







2.2 Ensure that all necessary components are present in your injection system and in good working order. CheckPoint is available to answer your process questions or to help design and build a skid system utilizing components appropriate for your application.

**CAUTION: The pump must always be oriented with the suction check valve facing directly down OR HORIZONTALLY. Mounting the pump in another orientation may cause chemical leakage to collect in an undesired location or cause other problems.**

2.3 CheckPoint recommends use of a calibration gauge for your assurance of proper pump function and chemical delivery rate. Refer to *Section 11: Setting and Adjusting the Pump Delivery Volume* for more information. The proper position of the calibration gauge (labeled #5) is shown in Figure 1.

**CAUTION: It is necessary to attach a vent tube to the top of all calibration gauges, chemical tanks, and tank level gauges. The height of the top of each vent tube should always be greater than the highest possible liquid level in the system, and the tube should have means to prevent water entry, such as a 180 degree bend.**

2.4 This pump does not require flooded suction or positive chemical pressure to prime, and can therefore be mounted above the chemical container. For a chemical with water-like viscosity, the pump will pull air out of the chemical line and prime from up to twelve feet above the liquid level in the tank. This feature is dependent upon proper packing adjustment and adherence to all points made in Section 2.5 below.

2.5 All valves, fittings, and piping between the source of chemical and the pump's suction check valve must be 100% bubble-tight and fully compatible with the chemical being delivered and with each other. Failure to adhere strictly to this rule will lead to gas build-up in the chemical head and loss of prime. Specifically:

2.6 Any fitting or screw-on joint without Teflon™ tape or other acceptable joint sealant may allow air at atmospheric pressure to enter the suction tubing, even if no chemical leakage is visible.

2.7 Dissimilar metals, when joined together in the suction pipe work may react with each other, creating gas bubbles that will end up being carried into the pump head. CheckPoint generally recommends all suction components, including all tubing, piping, fittings, and valves, be of similar material, preferably stainless steel or other chemically resistant metal.

2.8 Incompatibilities between the chemical and the metallic elements in the suction pipe work can also create such gas bubbles. In particular, some acids require Hastelloy™ or PVC fittings and tubing, while other chemicals may only require 316 SS.

2.9 Always check to ensure that all process block valves are closed prior to disconnecting or re-installing any chemical injection pump. There should always be a block valve placed between a properly installed pump and the process flow and the chemical supply. Conversely, while the pump is running, all such block valves should always be open.

2.10 To ensure sufficient flow rates of chemical and minimize pressure drop through the lines, all suction lines should be at least 3/8 inches diameter and all discharge lines should be at least 1/4 inch diameter. Multiple pump installations and for viscous chemicals require additional allowances. Contact CheckPoint or your authorized CheckPoint distributor for design assistance.

2.11 Pulsation dampeners are sometimes specified in systems utilizing low-flow 1250/1500 Series CheckPoint pumps. CheckPoint does not recommend their use because the low flow rates of all 1250/1500 Series pumps do not generate harmful pulsation.

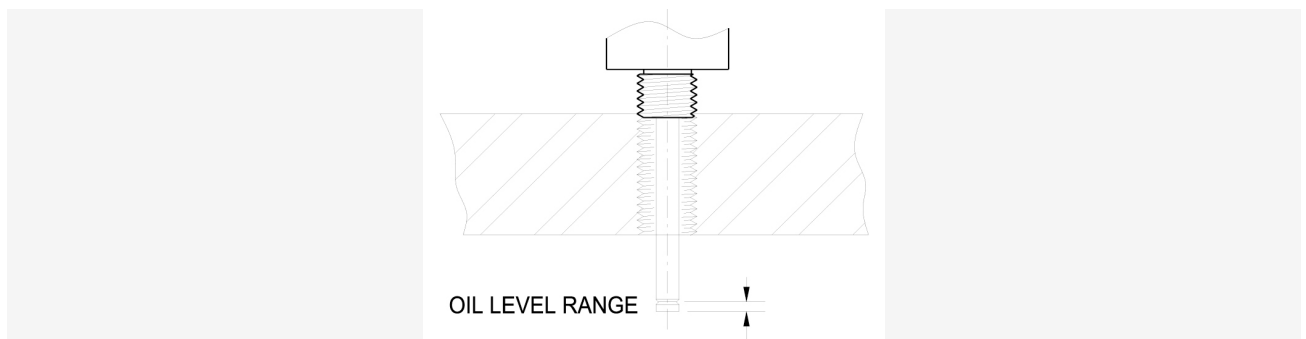
### 3. PRIOR TO STARTUP – SAFETY CHECKS

- 3.1 Is the gearbox filled with suitable lubricant?
- 3.2 Is the power supply correctly matched to the motor?
- 3.3 Is the electric hookup of the pump correct and carried out according to all applicable codes?
- 3.4 Are all tubing/pipe connections made up correctly?
- 3.5 Is there a pressure relief valve on the discharge side?
- 3.6 Is the pressure relief valve operating correctly and is it set to the correct pressure?

