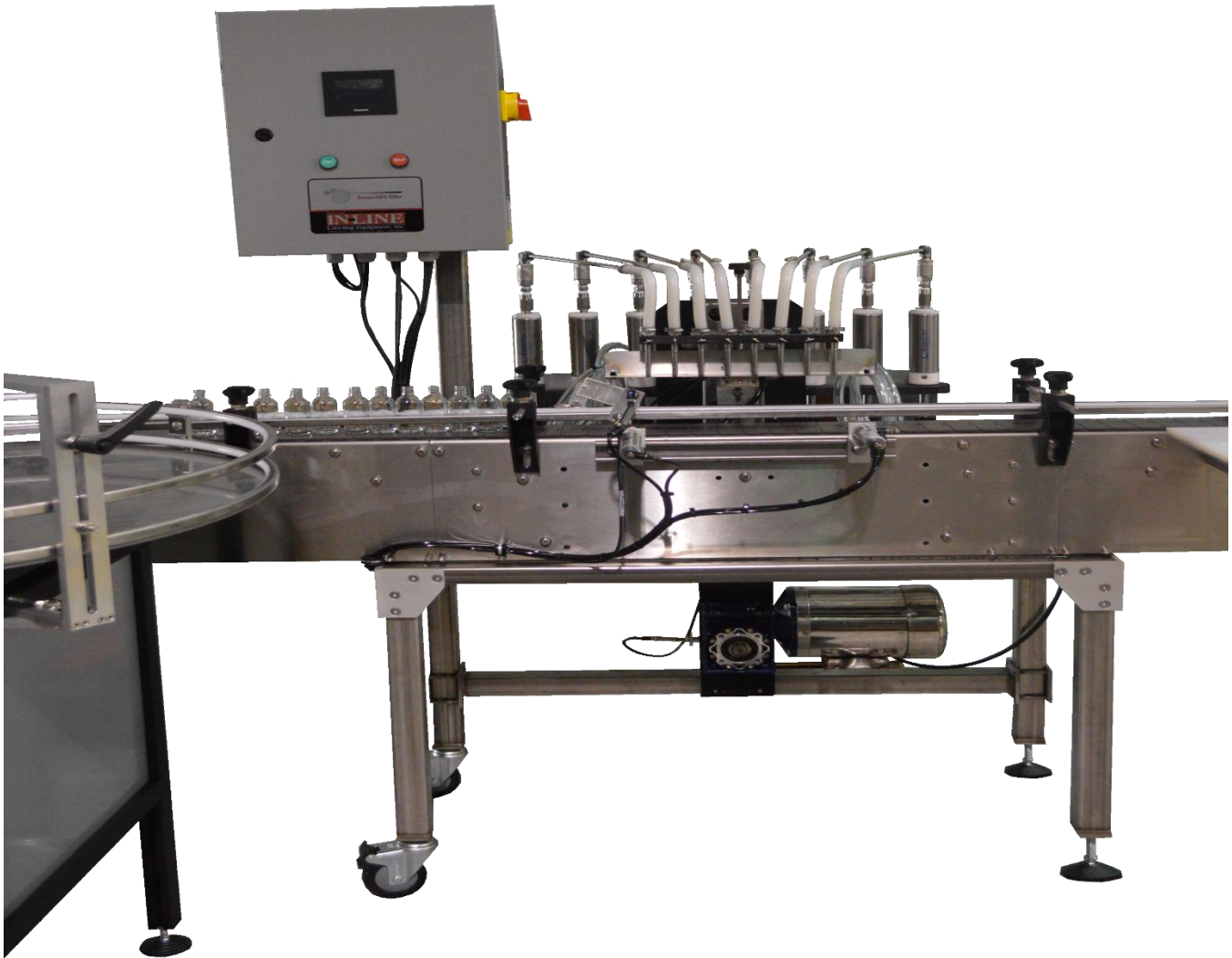


# Operation Manual

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## Piston Filler



## Piston Filler

**In-Line Packaging Systems, Inc.**

7282 Spa Road, North Charleston, SC 29418

Phone: 843.569.2530 Fax: 843.569.2531

[www.inlinepack.com](http://www.inlinepack.com)

# **CAUTION!**

Persons operating this machinery are reminded to observe their own company safety policies. In addition, the following safety rules should be observed:

**DO NOT REACH INTO THE MACHINE WHILE IT IS IN OPERATION.**

**USE ONLY THE CORRECT TOOL FOR THE JOB BEING DONE.**

**STAY ALERT, REMEMBER LOCATION OF CONTROL SWITCHES.**

## **MAINTENANCE**

The main electric switch supplying power to the machinery should be locked out or disconnected when repairs are performed on this equipment.

Machine should be cleaned and inspected regularly. All safety switches must be operable, attachments secure and machine free of broken glass and paper.

Do not hand lubricate when the machine is in operation.  
Work area should be kept clean and as dry as is practical.

The repair or adjustment of this equipment should be performed only by persons qualified through technical training and ability, as assigned by your company.

## **OPERATION**

All guards should be securely in place before operating the machine.

Company rules on eye protection should be followed.

Loose clothing or jewelry such as neckties, rolled sleeves, over blouses, bracelets, watches and rings should not be worn when operating the machine.

Report all malfunctions, unusual operation and defects immediately.

Please exercise caution with any moving parts, including the conveyor and any pinch or drive rolls.

