Submittal

Capacity Control Device (CCD)

Description

A capacity control device was originally patented by a company called Rawal about 20 years ago. This device allows for refrigerant to bypass back to compressor plus has both hot gas and liquid reinjection to maintain an optimal temperature in the evaporator coil. This allows the air conditioning system to stay on longer (not overshoot and undershoot temperatures as much) at the correct temperature. Keeping the compressor on longer helps wring additional moisture out of the air and this device helps maintain humidity better in the space. iAIRE can install this device in a customer provided unit.

SIZING A CCD VALVE

1. Determine the number of compressors in the unit.
2. Divide the tonnage by the number of compressors of the unit and then divide by 2 to get the CCD size.
3. CCD Valves are available in the following sizes (if there is not a CCD Valve for the size you need, you always round down to the next available size):

410-1 = 1.5T | 410-2 = 2.5T | 410-3 = 3.5T | 410-5 = 5.5T

RCCD Installation Instructions

Refrigeration
Capacity
Control
Device

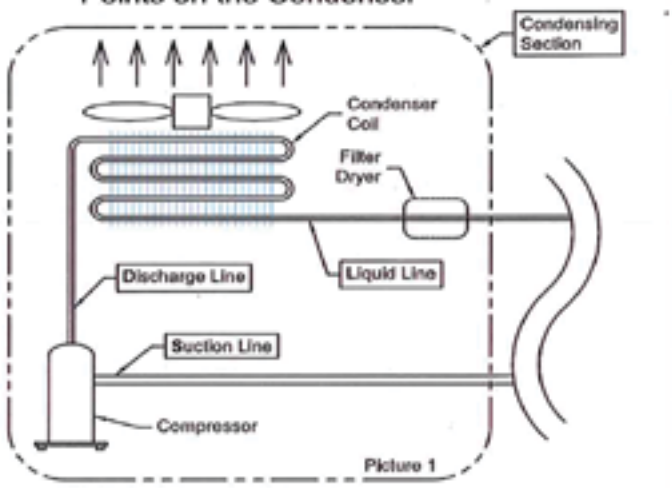
RCCD Installation Overview

Installation can be summarized in following steps:

1. Recover refrigerant, and purge the system with nitrogen.
2. Identify mounting location, and connection points, and install RCCD.
3. Recharge, test and optionaly adjust the low pressure on the RCCD.

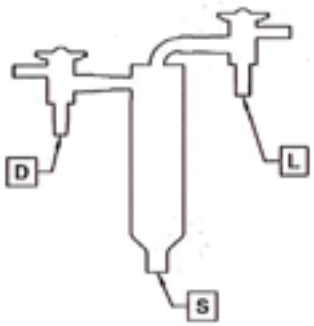
1. - Refrigerant Recovery - Refrigerant should be recovered into empty container, so it can be re-used after the installation. After the recovery the vacuum must be broken with Nitrogen, and during soldering / brazing of the new connection, slight purging flow of Nitrogen is highly recommended in order to prevent scale and oxides buildup on the inside of the refrigerant tubing. This is particularly important if high temperature brazing is used.

2a - Identifying the Connection Points on the Condenser



Picture 1

2b - Identifying the Connection Points on the RCCD



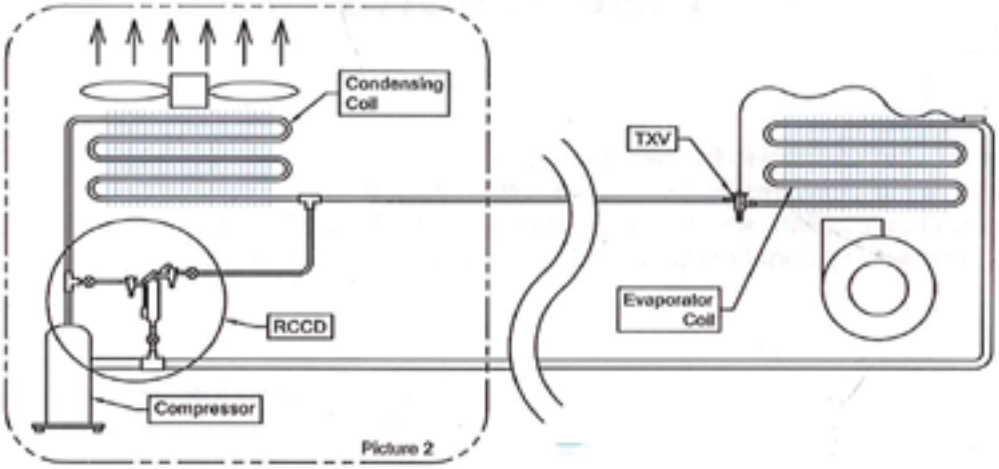
2. - The location for installation of the RCCD should be chosen to enable convenient connections to the system. Two of the three connections are made to suction and discharge lines, close to the compressor, so mounting of RCCD near compressor is usually the best choice. The third line goes to the liquid line (at the output of the condenser coil), and is always the smallest diameter line in the system.

