

INITIAL START-UP

This Section should only be completed by an Authorized VRTX Representative (estimation 4 hrs without training)

1. Verify all plumbing and electrical connections have been constructed to meet applicable design and local regulations.
2. Verify that the supplied power to the skid on each leg is appropriate.
3. Install all required filtration elements that may have been shipped separately.
4. Lubricate all O-rings associated with the basket strainers and filtration housings with Silicone Lubricant.
5. With all power turned OFF from the skid, verify all electrical connections on the pump, and motor start boxes are tight.
6. Momentarily, turn ON each motor control and verify that the power ON/OFF switch control will initiate and halt motor operation.
7. Verify the direction of rotation is correct for all pumps and or motors. If the rotation is not correct, transpose any two pump power wires to reverse the motor.
8. Verify that the correct Units of Measure and Language is selected on the PLC. At this time you may want to set or check those VCS settings as described at the end of this procedure.
9. Open all Isolation valves (slowly as to not overwhelm the makeup's ability to maintain the basin level) and allow water to flow into all pumps.
10. Verify that all piping connections from the tower are not leaking.
11. Turn ON the motor and verify that no leaks are present on the skid or in the pipes as they return to the tower.
12. Verify that no abnormal noise or vibration is present during motor operation.
13. After 5 minutes of operation. Turn the systems power OFF and clean the basket from the basket strainer.
14. Turn ON the system again, and adjust any required flows or pressures.
 - a. With a single pump on a combo skid, make sure to adjust the flow valve so that the VRTX chamber has the appropriate pressure (V20=74-80, all others 84-100 psi).
 - b. With dual pumps, make sure the VRTX pressure is correct (see above).
 - c. Close down the VRTX discharge so that 3-5 psi back pressure is found.
 - d. Close the flow regulation valve on the output on the screen filter.
 - e. Adjust the output valve of the Filter > Tower so that minimally 35 psi is shown on the outlet of the filter, now initiate a back wash of the filter. If you have a side stream screen filter make sure that during a filter backwash at least 20 psi (25 – 30 is preferred) is present at the inlet of the screen filter, if the screen filter is the primary filter, then the pressure during a back wash must maintain a minimum 32 psi during a back wash). If the pressures are below the 20 or 32, increase the back pressure on the filter by closing the outlet valve until the pressures are reached during a back pressure.
 - f. Verify that during a back wash of the screen filter, that water is discharged down the drain and stops as the back wash stops.
 - g. Verify that the VRTX pressure remains with tolerance. Adjust if necessary.
15. Select a Bleed Test function and make sure the blow down valve changes appropriately.
16. Verify that during an open blow down valve, water is discharged to the drain and that as the valve closes, the flow to the drain stops.

17. Adjust the flow control valves to achieve 5-8 gpm flow through the flow meter and corrosion coupon rack. If your unit does not have a flow meter, open the valve 1/3 or to the mark as set by the manufacturing group (indicated with permanent marker)
18. Turn the skid pump power OFF, isolate the skid by closing the inlet and outlet valves and remove the conductivity probe from its tee. Calibrate the VCS Air Cal for Conductivity. Make sure and press the Air Cal button at least twice.
19. Calibrate the Zero Cal values for all pressure transducer. Make sure and press the Zero Cal button at least twice.
20. Open the Isolation valves that you closed on step 15, and turn the skid's power back ON.
21. Calibrate the conductivity meter probe and select the units that is familiar to the customer, the user can select from $\mu\text{S}/\text{cm}$ or ppm. Adjust the bleed set point to the desired level against the makeup water conductivity as specified within the quote.
22. Close down the filter discharge valve so that the pressure on the separator increases to above 50 psi, but not above the range as shown on the discharge gauge of the filter.
23. Calibrate the pressure transducers at this time as shown in the manual for HI Cal pressures.
24. Turn OFF the skid's pump and verify the transducer pressure values, drop back to Zero, turn the pump power back ON and verify the reading return to a value representative of the gauge pressure.
25. Open the Auto Screen filter's discharge valve (valve that goes back to pump suction from the screen filter discharge connection) so that the outlet pressure of the separator decreases by 5 PSI.
26. Open the filter discharge valve so that the normal operating pressure is reached on the separator.
27. Initiate a Filter Back Wash and verify that the filter inlet pressure stays within its operation range (see step 11.e) make adjustments as needed.
28. Record the normal operation pressure of the screen filter's outlet. This value minus 8 psi must be entered into the Trip Pressure set point within the VCS setting screens.
29. Mark with a permanent marker all valves, and flow meters so that the current settings are noted as well as any ranges that are appropriate.
30. Turn OFF the pump, Turn OFF the Main Power Disconnect Switch. Verify that power has been removed from all systems, inspect the motor connectors, as well as electrical control panel components for arcing or heating. If no indications are noted continue with operation. If any indications of electrical issues are noted, contact the appropriate electrician to correct any issues. Turn the power back on and record the Pump amperages from each leg of power.
31. Mark all Gauges with a permanent marker to show the initial pressure settings.
32. Verify that the Blow down duty cycle setting or blow down flow regulation valve settings are appropriate. (you should never blow down more water than their makeup system is capable of replacing at any one time).
33. Review the hidden screen and verify the settings of the VCS. If changes are need, make those changes and then return to this screen and take a picture of the screen information.
34. All data should be entered into Ulysses at this point and call made to VRTX engineering to notify them of the Start Up CSR being created for their approval and processing.
35. Return back into the VSC system settings and initiate a Save to User Defaults the current configuration.
36. Complete the Installation Certificate and have it signed by the customer.
37. Conduct all required training sessions for the local VRTX representative as well as any service personnel specified by the customer. (Pass out and discuss Operation Manual, Instruct Personnel on Service Requirements, Instruct Personnel on required troubleshooting as shown in manual. (This section normally takes 1 hr per training session. Verify that all customer

personnel requiring training are given a class, some personnel may require training for multiple shifts, consult customer.)

38. Take good pictures of the current condition of the tower, any tubes or piping that would be good for our records.

Things to check in the VCS Settings:

- Language and units are correctly selected
- Contact phone number is correctly shown on the screen.
- The selection of filter type is correct (normally set to Sep/Auto)
- The Sep settings should normally be 18 seconds Open and 3-6 hours Closed (if the tower is dirty select on off time of three hours while if the basin is clean, select the 6 hours setting)
- The Auto Screen Settings should be 13-16 seconds Rinse time, 300 seconds Delay, and 60-360 Auto, 60 if the tower is extremely dirty and 360 if it is clean with little debris.
- The Trip pressure is set 8 psi below the normal operating pressure as shown on the screen, unless otherwise specified.
- Power Saver should be OFF unless required.
- Safety Valve should be OFF unless required.
- All Calibrations correctly entered
- The blow down set points and duty cycle settings are correct as specified.
- The User Defaults are saved.
- Enter Passcode 2000 to clear the back wash counts on the screen
- Make sure a formatted micro SD card is installed on the PLC
- You have taken a picture of hidden screen #2.

If you have any questions, contact VRTX Engineering Department.