Stop the machine before placing hand or arms near or into any area where moving parts are located.



## **Table of Contents**

### **Section One - General Information**

- 1.1 Terminology of Machine
- 1.2 Specifications and Requirements
- 1.3 Functional Description of Machine
- 1.4 Basic Machine Controls

### **Section Two - Uncrating and Installation**

- 2.1 Power and Air Connections
- 2.2 Installing in Production Line
- 2.3 Leveling Base Machine

### **Section Three - Preparing to Fill**

- 3.1 Loading Filling Product
- 3.2 Set Conveyor Rails to Container Size
- 3.3 Adjust Height of Fill Nozzles to Container
- 3.4 Adjust Fill Volume Based on Container Size

### **Section Four - Operational Adjustments**

- 4.1 Adjusting Fill Volume between Nozzles
- 4.2 Operator Interface and Machine Settings

### **Section Five - Periodic Maintenance, Cleaning and Lubrication**

### **Section Six - Troubleshooting**

- 6.1 Nothing Works at all or Has Power but Nothing Works
- 6.2 Count Has Been Met but No Liquid Dispenses

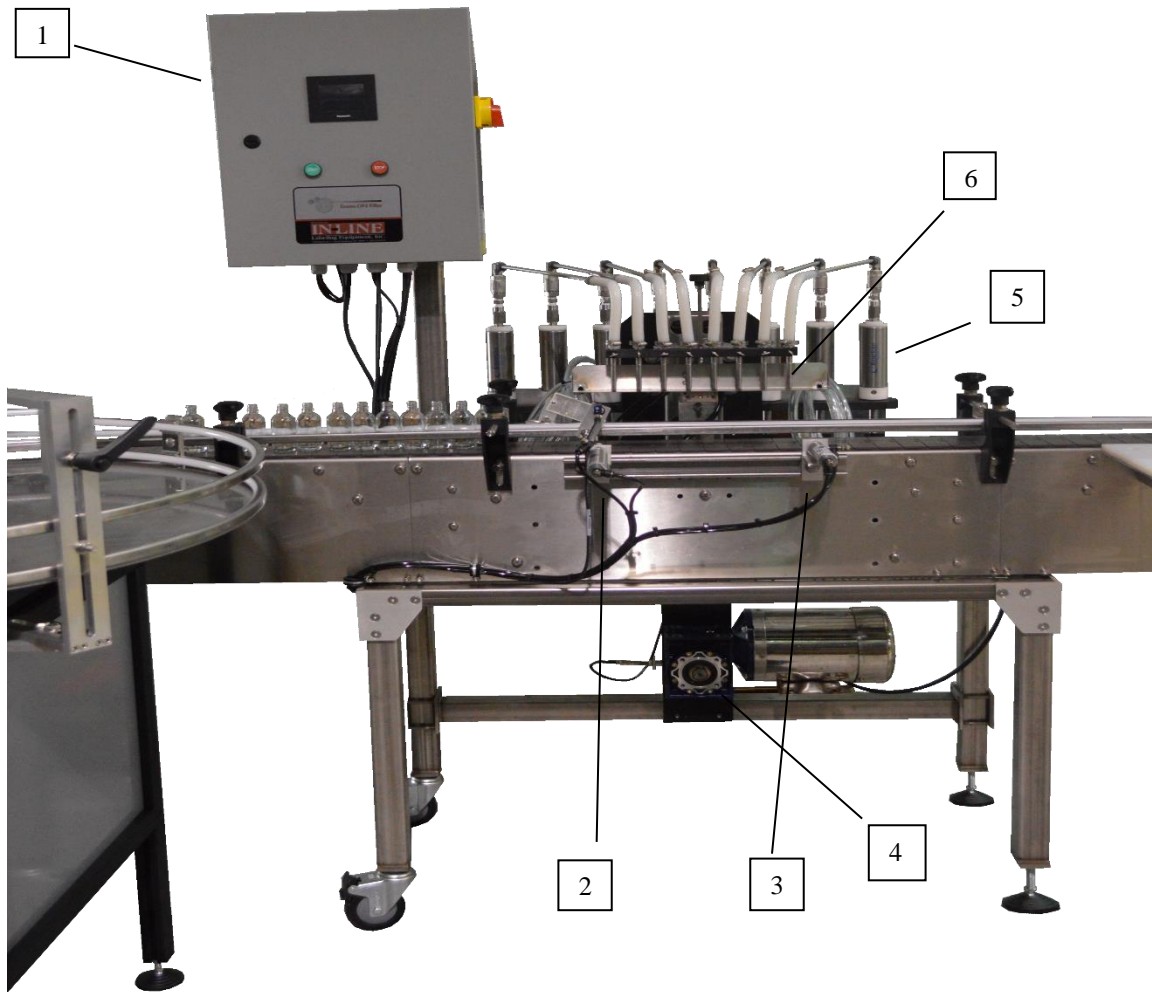
### **Section Seven - Parts Diagrams**

### **Section Eight - Recommended Spare Parts**

## **Section One - General Information**

The IN-LINE small ampule piston pump filler utilizes a common air actuated piston drive, and people friendly controls to provide a simple and cost-effective method for container handling and filling. The system is capable of filling viscous, semi-viscous, and water thin liquids into plastic, glass, and metal containers ranging in sizes and configurations.

