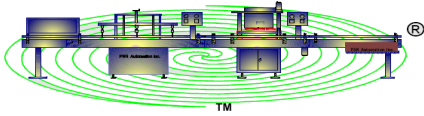


PSR Automation Inc.



Patented Design

F1000 Servo Filler Manual

PSR Automation Inc.
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Machine Type: 1-Head Servo Filler
Machine Model Number: F1000

Automatic Servo Filler

Description

The Volumetric Servo Filler is a highly accurate filling machine that dispenses liquids into containers based on volume. The user-friendly controls allow the user to precisely control the Filler pump revolutions, acceleration, deceleration, and velocity. The use of a rotary pump enables the Filler to fill small vials to large containers quickly and accurately, based on the set revolutions.

Usable Products:

The F1000 can fill most liquids and semi-solids. Products include gels, waxes, candles, conditioners, shampoos, chocolates, toothpastes, as well as very thin liquids such as water, apple juice, chemicals, etc.

Physical Data

Standard Height: 6 ft

Footprint (Base): 2' x 3'

Conveyor: 4'

Weight: 500 lbs approximately

Operating Resources:

-Voltage: 220VAC, 1-phase 10 amps

-100 PSI Filtered Air

Liquid Product level from ground: 42.5", +0.5" -1.0" allowable range

Performance*:

Max Fill: 1 gallon

Min Fill: 15ml

Accuracy: within 0.5% of weight

*Depends on container

F1000 Warranty

The PSR Automation Inc. F1000 Filler includes a 6 month warranty from the time of machine delivery. The warranty applies to the design, construction, and non-consumable components within the machine.

Consumable components are not covered under warranty, which may include items such as o-rings, nozzles stems, nozzle tubes, gaskets, wear strips, conveyor chain, and any normally wearable component. This warranty does not cover items that have been misused, modified, damaged by operator error, neglected required maintenance, or operated in a manner inconsistent with its intended design.

All warranty determinations and fulfillments are done at the discretion of PSR Automation Inc. Items deemed defective will be repaired or replaced with the same, similar, or improved item.

Servo Motor Precautions

- Do not shake, drop, or hit servo motor shaft. Do not lift servo motor by shaft. This may damage the encoder.
- Do not modify or replace the ballscrew system. Incorrect adjustment may result in bearing or motor failure. Call PSR Automation Inc. for service.
- Do not modify or replace motor coupling. Incorrect balancing, may result in motor damage. Call PSR Automation Inc. for service.
- Nozzle bar can lower or move unexpectedly. Never place any part of body or clothing inside machine.**
- Do not place any part of body or clothing near servo motor or ballscrew. Always keep guards in place when machine is in operation.**
- Never service or clean machine with power applied! Unintended motor operation may result in serious bodily harm. Remove power during service.**
- Do not turn pump shaft, especially when cleaning. Excessive force may damage or strip gearbox.**

Setup for Automatic Servo Filler

It is dangerous to manually clean the pump with power applied! **Remove power before cleaning.**

1. Turn power off.
2. Clean pumps and hoses fully by following standard procedures. **Do not hit the pump or impellers. Do not forcibly turn the impellers, as this may strip-out the gearbox, or damage the motor. Use two pump wrenches if needed.**
3. Attach hoses to product pump infeed and nozzle. Be sure to select nozzles and hoses with the proper diameter for that product. Use gaskets with quick clamps to connect product hoses to pump and nozzle.

Powering, Calibrating and Setup of Filler

It is required that you follow this procedure in the following order, otherwise the machine may not calibrate correctly.

1. Apply electrical power to machine.
2. Apply air pressure to machine.
3. Ensure the emergency stop is not activated and all safety doors are closed.
4. When operator touchscreen is booted up, press “SERVO POWER”. This applies power to the servo motors.
5. Press “CALIBRATE”. This will calibrate the machine by moving the nozzle bar to the bump stop. **DO NOT activate other buttons while this process is active.** When the nozzle bar has finished calibration, pop up window will ask user if height is correct.
6. Select the “AUX FUNCTIONS” parameter page (Ensure nozzles are correctly installed). Press the “NOZZLE CLOSE/OPEN” button. This will open or close the nozzle. The nozzle may stay closed if not used for extended periods of time.
7. Press the “NOZZLE CLOSE/OPEN” button to open and close. Repeat until a strong distinctive “click” of the shut-off valve is heard
8. Set the button to “NOZZLE CLOSE” before enabling the run cycle.
9. Now prime the pump. The number above the prime button is the priming velocity. It may have to be set at a higher value for viscous products. Do not use excessive speed when priming the pump.
10. To prime the pump, open the nozzle by pushing the PSx button until it says “NOZZLE OPEN”. Refer to the Page 8 on how to prime the pump.
11. After priming pump, position several bottles on the conveyor and align the bottles so that they are properly centered on the conveyor.
12. Adjust the bottle centering guide and the drip tray, so they are at the correct settings. Adjust the **indexers (*11 and *12)** so that they properly position the bottles.
13. Adjust the photoeyes and reflectors, so that they correctly detect the bottle. Preferable Phototeye1 should be as close as possible to Indexer 1. Remember to reposition the reflector.
14. As needed adjust the **NOZZLE HOLDER(*8)** and **NOZZLE(*9)** so they are properly aligned with the bottles. By jogging the nozzle bar up or down from the AUX FUNCTIONS screen will help to ensure the bottles are correctly lined with the nozzles
15. Enter your bottle and fill parameters, or recall from memory. For a detailed explanation of the parameters or how to recall parameters see next page. The **SAFE HEIGHT > FILL HEIGHT and FILL HEIGHT > DIVE HEIGHT. Always keep at least 1/2” difference between (SAFE HEIGHT and FILL HEIGHT) and (FILL HEIGHT and DIVE HEIGHT). Do not use excessive acceleration or deceleration. The motion controller will not be able to interpolate the axis motions if the acceleration/deceleration times are larger than the actual fill time.** Using excessive acceleration or entering incorrect parameter values , will cause the error display to flash, and the program will not start.
16. Making necessary changes to the program to run usually start with machine default acceleration values and adjust up/down if needed.
17. Ensure that the nozzles, drip tray, and indexers and photo eyes are properly setup, and the parameters are all correct, close all safety doors and press **START CYCLE(*2)** once. The nozzle bar will move to the safe

- height.
18. Press **START CYCLE(*2)** and the run cycle will start.
 19. Adjust the volume as necessary to obtain weight by entering a new value, or by pressing increment, or decrement buttons on the “RUN” screen. These values will be recalculated and take affect on the next cycle.
 20. To stop the cycle, press **STOP CYCLE(*3)**. The filler will finish the current cycle. Press the **E-STOP(*1)** in the event of an emergency. This will stop the machine instantly and power will be removed.

In case of an emergency press the E-STOP!

