Armstrong Electric Single Point and Retrofit Purger Installation and Operation Manual

Models XR1501 (Electric Single Point Purger) and XR1501R (Retrofit Purger)

Armstrong®

Installation and Set Up Overview

Warning:
These installation, operation and technical instructions should be used by experienced personnel as a guide to insure that the Armstrong XR1501 (Electric Single Point Purger) and XR1501R (Retrofit Purger) function in a correct manner. Selection or installation of equipment should always be accompanied by competent technical assistance. We encourage you to contact your local representative or the Armstrong Factory if further information is required.

Installation

XR1501 Electric Single Point Purger

Warning:
All installation and service performed on the Armstrong Purger should be performed by competent personnel. Observe all safety precautions plus wear protective clothing and eye protection at all times.

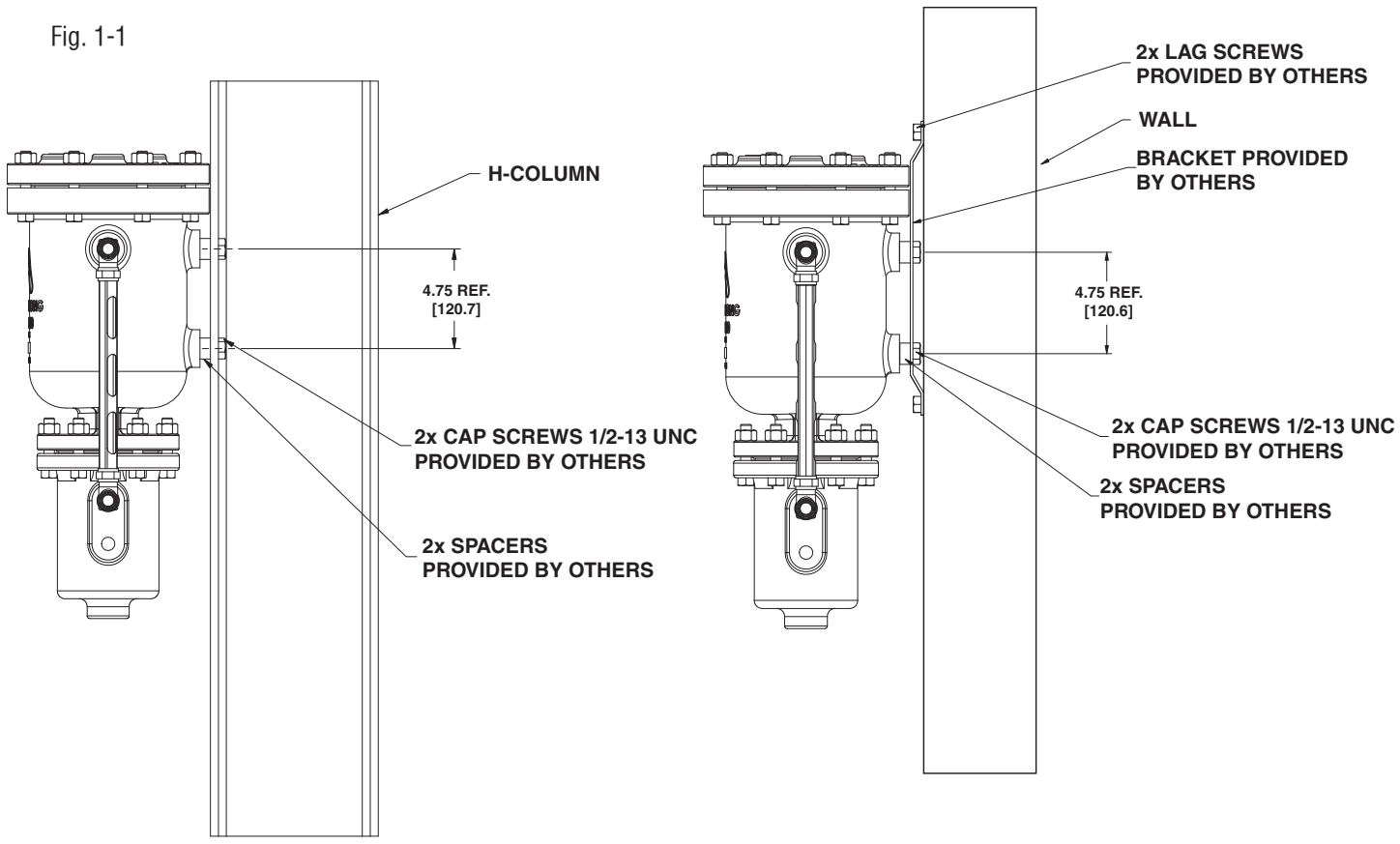
- **Location of Purger:** The purger should be installed where convenient for operation and inspection, usually in the compressor room. Where practical, install at a higher elevation than the liquid receiver.

- **Mounting the Purger:** The purger should be fastened securely to a wall or column. Two ½" tapped holes are provided in the purger housing to facilitate mounting. See Fig. 1-1.

  The XR1501 Package is 40" tall by 47" wide. The frame has four (4) 5/8" mounting holes.

- **Gauge Glass:** The gauge valves, glass and gauge guard supplied with the XR1501 Purger are packed separately and should be installed after the purger is in the line. **Note:** The XR1501R retrofit does not include a gauge glass.

