



flowvess[®]

GFU Expansion Vessel

OPERATION AND MAINTENANCE MANUAL

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OPERATION & MAINTENANCE

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General Information

These instructions are to assist in the installation of the flowvess GFU Expansion Vessels please follow them carefully.

If, having read this Operation & Maintenance Manual, there is any doubt about any aspect of the installation please don't hesitate to contact our technical team.

Definitions of Safety Warnings and Precautions



WARNING!

Indicates a potentially hazardous situation which, if not avoided, can result in serious injury or death.



CAUTION!

Indicates a potentially hazardous situation which, if not avoided. Can result in minor to moderate injury, or serious damage to the product.

Safety

Information

It is essential that correct and safe working practices are adhered to at all times when installing, operating and/or maintaining any piece of equipment. Always consult safety data sheets, operating and maintenance manuals, Health & Safety legislation and recommendations and specific requirements of any equipment manufacturer, site controller, building manager or any other persons or organisation relating to the procurement, installation, operation and/or maintenance of any piece of equipment associated or in conjunction with any product provided by **flowtech** Water Solutions.

This document is intended for ALL installers, operators, users and persons carrying out maintenance of this equipment and must be kept with the equipment, for the life of the equipment and made available to all persons at all times. Prior to carrying out any work associated with the set it is essential that the following sheets are read, fully understood and adhered to at all times.

Equipment must only be installed, operated, used, and/or maintained by a competent person. A competent person is someone who is technically competent and familiar with all safety practices and all of the hazards involved.

Any damage caused to any equipment by misapplication, mishandling or misuse could lead to risk of Electrocutation, Burns, Fire, Flooding, death or injury to people and/or damage to property dependent upon the circumstances involved. **flowtech** Water Solutions accepts no responsibility or liability for any damage, losses, injury, fatalities or consequences of any kind due to misapplication, mishandling or misuse of any equipment, or as a result of failure to comply with this manual.

Failure to install, operate, use or maintain the equipment in accordance with the information contained within this document could cause damage to the equipment and any other equipment subsequently connected to it, invalidating any warranties provided by **flowtech** Water Solutions to the buyer.

Safety Warnings &

Precautions

These instructions should be read and clearly understood before working on the system. Please read this manual carefully and all of the warning signs attached before installing or operating the equipment keep this manual handy for your reference. This equipment should be installed, adjusted and serviced by trained and qualified personnel. Failure to observe this precaution could result in bodily injury.



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.



CAUTION! - It is strongly recommended that all electrical equipment conforms to National Electrical Codes and local regulations. Only qualified personnel should perform installation, alignment and maintenance. The manufacturer reserves the right to alter the technical data in order to make improvements or update information.



CAUTION! - Failure to observe these rules will render the guarantee invalid. The same applies to repair jobs and/or replacement. Your legal rights are not affected.



CAUTION! - The manufacturer declines all responsibility in the event of damage or injury caused as a result of tampering with the equipment.



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.

Customer / Contractor Responsibilities

It is the responsibility of the customer and/or the contractor:

- To ensure that anyone working on the equipment is wearing all necessary protective gear and/or clothing.
- Is aware of appropriate health & safety warnings.
- Has read the information in this section of the manual.

General Information

Flowtech GFU expansion vessels are designed designed for use in well water or potable water booster systems.

The air and water is permanently separated in the expansion vessel by a butyl diaphragm. All Flowvess GFU vessels are suitable for floor standing applications only. The air pressure must be adjusted up or down to suit site conditions.

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.

These instructions have been prepared to acquaint you with the correct method of installing and operating your Flowvess expansion vessel. 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 **flowtech** water solutions on 0333 200 1756.

These instructions have been prepared to acquaint you with the correct method of installing and operating your expansion vessel.

We urge you to study this document carefully and follow all the recommendations. In the event of installation difficulties or the need for further advice, you should **flowtech** water solutions on 0333 200 1756

Flowvess GFU vessels are designed for use in well water or potable water booster systems.

Refer to Sec. 1 for installation details.

These 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 PLUMBING CODES.

Installation

- An isolating and drain down valve must be installed in between the system and the expansion vessel (and autofiller if fitted) to enable correct commissioning of the vessel.
- The installation should be indoors and not subject to freezing conditions.
- The vessel should be installed so that in the event of water leaking from the vessel or any associated pipe work this will not cause damage to surroundings, the manufacturers will not accept claims for damage caused by water leaks.
- The factory pre charge is 1.4 bar, this will need adjusting depending upon system conditions, to check the vessel pressure correctly and readjust if necessary the system must not be pressurised with water.
- The vessel must not be supported by the pipe work.
- The vessel should be connected to the return pipe work on heating systems, potable system installations vary, please contact our technical help line if required.

