Maintenance Guide

Contents

Brown Manufacturing Group, Inc.

4661 Stafford Ave SW

Wyoming, MI 49548

616-249-0200

Maintenance Procedures

Deactivating a Pump

1. In the software, navigate to Diagnostics → Plumbing
2. Tap the ‘Manual’ checkbox underneath the pump to be deactivated, so that a green check appears.
3. Make sure that the pump icon is greyed out, instead of green.
4. The pump is now deactivated. It will not turn on unless the pump icon is clicked, or manual mode is turned off.

Bleeding a Pump

Bleeding the Central Source pumps is slightly different for the fill pumps (pumps 1, 3, and 5) and the spray pumps (pumps 2, 4, and 6).

Bleeding a Fill Pump:

1. Deactivate the pump to be bled (see Deactivating a Pump).
2. Make sure that the input tube is securely inside the fluid to be bled through the pump.
    a. The input tubes for fill pumps are the 36in dip tubes inside the fluid source tanks.
        i. The tube for Pump 1 is labeled ‘Line 1’.
        ii. The tube for Pump 3 is labeled ‘Line 2’.
        iii. The tube for Pump 5 is labeled ‘Line 3’.
3. Make sure that the output tube is securely connected to the correct container.
    a. The output tube of a fill pump is attached to the 5gal tank inside the fluid cabinet.
    b. If the bleed needs to output to a different container, the tube can easily be removed from the 5gal tank, and placed in whatever container necessary.
        i. The output tube for Pump 1 is connected to Tank 1 and is labeled ‘Tank 1 Input’.
        ii. The output for Pump 3 is connected to Tank 2 and is labeled ‘Tank 2 Input’
        iii. The output for Pump 5 is connected to Tank 3 and is labeled ‘Tank 3 Input’

Important: When bleeding a fill pump, the fluid will be moving from one container to another. It is important to monitor the levels of both containers. There is nothing automatically preventing the source tank from emptying, or the end tank from overflowing. If air gets in the line, the bleed will have to be restarted.

4. Tap the pump icon on the touchscreen. The pump will turn on, and fluid will flow from the source tank, through the pump, and into the end tank.
5. Let the pump run for 2 mins.
6. If, after 2mins, there is still air anywhere in the line, check for the following, and try again:
    a. Make sure that the input dip tube is inside the input fluid, and the input tank is not empty.
    b. Make sure there are no cracks in the input dip tube.
    c. Tighten the bowl filter as hand-tight as possible.
    d. Make sure there are no leaks in the line
7. Tap the pump icon to turn off the pump.
8. Tap the ‘Manual’ checkbox to turn off manual control.

Bleeding a Spray Pump:

1. Deactivate the pump to be bled (see Deactivating a Pump).
2. A spray pump bleed will pull fluid from the 5gal tank, run it through the pump, and return it to the tank. If a different fluid needs to be bled through the pump, the input and output tubes will need to be removed and placed inside the desired fluid container.
    a. Both the input and output tubes for spray pumps are inside the 5gal tanks in the fluid cabinet.
    b. The input tube for Pump 2 is labeled ‘Tank 1 Output’. The output tube for Pump 2 is labeled ‘Tank 1 Bleed’.
    c. The input tube for Pump 4 is labeled ‘Tank 2 Output’. The output tube for Pump 4 is labeled ‘Tank 2 Bleed’.
    d. The input tube for Pump 6 is labeled ‘Tank 3 Output’. The output tube for Pump 6 is labeled ‘Tank 3 Bleed’.
3. Make sure that both tubes are securely inside (or connected to) the correct fluid container, and the end of the input tube is well below the fluid level.
4. Turn the Manual Bleed Valve to the ‘Bleed’ position.
    a. The Manual Bleed Valve for each spray pump is located directly above it.
5. Tap the pump icon on the touchscreen. The pump will turn on, and fluid will flow from the tank, through the spray pump, and return to the tank.
    a. During this process, it is possible that the back pressure regulator will activate, and cause strong vibrations inside the machine. This is alright, as long as it is maintaining a line pressure of less than about 130PSI.
6. Ensure that there is fluid coming out of the output tube.
7. Let the pump run for 2 mins.

