

Low Charge Central System

Efficiency and Reliability of a Central Refrigeration System With
The Controlled Precision of Remote Distributed Condensing Units



The Low Charge Solution. From a Single Source.

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



Top: A standard 50 TR RDC unit can be charged with 75 lbm from an ammonia cylinder in as little as 15 minutes

Bottom: DX evaporators



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.



Scalable And Flexible – The LCCS is suitable for:

- New projects
- Expansions
- Cold storage warehouses
- Process facilities

| Remote Distributed Condensing (RDC) Model Nomenclature | | | | |
|--|--------------------------|---------------------|--------------------|----------------------------|
| TR | Adiabatic ⁽¹⁾ | PFHE ⁽²⁾ | Dry ⁽³⁾ | Evaporative ⁽⁴⁾ |
| 20 | RDC20A-(X) [†] | RDC20P-(X) | RDC20D-(X) | RDC20E-(X) |
| 40 | RDC40A-(X) | RDC40P-(X) | RDC40D-(X) | RDC40E-(X) |
| 60 | RDC60A-(X) | RDC60P-(X) | RDC60D-(X) | RDC60E-(X) |
| 80 | RDC80A-(X) | RDC80P-(X) | RDC80D-(X) | RDC80E-(X) |
| 100 | RDC100A-(X) | RDC100P-(X) | RDC100D-(X) | RDC100E-(X) |
| 120 | RDC120A-(X) | RDC120P-(X) | RDC120D-(X) | RDC120E-(X) |

[†] 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.

Frick® | Low Charge Central System

1 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

- No roof weight concerns
- All major components and routine maintenance items are easily accessible
- No confined space concerns

2 Evaporators

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

3 Hygienic Unit

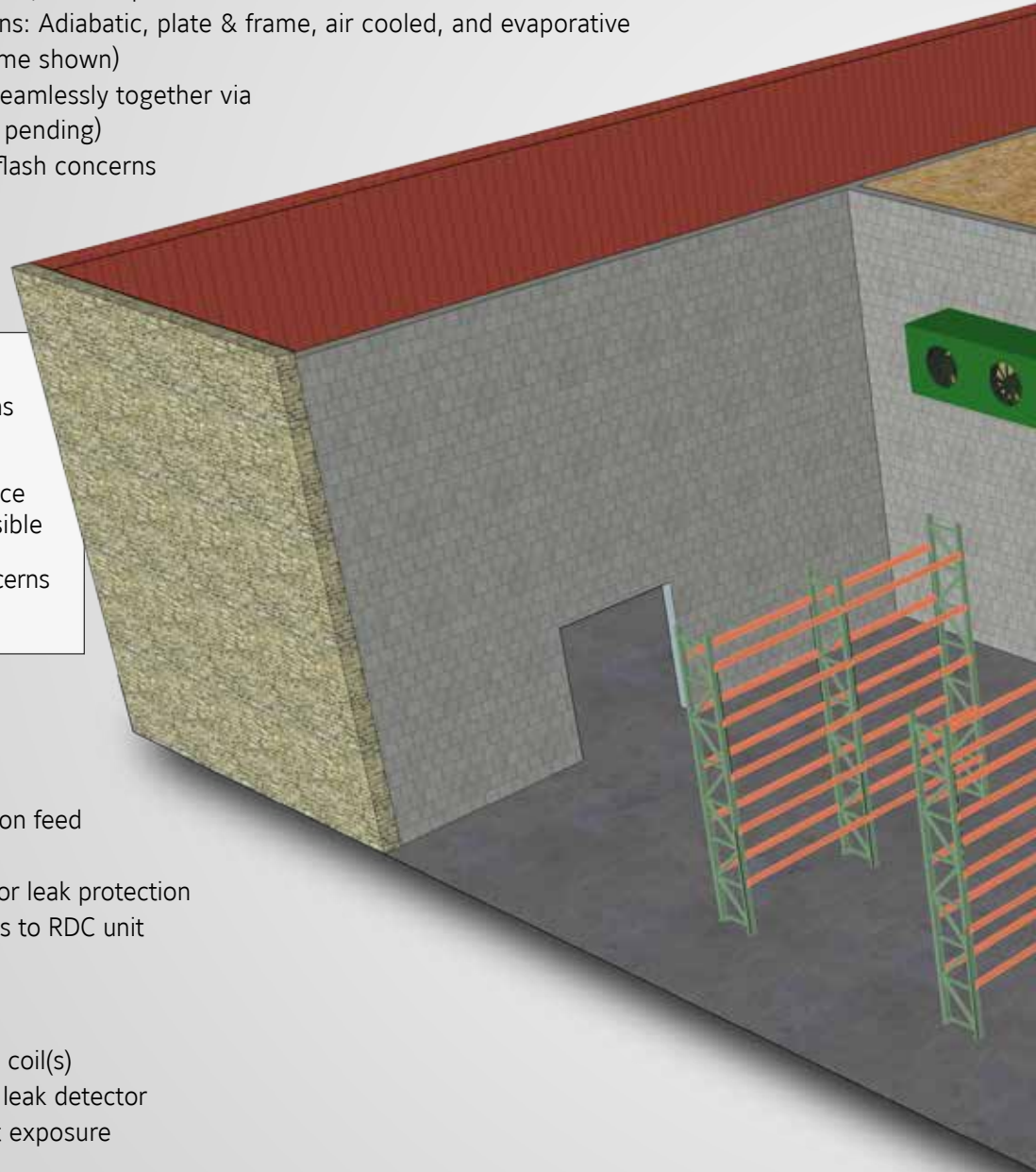
- Low refrigerant charge DX coil(s)
- Self-contained refrigerant leak detector
- Minimal risk of refrigerant exposure

