TOWLE WHITNEY LLC

Instruction and Operations Manual

TW2018U Duplex
Over/Under Frame
Variable Speed Booster Pump System

1. Safety Instructions

CAUTION! Issues such as water softeners, filters, low producing wells, and galvanized pipes can affect the performance of the system. Please consult our expert booster system designers to help evaluate your current setup and select/design the system appropriate for your application.

WARNING! Plumbing code requirements for a closed system: The check valve installed on the TW booster system creates a closed system which restricts back flow and may result in thermal expansion issues. Please provide thermal expansion provisions and ensure proper testing & tamper-proofing of the T&P valve.

WARNING! A Towle Whitney variable speed booster system must ALWAYS be installed such that it is protected from the elements [unless specified otherwise].

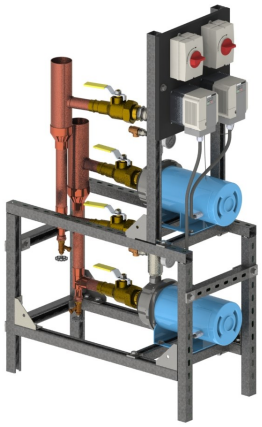
PRE-WIRED
&
TESTED

Note: Your pump has been tested at the factory for satisfactory operation and may contain some water and pipe dope.

We would like to thank you for your purchase and hope you enjoy great pressure and energy savings from our Booster system !

2. Installation Instructions

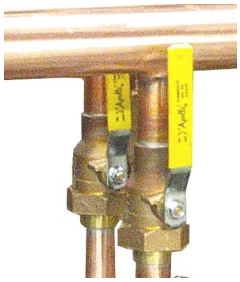
All local building, electrical, and plumbing codes must be followed while installing and operating the TW2000 booster pump systems.



Step 1: Make appropriate plumbing and electrical connections. The pneumatic expansion tank MUST be installed on the discharge manifold of the system using the port provided.

For plain ends, grooved ends may be cut off.

All local building, electrical and plumbing codes must be followed while installing and operating a TW booster system.



Step 3: Open all shut off valves on the incoming line and outgoing line to the building including those on the suction and discharge manifolds [***Figure 2***] of the booster system.

Open / operate all fixtures in the facility to displace the air in the system [Pump & piping] !

If bypass is installed, bypass line must be closed *[A swing type check valve must NOT be installed on the bypass line or either pump suction]*

Step 4: Turn ON power to the system one pump at a time. The VF drives are pre-programmed at the factory.

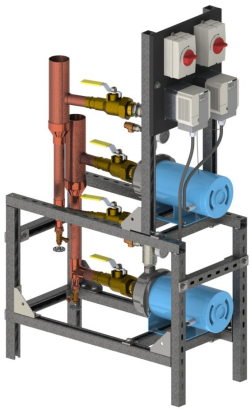
<u>All drives must be installed on independent circuits.</u>

When the power is turned ON, the AUTO mode light turns ON and the pumps are operational. If not, press the AUTO key on each drive.

2. Installation Instructions

All local building, electrical and plumbing codes must be followed.

Towle Whitney Variable Speed Booster Pump Systems are built for ease of installation and quick hassle free start-up.



(Optional) Raise Header

Step 1
Electrical
Make appropriate electrical connections.

Amperage requirements shall be taken from the Variable Frequency Drive NAMEPLATE ONLY.
Each pump will always have a 3-phase motor.

Each Disconnect Box must be installed on independent circuits.

(Optional)
The VF Drive Header Panel can be raised by loosening four bolts, Max height 42", remember to tighten bolts securely.

Step 2
Make appropriate plumbing connections.

(Optional):
Follow **2a** and **2b I**nstructions if Manifold Orientation needs to be changed.

2a: Ensure all plumbing connections are tight:
- *Grooved Couplings are tight*

(If installing a bypass, check valve MUST be in-line and spring loaded. A swing type check valve must NOT be installed on the bypass line.)

Step 4
Follow instructions in **2c** for expansion tank installation.

