EN INSTALLATION AND OPERATING MANUAL

PressureWave™ / Max™ / UltraMax™ / M-Inox™ / E-Wave™ / Challenger™ / C2-Lite CAD™ / FlowThru™ / All-Weather™ / HeatWave™ / SolarWave™ / ThermoWave™ Series

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CAUTIONS AND WARNINGS

⚠ **CAUTION:** To prevent personal injury, ensure all water pressure is released from the pressure system prior to work being performed. Ensure pumps are disconnected and / or electrically isolated.

⚠ **WARNING:** It is strongly recommended that the system is protected by a suitable pressure relief valve set at or below the maximum tank pressure rating. Failure to install a relief valve may result in tank explosion in the event of a system malfunction or over pressurization, resulting in property damage, serious personal injury or death.

⚠ **WARNING:** If the pressure tank leaks or shows signs of corrosion or damage do not use it.

Installed on _____ by _____

PLEASE READ ALL INSTRUCTIONS BEFORE INSTALLING YOUR NEW GLOBAL WATER SOLUTIONS (GWS) TANK

These instructions have been prepared to acquaint you with the correct method of installing and operating your GWS pressure tank. We urge you to study this document carefully and follow all of the recommendations. In the event of installation difficulties or the need for further advice, you should contact the dealer from whom you purchased the system or the nearest GWS sales office.

- PressureWave™, Max™, UltraMax™, M-Inox™, E-Wave™, All-Weather™, Challenger™, C2-Lite CAD™, and FlowThru™ Series tanks are designed for use in well water or potable water booster systems. Refer to Sec. 1 for installation details.
- HeatWave™ and SolarWave™ Series tanks are designed for use in non-potable closed loop hydronic or solar water heating systems. Refer to Sec. 2 for installation details.
- ThermoWave™ Series tanks are designed for use in open loop potable water heating applications. PressureWave™, E-Wave™, Challenger™ and SuperFlow™ Series may also be used in open loop potable water heating applications. Refer to Sec. 2 for installation details.
- See tank data label for maximum working pressure and maximum temperature.
- Be sure to protect tank, piping and all system components from freezing temperatures.
- The manufacturer is not responsible for any water damage in connection with this diaphragm pressure tank.

INSTALLATION MUST BE IN ACCORDANCE WITH LOCAL AND STATE PLUMBING CODES.

1. Well Water and Booster System Tank Installation

1.1 Proper GWS Tank Location

In order to ensure your tank provides its maximum service life it should always be installed in a covered, dry position. The tank should not be allowed to rub against any surrounding hard surfaces, such as walls etc.

Install the tank at a suitable location to prevent water damage due to leaks. The tank should always be located downstream from the pump. If the tank is located at a lower elevation than the demand then a check valve should be installed. If the tank is installed remotely from the pump then install the pressure switch near the tank. The tank should be installed as close as possible to the pressure switch, transducer or flow sensor. This will reduce the adverse effects of added friction loss and differences in elevation between the tank and / or the water mains' and the pressure switch, transducer or sensor.

1.2 System Connection

1. Place the GWS tank in its final desired location.
2. Level as necessary. All vertical and horizontal model tanks should be placed on a firm base. If vibration is likely to occur in the vicinity the tank should be mounted on a resilient mounting. Tanks with steel bases should be mounted using supplied "L" brackets, while tanks with plastic bases should be mounted through the holes in the base. For bases without holes, holes should be drilled at four points equally distant along the rim of the base and then mounted accordingly. Inline tanks should be connected directly to the pump or to the supply line using a "T" connection.
3. Connect the tank to the pump supply line with a short pipe to eliminate unnecessary friction loss.
4. All piping should be in accordance with prevailing local codes and standards.
5. Refer to tank data label to confirm BSP or NPT threaded connections.
6. Tanks mounted on booster sets should be strapped down for shipment.

1.3 Adjusting Precharge Pressure

Correct precharge is required for proper tank performance.

