USER MANUAL

BMC OPERATION AUTOMATIC & MANUAL SYSTEMS

Automatic Control

Manual Control

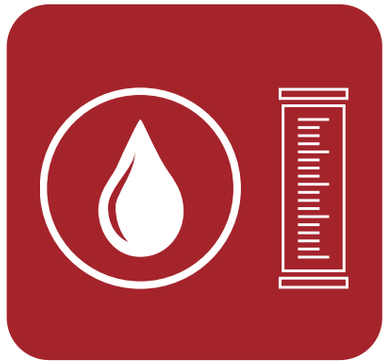
MENU

This is an interactive PDF. Click on an icon tile and navigate to a chapter of interest.

Legal & Safety

Auto System

Seed Flow



Pump Cal.

Run Sequence

Manual System

Pictograms

Users can advance or go back single pages by using quick navigation links shown below, right.

Users can navigate to the Menu by clicking on the Menu icon shown below, left.

LEGAL & SAFETY

This manual contains technical information regarding Bayer SeedGrowth™ Equipment. Please read and understand these instructions completely before proceeding to install and operate the equipment. Bayer reserves the right to change specifications, models, components, or materials at any time without notice. For additional equipment information contact us at 1.800.634.6738. Please have this manual available when contacting Bayer.

Always use caution and common sense when working with any chemical. Read the product label and SDS carefully and follow their instructions exactly as described.

Optimal operating conditions for this piece of equipment requires an ambient temperature 32° F to +104° F (0° C to +40° C), relative humidity less than 90% (minimum condensation). Make necessary provisions to protect this piece of equipment against excessive dust, particles containing iron, moisture and against corrosive and explosive gases.

Our technical information is based on extensive testing and is, to the best of our current knowledge, true and accurate but given without warranty as the conditions of use and storage are beyond our control. Variables, such as humidity, temperature, change in seed size or variety and viscosity of chemical products can all affect the accuracy of the chemical application and seed coverage. To ensure the desired application rate and optimum seed coverage, check the calibration periodically throughout the day, and make adjustments as needed.

Any person who is involved in the installation or periodic maintenance of this equipment should be suitably skilled or instructed and supervised using a safe system of work. Isolate the treater before removing guards for maintenance.

EXPOSURE CONTROL

Always use caution and common sense when working with chemicals. Read the product label and SDS carefully and follow their instructions exactly as described. The following Personal Protective Equipment (PPE) recommendations and best practices help promote safe use in seed treatment.

Note: Exposure Control signs and labels conform to the requirements of ANSI Z535.4 or ISO 3864.

Wear protective clothing

Wear disposable or reusable coveralls with long sleeves.

Hand protection required

Wear chemical-resistant gloves.

Wear rubber boots

Wear chemical resistant rubber boots.

Labels

Label recommendations and directions for handling must be followed, including treatment procedure (use of sticker) as well as the safety requirements.

Treatment products

Keep products in a locked room that has been approved for crop protection products.

Wear a mask

Wear respiratory protection.

Eye protection required

Wear protective eyewear.

Calibration

Seed treatment equipment must be checked and calibrated regularly to ensure accurate and safe application.

Clean seed

Use well cleaned seed to avoid creation of polluted dust that will contaminate the machine, treating facility, workers, farmers and the environment during sowing.

Cleaning

Use a vacuum to clean machines. Avoid using compressed air for cleaning.

Laundry

Wash soiled reusable clothing separately. Workers must take a shower after each shift.

Empty containers

Non-returnable empty containers must be triple rinsed before they can be disposed. For others the recommendation of the producer must be followed.

Spillage

Spillage must be avoided; it must be thoroughly cleaned up to avoid contaminating the environment and waterways.

Maintenance

Keep machinery clean between treating sessions.

REFERENCE SYMBOLS

Symbols and signal words are used to identify the level of hazard and help avoid personal injury.

Note: Safety signs and labels conform to the requirements of ANSI Z535.4 or ISO 3864.

Shock Hazard

Alerts that dangerous voltage may be present.

Warning

Alerts that a hazard may cause serious injury or death.

Caution

Alerts that a hazard may cause minor or moderate injury.

Hand crush - moving parts

Alerts crushing is possible.

Pinch point

Keep hands away from pinch points.

Rotating shaft

Do not wear loose clothing around turning parts.

Disconnect

Disconnect to de-energize before opening.

Tools

Required tools for installation and maintenance.

Use guards

Keep guards in place. Do not remove during operation.

Parts

Required parts for installation and maintenance.

Lifting

Requires two people to safely lift an item.

Tip

Calls attention to special information.

Lift points

Requires the use of proper rigging and lifting techniques based on the lift plan.

Note

Emphasizes general information worthy of attention.

Center of gravity

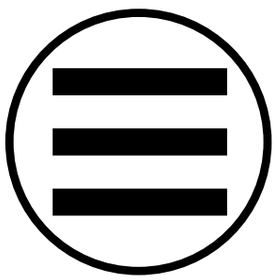
Indicates the center of gravity of the machine to help assist when rigging and lifting.

Example

Provides a problem or exercise that illustrates a method or principle.

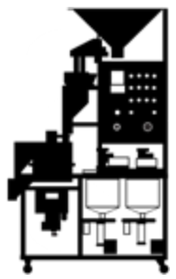
PICTOGRAMS

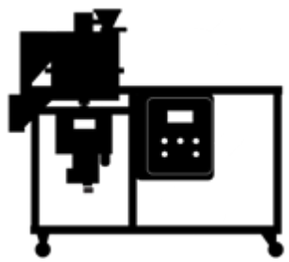
Each Signifier displayed here is specific to this User Manual.


Menu

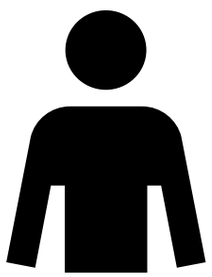

Previous


Advance

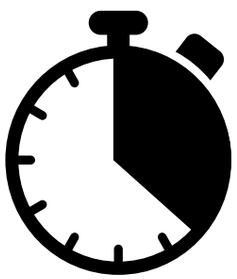

BMC Auto

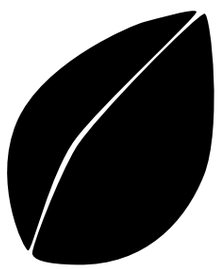

BMC Manual

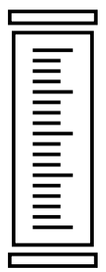

Like


Person

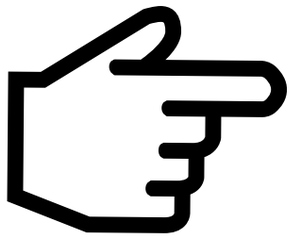

Run Sequence


Time

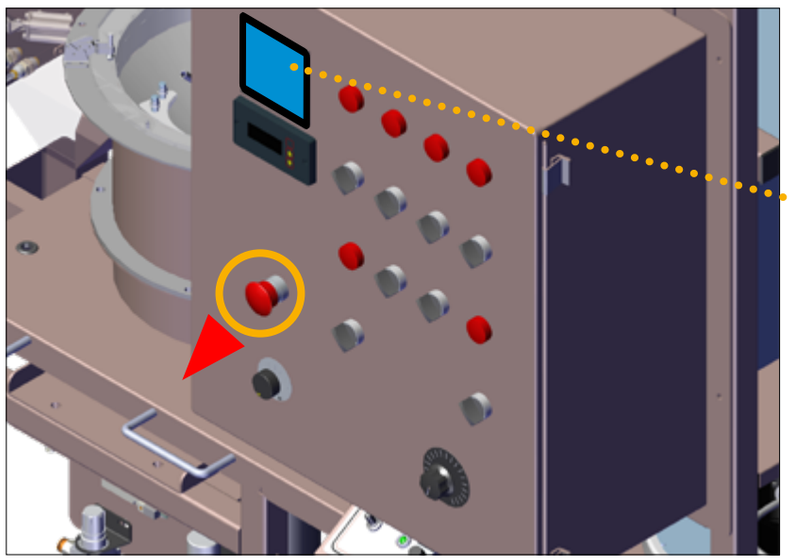

Seed


Calibration


Liquid


Cursor Hand

AUTO SYSTEM HMI



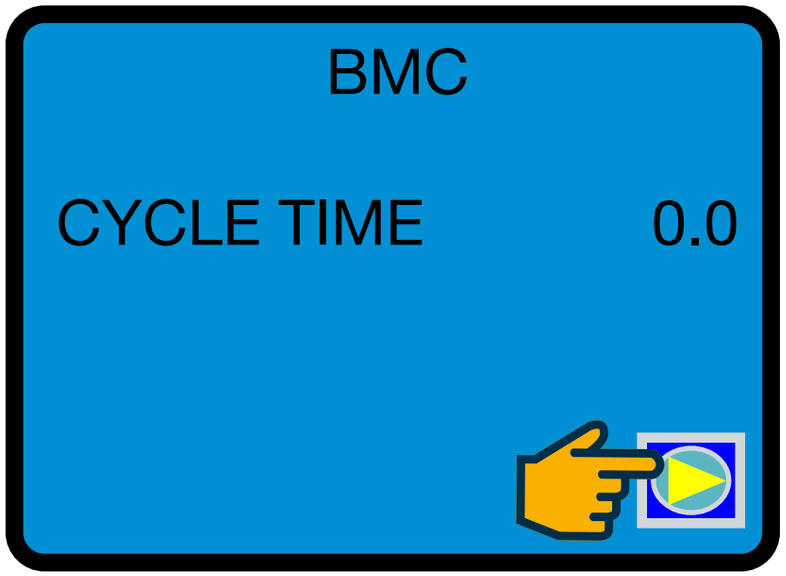
HMI DISPLAY

Ensure the Control Panel is connected to a power source (Electrical Service Required: 115VAC/1PH/60Hz/25AMP).

- Pull **OUT** the **E-Stop** Button on the Control Panel to initiate the system.

The **HMI** on the Control Panel boots up and displays the PLC program.

- The following pages describe each HMI touchscreen and their functionality.
- Included are steps to make timer numerical value changes.
- Running a batch will be covered later on in the guide under Run Sequence.



SCREEN 1 - CYCLE TIME

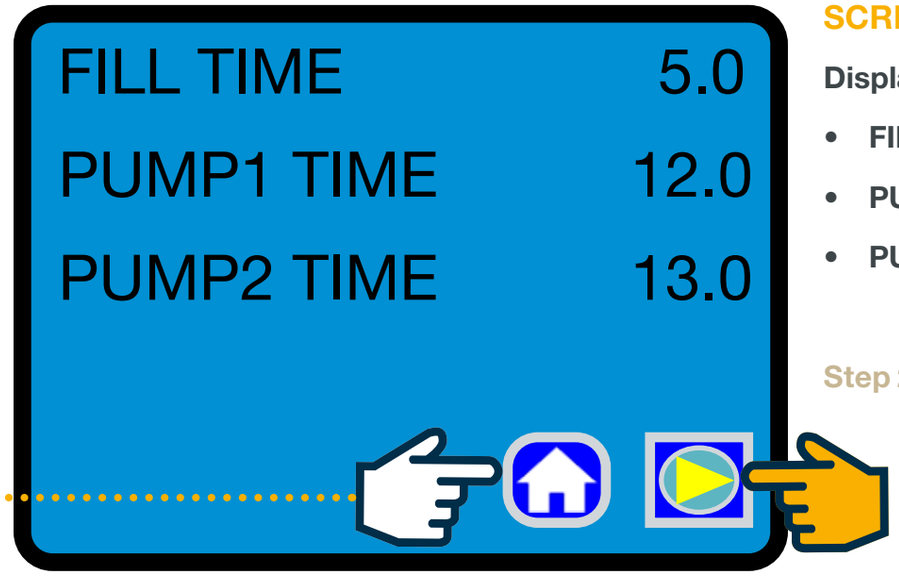
Displays the Cycle Time - or display only

- This is a timer that changes according to each cycle that runs.

Step 1: Touch the yellow **Next** arrow button icon at the bottom of the HMI screen: navigates to **Screen 2**.

Continued ➲

Note: Touch the **Home** icon button at the bottom of screens **2-4** to return to **Screen 1 - Cycle Time**

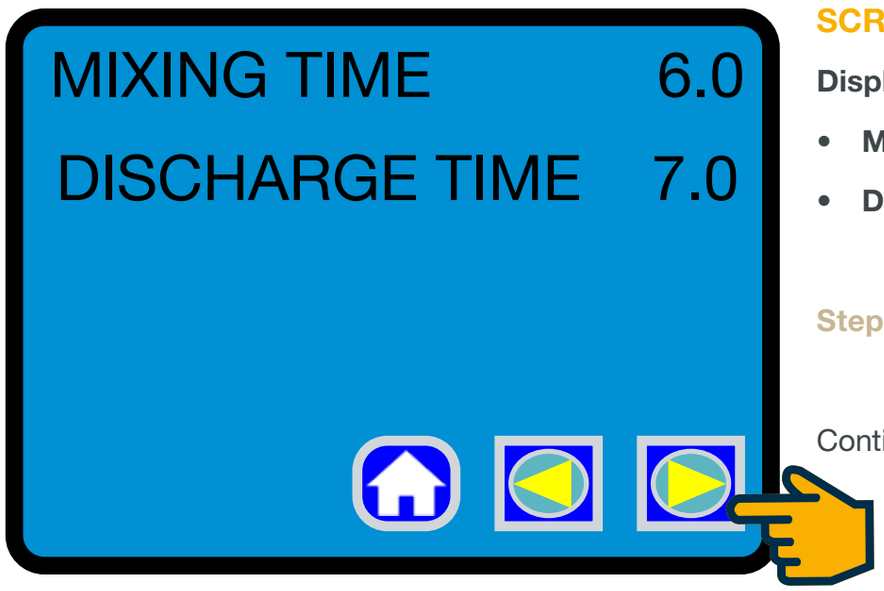


SCREEN 2 - FILL & PUMP TIMERS

Displays the following Factory set Times (times can be changed)

- **FILL TIME** - length of time it takes the Weigh Scale Gate to open and fill the Mixing Bowl with seed.
- **PUMP1 TIME** - length of time Pump 1 runs.
- **PUMP2 TIME** - length of time Pump 2 runs (if used).

