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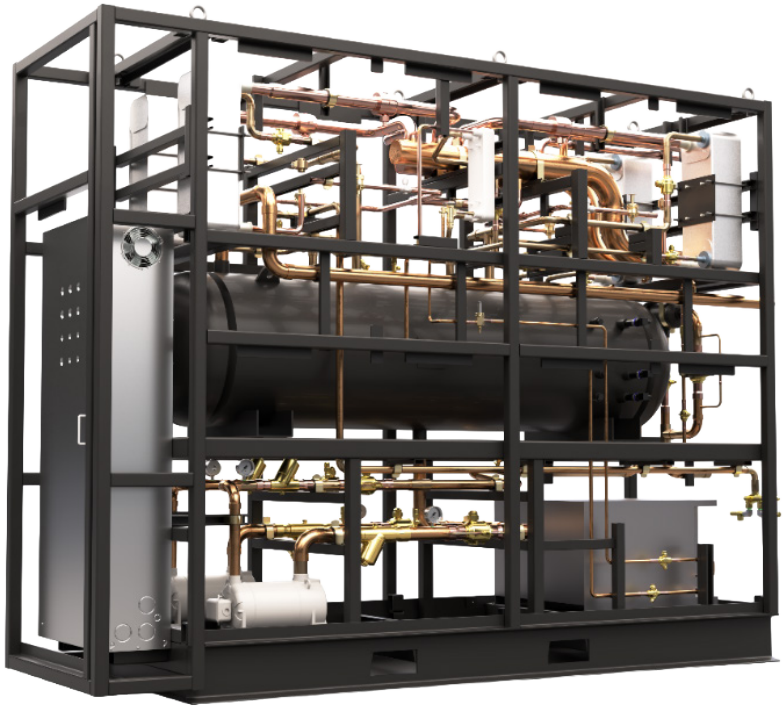
EVOLVE® $CO_2$



**Technical Datasheet**

# Liquid R-744 ($CO_2$) Overfeed Rack

**P/N** 3248350 **Rev** A
May 2026

## Refrigerant Type

Primary: HFC, HFO, or HFC/HFO blend
Secondary: R-744 ($CO_2$)

## Table of Contents



### Customer-Focused Solutions

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Hussmann can help you understand benefits and trade-offs associated with each solution and make the most of rebate and incentive programs.

Scan QR code for more information on R-744 ($CO_2$) systems.

### Certifications

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⚠ ***WARNING***

**Component parts shall be replaced with like components, and servicing shall be done by factory authorized service personnel only, so as to minimize the risk to personnel and property due to use of incorrect parts or improper service.**



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# Liquid R-744 ($CO_2$) Overfeed Rack

**Model Overview**

## WARNING:

**Read the entire installation, operation, and service manual before installing, servicing, or using this equipment.**

This equipment uses liquid carbon dioxide (R-744 [$CO_2$]) refrigerant and a primary refrigerant handled by an external rack for heat transfer. The system is sealed and pressure-tested with ASME-certified vessels, but leaks can occur in the event of a system failure. A $CO_2$ leak in an unventilated space can pose serious hazards. Therefore, units must be installed in areas with adequate ventilation and in accordance with local safety codes.

A leak of R-744 could result in a concentration exceeding the practical limit in an enclosed, occupied space such as a cold room. Precautions must be taken to prevent asphyxiation. These include the use of permanent leak detection, which activates an alarm in the event of a leak.

Observe all warnings and labels on the unit being installed or serviced such as the one below indicating high pressure.

All refrigeration servicing must be completed by a certified refrigeration installation professional, and all tubing and components MUST be qualified for $CO_2$ applications, with a minimum design pressure matching the specific pressures listed (generally 870 PSIG [60 bar] for this unit) in this document and the installation, operation, and service manual.