1. For tanks installed with a pressure switch controlled pump with a differential pressure set up to 2 bar (30 psi), the precharge should be set to 0.2 bar (2 psi) below the cut-in pressure.
2. For tanks installed with a pump controlled by a pressure switch with a pressure differential greater than 2 bar (30 psi), electronic controls or variable speed controls, the precharge should be set to 65% of the cut-out or maximum system pressure.
3. For tanks installed on mains' pressure, the tank precharge should be set equal to the mains' pressure. For mains' pressure exceeding 6 bar (88 psi), a suitable pressure regulator should be installed.

For correct operation, pressure tanks should be precharged as follows:

1. Turn off the pump, disconnect the tank from the system and completely drain all water inside the tank to avoid water pressure affecting precharge readings.
2. Using a suitable pressure gauge, check the precharge pressure of the tank.
3. Release or add air as necessary to adjust to the required precharge pressure.
4. Replace protective air valve cap and seal with the air valve label, if provided. This will enable you to determine if the valve has been tampered with in case of future service calls.
5. After correctly setting the precharge, no regular air charge checks are required.

Do not check air after installation.

⚠ **CAUTION:** Never over-charge the tank and precharge the tank with air at ambient temperature only!

If the tank is to be precharged over 4 bar (58 psi):

1. Adjust the precharge of the tank to 4 bar (58 psi).
2. Install the tank into the system.
3. Fill the system with water to equalise the system and precharge pressure at 4 bar (58 psi).
4. Increase precharge pressure in maximum 3 bar (44 psi) steps and afterwards adjust the system pressure to the new precharge pressure by filling water into the system.
5. Repeat steps 3 and 4 until the required precharge is reached.

Emptying a tank that has a precharge over 4 bar (58 psi):

1. Make sure there is some water in the tank.
2. Isolate the tank from the system (close isolation valve).
3. Make sure no additional water can get into the tank (shut off the pump and / or any water supply).
4. Release air from tank until 3 bar (44 psi) tank / air pressure is remaining.
5. Open a drain valve and afterwards the isolation valve to drain the tank.

⚠ **CAUTION:** Make sure that the system pressure is never lower than 4 bar (58 psi) below precharge. If system pressure needs to be lowered, the tank should be isolated or emptied as previously described.

1.4 Typical Installations

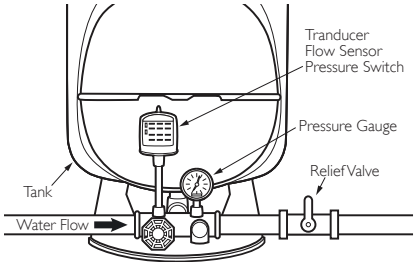


Fig. 1.4-1 Tank Installation with Accessories

- This is a diaphragm type pressure tank for use on a well water or booster system. The system must be protected by a suitable relief valve.
- FlowThru™ Series tanks should only be used in Variable Speed Drive or Variable Frequency Drive controlled pumping systems.