NOTES:

- Always keep at least 0.5” difference between (SAFE HEIGHT and FILL HEIGHT) and (FILL HEIGHT and DIVE HEIGHT).
- Do not use excessive acceleration or deceleration as the motion controller will not be able to interpolate the motions if the acceleration/deceleration times are larger than the actual fill time.
- Usually start with machine default acceleration values and adjust after product has be setup and run. Use minimum values as possible.

WARNINGS:

IF ADJUSTING FILL VOLUMES WHILE THE MACHINE IS RUNNING, ONLY ADJUST THE FILL VOLUME IN SMALL INCREMENTS(+/- 10 mL). THIS IS THE ONLY PARAMETER THAT CAN BE SAFELY CHANGED WHILE THE MACHINE IS IN OPERATION. DO NOT ADJUST ANY OTHER PARAMETERS WHILE THE MACHINE IS RUNNING!

NEVER ADJUST THE SAFE HEIGHT, FILL HEIGHT, DIVE HEIGHT, OR DWELL TIME WHILE THE MACHINE IS RUNNING A CYCLE.

NEVER ADJUST VELOCITY ACCELERATION OR DECELERATION WHILE THE MACHINE IS RUNNING A CYCLE.

NEVER ENABLE OR DISABLE PUMPS WHILE THE MACHINE IS RUNNING A CYCLE.

NEVER ENABLE OR DISABLE DYNAMIC PUMP CONTROL WHILE THE MACHINE IS RUNNING A CYCLE.

ALWAYS CLOSE THE NOZZLE BEFORE RUNNING A CYCLE.

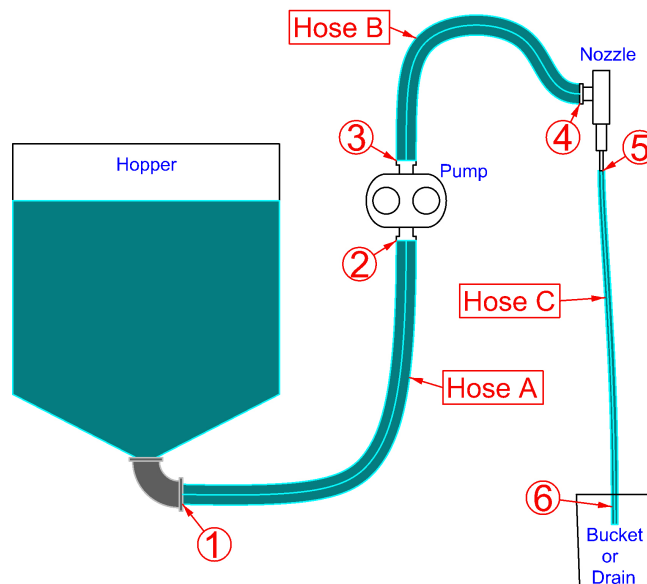
DO NOT JOG THE NOZZLE BAR WHILE THE MACHINE IS RUNNING A CYCLE.

Priming the Pump for Low Viscosity (Thin) Products

1. Fill Hopper with product.
2. Power and calibrate machine using instructions on Page 6.
3. Attach Hose C to Nozzle tip (5). Insert other end of Hose C to a Drain or Bucket (6). Note: It is best to use a hose that fits tightly around Nozzle tip, otherwise product can spray out from a poor hose connection between Hose C and Nozzle.
4. Go to AUX FUNCTIONS screen.
5. Press NOZZLE CLOSE/OPEN. This will open Nozzle.
6. Press and hold PRIME. This will run Pump, and cause product to flow through system.
7. Once all air pockets are flushed out of system, release PRIME button.
8. Press NOZZLE CLOSE/OPEN again. This will close Nozzle.

Priming the Pump for High Viscosity (Thick) Products

1. Fill Hopper with product.
2. Power and calibrate machine using the instructions on Page 6.
3. Detach Hose B at Location (3).
4. Add priming liquid (water or similar liquid) at Location (3) until liquid level is to the top of the Pump.
5. Reconnect Hose B to Location (3).
6. Go to AUX FUNCTIONS screen.
7. Press NOZZLE CLOSE/OPEN. This will open Nozzle.
8. Press and hold PRIME. This will run Pump, and cause product to flow through system.
9. Once all air pockets are flushed out of system, release PRIME button.
10. Press NOZZLE CLOSE/OPEN again. This will close Nozzle.



Simple Hose Connection Diagram
For Priming Pump

Shutting down the machine after run is complete

1. If desired, save the current product.
2. Remove power by turning the disconnect to the OFF position.
3. Remove Pneumatic Pressure
4. Remove Electrical Power

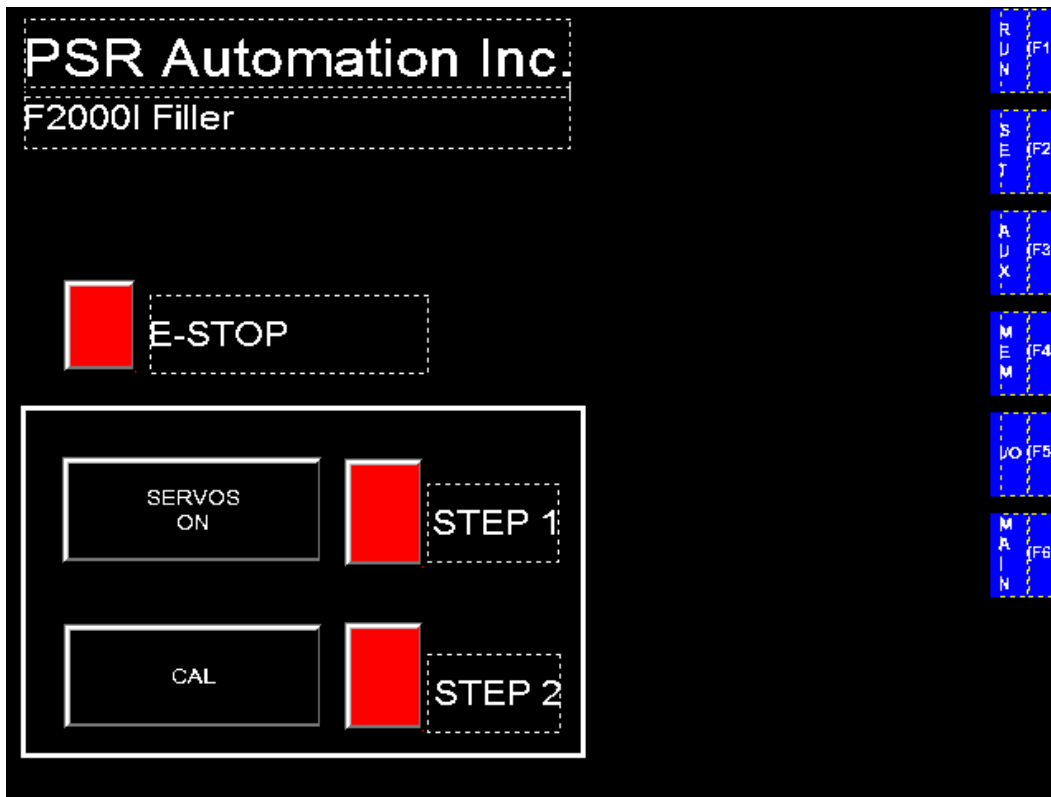
Machine Operation

The F1000 filler works by using servo motors to coordinate the pump revolution and nozzle bar rise rate. This results in fast and accurate fills with most bottles. The operator simply provides the machine with several parameters through the touchscreen, and the machine will automatically adjust to these settings.