**Failure to abide by all warnings contained within the associated manual could result in an explosion, death, injury, and property damage.**

## Overview

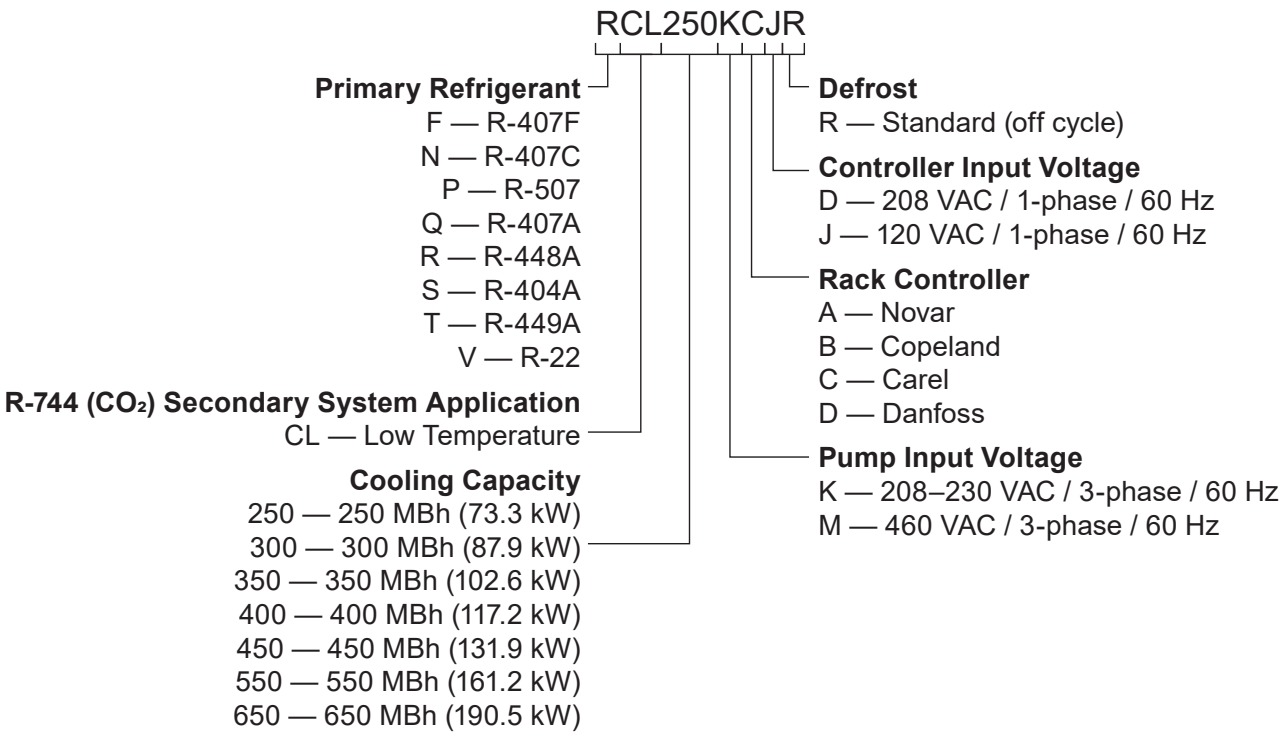
The liquid $CO_2$ overfeed rack utilizes pumps to move liquid $CO_2$ to display cases and evaporators. The $CO_2$ that returns to the liquid overfeed rack is then chilled using heat exchangers connected to a separate primary refrigerant system, typically using an HFC, HFC/HFO blend, or HFO depending on configuration.

This equipment is available in low temperature application configurations. R-744 ($CO_2$) is more dense than comparable synthetic refrigerants, which translates into smaller pipe sizes than other refrigerants.

In addition, the primary refrigerant selection and application units can also be configured to accommodate a wide range of loads, use a variety of popular control options, and be connected to a variety of common input voltages.

The liquid overfeed rack also includes a backup condensing unit, which utilizes a dedicated refrigerant circuit (standard version is designed for R-448A). This unit can be wired to a compatible generator or it can be battery-powered. The backup unit functions in the event of a power outage or abnormal temperature/pressure as a safeguard to prevent unintended venting of $CO_2$ from the system.

## Model Nomenclature




## Ordering Information

Complete model number (including primary refrigerant), required design specifications, and desired power source for backup generator must be specified during the ordering process.

### Standard Features and Options

- External panels are constructed of galvanized steel with hinged front and rear panels for access.
- Carel controls are standard. Copeland, Danfoss, and Novar options will also be available upon request, but may require additional lead time.
- Each liquid overfeed unit is equipped with 2 pumps, 5 thermosyphon heat exchangers, and one backup condensing unit (requires filed charging).
- Optional battery backup unit (UPS) to power backup condensing unit is a ship loose item.
- Filters are included as a ship loose item.
- Oil can be included as a ship loose option.