4 Controls

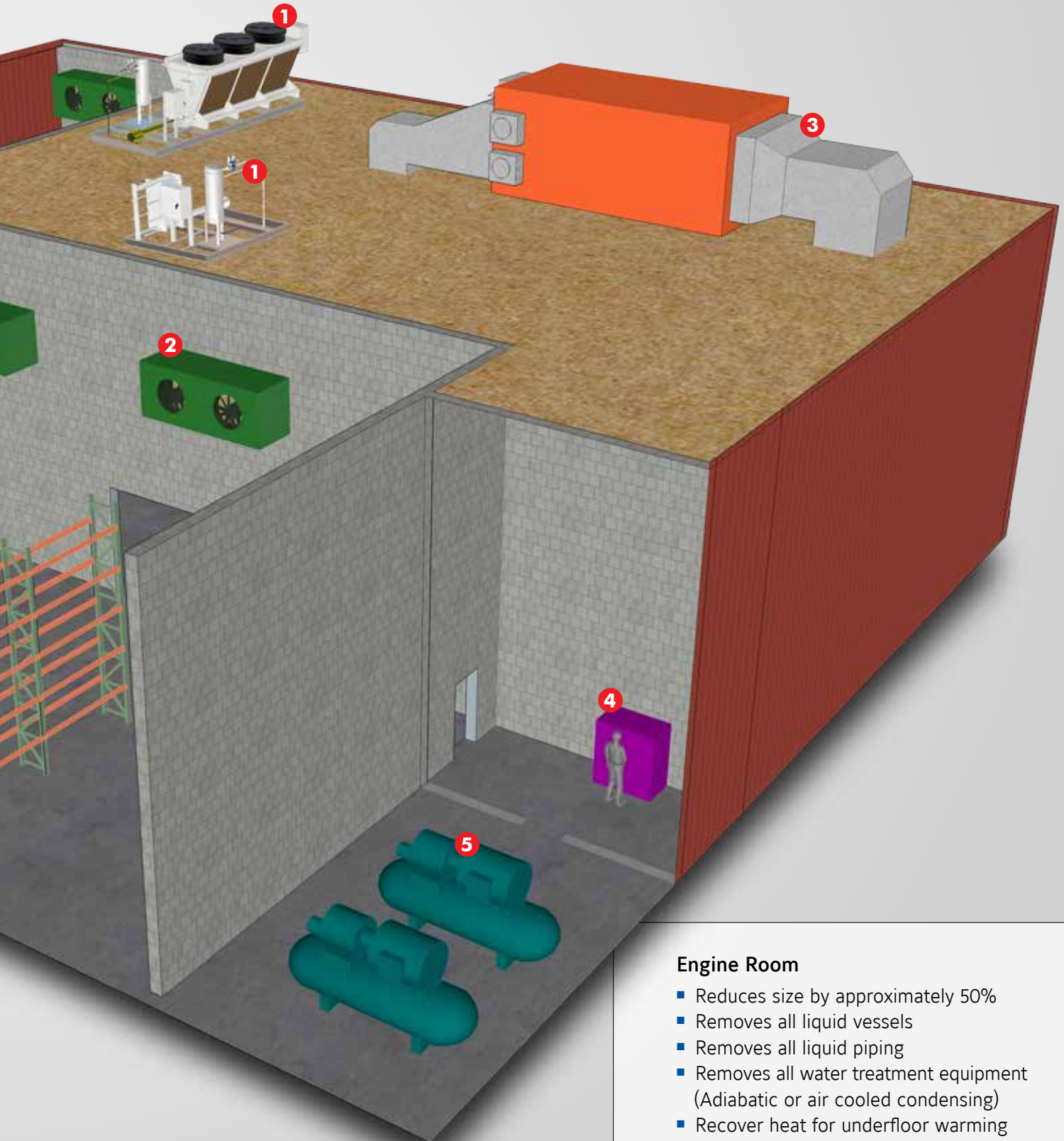
- Automatic refrigerant management between multiple RDC units minimizes charge
- Control of energy and water usage delivers lower operating cost