Step 2: Touch the yellow **Next** arrow button icon at the bottom of the HMI screen: navigates to **Screen 3**.



SCREEN 3 - MIXING & DISCHARGE TIMERS

Displays the following Factory set Times

- **MIXING TIME** - length of time seed and chemical mix in the Mixing Bowl.
- **DISCHARGE TIME** - length of time it takes treated seed to empty out of the Mixing Bowl.

Step 3: Touch the yellow **Next** arrow button icon at the bottom of the HMI screen: navigates to **Screen 4**.

Continued ➲

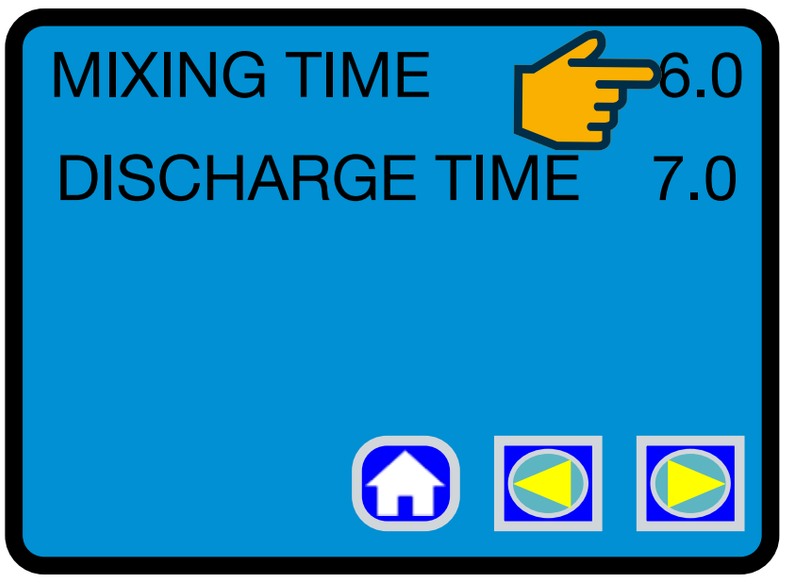
Note: This screen displays the current PLC Revision number and date of last revision update.

SCREEN 4 - INFORMATION & LANGUAGE SELECTION

Displays Contact and Language Information

- **CONTACT INFORMATION** - Bayer Equipment phone number.
- **LANGUAGE SELECTION** - touch a button icon to select which language displays on the HMI.

Step 4: Touch the yellow **Back** button icon at the bottom of the HMI screen: navigates back to **Screen 3**.



SCREEN 3 - MIXING & DISCHARGE TIMERS

Step 5: To change any of the Factory set times displayed on **Screens 2 or 3**, touch the numerical number displayed on the screen: displays a Keypad pop-up as a layer on top of **Screen 3**.

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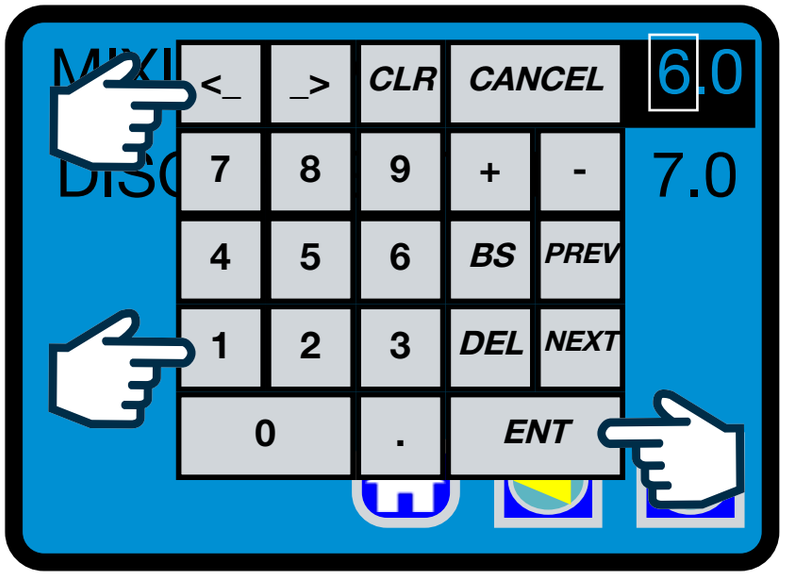


SCREEN 3 - MIXING & DISCHARGE TIMERS - KEYPAD POP-UP

Step 6: To make a numerical value change, on the Keypad pop-up touch the **<_** or **_>** button to move the cursor (box surrounding a number) right or left.

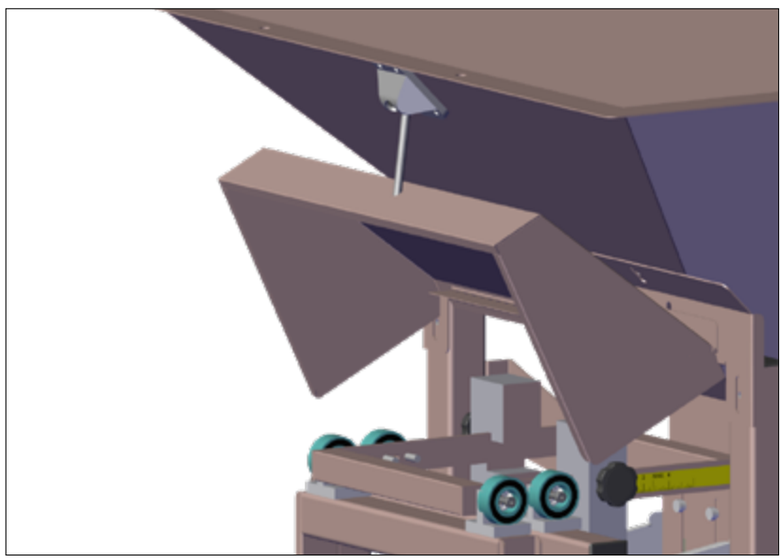
Step 7: Then touch a number **(0-9)** on the Keypad pop-up to change the numerical value.

Step 8: Then touch the **ENT** button on the Keypad pop-up to save the new value: Keypad pop-up closes.

- The number selected will then display the changed value.
- Touch the yellow **Back** arrow button icon at the bottom of the screen to navigate to **Screen 2** to change those numerical values, if needed.

This completes the BMC Auto HMI Screen Function.

SEED FLOW RATE



Seed Scale Counter Weight Placement

Step 1: Lift the Scale Hopper Adjust/Hood and lock it in place with the Hook.

Step 2: Determine the **COUNTER WEIGHT** position on the Scale Arm (HIGH or LOW capacity) and move it to the correct INDENT (this will be pre-set from the factory, based on customer specifications).

- **HIGH** = 5 - 7.5lb Capacity
- **LOW** = .5lb - 6lb Capacity

There are two weights, weight **A** which determines high or low capacity, and Weight **B** which fine tunes between the capacities.

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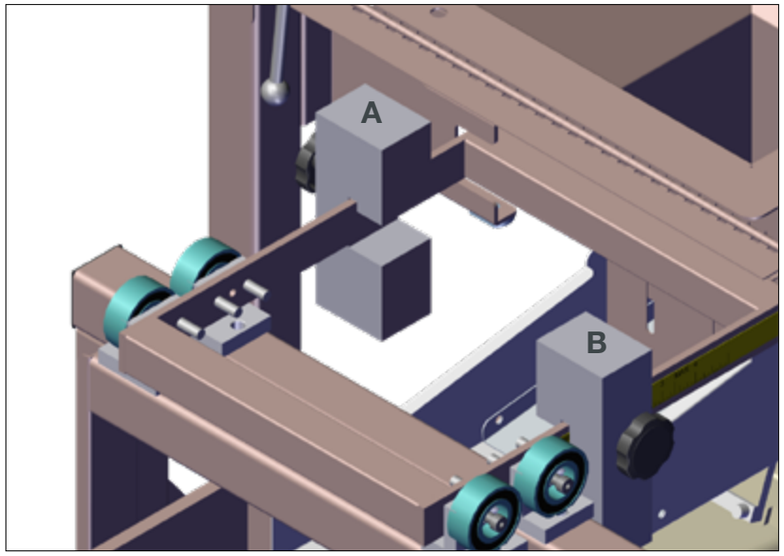
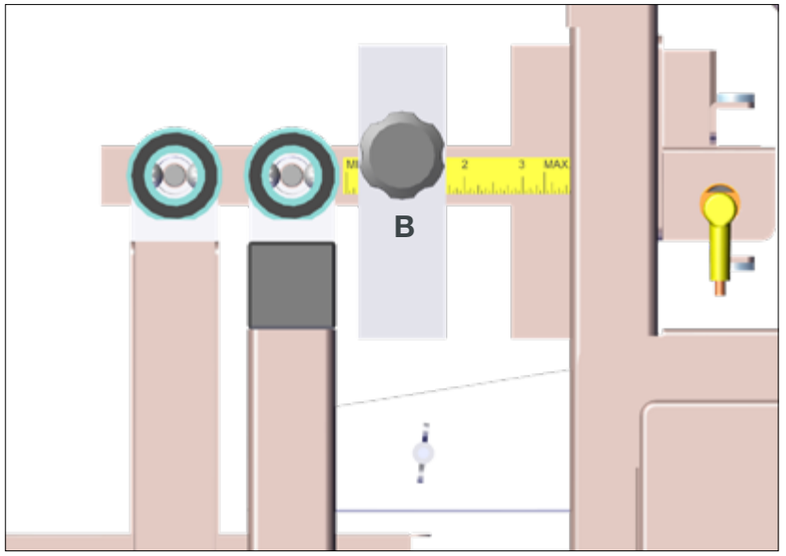
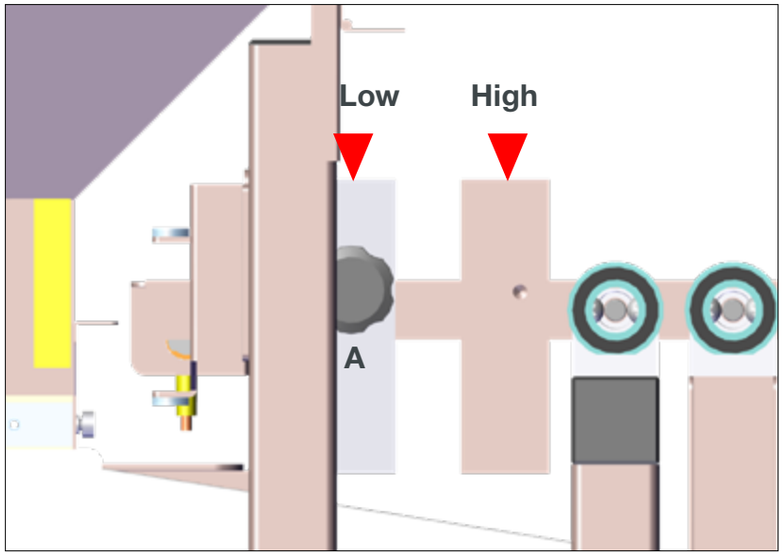


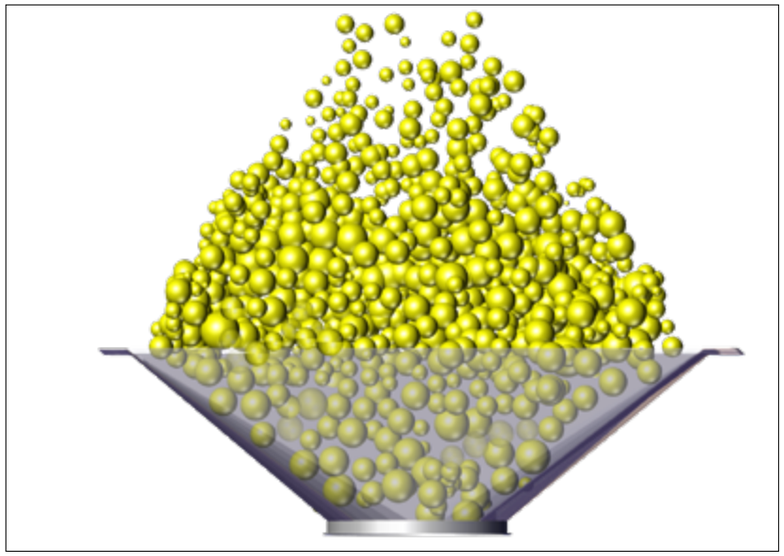
Adjustable Counter Weights - A (Left Side) & B (Right Side)



