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**INSTALLATION AND OPERATING INSTRUCTIONS**

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# Armex Transfer Expansion Equipment

## Integral Transfer Pumps / *SAFE*\* Tank units

### Transfer units with separate or multiple *SAFE* Tanks

#### ARMEX EXPANSION CONTROL SYSTEM

The purpose of the Armex Expansion Control System is to maintain the pressure in a hydronic system within the design operating range. Armex replaces the need for one or more traditional expansion tanks in closed systems. The Armex can be used in heating and cooling applications for water or glycol mixtures when the sealed system incorporates a single closed loop.

#### ESSENTIAL SAFETY REQUIREMENTS

1. Locate units in a well ventilated environment and ensure that ventilation fans and exhaust louvers are not obstructed.
2. Ensure that the supply voltage matches the control panel voltage.
3. Check that the motor protectors and conductors supplying the panel are adequately sized (per NFPA70 or CEC).
4. Electrical installation should be performed by a qualified electrician.
5. Guards and covers must not be removed during operation.

#### INSTALLATION

1. Install the equipment as indicated on Fig. 1 (integral transfer/*SAFE* units) or Fig. 2 (Separate/Multiple *SAFE* units). Depending on the system application, there will be 3 separate installation types:
  - Cooling System – intermediate vessel and anti-gravity loop NOT REQUIRED
  - Heating Systems <200°F (93°C) – intermediate vessel NOT REQUIRED – anti-gravity loop REQUIRED
  - Heating Systems >200°F (93°C) – both intermediate vessel and anti-gravity loop REQUIRED

The anti-gravity loop and intermediate tanks are to be applied to maintain safe relative temperature differences in the system and to prevent the possibility system fluid flashing to steam in the *SAFE* tank. The air vent for the anti-gravity loop has been provided loose for field installation.
2. Piping from the Armex Transfer unit to separate or multiple *SAFE* tanks
  - a) Install piping to rise from the transfer package up to the *SAFE* tank per standard piping practices (sloped).
  - b) For Multiple Tanks pipe velocity should be limited to 1.5 ft./sec., and the piping arrangement should be symmetrical to each *SAFE* tank to ensure even transfer of fluid.
  - c) All connections to the *SAFE* tank(s) must have a flex connector. This will ensure that the tank is free to move ensuring correct operation of the level control system.
3. Fit isolating valves where indicated on Figures 1 & 2. It is recommended to use ball isolation valves with removable handles to ensure valves are not inadvertently closed during normal system operation.
4. The size of the cold water supply should provide a flow rate equal to the maximum transfer rate of the Armex unit. Contact your local Armstrong representative if you do not have this information available.

5. Install anti-gravity loop. The anti-gravity loop pipe diameter should be at least equal to transfer unit system connection size. Install air vent at the top of the anti-gravity loop. DO NOT insulate the pipework from the system to the SAFE tanks.