8. If, after 2mins, there is still air anywhere in the line, check for the following, and try again:
    a. Make sure that the input dip tube is inside the input fluid, and the input tank is not empty.
    b. Make sure there are no cracks in the input dip tube.
    c. Tighten the bowl filter as hand-tight as possible.
    d. Make sure there are no leaks in the line
9. Tap the pump icon to turn off the pump.
10. Return the ‘Manual’ checkbox and the manual bleed valve to their original positions

Pressurizing a Line

1. To pressurize a fluid line, first ensure that both pumps belonging to that fluid line are properly bled (see Bleeding a Pump).
    a. For Line 1, the pumps are 1 and 2
    b. For Line 2, the pumps are 3 and 4
    c. For Line 3, the pumps are 5 and 6
2. Make sure that the fluid line output is connected to a Synergy machine.
3. Make sure that both of the manual shutoff valves between the Central Source and the Synergy are turned on (with the handle parallel to the tubing).
4. Make sure that the manual bleed valve is turned to ‘Operation’ position.
5. Ensure that the pump is in automatic control mode (tap ‘Manual’ in Diagnostic → Plumbing so that there is a red X)
6. Clear any errors currently on the machine, if any
    a. Tap the red triangle on the top bar
    b. Tap ‘OK’
7. The spray pump should turn on and attempt to pressurize. Both the virtual pressure gauge on the Home screen and the physical pressure gauge on top of the machine should show an increasing pressure. When it reaches the desired pressure, the spray pump should turn off.
8. On the Synergy software, spray out of the correct spray head. (Maintenance → Spray Head → Begin Spray)
    a. To prime Line 1, do a spray on Spray Head 1.
    b. To prime Line 2, do a spray on Spray Head 2.
    c. To prime Line 3, do a flush of either spray head.
9. As the Synergy sprays fluid out of the line, the pressure will slowly go down. The spray pump will then automatically turn on for a short amount of time to maintain the desired pressure. If this behavior is not observed, try clearing any errors and repeating the process.

Depressurizing a Line

1. Deactivate the spray pump for the line (see Deactivating a Pump)
    a. Pump 2 for Line 1
    b. Pump 4 for Line 2
    c. Pump 6 for Line 3
2. On the Synergy software, spray out of the correct spray head. (Maintenance → Spray Head → Begin Spray)
    a. To depressurize Line 1, do a spray on Spray Head 1.
    b. To depressurize Line 2, do a spray on Spray Head 2.
    c. To depressurize Line 3, do a flush of either spray head.
3. The line should lose pressure, without the spray pump repressurizing. Both the virtual pressure gauge on the Home screen and the physical pressure gauge on top of the machine should show a decreasing pressure.

The depressurizing process only relieves the fluid pressure in the line, it does not empty the line of fluid. If any plumbing parts need to be removed, it is suggested that the Emptying a Line procedure is completed as well, to prevent as much fluid spill as possible.

Emptying a Line

There are two parts to each fluid line: the fill system, containing the fill pump, and the spray system, containing the spray pump and many other components. Each half of a fluid line can be emptied independently.

Emptying a Fill Line:

1. Deactivate the fill pump for the line (see Deactivating a Pump)
    a. Pump 1 for Line 1
    b. Pump 3 for Line 2
    c. Pump 5 for Line 3
2. Make sure that the output tube is securely inside the correct container.
    a. The output tube of a fill pump is connected to the 5gal tank inside the fluid cabinet and is labeled ‘Tank X Input’.
    b. If the fluid needs to be output to a different container, the tube can be removed from the 5gal tank, and placed in whatever container is necessary.
3. Remove the 36in dip tube from the source tank
    a. The tube for Pump 1 is labeled ‘Line 1’.
    b. The tube for Pump 3 is labeled ‘Line 2’.
    c. The tube for Pump 5 is labeled ‘Line 3’.

