Maverick LONG-TERM Shutdown Procedure

PLEASE NOTE: Once installed, the Maverick is intended to be used as a daily production machine. If possible, we recommend avoiding long periods of non-use.

PLEASE NOTE: The following procedure is used to evacuate ink from the entire system. As such please plan to have an adequate supply of ink available for the priming process after the shutdown period.

PLEASE NOTE: Always be mindful of moving parts around the machine. Several components will be moved during the shutdown process, and it is best practice to keep safety in mind during the procedure.

PLEASE NOTE: The following steps assume that the machine has just finished printing the final copy before the shutdown procedure. Many of the following steps will involve physical cleaning of components. Due to the nature of water-based ink, residue can build up. Taking a little extra time to clean now, will make starting back up that much easier.

-- START --

SECTION 1

1. **Click the STOP button**
   Click the **STOP** button to take the machine out of an active print status.
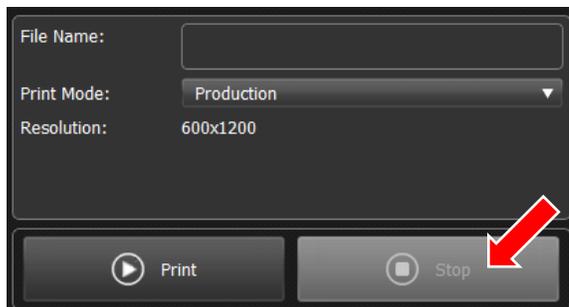
2. **Print Nozzle Test**
   Print a *Nozzle Test* to ensure that the printheads are in good working condition prior to the long term shutdown. The test print should be dated and stored with the machine.

3. **Backup software settings**
   Export a copy of the existing settings using the Maverick software. Save this to a folder on the desktop labeled "Backups." Navigate to the *Configure tab* and click the *Printer Option* sub-section. Click the *Export* button, select the desired directory, and then click the *OK* button to export the current settings.
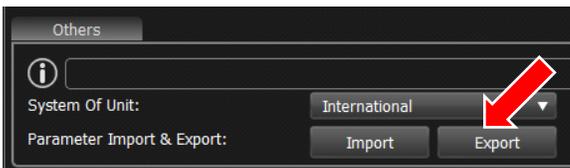
4. **Lower heat press temperature to 0**
   Lower the heat press temperature setting for both presses to 0.

5. **Seal the printhead plate against the wiper tray gasket**
   Navigate to the *Maintain* tab and click the **Keep Wet** button. The head carriage will lower itself until coming in contact with the gasket of the wiper tray.
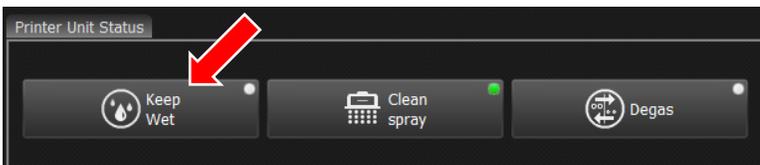
6. **Visually confirm that the heads are being protected**
   Once the keep wet process is complete, the software will show a little green light on the Keep Wet button. Open the left front door to visually confirm that the head plate has sealed against the wiper tray gasket, and then close the door.

7. **Close the printer software**

   Close the printer software. A dialog box will pop up to confirm that the software should indeed be closed. There will also be a note about making sure the printer is in a keep wet status. Please confirm that the printhead carriage is sealed against the wiper tray (capped) before proceeding. It is important to close the software when powering down the printer, because the software is used to trigger the initialization process upon startup.
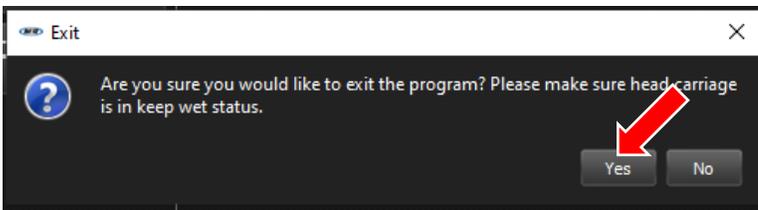
8. **Power OFF the machine**

