



# CHEM-FEED® Diaphragm Metering Pump

# **Series C2**

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# PLEASE READ ENTIRE INSTRUCTION MANUAL PRIOR TO INSTALLATION AND USE.



# 1.0 Introduction

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

Your CHEM-FEED® 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.

### 1.1 Available Models

Feed Rate Ran	ige at 0 PSIg	Max Pressure	CAM Stroke Length and Diaphragm Size	
GPH	LPH	PSI(bar)	CAM Stroke Length and Diaphraght Size	
.02 - 2.3	.09 - 9.0	150 (10)	.040" (1.02 mm) stroke with Micro-Feed	
.04 - 4.0	.15 - 15.0	150 (10)	.060" (1.52 mm) stroke with Micro-Feed	
.067 - 6.7	.254 - 25.4	175 (12)	.040" (1.02 mm) stroke with small diaphragm	
.10 - 10	.38 - 38	175 (12)	.060" (1.52 mm) stroke with small diaphragm	
.165 - 16.5	.625 - 62.5	175 (12)	.060" (1.52 mm) stroke with large diaphragm	

•CHEM-FEED® 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.

•See Section 15 for Flow Curves. Size pump based on flow curves.

# 2.0 Specifications

Maximum Working Pressure	150 psig (10.4 bar), 175 psig (12 bar) See specific Model
Maximum Fluid Temperature	130 °F (54 °C)
Maximum Ambient Temperature	14 °F to 110 °F (-10 °C to 46 °C )
Maximum Viscosity	1,000 Centipoise
Maximum Suction Lift	15 ft. Water, 0 psig (4.5 m, 0 bar)
	115VAC/60Hz, 1ph (1.5 Amp Maximum)
	230VAC/60Hz, 1ph (0.7 Amp Maximum)
Operating Voltage	220VAC/50Hz, 1ph (1.0 Amp Maximum)
	240VAC/50Hz, 1ph (1.0 Amp Maximum)
	230VAC/50Hz, 1ph (1.0 Amp Maximum)
	115V60Hz = NEMA 5/15 (USA)
	230V60Hz = NEMA 6/15 (USA)
Power Cord Options	220V50Hz = CEE 7/VII (EU)
	240V50Hz = AS 3112 (Australia/New Zealand)
	230V50Hz = BS 1363/A (UK)
Motor	1/8 HP, Brushed DC
Duty Cycle	Continuous
Motor Speed Adjustment Resolution	100:1, (1.0% – 100% motor speed) Max. spm (strokes/min) = 166
Accuracy	+/- 2% of full scale, +/- 0.5% repeatability
Display	Backlit LCD, UV resistant
Keypad	Positive action tactile switch keypad
Approximate Shipping Weight	24 lb. (10.9 Kg)
Enclosure	NEMA 4X (IP66), Polyester powder coated aluminum.
RoHS Compliant	Yes
Standards	cETLus, CE

# 2.1 Materials of construction

### Non-wetted Components:

Enclosure: 413 Aluminum (Polyester powder coated)

Pump Head: PVDF

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 Stainless steel

Wetted Components:				
Pump Head	Pump Head: PVDF			
Assembly:	Adapter Fittings: PVDF			
	Valve Cartridges: PVDF			
	Valve Balls: Ceramic (optional: PTFE & Hastelloy)			
	O-Ring Seals: TFE/P (optional EP)			
	Diaphragm: PVDF, Flex-A-Prene® (optional)			
	Body & Insert: PVDF			
Injection / Back-Flow	Check Ball: Ceramic			
Check Valve:	Spring: Hastelloy C-276			
	O-Ring Seals: TFE/P (optional EP)			
	Body & Adapter: PVDF			
	Check Ball: Ceramic			
Foot Valve / Strainer:	Spring: Hastelloy C-276			
	O-Ring Seals: TFE/P (optional EP)			
	Filter Screen: PVDF			
Suction Tubing	1/2" connections: Not supplied			
	1/4" x 3/8" Tube connections: Clear PVC			
	1/2" connections: Not supplied			
Discharge Tubing	1/4" x 3/8" Tube connections: Natural Polyethylene (LLDPE)			

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## 3.0 Features

Motor driven diaphragm pump offers smooth and quiet chemical dosing.