## 1.1 Terminology of Machine



### Piston Filler - Front

1. Control Box
2. Entry Gate
3. Exit Gate

4. Fill Level Adjustment (back side)
5. Fill Piston
6. Fill Nozzles

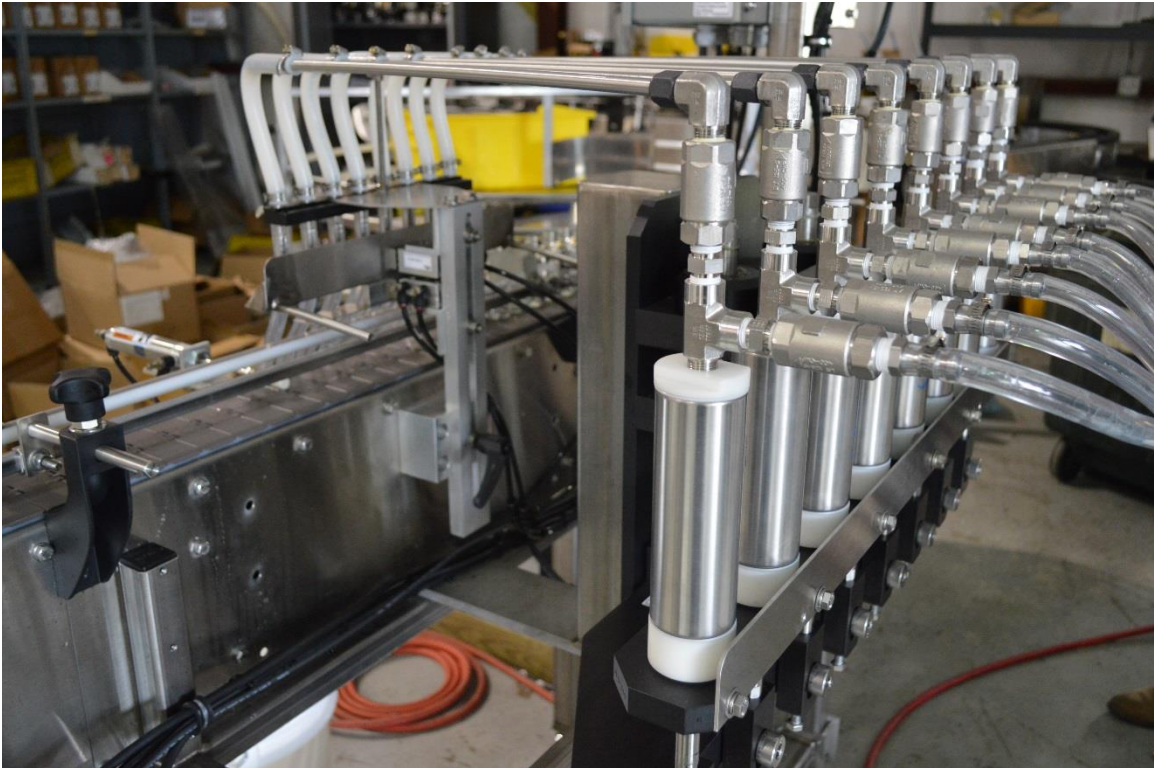


### Piston Filler - Rear

- |                                    |                 |
|------------------------------------|-----------------|
| 1. Fill Level Adjustment Eccentric | 3. Fill Pistons |
| 2. Fine Tune Adjustments           | 4. Air Inlet    |

## 1.2 Specifications - Standard Machine

| Item                  | Specification                       |
|-----------------------|-------------------------------------|
| Conveyor width        | 4 1/2 inches standard               |
| Machine speed         | variable to 60 cpm                  |
| Machine weight        | 600 lbs                             |
| Overall dimensions    | 72" long by 30" wide by 32-36" high |
| Electric requirements | 115 VAC, 60 hz, 15 amp              |
| Air requirements      | 65 psi, 3-4 cfm                     |



\*Picture shown with Stainless Steel Tubes option

### 1.3 Functional Description of Machine

The In-Line Piston Filler is a fully automatic filling machine capable of filling viscous, semi-viscous, and water thin fluids on plastic, glass, and metal containers ranging in sizes and configurations. The machine functions in this manner:

- Incoming containers are counted on a photo-eye based on the inputted amount in the PLC.
- Once the count has been met, the infeed gate closes and blocks additional bottles from entering the fill area while the outfeed gate is already extended to prevent the bottles from flowing through without filling.
- The bottles are then held in place by a neck guide that extends out and positions the bottles under the nozzles to ensure proper alignment.
- The automatic drip tray (if installed) retracts and the Piston Filler pumps fluid into the containers.
- Once filling has completed, the neck guides and outfeed gate are opened to allow the bottles to flow out while the drip tray extends to prevent any dripping on the conveyor.
- This process will automatically repeat itself until the desired number of containers have been filled and the machine is stopped or until there are not enough containers left to reach the required count.

### 1.4 Basic Machine Controls

Main Power Switch - Located on the lower right side of the electrical enclosure

1. Start and Stop Pushbuttons





## **Section Two - Uncrating and Installation**

### **2.1 Power and Air Connections**

A grounded electrical male plug is provided with the machine, and is connected to the main electrical enclosure on the rear side of the machine. Plug this into any grounded receptacle. For compressed air, behind the electrical enclosure is an air filter/reservoir with a 1/4" male quick disconnect attached. You can supply compressed air to the machine by either a mating quick disconnect on the end of an air hose, or you can permanently pipe air to the machine using standard pipe and connecting directly into the air filter using threaded pipe connections. If you permanently pipe into the system we recommend a cut-off valve be mounted at the machine. Some changeover adjustments are easier if the operator is able to temporarily turn off the air pressure.

