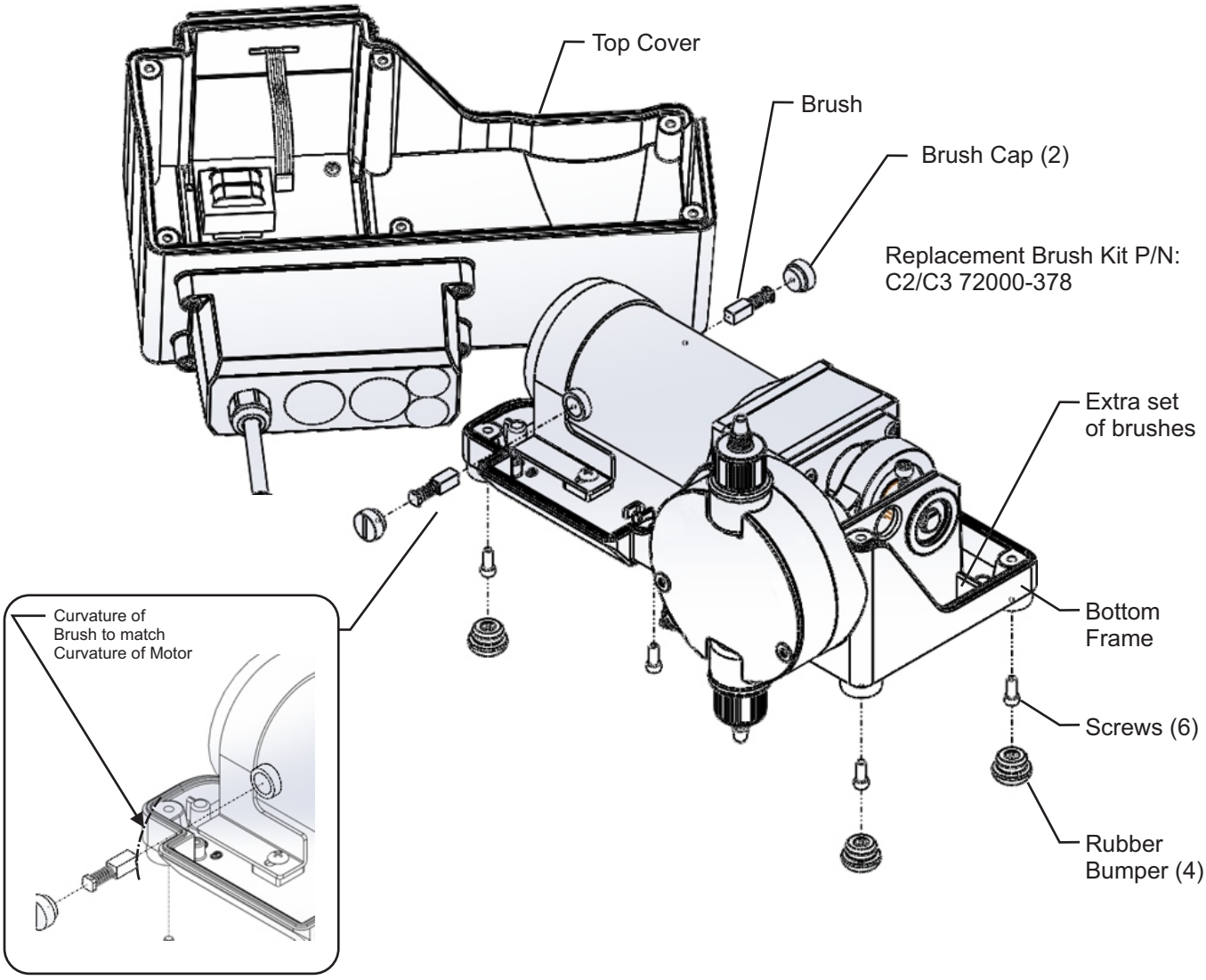
12.2 Cleaning Pump

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

- Inspect and replace pump head valves as required.
- When changing diaphragm, pump head chamber and pump head cover should be wiped free of any dirt and debris. The pump stroke must be FORWARD when screwing in the diaphragm and BACKWARD when installing and tightening the pump head.
- Periodically clean injection / check valve assembly, especially when injecting fluids that calcify such as sodium hypochlorite. These lime deposits and other build ups can clog fitting, increase back pressure and interfere with check valve operation.
- Periodically clean suction strainer.
- Periodically inspect pump housing (enclosure) for chemical attack. Protect pump housing from continuous exposure to chemicals, such as drips or fumes from surrounding equipment and plumbing.