# Liquid R-744 ($CO_2$) Overfeed Rack

**Specifications**

## Specifications

### Electrical

Main electrical disconnect will be an external breaker. There are power disconnects on the rack that cut power on internal systems to the rack.

Rack

| Input Voltage | | MCA | MOPD | SCCR |
|---|---|---|---|---|
| 208–230 VAC / 3-phase / 60 Hz | 208 VAC | 13.9 A | 20 A | 10 kA standard (optional up to 35 kA) |
| | 230 VAC | 9 A | 15 A | |
| 460 VAC / 3-phase / 60 Hz | | 6.5 A | 15 A | |

Controls

| Voltages |
|---|
| 120 VAC / 1-phase / 60 Hz |
| 208–230 VAC / 1-phase / 60 Hz |

Pumps

| Quantity | Input Voltage | FLA |
|---|---|---|
| 2 | 208–230 VAC | 8.7 |
| | 460 VAC | 4.1 |

Backup Condensing Unit

| Input Voltage | Current | MCA | MOPD |
|---|---|---|---|
| 208–230 VAC / 1-phase / 60 Hz | up to 5.8 A | 7.9 A | 15 A |

Battery Backup (UPS)

| Input Voltage | Current |
|---|---|
| 240 VAC / 1-phase / 60 Hz<br>480 VAC / 1-phase / 60 Hz | up to 5.8 A |

### Connections and Lines

| Model | Liquid Line | Suction Line |
|---|---|---|
| Primary Refrigerant | 1 3/8" | 1 1/8" |

| Model | Discharge Line | Return Line | Maximum Line Length |
|---|---|---|---|
| $CO_2$ (Secondary Refrigerant) | 1 5/8" | 2 1/8" | refer to pump curve info to maintain proper head pressure |

## Refrigerant and Oil Capacities

Liquid Overfeed Rack

| Refrigerant Circuit | Refrigerant | Approx. Operating Charge (liquid overfeed rack only) | Oil Type | Approx. Oil Charge |
|---|---|---|---|---|
| Primary | HFC<br>HFC/HFO blend<br>HFO | 15 lb (6.8 kg) | N/A | N/A |
| Secondary | R-744 ($CO_2$) | 770 lb (349 kg)<br>(at 50% surge tank) | BSE85K | 2 qt (1.9 L) |

Backup Condensing Unit Compressor

| Compressor Type | Refrigerant | Approx. Refrigerant Charge | Oil Type | Approx. Compressor Oil Charge |
|---|---|---|---|---|
| Reciprocating | R-448A | 5 lb (2.27 kg) | POE-32 | 17.3 fl oz (0.5 L) |

## System Pressure

| Model | Design Pressure |
|---|---|
| Liquid $CO_2$ Overfeed | 870 PSIG (60 bar) |

## Operating Temperature

| Maximum Ambient Operating Temperature |
|---|
| 110° F (43.3° C) |

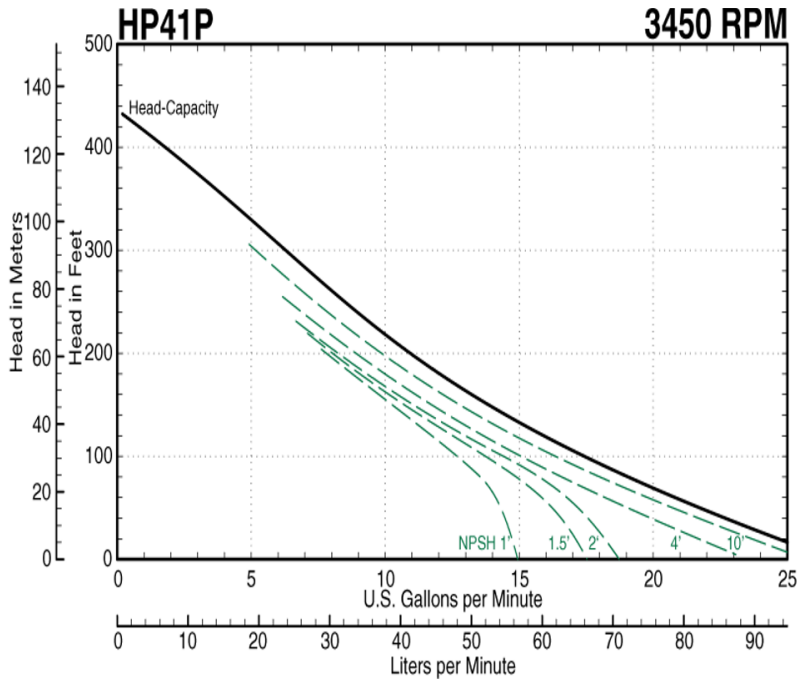
## Weight

| Approximate Shipping Weight | Approximate Operational Weight |
|---|---|
| 5,000 lb (2,268 kg) | 6,000 lb (2,722 kg) |

## Liquid Overfeed Pump Curve

Piping runs must not allow the system to exceed the maximum allowable pump head pressure. For example, at 10 GPM (37.9 L/min) system should not exceed 220 feet (67 m) of head.