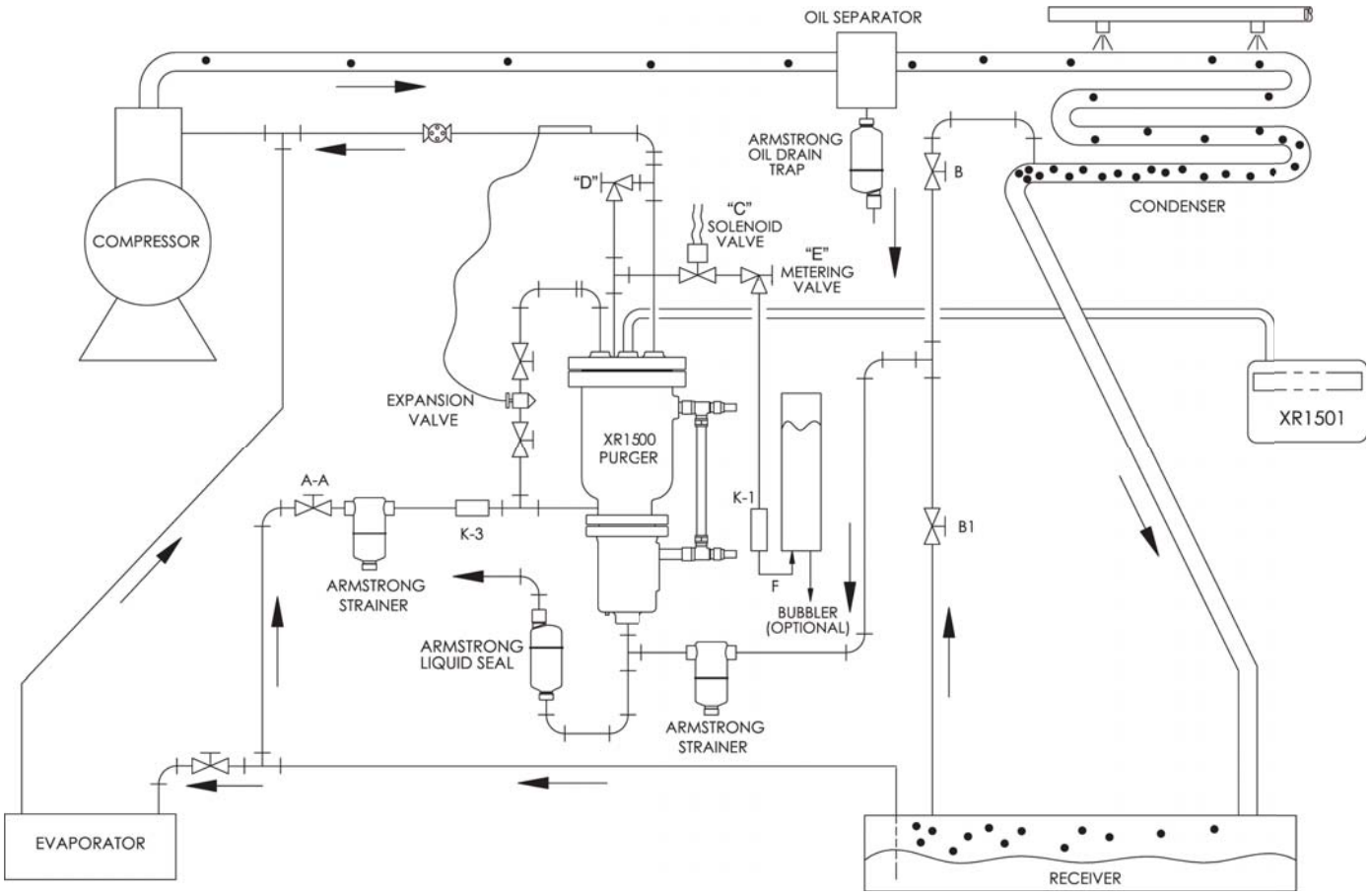
Fig. 1-1



Installation Procedure

Connecting the Purger to the Refrigeration System

Fig. 2-1, How an Armstrong XR1501 Purger fits into a refrigeration system



- **The Liquid Supply** for the purger must come from a point where liquid refrigerant is always available.
  Note: Be certain the liquid supply comes from the same pressure source as the purge points.

- **Connect the Purger to the Electrical Supply:** Any properly grounded 120 VAC 15 AMP supply will be sufficient. Refer to Fig. 10-1, the Field Wiring Diagram for XR1501 & XR1501R Purger.

- **Suction Connections:** Piping should be at least ½". Connect to main suction line at any convenient point where low pressure is always present. On a two-stage system, if the low pressure compressor operates continuously while the purger is in service, connect it to the lower pressure stage.

- **Purge Point Connections:** Purge point connections should be ½" minimum. Location of these connections is discussed in more detail on Page 3. To ensure proper system purging, purge from one purge point at a time. Never "group" purge.