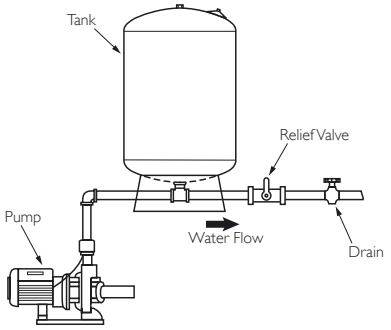


Fig. 1.4-2 With Convertible Jet Pump

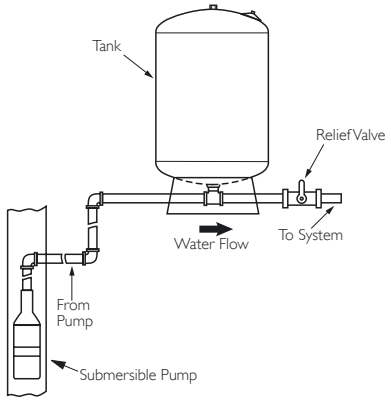


Fig. 1.4-3 With Submersible Pump

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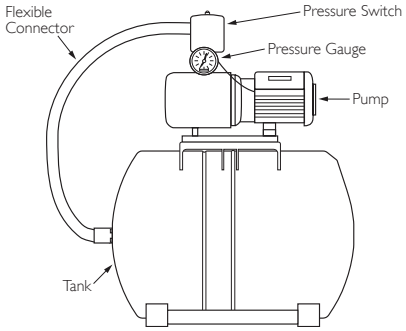


Fig. 1.4-4 Booster Pump w/ Horizontal Tank

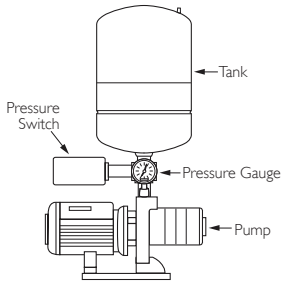


Fig. 1.4-5 Booster Pump w/ Inline Tank

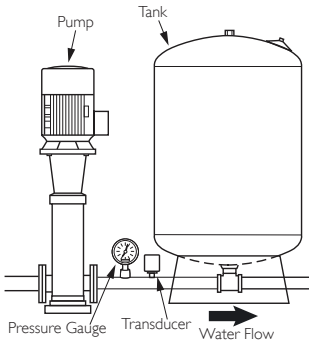


Fig. 1.4-6 Booster Pump w/ Tank

1.5 Multiple Tank Installation

All tanks must have the same precharge for the system to function properly. Tanks should be installed on a header to ensure all tanks receive equal and balanced pressure. Adjust each tank precharge as detailed in section 1.3. The system pressure switch or control should be centrally located (see Fig 1.5) in order for the tanks to function properly.

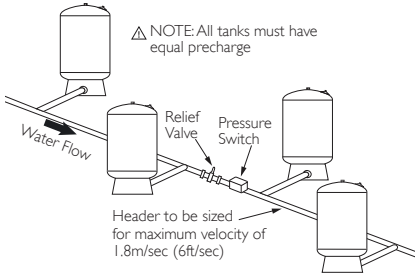


Fig. 1.5 Multi-tank Installation

1.6 Pump Run Control Operating Principles

Without a pressure tank, a water system's pump would cycle (turn on) every time there was a demand for water. This frequent and potentially short cycling would shorten the life of the pump. Pressure tanks are designed to store water when the pump is running and then deliver pressurized water back to the system when the pump is shut off (Fig 1.6). A properly sized tank will store at least one liter of water for every liter per minute (LPM) of pump capacity. This allows for fewer pump starts and longer run times which should maximize the life of the pump.

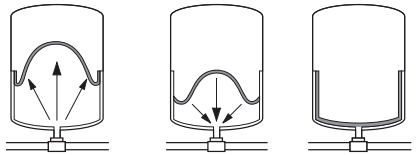


Fig. 1.6

1.7 Replacing Plain Steel Tanks with GWS Tanks

GWS recommends that defective plain steel tanks are replaced with GWS tanks. It is strongly recommended that a relief valve is installed at the GWS tank connection. Also be sure to plug the air port on a jet pump, as air is no longer required to be supplied to the tank.

2. Thermal Expansion Tank Installation

Thermal expansion tanks are designed to accommodate the natural expansion of water as it is heated. Thermal expansion tanks may be used in several different applications including closed loop hydronic heating systems, direct and indirect solar heating systems, and open loop potable water heating systems. GWS has developed three different series of tanks to be used for each application: HeatWave™ for closed loop hydronic heating systems, SolarWave™ for indirect closed loop solar heating systems, and ThermoWave™ for direct solar heating and open loop potable water heating systems. For high volume thermal expansion applications Challenger™ and SuperFlow™ Series tanks may be used.

