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MERLIN BEER BOTTLE FILLING MACHINE



OPERATING MANUAL

10/17/11

“N”-Series with Temperature display and Tank pressure control
Bottle detection system

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WARNING:

AS WITH ALL MECHANICAL EQUIPMENT, CARE MUST BE TAKEN TO AVOID INJURY FROM MOVING PARTS WHICH OPERATE WITH CONSIDERABLE FORCE AND WITHOUT WARNING. MEHEEN MANUFACTURING SHALL NOT BE HELD LIABLE FOR INJURY OR DAMAGE RESULTING FROM THE INAPPROPRIATE USE OF THIS MACHINE OR FROM NORMAL OPERATION WITHOUT REGARD TO NORMAL SAFETY CONSIDERATIONS. MEHEEN MANUFACTURING SHALL BE HELD HARMLESS IN THE CASE OF INJURY RELATED TO THE USE OF THIS MACHINE REGARDLESS OF THE CIRCUMSTANCES AND OPERATING PROCEDURES USED.

GENERAL

The Merlin automated bottling machine is designed with quality and portability in mind. An onboard computer controls all automated functions including bottle fill levels and pressures. Standard automated features are sanitizing, cleaning, filling and crowning.

The Merlin is specifically designed for bottling carbonated beverages under cold counter pressure conditions directly from the bottling tank. Generally optimum bottling conditions are cold (30-35⁰F) and 2.0-3.0 volumes dissolved CO₂.

A compressed air source that can provide 95 psi + is required to operate Merlin as well as 110 volt AC electrical power and a regulated CO₂ source. Meheen Manufacturing suggests the use of an oil sump, reciprocating type air compressor of at least 4 HP, DO NOT use a home style direct drive oil-less compressor. Minimum air hose size is 3/8" inside diameter for a 50' hose or less and larger for longer runs. Also all devices restricting air flow, such as regulators and moisture traps should be removed between the air compressor and the bottling machine.

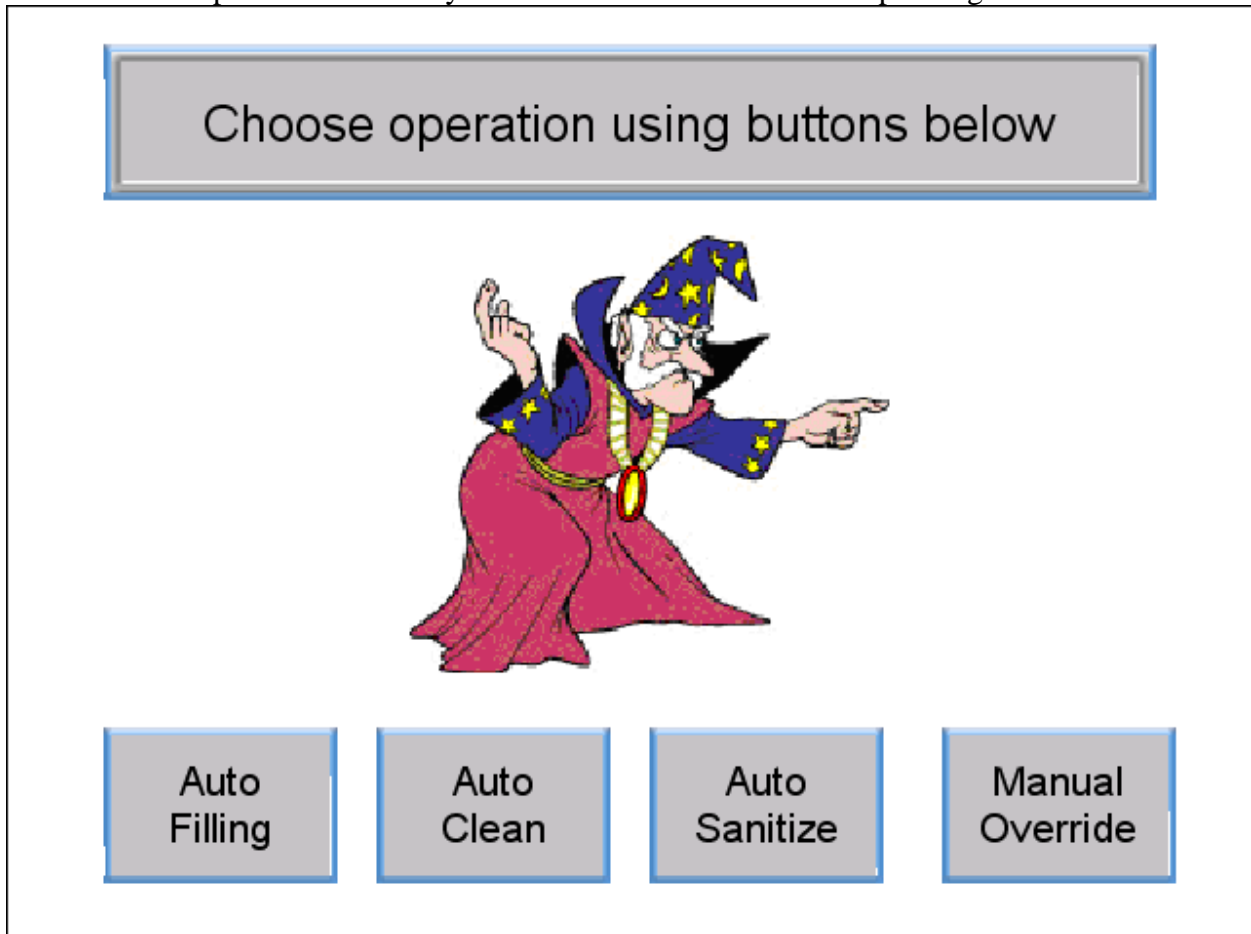
CONTROL PANEL



The control panel of the Merlin bottling machine consists of the operator interface shown above and a large red mushroom switch which is located near the bottom center of the panel. The opening screen gives information about the Merlin machine, such as Brewery Name, Serial#, interface and computer programs versions. This screen appears each time the machine is turned on. To access the main operating screen, simply touch the wizard and the screen will change to the main operating screen.

ON/OFF: Main power to the machine is turned on by pulling the red mushroom button out, and turned off by pushing it in.

MAIN SCREEN: The main operating screen shown below allows you to choose the function needed. From any of the operating screens the Reset key can be pressed and the Main button with the wizard pictured on it and you will be returned to the main operating screen.



Auto Filling, Clean, Sanitize & Manual Override: These operations are entered from the Main screen show above by pressing the desired button. When any of these buttons are pressed the screen will change to that operation. Note: The reset key must be pressed before starting any operational mode except the Manual override functions.

RESET: The RESET button is used any time the machine has been stopped, paused, or about to be started in a new mode. The RESET always returns the machine to its starting conditions for each mode. RESET must be used each time the machine enters a new operation before the machine will start any program functions and before pressing the Main screen button.

CAUTION: If the bottling machine is paused and rapidly RESET during a time when the machine has pressure in the bottle (i.e., filling), pressure in the bottles will be released rapidly without warning. Rapid release of pressure can be hazardous due to glass breakage and liquid spray.