The various screens and parameters used by the operator are listed and described in the following pages:

Parameter and Screen Descriptions

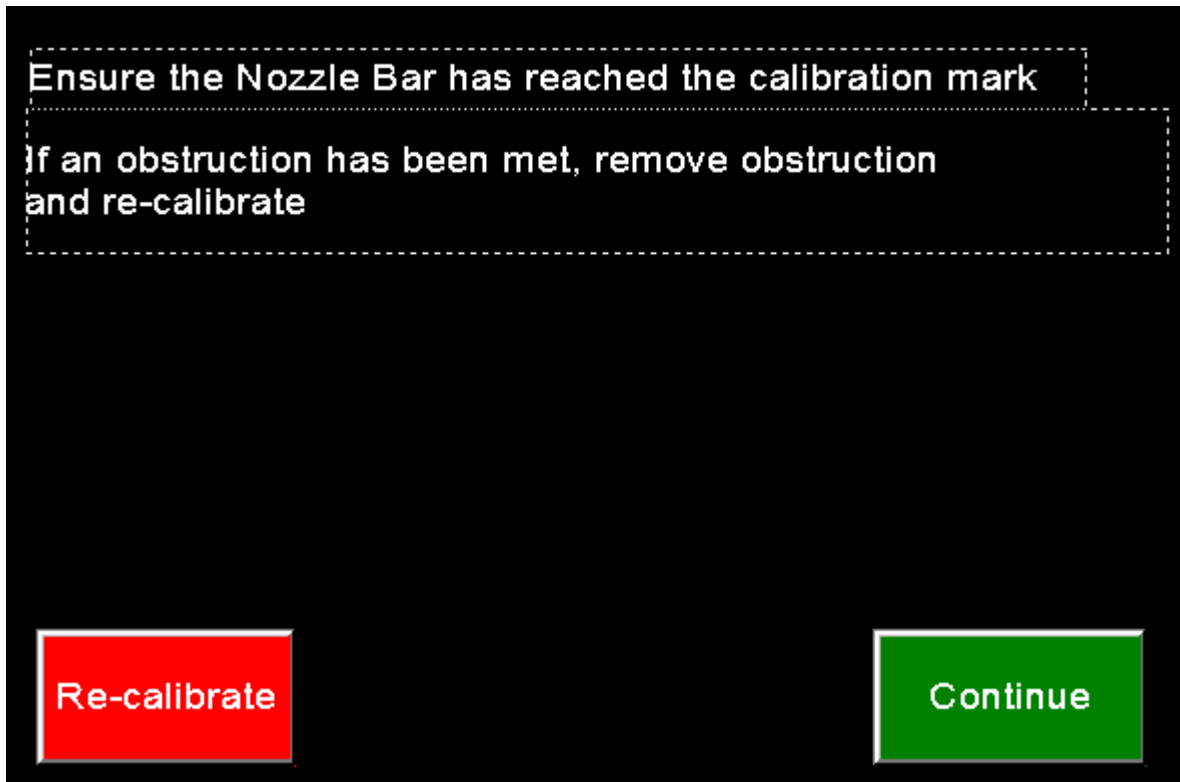
CALIBRATION SCREEN



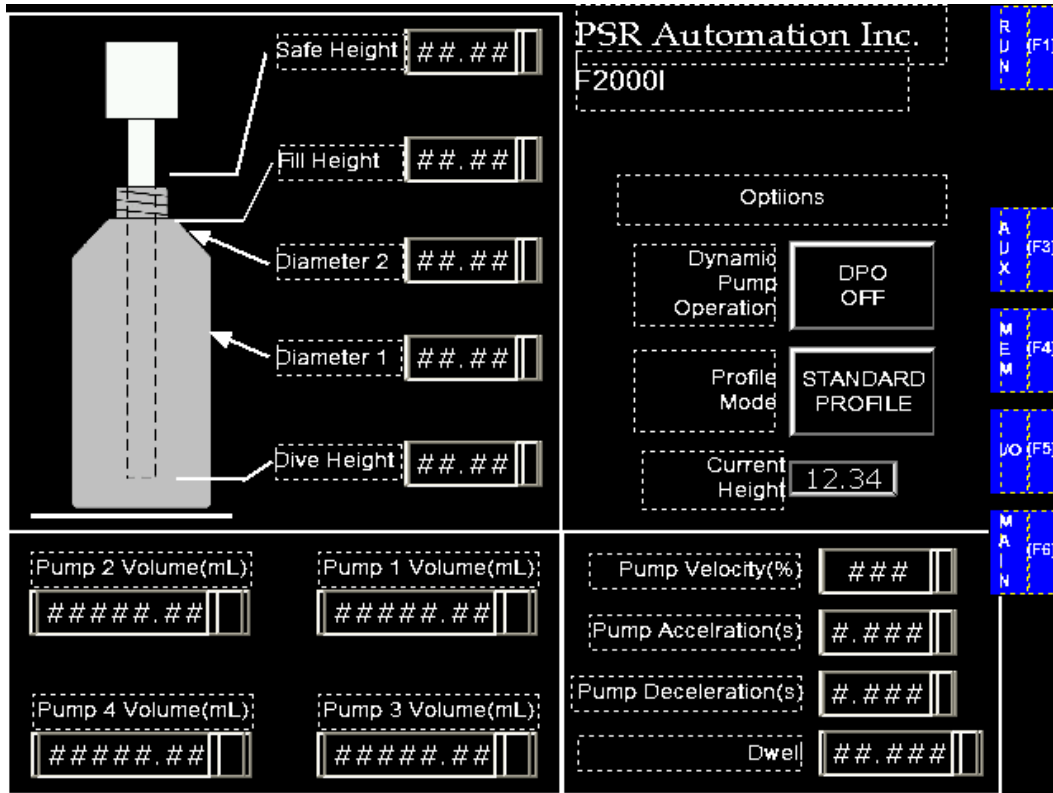
SERVOS ON- Enables the servo systems.

CAL- Calibrates the vertical servo system.