Connection points are easy to identify. In this text we are going to assign the letter codes for the connection points as follows:

"D" for discharge of the compressor,
"S" for the suction of the compressor, and
"L" for the liquid line, at the output side of the condenser coil.

D, and S lines are easy to identify, because these are the only 2 lines that are connected to the compressor. D is usually smaller in size than S, and D is the hottest point in the system during normal operation. S line will usually enter the compressor at the lower point, be larger in size, and depending on the system operating point it may be more or less cool to the touch. The L line is the smaller of the 2 lines that are used to connect the condensing unit to the air handling unit in the split systems.

System with RCCD Installed



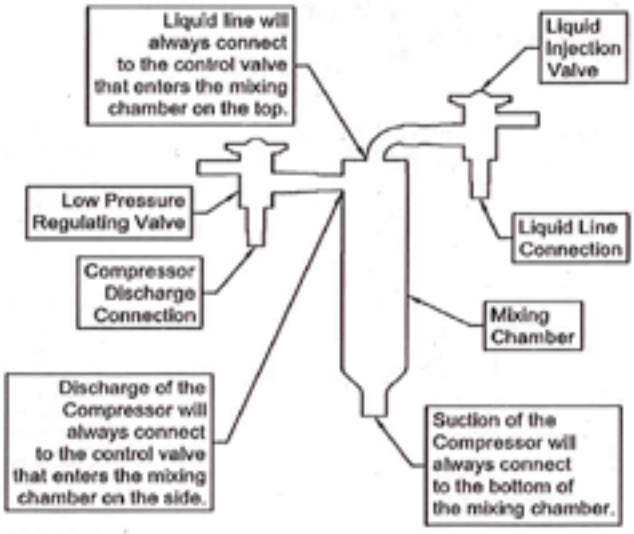
3. - After the mounting of the RCCD valve, and soldering all the connecting lines, the following installation steps should be performed:

a) The system should be leak tested, bu compressed Nitrogen.
b) Vacuum should be pulled on the system in order to remove the Nitrogen, and prepare for the system re-charge.
c) Refrigerant should be charged. This is the opportunity to check the charge by weight, and top off if necessary.
d) The system should be tested under the full load. It should perform as expected, because the RCCD will not start modulating under the full load.
e) Partial load test will prove the effectiveness of the RCCD. The easiest way to partially unload the system is to partially block the airflow in the air handling system. For example cover the 75% of the return air filter, and observe the system pressures, and compressor amperage. RCCD operation is confirmed if the low pressure remains stable, and high pressure and compressor amperage drops. If the airflow is completely blocked, the required depth of modulation may exceed the capacity of the RCCD. This condition should never occur during normal use, and it may lead to low pressure drop, and coil freezing.

3f. - Fine Tuning:

For fine tuning measure the low pressure, and read the corresponding temperature on the refrigerant PT chart during partial unload conditions (see 3e above). The low pressure control valve is located between the discharge of the compressor and RCCD mixing chamber. This valve can be adjusted to achieve different evaporating temperatures. For better humidity control choose higher evaporating temperature. This setting will still give you the full cooling capacity when the demand is high (worm inside space), but it will start reducing the capacity of the unit as the conditioned space temperature approaches the set point. This will enable longer run times under lower power consumption, and maintain the dehumidification functionality.

Anatomy of the RCCD Device



For more information, or to discuss your application, please call 800-231-3112 or e-mail rccd@customcontrolsco.com