   Press the power button to turn the machine off.
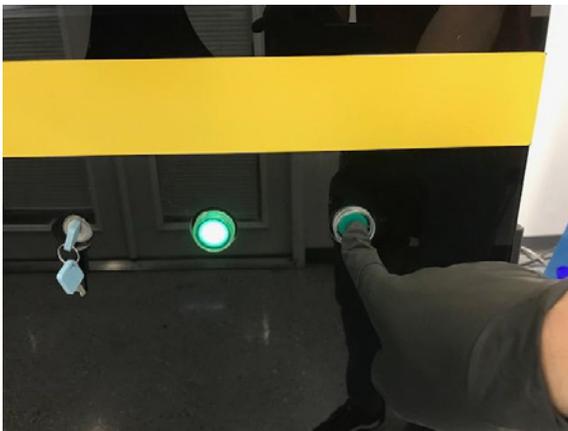
9. **Empty the waste tank**

Disconnect the connector for the waste tank float sensor. Dispose of the waste tank contents via the proper safety protocols before proceeding.

10. **Remove head carriage front cover**

Remove the sheet-metal cover that is attached to the front of the head carriage for easy access and visibility into the printhead compartment.
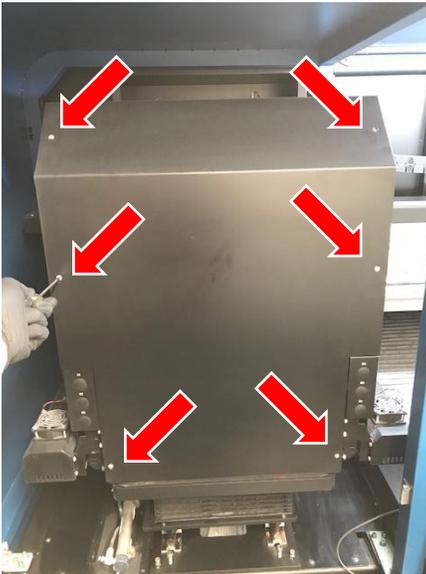
11. **Power ON the machine**

Press the power button to turn on the machine.

12. **Listen for the X-Axis to engage**

    Wait for the X-Axis to audibly engage (approximately 15s after power on). A series of "tumbling" noises will be heard, at which point there is open communication to the PLC.

13. **Launch the printer software**

    Open the *Maverick* software to begin the initialization procedure. The printer status will change from *CONNECTING* to *IDLE* when the machine is ready for use.

14. **Visually confirm the printheads are uncapped**

    Confirm that the printhead carriage has separated from the gasket of the capping station and is in an idle state. Please see the gap in the image below.
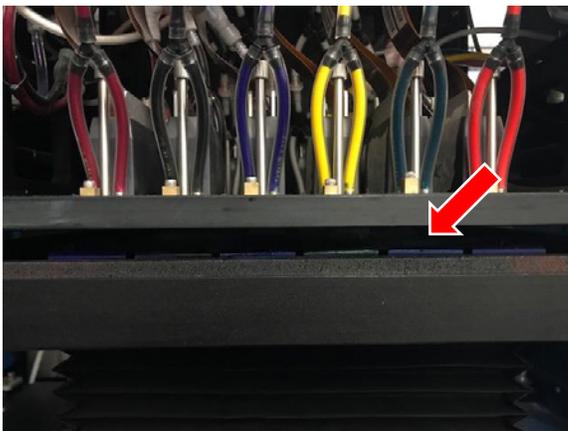
15. **Adjust the Auto Keep Wet setting**

Under the *Auto Keep Wet* option, set the *Wait Time* to a value of "60 minutes" and then deselect the checkbox. This will disable the function that automatically caps the machine after a period of non-use. It is best practice to disable this feature whenever a physical cleaning of the headplate will occur.
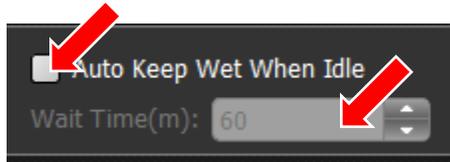
16. **Confirm there are no obstructions along gantry path**