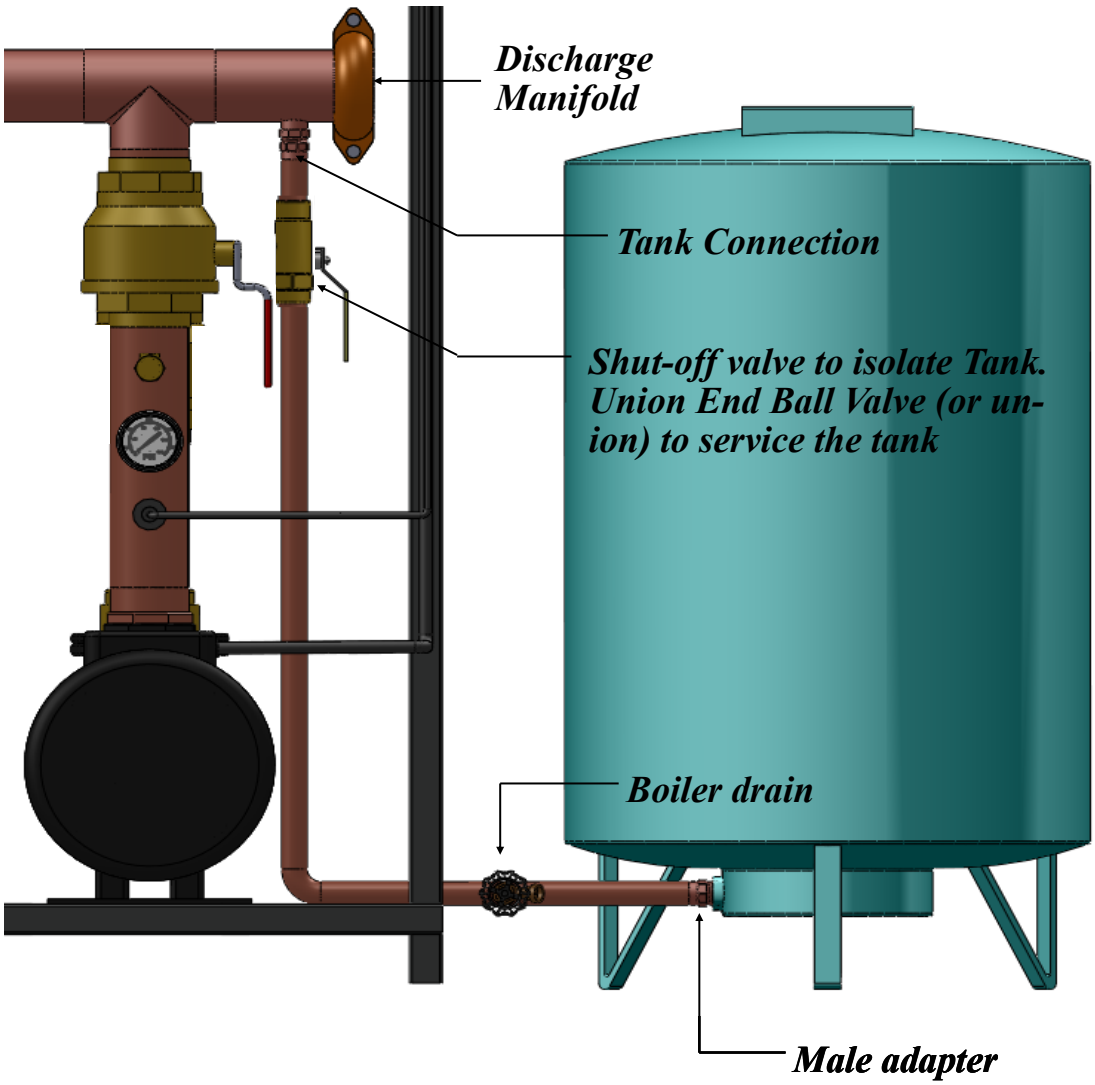
Step 5
Open all shut off valves on the incoming line and outgoing line to the building including the four ball valves on the Booster Pump System. If bypass installed: BYPASS LINE MUST BE CLOSED

Step 6
Open/operate all fixtures in the facility to displace the air in the piping and pumps before startup!

Step 7 Start-up
- Turn ON power to PUMP ONE. The VF drives are pre-programmed at the factory. Ensure first pump runs quietly, and hits the discharge pressure and turns off. Turn off pump one.
- Turn ON power to PUMP TWO. Ensure PUMP TWO runs quietly, and hits the discharge pressure and turns off.
- Turn ON power to ALL PUMPS.
- Once pumps are online, continue to open/operate all fixtures and continue to displace air in pumps/piping.

2a. Installation Instructions

- Check pressure in tank before installing.
- Pressure must be 10 psi below Booster System Set Pressure.
- Pipe the discharge manifold on labeled port. Follow recommended piping.



3. Operation & Maintenance

Operation:

Once plumbed and wired, a Towle Whitney Booster System operates automatically:
- The pumps turn ON when there is a demand for water
- The pumps go to standby "Sleep mode active" when the water demand is satisfied

The sequence of operation is typically set as follows:
- Lead lag operation
- Alternation

VF Drives have been programmed at the factory. Do not change any parameters without contacting the factory. [Ph: 603-626-7371]

Alternation:

The drives are programmed to alternate the pumps every 24 hrs [adjustable].

Lead lag operation:

The pressure setpoint on each pump of the system can be changed by following the procedure in section 4. If the pressure setpoint on each pump is set up with a pressure differential, the pump with the higher PSI set point will act as the lead pump. As the water demand exceeds the GPM capacity of this pump, the system pressure will start dropping, causing the second pump [in this case the Lag pump] to start operating and both pumps will maintain the pressure setpoint of the Lag pump. [A recommended pressure differential not to exceed 10 PSI].