The vertical system is calibrated based on the bump stop method and monitors the torque level to the drive. It is possible for an object to get jammed in the pathway of the system, thus causing a false reading. To ensure proper calibration, a pop up instruction will appear on the screen to confirm the calibration location. The user must confirm that the Nozzle Bar has reached the designated calibration mark. If the nozzle bar is not in the correct location, the obstruction that caused the false calibration must be removed and the "Re-calibrate" button must be pressed. This will allow the system to re-calibrate. If the System is in the correct location, the user can press Continue which will allow the user to access the other screens for operating the machine.



BOTTLE / FILL SETUP SCREEN



Safe Height - The safe height of the bottle in inches. Set this value to the height of the bottle with clearance. Do not change while cycle is running.

Fill Height - The fill height of the bottle in inches. Set this value to the height of the fill level. Do not change while cycle is running.

Dive Height - The dive height of the nozzle from the bottom of the bottle in inches. Do not change while cycle is running.

Diameter 1 - The larger diameter of the bottle. This is used for calculating the profile when the machine is in “double profile” mode. It is not used when in Standard Profile Mode.

Diameter 2 - The smaller diameter of the bottle. This is used for calculating the profile when the machine is in “double profile” mode. It is not used when in Standard Profile Mode.

PUMP # mL - The volume of the product to be filled. The machine will estimate the amount of revolutions (in counts) the pump will have to make to achieve this volume. This is an estimate and it is recommended to use slightly lower values initially. The value can be tweaked in, at the the RUN screen.

Pump Velocity - This is the percentage of the maximum pump velocity. 100% is the maximum. Do not change while cycle is running.

PUMP Acceleration - This is the the amount of acceleration time (in seconds) that is used on the pump profile. Do not change while cycle is running.

PUMP Deceleration - This is the amount of deceleration time (in seconds) that is used on the pump profile. Do not change while cycle is running.

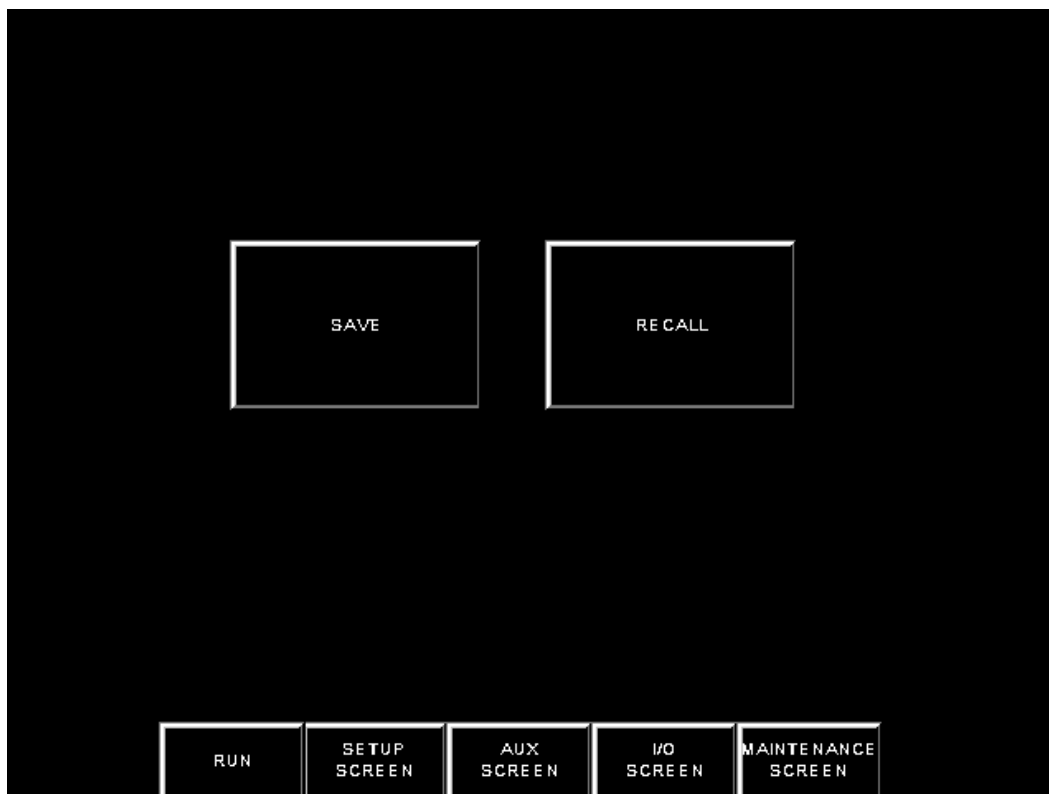
Dwell - The amount of time that the nozzle dwells in the bottle before rising upward in seconds. Do not change while cycle is running.

Dynamic Pump Operation - Activate this setting after the fill has been set and run. It will automatically adjust the pumping speeds for equal fill times. Do not activate while the cycle is running.

Profile Mode- Allows the operator to select between Standard and Double Profile Modes. Double profile

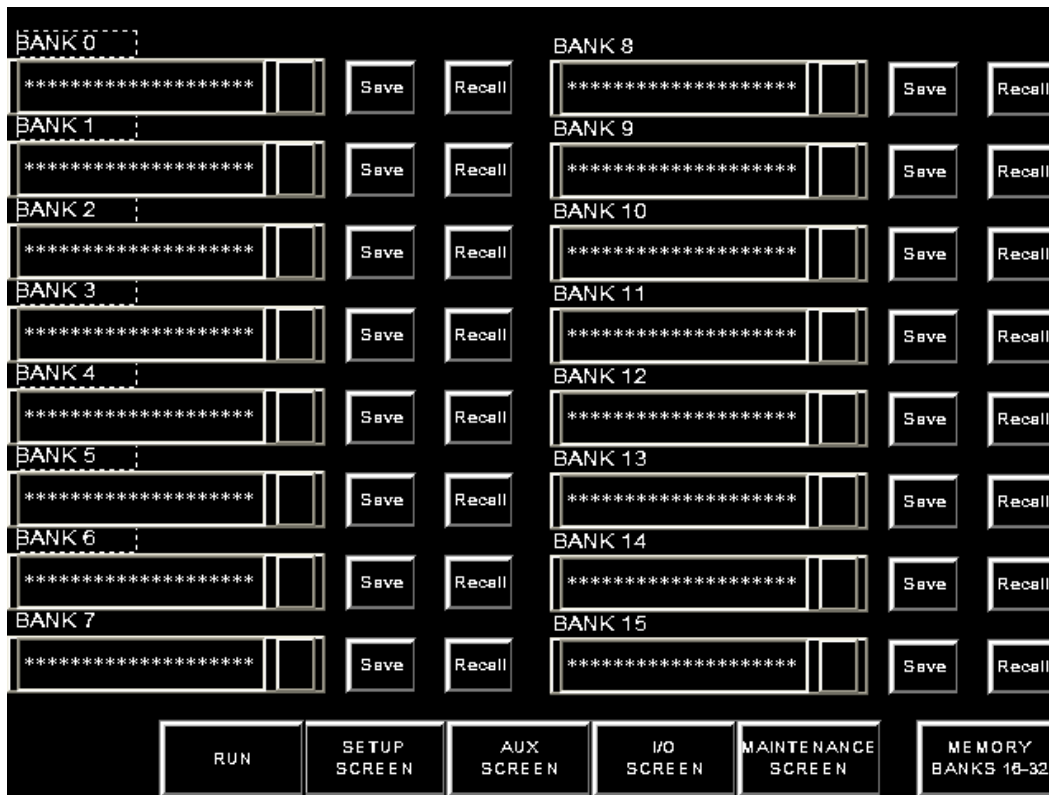
mode accurately tracks bottles with large tapers. Standard profile is recommended for most operations