12.3 Motor Brush Replacement

Brushes wear differently on each side of motor. It is recommended to replace both brushes at the same time.



Step 1
Remove 4 black rubber bumpers from bottom frame.

Step 2
Remove 6 screws from underneath side of bottom frame.

Step 4
Lift off top cover from bottom frame carefully. Place top cover close to bottom frame.
Please Note: Wires connecting top and bottom may become unplugged if pulled too far apart.

Step 5
Unscrew and remove brush caps by turning counter-clockwise.

Step 6
Remove used brushes and discard properly.

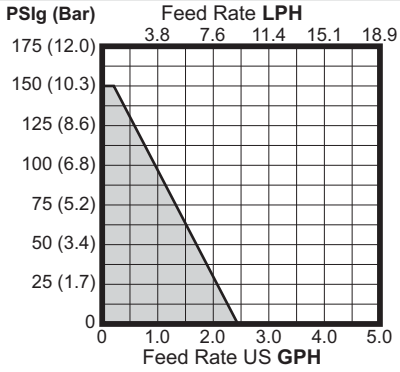
Step 7
Insert new brushes. Be sure to install brushes to that curvature of brush is concentric to curvature of motor.
Please note: One extra set of brushes are provided inside frame.

13.0 Output Versus Pressure

13.1 C2 Output V. Pressure

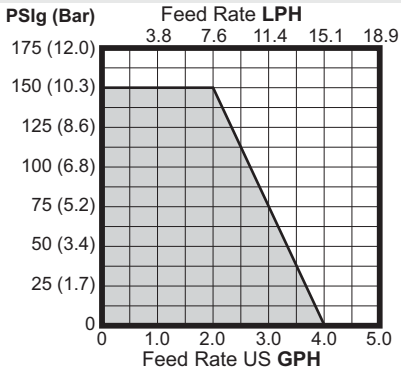
Micro Diaphragm, Max 150 PSIg / 10.3 bar

Model: C2x2x5
166 RPM
Small Diaphragm
.040" Offset



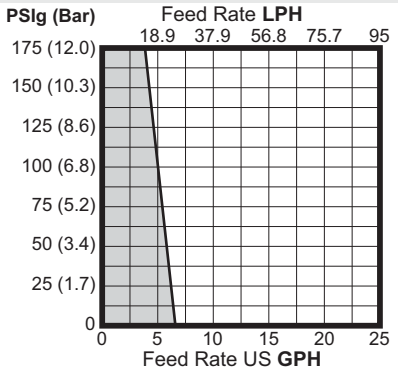
Micro Diaphragm, Max 150 PSIg / 10.3 bar