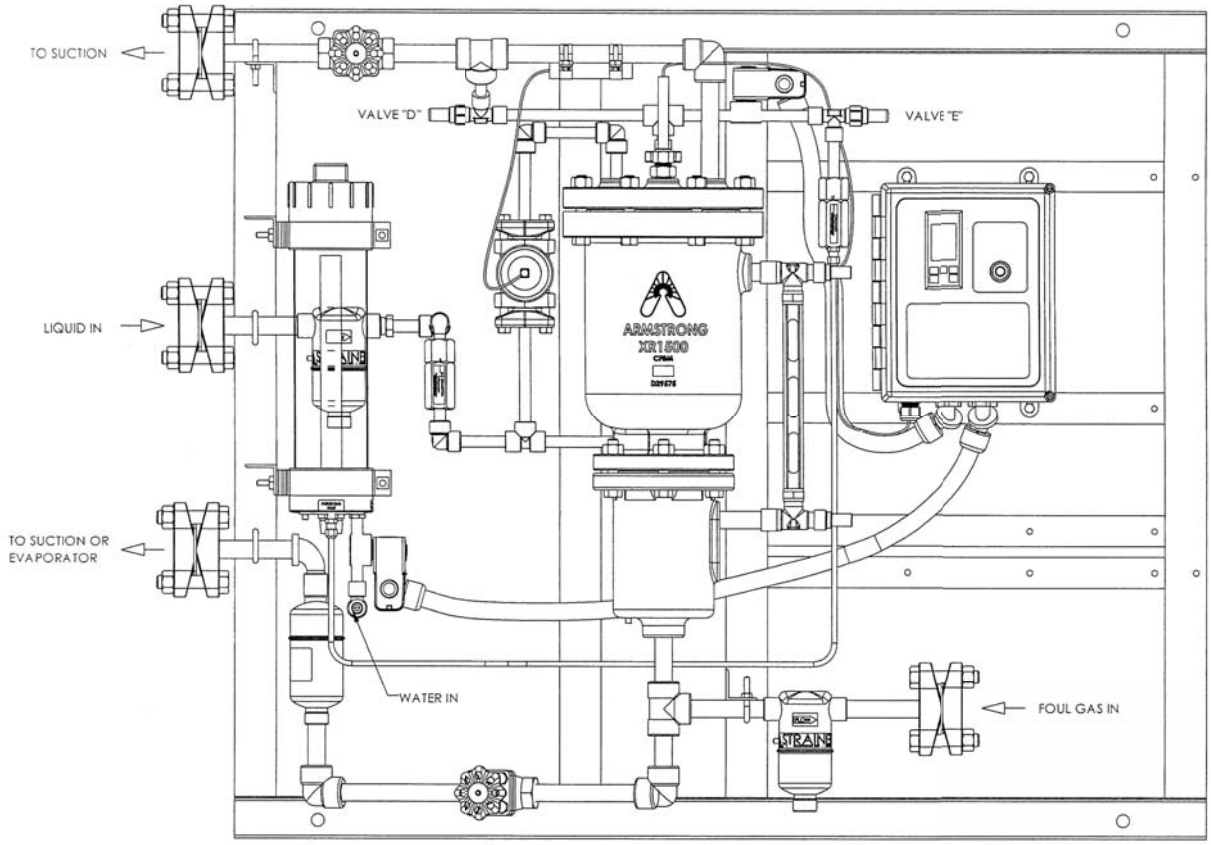
- **Operation Solenoid:** The XR1501 and XR1501R come with solenoid valve "C" and needle valves "D" & "E" (See Fig. 2-1). The automatic vortex bubbler with solenoid, needle valve and K-1 check valve are optional accessory items. The XR1501 package comes complete with needle valves "D" and "E", solenoid valve "C" and vortex bubbler on ammonia systems. (See Fig. 3-1)

- **Metering Valve "E"** is used to slow the purge discharge rate. The typical setting is 1/4" to 1/2" turn open.

Installation Procedure (continued)

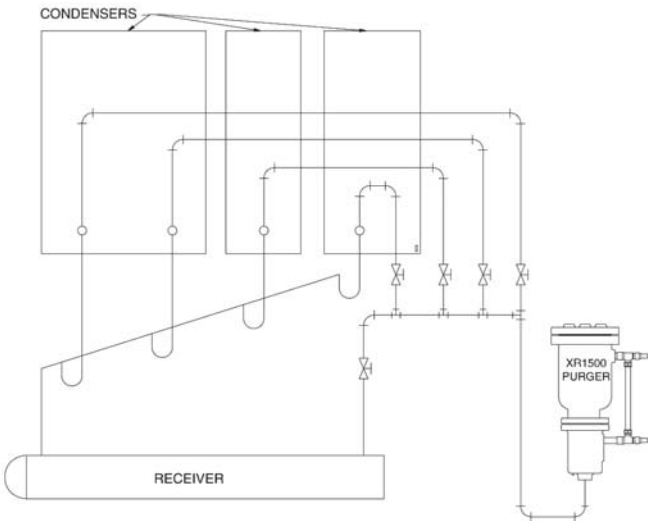
Connecting the Purger to the Refrigeration System

Fig. 3-1



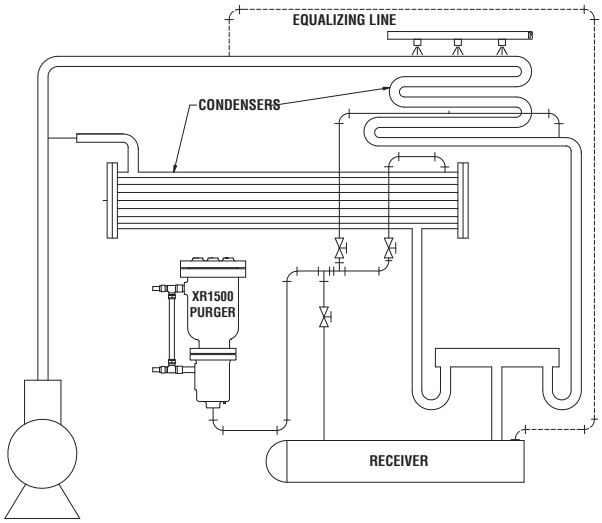
- **Purge Piping for Multiple Condensers:** Provide a separate purge connection from each pass of evaporative condenser. Only one condenser should be purged at one time; a lot of steps can be saved by running separate purge lines with easily accessible valves to a manifold just ahead of the purger as shown in Fig. 3-2 and Fig. 3-3.