SAFE OPERATION OF THE BOTTLING MACHINE

During normal operation of Merlin several very powerful moving parts are utilized that could cause serious injury if proper precautions are not taken. Even though bottles are designed for much higher pressures than utilized by the bottling machine, manufacturing defects can exist which can cause bottle failure resulting in breakage and potentially flying glass. Meheen Manufacturing recommends the following safety precautions be observed while operating Merlin:

- 1. Always wear safety glasses or other eye protection.**
- 2. Avoid loose fitting clothing which could become caught in moving parts of the machine.**
- 3. Keep hands and face away from moving parts of the machine at all times when air pressure is connected to the machine.**
- 4. Do not exceed 40 psi CO₂ to the machine at any time, damage to the pressure sensor will occur.**
- 5. Avoid direct water spray on the control panel and electrical parts.**
- 6. Components located inside the control panel operate on 24VDC, high voltage (100-220 Volts AC) energy is converted by a power supply located on the cord. DO NOT open the control panel or power supply when plugged in.**
- 7. Service of electrical components should be referred to qualified personnel only.**

PROCEDURE FOR CLEANING AND SANITIZING:

Even though the products mentioned in this procedure are supplied by Birko Corporation any brand could be used. Birko products can be purchased from:

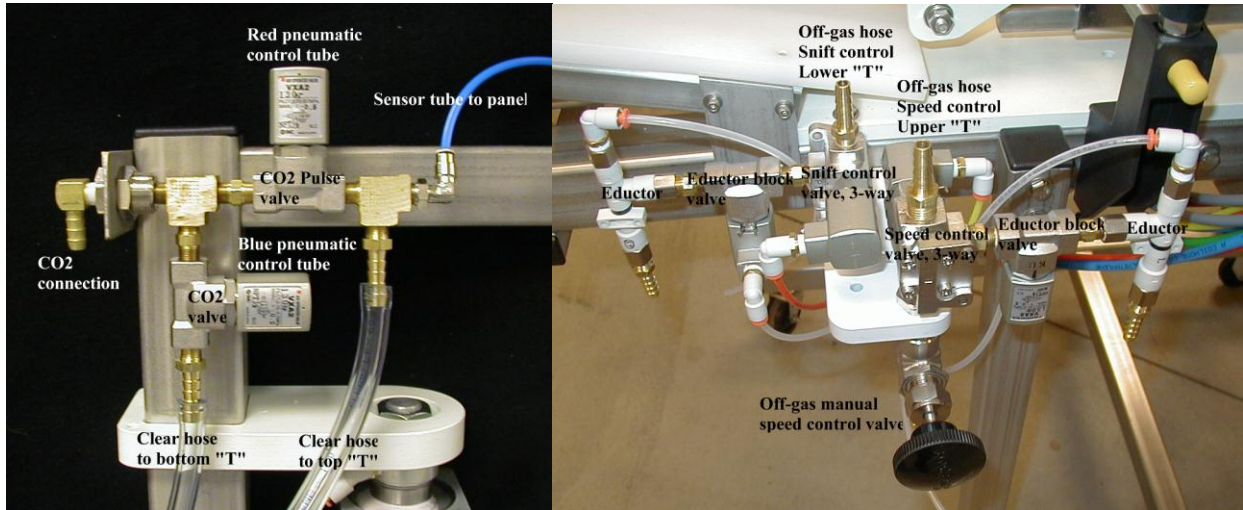
Birko Corporation
9152 Yosemite St.
Henderson, CO 80640-8027
(800) 525-0476

1. Dissolve four ounces (one-half cup or about 125 grams) of Birko CELL-R-MASTER in 5 gallons of 120-130⁰F water.
2. For light-duty cleaning, circulate the CELL-R-MASTER solution through the machine for a minimum of 2-4 minutes. For heavily soiled machines, circulate the solution through the machine until clean. Do this by operating the machine in the Sanitize mode as many times as needed.
3. Drain CELL-R-MASTER solution, and then rinse the machine with ambient or warm water until the pH of the rinse water is the same as the pH of the tap water. For final rinse, operate the machine in the Clean mode to blow out the tubing before storing the machine.


- Prior to bottling, sanitize using an appropriate no-rinse sanitizer such as Chlorine Dioxide (ClO₂) or Peracetic Acid (PAA). Operate the machine in the Sanitize mode.

To remove beer stone (Calcium Oxalate) deposits, the use of an acid product such as Acid Brite No.2 (Phosphoric/Nitric blend) is recommended. Run 1 ounce (30ml) of acid per gallon of warm (120⁰F) water for a minimum of 2-4 minutes prior to CELL-R-MASTER.

OPERATIONAL SUMMARY



SANITIZING:

Main Menu 	RUN	PAUSE	FAIL
Reset	AUTO SANITIZE Connect product hose from the supplied pump to the distribution manifold at the top of the machine. Place the pump in sanitizing solution and plug it in. When you start the sanitizing cycle the machine will index a row of bottles under the filling head and the fill valve will open for 1 minute. This process is performed for two rows of bottles. When sanitizing is complete you will be prompted that sanitizing is complete.		
Sanitize Off/On	LOOK UP TEXT		

1. Mix a sufficient amount of sanitizing solution (about 5 gallons) to keep the pump submersed during sanitation. Most sanitizing solutions which require less than 2 minutes of contact time to be effective can be used.
2. Connect air pressure to the bottling machine before loading caps or connecting the sanitizing pump to the machine.
3. Fill cap feed ramps with caps, seal side down.
4. Connect the hose to be used for bottling between the sanitizing pump and the beer distribution manifold on the bottling machine. Be sure to clamp both ends of the hose securely.
5. Disconnect the 5/32" liquid line pressure sensor hose (small tubing) from the pressure sensor located in the bottom of the control panel. To disconnect the hose, depress the collar of the tube fitting and pull the hose out. Place the end of the hose you just disconnected below the machine into a bucket or drain. Sanitizing solution will flow through this line when the pump is started.
6. Place three rows of four bottles on the bottle runway at the base of the bottle feed ramp. When the bottling machine is started it will automatically index the bottles to the filling and crowning stations.
7. Press the RESET button on the interface and the "System is Reset" message will appear at the bottom of the screen.
8. Place the sanitizing pump into the bucket of sanitizing solution and plug it in.
9. Press the Sanitize Off/On button to begin the sanitizing cycle. The button will change color from red to green and the green RUN light will illuminate at the top of the screen. A message in the bottom message bar will have the word "Sanitizing" displayed. The machine will automatically perform two 1 minute sanitizing cycles then stop illuminating the PAUSE light and display in the message box "Sanitizing Complete".