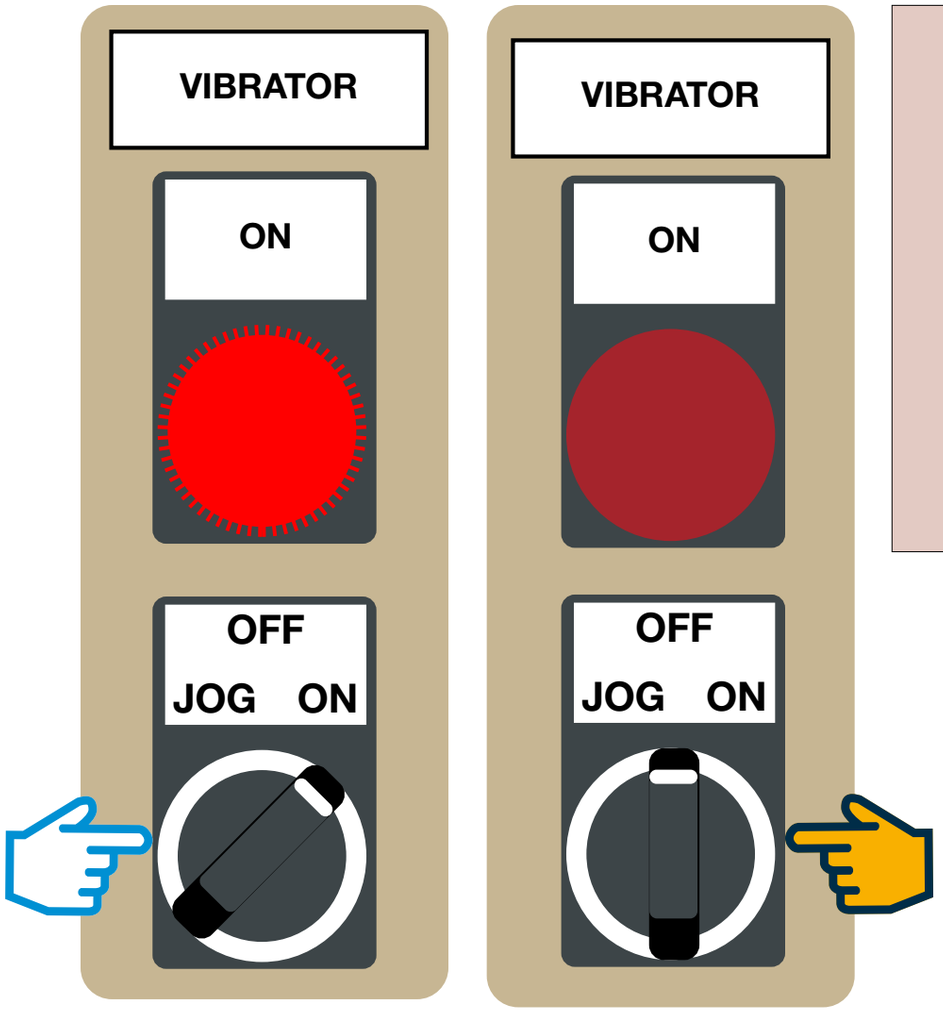
Right Hand Side - B -Fine Tunes Capacity (incremental)

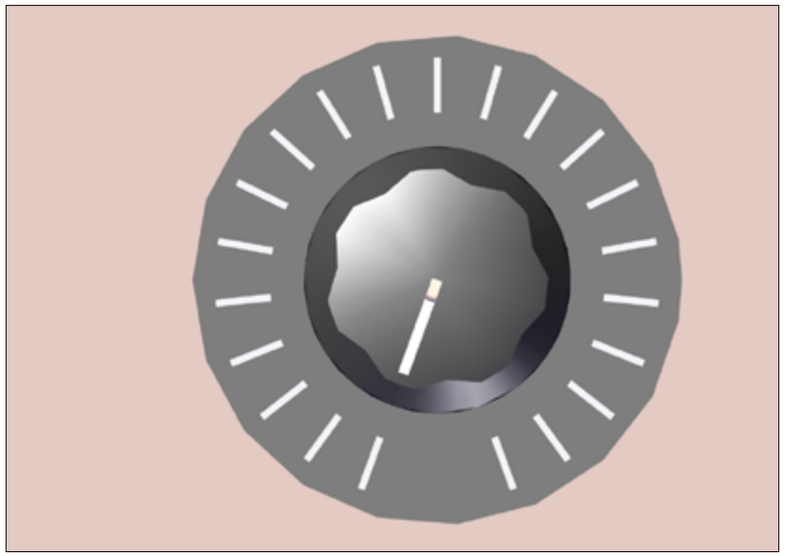


Left Hand Side - A - High or Low Capacity Setting



Step 3: Fill the Seed Inlet Hopper with clean seed (2.5 CUFT capacity).





VIBRATOR SPEED

Dry Run Seed Calibration

Step 1: On the Control Panel, turn **ON** the **VIBRATOR** Switch.

- The Vibrator light turns **ON** as the Seed Inlet Hopper empties...
- Then fills the Weigh Scale..
- Then opens the slide gate and fills the Mixing Bowl (based on the HMI timer settings of **FILL TIME**)...then turns off.

Allow the mix cycle to run and discharge the seed from the Mixing Bowl (untreated).

- To change the seed output, increase or decrease the Scale Vibrator using the **VIBRATOR SPEED** dial.

Also, refer to Seed Gate Setting (next page), to increase/ decrease the seed flow rate.

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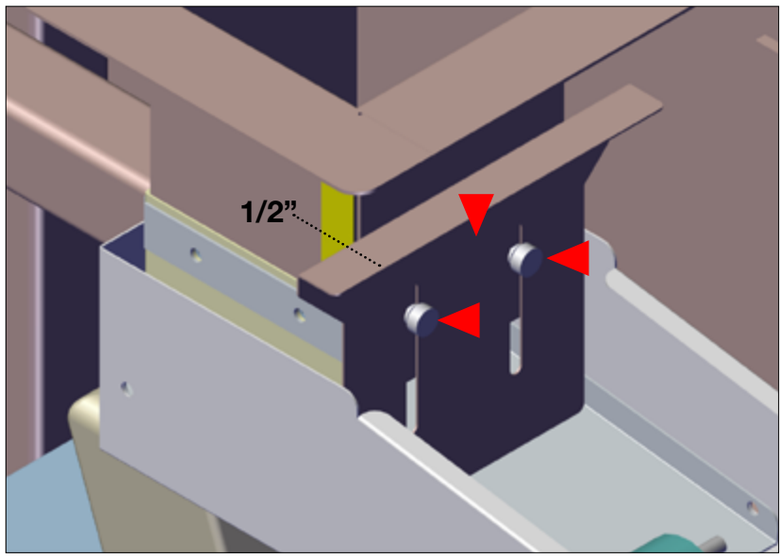
Note: The tighter the Seed Gate opening, the SLOWER the feed rate - for improved accuracy.



Adjust the Seed Gate UP/DOWN - Feed Rate

Seed Gate Adjustment - Feed Rate

Step 1: Turn the knurled screws **OUT** to loosen the Seed Gate (the Seed Gate will drop down).

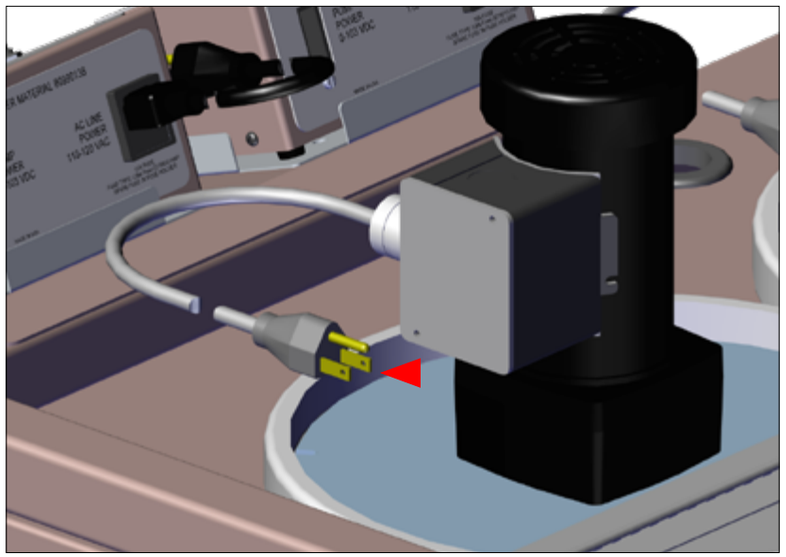
- Set the top edge of the Seed Gate to the **1/2” OPEN** mark (use the ruler as a guide).
- When set, finger tighten the knurled screws to lock the Seed Gate in place.
- Several dry runs can be made to adjust the correct seed flow rate, if needed.
- Further Seed Gate adjustments can be made to improve the seed flow rate, if needed.

This completes the BMC Auto Seed Flow Adjustment procedure.

PUMP CALIBRATION

Warning! Do NOT run seed at this time!

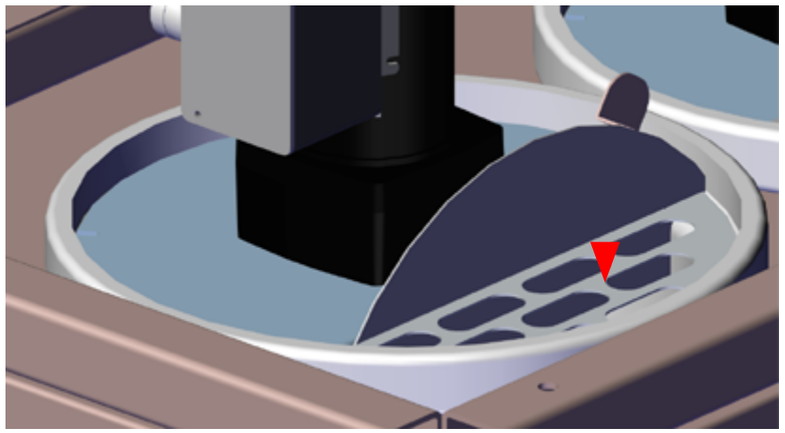
Warning! Exercise extreme caution when working with chemicals! Wear proper PPE >>



Pump Prime

Step 1: Plug in **TANK 1** Agitation 115VAC power cord to external power source.

- Agitation Motor begins turning the Agitation Propeller inside the 4 Gallon Poly Supply Tank.



Step 2: Open **TANK 1** lid and fill with chemical.

- Allow chemical to mix for five minutes before using.

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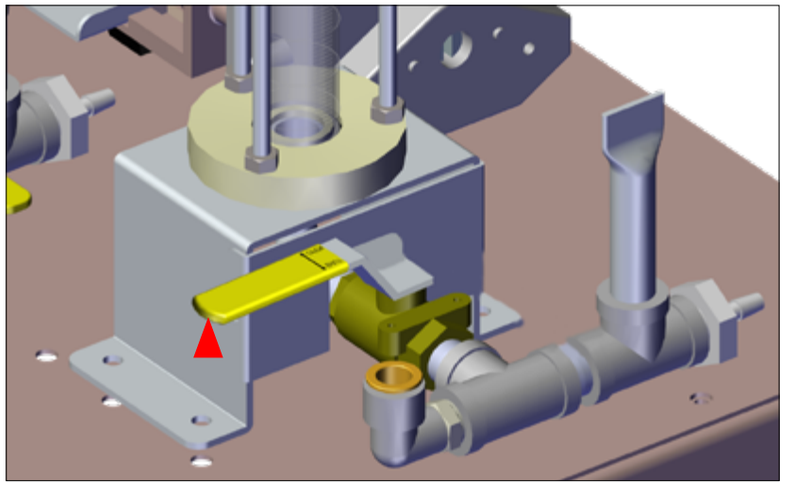
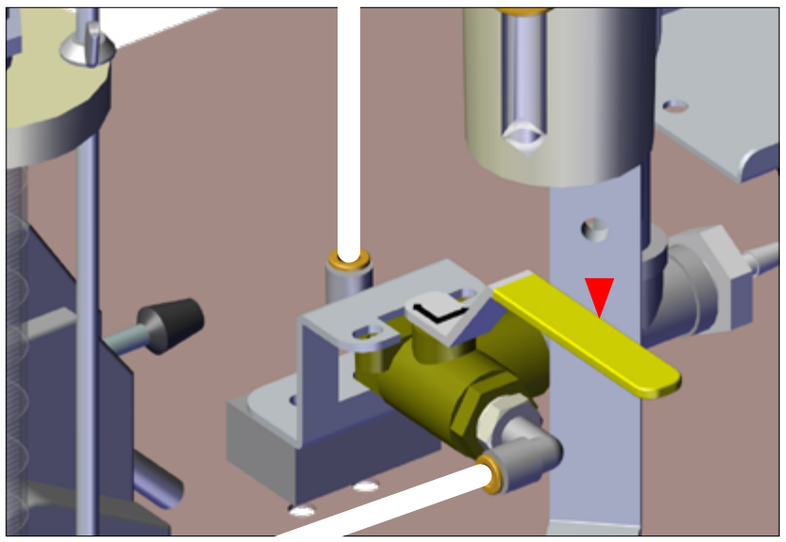


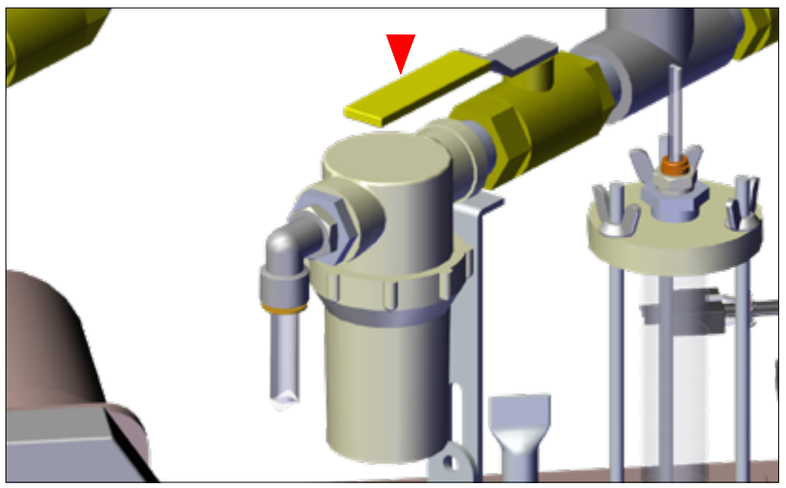
Step 3: Close **PUMP 1** Calibration Valve, as shown.

- This position allows chemical to bypass the graduated cylinder and circulate to the pump.



Step 4: Open **PUMP 1** Recirculation Valve, as shown.

- This position recirculates chemical from the pump back up to the Tank.



Step 5: Open **TANK 1** Main Valve, as shown.

- This position drains chemical from the Tank above down to the pump.