Fig. 3-2



Purge lines and valves manifolded close to purger make it easy to switch from one unit to another.

Fig. 3-3



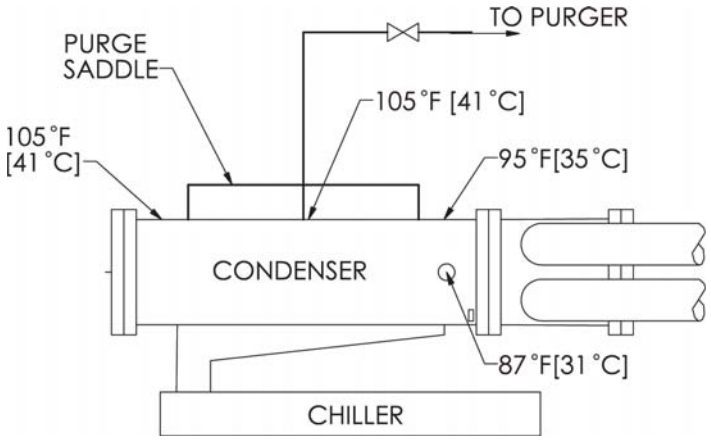
Purge lines for an evaporative condenser in parallel with a shell and tube condenser.

Installation Procedure (continued)

Connecting the Purger to the Refrigeration System

- **Purge Piping for Centrifugal Machines:** A purge "saddle" is usually provided on top of the condenser as shown in Fig. 4-1. The three purge outlets are connected and a single purge line run to the purger. NOTE: If you suspect more than 5 psi differential pressure between purge points, a check valve should be used on the low pressure purge points.

Fig. 4-1



Conventional purge saddle and pyrometer readings of surface temperatures.

Installation Procedure (continued)

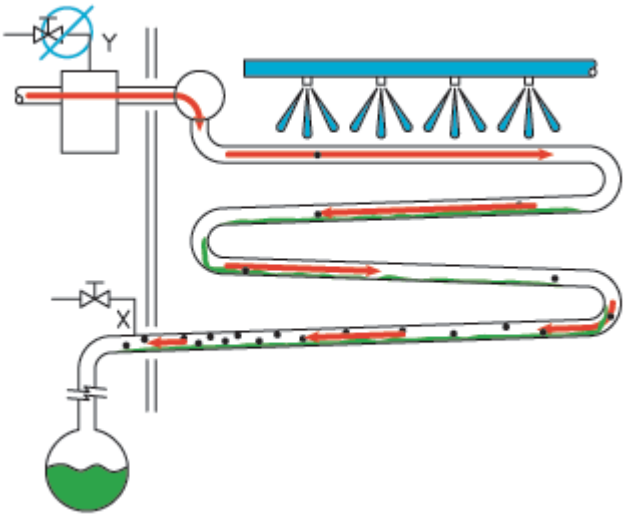
Piping Tips

Purge Connections for Condensers

- **Evaporative Condensers:** In these drawings, long arrows show high gas velocity. Arrow lengths decrease as gas velocity decreases approaching the no-velocity zone. Air accumulation is shown by black dots.

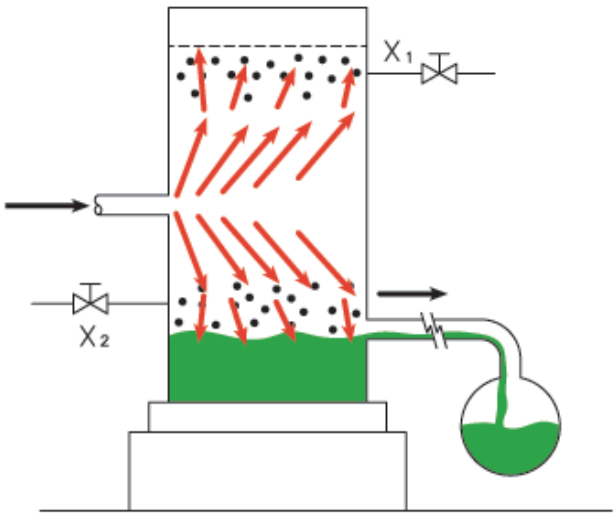
Fig. 5-1. The high velocity of entering refrigerant gas prevents any significant air accumulation upstream of point X. High velocity past point X is impossible because receiver pressure is substantially the same as pressure at point X. Purge from Point X. Do not try to purge from point Y at the top of the oil separator because no air can accumulate at this point when the compressor is running.

Fig. 5-1



- **Vertical Shell and Tube Condensers:** Fig. 5-2. Low gas velocity will exist at both the top and bottom of the condenser. Purge connections are desirable at both X_1 and X_2.

Fig. 5-2



- **Horizontal Shell and Tube Condensers:** Fig. 5-3. Incoming gas carries air molecules to the far end of the condenser near the cooling water inlet as shown. Purge from Point X. If purge connection is at Y, no air will reach the connection against the gas flow until the condenser is more than half full of air.