Pump Curve Graph



# Liquid R-744 ($CO_2$) Overfeed Rack

## Specifications

### Pump Performance Data

-10° F (-23.3° C) $CO_2$ Supply Temperature at 50 ft (15.2 m) Head

| Secondary Refrigerant | | | | Primary Refrigerant | | |
|---|---|---|---|---|---|---|
| Speed RPM | Frequency Hz | Flow Rate GPM (L/min) | Capacity MBH (kW) | Design SST | Design Approach | Design EEV Superheat |
| 3,450 | 60 | 21.6 (81.8) | 712.8 (208.9) | -16° F (-26.7° C) | 6° F (3.3° C) | 5° F (2.8° C) |
| 3,200 | 55.65 | 19.4 (73.4) | 640.2 (187.6) | | | |
| 3,095 | 53.83 | 18.3 (69.3) | 603.9 (177) | | | |
| 2,880 | 50.09 | 16.4 (62.1) | 541.2 (158.6) | | | |
| 2,740 | 47.65 | 15.2 (57.5) | 501.6 (147) | | | |
| 2,565 | 44.6 | 13.6 (51.5) | 448.8 (131.5) | | | |
| 2,375 | 41.3 | 11.7 (44.3) | 386.1 (113.2) | | | |
| 2,175 | 37.83 | 9.8 (37) | 323.4 (94.8) | | | |
| 1,945 | 33.83 | 7.5 (28.4) | 247.5 (72.5) | | | |
| 1,695 | 29.48 | 5.1 (19.3) | 168.3 (49.3) | | | |
| 1,380 | 24 | 2.2 (8.3) | 72.6 (21.3) | | | |
| pump stall point | | | | | | |

-10° F (-23.3° C) $CO_2$ Supply Temperature at 100 ft (30.5 m) Head

| Secondary Refrigerant | | | | Primary Refrigerant | | |
|---|---|---|---|---|---|---|
| Speed RPM | Frequency Hz | Flow Rate GPM (L/min) | Capacity MBH (kW) | Design SST | Design Approach | Design EEV Superheat |
| 3,450 | 60 | 17.5 (66.2) | 577.5 (169.2) | -16° F (-26.7° C) | 6° F (3.3° C) | 5° F (2.8° C) |
| 3,200 | 55.65 | 15.1 (57.2) | 498.3 (146) | | | |
| 3,095 | 53.83 | 14 (53) | 462 (135.4) | | | |
| 2,880 | 50.09 | 11.9 (45) | 392.7 (115) | | | |
| 2,740 | 47.65 | 10.6 (40.1) | 349.8 (102.5) | | | |
| 2,565 | 44.6 | 8.8 (33.3) | 290.4 (85.1) | | | |
| 2,375 | 41.3 | 7.1 (26.9) | 234.3 (68.7) | | | |
| 2,175 | 37.83 | 5.2 (19.7) | 171.6 (50.3) | | | |
| 1,945 | 33.83 | 3.2 (12.1) | 105.6 (30.9) | | | |
| pump stall point | | | | | | |