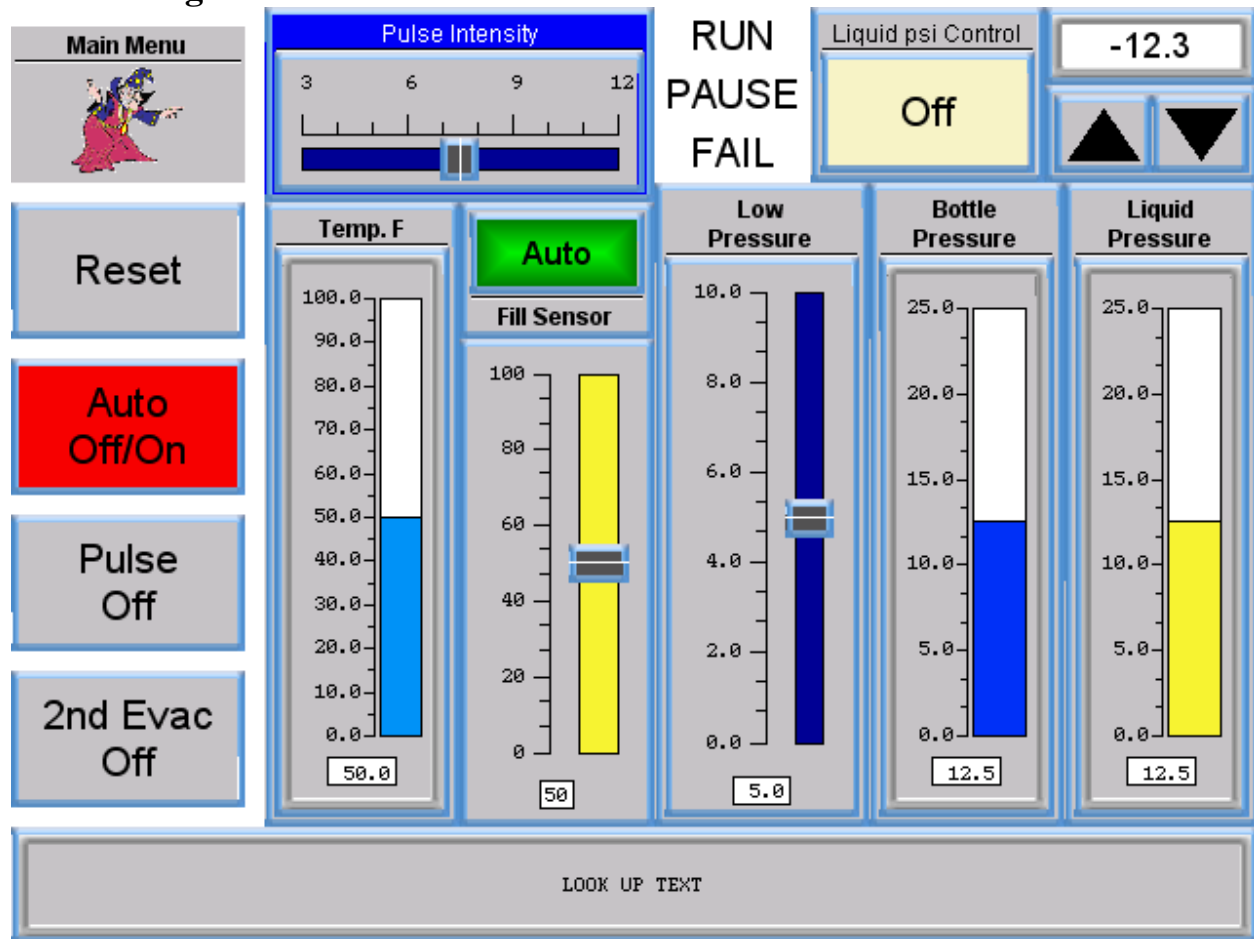
CAUTION: The bottle filling head will come up without warning to index the next row of bottles. Keep hands and face away from moving parts at all times.
10. Bottle caps in the cap feed ramps will automatically feed into the capping head each time the capping head cycles to the up position. The cap feed ramps hold enough caps for 2-3 cases of bottles. More caps can be added to the cap feed ramps at any time.

11. The machine automatically stops at the end of the second sanitizing cycle with the filling heads down. The amber pause light in the center of the interface will be lit when the cycle is complete and the message display will read “Sanitizing Complete”. Press the Sanitize button to turn the program off. The button will turn Red and the message display will show “System is Reset”. Do not remove bottles filled with sanitizing solution from the bottling machine as they will be needed for weight to provide proper bottle feeding when starting the automatic bottling cycle. When the Sanitize cycle is complete, unplug the pump to stop solution still being pumped through the liquid pressure sensor hose. You may now press the “Main” button with the wizard’s image to return to the Main Operation menu.
12. Allow the liquid pressure sensor hose from the beer distribution to drain before connecting to the control panel. After the pressure sensor hose is drained reinstall it on the bottling machine by pushing the hose firmly into the fittings on the sensor and beer manifold. **Note:** The tubing is often difficult to push into the fittings. You should feel the tube slide into the fitting and seat when it is installed properly.

BOTTLING:

1. Connect the hose from the distribution manifold of the machine used for the sanitizing cycle to the product dispensing tank. Be sure to clamp both ends of the hose securely. Open the dispensing tank valve very slowly when first charging the line. If the tank valve is opened too fast, severe damage may occur to the beer line pressure sensor.
2. Connect the CO₂ supply to the CO₂ inlet on the top of the bottling machine and adjust the pressure to 30 psi for the 4 head machine and 35 psi for the 6 head. This CO₂ source is used to purge the bottles, bring them to counter pressure and pulse the full bottles. **DO NOT EXCEED 40 psi to avoid damage to pressure sensors on the machine.**
3. Adjust the CO₂ pressure applied to the head space of the dispensing tank 1-2 psi above the tank equilibrium pressure or an adequate level to dispense the product into the bottles.
4. Place 4-5 rows of bottles on the sloped bottle feed ramp to begin the bottling process. The full bottles from the sanitizing cycle should remain on the machine until enough full bottles have accumulated on the machine to keep the bottle feeding system operating properly. As full bottles accumulate on the exit portion of the machine more bottles can be added to the bottle feed ramp. The full bottles provide the needed friction for the bottle gravity feed system to operate properly, and keep the bottles being indexed from sliding too far and misfeeding. Once the machine is operating in the bottling mode, at least 6 rows of full bottles must be maintained on the exit portion of the machine.

Auto Filling:



- The Auto Filling screen is shown above and consists of three slide bars, two pressure meters, manifold temperature display and Auto Off/On, Rest, Pulse, 2nd Evac, Liquid psi Control buttons and Liquid psi arrow key adjustment with pressure display. The first time the machine is turned on, the Fill Sensor will be in the Auto mode and the slide for the Manual mode will always default to “10”. This is quite sensitive for fill detection at low filling speeds. When the Fill Sensor is in the Auto mode, it will automatically adjust to changing pouring conditions and is not adjustable by the operator. Should the Auto Fill Detection fail to work properly, it may be changed to Manual adjustment by pressing the selector button at the top of the Fill Sensor. The color of the button will change from green to blue and the text will change to Manual indicating the mode change for Fill Detection. As filling speeds are increased in the Manual mode, the Fill Sensor will need to be raised to a higher number to ensure the bottles are completely filled. The “Low Pressure” slide is used to adjust how much pressure is in the bottles when the filling heads are raised, or the pressure at which the Pulse will occur. It is generally recommended to operate the Low Pressure as low as possible and still maintain a 1 second or less time from when the filling valve closes until the filling heads are raised from the bottles. If the filling heads remain in the bottle more than 1 second after the filling valve has closed, you need to raise the Low Pressure until the 1 second has been met. The two pressure bars simply display incoming product pressure to the machine and the pressure in the bottle. It can be used for adjustments to the machine or trouble shooting any problems such as “counter pressure fail” or fill detection issues.

6. The Merlin control panel also displays temperature in the product manifold located at the top of the machine. This temperature display simply lets the operator observe the incoming temperature of the product and can be used to help with determining proper pressures in the liquid tank.
7. A button labeled “Liquid psi Control” is located in the upper right hand portion of the display. This button turns on and off the controls to adjust CO2 dispensing pressure in the head space of the tank based on liquid manifold pressure at the machine. This function is optional and intended to help resolve dispensing pressure drops that can occur using manual style regulators. To utilize this feature, an independent CO2 source, different from the one



used for the bottling machine, is connected to the control valve inlet (see photo). The inlet pressure should be set at 30-35psi from the CO2 source. A hose will need to be connected between the control valve and head space of the dispensing tank.

How “Liquid psi Control” (LpC) works, is when connected to a CO2 source and the head space of the dispensing tank and the system is activated by pressing the “Liquid psi Control” button. The computer initially records the static liquid pressure at the manifold and displays that pressure as the set point above the adjusting arrow keys. Using the arrow keys you can adjust this set point up or down as needed. Each cycle, before the product valve opens the computer, will sample the manifold pressure and turn the CO2 control valve

on or off as needed.

NOTE: This system is limited to a maximum control pressure of 14.9 psi and only operates when the filling process is running. It does not function when the machine is paused.