1.1 Proper Vessel 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 expansion vessel 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, the Precharge should be set to 0.2 bar 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, 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:

1. Adjust the precharge of the tank to 4 bar.
2. Install the tank into the system.
3. Fill the system with water to equalise the system and precharge pressure at 4 bar.
4. Increase precharge pressure in maximum 3 bar 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:

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 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 below precharge. If system pressure needs to be lowered, the tank should be isolated or emptied as previously described.

1.4 Typical Installations

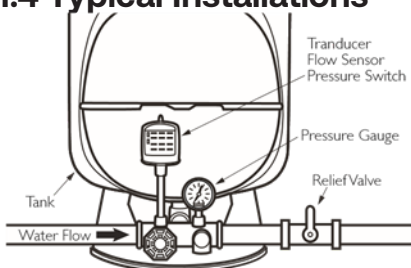
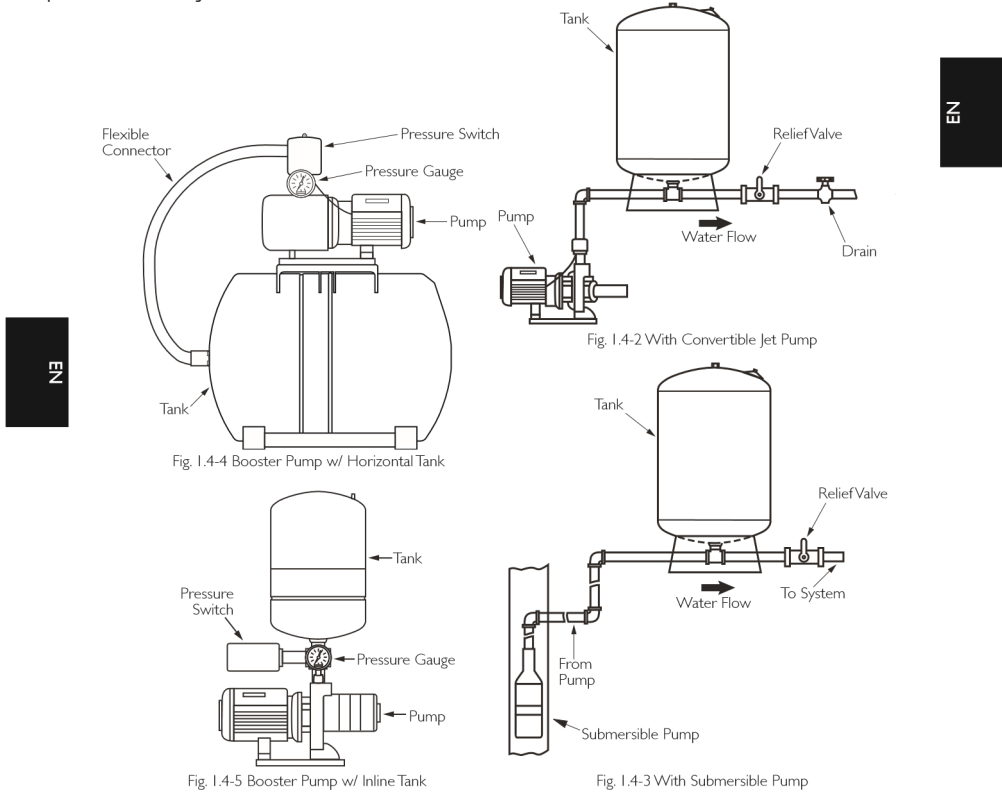


Fig. 1.4-1 Tank Installation with Accessories

- 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.



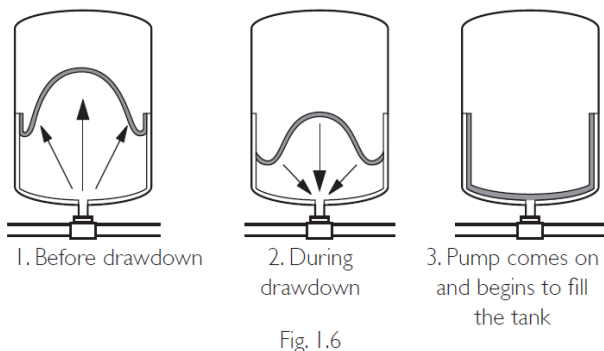
FlowThru vessels should only be used in Variable Speed Drive or Variable Frequency Drive controlled pumping systems.

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.

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 litre of water for every litre per minute (LPM) of pump capacity. This allows for fewer pump starts and longer run times which should maximize the life of the pump.