-20° F (-28.9° C) $CO_2$ Supply Temperature at 50 ft (15.2 m) Head

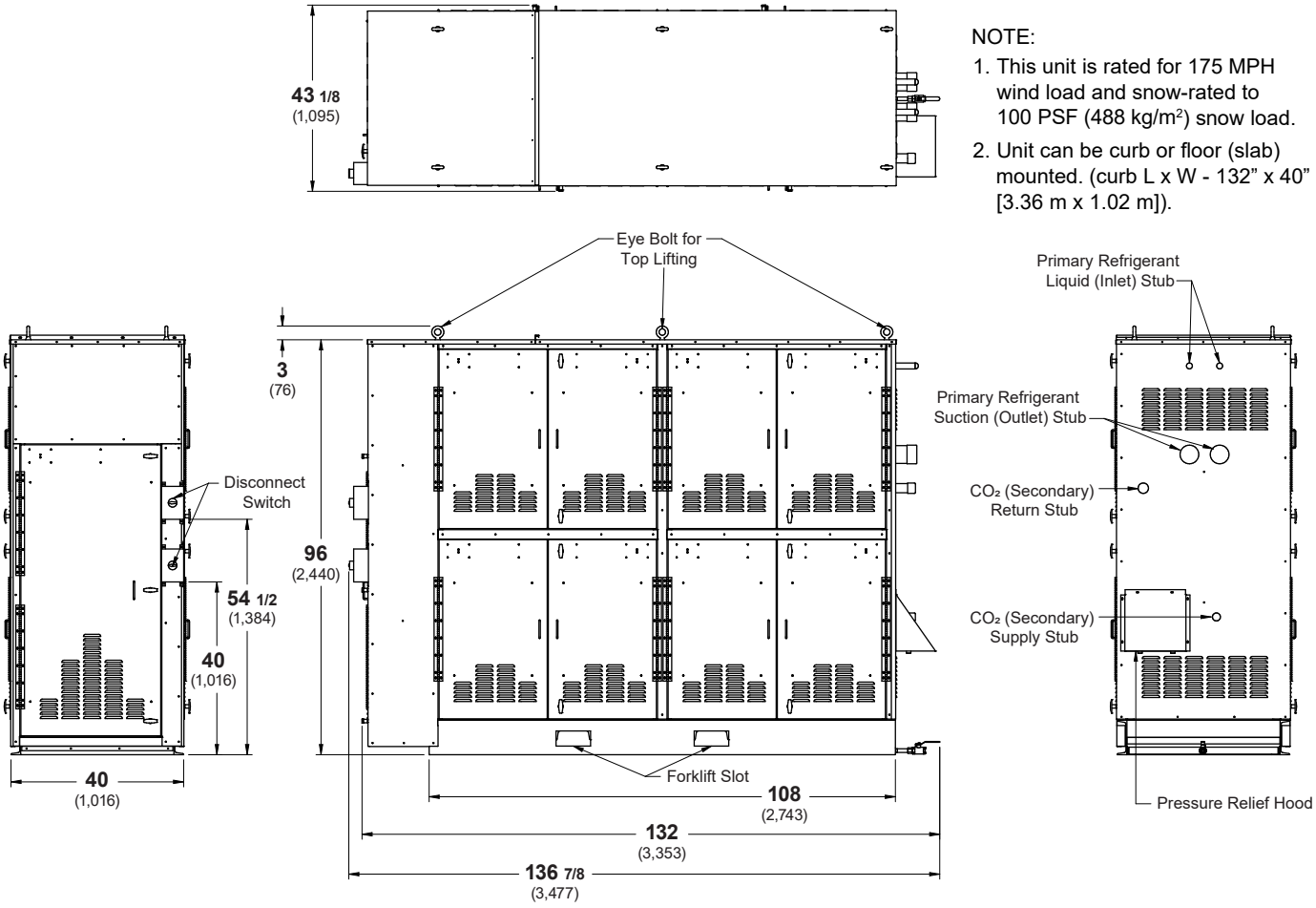
| Secondary Refrigerant | | | | Primary Refrigerant | | |
|---|---|---|---|---|---|---|
| Speed RPM | Frequency Hz | Flow Rate GPM (L/min) | Capacity MBH (kW) | Design SST | Design Approach | Design EEV Superheat |
| 3,450 | 60 | 21.6 (81.8) | 756 () | -26° F (-32.2° C) | 6° F (3.3° C) | 5° F (2.8° C) |
| 3,200 | 55.65 | 19.4 (73.4) | 679 () | | | |
| 3,095 | 53.83 | 18.3 (69.3) | 640.5 () | | | |
| 2,880 | 50.09 | 16.4 (62.1) | 574 () | | | |
| 2,740 | 47.65 | 15.2 (57.5) | 532 () | | | |
| 2,565 | 44.6 | 13.6 (51.5) | 476 () | | | |
| 2,375 | 41.3 | 11.7 (44.3) | 409.5 () | | | |
| 2,175 | 37.83 | 9.8 (37) | 343 () | | | |
| 1,945 | 33.83 | 7.5 (28.4) | 262.5 () | | | |
| 1,695 | 29.48 | 5.1 (19.3) | 178.5 () | | | |
| 1,380 | 24 | 2.2 (8.3) | 77 () | | | |
| pump stall point | | | | | | |