4. Tap the pump icon on the touchscreen to turn on the fill pump.
5. The fill pump will turn on, and suck air through the dip tube. The fluid in the line will be emptied into the output container.

Emptying a Spray Line:

1. Deactivate the spray pump for the line(see Deactivating a Pump)
    a. Pump 2 for Line 1
    b. Pump 4 for Line 2
    c. Pump 6 for Line 3
2. Depressurize the line (see Depressurizing a line)
3. Turn the Manual Bleed Valve to the ‘Bleed’ position.
4. Remove the input dip tube from the 5gal tank.
    a. The input tube for Line 1 is the dip tube labeled ‘Tank 1 Output’
    b. The input tube for Line 2 is the dip tube labeled ‘Tank 2 Output’
    c. The input tube for Line 3 is the dip tube labeled ‘Tank 3 Output’
5. Tap the pump icon to turn on the spray pump.
6. The spray pump will turn on, and suck air through the dip tube. The fluid in the line will be returned to the 5gal tank.
7. When fluid stops coming out of the bleed tube, turn off the pump.
8. This will empty as much fluid as possible from the line up until the bleed valve, but not anything further (see Plumbing diagram for details). This means that if a pressure transducer, pressure gauge, or any connection between the spray system and the Synergy needs to be removed, the fluid will need to be drained from that line. The best way to do this is as follows:
    a. Turn the Manual Bleed Valve to ‘Operation’ mode
    b. Open both Manual Shutoff Valves between the Central Source and the Synergy (turn the handle so it is parallel to the tubing)
    c. Tap the pump icon to turn on the spray pump
    d. Do a test spray on the appropriate fluid head (*Diagnostics → Spray Head X → Start Spray*)
        i. To empty Line 1, do a test spray of Spray Head 1.
        ii. To empty Line 2, do a test spray of Spray Head 2.
        iii. To empty Line 3, do a flush of either spray head.
    e. When fluid stops coming out of the spray head, turn off the pump.

The Emptying a Fluid Line process pumps as much fluid as possible from a fluid line. It does not, however, remove all of the fluid. When removing plumbing components, it is advised to be prepared for minor spillage.

Swapping a Pump

1. Depressurize the Line (see Depressurizing a Line).
2. Empty the Line (see Emptying a Line)
3. Deactivate the pump (see Deactivating a Pump).
4. Remove the wing nuts fastening the pump's mounting bracket to the mounting crossbar.
5. Disconnect the waterproof electrical connection about 8in along the pump's cable
6. Disconnect the plumbing connections on either side of the pump.
    a. For a fill pump, both will be valved quick-disconnect connections. This simply requires pressing the latch button and lightly pulling. While no fluid should come out of the fluid line, a small amount may come out of the pump itself
    b. For a spray pump, one connection will be a quick-disconnect, while the other is a push-connect. To remove a push-connection, push on the gray ring on the end of the connector, while lightly pulling on the tube. Be prepared for a small amount of fluid to come out of both the pump and the fluid line
7. Replace the old pump with the new one
8. Reconnect the plumbing connections
    a. When reconnecting a push-connect. Push the tubing into the connector, pull firmly, and then push again. You should feel the tube slide into the gripping teeth.
9. Reconnect the waterproof electrical connection, ensuring the proper orientation
    a. Both the male and the female end of the electrical connector have pin numbers, ensure that the same number pins are being connected when plugging in the connector
    b. Twist the collar to secure the connection
10. Re-fasten the pump to the crossbar by replacing the wing nuts and tightening firmly.
11. Test the pump by tapping the pump icon, and ensuring the pump activates.
    a. Do not leave the pump running in manual control mode for too long, so a tank does not overfill, or a line over-pressurize.
12. To return to an operational state the pump will have to be bled and the line re-pressurized (see Bleeding a Pump and Pressurizing a Line).

