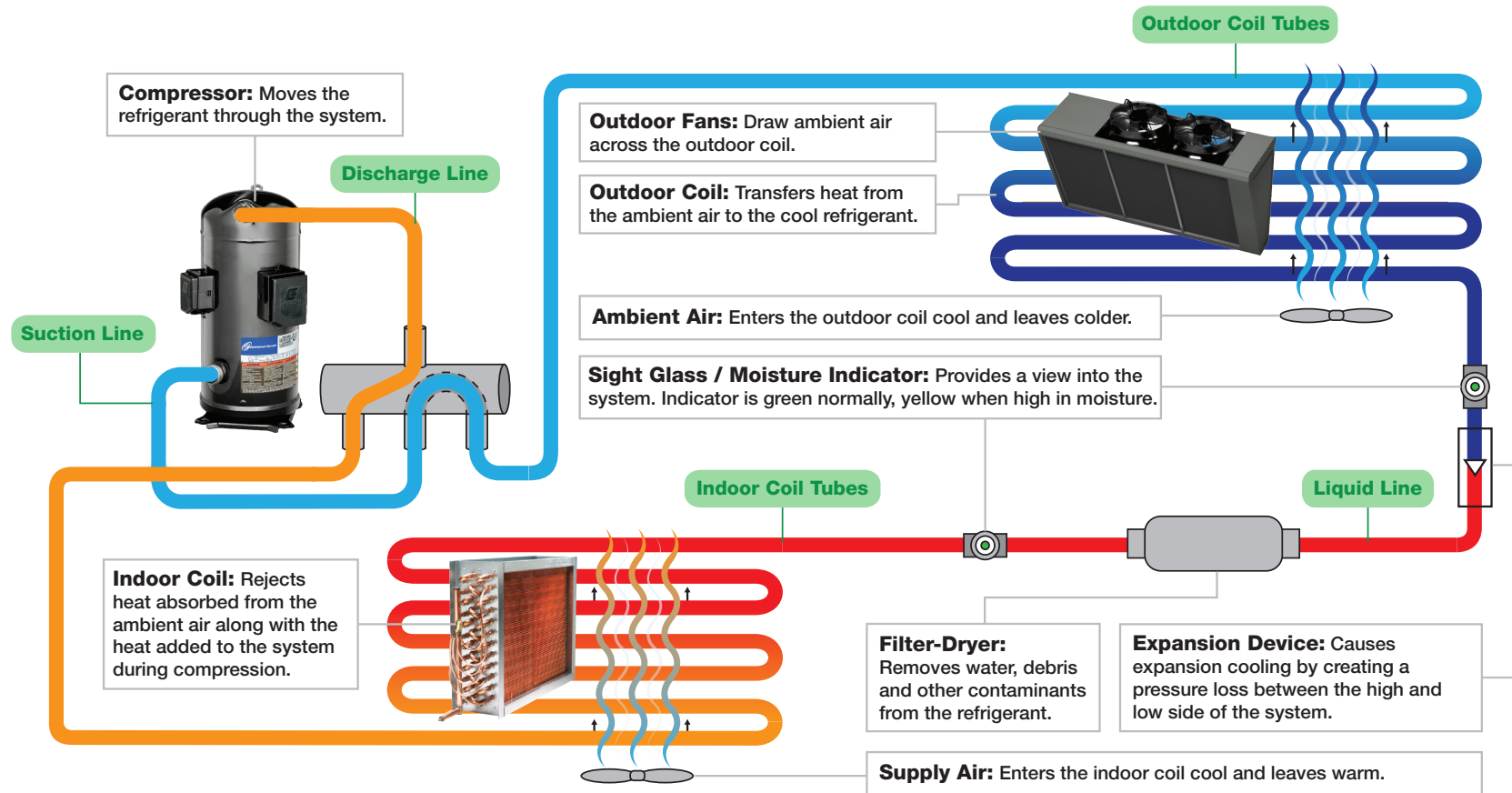


# Air-Source Heat Pump Refrigeration System

## Heating Mode

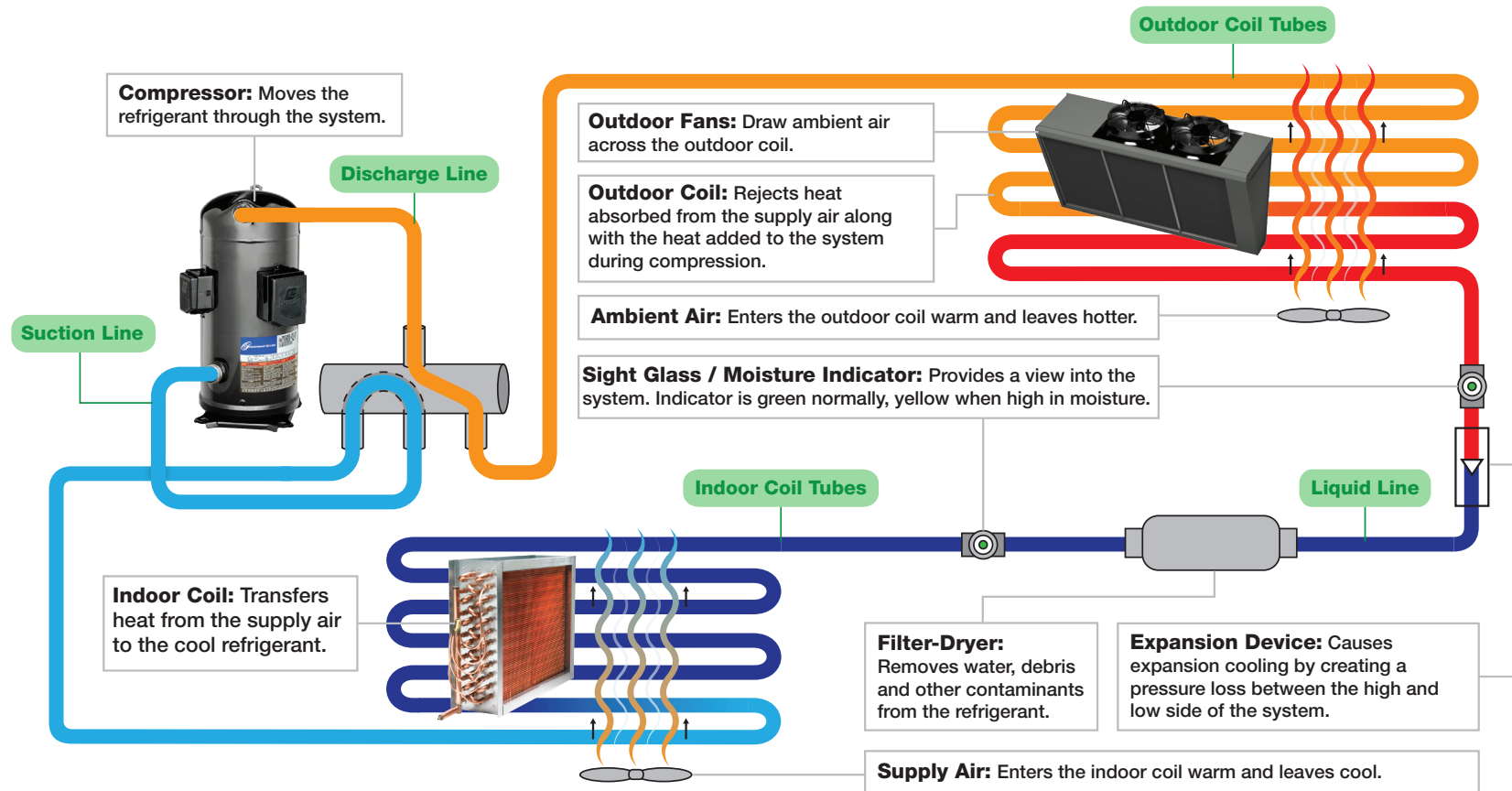


| SYSTEM TEMPERATURES AND PRESSURES |       |              |                                                                          |
|-----------------------------------|-------|--------------|--------------------------------------------------------------------------|
| Refrigerant State                 | T, °F | R-454B, psig | Superheat/Subcool                                                        |
| Low Pressure Saturated            | 27    | 82           |                                                                          |
| Low Pressure Superheated Vapor    | 37    | 82           | Superheat = $T - T_{sat} = 37^{\circ} - 27^{\circ} = 10^{\circ}\text{F}$ |
| High Pressure Gas                 | 145   | 300          |                                                                          |
| High Pressure Saturated           | 100   | 300          |                                                                          |
| High Pressure Liquid              | 90    | 300          | Subcool = $T_{sat} - T = 100^{\circ} - 90^{\circ} = 10^{\circ}\text{F}$  |

| LOAD CALCULATIONS         |                                                                                        |
|---------------------------|----------------------------------------------------------------------------------------|
| Condenser (Indoor Coil)   | $Q_{out} \text{ (Btu/hr)} = 1.08 \times \text{SCFM} \times \Delta \text{ Temperature}$ |
| Evaporator (Outdoor Coil) | $Q_{in} \text{ (Btu/hr)} = 4.5 \times \text{SCFM} \times \Delta \text{ Enthalpy}$      |