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 US CSA Standard C22.2 as process control equipment

**C** 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
4	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

Risk of chemical overdose. Be certain pump does not overdose chemical during backwash and periods of no flow in circulation system.
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.
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. (Optional Extened brackets available. See below.) 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



Dim	Inch	cm
Α	14.1"	35.8
в	11.5"	29.2
С	2.5"	6.4
D	13.1"	33.2
Е	7.9"	20.1
F	7.3"	18.4
G	6.5"	16.4
н	15"	38.0
1	8"	20.3

NOTE: Optional Extended Bracket adds 4.5" (11.43cm) to overall height (dimension F and G).



# 4.3 Installing Injection Fitting and Strainer





- Ball, Ceramic

- PVDF

O-Ring, TFE/P (optional EP)

Assembly

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

Included cable and conduit connectors:

QTY. DESCRIPTION	
Qty: 250 Inch (12.7 Mm) Liq-tight Hole Plugs (mat'l = Neoprene), Pre-installed Qty: 3875 Inch (22.2 Mm) Liq-tight Hole Plugs (mat'l = Neoprene), 2 Pre-installed Qty: 250 Inch (12.7 Mm) Liq-tight Connectors For Pass Thru Cords (mat'l = Nylon)	
Acceptable Cable Diameter .12 To .26 Inch (3.0 To 6.5 Mm), Not Installed Qty: 3875 Inch (22.2 Mm) Liq-tight Connectors For Pass Thru Cords (mat'l = Nylon) Acceptable Cable Diameter .20 To .40 Inch (5.1 To =10.0 Mm), 1 Pre-installed W/ Power Cord Models Qty: 2 - Metallic Liq-tight Connectors For .50 Inch Flexible Conduit (mat'l = Die Cast Zinc), Not Installed	S

# 5.1 C2F Wiring Terminals and I/O Schematics





Terminals T1 Thru T8 Plug type 16 - 24 AWG

Power Input Terminal T11 Plug type 14 - 30 AWG

FUNCTION	TERM	PIN #	RATING	ELECTRICAL SP.		BLOCK DIA	AGRAM	
INPUT: FVS SYSTEM	T4	3	(+) POSITIVE		BLUE-WHITE RED (+)		RED (+)	
(FLOW VERIFICATION SENSOR)	T4	4	SIGNAL		FVS SENSOR BARE 55 GND BLACK (-) T4 FVS			
FV SENSOR ONLY	T4	5	(-) NEGATIVE					
INPUT: FVS SYSTEM						SIGNAL DEPWR (+)		
(FLOW VERIFICATION SENSOR)	T4	4	SIGNAL			MICRO-FLO FLOWMETER	4 # SIGNAL 5 □ GND (-)	
S6A FLOW METER ONLY	T4	5	(-) NEGATIVE				NEGATIVE (-) T4 FVS	
INPUT: REMOTE	Т3	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 EXTERNAL DEVICE 6 TO 30V DC		
(DRY CONTACT C.)	Т3	2	(-) NEGATIVE				(+) 2 RMT 3 COM	
INPUT: REMOTE START / STOP	Т3	2	(+) POSITIVE	6 TO 30 VOLT DC 1 AMP MAX.			(+) T3 REMOTE	
(WET CONTACT C.)	Т3	3	(-) NEGATIVE				(-) 2 RMT 3 COM	
OUTPUT: RELAY, 3 AMP	Τ7	1	NORM. CLOSED	Form C 3 AMP MAX AT 250 VAC, 3 AMP MAX AT 30 VOLT DC	Form C 3 AMP MAX AT 50 VAC, 3 AMP MAX AT 3 AMP MAX @ 250V AC 3 AMP MAX @ 30V DC NO NO NO NO NO NO NO NO NO NO			
(Triggers with DFD, or FVS, if enabled)	T7	2	COMMON					
	Τ7	3	NORM. OPEN					
INPUT: POWER	T11	1	GROUND	115V OR 230V AC MANUAL SWITCH				
	T11	2	NEUTRAL	50 / 60 HZ 100W			SWITCH S1	
	T11	3	LINE (HOT)				5V TO 230V	
FUSE	F1	N/A	5 AMP	5A SLOW BLOW (20 X 5MM)				