5 Compressors

- Ease of service
- Compressor redundancy or swing
- Larger compressors increase efficiency
- Flexibility: Single stage, two stage, economized



Frick®. The Leader In Industrial Refrigeration.



Engine Room

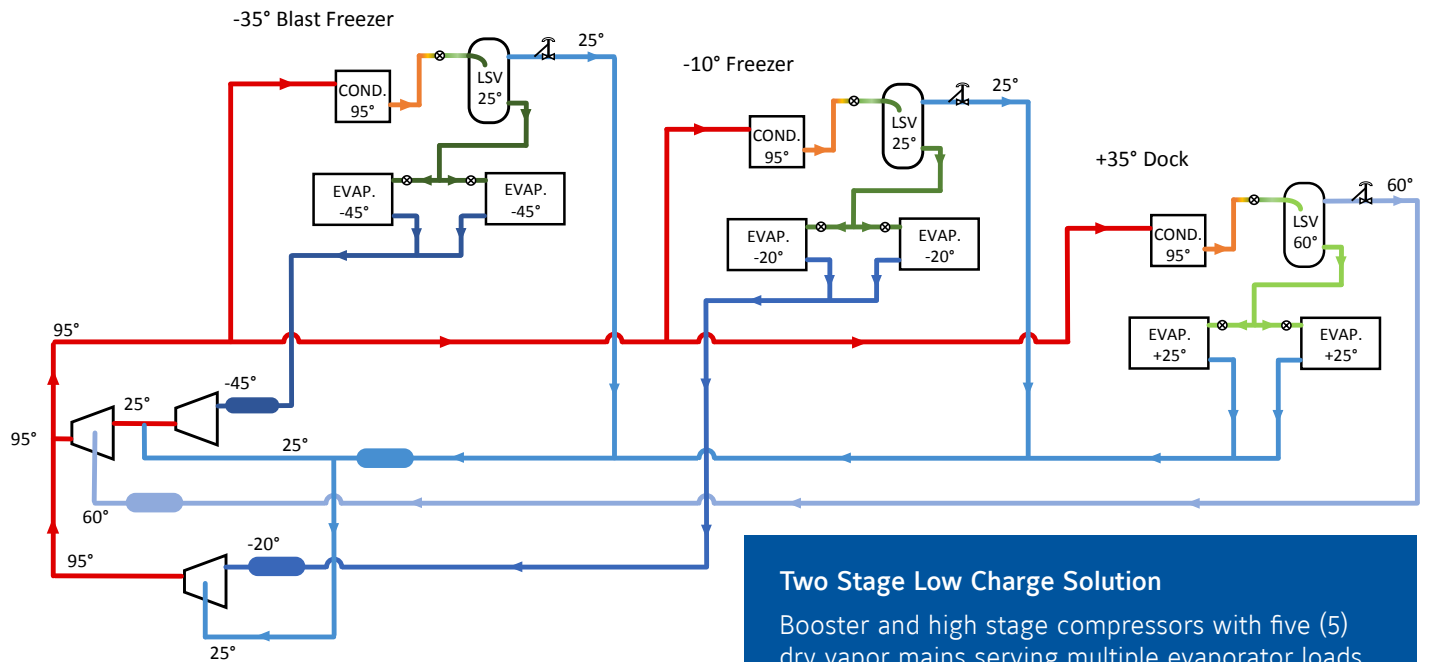
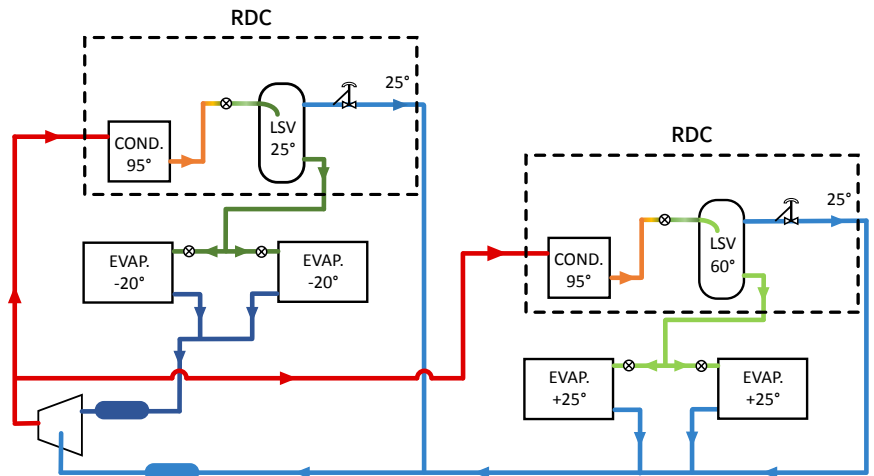
- Reduces size by approximately 50%
- Removes all liquid vessels
- Removes all liquid piping