Fig. 5-3

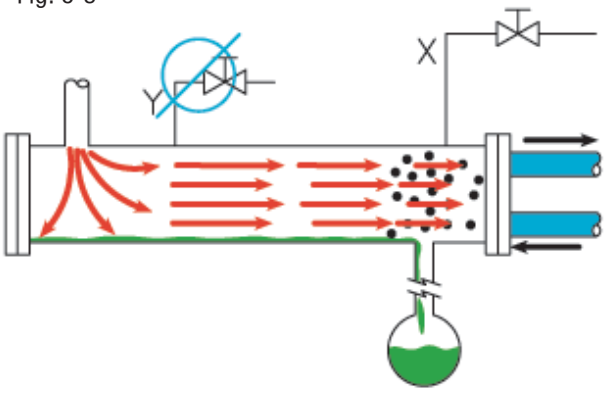
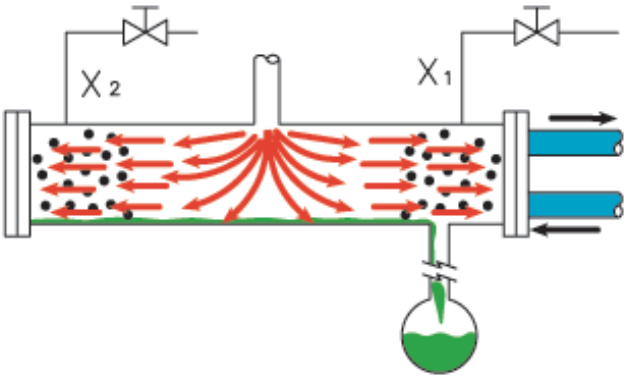


Fig. 5-4. Incoming refrigerant blows air to each end of the condenser. Air at the left hand end can't flow against the incoming gas to escape through the right hand connection at X1. Provide A Purge Connection at each end. However, if the condenser is equipped with a purge "saddle" (as in Fig. 4-1) only one purge point is used.

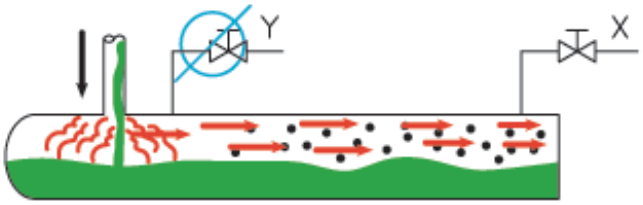
Fig. 5-4



Purge Connections for Receivers

Fig. 5-5. Purge from point X, farthest away from the liquid inlet. A "cloud" of pure gas at the inlet will keep air away from point Y.

Fig. 5-5



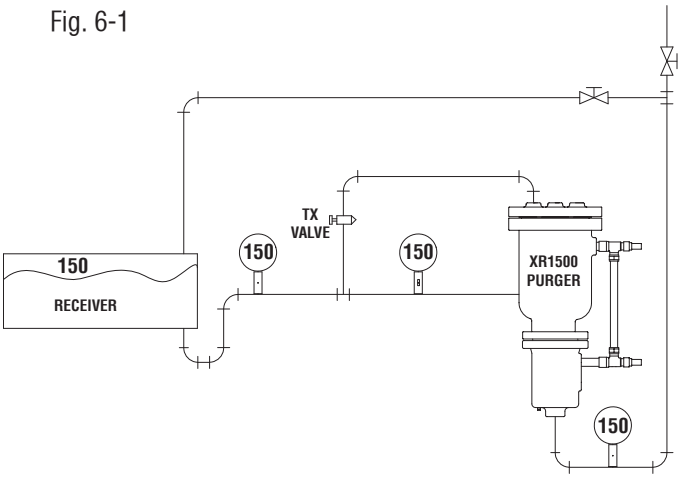
Installation Procedure (continued)

Installation Notes

Adherence to the following notes and recommendations are very important in achieving a fully satisfactory, trouble free installation. Please read them carefully.

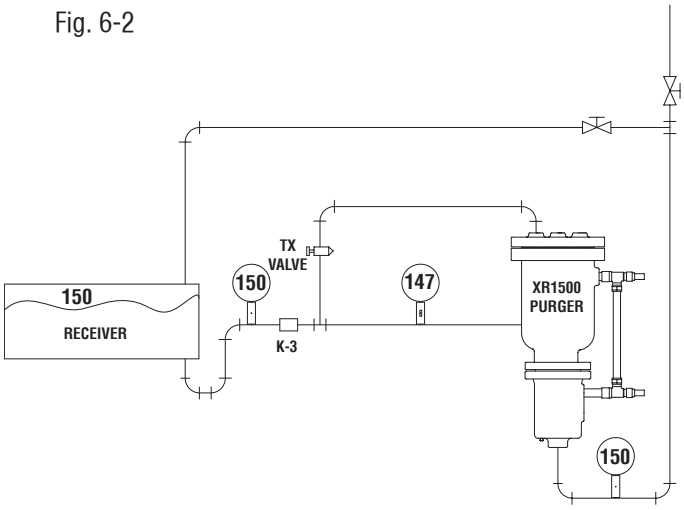
- **Differential Check Valve (K-3):** With an expansion valve between the purger liquid outlet and the refrigerating coil inlet, pressures at the purge gas inlet and purger liquid outlet are identical. Gas can not enter the purger because a light spring holds the check valve in the bottom of the purger closed, and there is no pressure differential to permit gas to enter the purger. See Fig. 6-1.

