



### TROUBLE AT LIFT STATION NO. 3 (TAYLOR)

VFD'S (Variable Frequency Drives) = 2 Units.

This station is logged (recorded) daily for input and output flows.

VFD's are checked for error messages on the LCD panel present on the VFD face every day. Some errors can be fatal, meaning the pump or pumps are disabled by the nature of the error. The more common errors will occasionally appear on the LCD panel. These "lesser errors", will more than likely not be serious and just need to be cleared. Read the operations manual on the VFD's. Normally, non-serious errors are "over voltage" or "under or over current" errors. They are usually a result of line spikes from the supply side, an imbalance of some sort on supply legs of voltage, or possibly the pump slowed down a little too fast and created an imbalance between AC to DC and back to AC again. These lesser errors can easily be reset by either the LCD Menu, or temporary removal of the LCD Pad. (This is an interchangeable LCD and is upgradable to Bluetooth.)

If standard error checking/clearing is not working, a power down of the VFD's may be necessary to clear the error from the VFD's. Wait two minutes, or preferably three minutes, to clear the capacitor banks in the VFD's (bleed them off). A permanently failed VFD may stop operations. It may disable both AC supply and generator supply as both generator and AC power flow through the VFD's. In the event of a failed VFD, it may be necessary to use a gas bypass pump. (A new Honda style trash pump is currently being considered to replace the old Briggs and Stratton.)

The generator "Ready to Run" screen is checked daily and the generator is checked weekly on Tuesday for exercise time and recorded. The generator has a programmable LED and a menu. Consult the generator manual for programming information. The manual shall be kept on site inside the generator enclosure. The manual for the VFD's is on the laptop only, as it is 60 or more pages. This VFD



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manual can also be obtained and accessed at the ABB VFD website. Be sure to have the model number on hand.

Smith & Loveless Pumps are able to pump anything smaller than a golf ball, however it could plug with rags. The newer Smith & Loveless design enables access from above. There is a pump pulling stand present at the Taylor Lift Station. You will need a Come-Along puller and chain or straps. Consult the manual at the station for tear down procedures and/or troubleshooting advice.

This station also has a compressor priming system. The compressors will prime the pump. There are two of them, one each. After achieving prime, the pump will activate. Should a pump not start, it will show up on the readings, and may be a priming issue. Consult the troubleshooting manual present at the site. This station will show around 8-10 lbs. head pressure on the gauges at the outlet sides of the pump skid. These are 3-inch gauges and are easy to see. When one pump is running normally at the station, you will notice the pressure gauge go up while pump is underway. VFD screens will show Amps drawn and various other info while running. The check valves are also accessible from the top with this model station with easier access to valves. This station is designed one pump at a time unless lag float is activated, or higher than normal water level is indicated by float/floats. If two pumps are running, it is either high water due to a failed pump/VFD or overwhelming flow into the tank. Note that two pumps running is not normal. Check water level, switches, floats, and primer system.

### **GASOLINE BYPASS PUMP**

If there is no AC power and no backup generator, there is a gasoline-powered bypass pump on site. Begin operation of the gasoline bypass pump. Hook up the battery at this station. The negative terminal is always disconnected after use to avoid battery drawdown at this station. “Bump” the starter to prove a hot battery. Do not start yet. Move choke to full choke. Check oil in crankcase and fuel delivery if necessary.

“Key out” using your mission key to avoid alarms being sent if necessary.



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Turn off AC to pumps using the black plastic swing switches on top of electrical box. These are next to the cycle counter switches/resets. Open the bypass valve using the wheel that is inside of the black water box to the west of the station. It is in the ground and the box can be opened.

When the wheel is full counterclockwise and open, proceed to the priming valve. It is the 1-inch valve with the copper tube coming out of the pump and into the upper sewer tank. Open the priming valve and verify there is priming water. After the priming outlet tube is running, you will see water running into the wet well from inside the wet well, to the west and top of inside sewer tank. The priming valve is now open, the pump is filled with fluid. You may now close the priming valve. Set the choke on the engine to full choke. The station will need to be flooded clear up to the shoulder, or to bottom of the cover section of the tank. It is noted that the older Briggs & Stratton gas pump has a weak ceramic seal and replacing this pump with a Honda Trash Pump is being considered.

Turn both key switch and run switch to ON. Start the pump. After a few seconds of running, it will be necessary to open the choke a little during the first 20 seconds, and then fully open when warm enough. There is a wire present for locking the choke open. It will tend to “walk” towards closed without this wire. After the pump is running stable, wait, if necessary, for the water level to reach close to the shoulder, or bottom of the riser tank...within a few inches is acceptable.

This pump is a more difficult to prime, and opening and closing the prime valve to achieve prime as the water rises may take several attempts. If it takes too long, or if the pump was started too early, the water inside of the pump can get hot after 5 minutes or so. To avoid hot water inside the pump because it taking too long to prime, open the primer tube and let cool water enter the pump, same as regular priming. When attempting to prime, the pump will ramp up and down a tiny amount, or hover on it. Water is moving up and down the suction tube as it gets closer to achieving prime. Eventually it will start pumping, and a noticeable “load” will be heard on the bypass pump. The gauge on the copper priming tube will rise as pumping begins. The throttle arm on the carburetor throat will also be pulled



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down into a full run position at this point. The throttle arm also bounces with the up and down water in the suction tube before it fully primes. (Note: This is a quirky old pump and due for replacement.)

When pumping down, pay attention to the suction pipe and its relationship to the water level. Over-pumping this station with the bypass pump can result in loss of prime, (sucking air), or introducing entrained air into suction tube. It is possible to get air into the tube from the inlet sewer pipes draining roughly into the tank and entering the suction line. Better to under-pump than to over-pump. Pay attention to the grease formation line that marks the “normal” level as the water comes down. This is your warning to watch closely for shut down time. There will not be a second grease line at the bottom or start level of the tank, but it can be observed that the water is starting to spin around that suction pipe slowly. You will be down to a quarter tank or less at this point. Shut the gas pump down either by the ON switch or the key switch. They both kill spark the same way.

In the event that the AC comes on while pumping, shut down the gas pump. Close the wheel-operated bypass valve, and turn one pump switch to AUTO. After the AC pump has pumped down into range or stopped, you may turn the second switch to AUTO, as well. I tend to avoid both pumps running if I can. They can be both allowed to run at higher water level startups but, if not necessary, it is preferred not to do this.

If no AC or generator is present as yet and water level is rising, repeat gas bypass pump run when water reaches shoulder of tank again.

When operating normally, the priming switches on the top of panel inside enclosure are set to ON DEMAND for priming system. The pump switches next to them labeled #1 and #2, are set to AUTO. Never leave pump switches in manual settings, unless you are physically present.