Model: C2x2x6
166 RPM
Small Diaphragm
.060" Offset



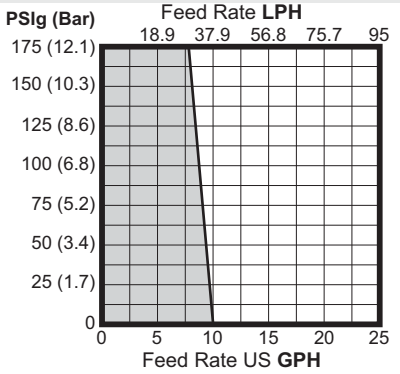
Small Diaphragm, Max 175 PSIg / 12 bar

Model: C2x2x3
166 RPM
Small Diaphragm
.040" Offset



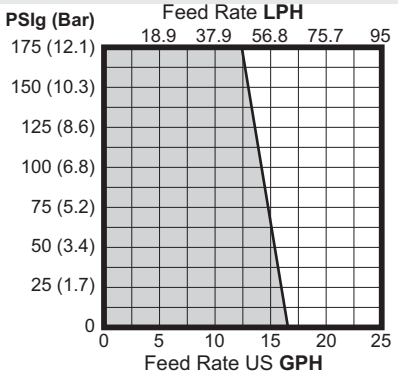
Small Diaphragm, Max 175 PSIg / 12 bar

Model: C2x2x1
166 RPM
Small Diaphragm
.060" Offset



Large Diaphragm, Max 175 PSIg / 12 bar

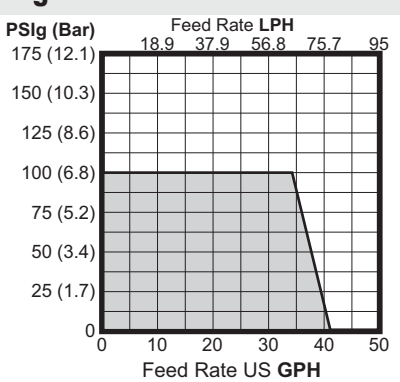
Model: C2x2x2
166 RPM
Large Diaphragm
.060" Offset



13.2 C3 Output V. Pressure

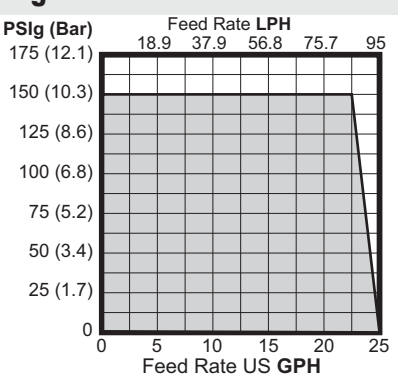
Maximum 100 PSIg / 5.5 bar

Model: C3x2x2
130 RPM
.100 Stroke Length



Maximum 150 PSIg / 10.3 bar

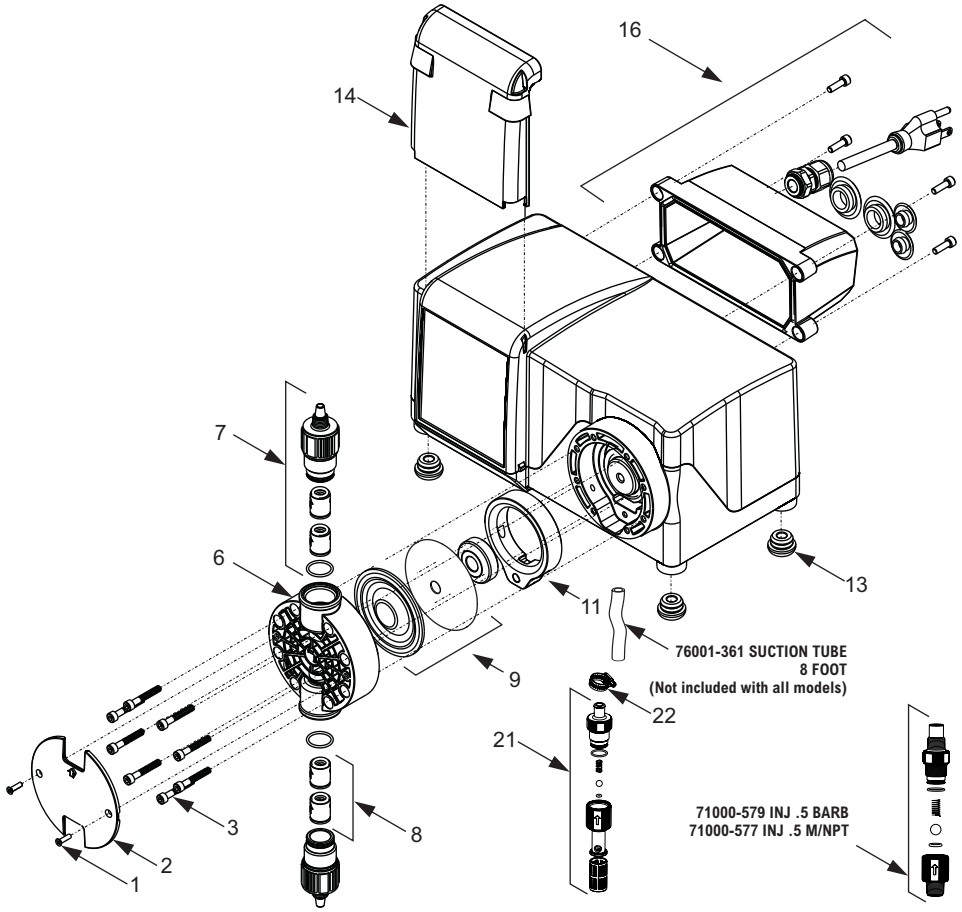
Model: C3x2x1
130 RPM
.060 Stroke Length