# Air-Source Heat Pump Refrigeration System

## Cooling Mode



| SYSTEM TEMPERATURES AND PRESSURES |       |              |                                                                          |
|-----------------------------------|-------|--------------|--------------------------------------------------------------------------|
| Refrigerant State                 | T, °F | R-454B, psig | Superheat/Subcool                                                        |
| Low Pressure Saturated            | 45    | 118          |                                                                          |
| Low Pressure Superheated Vapor    | 55    | 118          | Superheat = $T - T_{sat} = 55^{\circ} - 45^{\circ} = 10^{\circ}\text{F}$ |
| High Pressure Gas                 | 160   | 370          |                                                                          |
| High Pressure Saturated           | 115   | 370          |                                                                          |
| High Pressure Liquid              | 105   | 370          | Subcool = $T_{sat} - T = 115^{\circ} - 105^{\circ} = 10^{\circ}\text{F}$ |

| LOAD CALCULATIONS        |                                                                                        |
|--------------------------|----------------------------------------------------------------------------------------|
| Condenser (Outdoor Coil) | $Q_{out} \text{ (Btu/hr)} = 1.08 \times \text{SCFM} \times \Delta \text{ Temperature}$ |
| Evaporator (Indoor Coil) | $Q_{out} \text{ (Btu/hr)} = 4.5 \times \text{SCFM} \times \Delta \text{ Enthalpy}$     |