1.7 Replacing Plain Steel Tanks with Expansion Vessels

It is strongly recommended that a relief valve is installed at the expansion vessel 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. There are three different series of tanks to be used for each application: For closed loop hydronic heating systems, For indirect closed loop solar heating systems, and for direct solar heating and open loop potable water heating systems. For high volume thermal expansion applications GFU and SFW 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.
- ⚠ 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 pressurisation, resulting in property damage, serious personal injury or death.

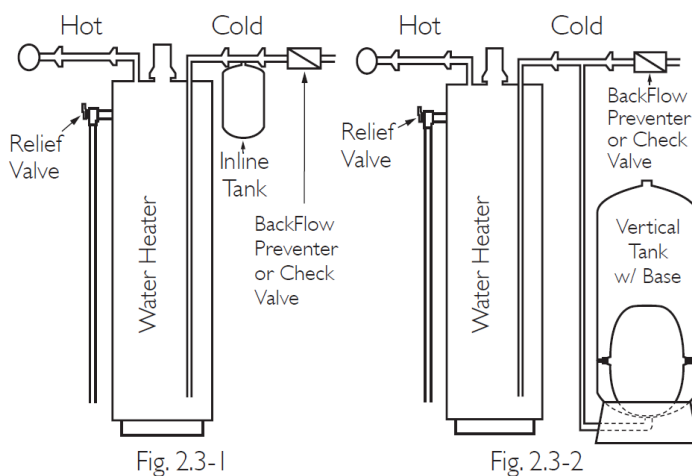
2.1 Precharge

Using a suitable pressure gauge, check the tank precharge pressure prior to installation. Refer to the tank data label for factory precharge pressure. Vessels in closed loop heating circuits should be precharged to system fill pressure. Vessels in open loop heating storage systems should be precharged to mains' pressure. For Vessels 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



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. Vertical tanks with base are designed to be self-supporting and should be connected to the system with additional piping (See Fig. 2.3-)

2.4 Solar Heating System Connections

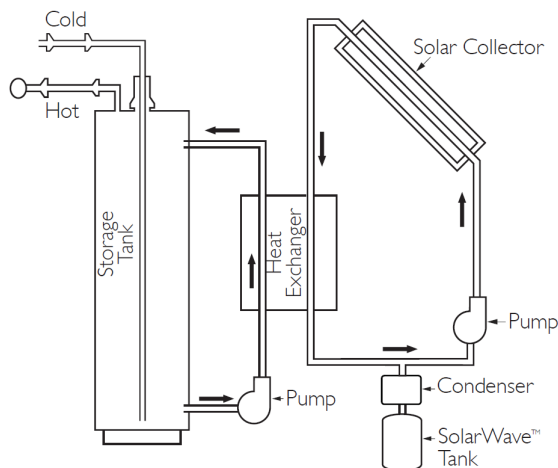


Fig. 2.4

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.

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.

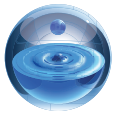
3. Disposal

Check with local authorities for proper disposal and recycling.

4. Troubleshooting

- Problem: - Safety relief valve leaks/passes
- Solution: - Dirt under seat of valve. Safety relief valve faulty. Incorrect pressure in vessel.
- Problem: - Pressure in system slowly decreases.
- Solution: - System is not entirely sealed, check for leaks and repair.
- Problem: - Pressure rises quickly on increase
- Solution: - Too much air in vessel in temperature. Insufficient air in vessel Vessel not sized correctly

All vessels should be checked annually for the correct pressure and adjusted if required. Failure to have the correct pressure will reduce the life expectancy of the vessel.



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WATER SOLUTIONS

flowzone[®]

MEMBERS AREA

This section of the **flowtech**[®] website holds information exclusively for members. Members will need to log in to gain access to these pages.

Our member's will be granted exclusive access to our technical resource library. Within this resource is a wide range of product information including data sheets, technical drawings, O&M Manuals and training videos



flowcare[®]

AFTER SALES SERVICE

At **flowtech**[®] we operate a network of Service Engineers located throughout the UK who are supported by our offices located in and Greater Manchester. The distribution of engineers means that in the majority of cases we are less than 4 hours away from attending a customer call out.

We place great emphasis on providing technical back up to support our Service Engineers in resolving some difficult operational and technical issues. We pride ourselves on completing a project on time, within budget and never leaving a problem unresolved, or a customer waiting. This quality of service has made us the first choice for our customers.

FOR FURTHER INFORMATION OR ASSISTANCE

contact us

Flowtech Water Solutions are experts in water services and water booster sets. We have continuously supplied a wide range of standard and custom products since being founded in 1996.

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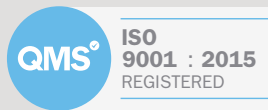
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