### 4. CHECKING THE GEAR LUBRICANT LEVEL

**CAUTION: The pump gearbox must be filled with gear lubricant at all times when operating the pump TO AVOID RISK OF DAMAGE AND OVERHEATING.**

FIGURE 2



- 4.1 Oil level should be checked weekly.
- 4.2 Use the Gear Oil Level Dipstick/Fill Plug (Item 9 in Figure 5 at the end of this Manual) to check the level of lubricant as follows:
  - 4.3 Stop pump and wait for approximately 5 minutes.
  - 4.4 Unscrew cap, wipe dipstick with clean rag.
  - 4.5 Put dipstick into hole, but do not screw it back in.
  - 4.6 Oil level should be between the end of the dipstick and the middle of the groove.
  - 4.7 Replace cap by screwing back in snugly.

### 5. GEAR LUBRICANT TYPE

- 5.1 Oil type for refilling and adding may be either synthetic or mineral, but never both at the same time.

**CAUTION: NEVER MIX SYNTHETIC AND MINERAL OIL IN THE GEARBOX!**

- 5.2 Mineral oil must conform to CLP 220 or ISO – L – CKC 220. Shell Omala 220, Mobil Gear 630, and Exxon Spartan EP 220 are examples of mineral oils that are acceptable.
- 5.3 Synthetic oil must conform to CLP PG 220 or ISO – L – CKS 220.
- 5.4 Mineral oil should be changed after each 4000 hours of use or one year of operation.
- 5.5 Synthetic oil should be changed after each 8000 hours of use or two years of operation.
- 5.6 Capacity of unit is approximately 3.0 liters.

**CAUTION: DANGER OF BURNS WHEN DRAINING HOT LUBRICANT!**

NOTE: ASSURE ENVIRONMENTALLY SAFE DRAINING AND DISPOSAL OF SPENT LUBRICANTS.

**6. RELIEF VALVE**

**CAUTION: NEVER OPERATE PUMP WITHOUT A PRESSURE RELIEF VALVE on the discharge side of the pump that has been SET TO THE APPROPRIATE OVERLOAD PRESSURE! DOING SO MAY CAUSE DAMAGE TO THE GEARBOX and/or cause a leak hazard!**

NOTE: When using a pressure relief valve, chemical tank or vessel MUST BE properly vented to atmosphere to avoid the possibility of over-pressurizing the tank if the pressure relief valve opens!

6.1 A discharge pressure relief valve has been supplied with the pump when shipped from CheckPoint. It has been set to the appropriate discharge overload pressure at the factory. Overload pressures are as given in Figure 3 according to plunger diameter:

**FIGURE 3**

| Head Series | Plunger Diameter (IN) | Set Pressure (PSIG) |
|-------------|-----------------------|---------------------|
| 1250        | 0.125                 | 10,000              |
| 1250        | 0.250                 | 10,000              |
| 1250        | 0.375                 | 9,000               |
| 1250        | 0.500                 | 5,000               |
| 1500        | 0.375                 | 15,000              |
| 1500        | 0.750                 | 2,500               |
| 1500        | 1.000                 | 1,400               |
| 1500        | 1.500                 | 600                 |

## 7. MOTOR ELECTRICAL CONNECTION

7.1 The electric motor must be connected so that its direction of rotation is the same as the arrow on the gearbox.

7.2 The electric motor must be connected in accordance with all local regulations, including especially overload protection.

7.3 The complete installation must be equipped with an “emergency off” switch that is easily and quickly accessible by the user.

## 8. CONNECTING THE CHEMICAL SUPPLY

8.1 Clean suction lines and check chemical containers to ensure that they are free of all foreign matter, sand, sludge, or chemical buildup.

