Low Charge Central System

Efficiency and Reliability of a Central Refrigeration System With The Controlled Precision of Remote Distributed Condensing Units
The Frick® Low Charge Central System (LCCS) retains the operational efficiency and reliability of a central refrigeration system with the controlled precision of the Frick packaged Remote Distributed Condensing (RDC) units. This configuration results in a total system ammonia charge of approximately 1.5-3 lbm/TR. Frick offers a complete low charge solution with compressors, evaporators, condensers, and controls.

Advantages

- **Significantly reduces ammonia charge**
- **Lowest total cost of ownership of any low charge system**
- **Minimal liquid in occupied space**
- **Eases regulatory burden**
- **Flexibility: Single and/or two stage, economized, side loads**
- **Easy expansion capabilities**
- **Capacity redundancy**
- **Addresses water scarcity issues without water treatment concerns, with adiabatic or air cooled condensing**
- **Ease of system start up after power disruption**
- **Multiple heat recovery possibilities**
- **Compressor wiring, maintenance and oil cooling are in the engine room**
- **Retains familiar industry components**
- **Frick Factor customization, installation and service**
Remote Distributed Condensing

The key components of the Frick Low Charge Central System (LCCS) are the remote distributed condensing (RDC) units and supporting control system. Offering simplicity, flexibility and efficiency, projects are scalable based on the application needs.

### Remote Distributed Condensing (RDC) Model Nomenclature

<table>
<thead>
<tr>
<th>TR</th>
<th>Adiabatic (1)</th>
<th>PFHE (2)</th>
<th>Dry (3)</th>
<th>Evaporative (4)</th>
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</thead>
<tbody>
<tr>
<td>20</td>
<td>RDC20A-(X)†</td>
<td>RDC20P-(X)</td>
<td>RDC20D-(X)</td>
<td>RDC20E-(X)</td>
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<tr>
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<tr>
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<td>RDC120P-(X)</td>
<td>RDC120D-(X)</td>
<td>RDC120E-(X)</td>
</tr>
</tbody>
</table>

† Substitute the suction temperature (+35/+20/0/-20) in °F, for the X in parentheses.

1. Adiabatic condensing: Based on 98 °F condensing, 95 °F dry bulb and 78 °F wet bulb temperatures.
2. Plate frame heat exchanger condensing: Based on 98 °F condensing with 85 °F to 95 °F propylene glycol (30%).
3. Dry condensing: Based on 110 °F condensing and 95 °F dry bulb temperatures.
4. Evaporative condensing: Based on 95 °F condensing, 95 °F dry bulb and 78 °F wet bulb temperatures.
Remote Distributed Condensing (RDC) Units
- Standard 20, 40, 60, 80, 100, 120 TR per RDC unit
- Flexible condensing options: Adiabatic, plate & frame, air cooled, and evaporative (Adiabatic and plate & frame shown)
- Multiple RDC units work seamlessly together via Frick control logic (Patent pending)
- Frick 24V panel – No arc flash concerns
- Completely factory wired

Evaporators
- Low charge direct expansion feed
- Defrost – air or hot gas
- Automatic safety system for leak protection
- Defrost condensate returns to RDC unit

Hygienic Unit
- Low refrigerant charge DX coil(s)
- Self-contained refrigerant leak detector
- Minimal risk of refrigerant exposure

Controls
- Automatic refrigerant management between multiple RDC units minimizes charge
- Control of energy and water usage delivers lower operating cost

Compressors
- Ease of service
- Compressor redundancy or swing
- Larger compressors increase efficiency
- Flexibility: Single stage, two stage, economized
Engine Room
- Reduces size by approximately 50%
- Removes all liquid vessels
- Removes all liquid piping
- Removes all water treatment equipment (Adiabatic or air cooled condensing)
- Recover heat for underfloor warming
Low Charge Central System

Single Stage Low Charge Solution
One or more compressors piped with three (3) dry vapor mains serving multiple evaporator loads at differing suction conditions.
No liquid refrigerant is in the engine room.

Economizer Vapor
Compressor Discharge Line
Subcooled Liquid
Suction Line

Two Stage Low Charge Solution
Booster and high stage compressors with five (5) dry vapor mains serving multiple evaporator loads at differing suction conditions.
No liquid refrigerant is in the engine room.
Ideal for blast freezing.
System Operation - RDC And Evaporators

Normal Operation
In normal operation, the discharge vapor is condensed very close to the evaporators and then fed into the liquid supply vessel.

The supply vessel feeds the condensed liquid to two or three evaporators.

Electronic expansion valves on each evaporator function so that only dry vapor is returned to the compressors.

Evaporated ammonia (100% vapor) returns to compressor suction line.

All liquid is contained between the RDC units and the evaporators.

Defrost Operation
During defrost, hot gas is directed away from the condenser and fed into one of the evaporators.

The hot gas is condensed and fed into the liquid supply vessel.

The beneficial liquid makeup is added to the existing liquid ballast feeding the other evaporator.

Evaporated ammonia (100% vapor) returns to compressor suction line.

All liquid is contained between the RDC units and the evaporators.
Single Source Industrial Refrigeration Solutions!

- Heat Exchangers
- Packaged Equipment
- Hygienic Air Units
- Vessels
- Controls
- Evaporators
- Compressors
- Condensers