During the next step, the head carriage will be moved to the far-right side of the gantry. This will allow for easy access during the cleaning procedure. Being mindful NOT to lean or reach into the machine, please confirm that there are no obstructions along the path of the gantry. The arrows seen in the image below are meant to point to the path of travel for the gantry.
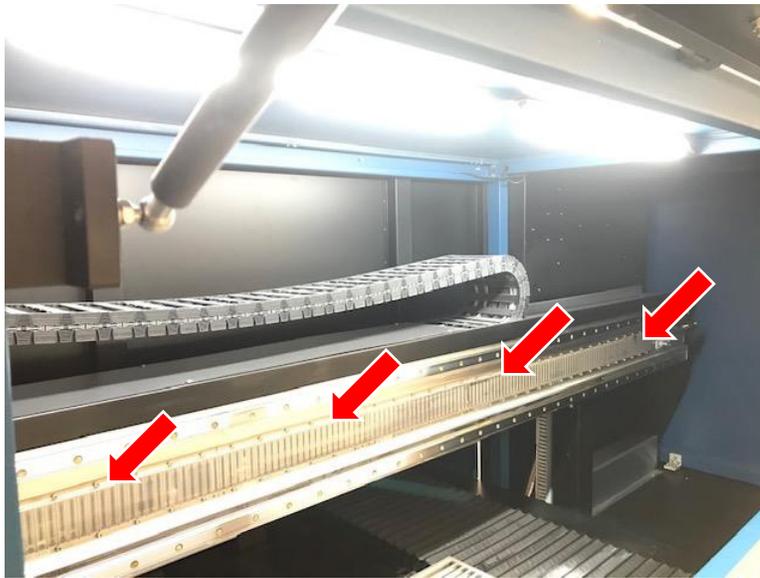
17. **Move the head carriage to the right-hand side of the machine**

If the path of the gantry is clear, navigate to the *Maintain* tab in the Maverick software. In the upper-left corner, there will be a directional pad. Click the *right arrow* once to move the head carriage to the center of the machine. Click the *right arrow* a second time to move the head carriage the rest of the way to the right-hand side of the machine.
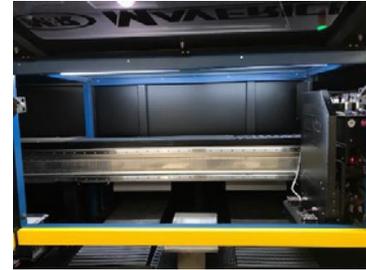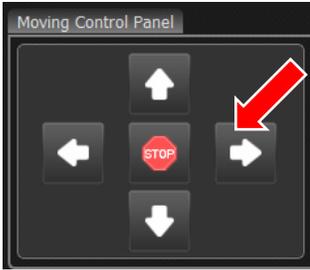
18. **Open right-hand access door**
    Carefully swing the monitor mount to the side of the machine. Open the right-hand side door to gain direct access to the head carriage.

19. **Visually inspect the headplate surface**
    Set a small light (or phone) on the interior floor of the compartment (under the head carriage) to provide light to the underside of the head plate. Visually inspect the head plate surface to determine how much cleaning will be necessary during the following step.

20. **Physically clean the headplate surface**
    It is very important to take extra caution during this step. The goal is to clean any debris (lint, ink buildup, etc.) from the areas AROUND the printheads. Please do not touch or wipe the printheads themselves. Only lint-free wipes should be used during this process, as well as distilled water and/or I-CLEAN solution. DO NOT use aggressive chemicals that could damage the printheads. Gently clean the entire head plate surface until no buildup is present.

21. **Move the head carriage back to the home position**
    At this point, the head carriage should be able to return to the home position. Ensure that there are no obstructions in the way of the head carriage before proceeding. Navigate to the *Maintain* tab in the Maverick software. In the upper-left corner, click the *left arrow* once to return the head carriage all the way to the home position above the wiper tray.
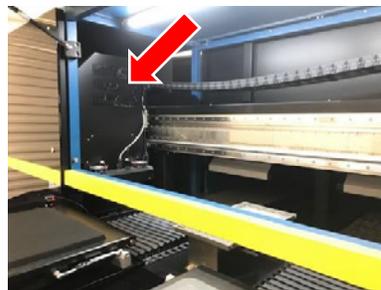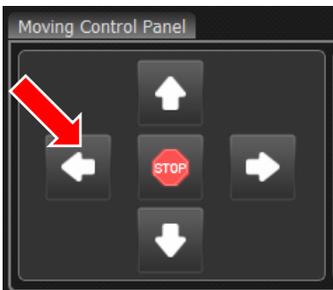
22. **Disconnect sub-tank float sensors**
    Disconnect all (8) sub-tank float sensors. This will prevent a "low ink level" signal being sent, which would cause the ink pumps to begin circulating.
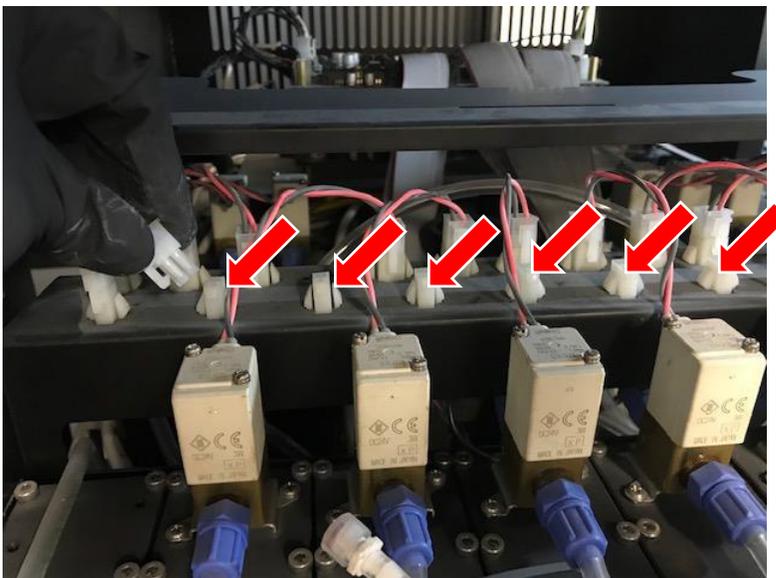
23. **Open recirculation flow control valves**

