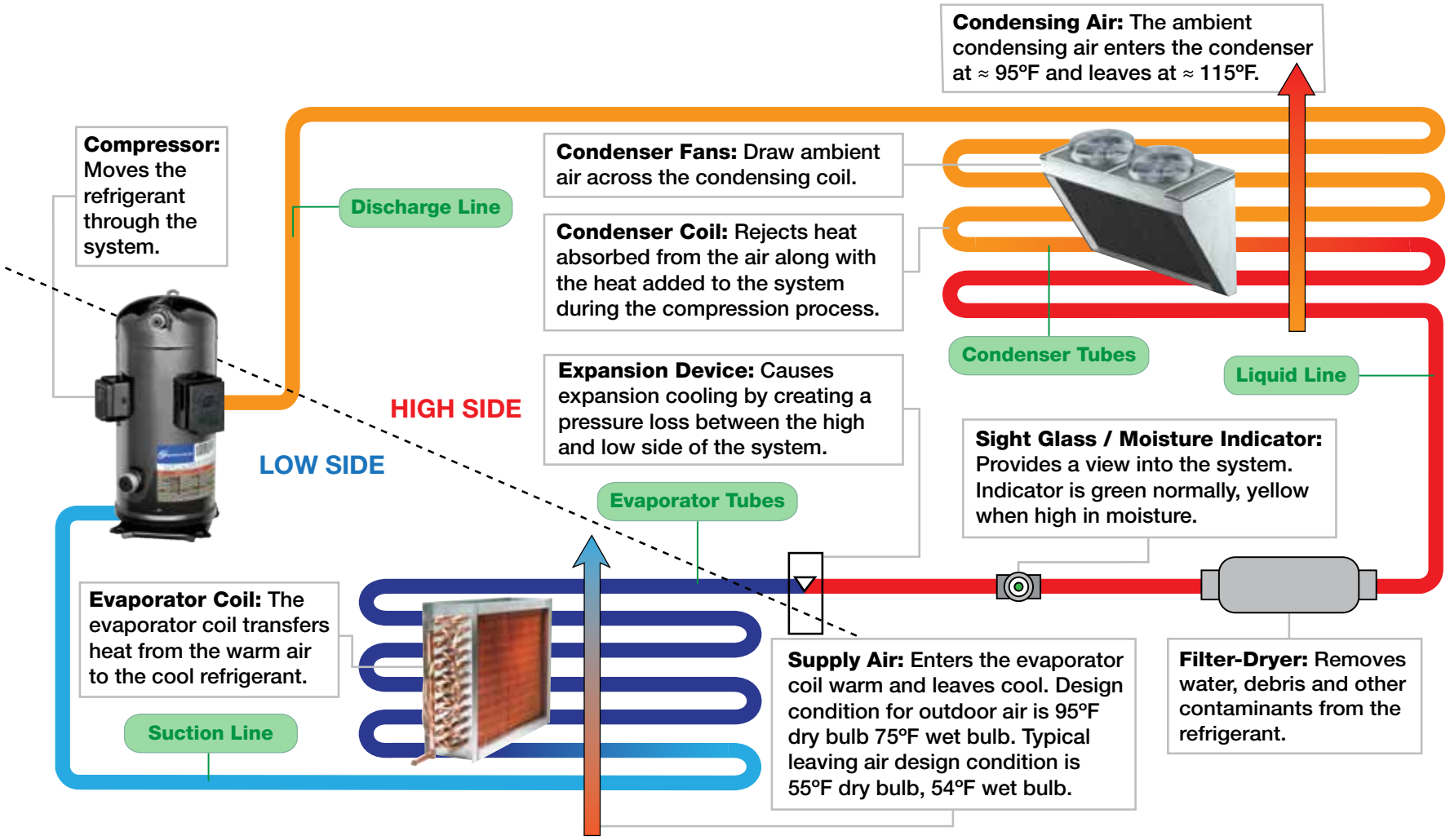
Standard Direct Expansion (DX) Cooling Air Conditioning System



SYSTEM TEMPERATURES AND PRESSURES			
Refrigerant State	T, °F	R-410A, psig	Superheat/Subcool
Low Pressure Saturated	45	131.1	
Low Pressure Superheated Vapor	53	131.1	Superheat = T - T_{sat} = 53° - 45° = 8°F
High Pressure Gas	180	448.2	
High Pressure Saturated	125	448.2	
High Pressure Liquid	110	448.2	Subcool = T_{sat} - T = 125° - 110° = 15°F

LOAD CALCULATIONS	
Condenser	Q_{out} (Btu/hr) = 1.08 x SCFM x Δ Temperature
Evaporator	Q_{in} (Btu/hr) = 4.5 x SCFM x Δ Enthalpy