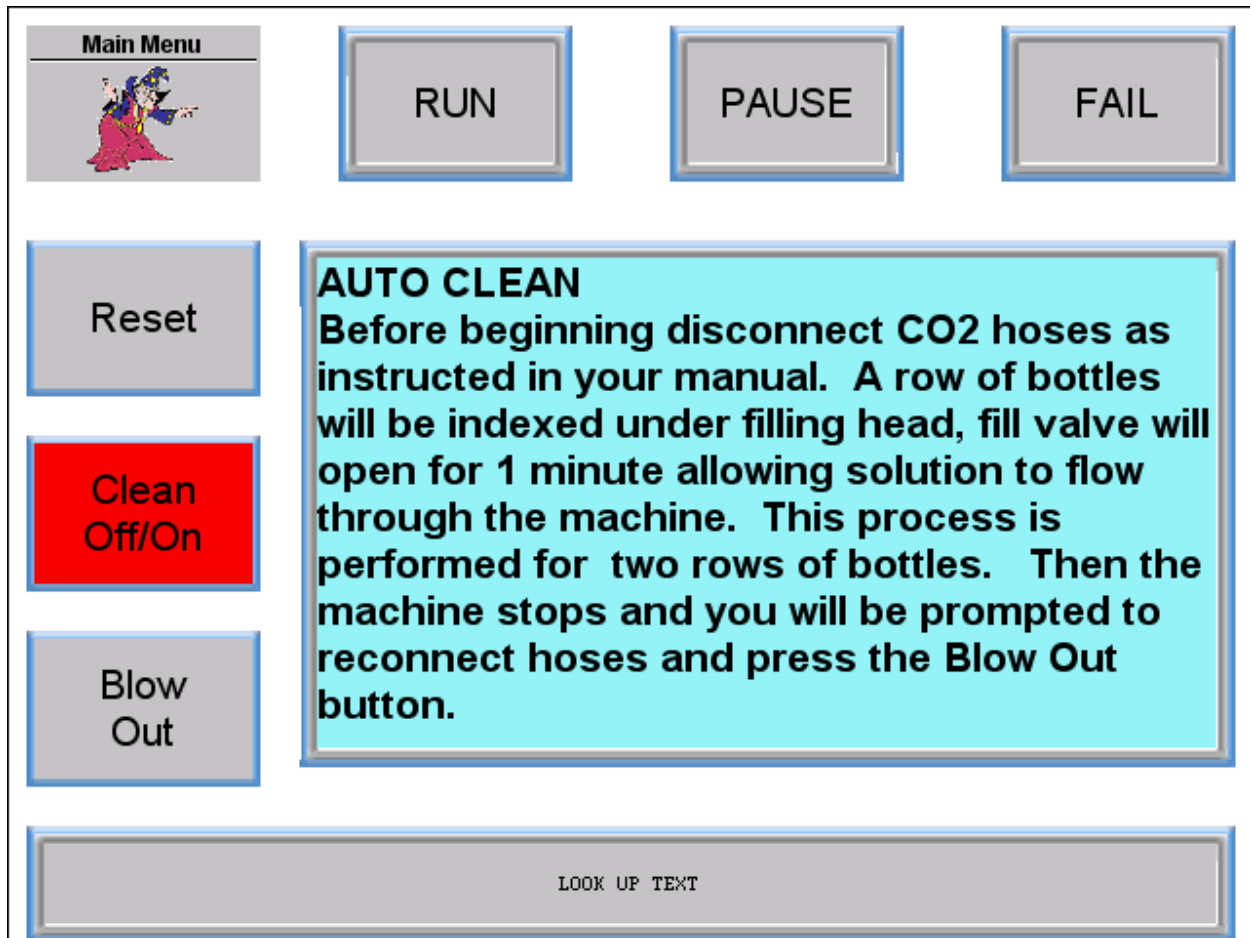
8. Press the RESET button on the operator interface and the message display should read “System is Reset”. Press Auto Filling to start the machine in its automatic filling and capping mode. The message display will display “Automatic Filling”, the RUN light will be illuminated and the Auto Filling button will change from red to green. To adjust the Low Pressure and Fill Sensor simply move the slide bars to the desired amount. Adjusting the Fill Sensor to a higher value makes it less sensitive and a lower value makes it more sensitive.
- 2nd Evac (Optional): When turned on, this button will cause the machine to do the first evacuation of the bottles, then put CO2 into the bottles, then evacuate the bottles a second time before counter pressure of the bottles takes place. Using this feature slows production rates slightly, but ensures the lowest air pickup to the product.

- PULSE (Optional): Generally it is recommended to operate Merlin in the Auto Filling program with the PULSE button off. When the PULSE button is on, a rapid pulse of CO₂ is blown into the bottles after they are filled. This pulse creates seed bubbles in the beer and causes foaming prior to capping the bottles. The Low Pressure adjustment described above is the amount of pressure left in the bottles when the pulse takes place. The intensity of the pulse is controlled using the horizontal slide bar labeled “Pulse Intensity”. The pulse intensity is adjustable from 3-12, with 12 being the highest level available. If the PULSE is turned off the machine uses the Low Pressure setting as the pressure in the bottles when the filling heads will be raised. The PULSE can be turned off and on during the automatic fill program as needed.

NOTE: The first bottles off the bottling machine will contain sanitizing solution. Be sure to set those bottles aside so they don't get mixed up with bottles containing beer.

6. The bottle fill rate is adjusted by using the off-gas flow regulator valve located just below and to the left of the control panel. Closing this valve slows the flow of liquid into the bottle, while opening the regulator increases the rate of fill. The fill rate should be slow enough that the liquid does not foam while the bottles are filling.
7. Once the machine is operating, you can adjust the fill sensitivity as needed to get consistent fills, and the Low Pressure as needed to control foaming along with turning the PULSE on or off.
8. To pause the machine at any time during automatic filling, press the Auto Filling button and the machine will stop in the safe shut down configuration, releasing pressure from the bottles with the filling head down. When the Reset button is pressed the machine will reset and the filling heads will go up. Once the machine has been reset you can start another Auto Filling operation by pressing that button or press the “Main” button with the wizards image to go to the main menu.

AUTO CLEANING:



1. Make sure the air and power are still connected to the machine and enough filled rows of bottles remain on the machine for proper feeding. Also leave at least 3 rows of empty bottles on the bottle feed ramp.
2. Connect the product hose to the sanitizing pump ensuring the other end is connected to the product manifold on the bottling machine.
3. Immerse the sanitizing pump in an adequate volume of clean water or cleaning solution. Most cleaning solutions are acceptable with the exception of acid based materials that can damage the internal parts of valves used in the off-gas system. Remember you will be filling 2 rows of bottles and washing through the off-gas system.
4. Disconnect the 5/32" liquid pressure sensor hose (small tubing) from the pressure sensor located in the bottom of the control panel. To disconnect the hose, depress the collar of the tube fitting and pull the hose out. Place the end of the hose you just disconnected below the machine into a bucket or drain. Cleaning solution will flow through this line when the pump is started in the next step.