**CAUTION: Removing foreign debris from suction lines and chemical containers will substantially extend the life of the packing and other components of the pump. Even a new chemical tank can contain debris that can be carried into the pump and damage it.**

**NOTE:** If premature scoring of the pump plunger or early packing failure is observed during operation, a likely cause is abrasive particles carried into the pump through the suction plumbing. Use of a pre-suction in-line chemical filter such as the CheckPoint F40 Series and/or a ceramic or Hastelloy™ plunger is recommended.

**CAUTION: Substantial scoring of the plunger can lead to severe leakage of chemical into the environment.**

8.2 Connect the chemical suction line to the suction check valve on the pump head. The suction check valve has a 1/4" NPT male thread (for Series 1250 heads) or a 1/2" NPT male thread (for Series 1500 heads), with an arrow indicating chemical flow direction towards the pump (see Figure 5 at the end of this Manual).

**NOTE:** Always apply Teflon™ tape or other appropriate thread sealant to the check valve threads prior to attachment to prevent leakage.

**CAUTION: Never re-locate the suction or discharge check valves away from the chemical head. To operate properly, check valves must remain directly attached to the chemical head. If desired, a secondary discharge check may be placed downstream of the primary discharge check valve.**

8.3 Connect your discharge line to the discharge check valve. This is a 1/4" NPT male thread on the Series 1250 head and 1/2" NPT male thread on the Series 1500 head. An arrow is stamped on the discharge check valve pointing away from the pump.

8.4 Check that the packing nut is properly adjusted. In a new pump, proper adjustment is finger-tight, plus 1/8 of a turn. Use a packing adjustment tool (available from CheckPoint at no charge) for best results.  
IMPORTANT: PLEASE REVIEW *Section 11: Packing Adjustment*.

**CAUTION: DO NOT OVER-TIGHTEN THE PACKING NUT. Applying excess torque to the packing nut will decrease the life of the packing.**

8.5 Open the process block valve, allowing the process pressure to reach the chemical head. Correct any leakage observed.

## 9. BLEEDING/PRIMING THE PUMP

9.1 The bleed screw is fitted with a 1/8" NPT female connector to allow the user to tube chemical used in the bleeding process to a safe area.

9.2 Prior to bleeding air from the pump head, check to ensure that the packing nut is properly adjusted. Before attempting to adjust or tighten the packing nut, please read *Section 11: Packing Adjustment*. It is important not to over-tighten the packing nut.

9.3 Open the chemical supply block valve.

9.4 Open the process block valve.

**CAUTION: Other than during brief testing, NEVER operate the pump without chemical supply available and flowing freely. Doing so will create undue friction and heat, decreasing the life of the packing, hastening chemical leakage, and voiding the pump warranty.**

9.5 Start the pump.

9.6 Adjust the stroke length to maximum.

9.7 Open the bleed screw 1 1/2 to 2 turns. The pump will begin to pull air and chemical through the chemical supply plumbing, into the head, and out the port in the bleed valve. Leave the valve open until a solid stream of chemical pumps out the bleed port with each stroke of the pump.

**NOTE:** If the pump is not new, it is very possible for dried or solidified chemical to be present in the bleed assembly. If your pump does not bleed when following the directions above, try cleaning these items in solvent and replacing them.

9.8 Close the bleed screw until chemical flow through the bleed port stops.

**CAUTION: DO NOT OVER-TIGHTEN THE BLEED SCREW. Tighten the bleed screw ONLY until chemical stops flowing. Applying excess torque to the bleed valve may impair future valve operation.**



**NOTE:** Occasionally, soon after closing the bleed assembly, you may observe packing leakage. If so, this is usually due to a loose packing nut. Adjust the packing nut per the instructions in *Section 11: Packing Adjustment*.

9.9 Adjust the stroke length to obtain proper delivery volume per directions in Section 10 below.

## **10. SETTING AND ADJUSTING THE PUMP DELIVERY VOLUME**

10.1 The pump stroke rate remains constant regardless of delivery volume.

10.2 The pump stroke rate is determined by the gear ratio of the gearbox and the motor speed in revolutions per minute. To calculate the stroke rate of the pump, divide the motor speed on the faceplate of the electric motor by the gear reduction factor of the gearbox. The gear reduction factor is shown on the PUMP DATA SHEET.

10.3 The pump delivery volume is adjusted by changing the stroke length.

10.4 The large black dial (Item 8 on Figure 5 at the end of this Manual) is used to adjust the stroke length of the pump.