14.0 Replacement Parts List

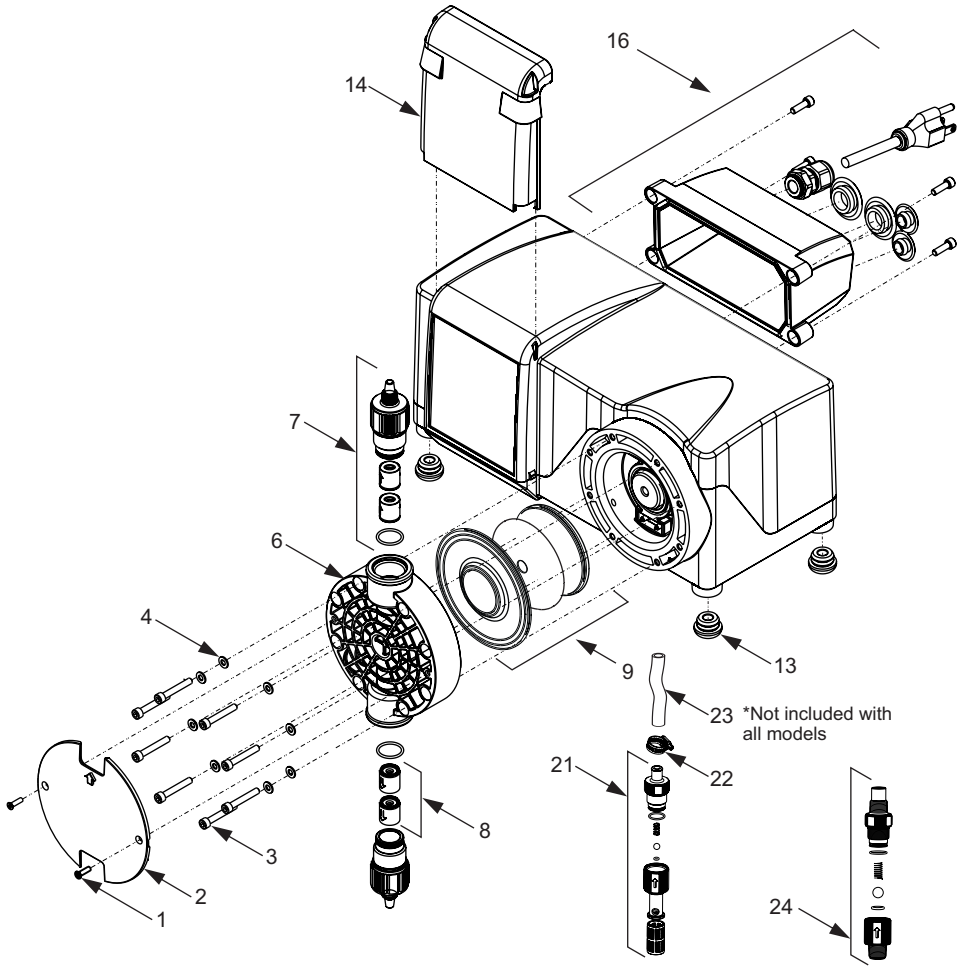
14.1 C2 Parts List

ITEM	PART NO.	DESCRIPTION	QTY REQ.
1	90011-081	SCREW 6-32 X .5	2
2	90001-170	COVER P/H C2	1
	90001-171	COVER P/H NO LOGO	1
3	90011-181	SCREW 10X32 X 1.25	8
6	71010-446	P/HEAD MICRO C2 PVDF	1
	90002-273	P/HEAD SM C2 PVDF	
	90002-272	P/HEAD LG C2 PVDF	
7	70001-349	VALVE .5 M/NPT VIT	2
	70001-350	VALVE .5 M/NPT EP	
	70001-351	VALVE .5 F/NPT VIT	
	70001-352	VALVE .5 F/NPT EP	
	70001-347	VALVE .5 T-BARB VIT	
	70001-348	VALVE .5 T-BARB EP	
	70001-372	VALVE .375 TUBE VIT	
	70001-373	VALVE .375 TUBE EP	
8	20000-194	KIT 4 EA. VALVE VIT	1
	20000-195	KIT 4 EA. VALVE EP	
9	72000-551	MICRO DIAPHRAGM KIT	1
	72000-296	SMALL DIAPHRAGM KIT	
	72000-297	LARGE DIAPHRAGM KIT	
	72000-606	MICRO DIA KIT FLEX-A-PRENE	
	72000-607	SM DIA KIT FLEX-A-PRENE	
	72000-605	LG DIA KIT FLEX-A-PRENE	
11	90001-173	P/HEAD LG. SPACER	1
	90001-172	P/HEAD SM. SPACER	
13	90003-561	BUMPER FEET	4
14	90002-326	UV LCD CVR PLYCRB	1
16	71010-027	J-BOX KIT W/ 115V	1
	71010-028	J-BOX KIT W/ 230V	1
	71010-029	J-BOX KIT W/ 220V	1
21	71000-575	FOOTVALVE .5 T CR VIT	1
	71000-447	FTVALVE .5 CR VT/AF NO SP	
	71000-325	FOOTVALVE .5 CR EP NO SP	
22	90008-043	CLAMP SS .5"	1