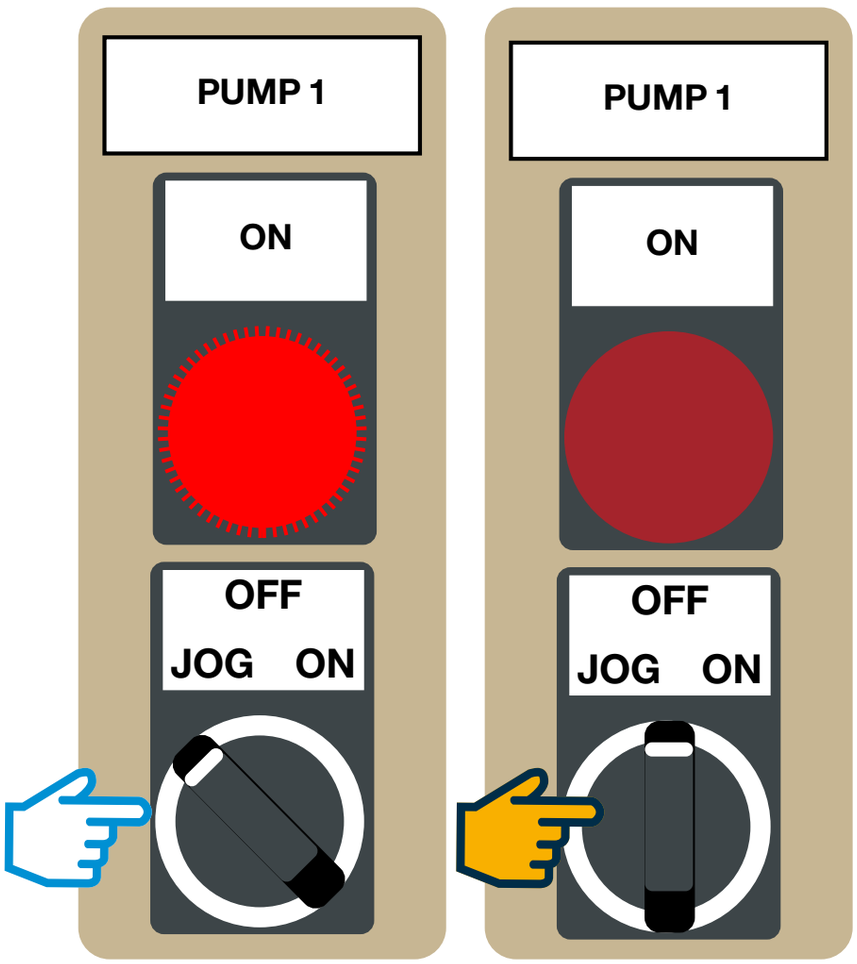
Continued ➲

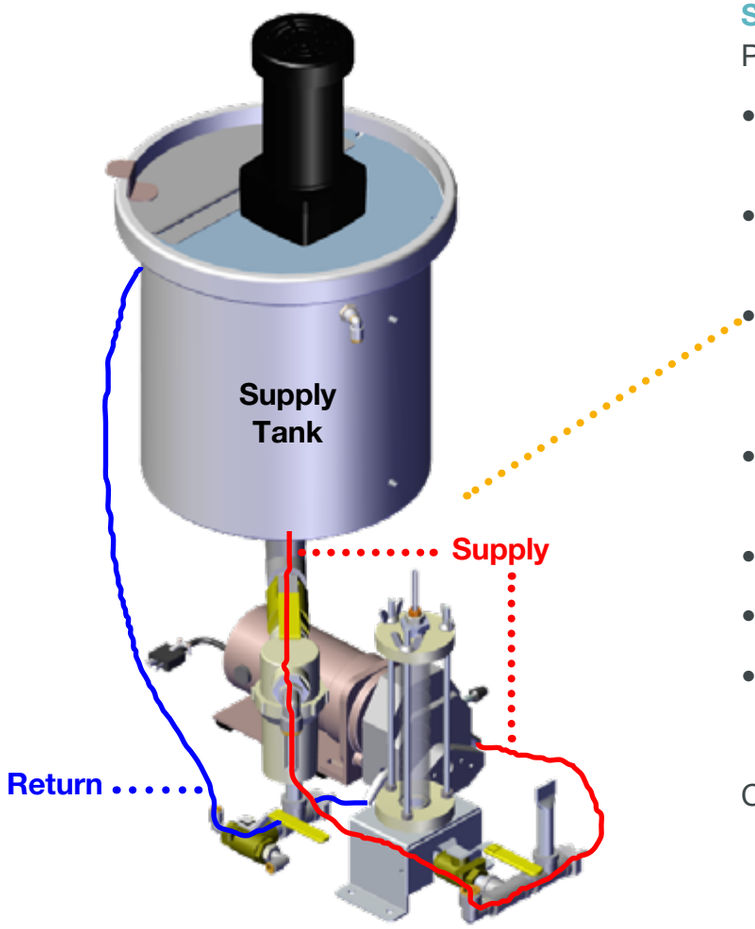
Note: Keep **PUMP 1** switch in the **FWD** position for calibration, next section.

Note: Turning **PUMP 1** switch to **ON** will only run the Pump for the time that the timer has been preset to run (refer to page 5). For priming and calibration hold the switch to **JOG**.

Step 6: Push **Pump 1** Control switch to **FWD**.

- The green Power light will also indicate that the power is **ON** when lit.
- Set the Speed Indicator Dial to **500** to run the Pump at 50% rate / output speed, rather than at full speed.





Step 7: Turn and hold the **Pump 1** Switch (on the Control Panel) to **JOG** for 3-5 minutes.

- This will prime the lines and warm the element before calibration.
- The **ON** light above the switch turns on while the switch is held in the **JOG** position.
- Chemical drains from the Supply Tank, runs through the Pump Element and recirculates back into the Supply Tank.
- Release **Pump 1** Switch (returns to **OFF** position) and the **ON** light turns off.
- **Pump 1** is now primed and ready to use.
- Repeat Steps **1-8** if **Pump 2** is used.
- Advance now to Pump Calibration.

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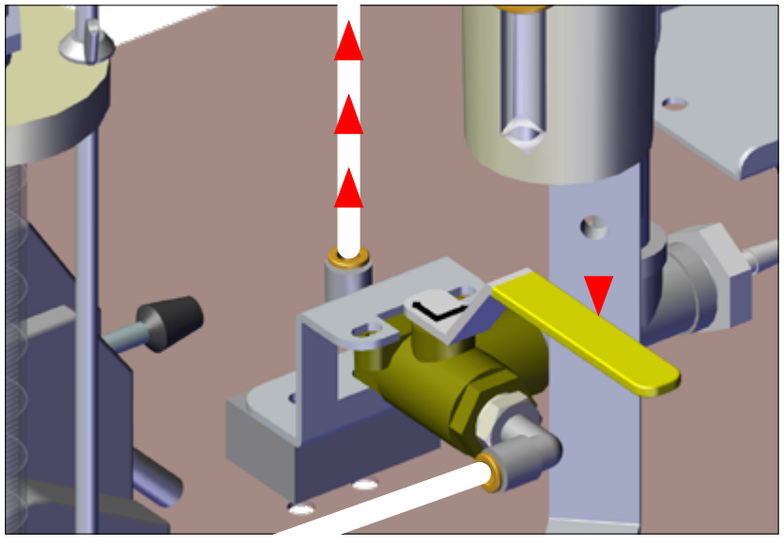
Example: **Application Rate**

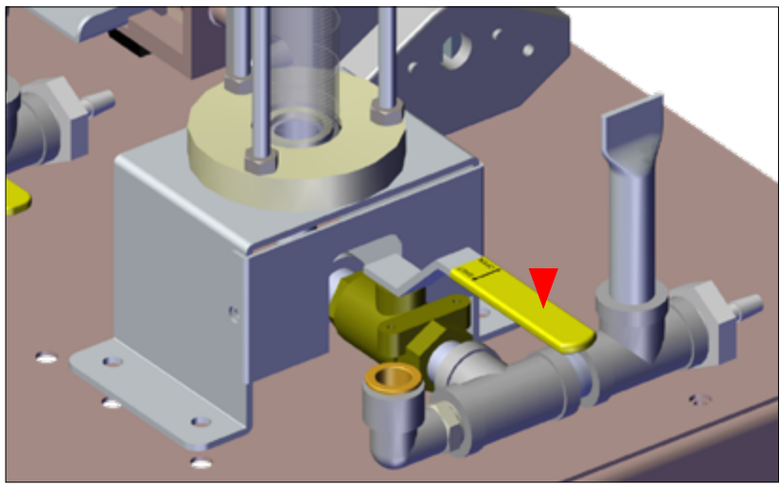
- Check the chemical label for the required application rate...
- **Chemical Product** = 50 ml/5 Kg Seed
- **Batch Size** = 5 Kg of seed
- **Treat Time** = 7.5 seconds (mixing seed with chemical)
- **Pump Output** = 50% (pump speed setting = 500)



Liquid Calibration

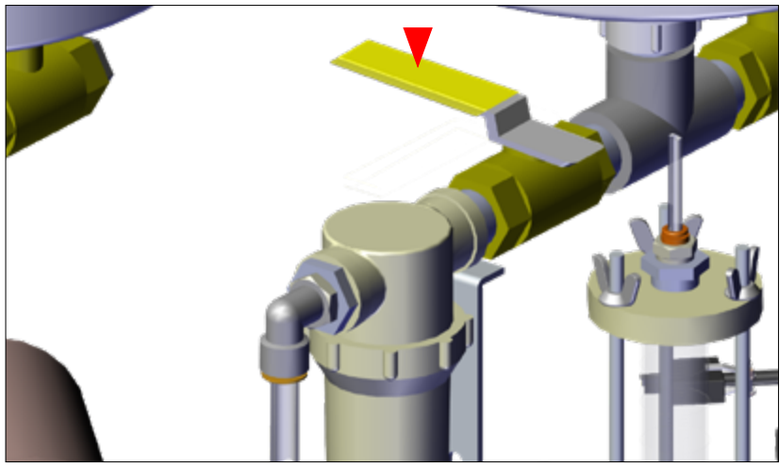
Step 1: Ensure **PUMP 1** Recirculation Valve is in the open position, as shown.

- This position recirculates chemical from the pump back up to the Supply Tank.



Step 2: Ensure **PUMP 1** Calibration Valve is in the open position, as shown.

- This position allows chemical to fill the graduated cylinder with chemical.



Step 3: Ensure **TANK 1** Main Valve is in the closed position, as shown.

- This position stops chemical from draining out of the Supply Tank.

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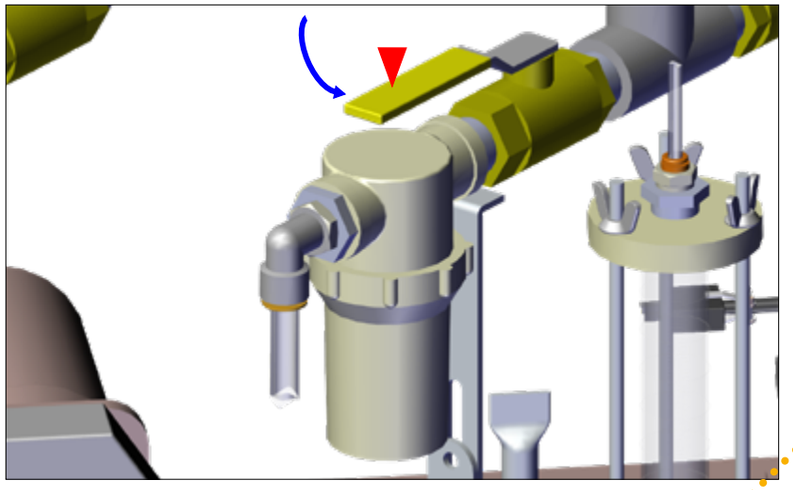
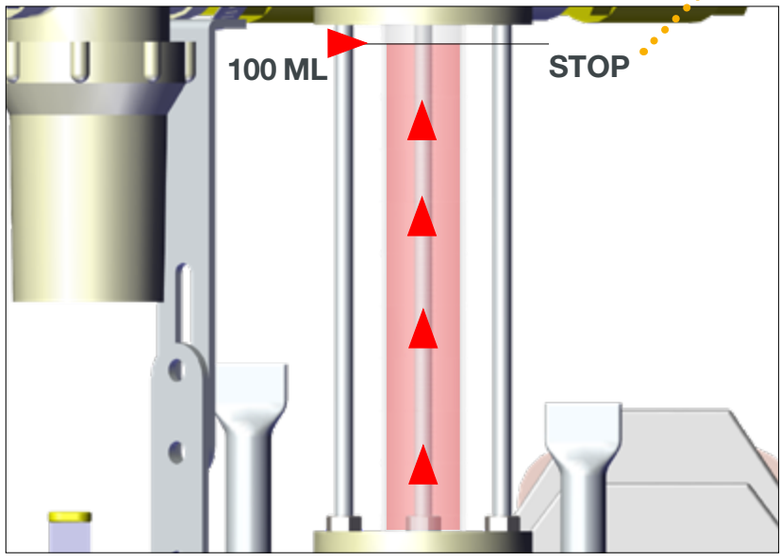
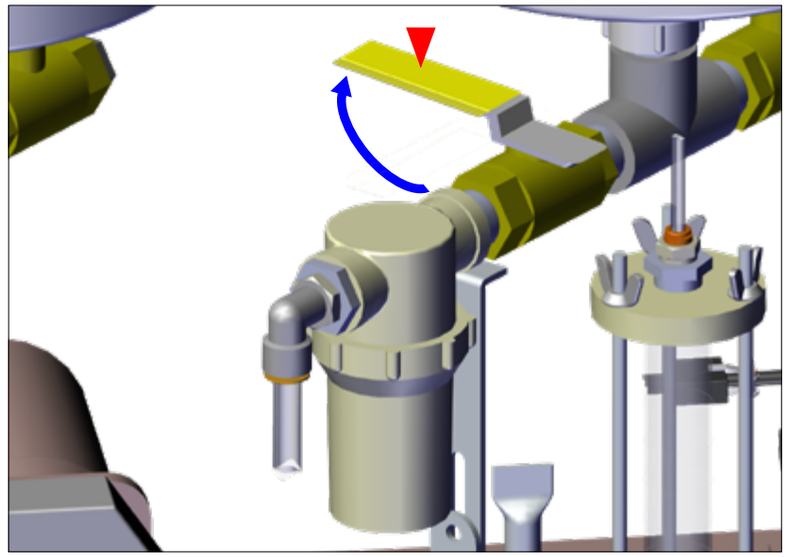


Step 4: Slowly turn **TANK 1** Main Valve to the open position, as shown.