Calibrating a Fluid Sensor

1. Deactivate both pumps on the line (see Deactivating a Pump).
    a. Pumps 1 and 2 for Line 1
    b. Pumps 3 and 4 for Line 2
    c. Pumps 5 and 6 for Line 3

2. Navigate to Factory Settings → Sensor Calibration.
3. Remove the 5gal fluid tank from the scale, and empty it of any fluid that isn't water.
4. Check that the 'Raw' value on the software reads between 10-20
5. Fill the tank with 5gals of water.
6. Place the full tank on the scale.
7. Tap 'Add Point'.
8. For 'Gallons', put the number of gallons in the tank.
9. For 'Raw', put the current raw reading, as shown on the fluid display above.
10. Add 2 more points, filling the tank with 2.5, and 0gals.
11. Empty the fluid tank and place it back on the scale.
12. Turn the pumps back to automatic mode. The fill pump should automatically refill the tank.

Regular Maintenance

Daily Maintenance

1. Check for Errors
    a. Check to see if the red alert triangle has appeared in the top bar of the Home Screen.
    b. If it has, tap the icon, and consult the Central Source Troubleshooting Guide.
2. Check the pressure in the lines
    a. Navigate to Settings → Lines
    b. For each fluid line:
        i. Select the line number
        ii. Check the 'Desired Pressure' value and ensure that the physical pressure gauge on the top of the machine shows a similar value (It is likely that the gauge will show a slightly higher value than the 'Desired Pressure' value. This is fine, as long as the actual pressure does not exceed the desired by more than about 20 PSI).
    c. If the pressure gauge does not show the expected value
        i. Check that the spray pump is not deactivated
            1. Pump 2 for Line 1
            2. Pump 4 for Line 2
            3. Pump 6 for Line 3
        ii. Check that the Manual Bleed Valve is in the 'Operation' position
        iii. Check for errors

1. If there is a red alert triangle on the top bar, tap it to read error messages. Consult the Central Source Troubleshooting guide.

3. Check that there are no leaks
    a. Do a cursory check for any major puddles in the drip tray or the floor underneath the machine
    b. A minor leak can occur in many places, the most common are:
        i. The input and output connections of each pump
        ii. The input and output connections of regulator
        iii. The seal around the bowl filters
        iv. The manual shutoff valves on the outside of the Central Source and the Synergy

Weekly Maintenance

1. Test Sensor Response
    a. Fluid Level Sensors
        i. Navigate to the Home Screen
        ii. Push down on the tank scale, and ensure the digital fluid level display goes up.
        iii. Pull up on the tank scale, and ensure the digital fluid level display goes down.
        iv. If any errors are thrown in this process, clear them.
            1. Tap the red alert triangle
            2. Tap ‘OK’
    b. Pressure Sensors
        i. Do a test spray on the Synergy machine:
            1. While the Synergy machine is spraying, the physical pressure gauge will slowly go down, and then quickly back up when the spray pump repressurizes.
            2. Ensure that the digital pressure gauge display closely emulates what the physical pressure gauge shows.

Monthly Maintenance

1. Check Filters
    a. For each filter:
        i. Empty the line (see Emptying a Line). For spray pump filters, step 8 of Emptying a Spray Line does not need to be done.

ii. Remove the bowl on the bottom of the filter.
    1. The bowl will likely be full of fluid.
iii. Inspect the filter, and ensure that the filter mesh is not clogged with coagulated pretreat.
iv. If so, the filter needs to be replaced.
    1. Remove the old filter by firmly pulling down
    2. Clean the filter housing of any remaining pretreat or debris
    3. Install the new filter by pushing it up into the housing until it is firmly in place
v. Replace the bowl by turning it as hand-tight as possible.