Open the rear panel compartment that houses the ink lines and reservoirs. Locate the flow control valve for each ink line and set each of the flow control valves to *12,* which represents fully open.

24. **Lower and set the Negative Pressure**
Navigate to the *Maintain* tab to find the fields for inputting the desired negative pressure. Use a value of -3.0kPa for the color field and -3.0kPa also for the white field. Once entered, click the *Set Neg. Pre.* button to apply.
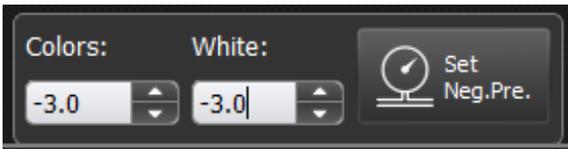
25. **Wait approximately 10 minutes**
Wait for approximately 10 minutes to let the ink recirculate back into the main reservoirs.

26. **Set and use the Press All function**
Set the *Press Time* to 9*s* and the *Drain Time* to 1*s.* Click the *Press All* button to purge ink through the printheads. If the ink pumps have engaged, wait until they finish pumping ink and then click the *Press All* button again to purge ink a second time. Repeat the process until the majority of ink has been visibly purged from the inlet lines (approximately 5 times).

27. Lower and set the Negative Pressure

Navigate to the *Maintain* tab to find the fields for inputting the desired negative pressure. Use a value of -1.1kPa for the color field and -1.1kPa also for the white field. Once entered, click the *Set Neg. Pre.* button to apply (NOTE: do not set to -1.0, as this will trigger an alarm).

28. Disconnect ALL recirculation electronic valves

In the rear compartment of the machine, disconnect all (8) electronic recirculation valves so that they are in a closed state.
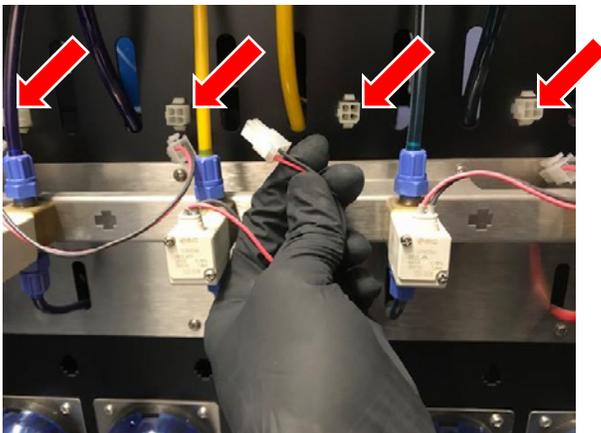
29. Place temporary fluid container near ink reservoirs

Position an empty container at the rear of the machine which will be used for collecting fluid during the cleaning process. The container should have at least a 5-gallon capacity to avoid any interruptions during the cleaning process.

30. Place distilled water containers and cleaning solution near ink reservoirs

Position (2) gallon jugs of distilled water at the rear of the machine near the ink containers. Similarly, place (2) I-CLEAN-5L containers near the distilled water jugs. In the following steps, the distilled water will be used to clean the system, as well as the cleaning solution, which will ultimately stay as a preservation fluid in the lines.