### **2.2 Installing in Production Line**

Move the machine into its permanent location. Adjust the conveyor height of the machine to match the heights of the adjoining machines as required. Four leveling pads are provided with the Piston Filler that allow you some vertical adjustment. If necessary, make spacing blocks to raise the height. Approximately 18 inches of lineal space is provided on each end of the machine to allow a crossover from or to the next machine. Butt the conveyor ends as close to each other as possible and then use conveyor rails to guide the containers across narrow dead plates onto the conveyor.

### **2.3 Leveling the Base Machine**

Once the machine is installed, level the main conveyor through the machine by using a bubble level. Place the bubble level along the length of the machine. Leveling the machine is important to the flow of the line as it allows for more seamless transitions between machines. The squaring and straightness of the base machine will ensure the machine operates correctly.



## **Section Three - Preparing to Fill**

### **3.1 Loading Filling Product**

Product is to be loaded into containers with the Piston Filler supply hoses placed inside for product flow. If tank and cart is supplied, the product is to be loaded into the tank and the supply hose secured to the manifold located on the bottom of the tank with a tri-clamp. Prime the Piston Filler to allow the machine to pull product into the lines. Ensure there is no air trapped inside the hoses prior to filling.

### **3.2 Set Conveyor Rails to Container Size**

The Conveyor Guides must be set to the container size to ensure smooth control of the containers into and through the filler. On the Piston Filler the containers center on the conveyor through the machine, so the Conveyor Rails should be used to center the container as close as possible. Adjust by loosening the knobs holding the rods attached to the rail and then slide the rod in or out. Tighten the handle once complete. The correct tightness to the container diameter should allow about 1/8" to 1/4" of space greater than the diameter of the container.

### **3.3 Adjust Height of Fill Nozzles to Container**

The height of the nozzles should be adjusted to the containers prior to filling. This can be achieved by adjusting the ratchet handle located on the bracket on the back side of the conveyor below the nozzle bar. The distance between the nozzles and the containers should not be so low in that air in the bottles does not have the ability to escape. This will create an air pocket and prevent product from flowing into the container.

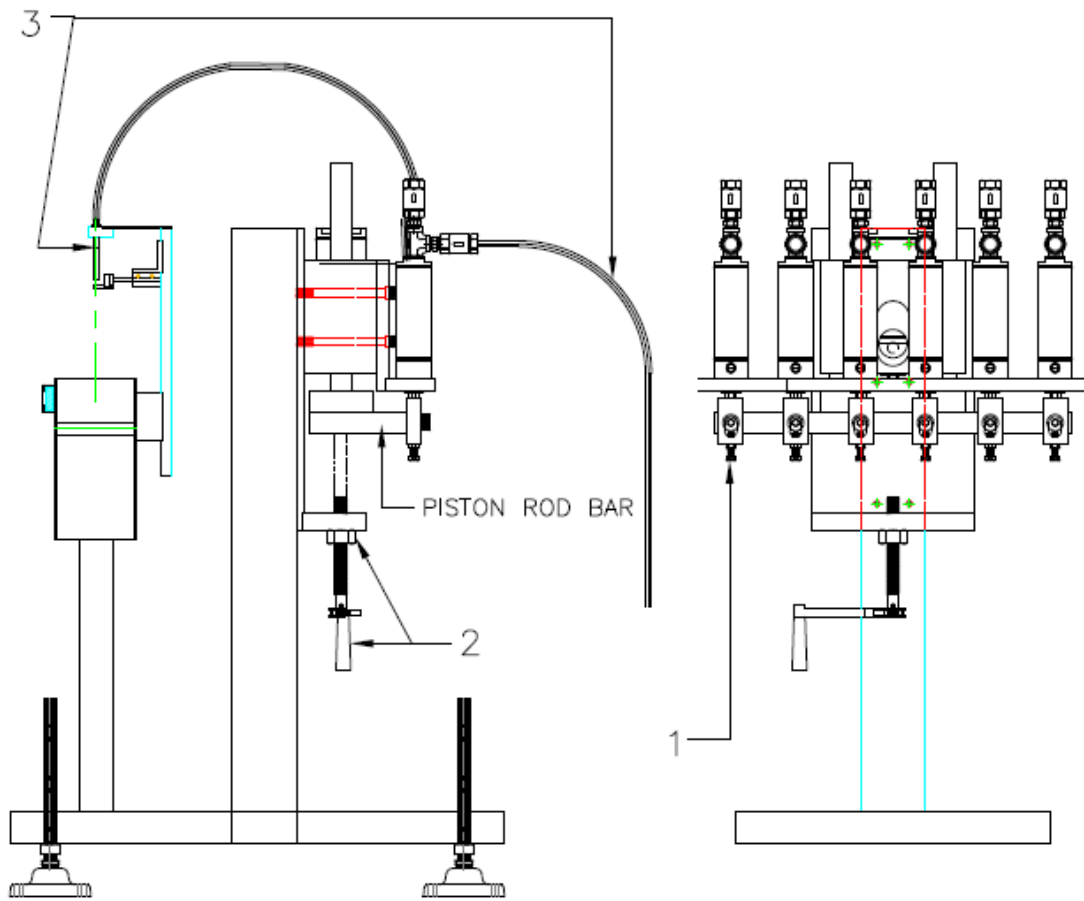
### **3.4 Adjust Fill Volume Based on Container Size**

Make sure that all of the fine adjustment screws are adjusted fully up on each individual piston rod and that there is no free play on the adjustment block.