- Removes all water treatment equipment (Adiabatic or air cooled condensing)
- Recover heat for underfloor warming

Low Charge Central System Circuits

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

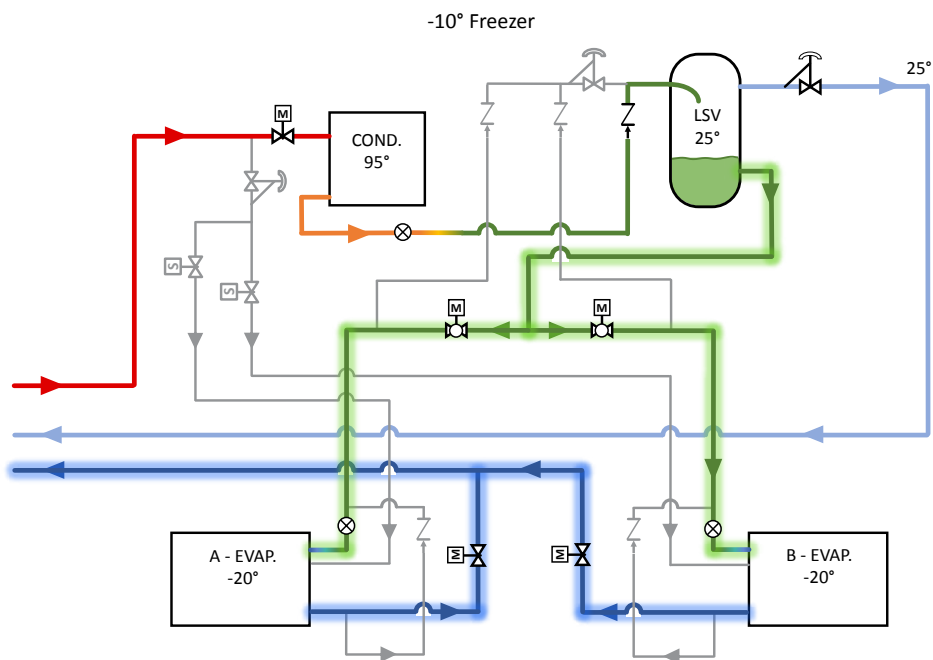
In normal operation, the discharge vapor is condensed very close to the evaporators and then fed into the liquid supply vessel.