Fig. 6-1



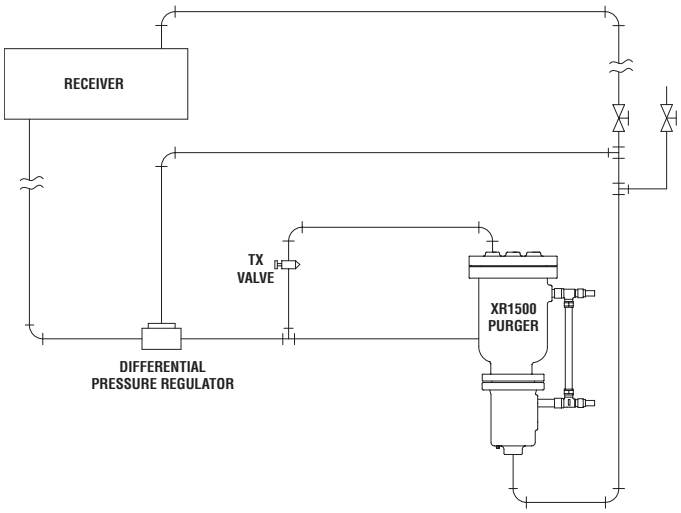
A K-3 differential valve reduces the pressure at the purger liquid outlet to enable gas to enter the purger and liquid to be discharged from the purger. See Fig. 6-2.

Fig. 6-2



- **High Liquid Head May Exceed K-3 Differential Valve Capability:** When the liquid refrigerant supply comes from more than approximately 5 to 10 feet (1.5 to 3.0 meters) above the purger liquid inlet, a K-3 differential valve (a spring loaded check valve) may not be able to maintain the liquid pressure at the purger liquid inlet below the inlet foul gas pressure. Under these conditions use a differential pressure regulator instead of a K-3 differential valve. See Fig. 6-3.

Fig. 6-3



- **Thermostatic Expansion Valve:** Where high side or suction pressures vary, a thermostatic expansion valve is recommended. This valve may be installed with a by-pass that includes a manually-controlled expansion valve. The capillary bulb should be mounted 12” to 18” (31cm to 46cm) away from the purger on the suction line.

- **Thermostatic Expansion Valve Recommendations:** With suction temperature above 15°F, use a 2 ton valve. With suction temperature below 15°F, use a 1 ton valve.

Installation Procedure (continued)

Installation Notes

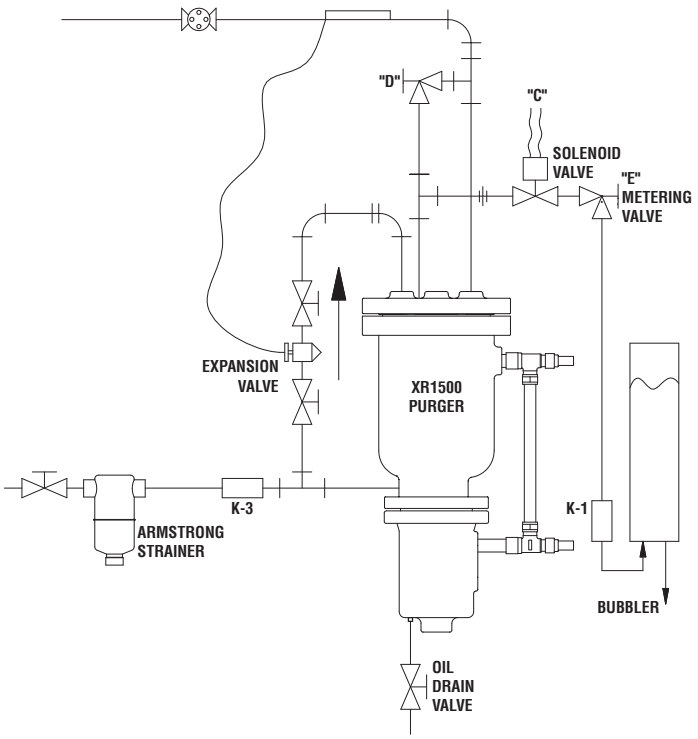
Warning: Use pipe thread compound sparingly. An excess may prevent the expansion valve from operating.

- **Avoid Pockets** in the foul gas line from the condenser to the purger. They will form a liquid seal which will prevent flow of gas from entering the purger. If pockets cannot be avoided, use a liquid seal trap to remove liquid. See Bulletin 760.

- **Excessive Oil** will interfere with purger operation. Remove oil before you install your purger. Prevent further oil accumulation by installing a separator in the discharge line from the compressor. This separator should be drained by an Armstrong Oil Trap that discharges to the compressor crank case through a suitable oil filter or to an oil barrel.

- **Oil Drain:** Every purger is provided with a bottom oil drain. Where oil accumulations are likely, install a ¼" Drain Valve as shown in Fig. 7-1. To drain oil, pump down the purger. When purger is at room temperature, open Oil Drain Valve and crack a union on the purge line so oil can drain by gravity.

Fig. 7-1



- **Purge Outlet Check Valve:** This check valve in the air discharge line prevents siphoning liquid from the bubbler back to the purger. **This check valve is purchased as an accessory item (K-1 check valve). The bubbler package includes a check valve.**

Installation Procedure

Armstrong XR1501R Retrofit Purger

Warning: All installation and service performed on the Armstrong Purger should be performed by competent personnel. Observe all safety precautions plus wear protective clothing and eye protection at all times.