10.5 Turning the knob adjusts the stroke length from a maximum of 15 mm (0.591 in) to a minimum of no stroke at all.

10.6 Use the Adjustment Gauge (Item 9 on Figure 5 at the end of this Manual) on the side of the vertical stem just underneath the black dial to determine the stroke length.

10.7 stroke length may be adjusted whether the pump is running or not.

10.8 There are a variety of calibration gauges available, including a complete line of appropriately-sized CheckPoint calibration gauges for every CheckPoint pump. To ensure that your pump is working as is should and that chemical is being delivered at the rate you need, it is important to use a calibration gauge.

10.9 Most calibration gauges are designed to read properly when one full minute of pumping has taken place. However, if the liquid level drops too fast to allow for a full minute, shorter periods are acceptable. Try to size the gauge so that at least a 30 second test can be made, however, or a loss of accuracy will result.

10.10 Proper gauge placement and plumbing is important. Please refer to Figure 1 for appropriate valving and placement, and for reference numbers as used in this section. The calibration gauge is labeled as #5.

10.11 With the pump either running or stopped, open the Gauge Fill Valve (shown as #4 in Figure 1). The calibration gauge (#5) should begin to fill. Continue filling until the chemical level is at or near the top markings on the gauge, then close the Gauge Fill Valve (#4).

10.12 Now ensure that the CheckPoint pump is running. Take note of the level of chemical in the gauge using the appropriate scale for the volume units you want to measure the pump's output in. Usually the calibration gauge will show liters on one scale and quarts or gallons on the other. It is best to write down the number so that you can calculate flow accurately.

10.13 Open the Gauge Fill Valve (#4), and immediately close the Chemical Supply Valve (#1). This isolates the pump and gauge so that the pump is being supplied directly from the gauge.

10.14 The level in the gauge should begin to fall. When the liquid level in the gauge gets near the bottom of the gauge, or when one minute has expired (whichever comes first), stop timing, note the ending level on the gauge, and reopen the Chemical Supply Valve (#1).

10.15 Write down the amount of time in seconds and the final gauge reading, then close the Gauge Fill Valve (#4).

NOTE: Failure to reopen the Chemical Supply Valve will result in the pump quickly depleting the remaining chemical in the gauge and sucking in air from the gauge, necessitating pump re-priming.

NOTE: In cases where the chemical flow rate is extremely low, you may need to time for longer than one minute to allow an adequate amount of chemical to move out of the gauge.

10.16 The pumping volume (in the units specified on the gauge scale) will be given by the following equation:

$$\text{PUMPING VOLUME} = \frac{[\text{END READING}] - [\text{BEGINNING READING}]}{[\text{DURATION OF READING IN SECONDS}]} \times 60$$

NOTE: To ensure accurate stroke rate measurement, allow sufficient measurement duration. Where possible, allow at least thirty seconds of gauge drawdown.

## 11. PACKING ADJUSTMENT

11.1 Packing adjustment is usually indicated whenever adjustable packing is installed in the pump and leakage can be observed around the packing nut or coming out of the weep hole drilled through the packing nut. In most cases, if there is no leakage, no adjustment is necessary.

11.2 Use a CheckPoint T55-101 packing adjuster, which is specifically designed for this purpose. If one is not available, you may order one at no charge directly from CheckPoint. In an emergency or if time is short, a 6" length of ¼" OD tubing or metal rod may be used.

11.3 Packing should generally be adjusted while pump is running if it is already in service.

11.4 To tighten the packing, insert the tool into one of the six shallow radial holes in the packing nut (Packing Nut is shown as #3 in Figure 5 at the end of this Manual), and tighten the nut clockwise (when looking at the pump from above). Snug the nut until light pressure with one finger on the packing nut tool no longer moves the packing nut.

11.5 From this point, **TIGHTEN THE NUT 1/8 TURN ONLY** as follows:

11.6 If adjusting the packing while pump is operating, pause after each 1/8 turn to determine if the leakage has stopped, allowing for enough time to ensure previous leakage has already drained from the nut weep holes and threads. If pump is still leaking, turn packing nut an additional 1/8 turn and check again. Continue turning the nut 1/8 turn at a time as often as necessary to stop the leakage. If the leakage cannot be stopped, or if excessive force is required to stop leakage, it is time to replace the packing.

11.7 If adjusting the packing prior to new installation or when not currently running, tighten the nut 1/8 turn from the finger tight position.