6. Connect electrical supply (Three Phase, Neutral and Ground) to control panel.

**Note:** Unit-specific wiring diagram is located inside control panel.

7. Fit air release valves (supplied loose) to top of SAFE tank (see Figures 1 & 2).

**\*SAFE refers to "Sealed Acceptor for Fluid Expansion". This is a non-pressurized tank.**

## INSTALLATION DIAGRAMS

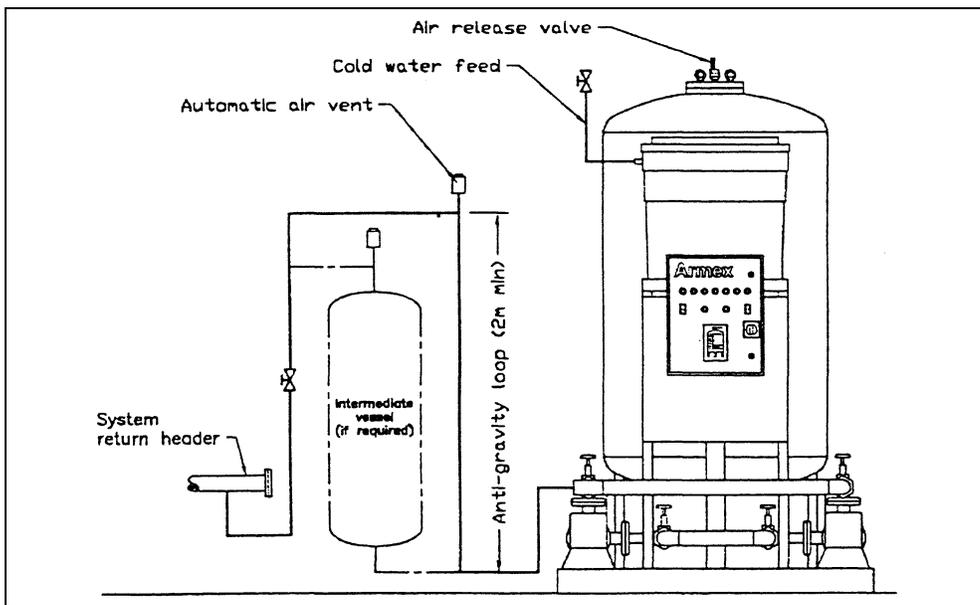


Fig. 1

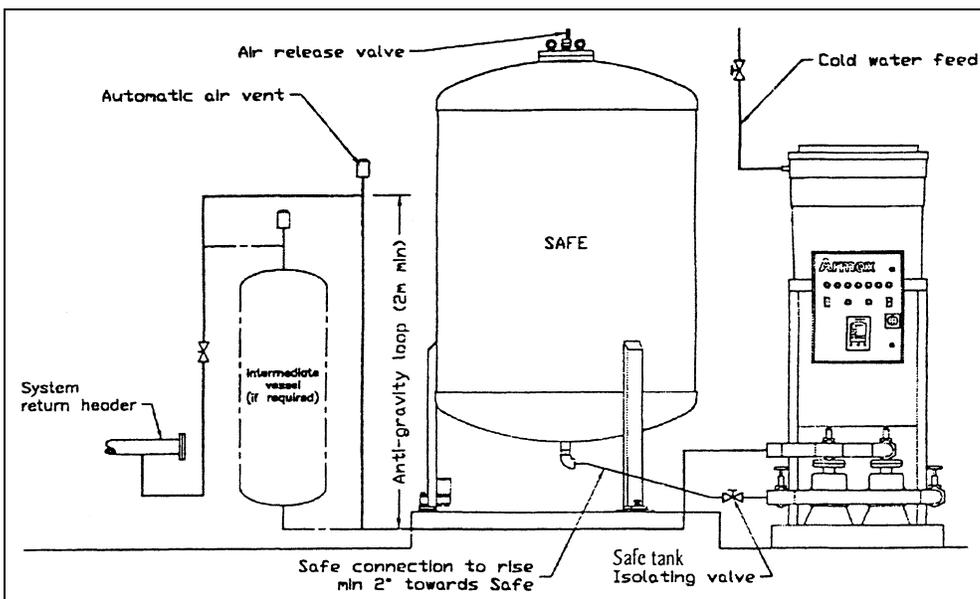


Fig. 2

## **OPERATION**

1. Ensure the equipment is installed correctly. Close system isolating valve, water supply valve and pump discharge valves. Open the *SAFE* tank isolating valve and pump suction valve.
2. Disconnect power to the Armex unit using the main disconnect switch on the panel. Ensure pump HOA switches are in the 'OFF' position.
3. Fill the hydronic system per standard practice. The isolation valve from the Armex System to the hydronic system **MUST** remain closed during this operation.