- **Purger Shut-Down:** (Fig. 8-1) Close valve AA, "D", B, and B1. Under this condition suction will be maintained on the purger coil. As the purger warms up, the expansion valve will open. The liquid level inside the purger will drop. Leave the purger in this condition until all the frost is gone and the purger body is dry and warm. Then close valve "CC" (and M).

- **Disassemble** the purger and existing piping. Remove the existing cap, coil, and float assembly and replace them with the new cap, coil, and float assembly. Reassemble the purger body. Make the necessary piping changes to agree with Fig. 2-1 for adding solenoid valve "C" and metering valves "D" and "E".
  Note: Be certain the float assembly rod is pulled up as high as possible, approximately 4 inches above the cap.

  Mount the controller on a wall or other suitable structure near the purger. Be certain the controller is located in a visible non-obstructed location. Note: Control box is a NEMA 4 enclosure.

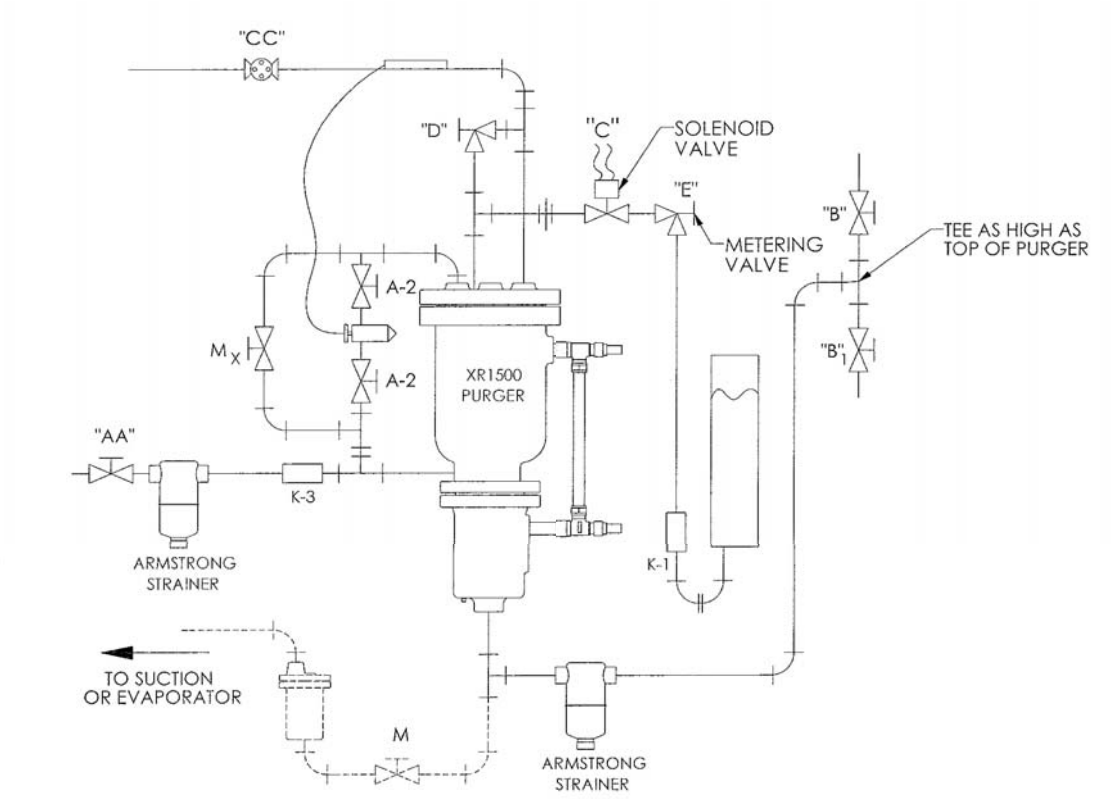
- **Purge Point Valves** should be installed for each purge point. See pages 3, 4, and 5 for further details.

- **Wire** the float switch and purge solenoid valve "C" to the purger controller per the wiring diagram. (See Fig. 10-1.)

- **Connect** the purger controller to the proper power source as per Fig. 10-1. **Be certain to follow proper state and local electrical code requirements.**

- **Bubbler Wiring** should be to terminals TB5 and TB6.

Fig. 8-1



Start Up Procedure

Armstrong XR1501 Electric Single Point Purger and XR1501R Retrofit Purger

- **Energize Purger Controller:** The LED will display the temperature inside the purger body (PV). To set the purge temperature, press the 900-TC8 controller down-up arrows until the LED display SV indicates a temperature approximately 5ºF - 10ºF (3ºC - 6ºC) above the suction temperature of your system. Your controller is now set. If it is desired to change to ºC, press and hold the round button ⊙ in the lower left hand corner of the 900-TC8 for at least three (3) seconds and release. Press the button until d-U is displayed. Press the down arrow once to change ºF to ºC. Press and hold the round button for one (1) second and the controller will resume standard operation.

- **Prime and Chill:** The purger can be primed and chilled in one operation by opening liquid supply valve and suction line valves. Crack open needle valve “D” (See Fig. 2-1). When liquid rises in the gauge glass to approximately 1 inch (2.5cm) from the top, close valve “D”. The capillary bulb will control the Tx valve and chill the purger body.

- **Turn on Foul Gas:** Open one “foul gas” valve at a time. Never purge from more than one point at a time for best purge results.