⚠ **CAUTION:** Check tank data label for maximum operating pressure and temperature prior to installing.

⚠ **CAUTION:** Additives (such as glycol) can affect the thermal expansion and expansion tank operation. Check with your GWS dealer or nearest GWS sales office for more details.

⚠ **WARNING:** It is strongly recommended that any heating system is protected by a suitable pressure relief valve set at or below the maximum tank pressure rating. Failure to install a relief valve may result in tank explosion in the event of a system malfunction or over pressurization, resulting in property damage, serious personal injury or death.

2.1 Precharge

Using a suitable pressure gauge, check the tank precharge pressure prior to installation. Refer to the tank data label for factory precharge pressure. HeatWave™ tanks in closed loop heating circuits should be precharged to system fill pressure. ThermoWave™ tanks in open loop heating storage systems should be precharged to mains' pressure. For SolarWave™ tanks in closed loop solar systems precharge should be set at minimum system operating pressure and / or fill pressure. Release or add air by the tank air valve accordingly. Make sure the tank is completely drained of water and there is no system pressure affecting the precharge pressure reading when adjusting tank precharge.

2.2 Thermal Expansion Tank Location

As tanks, pipes and connections can leak even when installed correctly; make sure to install the tank at a location where any leak will not cause water damage. The thermal expansion tank should be installed on the cold or supply side of any heating system. The tank should be installed indoors and protected from freezing temperatures.

2.3 System Connection

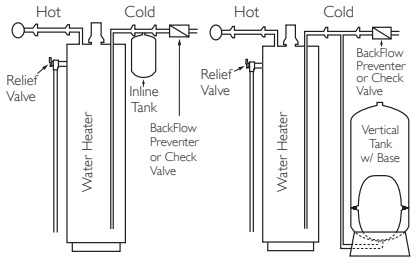


Fig. 2.3-1 Fig. 2.3-2

Thermal expansion inline tanks are designed to be supported by system piping and should be connected to the system piping using a "T" connection (See Fig. 2.3-1). Optional wall mounting brackets are also available for increased support (check with your local GWS dealer for more information). Vertical tanks with base are designed to be self-supporting and should be connected to the system with additional piping (See Fig. 2.3-2).

2.4 Solar Heating System Connections

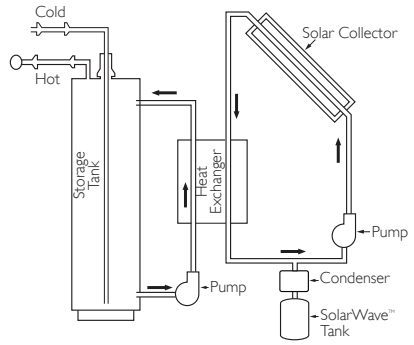


Fig. 2.4

SolarWave™ tanks are intended for use in the solar liquid loop of indirect thermal transfer systems and may be mounted either on the suction or pressure side of the circulation pump. If a condenser is employed to cool evaporated solar liquid it must be in the location between the solar liquid loop and the expansion tank. A relief valve should be employed and maximum operating parameters must not be exceeded. If the temperature of the solar system has the potential to rise above the evaporation point of the solar liquid, a condenser chamber or coil is required between the solar collector and the expansion tank (See Fig. 2.4).

2.5 Thermal Expansion Operating Principles

As water is heated it expands. A thermal expansion tank is used to accommodate for this natural water expansion, which otherwise may lead to increased system pressure and cause damage to piping, fittings and other system components. A thermal expansion tank uses a diaphragm membrane sealed inside the vessel to create a barrier between water and air chambers. The air chamber acts as a cushion which compresses as heated water expands. The thermal expansion tank absorbs the expanded water volume and ensures constant system pressure is maintained. Using a thermal expansion tank also conserves water and energy. This is accomplished by eliminating the need to refill and reheat water lost due to venting from the relief valve during heating cycles.

3. Disposal

Check with local authorities for proper disposal and recycling.