31. Organize the containers

To prevent any delays during the future steps, it is best to organize all containers near the ink reservoirs at this time. Set the 5-gallon empty container centered against the back compartment. Place (1) of the distilled water containers and (1) of the I-CLEAN-5L containers to behind this. The additional containers of distilled water and I-CLEAN-5L are meant as reserves if needed.

32. Connect temporary feeder hoses

Cut a total of (8) lengths of tubing to a size of 36" each that will serve as temporary feeder lines. Locate the ink line that runs from the outlet of the main reservoir to the inlet of the corresponding ink pump. Disconnect this line at the end attached to the main reservoir and connect it to a temporary feeder line. Repeat this process for each channel of ink and place all feeder lines into the distilled water container. A zip tie can be used to keep the lines grouped together.

33. Install temporary recirculation routing lines

Cut a total of (8) lengths of tubing to a size of 36" each that will serve as temporary exhaust lines. Trace the recirculation line for each color channel back to the corresponding main reservoir. Disconnect this line from the lid of the main reservoir and connect it to one of the temporary exhaust lines. Repeat this process for all (8) recirculation lines and route the ends of each section into the temporary fluid container. A zip tie can be used to keep all hose ends secure while positioned inside of the container.

34. Seal the main ink reservoirs

Install a cap on each of the inlet and outlet fittings found on the lids of the main ink reservoirs. This will help protect the ink that is remaining inside of each reservoir.

35. Reconnect sub-tank float sensors for ALL channels

Reconnect all the sub-tank float sensors and confirm that the pumps are now operating. Each pump should be circulating distilled water up to the sub-tanks.

36. Use the Load Ink command

Once the pumps have timed out from the initial priming, a low-ink alarm will likely be triggered. If this occurs, click the *Load Ink* button to continue filling the sub-tanks and clear the low ink alarm. (The timeout period should be approximately 80 seconds). If the alarm is still present, click the *Load Ink* button again and wait for more distilled water to be pumped to the sub-tanks. Repeat as necessary until the sub-tanks are full and the alarm has cleared.

37. Reconnect recirculation electronic valves for ALL channels

At the rear of the machine, reconnect the (8) electronic valves for all channels.

38. Alternate between the Press White and Press All functions

Set the *Press Time* to 6*s* and the *Drain Time* to 1*s*. Click the *Press White* button to flow distilled water through the white lines. Wait approximately 60 seconds, and then click the *Press All* button to flow distilled water through all the lines.

39. Confirm the flow of distilled water

At this point, the pumps should be operating on their own and sending more distilled water to the sub-tanks. There should also be distilled water cross-flowing through the printheads and back through the recirculation lines. The recirculation lines should be routing fluid into the 5-gallon fluid container.

40. Monitor the fluid levels and inspect the ink lines

Keep checking the fluid level of the distilled water container to make sure that the container does not run out. If low, switch in the reserve container. Similarly, check the level of the fluid catch container. Inspect all ink lines from the inside of the head carriage as well as in the rear compartment. Allow fluid to circulate until the lines are mostly clear.

41. **Alternate between the Press White and Press All functions again**
Set the *Press Time* to 6*s* and the *Drain Time* to 1*s*. Click the *Press White* button to flow distilled water through the white lines. Wait approximately 60 seconds, and then click the *Press All* button to flow distilled water through all the lines.

42. **Remove feeder lines from distilled water container and wait 5 minutes**
Remove the ends of the feeder lines from the container of distilled water. Allow air to be pumped into the lines, which will cause the remaining distilled water to continue flowing into the catch container until the lines are mostly empty. This should take approximately 5 minutes.

43. **Place temporary feeder lines in I-CLEAN-5L container**
Place the ends of the temporary feeder lines into the I-CLEAN-5L container.

44. **Use the Load Ink command**
Once the pumps have timed out from the initial priming, a low-ink alarm will likely be triggered. If this occurs, click the *Load Ink* button to continue filling the sub-tanks and clear the low ink alarm. (The timeout period should be approximately 80 seconds). If the alarm is still present, click the *Load Ink* button again and wait for more cleaning solution to be pumped to the sub-tanks. Repeat as necessary until the sub-tanks are full and the alarm has cleared.

45. **Set and use the Press All function**

Set the *Press Time* to 6*s* and the *Drain Time* to 1*s*. Click the *Press All* button to flow cleaning solution through the lines.