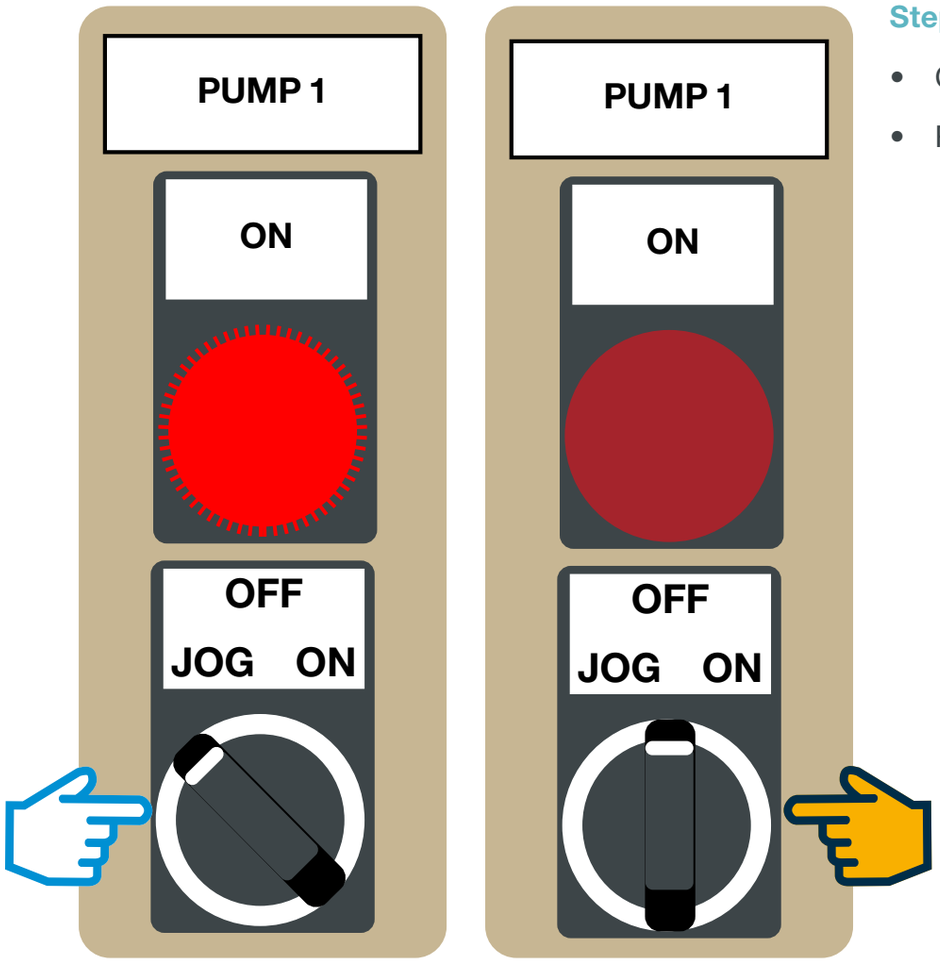
- This fills the Graduated Calibration Cylinder with chemical product by gravity.





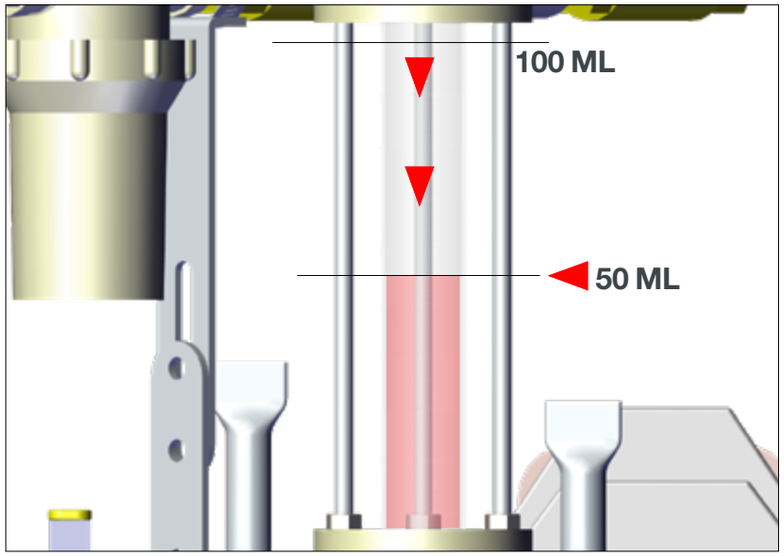
Step 5: Stop filling the Graduated Cylinder when chemical reaches the top **100 ML** mark by turning **TANK 1** Main Valve back to the closed position, as shown.

Continued ➲



Step 6: Turn and hold **Pump 1** Switch (on the Control Panel) to **JOG** for **7.5** seconds (TREAT TIME).

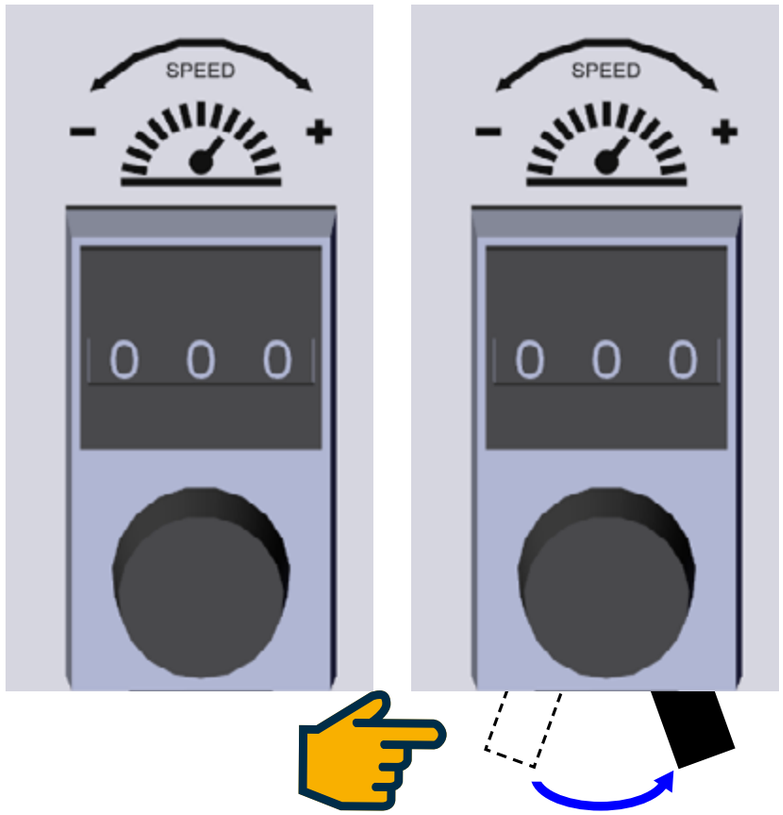
- Chemical drains out from the Graduated Cylinder through the Pump and back up into the Supply Tank.
- Release **Pump 1** Switch (returns to **OFF** position, light turns **OFF**).



Step 7: Note the amount of chemical drained out of the Graduated Cylinder in **7.5** seconds and compare that number to the desired application rate = 50 ML.

- 50 ML drained out of the 100 ML Graduated Cylinder while holding **Pump 1** switch to **JOG** for **7.5** seconds.
- 50 ML product is the desired target application rate for 5 Kg of seed.
- Calibration is now complete.

Continued ➲



Locked position⇨

Step 8: If the calibration output rate does not match the required label rate, adjust the Pump Control Speed Indicator Dial to increase or decrease Pump dispersion rate / output speed.

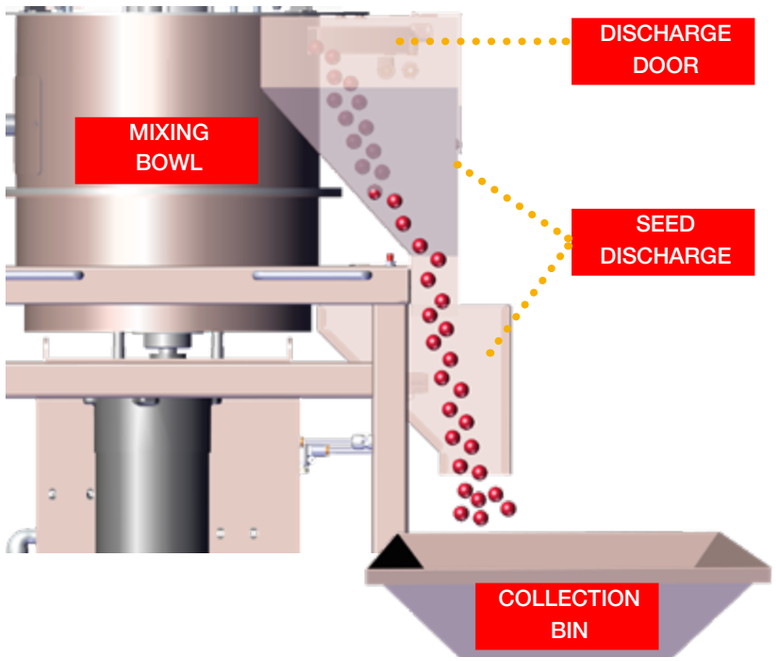
- Faster = more chemical pumped, slower = less.
- If a longer Pump time is required, refer to CHANGE VALUES on page 5 to change the PUMP 1 Timer value.
- Repeat Steps 1-8 until the desired amount of chemical pumps in **7.5** seconds.
- Once the calibration process is complete and the desired application rate is achieved, lock the Pump Speed Dial.
- Advance now to Run Sequence.

This completes the BMC Auto Pump Calibration procedure.

RUN SEQUENCE

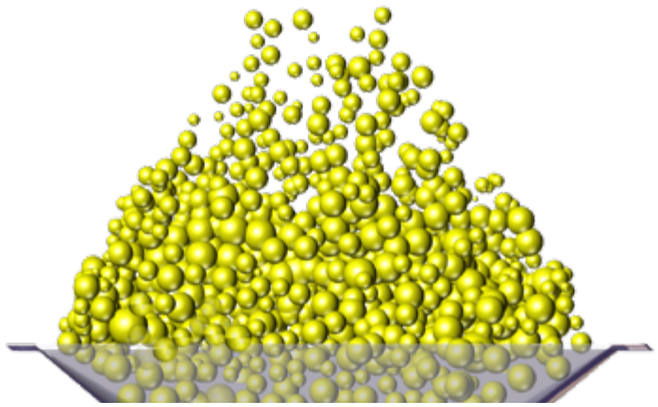
Warning! Wear proper personal protective equipment when bagging treated seed: long sleeves, chemical resistant gloves and a face respirator >>

Tip: Always treat clean seed! This can also affect the seed flow rate.



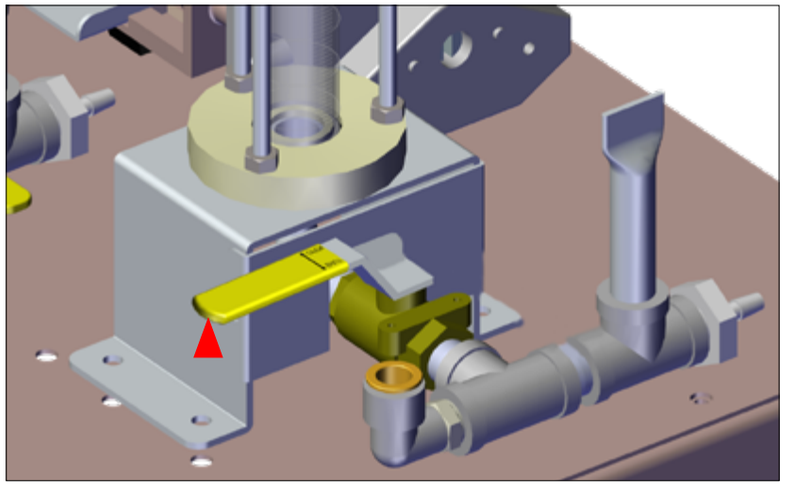
Treat mode

Step 1: When ready to begin treating seed, ensure a collection bin or bagging device is located underneath or affixed to the Seed Discharge.



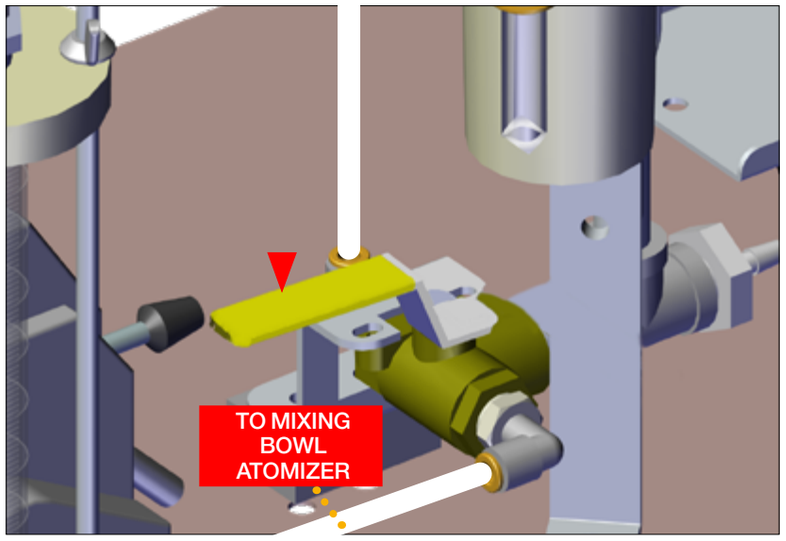
Step 2: Fill the inlet hopper with clean seed (2.5 CUFT capacity).