*Steps 3 to 7 can be performed while the system is filling. DO NOT begin step 8 until the system is full, vented of air, and pressurized to the minimum operating pressure.*

4. Transport safety requires that the ASME bladder vessel(s) on the transfer unit be shipped with no more than 12 psi pre-charge. For proper operation of the Armex System, the tank must be air-charged to the minimum system operating pressure. This should be done using a manual air pump or compressor.
5. The Armex is supplied with a contents indicator and load beam foot located on one of the legs of the *SAFE* tank(s). This system will indicate the level in the tank. For systems with loose *SAFE* tank(s), an electrical connection from the load beam foot to the Contents Indicator Controller must be made. Use the plug from the supplied wiring harness to make the connection to the sensing block.

**Note:** The Controller will have been calibrated prior to shipment, but can be re-calibrated on site if required. Re-calibration instructions are detailed below.

6. The *SAFE* tank is shipped with yellow painted travel bolts to prevent damage to the load beam foot instrument. These **MUST** be removed for the Armex System to properly function. Completely remove and discard the yellow painted travel bolts that fix the *SAFE* tank legs to the floor plates.
7. Raise the *SAFE* tank using the Jacking screws on all the tank legs so that there is ¼ inch (6 to 8 mm) clearance between the legs and the floor plate. This clearance will allow the sensor to read the level in the tank.

### **The Armex System is now ready for final commissioning.**

8. Open the isolation valve supplying the cold water make-up solenoid or break tank.

Close the main disconnect switch on the control panel. Ensure the "power on" pilot light is lit. The contents indicator will indicate a low water condition (flashing green LED on contents indicator). The solenoid valve from the water fill line will open allowing water to flow into the *SAFE* tank. The display will first change to "normal". A second LED will flash indicating the tank is filling via the makeup water line. When there is sufficient water in the *SAFE* tank, the second light will stop flashing and show a constant green.

9. Ensure the transfer package is vented of air and the pumps are primed. To fill the transfer package, open the drain valve on the suction header of the package. It will also be necessary to remove the priming plugs from the pumps allowing water to flow from the *SAFE* tank into the pumps.
10. Switch the pumps to the "Hand" position momentarily to check rotation. If the rotation is incorrect, open the disconnect switch, disconnect power from the building breaker, and reverse any two leads on the incoming power.

**WARNING:** When the controller disconnect switch is in the open position the leads entering the panel are still live. Supply power must be disconnected before performing this operation. It is recommended that this procedure be done by a licensed electrician.

11. Switch the pumps to the "Auto" position, and slowly open pump discharge valves. Both pumps will run. When the pressure reaches the threshold of the first pump pressure switch one pump will switch off. The second pump will switch off at the threshold of the second pump pressure switch.

12. Check the unit for any leaks that may have occurred due to shipping.
13. The Armex system is now fully commissioned.
14. With the exception of the system isolating valve, fully open all other valves. With the unit switched on and pumps on 'Auto', slightly open the system isolating valve and allow the Armex to pressurize the hydronic system. Fully vent the system and then fully open the system isolating valve. The system can now be started up.
15. Adjust pressure switches as required.
16. Fill the *SAFE* tank to check the high water alarm. This can be done by lowering the transfer pressure switch setting to open the transfer solenoid valve. Close the *SAFE* isolating valves and pressurize the Armex Transfer Unit to check the pressure switch settings.

**Note:** The contents indicator controller is calibrated with the Safe Tank during manufacturing and should not need to be changed. However, if the need arises to recalibrate the controller follow the instructions detailed at the end of this section.

### **Calibration of the Contents Indicator (Normally factory preset)**

1. The controller is self-calibrating. Fill the *SAFE* tank with water using the procedure in section 16 above. Begin by setting the pumps to "Off". Switch on panel with door open.
2. Connect the calibration link to the two pins on the controller marked 'CALIB'.
3. Run one pump in the "Hand" position to drain the *SAFE* tank. Remove the calibration link. The controller is now fully calibrated.

**Note:** The calibration procedure will also operate in reverse i.e. filling. During calibration the controller will show a single central lamp and the top and bottom lamps will flash as the controller senses new higher or lower signals.

**CAUTION:** During the calibration procedure if any load is applied to the *SAFE* tank the calibration will be incorrect.

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