MEMORY SCREEN



When entering the memory screen there are two options. Option one is to SAVE a product which requires that the user enters their password. This prevents unauthorized access to modify programs that have been previously set. The other option is to RECALL a product, which does not require a password. When this option is selected the user can recall any of the products, but cannot save any changes or new products.

NOTE: Entering SAVE will allow the user to both SAVE and RECALL products



To save a product

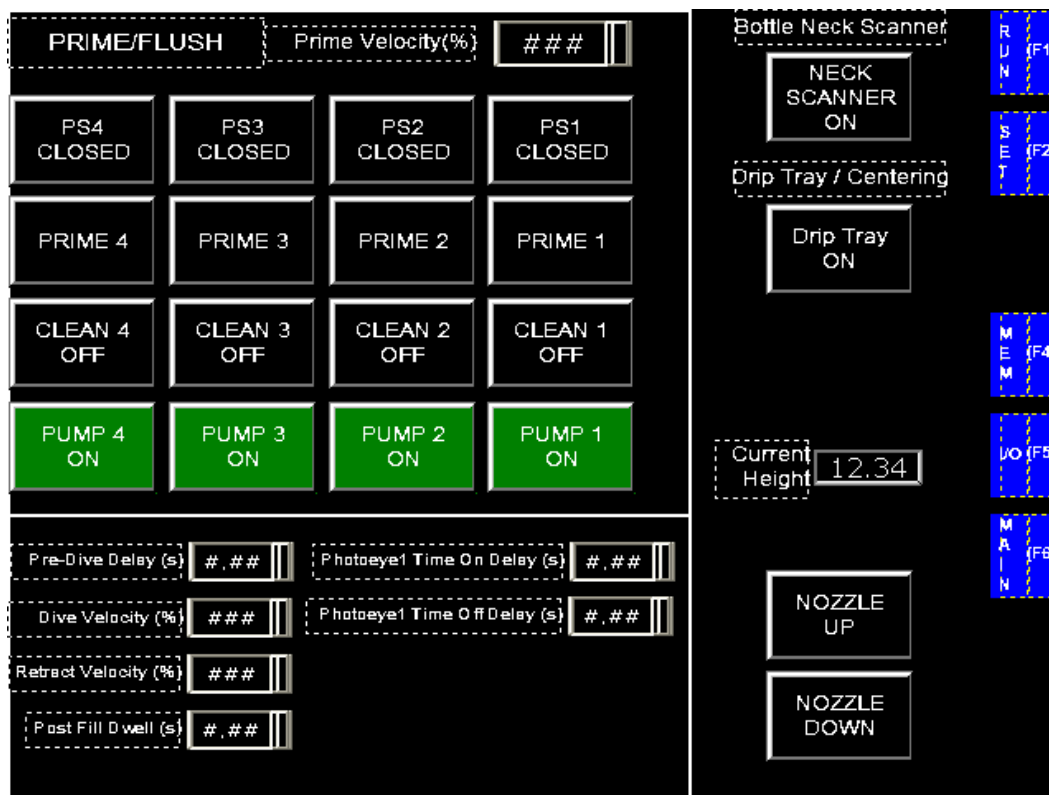
Enter the name of the product in the field to the left. Press save. The values that are in the machine will be saved to that particular field. This section is password protected.

To recall a previously saved product

Find the correct bank with the product saved. Press recall. The parameters will be recalled into the machine.

Note: Recalling a product will overwrite the current parameters. If desired, save the current product before recalling another.

AUX FUNCTIONS SCREEN



Pre-Dive Delay - This is a delay that can be set after the photoeye has detected a bottle, and before the nozzle dives to the Dive Height. This may be useful to allow bottle to “settle” before diving.

Dive Velocity - Adjust the velocity as the Nozzles travel to the Dive Height. It is advisable to set to a lower value if the bottle and nozzle diameters are close.

Retract Velocity - Adjust the velocity of the nozzle as it retracts out of the bottle. This may be useful if a product is stringy and must be slowly lifted out to break the string.

Post Fill Dwell - Amount of time that the Nozzles will Dwell above the bottles after they have been filled and before they are gated out of the filling area.

Photoeye1 Time On Delay - The ON-DELAY time for the photoeyes.

Photoeye1 Time Off Delay - The OFF-DELAY time for the photoeyes.

NOZZLE CLOSE/OPEN - Close or open the nozzle. Must be open to prime and clean machine.

Close before running machine. Do not change while cycle is running

Prime Velocity - The velocity at which the pumps will prime and clean at. 50% is usually a good starting point.