**NOTE:** If the packing is being adjusted while the pump is running, the pump will typically not stall no matter how much the packing nut is tightened. Care must thus be taken not to apply too much pressure when adjusting the packing nut, as this will reduce packing life.

## **12. PACKING REPLACEMENT**

Follow the steps below to change the packing.

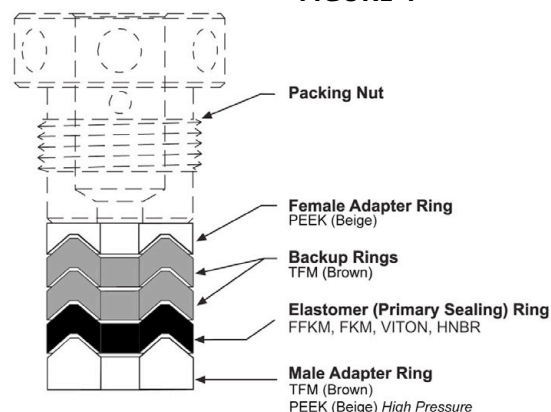
**NOTE:** The 1/8", 1/4", and 3/8" plunger sizes on the Series 1250 and the ½" and ¾" plunger sizes on the Series 1500 require a metal adapter sleeve in the packing gland. When removing the packing, this sleeve should also be removed and cleaned. It is important to remember to re-install the sleeve.

**NOTE:** The 1/8" plunger size on the Series 1250 and the ½" and ¾" plunger sizes on the Series 1500 require an O-ring and a backup ring. The 1/8" plunger size also requires a snap ring.

**NOTE:** If your early model 1/8" Series 1250 does not have a sleeve that contains the packing inside, and/or if it does not contain a backup ring, O-ring, and snap ring, please contact CheckPoint to obtain the updated parts.

- 12.1 Shut off power to the pump.
- 12.2 Close the block valves on the chemical supply and discharge.
- 12.3 Disconnect the chemical supply from the pump at the suction check valve, and disconnect the discharge line from the discharge check.
- 12.4 Remove the chemical head by removing the two head bolts and then separating the head component from the body of the pump.
- 12.5 Unscrew and remove the packing nut, using 1/4" tubing or a packing nut tool. A packing nut tool is available at no charge from CheckPoint. For all sizes other than 1/8", proceed to step 12.7.
- 12.6 For 1/8" plunger model, remove the internal snap ring from its groove. It is located on top of the sleeve just below where the internal packing nut threads end.
- 12.7 Remove the Inspection/Cleanout Plug from the head.
- 12.8 Using the access hole where the Inspection/Cleanout Plug was, push out the packing and sleeve with a punch or screwdriver. For the 3/8" Series 1250 head, proceed to step 12.10. For 1/2" Series 1250 head and the 1" Series 1500 head, proceed to step 12.11.
- 12.9 Remove the packing from the sleeve, along with the O-ring and backup ring on the small outside diameter of the sleeve. Clean the sleeve and lightly grease it, then install the new O-ring and backup ring supplied with your new packing. If you cannot locate these parts, please contact CheckPoint for replacements. Your 1/8" pump may leak chemical without replacing these components whenever you replace the packing.
- 12.10 Replace the metal sleeve.
- 12.11 Examine the new set of packing closely and ensure, prior to installation, that it is oriented properly according to Figure 4. Your packing will be similar to the cross sectional view shown.

**FIGURE 4**



**NOTE:** When replacing adjustable packing, always install the packing rings exactly as they are shipped. Rearranging the order of the vee-rings in an adjustable packing set will reduce the life of the elastomer ring in the packing set.

12.12 Grease the packing rings on their outside diameters lightly and install them, one ring at a time. It is important to adhere to the ring order and orientation as shown in the diagram.

|  |
|--|
| NOTE: On the 1/8" Series 1250 and the 1/2" and 3/4" Series 1500, the packing fits inside the sleeve rather than directly into the packing gland. |
|--|

12.13 On the 1/8" plunger model, replace the internal snap ring to retain the sleeve.

12.14 Grease the packing nut threads and replace the nut loosely by hand.

12.15 Grease the plunger rod protruding from the pump motor.

12.16 Taking care to insert the plunger into the packing without damaging or bending it, replace the chemical head onto the main body of the pump.