Continued ➲



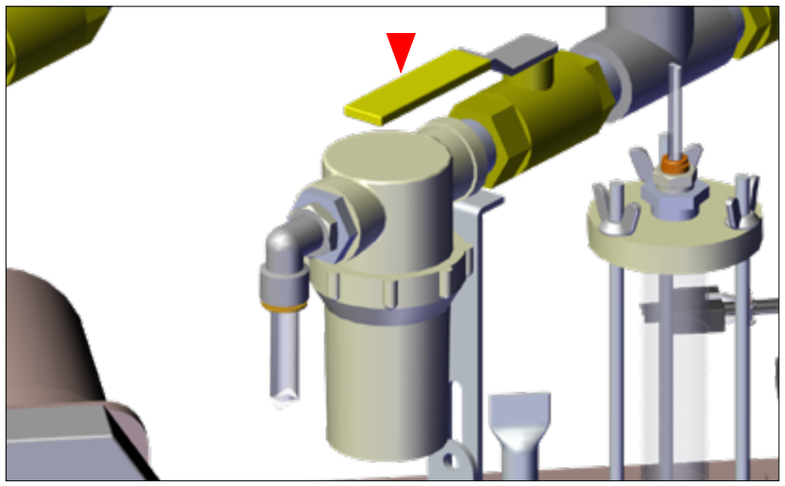
Step 3: Close **PUMP 1** Calibration Valve, as shown.

- This position bypasses the Graduated Calibration Cylinder and moves chemical from the Tank to the Pump.



Step 4: Open **PUMP 1** Recirculation Valve, as shown.

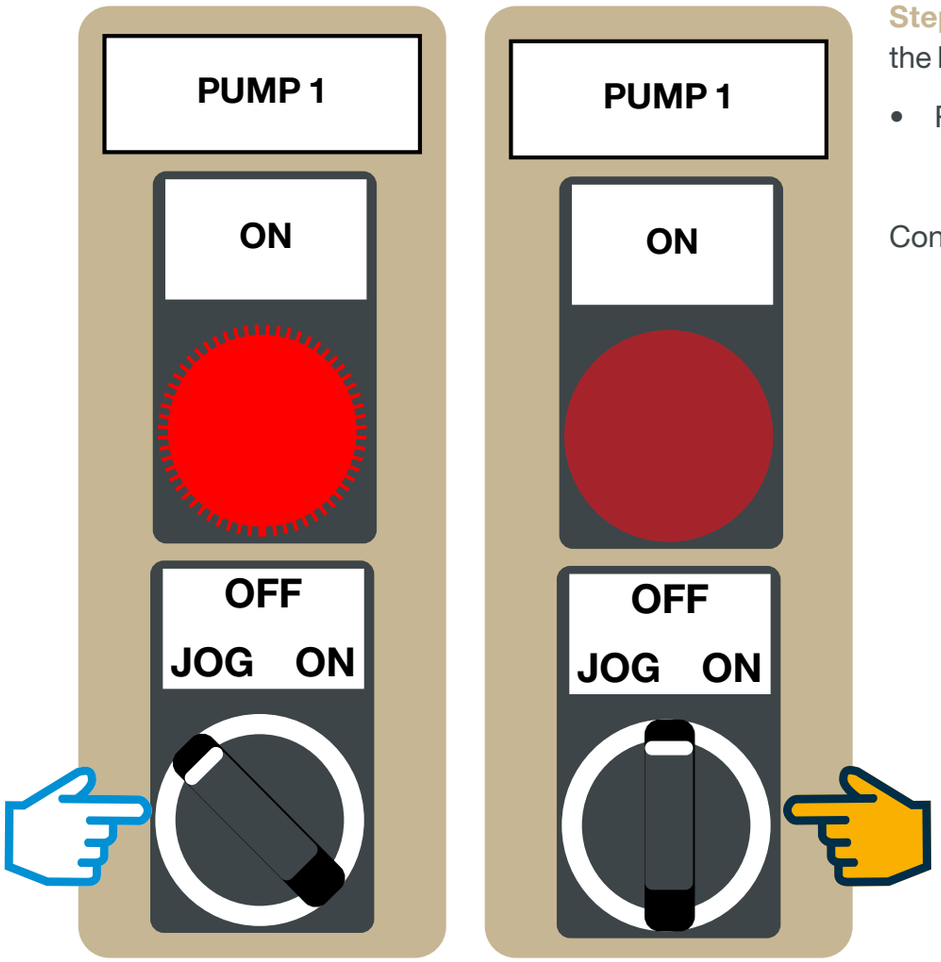
- This position sends chemical from the pump up to the Mixing Bowl Atomizer.



Step 5: Open **TANK 1** Main Valve, as shown.

- This position drains chemical from the Tank above down to the pump.

Continued ➲



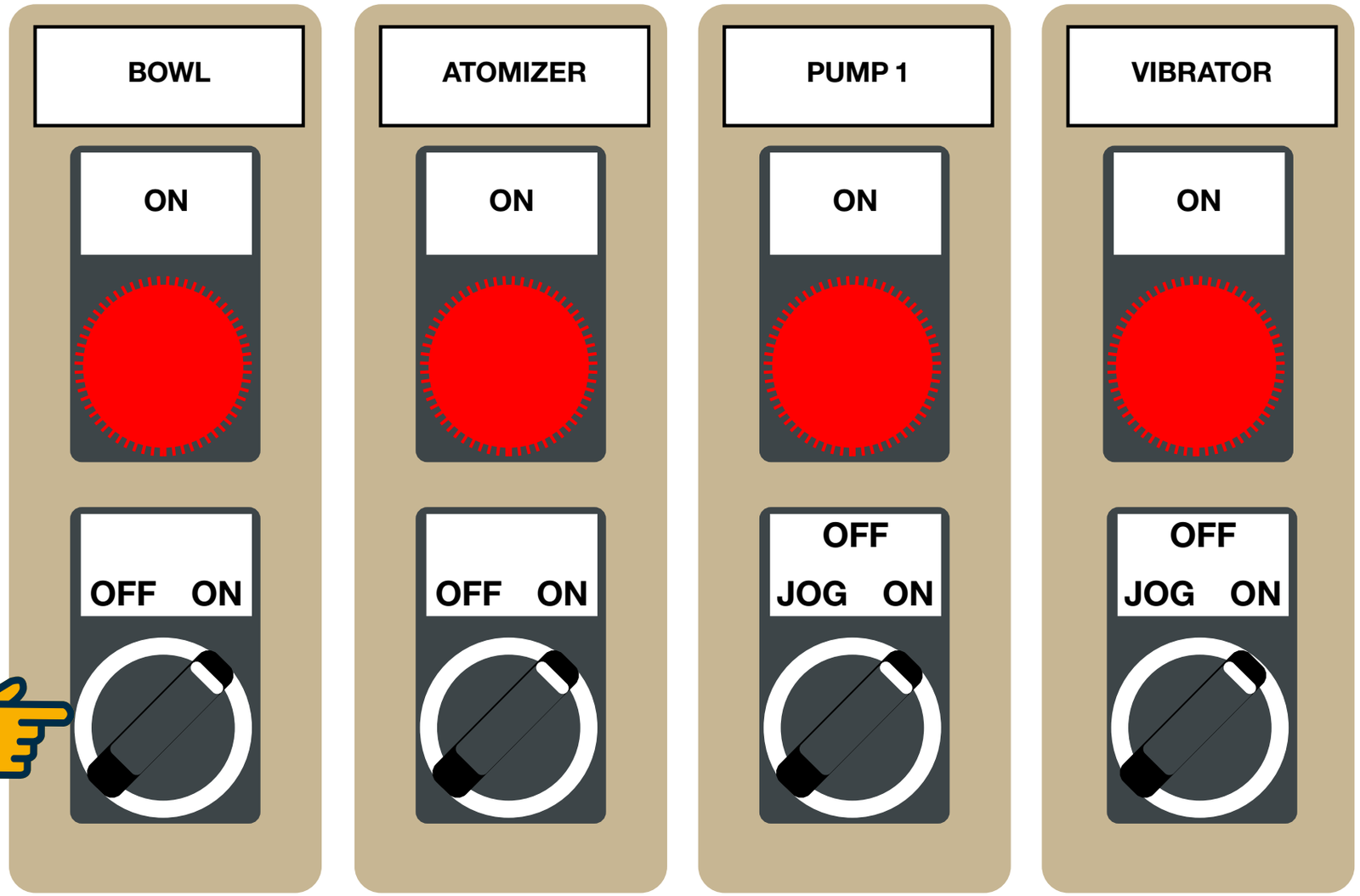
Step 6: Turn and hold **Pump 1** Switch (on the Control Panel) to **JOG** while chemical pumps up to the mixing bowl, priming the line.

- Release **Pump 1** Switch (returns to **OFF** position, light turns **OFF**).

Continued ➲

Note: seed empties from the Weigh Scale and fills the MIXING BOWL according to the FILL TIME pre-set (refer to page 5). The light will shut off when fill is complete.

Warning! If running one single batch, be sure to turn the VIBRATOR switch OFF when the VIBRATOR light turns off, otherwise, the Weigh Scale will begin filling for the next batch and run continuously as long as seed is in the Seed Hopper!



Step 7: Turn **ON** the following switches:

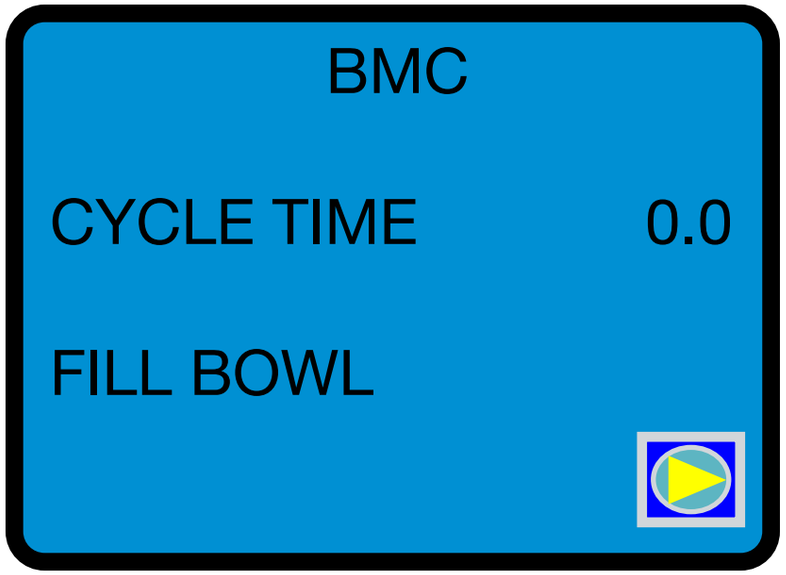
- **BOWL MOTOR**
- **ATOMIZER MOTOR**
- **VIBRATOR**
- **PUMP 1** (and **2** if both are used)

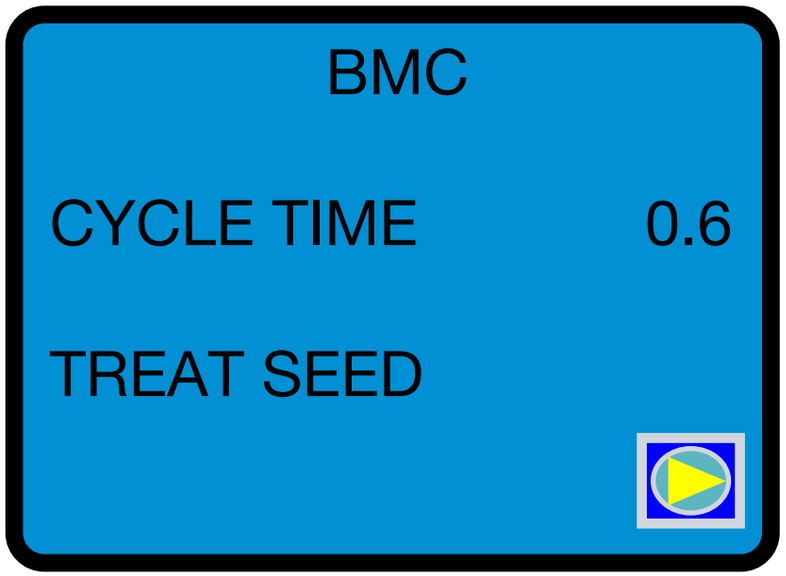
The **ON** light above each switch turns **ON**.

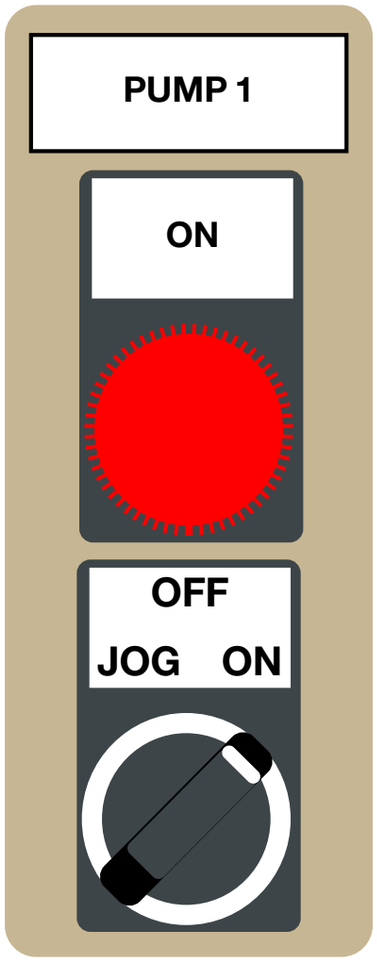
When the Vibrator switch is turned **ON**, the Batch Cycle Time begins...

