

Proper Planning is Essential to Successful Installation and Efficient Operation of Refrigerant Receivers

tech
tips



Refrigerant receiver valved to make servicing and inspection easier.

Consider the old maxim that a security system is only as strong as its weakest link. The same is true for refrigerant and air-conditioning systems—all of the components must be linked together to operate safely and efficiently. As refrigeration and air-conditioning units become larger to achieve needed capacities, additions to the basic system can complicate design plans.

Careful consideration must be given to the refrigerant receiver on new systems or when upgrading existing systems. Who hasn't, at one time or another, experienced problems with this essential component? With its many connections, it is important to select the receiver that meets the system's needs as well as all applicable building codes.

Before considering valving, let us review the function and design factors of a receiver. A refrigerant receiver is simply a pressure vessel sized to hold the liquid refrigerant charge of the system. To provide for

hydrostatic expansion refrigerant receivers, by are rated according to their pump down capacities, which is calculated at 90% of receiver volume at 90°F.

All receivers have liquid inlet and outlet connections. Other outlets normally furnished include drain valve connections and outlets for a relief valve, purge valve and liquid level gauge. Vessels in sizes of 3-inch through 6-inch diameters are copper-brazed and UL-listed.

Large Receivers

Receivers larger than 6 inches inside diameter are manufactured in accordance with the ASME code for unfired pressure vessels.

We have over 6 inches inside diameter are designed and manufactured in accordance with Section VII of the ASME Code and are marked with U Code symbol stamps. They can be supplied with National Board Certification.

The working pressure of larger receivers varies with the refrigerant used. The trend is toward a working pressure of 400 PSI or higher for use with the newer refrigerants.

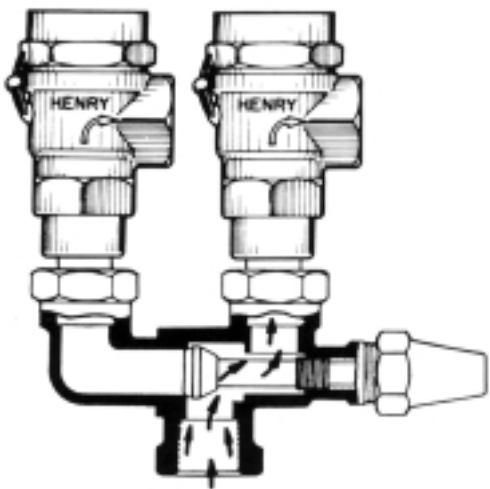
On the larger receivers, the selection of liquid line shut-off valves varies with the installation.

On systems that do not require back seating and have charging, purging or drain valves, simple forged valves are adequate. A charging and purging valve provides easy access for field servicing.

Gauge Sets

To meet ANSI/ASHRAE 15 code, the gauge sets should have metal guards and built-in automatic closing devices to prevent refrigerant loss in the event of damage to the sight glass.

Three-Way Valve

*Relief Devices*

Relief valves on receivers must be sized according to code requirements. We follow the provisions of the ANSI/ASHRAE 15 code in our selection of relief valves. Capacity requirements for relief valves are under the ANSI/ASHRAE code.

The required capacity for relief valves increases with the size of the receiver. Depending on conditions, the pressure setting of the relief valve should be at least 25% higher than the normal maximum operating pressure for the refrigerant.

The setting of the relief device depends on the working pressure of the receiver. A vessel designed for 400PSI can be furnished with a relief valve set at a maximum pressure of 400PSI. For optimum system performance, replace relief valves periodically.

On receivers with a capacity of 10 cubic feet or more, the code requires two relief devices. These devices can be installed in a three-way valve to comply with the code. This three-way valve is the only device permitted by code to be installed between the pressure vessel and the relief devices. It must be sized to handle the unrestricted flow of either relief valve.

This arrangement permits periodic checking and replacement of either relief device while the system is operating. For more detailed information on three-way valves, please request Tech Tips TT-2.

Other Design Factors

- Because there are a number of connections to make on the receiver, the piping and valves should be installed with a minimum number of joints.
- Use of seal cap-type valves prevents tampering and loss of expensive refrigerant.
- Construction, packing and seating for receiver valves must be of high quality and properly engineered.
- Adequate valving of a receiver allows for immediate and safe shutdown of a system and also isolates components for convenient repair and replacement.

Selection

We manufacture a complete line of horizontal and vertical liquid refrigerant receivers in sizes ranging from 3 inches to 20 inches in diameter. The receivers are compatible with refrigerants R-134a, R-22 and R-404a/R-507.

Pump-down capacities range from 2 pounds up to 423 pounds. Receiver storage capacities are based on the liquid occupying no more than 90% of the internal volume when the temperature of the refrigerant is 90°F (32°C) per ASHRAE Standard 15-94.

Receivers should be selected based on the operating charge for all system components, including the liquid lines. It is usual to add a small percentage to cover the refrigerant in long runs of suction and discharge line, etc. It is essential that the maximum operating charge allows for fluctuating conditions.

We also manufacture a wide range of UL-listed and ASME receivers for many original equipment manufacturers. These receivers feature special lengths and fittings.