12.17 Grease the threads on the two head bolts, then insert and hand-tighten them.

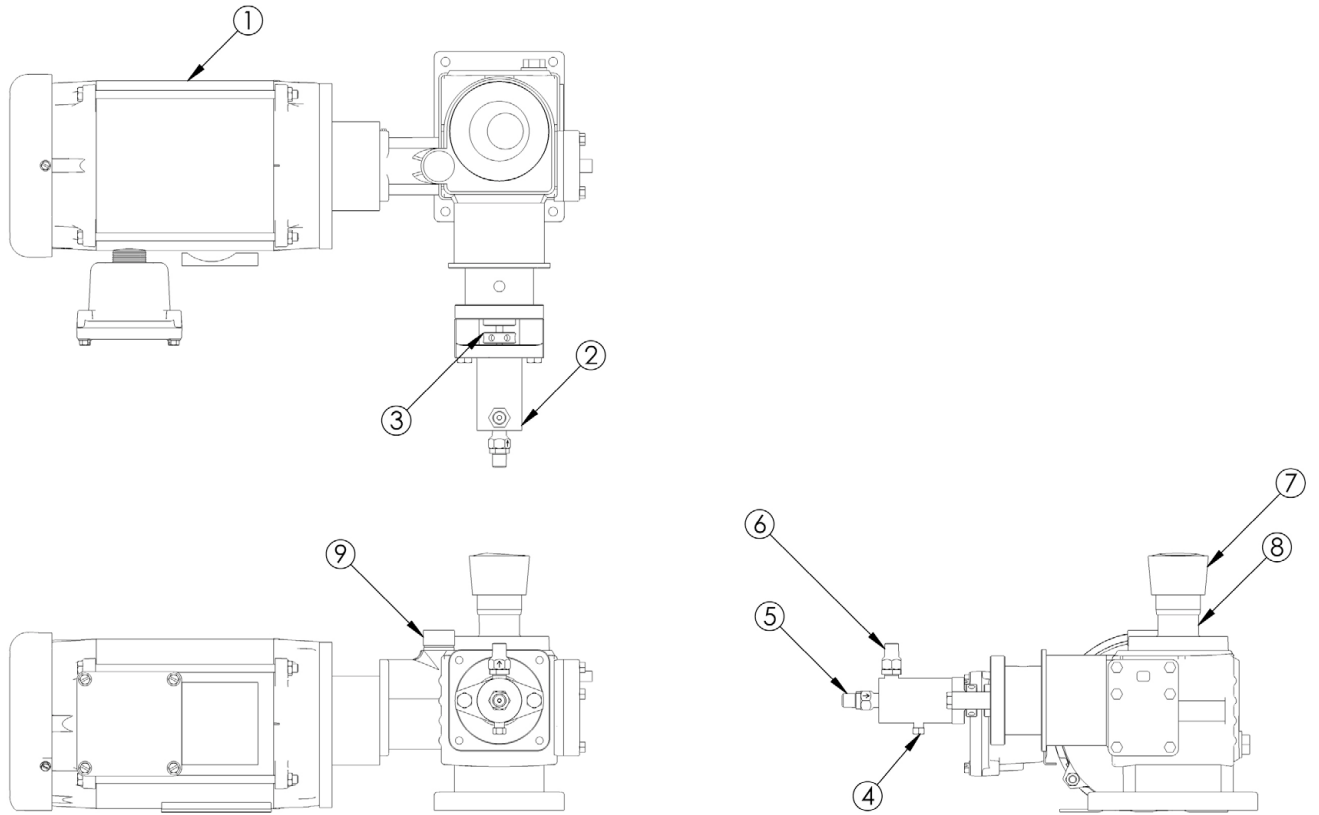
12.18 Tighten the packing nut to the point where light pressure with one finger on the packing nut adjuster will no longer move the packing nut.

12.19 Fully tighten down the head bolts. Failure to adhere to this procedure can lead to a misaligned head and leaking packing.

12.20 Reattach all process lines to the chemical head, and open all isolation valves leading to the pump chemical supply and discharge.

12.21 Adjust the packing nut per the directions in *Section 11*.

**13. FIGURE 5: NAME & FUNCTION DIAGRAM**



|                               |                          |                                     |
|-------------------------------|--------------------------|-------------------------------------|
| 1. Electric Motor             | 4. Bleed Screw           | 7. Stroke Length Adjuster           |
| 2. Plunger-Type Chemical Head | 5. Suction Check Valve   | 8. Stroke Length Adjustment Setting |
| 3. Packing Adjustment Nut     | 6. Discharge Check Valve | 9. Gear Oil Level /Fill Plug        |