Loosen the nut on the adjustment screw and minimize the stroke of the pistons by turning the adjustment screw so it comes within 1-1/2" from the piston rod bar that actuates all of the filling pistons. Make sure that the bar is in the most upper position while making the adjustment.

Take the product intake hose on piston-1 and place the hose in a large container with product. Make sure that all of the remaining hoses are not inside the product container. Remove the nozzle corresponding to the same piston and hold it over the same container (DO NOT submerge the tip of the nozzle in the product). With the nozzle over the large

container, cycle the machine until you see product coming out of the nozzle. Make sure that there is no air in the hoses by having a nice smooth stream of product coming out. Once the purging is accomplished, go back to number-2 and minimize the stroke of the piston by turning the adjustment screw closer to the piston rod bar. Place your measurement beaker or container you are about to fill under the same nozzle you finished purging and cycle the machine one shot at a time so you can adjust your volume. Use the number-2 adjustment to get as close as possible to an exact volume adjustment. Lock the adjustment in place by the lock nut on the main adjustment screw number-2. With the setting you have on the piston you just adjusted, take all of the remaining nozzles from the nozzle bar and place them over the large container so you can purge all of them at the same time. Take all of the intake hoses and place them in the product container, turn the machine on with the nozzles over the large container and cycle the machine until you see a smooth stream coming out of all the nozzles. All of the pistons should be delivering the same amount of product or very close to the same amount. If any of the pistons are delivering less than the target volume, you should increase the main setting to satisfy the lowest volume to the target volume. You can minimize the rest if need be by backing up the fine adjustment screw on each individual one until the target is accomplished.



## Section Four - Operational Adjustments

### 4.1 Adjusting Fill Volume between Nozzles

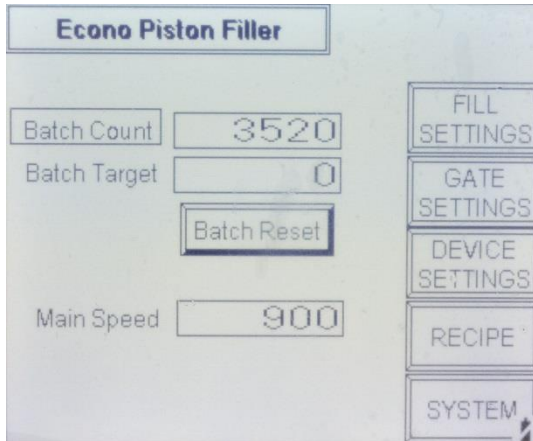
In the event that there is a deviation in fill volume between nozzles it is recommended that you repeat the steps in Paragraph 3 of Section 3.4. Operator will only need to test on the nozzle that needs adjustment. In most cases, the appearance of an unequal fill volume between containers (particularly glass) are due to imperfections in the container's batch.

In the event that the fill volume is deviating due to air in the hoses, simply remove the identified nozzles from the nozzle bar and purge the hoses into a large container. Air has been successfully been purged from the lines when there is a steady stream of product.



## 4.2 Operator Interface and Machine Settings

The Piston Filler has a Touchscreen Operator Interface through which the operator can make adjustments. Here are the following screens available and explanations of how they are used.



### Main Screen

**Main Speed:** Enter speed of machine (ipm)

**Batch Count:** displays current batch count

**Batch Reset:** Press to reset count to 0

**Batch Target:** Enter target amount for Batch

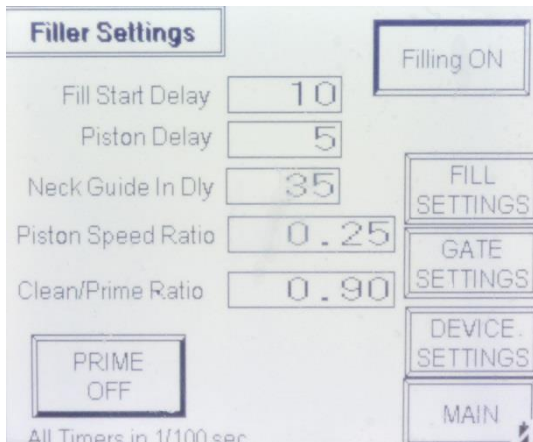
**Fill Settings:** access screen for Filling

**Gate Settings:** access screen for Gate control

**Device Settings:** change device speeds & ratios

**Recipe Functions:** save/recall previous settings

**System Settings:** change settings/devices



### Filler Settings Screen:

**Filling On/Off:** Push to Toggle On or Off

**Fill Start Delay:** Push Number to enter new delay. This number affects the timing in which the fill cycle starts after the count is complete.

**Piston Delay:** Push Number to enter new delay.

This number sets the start of the fill pistons.