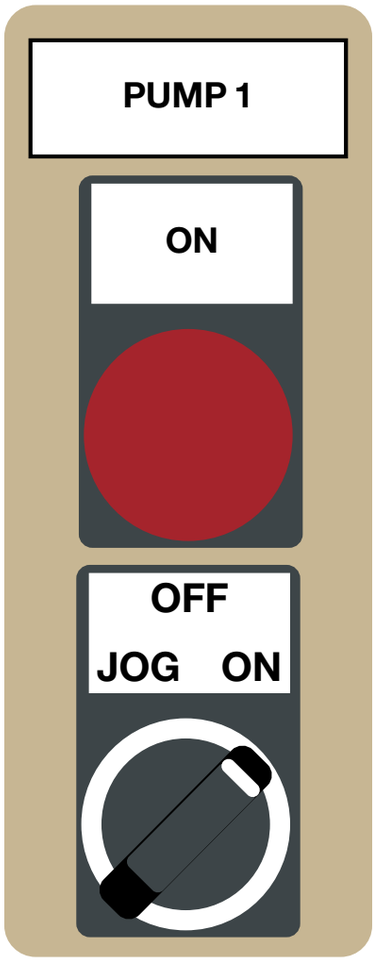
- The Weigh Scale fills with seed from the Inlet Hopper.
- Once the Weigh Scale has reached the capacity, the Scale Door opens and fills the Mixing Bowl with seed and the **ON** light above the Vibrator switch turns **OFF**.

Continued ➲









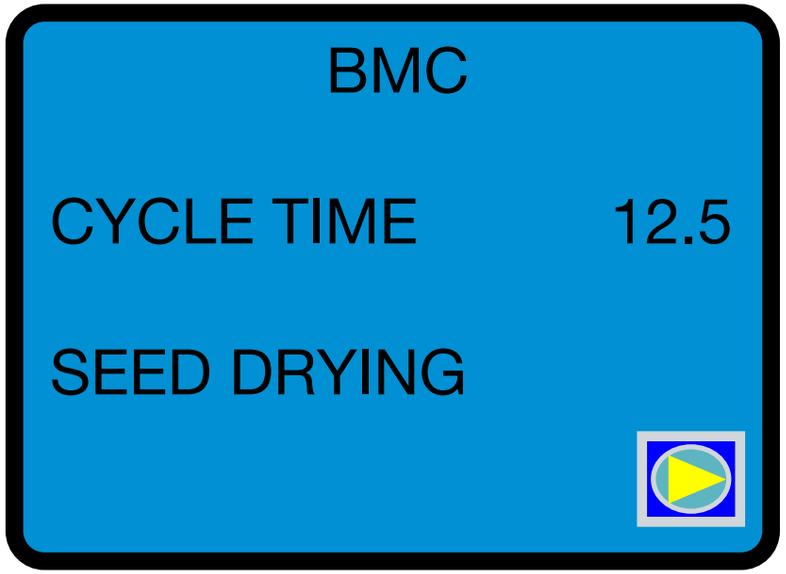
HMI - Treatment Sequence of Events

Once the **Vibrator Switch** is turned **ON**, the HMI displays each event in sequential order, according to the pre-set Timer settings (refer to page 5) for the duration of the cycle time.

The Cycle Time begins counting from zero and displays the following events...

- **FILL BOWL** - Weigh Scale Door opens and empties seed into the Mixing Bowl.
- **TREAT SEED** - **Pump** 1 sends chemical to the Mixing Bowl Atomizer for the duration pre-set according to **Pump** 1 Timer. **Pump** 1 Light turns **ON** while the Pump is running, then turns **OFF** when finished.

Continued ➲

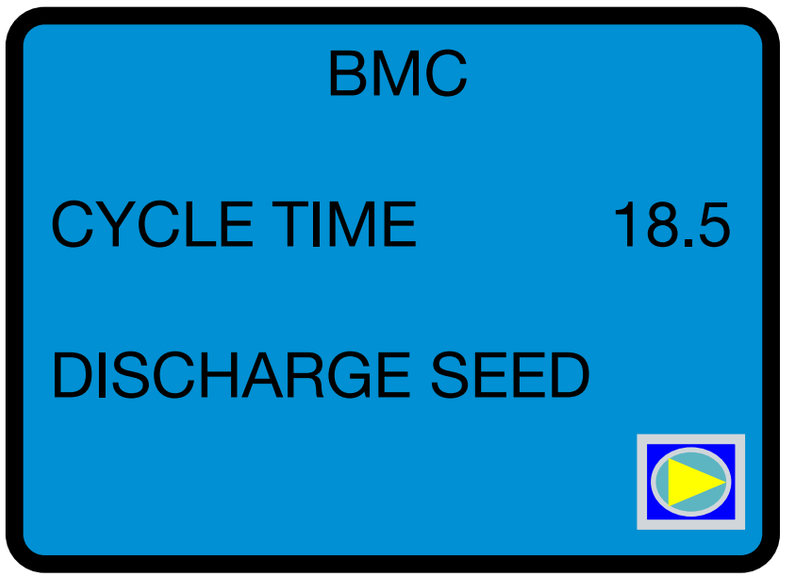


- **SEED DRYING** - Seed mixes with chemical and dries inside the Mixing Bowl.
- **DISCHARGE SEED** - Treated seed discharges from the Mixing Bowl.

When the batch cycle is complete, the Cycle Time resets to zero value.

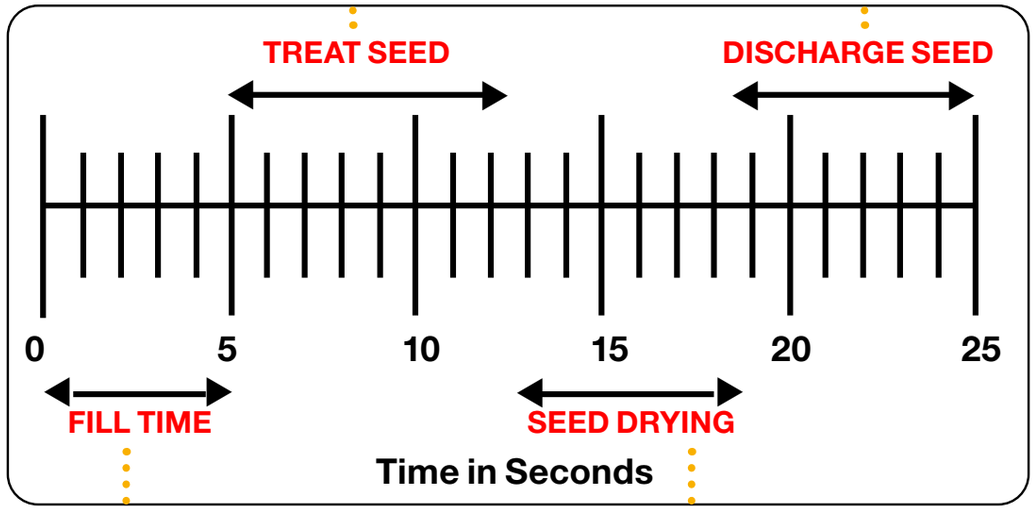
- Once the single batch or batching cycles finish running...
- Turn **OFF** the **PUMP 1**, **ATOMIZER**, and **BOWL** switches.
- Quality check treated seed for coverage.

This completes the BMC Auto Run Sequence procedure.



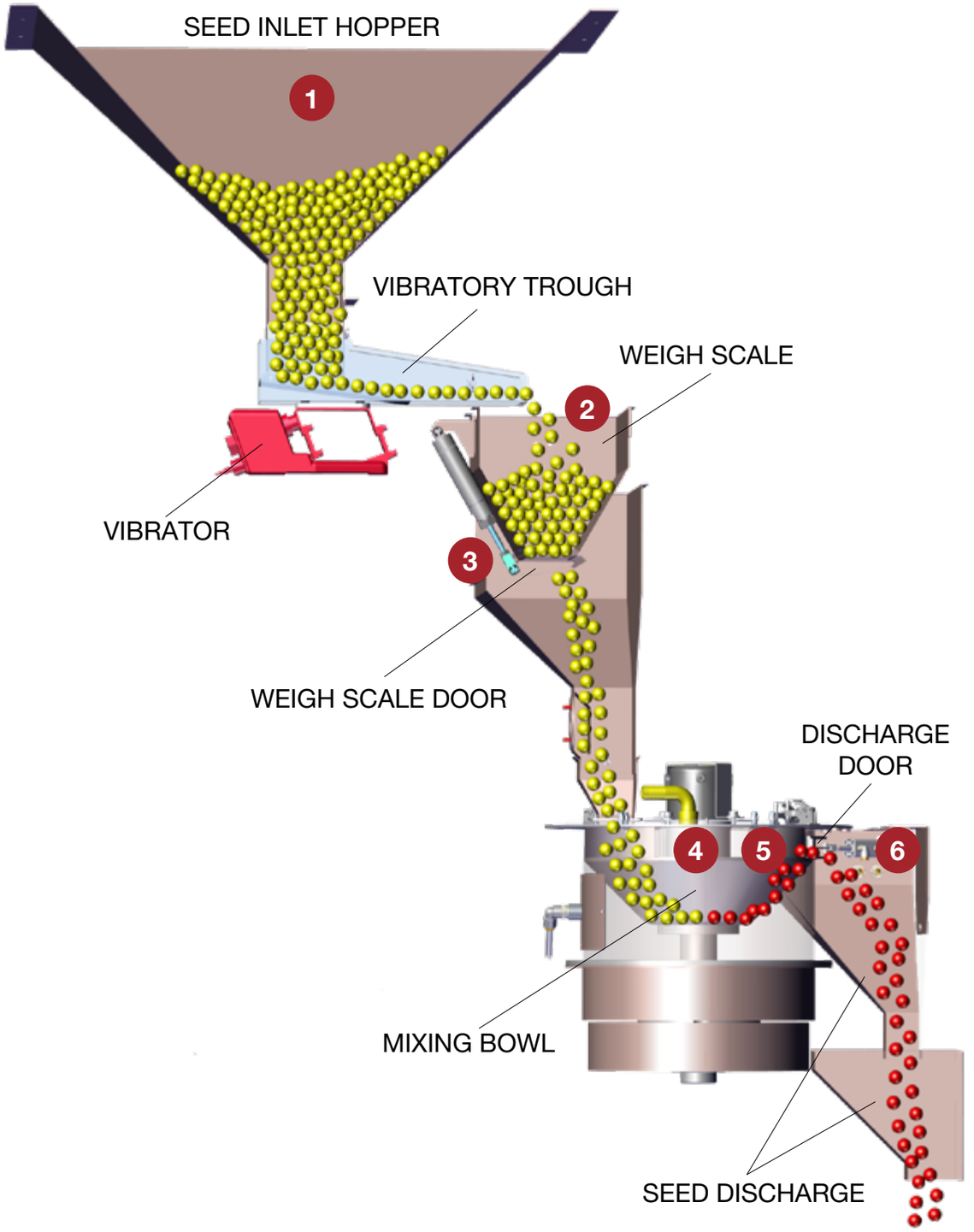
TREAT SEED (7.5)
Amount of time allotted for chemical product to enter the mixing bowl

DISCHARGE SEED (6.0)
Amount of time allotted for treated seed to exit from the mixing bowl



FILL TIME (0.5)
Amount of time allotted to fill the mixing bowl with seed from the weigh scale

SEED DRYING (6.0)
Amount of time allotted for seed to mix and dry in the mixing bowl



Theory of Operation

Step 1: Fill the Seed Inlet Hopper with clean seed.

Step 2: **CYCLE TIME**

When the Vibrator switch is turned **ON**, the Batch Cycle Time begins counting from zero on the HMI and the Weigh Scale fills with seed from the Seed Inlet Hopper.

Step 3: **FILL BOWL**

Once the Weigh Scale Optical Sensor activates by the accumulated weight of the seed, the Scale Door opens and empties the seed into the Mixing Bowl and the **ON** light above the Vibrator switch turns **OFF**.

Step 4: **TREAT SEED**

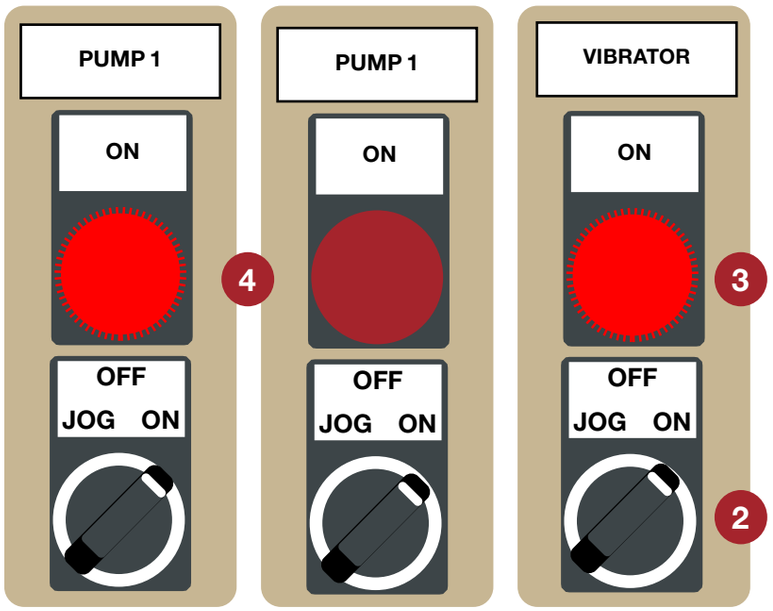
Pump 1 delivers chemical to the Mixing Bowl Atomizer and the **PUMP 1** Light turns **ON** while **Pump 1** runs, then turns **OFF** when finished.

Step 5: **SEED DRYING**

Seed mixes with chemical and dries inside the Mixing Bowl.

Step 6: **DISCHARGE SEED**

Once the Seed Drying time completes, the Mixing Bowl Discharge Door opens and the treated seed discharges from the Mixing Bowl.