46. **Confirm the flow of cleaning solution**
At this point, the pumps should be operating on their own and sending more cleaning solution to the sub-tanks. There should also be cleaning solution cross-flowing through the printheads and back through the recirculation lines. The recirculation lines should be routing fluid into the 5-gallon fluid container.

47. **Monitor the fluid levels and inspect the ink lines**
Keep checking the fluid level of the I-CLEAN-5L container to make sure that the container does not run out. If low, switch in the reserve container. Similarly, check the level of the fluid catch container. Inspect all ink lines from the inside of the head carriage as well as in the rear compartment. Allow fluid to circulate until the lines are primed with cleaning solution.

48. **Use the Press All function**
Confirm the *Press Time* is set to 6*s* and the *Drain Time* to 1*s*. Click the *Press All* button to flow cleaning solution through the lines.

49. Disconnect ALL recirculation electronic valves
Disconnect all electronic recirculation valves so that they are in a closed state.
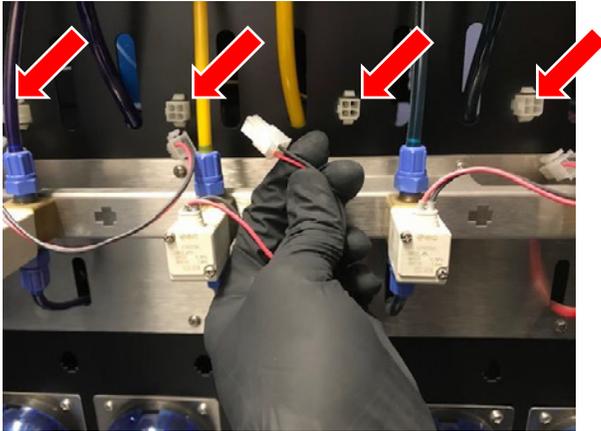
50. Disconnect sub-tank float sensors
Disconnect all (8) sub-tank float sensors. This will prevent a "low ink level" signal being sent, which would cause the ink pumps to begin circulating.

51. Confirm there are no obstructions along gantry path
During the next step, the head carriage will be moved to the far-right side of the gantry. This will allow for easy access during the cleaning procedure. Being mindful NOT to lean or reach into the machine, please confirm that there are no obstructions along the path of the gantry.
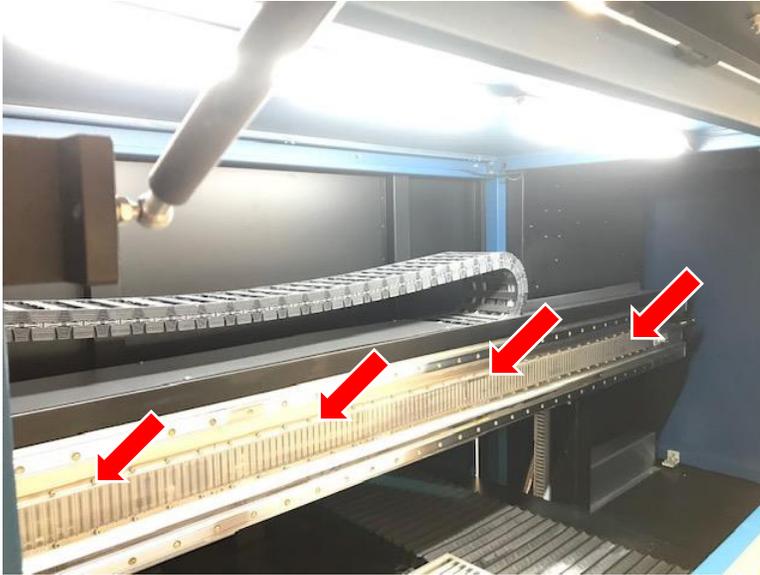
52. **Move the head carriage to the right-hand side of the machine**