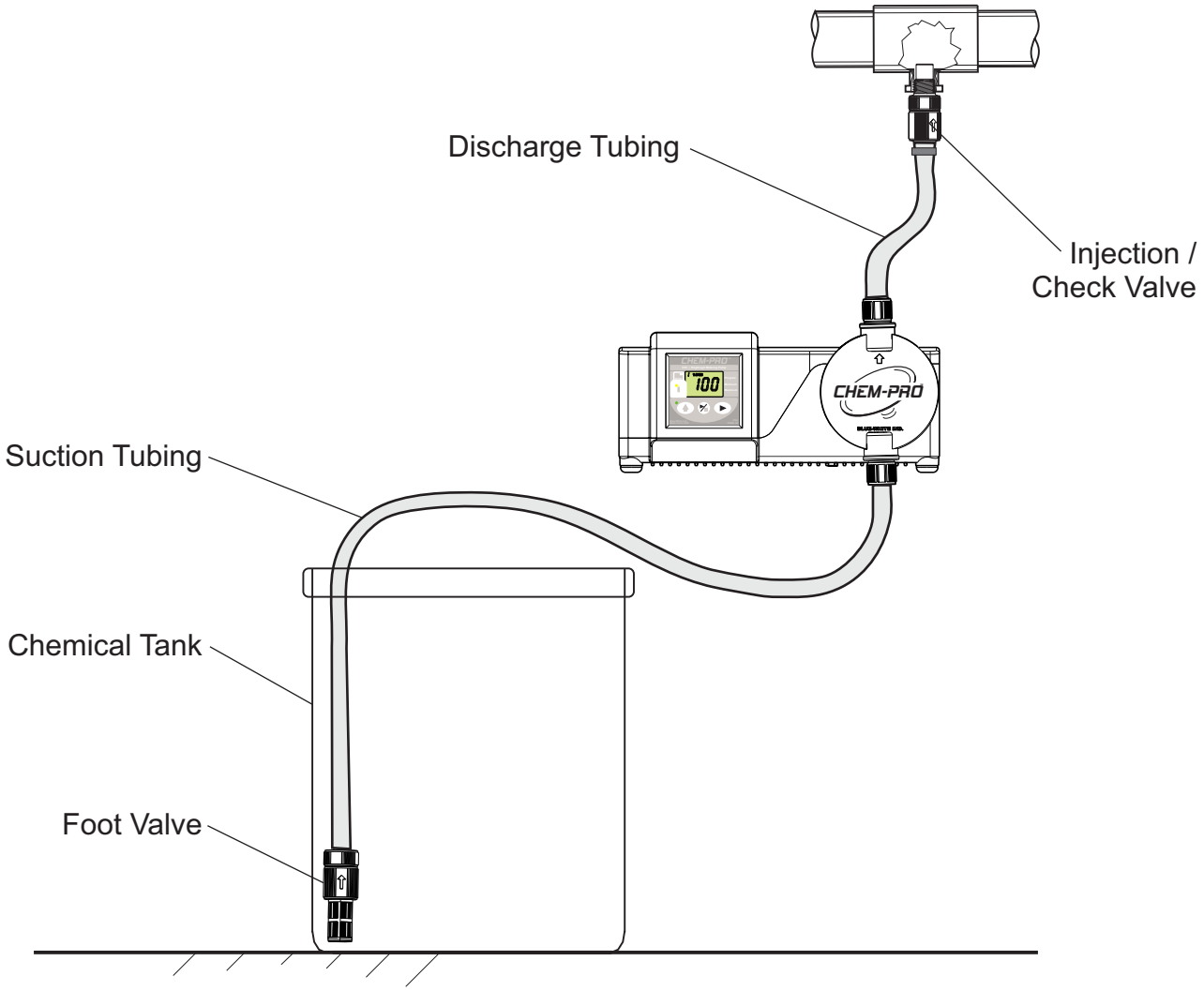


14.2 C3 Parts List

ITEM	PART NO.	DESCRIPTION	QTY REQ.
1	90011-081	SCREW 6-32 X .5	2
2	90001-157	COVER P/H C3	1
	90001-158	COVER P/H C3 NO LOGO	1
3	90011-181	SCREW 10X32 X 1.25	8
4	90011-094	WASHER #10 P/H SS	8
6	90002-258	P/HEAD LG C3 PVDF	1
7	70001-349	VALVE .5 M/NPT VIT	2
	70001-350	VALVE .5 M/NPT EP	
	70001-351	VALVE .5 F/NPT VIT	
	70001-352	VALVE .5 F/NPT EP	
	70001-347	VALVE .5 T-BARB VIT	
	70001-348	VALVE .5 T-BARB EP	
8	20000-194	KIT 4 EA. VALVE VIT	1
	20000-195	KIT 4 EA. VALVE EP	
9	72000-295	DIAPHRAGM. KIT C3	1
	72000-604	DIAPHRAGM KIT FLEX-A-PRENE	
13	90003-561	BUMPER FEET	4
14	90002-326	UV LCD CVR PLYCRB	1
16	71010-027	J-BOX KIT W/ 115V	1
	71010-028	J-BOX KIT W/ 230V	1
	71010-029	J-BOX KIT W/ 220V	1
21	71000-575	FOOTVALVE .5 T CR VIT	1
	71000-447	FTVALVE .5 CR VT/AF NO SP	
	71000-325	FOOTVALVE .5 CR EP NO SP	
22	90008-043	CLAMP SS .5"	1
* 23	76001-361	TUBE SUCTION .5 D, 8' L	1
24	71000-579	INJECTION .5 BARB	1
	71000-577	INJECTION .5 M/NPT	



Typical Installation



15.0 WARRANTY

15.1 Limited Warranty

Your Blue-White product is a quality product and is warranted for a specific time from date of purchase (proof of purchase is required). The product will be repaired or replaced at our discretion. Failure must have occurred due to defect in material or workmanship and not as a result of operation of the product other than in normal operation as defined in the product manual. Warranty status is determined by the product's serial label and the sales invoice or receipt. The serial label must be on the product and legible. The warranty status of the product will be verified by Blue-White or a factory authorized service center.

CHEM-FEED® C2 and C3 pumps are warranted for 2 years from date of purchase (proof of purchase is required). Pumps will be repaired or replaced at our discretion.