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.

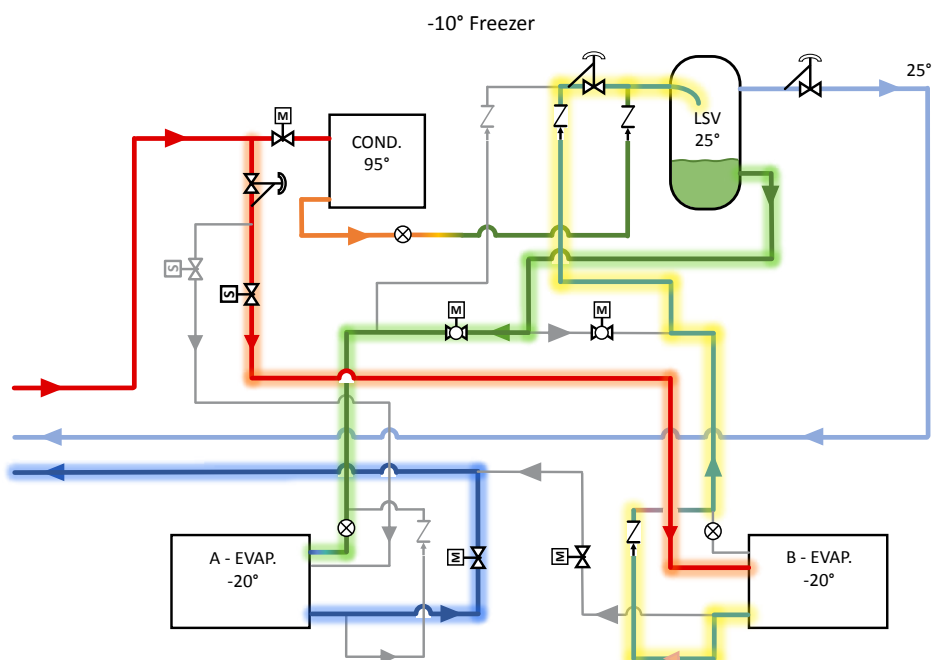
The hot gas is condensed and fed into the liquid supply vessel.

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

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

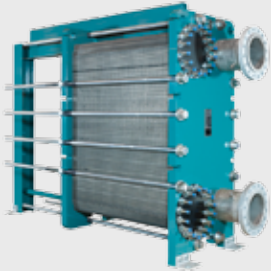
All liquid is contained between the RDC units and the evaporators.

— Condensate Return



Single Source Industrial Refrigeration Solutions !

Heat Exchangers



Packaged Equipment



Hygienic Air Units



Vessels



Controls



Evaporators



Compressors




Condensers



Johnson Controls
 100 Cumberland Valley Avenue
 Waynesboro, PA 17268-1206 USA
 Tel: 717-762-2121 • Fax: 717-762-8624
www.johnsoncontrols.com/frick

Form 020.200-SG1 (2017-09)
 Supersedes: 020.200-SG1 (2017-02)
 Subject to change without notice
 Published in USA • 09/17 • PDF

©2017 Johnson Controls International PLC
 - All rights reserved
 PRINTED ON CHORUS ART GLOSS COVER
 CONTAINS 25% POST-CONSUMER WASTE