**Neck Guide in Delay:** This number affects the point in which the neck guides initiate after bottle count is complete.

**Piston Speed Ratio:** This number affects the speed in which the pistons will pump, thus increasing fill speed.

**Clean/Prime Ratio:** This number affects the speed of the pistons in the prime/clean cycle.

**Prime On/Off:** Push to Toggle prime cycle.



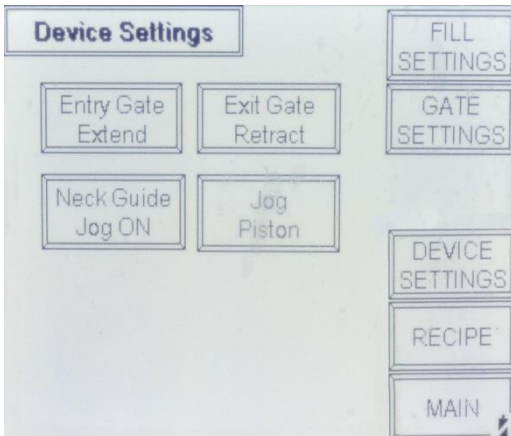
### Gate Settings:

**Entry Gate In Delay:** Push Number to enter new delay. This number affects the timing in which the gate extends.

**Entry Gate Out Delay:** Push Number to enter new delay. This number affects the timing in which the gate retracts after the fill cycle.

**Exit Gate Open Delay:** Push Number to enter new delay. This number affects the timing in which the gate retracts after the fill cycle.

**Exit Gate Open Time:** This number affects the length in time in which the gate shall remain open.



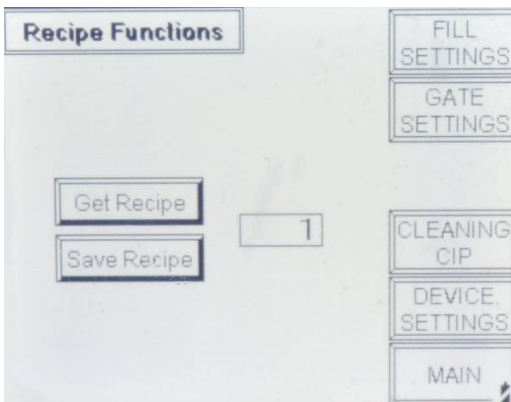
### Device Settings Screen:

**Entry Gate Extend/Retract:** Push to toggle.

**Exit Gate Extend/Retract:** Push to toggle.

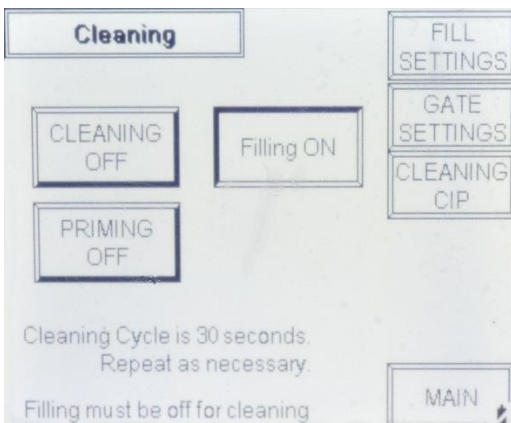
**Neck Guide Jog ON/OFF:** Push to extend/retract neck guide.

**Jog Piston:** Push to run one (1) piston cycle.



### Recipe Function Screen:

The recipe function allows you to enter a new recipe or load up a previously saved one. This is used for different configurations based on multiple container sizes.



### Cleaning Screen:

**Cleaning On/Off:** Push button to toggle cleaning cycle.

**Filling On/Off:** Push button to toggle filling on/off.

**Priming On/Off:** Push button to toggle priming on/off.

## **Section Five - Periodic Maintenance, Cleaning and Lubrication**

### **Maintenance:**

Ensure that you perform a monthly visual inspection for wear on the bearing and piston assembly.

### **Cleaning the Machine:**

The Piston Filler comes in stainless and aluminum construction. Cleaning the machine regularly is recommended using soap and water after filling.

### **Lubrication:**

The only lubrication points on the machine are:

1. The conveyor idler sprockets inside the frame of the machine may need some grease once/year. The conveyor idler sprockets are located under the conveyor chain.
2. Any threaded rod for linear motion should have light oil applied to it periodically to prevent rust and to keep the mechanism moving freely.

## **Section Six – Troubleshooting**

The list below represents a few scenarios in which troubleshooting may need to occur.