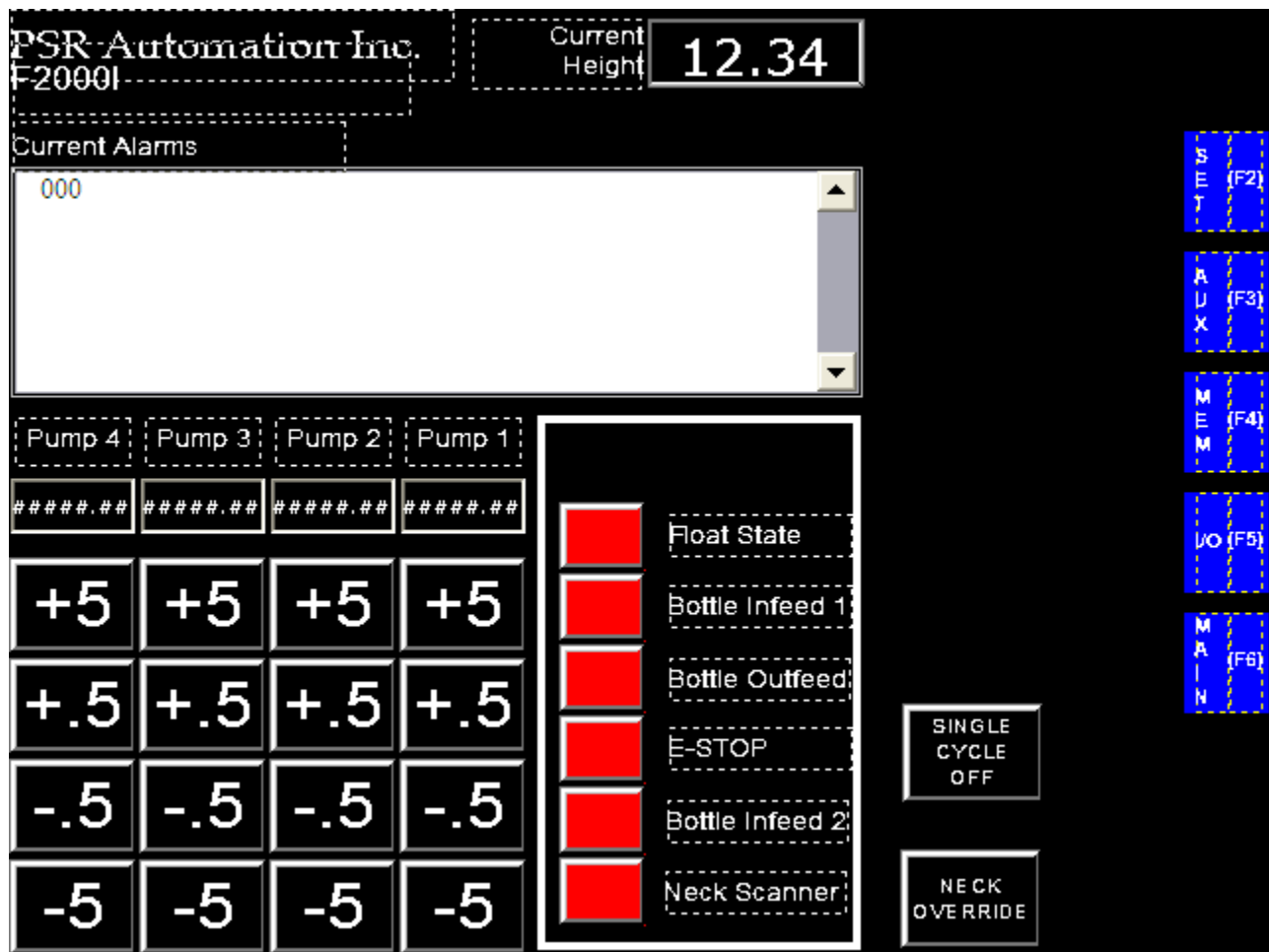
CLEAN - Continuously runs the pump at the Prime velocity. Push again to toggle off. Nozzle must be open. Do not change while cycle is running.

PRIME - Hold down to prime machine. Release to stop priming. Nozzle must be open for operation. Do not change while cycle is running.

NOZZLE UP/DOWN - Move the nozzle up and down manually after the machine is calibrated. Do not change while cycle is running.

Current Height - Displays the current height of the tip of the nozzle to the top of the conveyor. This is useful when calculating the various Fill Height parameters.

RUN SCREEN



Current Alarms - Any alarms that are currently Trigger are display on in the current Alarms Table. As the Alarms are cleared, they are removed automatically from the table.

Increment / Decrement Buttons - Increase or decrease the amount of volume by pressing these buttons. Changes take effect on next cycle.

Single Cycle - Allows the user to run one cycle. After the bottles have been gated out the machine will Stop.

Neck Override - When the Neck Scanner is active, this button can be pressed to manually override the neck scanner for one cycle.

Input States - The input states display the current input required for the machine to operate. If an indicator is red, this will signal the operator that a condition must be met before the cycle can continue.

Maintenance Screen

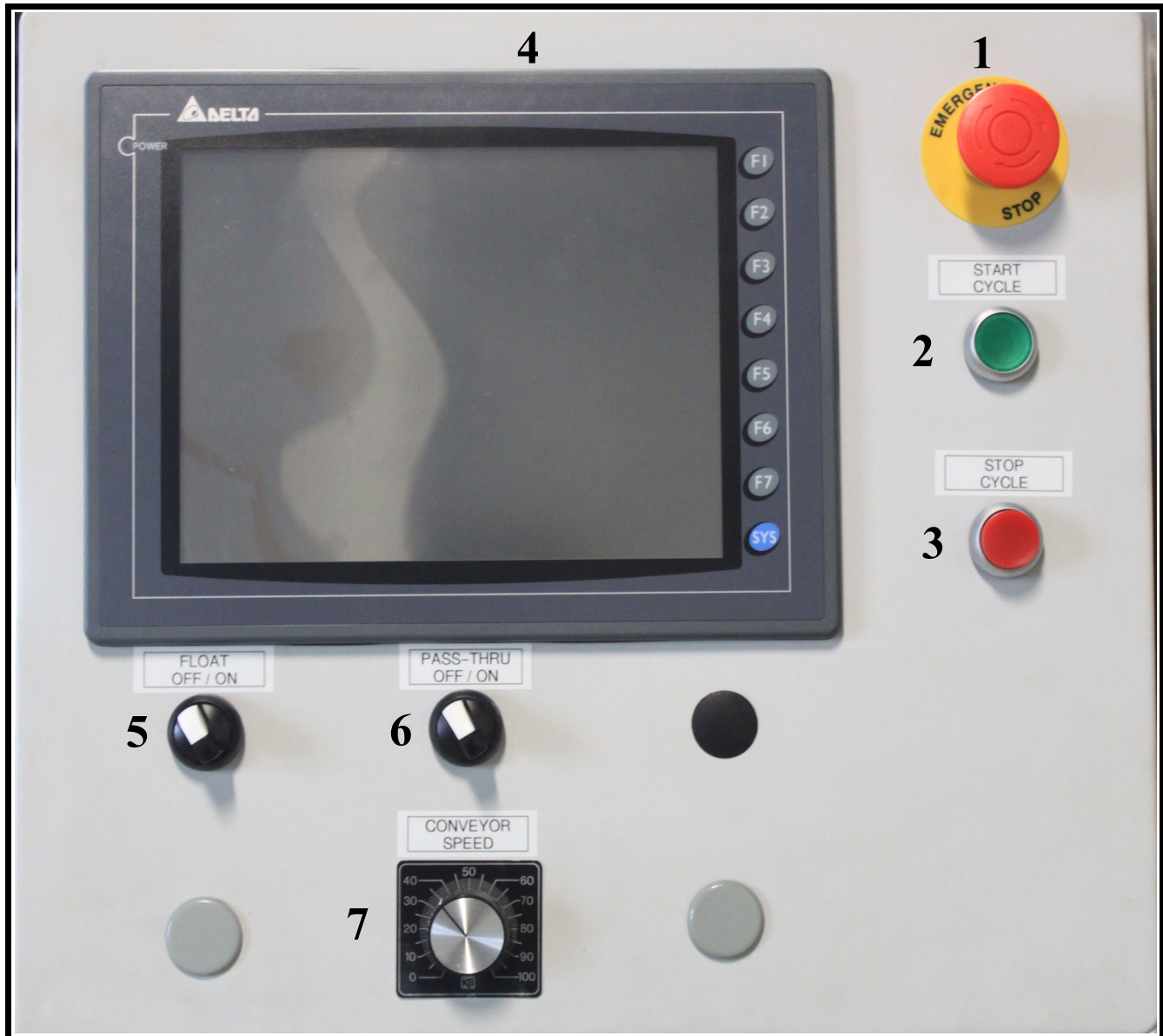


Cycle Operations - Cycle Operation is the amount of cycles that the ballscrew has made. This is useful for determining when to lubricate the system, and perform other maintenance on the machine. The current counter may be cleared by pressing the RESET button.