- **Operation:** The Armstrong Single Point Purger Controller is used with Armstrong XR1500 Series Refrigerant Purgers fitted with a float and temperature sensor assembly. This combination provides a simple and effective means of removing air and other non-condensibles from refrigeration systems.

  The controller continuously monitors the liquid level and temperature inside the purger body. When the float switch indicates an accumulation of gas, and the temperature inside the purger is below the set point, the purge solenoid will be energized to vent the non-condensibles from the refrigeration system. The purge light on the controller will light up when the purge solenoid is energized.

  The purge solenoid will de-energize and close when either the float switch indicates all the non-condensibles have been purged or the temperature inside the purger exceeds the set point (SV).

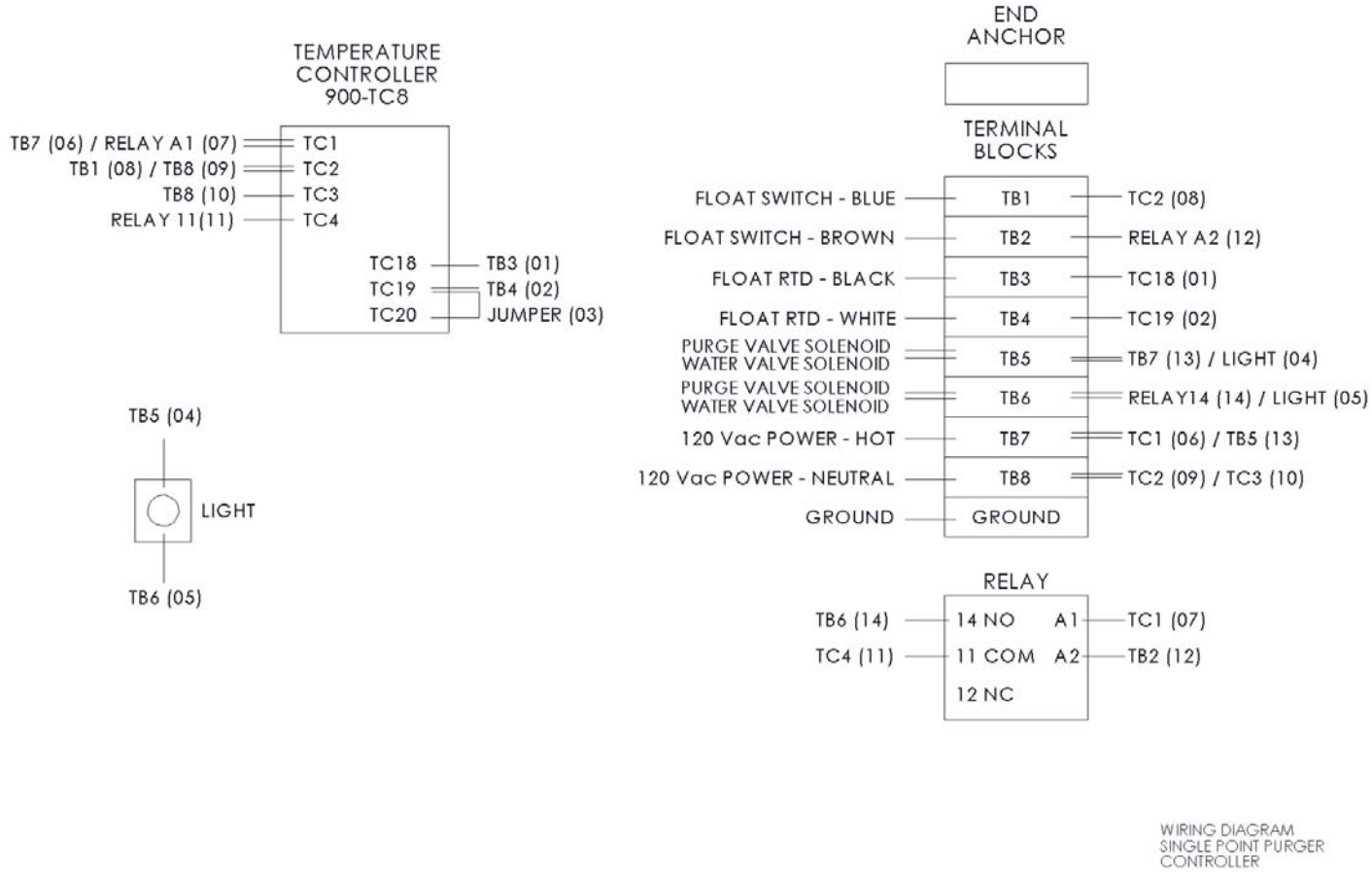
- **Liquid Seal Trap:** Condensation of purge gas in long or exposed lines will occur if the gas temperature exceeds the temperature of the air surrounding the purge gas piping. This condensation presents no problem if the amount is less than the make-up liquid required to offset purger heat gain. When the amount condensed exceeds make-up requirements, a seal of liquid refrigerant will form ahead of the purger.

  When such a seal forms, gas cannot get to the purger. Now the Tx valve has to supply only enough liquid to keep the purger chilled and none for condensing gas so the seal gets deeper and deeper. To cure this problem the XR1500 Series Package Purger is equipped with an Armstrong 1011-6 liquid seal trap (for ammonia service). The trap discharges to the low pressure or suction side of the system. This trap is a beneficial addition to any existing system being retrofitted to automatic control. (See Fig. 2-1)

Field Wiring Diagram

Armstrong Single Point Purger Controller (XR1501 and XR1501R)

Fig. 10-1



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