# 5.2 C2V Wiring Terminals and I/O Schematics



### Shielded cables should be used on all input signal wires.



Terminals T1 Thru T8 Plug type 16 - 24 AWG

Power Input Terminal T11 Plug type 14 - 30 AWG

FUNCTION	TERM	PIN #	RATING	ELECTRICAL SP.	BLOCK DIAGRAM			
<b>INPUT:</b> 4-20 mA	T1	1	(+) POSITIVE	120 OHM IMPEDANCE, NON POWERED LOOP	Single or dual pump (series) input. Loop voltage must be a minimum of 15V, and not exceed 24 Volts. TRANSMITTER SOURCE			
	T1	3	(-) NEGATIVE					
INPUT: FREQUENCY, AC	T1	3	(-) NEGATIVE	0-1000 HZ MAX.	FREQUENCY TRANSMITTER SOURCE			
CMOS	T1	4	(+) POSITIVE					
INPUT: EVS SYSTEM	T4	3	(+) POSITIVE					
(FLOW VERIFICATION SENSOR)	T4	4	SIGNAL					
FV SENSOR ONLY	T4	5	(-) NEGATIVE			BLACK (-) T4 FVS		
INPUT: FVS SYSTEM						BLUE-WHITE SIGNAL		
(FLOW VERIFICATION SENSOR)	T4	4	SIGNAL			MICRO-FLO FLOWMETER		
S6A FLOW METER ONLY	T4	5	(-) NEGATIVE			PULSE OUTPUT NEGATIVE (-)		
INPUT: REMOTE START / STOP	Т3	1	(+) POSITIVE	NO VOLTAGE				
(DRY CONTACT C.)	Т3	2	(-) NEGATIVE		ONLY DRY CONTACT FOR	50K OHM (+)		
INPUT: REMOTE START / STOP	Т3	2	(+) POSITIVE	6 TO 30 VOLT DC 1 AMP MAX.	REMOTE S/S WHEN USING 4-20mA INPUT			
(WET CONTACT C.)	Т3	3	(-) NEGATIVE			6 TO 30V DC		
OUTPUT: 4-20 mA * Option on pumps made	T6*	2	(+) POSITIVE	120 OHM RESISTANCE ACTIVE LOOP				
prior to 01/01/2023	T6*	1	(-) NEGATIVE					
OUTPUT: RELAY, 3 AMP	T7	1	NORM. CLOSED	Form C 3 AMP MAX AT		SWITCH LOAD 3 AMP MAX @ 250V AC 3 AMP MAX @ 30V DC		
(Triggers with DFD, or FVS, if enabled)	T7	2	COMMON	250 VAC, 3 AMP MAX AT				
	Τ7	3	NORM. OPEN	30 VOLI DC		NO		
OUTPUT: OPEN COLLECTOR	T1	2	SIGNAL	5 TO 24 VDC				
MOTOR ACTIVE	T1	3	COMMON		CLOSED WHILE	NEGATIVE (-) 3 GND (-)		
OUTPUT: MOTOR ACTIVE	T8*	1	NORM. CLOSED	Form C 1 AMP MAX AT 105 VAO	ENERGIZED			
(CONTACT CLOSURE)	T8*	2	COMMON	0.8 AMP MAX AT 30 VOLT DC				
	T8*	3	NORM. OPEN					
INPUT: POWER	T11	1	GROUND	115V OR 230V AC MANUAL SWITCH				
	T11	2	NEUTRAL	50 / 60 HZ 100W		POWER VOLTAGE		
	T11	3	LINE (HOT)		<u>-</u>			
FUSE	F1	N/A	5 AMP	5A SLOW BLOW (20 X 5MM)				

Note: T6 & T8 terminals only available in Models with electrical option A "4-20mA output signal"

# 6.0 How to Operate CHEM-FEED® C2F - Control Pad





### **Press and release** To prime pump (60 seconds) --See page 27

Press DOWN arrow to decrease pump speed

To decrease value while in programming mode.



### Press and release

Press UP arrow to increase pump speed (output) in Manual Operation. To increase 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

**Press and release** 

To enter programming mode.

(output) in Manual Operation.

- 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.

**Time-out** - CHEM-FEED® 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 automatically be saved if programming mode is allowed to Time-Out.

# 6.1 C2F 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)



### **Runtime Screen Shot - Standby**

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.