Current Alarms - Any alarms that are currently triggered are displayed on the current Alarms Table. As the Alarms are cleared, they are removed automatically from the table.

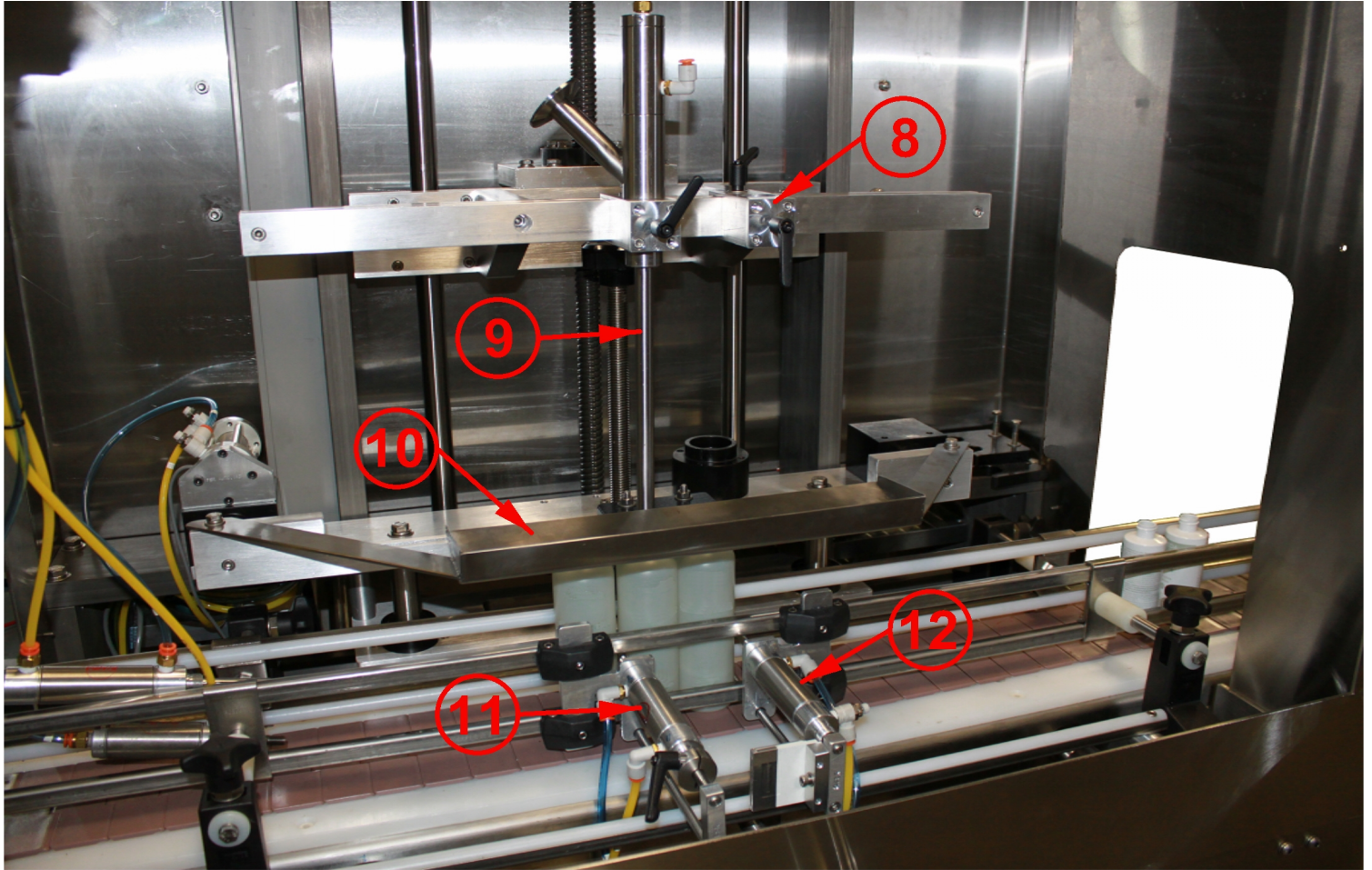
Alarm History - All alarms are stored in the alarm history. They may be cleared by pressing “Clear Alarm History” and entering the main password.