00.TAP.NB003 R1 9-2010 RG

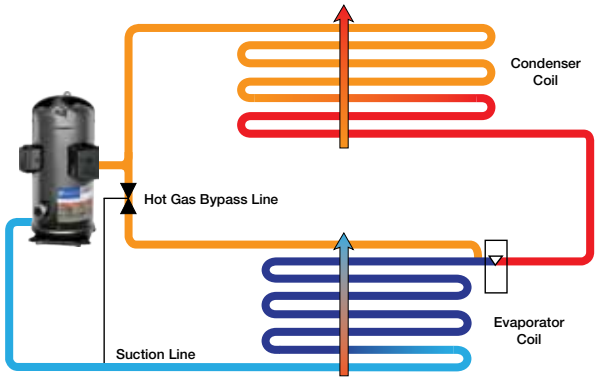
Air Cooled Packaged Refrigeration Options

Hot Gas Bypass

Hot gas bypass consists of a pressure-operated valve located on the discharge line and additional refrigerant piping from the valve to the evaporator (DX) coil. Hot refrigerant vapor enters the hot gas bypass valve from the compressor and is routed to the DX coil inlet as suction line pressure decreases. Suction line pressure decreases as the cooling load decreases (indicating a part-load condition).

Benefit: Prevents the DX coil from freezing and reduces compressor cycling at part-load conditions.

Availability: Standard on all MPX, ERCH and VER models with packaged DX cooling.



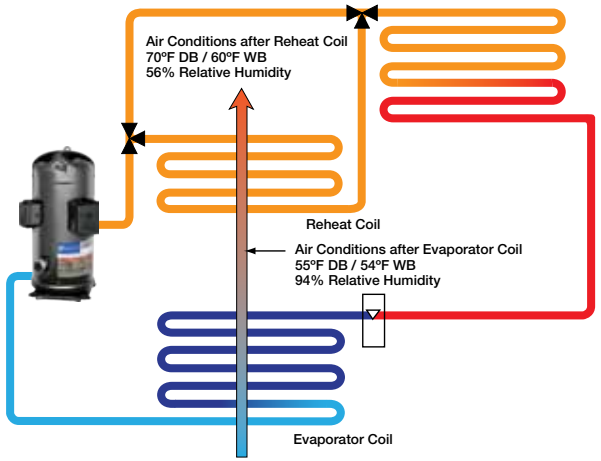
Models	MPX	ERCH	VER
Airflow Range			
Min. CFM	1,000	1,000	2,000
Max. CFM	10,000	10,000	10,000
Cooling Performance			
Cooling Capacity Range	5 - 30 tons	4 - 30 tons	4 - 30 tons
Hot Gas Bypass	Std.	Std.	Std.
Hot Gas Reheat	Optional	Optional	Optional
Digital Scroll Compressors	Optional	Optional	Optional
Additional Cooling Options			
Chilled Water		■	■
Water Source Heat Pump		■	
Heating Options			
Indirect Gas	■	■	■
Hot Water		■	■
Electric	■	■	■
Water Source Heat Pump		■	

Hot Gas Reheat

Hot gas reheat includes a condenser coil (located in the supply airstream) and a modulating refrigerant valve to control the supply air temperature and relative humidity.

Benefit: Hot gas reheat controls the supply air temperature and relative humidity without the need for auxiliary post heat (i.e. an electric heater). Hot gas reheat is often referred as “free reheat” as the refrigeration system needs to reject the heat absorbed by the refrigerant to the ambient air or supply air for proper operation. This configuration provides a means to provide dehumidified air without overcooling the space.

Availability: Optional on all MPX, ERCH and VER models.

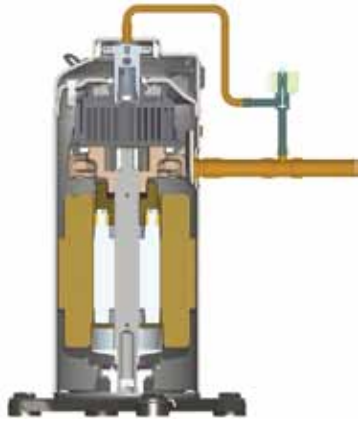


Digital Scroll Compressors

Digital scroll compressors adjust to the cooling demand by separating (engaging and disengaging) the compressor’s scrolls. When the scrolls are separated, or disengaged, no thermodynamic work is done on the refrigerant. The compressor resumes the normal cooling cycle when the scrolls are engaged. Cycle times between the disengaged and engaged states are varied by a controller and pressure valve to adjust the compressor output to meet the cooling demand.

Benefit: Digital scrolls offer capacity control from 10 to 100% of the rated compressor capacity. This turndown provides leaving coil temperature control as precise as 0.5°F. Digital scrolls also save energy by eliminating hot gas bypass as the compressor output can be adjusted to meet cooling demands at part load conditions.

Availability: Optional on the MPX, ERCH, and VER models (up to 30 tons).



GREENHECK

P.O. Box 410 • Schofield, WI 54476-0410 • 715.359.6171 • greenheck.com