# 6.2 C2F - How to 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.



**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.

# 6.2 C2F - How to Set FVS (Flow Verification System) - Cont.

Flow Verification Sensors are designed to give you installation options.

S6A Flow Sensor or Micro-Flo can be used with FVS System.

Sensor can be installed:

- Directly onto pump head of CHEM-FEED® pump, discharge side (MicroFlo only)

- discharge side of CHEM-FEED® pump, as directed by Micro-Flo and S6A manuals.

Wiring for sensor can be connected directly to a CHEM-FEED® 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.

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

MixroFlo 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-FEED® 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
S6A1	10-5000	10-5000
S6A2	50-10000	50-10000



**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 minimum range, 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.

# 7.0 How to Operate CHEM-FEED<sup>®</sup> C2V - Control Pad



**Press and release** To prime pump (60 seconds) --See page 27



### Press and release

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



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.

**Time-out** - CHEM-FEED® 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 automatically be saved if programming mode is allowed to Time-Out.

# 7.1 Mode Descriptions - C2V only



# 7.2 Mode 0 - Set Remote Start / Stop - C2V

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)



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.

# 7.3 Mode 0 - Set DFD Sensitivity - C2V

CHEM-FEED pump is equipped with a Diaphragm Failure Detection (DFD) system which is designed to stop pump in event diaphragm should rupture and chemical enters pump head. This system is capable of detection presence of a large number of chemicals including Sodium Hypochlorite (chlorine), Hydrochloric (muriatic) Acid, Sodium Hydroxide, and many others.

### Minimum and Maximum setting = 75 % to 100%

Default Setting = 75% (75% is recommended; triggers with most water treatment chemicals without false alarms) Important: 100% sensitivity setting may trigger false alarm by washdown or rain. 100% setting is only recommended when absolutely necessary.



# 7.4 Mode 0 - Set FVS (flow verification system) - C2V

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.



**Time-out** - CHEM-FEED® 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 automatically be saved if programming mode is allowed to Time-Out.

# 7.4 Mode 0 - Set FVS (flow verification system) - Continued

Flow Verification Sensors are designed to give you installation options.

S6A Flow Sensor or Micro-Flo can be used with FVS System.

Sensor can be installed:

- Directly onto pump head of CHEM-FEED® pump, discharge side (MicroFlo only)

- discharge side of CHEM-FEED® pump, as directed by Micro-Flo and S6A manuals.

Wiring for sensor can be connected directly to a CHEM-FEED® 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.

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

MixroFlo 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 CHEM-FEED® 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
S6A1	10-5000	10-5000
S6A2	50-10000	50-10000



**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 minimum range, 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.

#### 7.5 Mode 0 - Set 4-20mA Output - C2V only

Available on certain models.

Sends a configurable 4-20 mA signal, based on pump rotor speed, to an external device. This feature can be used to control other pumps (in sync / proportionally), data logging systems, and other external devices for plant automation. **Default Setting** 

100

![](_page_22_Figure_4.jpeg)

Time-out - CHEM-FEED® 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 automatically be saved if programming mode is allowed to Time-Out.

# 7.5 Mode 0 - Set 4-20mA Output - Continued

![](_page_23_Figure_3.jpeg)

![](_page_23_Figure_4.jpeg)

![](_page_23_Figure_5.jpeg)

# 8.0 Mode 1 - Manual Operation - C2V

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.

Step	<ul> <li><b>1</b></li> <li>Ensure pump is stopped and LCD reads "OFF." Note: Mode cannot be changed while pump is in running.</li> <li>Press and release STOP button if pump is running.</li> <li>Press and release MODE button multiple times until Mode 1 is selected.</li> </ul>	Mode 1
Step	<b>2</b> With Mode 1 selected, press and hold MODE button until 'Speed' icon begins flashing. This indicates that you've entered Setup menu.	Mode 1
Step	) 3 Oursent summer and will be disculated	Mode 1
	To increase value, press and release UP arrow. To decrease value, press and release DOWN arrow. To save value, press and hold MODE button until 'Speed' icon stop flashing.	SPEED SPEED

# 8.1 Mode 1 - Manual Operation Screen Shots

Runtime Screen Shot 1 Display motor speed percentage. Pump Running in Manual Operation		SPEED
Runtime Screen Shot 2         Display 4-20mA output (select models only)         Press and release MODE button to view mA output value in real-time.         Please note: 4-20mA output is only available on select models. If included in your model; 4-20mA output must be enabled in Mode 0 (see page 16).	MODE	mAout B.5
Runtime Screen Shot 3 Display motor speed percentage. Press and release MODE button to view percentage of motor speed.	MODE	SPEED

#### 9.0 Mode 2 - 4-20mA Input Operation - C2V

Used to remotely control pump with an incoming 4-20 mA signal.