5. Disconnect the CO₂ purge and pulse hoses from the top of the machine and place the ends in a bucket or to a drain. Cleaning solution or water will flow through these hoses when the sanitizing pump is plugged in.
6. Plug in the sanitizing pump.
7. Be certain you have at least 3 rows of empty bottles on the machine and press the Clean button. The machine will begin the program and “Cleaning” will appear in the message display and the Clean button will change from red to green. The RUN light will also be illuminated.
8. During the cleaning cycle it is acceptable to hose off the machine and bottling area. Care should be taken to keep water from splashing on the control panel and electrical devices.
9. The cleaning cycle will fill 2 rows of bottles with solution flowing through the CO₂ purge and pulse hoses removed in step 5 as well as from the valves under the machine. At the end of the second cycle the machine will stop with the filling and capping heads down and the operator interface will display the following instruction “Reconnect hoses and/Reset to continue”. Reconnect the CO₂ purge and pulse hoses and press the Blow Out button. The machine will index one more row of bottles, the filling and capping heads will come down and CO₂ will flow from the system for 15 seconds to complete the cleaning. When cleaning is complete the fill head and capping head will remain down and “Cleaning Complete” will be displayed in the message display. The filling heads can be raised by pressing the Clean button to turn off the cycle and pressing the Reset button.
10. When the cleaning cycle is complete, unplug the pump, as cleaning liquid will continue to flow through the pressure sensor hose until the pump is unplugged. Leave the beer line pressure sensor hose disconnected from the pressure sensor and hang vertically to promote draining.
11. During the cleaning cycle the off-gas regulating system is flushed and blown out with CO₂ and should be clean. No other cleaning of this system should be required.
12. When the cleaning cycle is complete, be sure to remove all bottle caps from the cap feeding ramps before disconnecting the air supply. If caps are not removed from the machine when the air source is disconnected, they will all fall into the capping head and jam the cap feeding mechanism. Also pull rubber bottle seals down or remove them and clean behind them so that no moisture remains behind the seals.
13. After the cleaning cycle is complete, it is recommended that excess moisture and debris be blown off the machine using compressed air. The bottler is now ready to be stored for the next use. **Never use high pressure air, gas or city water to blow out the fill manifold while the 5/32” pressure sensor hose is connected to the bottom of the control panel. Damage to the pressure sensor due to over pressurization is not warranted by Meheen Manufacturing.**

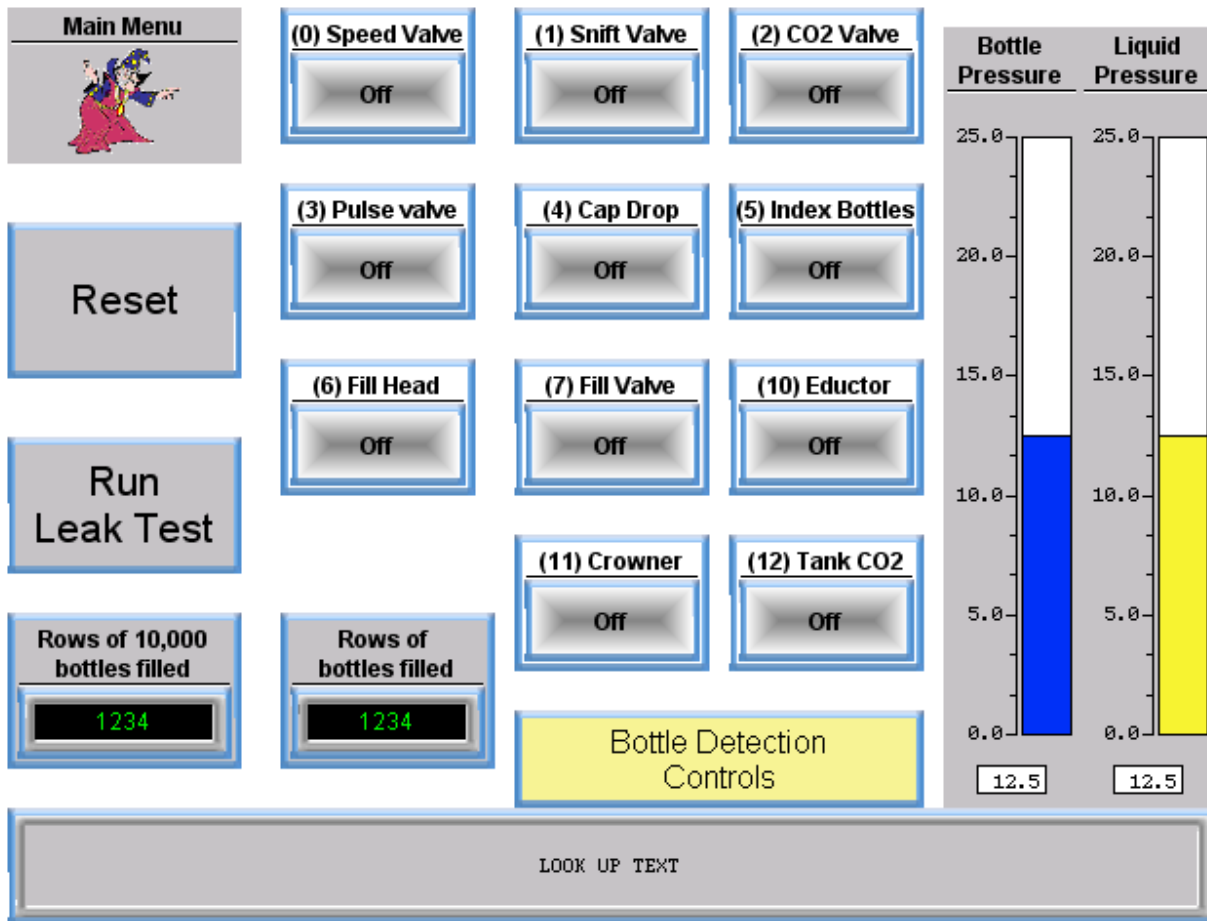
CLEANING:

Auto cleaning does a good job of rinsing the internal parts of the bottling machine and leaves it relatively clean; however, we recommend extra cleaning be performed on a regular basis to ensure good quality of your beverages and to avoid contamination. For this cleaning the filling head, distribution manifold and fill tubes should be removed from the machine and washed in a warm caustic or PBW solution which will remove protein and other contaminants from internal surfaces. The frequency of this type of cleaning will depend on the beverages and amount of use, as well as the cleaning requirements of your facility.

1. With the machine turned off, and all product lines, air, CO₂ and electricity disconnected, disconnect the pressure sensor hose and the clamps and hoses connected to the bottom of the manifold. Remove the liquid manifold by removing the two bolts that secure it to the frame.
2. Loosen or remove the screws for the tubing support clamps on the front of the filling head carriage. Then, disconnect the tubing from the front of the filling head by pressing in on the fitting collar while pulling the tubes out. Remove the filling head from the carriage by removing the two bolts that secure it to the carriage.
3. Remove the silicone filling tubes from the stainless steel filling tubes and discard them. Remove the filling tubes from the filling head carefully to avoid bending them. Remove rubber bottle seals.
4. Place the manifold, filling head and filling tubes in a container with the cleaning solution. Cleaning solution may be circulated with the sanitizing pump provided the operating temperatures and cleaning solution used is compatible with the pump specifications. If the sanitizing pump is used to circulate cleaners, be cautious and take all safety precautions to avoid being splashed by hot cleaners.
5. After cleaning is complete, rinse all parts thoroughly with water to remove all cleaner and reassemble the machine. Always flush the inner surface of the crowning heads thoroughly with water to remove any residual beverage deposits which may cause contamination.

Manual Override:

A Manual Override system is incorporated into the control system of the Merlin bottling machine, which allows you to operate any function on the machine without operating an automated cycle. Manual overrides are very useful for adjusting the machine for new bottles, trouble shooting components and verifying the operation of sensors. The overrides are accessed from the Main Menu by pressing the Manual Override button.