In case of a ***power outage*** or a ***brown outage***, once the power is restored, the pump shall resume normal operation. *If not, Turn off the system using appropriate circuit breaker, wait for 5 mins for the VF Drive capacitors to discharge and turn the system ON again.*

In case of an ***interruption in incoming water supply***, the VF drive will trip and the system will turn OFF to save the pump from running dry. Once the water supply is restored, Turn off the system using appropriate circuit breaker, wait for 5 mins for the VF Drive capacitors to discharge and turn the system ON again and push the **AUTO** button on each drive.

Maintenance:

- By virtue of self lubricated bearings, the pump system does not require any preventive maintenance.
- The VF drive being an electronic device, MUST be protected from the elements. However, it does not require any periodic preventive maintenance.

See also: *VF Settings for changing system set pressure, Troubleshooting and Automatic bypass.*

4. Troubleshooting

Solutions to some of the common issues with booster systems are discussed in this section:

Short cycling:

Issue:
- Pump turns ON / OFF every few minutes / seconds

Solution:
- Check for leaks in the line going from the pump to the building.
- As mentioned in the assembly section, it is essential to install a shut off valve on the suction [City/ Well side] and discharge [Building side] of the pump.
- Turn OFF the shut off valve on the discharge side of the pump and check to see if the pump turns OFF. If it does, there may be a leak in the water line, a faucet, ball cock, hose bib etc.
- If the pump continues to run after the shut off valve is OFF, ensure that water is not leaking back through the check valve on the suction side of the pump by turning OFF the shut off valve.
- The pump is governed by the controller which receives a pressure drop signal from the transducer. If there is a drop in pressure the pump will turn ON to increase the pressure up to the set point.

Constant operation:

Issue:
- Pump operates constantly without any demand for water

Solution:
- Air may be present in the line going from the pump to the building. Open faucets to purge air out.
- When all fixtures are closed and no water is being drawn, air may get trapped within the lines causing the pump to not reach the pressure setpoint and hence cause it to operate continuously.

Shaft Noise:

Issue:
- There is a squeaking noise at the end of a pump duty cycle

Solution:
- Lubricate the shaft through the gap between the pump casing and the motor.

Loss of incoming water supply:

- The TW pump is programmed to stop and start automatically upon loss/restoration of incoming water supply.
- However, if the pump does not start normal operation automatically, turn OFF the power to the pump, wait until the controller display goes blank and turn the power ON again.

Loss of power supply:

- The TW pump is programmed to start automatically upon restoration of power supply.
- However, if the pump does not start normal operation automatically, turn OFF the power to the pump, wait until the controller display goes blank and turn the power ON again.

Towle Whitney LLC Booster Pump Start-Up Sheet

Project: **Signature:**

Date: **Name:**

This check-off sheet is intended to be an overview, and may NOT cover all local building, electrical, and plumbing codes which must be followed while installing and operating a booster pump system.

Booster system MUST be protected from the elements and any adverse environmental conditions.

☐ ***1:*** Ensure all electrical connections are per local code. Verify voltage and phase. *Note: All pumps are three phase.* ***Amperage requirements shall be taken from the VFD nameplate.***
Each Disconnect Box must be installed on independent circuits.

☐ ***(Optional)***
The VF Drive Header Panel can be raised by loosening four bolts, Max height 42", remember to tighten bolts securely.

☐ ***2:*** Ensure all plumbing connections are per local code.
(Optional):
Follow **2a** and **2b I**nstructions if Manifold Orientation needs to be changed.

☐ ***2a:*** Ensure all plumbing connections are tight:
- *Grooved Couplings are tight*
- *SharkBite Ball valves are tight*

☐ ***3.*** If bypass is installed, **bypass line must be closed** *[If using an "automatic" bypass, check valve MUST be in-line and spring loaded. A swing type check valve must NOT be installed on the bypass line.]*

☐ ***4:*** Ensure pneumatic expansion tank is installed on the discharge manifold of the system using the port provided. Tank's air pressure must be:
- Set with no water pressure against it
- Shall be 10psi LESS than system discharge pressure.

☐ ***5.*** Open all shut off valves on the incoming line and outgoing line to the building, including all four ball valves on the suction and discharge manifolds of the booster system.

☐ **6.** Open / operate all fixtures in the facility to displace the air in the pump system and piping (especially new construction) !

☐ ***7:*** Turn ON power to PUMP ONE. The VF drives are pre-programmed at the factory. Ensure first pump runs quietly, and hits the discharge pressure and turns off. Turn off pump one.

☐ ***7a:*** Turn ON power to PUMP TWO. Ensure PUMP TWO runs quietly, and hits the discharge pressure and turns off.

☐ ***7c:*** Turn ON power to ALL PUMPS.

☐ ***7d.*** Open/operate all fixtures and continue to displace air.