

Accumulator or Receiver

The tank on the suction line between the evaporator and the compressor is a suction accumulator. The tank on the liquid line between the condenser and TXV is a liquid receiver. They do look similar but they serve two completely different purposes.

The primary function of the suction accumulator is to catch and hold any liquid refrigerant that didn't boil off in the evaporator. Liquid refrigerant getting to the compressor can damage the pistons or scrolls. This liquid will also dilute or even flush the oil out of the compressor crank case. This loss of oil will prevent proper lubrication to the compressor, causing compressor damage or failure. Liquid slugging can occur even on a properly installed system with the loss of air flow. Improper evaporator air flow due to dirty filters, coil or loose belt will have the same effect. Low suction temperatures such as on a heat pump in the heating mode can also cause liquid slugging of the compressor. Many heat pump manufactures utilize suction accumulators as standard equipment.

The accumulator function is quite simple. The suction gas leaving the evaporator enters the accumulator at the top and passes through a baffle or screen. Any liquid present collects on the screen and falls to the bottom of the accumulator. Inside the accumulator is a U-shaped tube that will allow only the refrigerant vapor to exit and enter the compressor. A small orifice in the bottom of the U tube will allow any oil that collected in the accumulator to exit and return to the compressor through the suction line. Accumulator failures are rare on properly maintained systems. A plugged orifice in the U tube would be the most likely problem. This plugged orifice would prevent oil from returning to the compressor.

An accumulator is inexpensive and can be added to almost any system that has experienced compressor slugging. The cause of the slugging should still be determined and corrected if possible. Systems that run under low load conditions may be a good place to add an accumulator. Parker recommends that the accumulator be replaced when a compressor is being replaced. Contaminated oil from the old compressor may be in the old accumulator. Also, a considerable amount of oil may still be in the old accumulator. This oil combined with the oil from the new compressor may create an oil overcharge.

Proper accumulator sizing is important when replacing or adding. The pressure drop across the accumulator should be kept as low as possible. The accumulator's internal volume must be sufficient. On a heat pump system with a fixed metering device the accumulator should be capable of holding 70% of the system charge. In a TXV system the accumulator should be able to handle 50% of the system charge. Refer to sizing charts for proper sizing. **The accumulator should never be sized by connection sizes.**

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