    If the path of the gantry is clear, navigate to the *Maintain* tab in the Maverick software. In the upper-left corner, there will be a directional pad. Click the *right arrow* once to move the head carriage to the center of the machine. Click the *right arrow* a second time to move the head carriage the rest of the way to the right-hand side of the machine.
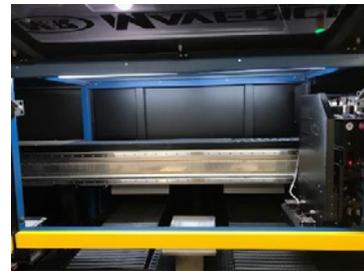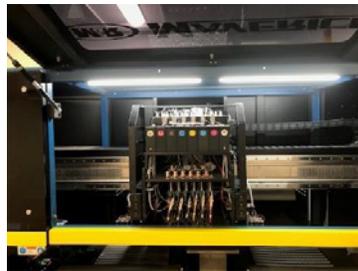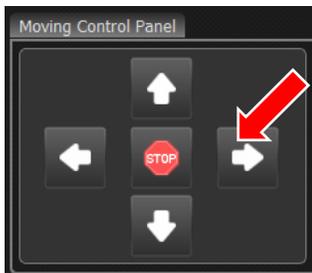
53. **Clean the wipers and wiper tray**

    While the head carriage is still on the right side of the machine, use another lint free cloth to gently clean each of the wiper blades. It is best to use a new section of the cloth during each wipe, so as not to contaminate the wiper blade with another color ink. Once the wiper blades have been cleaned, visually inspect the contents of the wiper tray. If there are any large pieces of debris or dried ink, remove those so that they do not block drainage of the tray. Clean the wiper tray using warm water and I-CLEAN, until there is no ink residue remaining.

54. **Maintain fluid level in wiper tray**

    Since the machine will be in an extended shutdown state, it is important to maintain a proper fluid level of cleaning solution that will not harden like the ink. Since the tray was flushed/cleaned during the previous step, please confirm that both drain valves are now closed. Carefully fill the reservoir of each tray section with enough I-CLEAN until the fluid just reaches the top of the drain opening. Each tray section should now have a stagnant pool of cleaning solution present.

55. **Move the head carriage back to the home position**
    At this point, the head carriage should be able to return to the home position. Ensure that there are no obstructions in the way of the head carriage before proceeding. Navigate to the *Maintain* tab in the Maverick software. In the upper-left corner, click the *left arrow* once to return the head carriage all the way to the home position above the wiper tray.
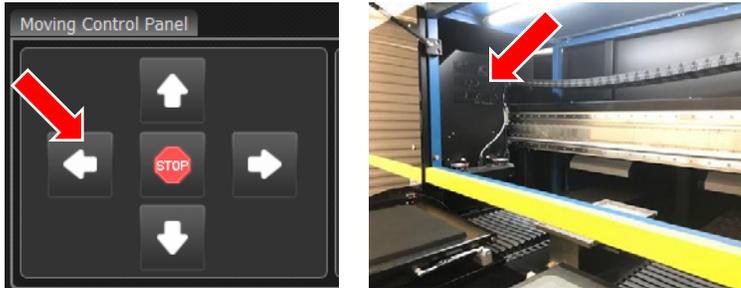
56. **Power OFF the machine**
    Press the power button to turn the machine off. (NOTE: It is okay for this procedure ONLY that the head carriage is not currently sealed. It needs to be "uncapped" for the following steps.
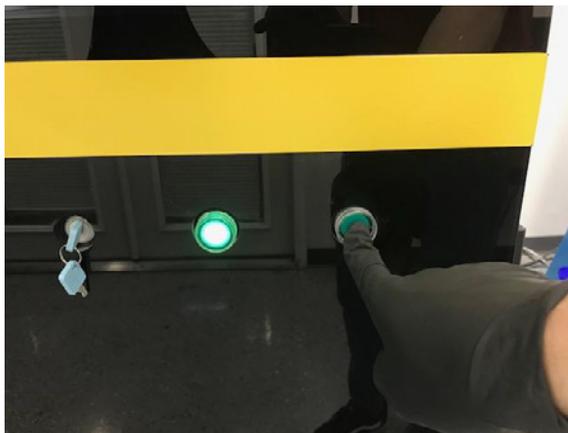
57. **Close the printer software**
    Close the printer software.

58. **Power OFF the computer**
    Shutdown the computer and turn off the monitor.

SECTION 2

PLEASE NOTE: Please take extra precaution when working near the printheads. It is very important not to damage the ribbon cables, as that can permanently damage the printhead. Be sure not to bend, tear, or coat the cables with any fluid. Similarly, do not move any of the printhead mounting/adjusting bolts, as this can affect the calibration of the machine.

59. **Disconnect printhead ribbon cables**
    Be very careful and gentle during this procedure. One by one, release each of the ribbon cable connectors from the headboard cards mounted above. Carefully lay each of the ribbon cables over with great care.