Pump 1 Switch

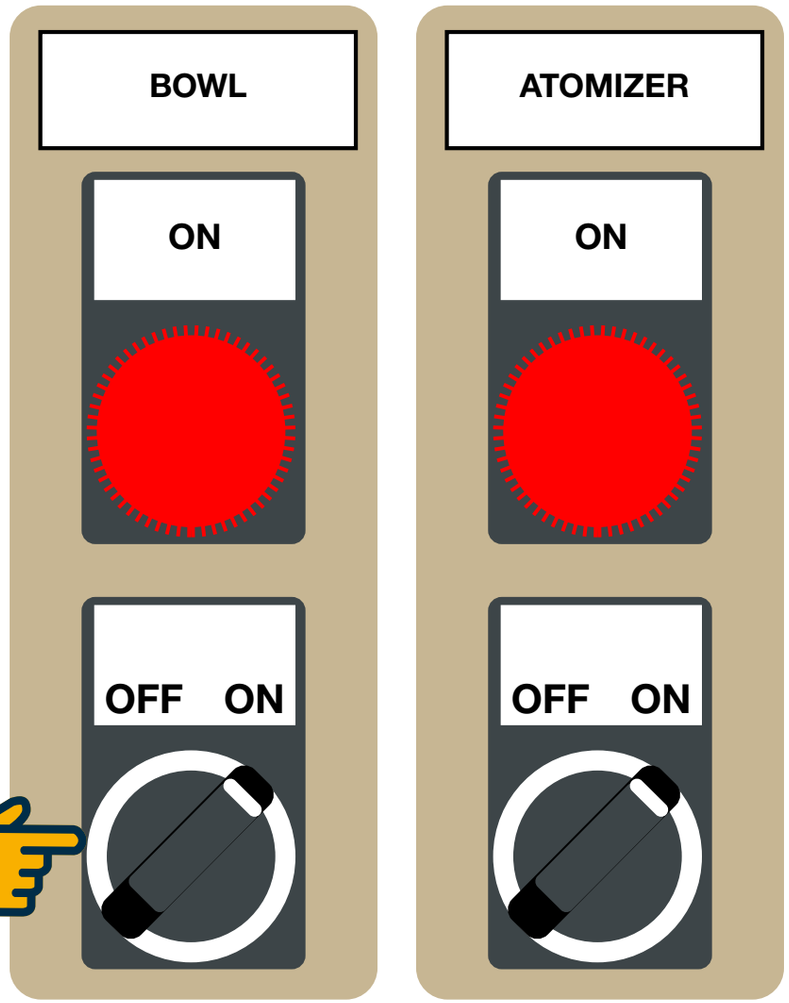
Vibrator Switch

HMI Touchscreen

MANUAL SYSTEM

Warning! Wear proper personal protective equipment when bagging treated seed: long sleeves, chemical resistant gloves and a face respirator >>

Note: Check the chemical label for the required application rate.



Treat Mode

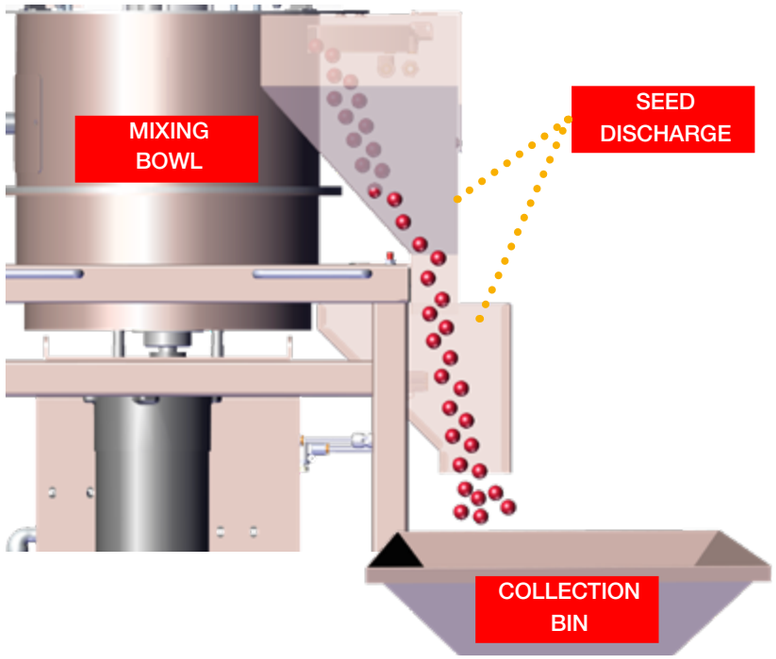
Ensure the Control Panel is connected to a power source (Electrical Service Required: 115VAC/1PH/60Hz/25AMP).

Step 1: Turn **ON** the following switches:

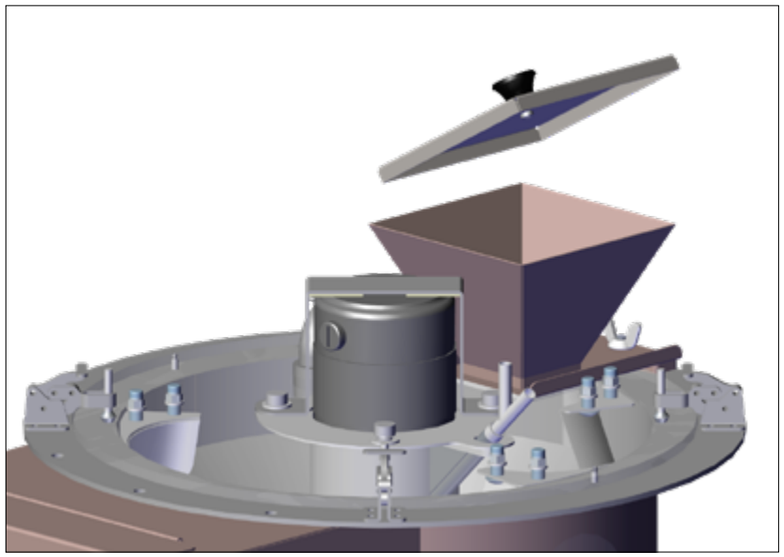
- **BOWL**
- **ATOMIZER**

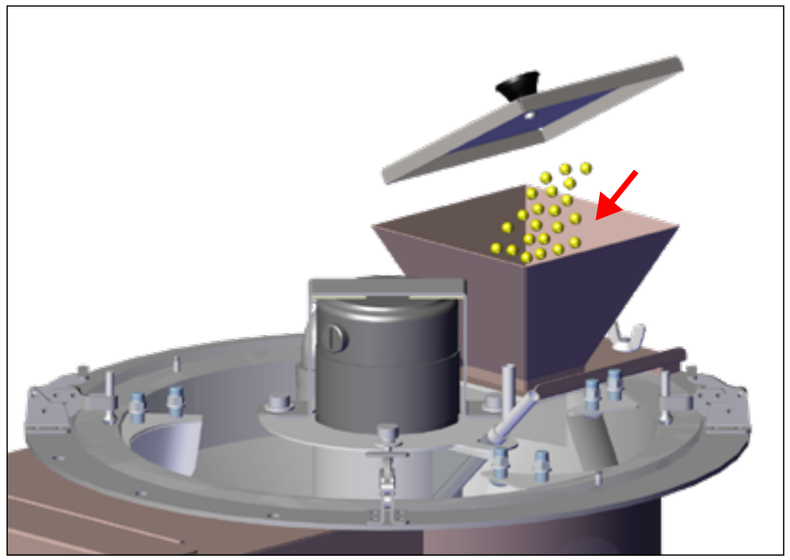
Both motors will start, as indicated by the **ON** light above each switch turns **ON**.

Continued ➲



Step 2: When ready to begin treating seed, ensure a collection bin or bagging device is located underneath or affixed to the Seed Discharge.

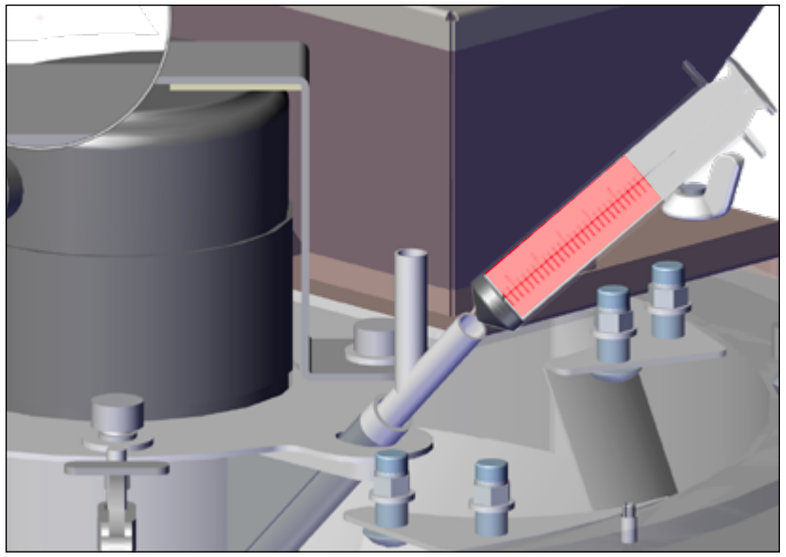


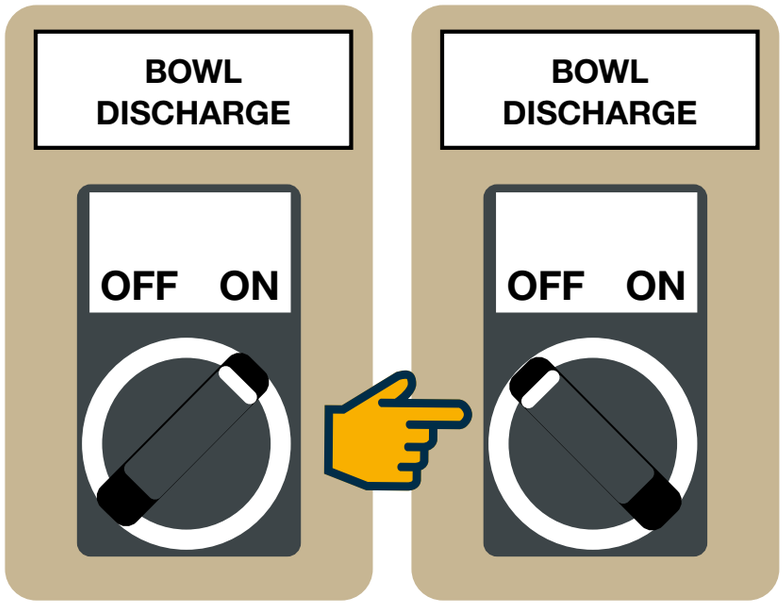


Step 3: Remove the Seed Inlet Cover on top of the Bowl Cover and place a determined amount of seed in the Mixing Bowl.

- Seed spins inside the Mixing Bowl.
- Replace the Seed Inlet Cover.

Continued ➲



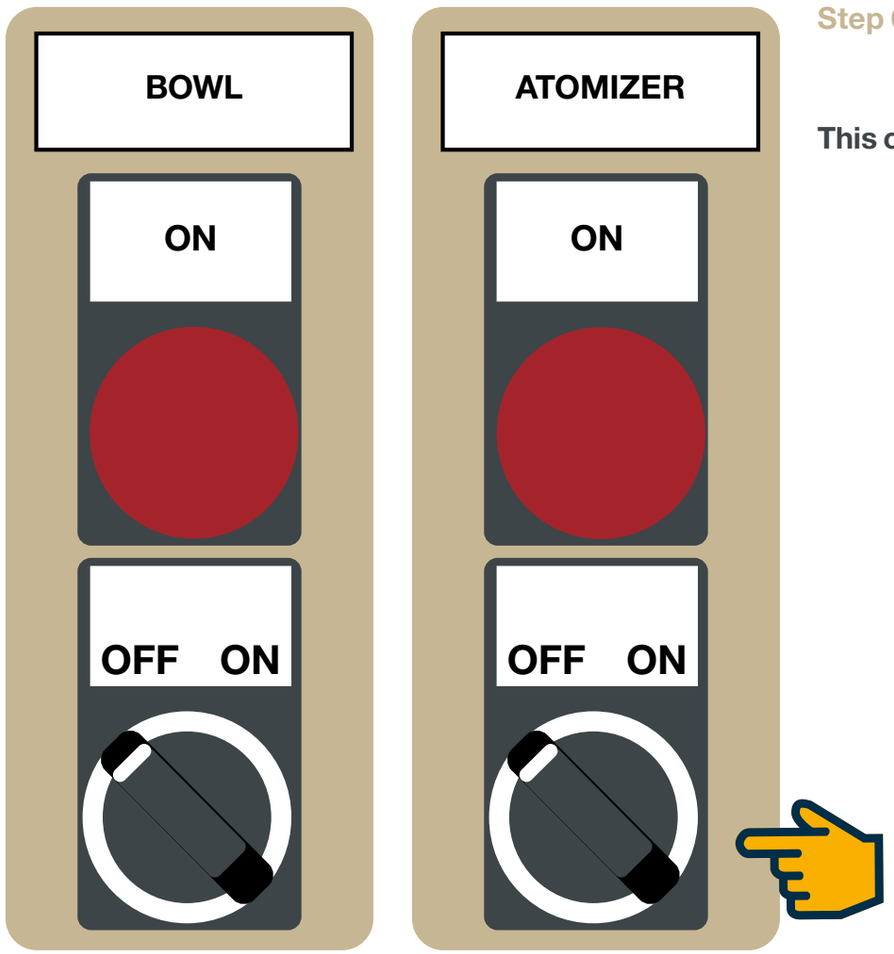


Step 4: Insert a syringe with chemical product in the Chemical Inlet.

- Allow the seed to mix with chemical.

Step 5: Turn the BOWL DISCHARGE switch ON.

- Treated seed will discharge from the Mixing Bowl.
- Then turn the BOWL DISCHARGE switch OFF.
- Check the quality of treated seed for coverage.



Step 6: When the batch cycle is complete, turn OFF the BOWL and ATOMIZER switches.

This completes the BMC Manual System.

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