Default setting: 4 mA signal = 0.1% motor speed

![](_page_26_Figure_5.jpeg)

Time-out - CHEM-FEED® 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 automatically be saved if programming mode is allowed to Time-Out.

# 9.0 Mode 2 - 4-20mA Input Operation - Continued

![](_page_27_Figure_2.jpeg)

# 10.0 Mode 3 - Frequency Input (Hz) Operation - C2V

Used to remotely control pump with an incoming high speed frequency signal. Typically used with flow meters or other external devices.

![](_page_28_Figure_4.jpeg)

**Time-out** - CHEM-FEED® 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 automatically be saved if programming mode is allowed to Time-Out.

# 10.0 Mode 3 - Frequency Input (Hz) Operation - Continued

![](_page_29_Figure_2.jpeg)

# 11.0 Mode 4 - Pulse Batch (low speed pulse) Operation - C2V

Used to remotely control pump with an incoming pulse signal. Can be used with an external foot pedal, a water meter, a PLC, contact closure, or other low speed pulse devices.

Default setting: 1 Pulse = 100% motor speed for 2.5 seconds

![](_page_30_Figure_4.jpeg)

**Time-out** - CHEM-FEED® 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 automatically be saved if programming mode is allowed to Time-Out.

# 11.0 Mode 4 - Pulse Batch (low speed pulse) Operation - Continued

![](_page_31_Figure_2.jpeg)

# 11.1 Mode 4 - Pulse Batch Operation Screen Shots

![](_page_31_Figure_4.jpeg)

### 12.0 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.

## 13.0 Volumetric Test - Calibration

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.

![](_page_32_Figure_14.jpeg)

### Example:

During your 1 minute calibration period, say CHEM-FEED pumped 1000 Milliliters in 1 minute.

$$(1 \text{ US Gallon} = 3.785 \text{ Liters} = 3785 \text{ Milliliters})$$

$$(1 \text{ US Gallon} = 3.785 \text{ Liters} = 3785 \text{ Milliliters})$$

$$(1 \text{ US Gallon} = 3.785 \text{ GPH (US gallons per hour)}$$

$$(1 \text{ Minutes per hour})$$

$$(1 \text{ Milliliters in a US gallon})$$

**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.** 

### 14.0 Pump Maintenance

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

### 14.1 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.

## 14.2 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.
- 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.

### 14.3 Replacing the Pump Diaphragm

- When changing the diaphragm, the pump head chamber and pump head cover should be wiped free of any dirt and debris. The pump stroke must be FORWARD when installing the diaphragm, and BACK when installing and tightening the pump head.
- ✓ When replacing the pump diaphragm, note the order of parts per the illustration below:
- Tighten pump head bolts in star-shaped pattern, so as to not overtighten one side. Tighten bolts to 38 in-lbs.

![](_page_33_Picture_17.jpeg)

# 14.4 Motor Brush Replacement

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

![](_page_34_Picture_4.jpeg)

# 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.

## 15.0 Output Versus Pressure

![](_page_35_Figure_3.jpeg)

![](_page_35_Figure_4.jpeg)

# Small Diaphragm, Max 175 PSIg / 12 bar

![](_page_35_Figure_6.jpeg)

![](_page_35_Figure_7.jpeg)

![](_page_35_Figure_8.jpeg)

![](_page_35_Figure_9.jpeg)

# Large Diaphragm, Max 175 PSIg / 12 bar

![](_page_35_Figure_11.jpeg)

# 16.0 DFD (Diaphragm Failure Detection)

CHEM-FEED® 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.