15.2 DIAFLEX® Warranty

DIAFLEX® diaphragms are warranted for the life of the pump. Blue-White will replace a damaged diaphragm at no cost to the customer provided the pump was at all times operated within the guidelines included in the pump's operation manual. This warranty only applies to DIAFLEX® diaphragms, not the pumps themselves. Blue-White pumps are separately covered by warranties specific to them.

15.3 What is not Covered

- **Flex-A-Prene diaphragm and rubber components - They are perishable and require periodic replacement**
- **Pump removal, or re-installation, and any related labor charge.**
- **Freight to the factory, or service center**
- **Pumps that have been tampered with, or in pieces.**
- **Damage to the pump that results from misuse, carelessness (such as chemical spills on the enclosure), abuse, lack of maintenance, or alteration that is out of Blue-White control.**
- **Pumps damaged by faulty wiring, power surges, or acts of nature.**

Blue-White does not assume responsibility for any loss, damage, or expense directly or indirectly related to or arising out of the use of its products. Failure must have occurred due to defect in material or workmanship and not as a result of operation of the product other than in normal operation as defined in the pump operation manual.

The 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 be legible. The warranty status of the pump will be verified by Blue-White or a factory authorized service center.

15.4 Procedure for In-Warranty Repair

Warranty service must be performed by the factory or an authorized service center. Contact the factory or local repair center to obtain a RMA (Return Material Authorization) number. It is recommended to include foot strainer and injection/check valve fitting since these devices may be clogged and part of the problem. Decontaminate, dry, and carefully pack the product to be repaired. Please enclose a brief description of the problem and proof of purchase. Prepay all shipping and insurance cost. COD shipments will not be accepted. Damage caused by improper packaging is the responsibility of the sender. When In-Warranty repair is completed, the factory pays for return shipping to the dealer or customer.

15.5 Product Use Warning

Blue-White products are manufactured to meet the highest quality standards in the industry. Each product instruction manual includes a description of the associated product warranty and provides the user with important safety information. Purchasers, installers, and operators of Blue-White products should take the time to inform themselves about the safe operation of these products. In addition, Customers are expected to do their own due diligence regarding which products and materials are best suited for their intended applications. Blue-White is pleased to assist in this effort but does not guarantee the suitability of any particular product for any specific application as Blue-White does not have the same degree of familiarity with the application that the customer/end user has. While Blue-White will honor all of its product warranties according to their terms and conditions, Blue-White shall only be obligated to repair or replace its defective parts or products in accordance with the associated product warranties. **BLUE-WHITE SHALL NOT BE LIABLE EITHER IN TORT OR IN CONTRACT FOR ANY LOSS OR DAMAGE WHETHER DIRECT, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL, ARISING OUT OF OR RELATED TO THE FAILURE OF ANY OF ITS PARTS OR PRODUCTS OR OF THEIR NONSUITABILITY FOR A GIVEN PURPOSE OR APPLICATION.**

15.6 Chemical Resistance Warning

Blue-White offers a wide variety of wetted parts. Purchasers, installers, and operators of Blue-White products must be well informed and aware of the precautions to be taken when injecting or measuring various chemicals, especially those considered to be irritants, contaminants or hazardous. Customers are expected to do their own due diligence regarding which products and materials are best suited for their applications, particularly as it may relate to the potential effects of certain chemicals on Blue-White products and the potential for adverse chemical interactions.

Blue-White tests its products with water only. The chemical resistance information included in this instruction manual was supplied to Blue-White by reputable sources, but Blue-White is not able to vouch for the accuracy or completeness thereof. While Blue-White will honor all of its product warranties according to their terms and conditions, Blue-White shall only be obligated to repair or replace its defective parts or products in accordance with the associated product warranties.

BLUE-WHITE SHALL NOT BE LIABLE EITHER IN TORT OR IN CONTRACT FOR ANY LOSS OR DAMAGE, WHETHER DIRECT, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL, ARISING OUT OF OR RELATED TO THE USE OF CHEMICALS IN CONNECTION WITH ANY BLUE-WHITE PRODUCTS.

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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