60. **Confirm ink line markings**
    In the following step, the ink lines will be released from the quick-connect fittings that are attached to each printhead. It is therefore important to make sure that each line is properly marked before disconnecting. If no visible marking is present, please add a label to each ink line, so that it can be properly rerouted when the machine is primed with ink again.

61. **Disconnect the inlet and outlet lines that are going to the printheads**
    Carefully disconnect all the ink lines that are routed to the printheads. There are (6) inlet and (6) outlet lines in total for each of the color (CMYKRG) printheads. The white printheads have (6) inlet lines, and a manifold of outfeed lines that are connected. Please disconnect only the (6) inlet lines for the white printheads. It is okay that the outlet lines are still connected.

62. **Use a syringe to "pack" the printheads with cleaning solution**
    Again, be very delicate during this procedure, as excessive pressure can damage the printheads. Confirm that the supplied syringe, filter, and tube assembly is clean. Set a container of the I-CLEAN-5L solution at the front left position of the machine for easy access.

    NOTE: The syringe will only be connected to the inlet side of each printhead during this procedure. The inlet side of each printhead is the side that receives ink from the sub-tank mounted above. This is the side that faces the rear of the machine.

    Decide on the sequence in which the printheads will be "packed." Usually this is a sequence of left to right, front to back. Draw a syringe of cleaning solution and connect it to the inlet side of the first printhead. Gently push cleaning solution through the printhead by applying light pressure to the syringe. DO NOT apply too much pressure to the plunger of the syringe, as this can damage the printhead. While syringing, observe the flow of the fluid coming out of the printhead via the gap between the headplate and the wiper tray gasket. (This is why the head carriage was left uncapped in Step #65). The appropriate amount of pressure will be at the point where the fluid coming out of the printhead has just transitioned from droplets to a steady "curtain." Be careful to keep the syringe upright to avoid pushing an air bubble into the line. Once the syringe is empty, fill it a second time and repeat. Push (2) syringes worth of cleaning solution through each of the printheads before continuing to the next step. Once complete, do not reconnect the inlet and outlet lines to the printheads.

63. **Manually center the head carriage and seal the printhead plate against the wiper tray gasket**
Since the machine is powered off, manually position the head carriage so that it is centered over the wiper tray. Locate the manual Z-Axis adjustment knob that is positioned on the top middle of the head carriage, behind the sub-tanks. Care fully turn this knob to manually lower the head carriage. Keep turning until the head carriage is touching the wiper tray gasket. Continue to turn the knob ½ turn past the point of contact to ensure a proper seal.
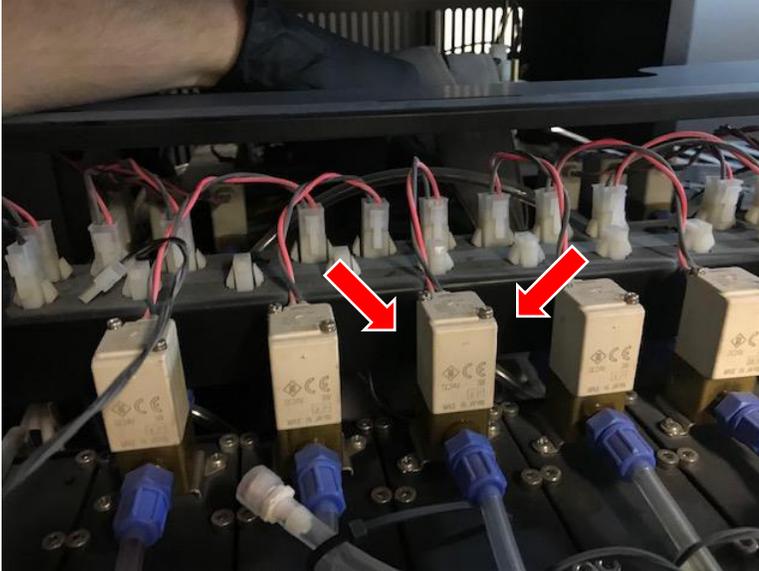
64. **Visually confirm that the heads are being protected**
Visually confirm that the head plate has sealed against the wiper tray gasket.

65. **Reinstall head carriage front cover**
Reinstall the sheet-metal cover that belongs on the front of the head carriage, being careful not to pinch any ink lines or wires.

66. Close all access doors

Make sure that all access doors have been closed.

67. Engage at least one E-stop

For added security, engage at least one of the E-Stops to prevent the machine from being powered on unless desired.

-- **FINISH** --