![](_page_36_Figure_4.jpeg)

![](_page_36_Figure_5.jpeg)

# 17.0 Replacement Parts List

# 17.1 C2 Exploded View

![](_page_37_Figure_4.jpeg)

# 17.2 C2 Replacement Parts

ITEM	PART NO.	DESCRIPTION	QTY REQ.
2	70004-541	COVER P/H, CM-2, SS	1
3	90011-149	SCREW 10X32 X 1.25	8
4	90011-094	WASHER #10 P/H SS	8
6	3 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 AFLAS		2
	70001-350 VALVE .5 M/NPT EP		
	70001-351	VALVE .5 F/NPT AFLAS	
	70001-352	VALVE .5 F/NPT EP	
	70001-347	VALVE .5 T-BARB AFLAS	
	70001-348	VALVE .5 T-BARB EP	
	70001-372	VALVE .375 TUBE AFLAS	
	70001-373	VALVE .375 TUBE EP	
8	8 20000-194 KIT 4 EA. VALVE AFLAS		1
	20000-195	KIT 4 EA. VALVE EP	
9	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	11 71001-002 FRAME INSERT LG. W/SEAL		1
	71001-003	FRAME INSERT SM. W/SEAL	
13	90003-561	BUMPER FEET	4
14	90002-326	UV LCD CVR PLYCRB	1
16	16 71010-027 J-BOX KIT W/ 115V		1
	71010-029 J-BOX KIT W/ 220V		1
	71010-028 J-BOX KIT W/ 230V		1
	71010-030	J-BOX KIT W/ 240V	1
21	21 71000-575 FOOTVALVE .5 BRR VIT/AF		1
	71000-447 FTVALVE .5 BRB VT/AF NO SP		
	71000-325	FOOTVALVE .5 BRB EP NO SP	
22	90008-043	CLAMP SS .5"	1

\*See page 35 for motor brush replacement.

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# 19.0 WARRANTY

### **19.1 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 pumps are warranted for 2 years from date of purchase (proof of purchase is required). Pumps will be repaired or replaced at our discretion.

# 19.2 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.

### 19.3 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.

# 19.4 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.

# 19.5 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.** 

# 19.6 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.

# Model Number Matrix

**Model Number** 

C2

C2 Diaphragm metering pump Series F Single manual output control (manual/local control only) Multiple automatic input output control and alarm modes (remote control) ν Input Voltage 4 115V / 60Hz, power cord NEMA 5/15 plug (US) 240V / 50HZ, power cord AS 3112 plug (AU/New Zealand) 8 5 230V / 60Hz, power cord NEMA 6/15 plug (US) 9 230V / 50HZ, power cord BS 1363 plug (UK) 220V / 50HZ, power cord CEE 7/VII plug (EU) 6 CAM Stroke Length and Diaphragm Size .060" (1.52 mm) stroke with small diaphragm | .10-10 GPH | 175 PSI 1 2 .060" (1.52 mm) stroke with large diaphragm | .165-16.5 GPH | 175 PSI .040" (1.02 mm) stroke with small diaphragm | .067-6.7 GPH | 175 PSI 3 .040" (1.02 mm) stroke with Micro-Feed | .02-2.3 GPH | 150 PSI 5 6 .060" (1.52 mm) stroke with Micro-Feed | .04-4.0 GPH | 150 PSI **Electrical Options** X Standard equipment Elastomer Material (o-rings) TFE/P EP (Ethylene Propylene) v Е **Fitting Connection Types** 1/2" Hose Barb Inlet, 1/2" Male NPT Outlet, with 1/2" Male NPT Injection Fitting 1/2" Hose Barb Inlet, 1/2" Female NPT Outlet, with 1/2" Male NPT Injection Fitting в С 1/2" Hose Barb Inlet and Outlet, with 1/2" ID Hose Barb Injection Fitting 3/8" OD Tube Compression Inlet, Outlet, and Injection Fitting D 1/2" Male NPT Inlet and Outlet, with 1/2" Male NPT Injection Fitting E F 1/2" Female NPT Inlet and Outlet, with 1/2" Male NPT Injection Fitting **Diaphragm Type** (Blank) Standard DiaFlex<sup>®</sup> Diaphragm s Flex-A-Prene® Diaphragm (Caustic Soda resistant diaphragm) 4 1 X C2 F 2 v Sample Model Number

### Accessories

![](_page_42_Picture_6.jpeg)

![](_page_43_Picture_0.jpeg)

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.

![](_page_43_Picture_3.jpeg)

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