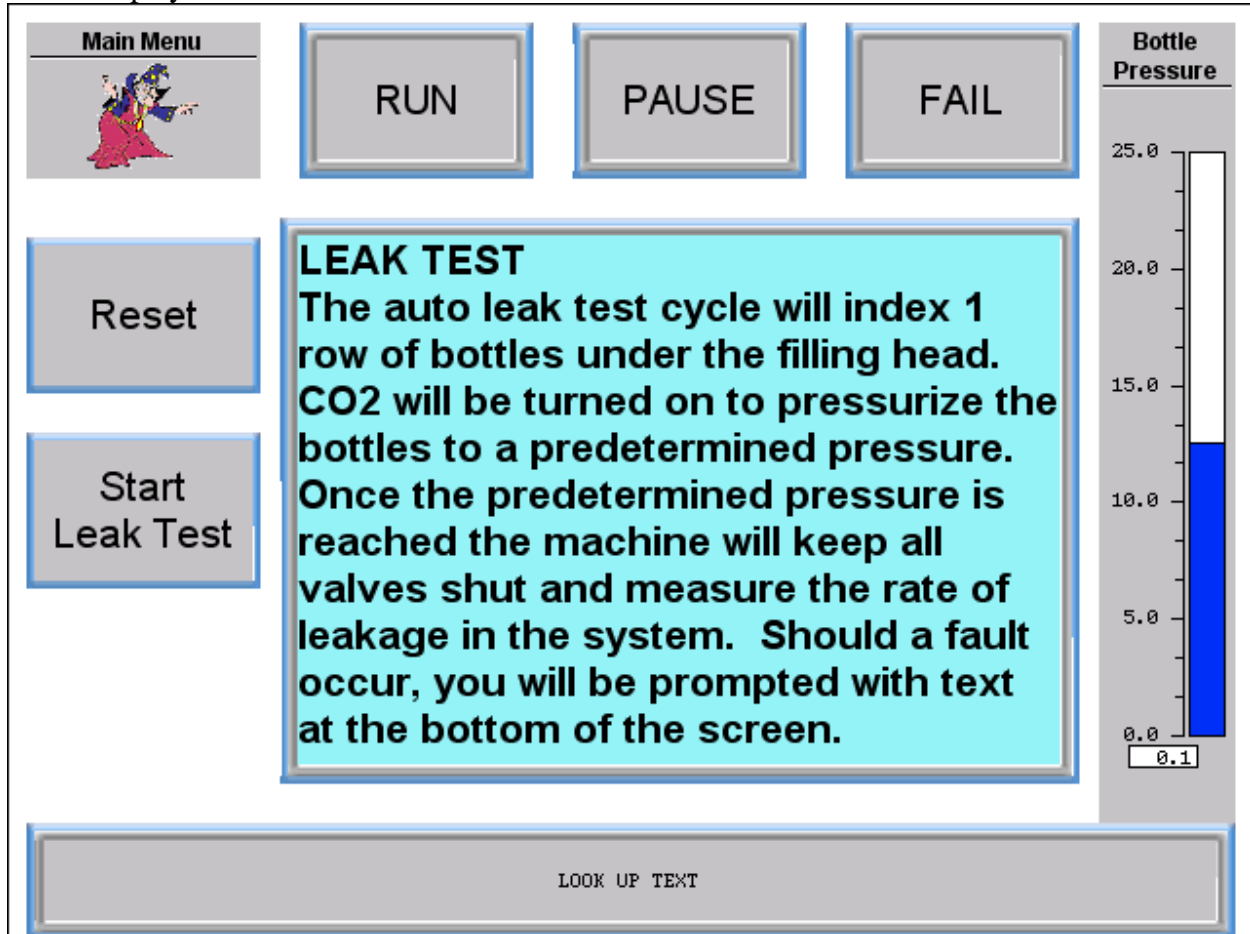
From the Manual Override screen shown above you can actuate any of the items on the machine by simply pressing the labeled buttons. The activated button will turn green while pressed indicating it is activated. The corresponding item on the machine should respond while activated. The “Bottle Detection Controls” button will load that page on the screen, see page 23.

At the right side of the screen is the Bottle and Liquid pressure meters which will indicate the pressure applied to each of the sensors in the control panel. These displays are very useful to verify proper operation of each of the sensors which are critical for proper operation of the bottling machine.

At the bottom of the screen the Rows of 10,000 and Rows of bottles are displayed. By multiplying the number displayed in the left counter by 10,000 and adding it to the counter on the right you can determine the total rows of bottles filled.

Run Leak Test:

From the Manual Override screen press the Run Leak Test button and the following screen will be displayed.



Place bottles on the machine so that empty bottles will be indexed under the filling head when the machine is started. Have compressed air and CO₂ connected to the machine as you normally would and press the Start Leak Test button to begin the leak test. Bottles will be indexed under the filling heads and pressurized with CO₂ and you will see the pressure rise at the right of the screen. A leak test is performed by bringing the bottles up to a certain pressure and monitoring if pressure is lost or gained over time. If pressure is lost or gained at such a rate that a leak is detected the leak test will be terminated, the red FAIL light will flash and a text message will be displayed at the bottom of the screen to identify the problem. This test can determine if a CO₂ valve or other valve is leaking into the system causing the pressure to increase as well as pressure leaking out of the system. Pressure increasing can be CO₂ leaking past one of the valves or possibly compressed air entering the system through a failed off-gas valve. Pressure leaking out of the system can be any mechanical connection, seal or valve and is the most common type of leak.

[To return the machine to normal operation, press the Start Leak Test button to turn it off and press reset, then the Main button to return to the main menu. Once a leak test is stopped, it cannot be restarted except from the Manual Override screen.]

ADJUSTMENTS OF THE MACHINE

BOTTLE INDEXING & FILL HEAD ALIGNMENT:

This adjustment is made only if it is determined that the bottles are not indexed far enough or are indexed too far in relation to the capping head. To determine if this adjustment is correct, place four bottles under the capping head then place two rows of four bottles under the fill head and lower the crowner head completely to locate bottles. **(NOTE: Make sure the power and air are disconnected.)** Reach under the bottle feed ramp of the machine and push the bottle indexing bar forward until it is fully extended and push the twelve bottles on the machine back against the pushing bar, being careful not to move the pushing bar. Manually lower the capping head. The holes in the head should be centered with the tops of the bottles directly below them. The bottles directly under the filling head should also line up with the holes in the bottle locating guide. If the bottles are not centered, and adjustment is necessary, follow these steps:

1. To adjust the travel of the bottle indexing, remove the end caps from the box tube under the bottle feed ramp which holds the air cylinder and loosen the two bolts located inside the box tube. The air cylinder can now be slid forward or backward to adjust the travel of the bottles so they are centered under the capping head, and the bottles under the filling head are centered in the bottle locator with the air cylinder fully extended. When the required location of the air cylinder has been found, tighten the two bolts for the air cylinder.

CAP FEED:

The cap feeding mechanism should not require adjustment unless a bottle size change is made which may require new riser blocks be installed. Contact Meheen Manufacturing regarding any bottle size changes.

NOTE 1: For crowns to feed properly, the crown feed shoots must be kept dry during operation and the crowning head must be fully in the up position when crowns are dropped. If the crown shoots become wet they may feed two crowns rather than one, resulting in a crown jam.

NOTE 2: The bottom face of the bottle ejection plunger should be flush with the bottom of the stainless steel crowning bar to locate the crown and keep it in the proper orientation. The location of the plunger is set by the ejection air cylinders located on top of the capping bar and are not adjustable.

COMPUTER:

The bottling machine computer program is designed to perform the bottling process based on certain events taking place in a certain fashion. Items of primary concern to the computer are the detection of filled bottles and proper bottle pressures. When the computer detects a pressure or fill problem it performs a predetermined response to identify the problem and stop the machine safely. When the machine experiences no or low counter pressure, or it takes in excess of 40 seconds to fill a row of bottles, the machine performs a safe shut down routine. This means any items which make pressure are shut off and the Snift valve opens to relieve pressure from the bottles. During a safe shut down the filling heads will remain in the down position until the machine is reset, at which time the fill heads will return to the up position. It should also be noted that any time the machine is changed from running a program to a paused condition the computer performs the safe shut down routine.

The following is a list of outputs to the computer. Pressure sensors are analog and do not show on this list. Outputs are listed from left to right; the first module is 0-17 (12-17 are not used).