HMI Screen



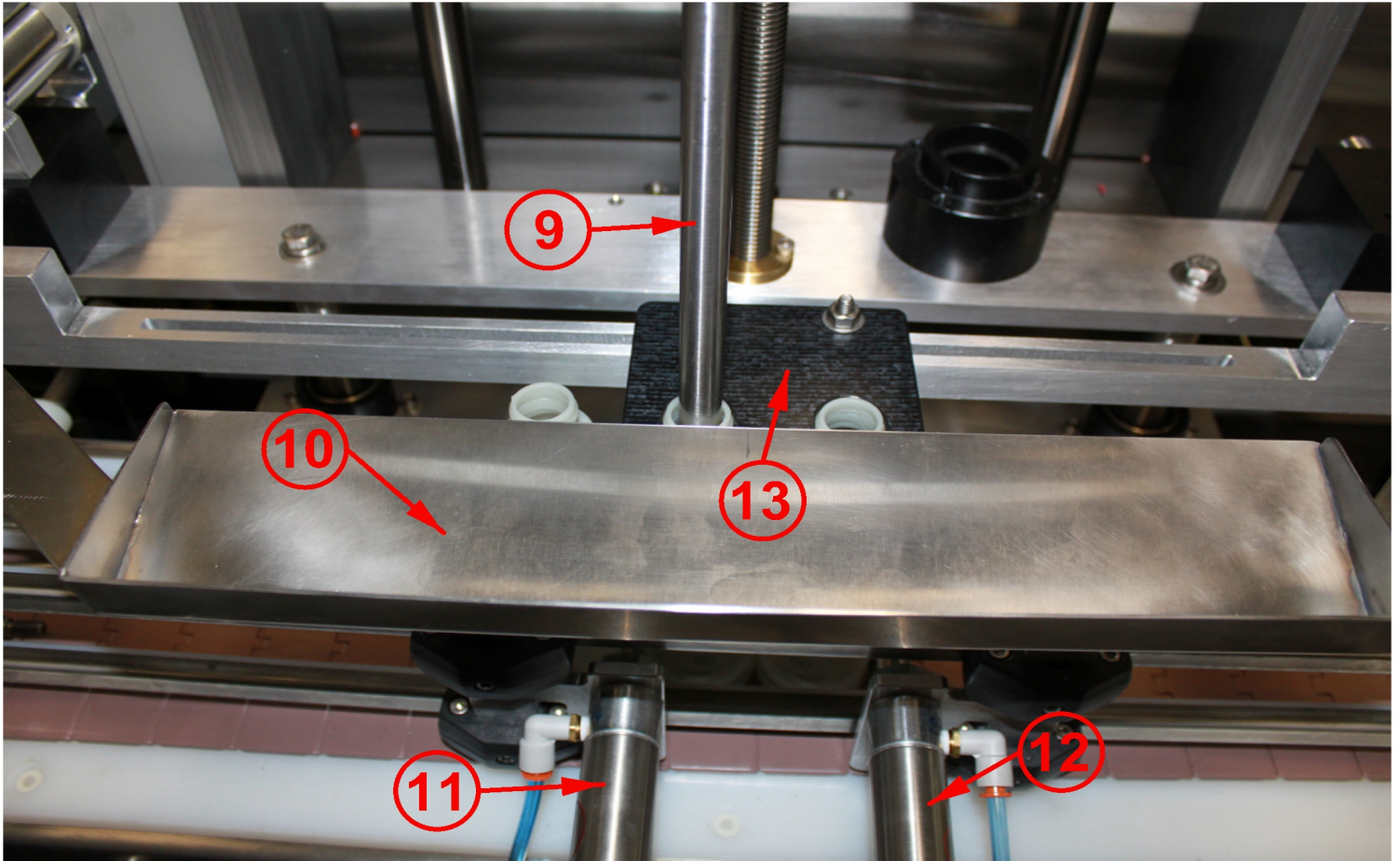
- 1) EMERGENCY STOP (E-Stop) button
- 2) START CYCLE Button
- 3) STOP CYCLE button
- 4) HMI (Touchscreen)
- 5) FLOAT OFF/ON Switch
- 6) CONVEYOR OFF/ON Switch
- 7) CONVEYOR SPEED knob

Item List of the Filling Area (Picture #1)



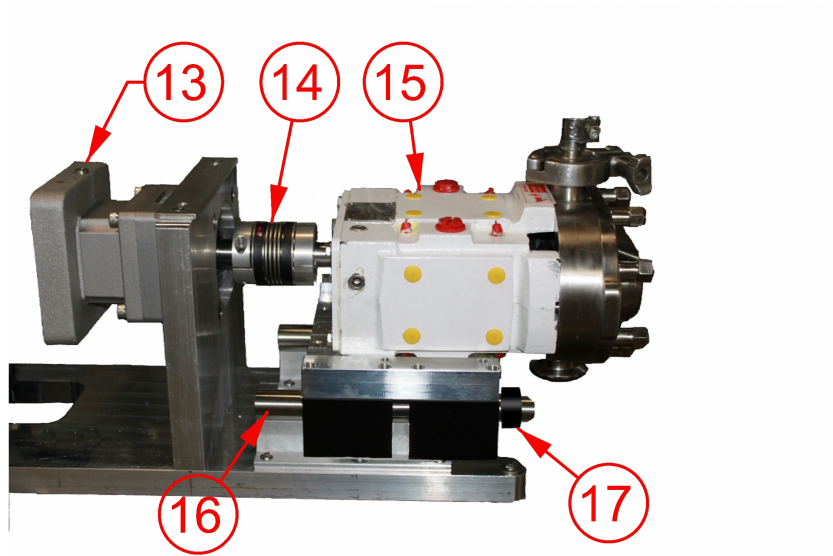
- 8) Nozzle Holder
- 9) Nozzle
- 10) Drip Tray
- 11) Left Indexer
- 12) Right Indexer

Item List of the Filling Area (Picture #2)



- 9) Nozzle
- 10) Drip Tray
- 11) Left Indexer
- 12) Right Indexer
- 13) Bottle Centering Device

Pump

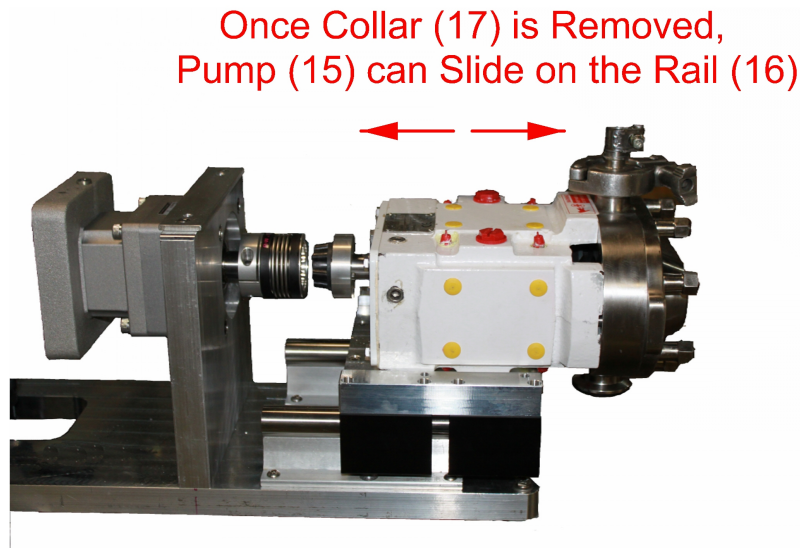


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- 13) Gearbox / Motor System
- 14) Coupling
- 15) Pump
- 16) Rail
- 17) Collar

How to Remove a Contaminated Pump For Quick Change Over

- 1) Remove power from machine.
- 2) Loosen and remove Collar (17) from Rail (16).
Warning: At this point, Pump (15) is not securely attached to the rest of machine. Pump (15) is very heavy. The operator should be careful to not drop Pump (15) onto ground.
- 3) Slide Pump (15) away from Motor (13) a couple of inches. Coupling (14) should separate into two pieces.
- 4) Slide Pump (15) off of Rail (16), and place on a level surface.



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How to Install a Clean Pump For Quick Change Over

- 1) Remove power from machine.
- 2) Slide Pump (15) onto Rail (16).
Warning: At this point, Pump (15) is not securely attached to the rest of machine. Pump (15) is very heavy. The operator should be careful to not drop Pump (15) onto ground.
- 3) Push Pump (15) toward Motor (13) until the two separate pieces of Coupling (14) mesh tightly together and form a single unit. The shaft of Pump (15) may need to be rotated by hand enable Coupling (14) to mesh properly.
Warning: Do Not rotate motor shaft, as this may strip the gearbox.
- 4) Place Collar (17) on Rail (16), and slide toward Pump (15) until it is pressed against Pump (15).
- 5) Tighten Collar (17).