### **6.1 Nothing Works at all or Has Power and Nothing Works**

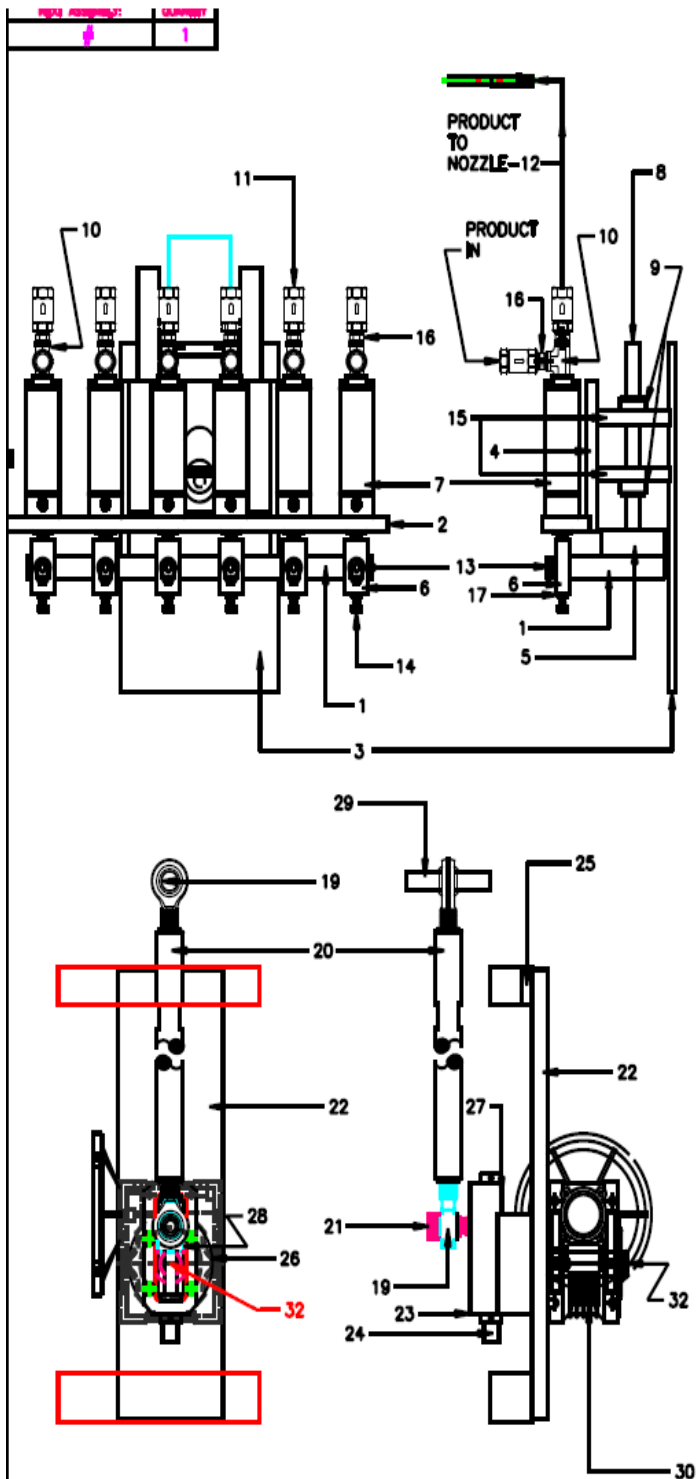
- a) Check main power. Is machine plugged in? Is main power switch turned on?
- b) Check fuses inside control panel.
- c) Are speed controls turned up above zero?

### **6.2 Count Has Been Met but No Product Dispenses**

- a) Ensure that the photo-eye sensor is properly connected. A test for this is to identify if the green light located on the sensor is on and that when an object running past it causes the orange light to blink. This indicates a count. Ensure that the reflector is properly positioned directly across from the sensor.
- b) Ensure that the filling button on either the Cleaning or Filler Settings screen are showing ON and that cleaning is OFF.
- c) Ensure that the feed hoses are properly positioned and submerged in the product to be filled.