<u>OUTPUT</u>	<u>FUNCTION</u>	<u>TUBING SIZE AND COLOR ON MACHINE</u>
0	Speed valve	5/32" Yellow
1	Snift valve	5/32" Orange
2	CO ₂ valve	5/32" Blue
3	CO ₂ pulse	5/32" Red
4	Cap drop	1/4" Green
5	Bottle index	1/4" Blue
6	Fill head	1/4" Gray
7	Fill valve	1/4" Yellow
10	Crowner	3/8" Red
11	Educator	5/32" Natural
12	Tank Head space CO ₂ Valve mounted to right side of control panel	
	Product sensor	5/32" Natural
	Bottle sensor	5/32" Blue
	Temperature RTD, located in product manifold, uses wire connection.	

The following are descriptions of possible problems with the pressure or fill detection and the resulting actions by the computer. This section should be very useful for determining which parameters need to be adjusted and for troubleshooting the machine when a part failure is suspected. The description of the problem is given, then a possible resolution to the problem is suggested.

- 1) Fill detection is not set sensitive enough to trip, indicating to the computer that the bottles are not full. The machine starts normally by indexing bottles, indexing caps into the capping head, capping head puts caps on bottles, the fill head stays down, and the fill valve remains open until the computer times out (about 40 seconds). When time out occurs, the computer performs a safe shut down and displays the "Filling Time Out" message.

Corrective Action: Increase the sensitivity of the fill detector by decreasing its numeric value.

- 2) Fill detection is set so sensitive that it trips early, indicating to the computer that the bottles are full even when they are only partially filled. The machine starts normally by indexing bottles, capping head puts caps on bottles, fill head remains down. The fill valve opens, then closes, as the fill valve closes the Snift valve opens and releases the pressure from the bottles. The fill head pulls up quickly and a new row of bottles are indexed.

Corrective Action: Reduce the sensitivity of the fill detector by increasing its value.

TROUBLESHOOTING:

1. **BOTTLES FILL UNEVENLY:**
 - A) CO₂ pressure on tank dispensing product is too low.
 - B) Product flow rate into bottles is too fast for the condition of the product.
 - C) Off-gas or fill tubes restricted or damaged.
 - D) Fill tubes are too close to bottom of the bottles. Fill tubes should always clear the bottom of the bottles by at least 3/8" with fill head down.

2. **EXCESSIVE FOAMING IN THE BOTTLE WHEN FILLING:**
 - A) CO₂ pressure on tank dispensing product is too low.
 - B) Product flow rate into bottles is too fast for the condition of the product.
 - C) Product is too warm for bottling in relation to dissolved CO₂ levels.
 - D) Snift or CO₂ valve on machine have worn or broken tubing.
 - F) Liquid in bottle sensor and line. Drain liquid from line and wick liquid from sensor using a paper towel with the tube fitting removed. (DO NOT USE COMPRESSED AIR FOR CLEANING).

3. **PRODUCT FLOWS BACKWARDS UP FILL TUBES FROM BOTTLES:**
 - A) CO₂ valve is leaking into the off-gas tubing of the filling head and the valve should be cleaned or replaced.
 - B) Liquid pressure sensor has been damaged by over pressurization. Check pressure sensor values using a separate gauge and regulator and the manual override feature to compare the sensor value against the gauge. (See sensor check section of this manual.)
 - C) Liquid in bottle sensor and line. Drain liquid from line and wick liquid from sensor using a paper towel with the tube fitting removed. (DO NOT USE COMPRESSED AIR FOR CLEANING).

4. BOTTLES ARE FULL BUT EXCESSIVE TIME FOR FILL HEAD TO RETRACT:
 - A) Low pressure needs adjustment to a higher value.
 - B) Product temperature is too high for bottling.
 - C) Pressure sensor failure. (See sensor check section of this manual.)

5. BOTTLES ARE BROKEN DURING CROWNING, OR FILL TUBES ARE FREQUENTLY PUSHED UP WHEN FILL HEAD PLUNGES:
 - A) Check bottle indexing and fill head alignment per instructions in this manual.
 - B) Check with bottle manufacture for possible changes in bottle dimensions or bottles improperly tempered.

6. BOTTLES START TO FILL, THEN MACHINE INDEXES A NEW ROW OF BOTTLES AND PARTIALLY FILLS THOSE, REPEATEDLY:
 - A) Pressure on dispensing tank is too low. Increase dispensing pressure.
 - B) Fill sensor is set too low, increase fill sensor value.

7. BOTTLES DO NOT FILL AND PRODUCT VALVE DOES NOT OPEN:
 - A) CO₂ pressure to the bottling machine is low or flow is restricted. CO₂ pressure at the machine should always be set at 25 psi and liquid line pressure should be less than 20 psi while operating. When this failure occurs the “Counter Pressure Fail” message will be displayed on the operator interface.

8. COMPUTER REGISTERS A CPU FAULT:
 - A) The most common cause of this problem is a power surge of the electrical circuit where the bottling machine is plugged. If you experience a CPU fault, shut off the machine for 1 minute, then turn the power back on. The computer will automatically reboot the program. Repeated power surges can cause permanent damage to the computer and should be corrected.
NOTE: If electrical surges are experienced, Meheen Manufacturing recommends installing a good quality surge suppresser.

9. BOTTLING MACHINE STOPS OR WORKS OUT OF SEQUENCE:

- A) CPU fault on the computer or an outside influence altering the program in the processor.
- B) Solenoid valves or air components are sticking and need lubrication or replacement.

PRESSURE SENSOR CHECK:

To check the sensor, disconnect the small sensor tubing from the bottom of the control panel. Attach a regulator, with a good gauge, directly to the fitting for the sensor to be tested (1/4" ID tubing slips over this fitting nicely). With the gauge reading 0 psi, use the Manual Override mode to monitor pressures. It should read 0 psi and match the gauge. Repeat this procedure at 10 and 15 psi and note any differences in pressure readings. If the gauge reads 0 psi and the sensor shows any pressure above 0.2 psi, it is very likely that the sensor has been over pressurized and needs to be replaced. If the gauge shows 10 or 15 psi and the sensor continues to read 0 psi, this indicates that the sensor is plugged or has failed. The sensor should be carefully rinsed out with warm water and allowed to air dry before checking again. If you have any questions or suspect that a pressure sensor has failed, contact Meheen Manufacturing.

LUBRICATION & MAINTENANCE:

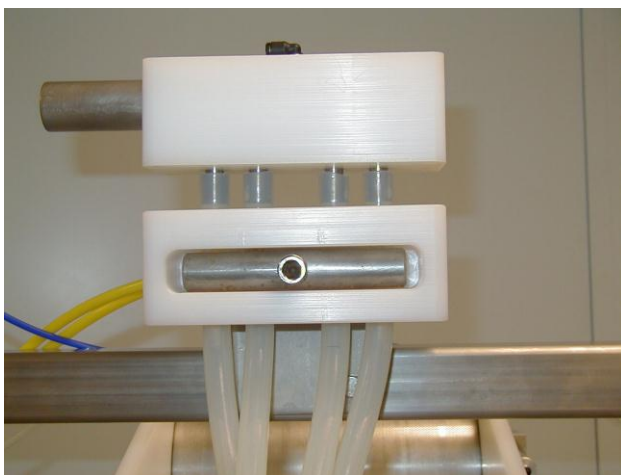
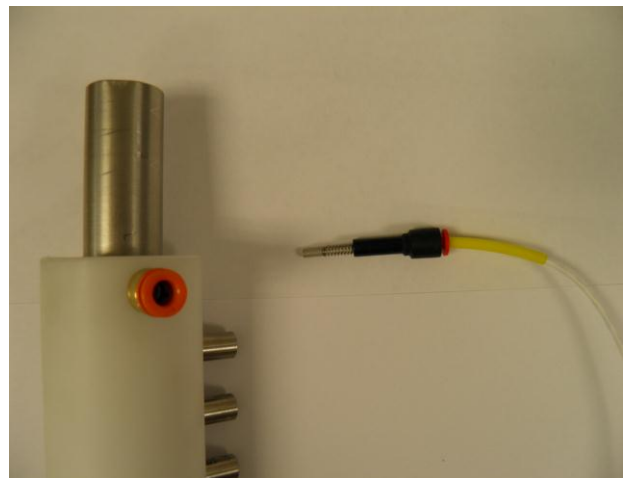
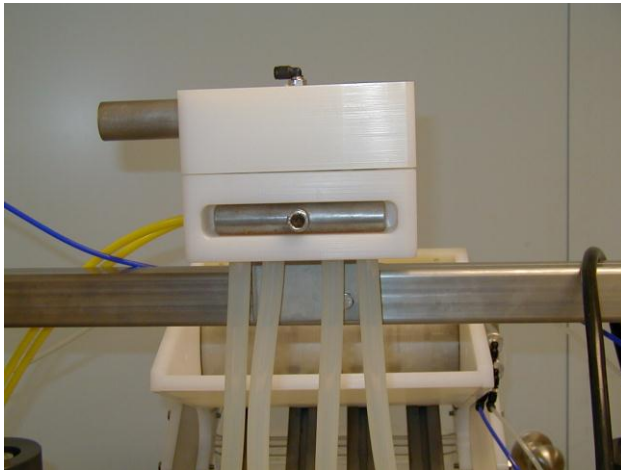
1. The only item which can be lubricated with grease on the machine is the fill head carriage cylinders. These cylinders act as slides for the fill head carriage. The carriage slide blocks have grease fittings on the outside of each block. These cylinders should be lubricated on a regular schedule; approximately every 20,000 cases produced or sooner. Caution should be exercised to avoid over greasing of the slides.
2. The moisture collection bowl under the machine should be drained at least once per day if it is not equipped with automatic draining. This prevents moisture from being carried through the pneumatic systems, causing damage or faulty operation of the machine. After each use, the bottling machine should be thoroughly cleaned, removing beer and foreign material.
3. Even though all the air valves and cylinders on the bottling machine are permanently lubricated, we still recommend occasional lubrication. Disconnect the air line from the moisture separation bowl located under the machine and place a few drops of light machine oil or air tool oil in the line and reassemble the connection. When air is connected to the machine, the oil will be carried throughout the valves and cylinders.

Occasionally spray the in-feed ramp and bottle indexer along with the portion of the main deck immediately at the bottom of the in-feed ramp with a high quality 100% pure silicon spray lubricant. This will help keep the bottles feeding properly.

FILL MANIFOLD & TUBING MAINTENANCE:

To replace or service the silicone fill tubing the filling manifold must be removed from the tubing pinch valve.

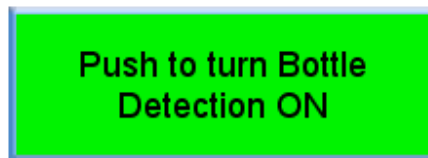
1. With the compressed air disconnected from the machine, remove the tubing clamps and tubing from the filling tubes at the top of the filling head. Disconnect the small sensor tube from the top of the liquid manifold.
2. Lift while wiggling the liquid manifold back and forth. The manifold tubes with silicone come up out of the tubing pinch valve. Once the manifold has been removed from the machine pull the silicone tubing off of the manifold tubes.
3. Cut new silicone tubing to the proper length and thread the new tubing through the pinch valve. The trick to this is twisting the tubing as you push it through the guide holes of the pinch valve.
4. Place the end of the tubing protruding from the top of the pinch valve fully on the tubes of the manifold. Grasp the silicone tubes from below the pinch valve and pull them down while pushing the liquid manifold down using a back and forth motion. When fully down you may still have a small gap between the manifold and pinch valve, this is normal.



Above, round style manifold with RTD temperature probe. Machines are shipped with the control panel removed and the temperature probe removed from the manifold as shown. The probe is spring loaded and simply pushes in to connect to the manifold similar to the pneumatic tubing connections on the machine. The tip of the RTD probe must be in firm contact with the SS tube in the manifold to provide accurate readings.

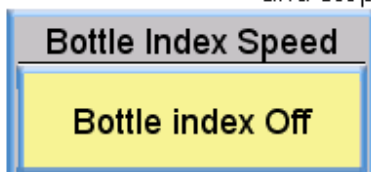
BOTTLE DETECTION SYSTEM/ INDEX PLATE ADJUSTMENT

From this screen the automatic bottle detection system can be disabled using a security code and the speed of the bottle indexing plate can be adjusted for optimum performance. Each time the bottling machine is turned on the automatic bottle detection system defaults on. This means if bottles are not present, mis-feed or do not move forward it will be detected and the bottling machine will automatically stop the system before the capping and filling heads move. The text box at the bottom of the Auto filling screen will display the cause of the fault and the machine will be in safe shut down mode. **NOTE: Before starting a new cycle after a fault, crowns must be removed from the capping head to avoid double capping the next row of bottles and to avoid bottle breakage. Warning: Bottle detection is not activated during the automated Leak Test or during Cleaning or Sanitizing cycles.**

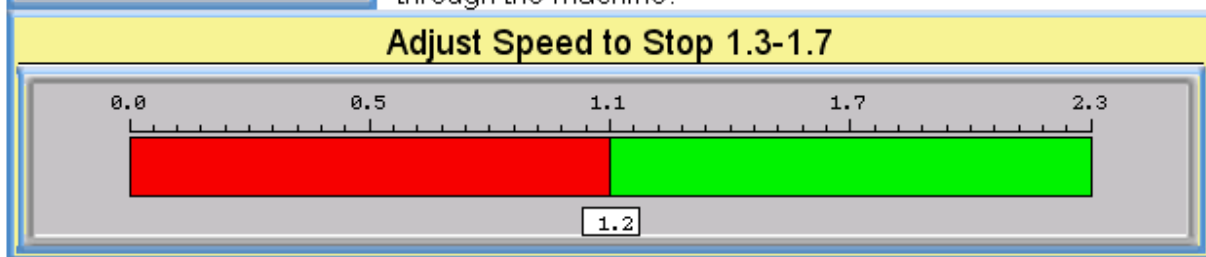


Bottle Indexing Speed Adjustment

This procedure allows you to adjust the bottle indexing plate speed correctly. Start by placing 6 rows of full bottles on the deck pushed up against the in feed ramp edge. To start the test press the "Bottle Speed Index" button ON. The indexing plate will start forward and the registration bar will move until the bottles are located at the filling head and stop. Note the time when the bar stops moving.



It should stop between 1.3-1.7, if not adjust the forward speed of the indexing plate using the flow control located at the bottle index cylinder mount. Repeat this process as needed to assure proper movement of the bottles through the machine.



Bottle detection By-Pass

By-Passing the bottle detection feature is possible using a security code entered into the system. In the screen above where the green "Push to turn Bottle Detection ON" button is will normally be a red/black button to access the numeric key pad for entering the by-pass code. Once the correct by-pass code has been entered the bottle detection system is disabled and the green button appears. Pressing this button will turn the bottle detection system back on.

Bottle Indexing Speed Adjustment

Instructions to perform this adjustment are on the screen. Start by pressing the RESET key and then the yellow "Bottle Index" key once. The indexing plate will move forward and the speed indicating bar at the bottom of the screen will change from Green to Red and stop when the bottles are detected at the filling station. As long as the button remains on air will continue to flow and the bar will indicate the time it took to locate the bottles. When you push the button to off the indexing plate will retract and the bar will turn back to green. You can repeat the process by simply pushing the button again. Repeat this process until a reading of 1.3-1.7 is achieved.