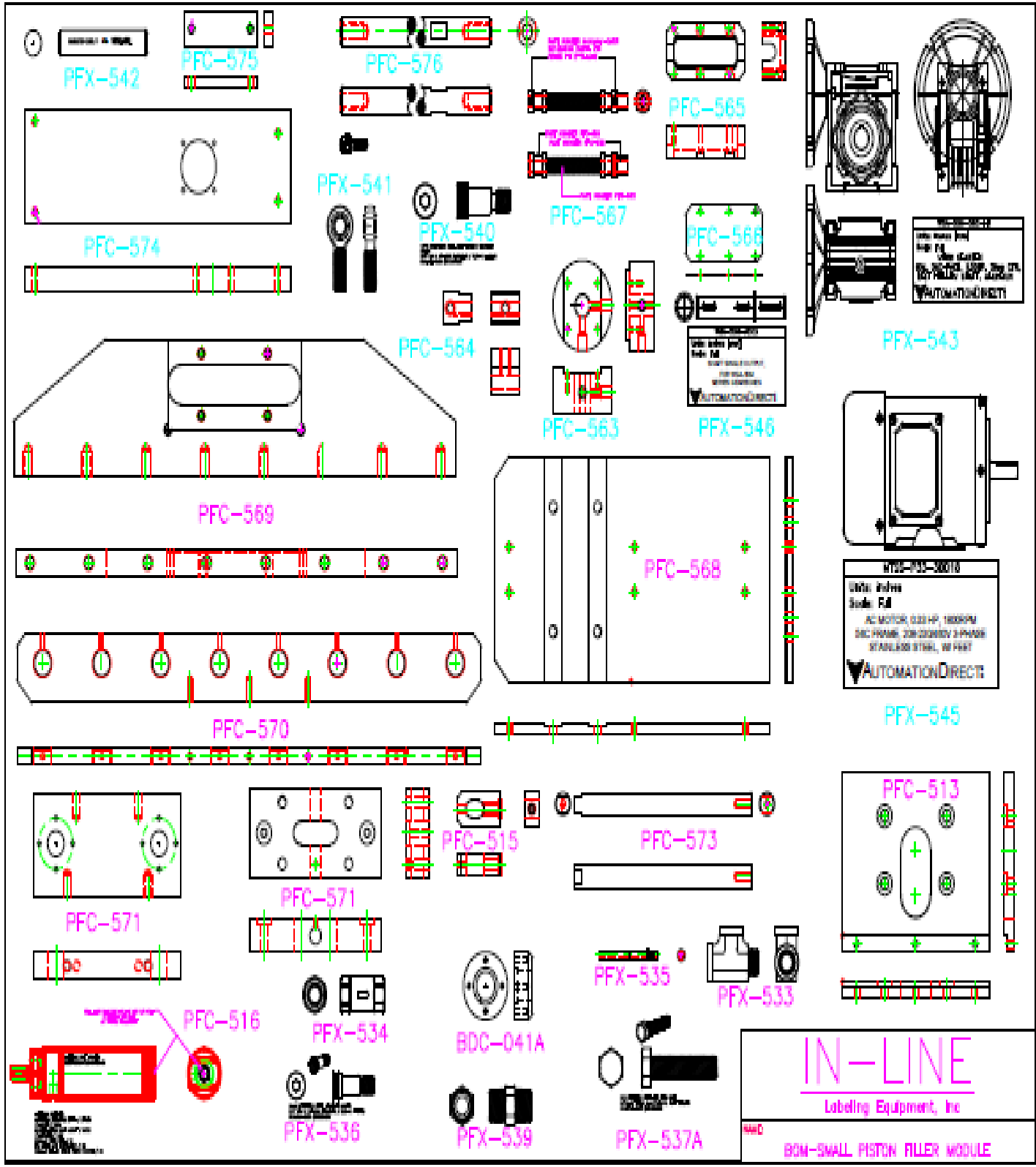


## Section Seven - Parts Diagrams



| ITEM NUMBER | QUANTITY | PART NUMBER | PART DESCRIPTION             |
|-------------|----------|-------------|------------------------------|
| 1           | 1        | PFC-569     | PLATE-CLEVIS MOUNTING        |
| 2           | 1        | PFC-570     | BAR-PISTON MOUNTING BAR      |
| 3           | 1        | PFC-568     | PLATE-MAIN ASSEMBLY PLATE    |
| 4           | 1        | PFC-513     | PLATE-PISTON PLATE MOUNT     |
| 5           | 1        | PFC-571     | PLATE-TOOLING PLATE          |
| 6           | 8        | PFC-515     | BLOCK-PISTON ROD CLEVIS      |
| 7           | 8        | PFC-516     | PRODUCT-CYLINDER ASSEMBLY    |
| 8           | 2        | PFC-573     | ROD-SLIDE SHAFT              |
| 9           | 4        | BDC-041A    | SLIDE BEARING ASSEMBLY       |
| 10          | 8        | PFX-533     | FITTING-PRODUCT TEE          |
| 11          | 16       | PFX-534     | PRODUCT CHECK VALVE          |
| 12          | 6        | PFX-535     | NOZZLE-PRODUCT DISPENSING    |
| 13          | 8        | PFX-536     | SHOULDER SCREW               |
| 14          | 8        | PFX-537A    | BOLT-FINE ADJUSTMENT SCREW   |
| 15          | 2        | PFC-572     | PLATE-BEARING MOUNTING PLATE |
| 16          | 8        | PFX-539     | FITTING-HEX NIPPLE           |
| 17          | 8        | JAM-NUT     | JAM NUT- 5/16-24 SS HEX NUT  |
| 18          | 2        | JAM-NUT     | JAM NUT 3/4-16 SS HEX NUT    |
| 19          | 2        | PFX-541     | ROD END                      |
| 20          | 1        | PFC-576     | ROD-MAIN TIE ROD             |
| 21          | 1        | PFX-540     | SHOULDER BOLT / SELF LOCKING |
| 22          | 1        | PFC-574     | PLATE / MOTOR-REDUCER MOUNT  |
| 23          | 1        | PFC-565     | HOUSING-ADJUSTMENT SCREW     |
| 24          | 1        | PFC-567     | ADJUSTMENT SCREW ASSEMBLY    |
| 25          | 1        | PFC-575     | BAR-MOTOR PLATE SPACER       |
| 26          | 1        | PFC-563     | HUB-MAIN DRIVE HUB           |
| 27          | 1        | PFC-566     | PLATE-COVER                  |
| 28          | 1        | PFC-564     | NUT-ADJUSTMENT SCREW T-NUT   |
| 29          | 1        | PFX-542     | DOWEL PIN-PER CLEVIS ROD     |
| 30          | 1        | PDX-543     | GEARBOX                      |
| 31          | 1        | PDX-545     | MOTOR                        |
| 32          | 1        | PDX-546     | SHAFT                        |

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## Section Eight - Recommended Spare Parts

|                                    |          |
|------------------------------------|----------|
| PSX411LR-M12QD PHOTOEYE (COUNTING) | - 1      |
| CHECKVALVE PFX534                  | - 2      |
| PSX915 AIR SOLENOID                | - 2      |
| PSX634-RELAY                       | - 2      |
| PSX125 CONVEYOR CHAIN              | - 2 FEET |
| PSX632-2" ROTATE                   | - 1      |
| PFX541 ROD END BEARINGS            | - 2      |
| PFX540 SHOULDER BOLT               | - 1      |
| PFX537A ADJUSTMENT SCREW           | - 1      |