-20° F (-28.9° C) $CO_2$ Supply Temperature at 100 ft (30.5 m) Head

| Secondary Refrigerant | | | | Primary Refrigerant | | |
|---|---|---|---|---|---|---|
| Speed RPM | Frequency Hz | Flow Rate GPM (L/min) | Capacity MBH (kW) | Design SST | Design Approach | Design EEV Superheat |
| 3,450 | 60 | 17.5 (66.2) | 612.5 () | -26° F (-32.2° C) | 6° F (3.3° C) | 5° F (2.8° C) |
| 3,200 | 55.65 | 15.1 (57.2) | 528.5 () | | | |
| 3,095 | 53.83 | 14 (53) | 490 () | | | |
| 2,880 | 50.09 | 11.9 (45) | 416.5 () | | | |
| 2,740 | 47.65 | 10.6 (40.1) | 371 () | | | |
| 2,565 | 44.6 | 8.8 (33.3) | 308 () | | | |
| 2,375 | 41.3 | 7.1 (26.9) | 248.5 () | | | |
| 2,175 | 37.83 | 5.2 (19.7) | 182 () | | | |
| 1,945 | 33.83 | 3.2 (12.1) | 112 () | | | |
| pump stall point | | | | | | |

## Dimensional Drawings

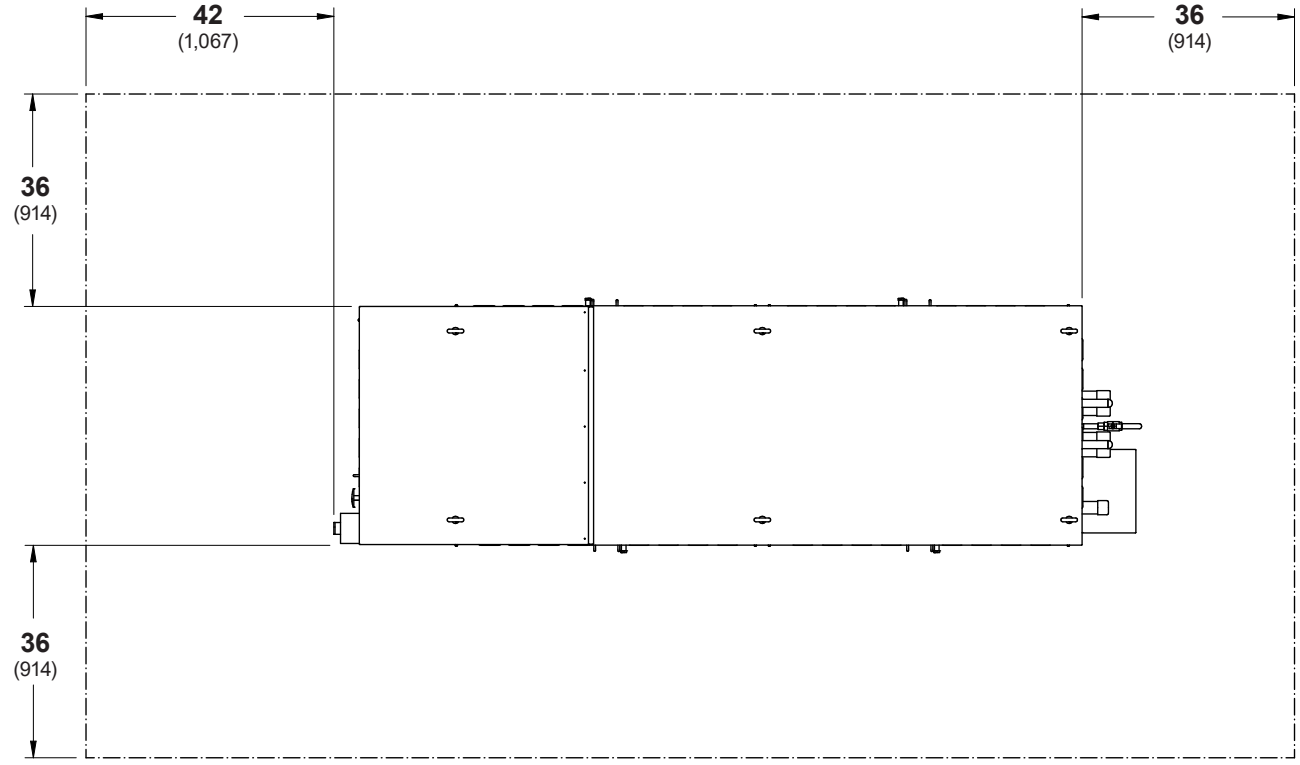
### Unit Dimensions




NOTE:

1. This unit is rated for 175 MPH wind load and snow-rated to 100 PSF (488 kg/m$^2$) snow load.
2. Unit can be curb or floor (slab) mounted. (curb L x W - 132" x 40" [3.36 m x 1.02 m]).

**Clearances**

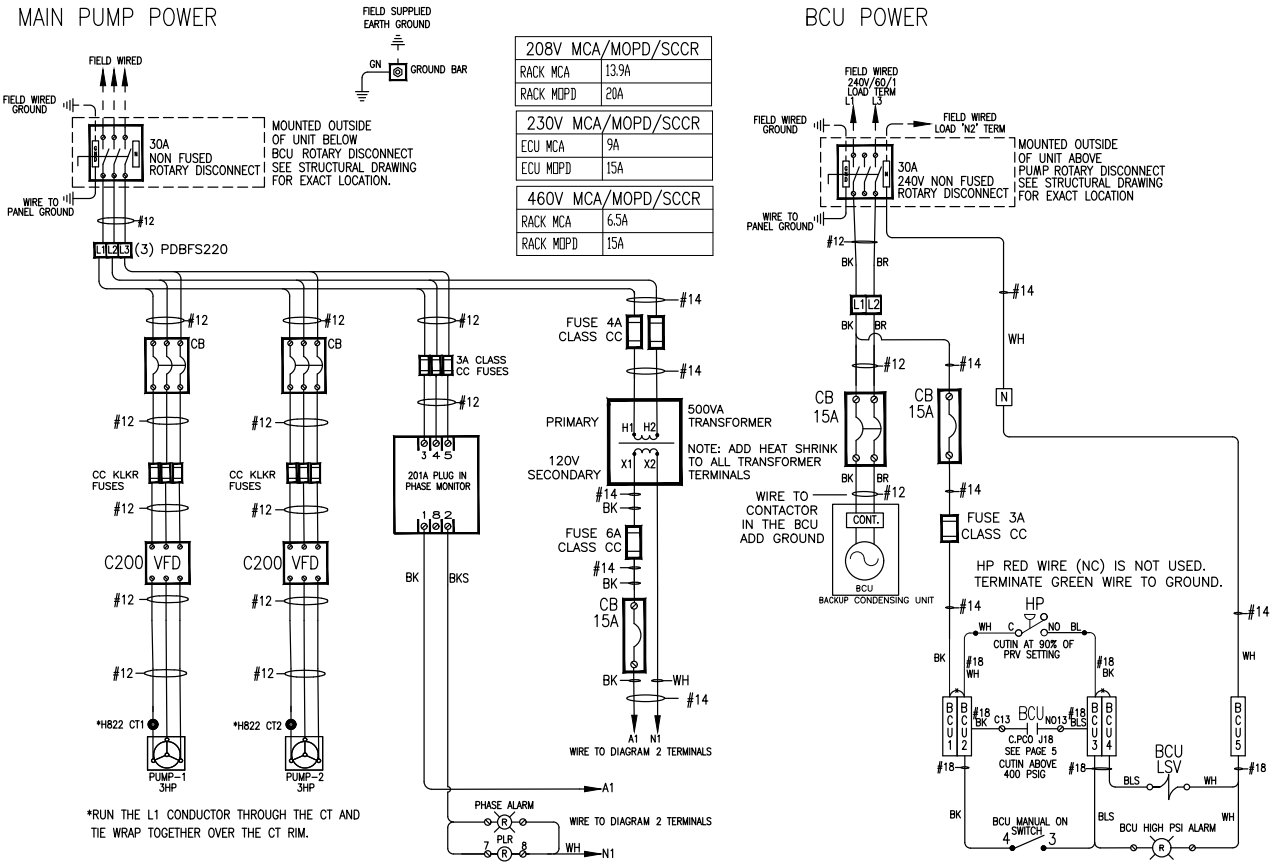


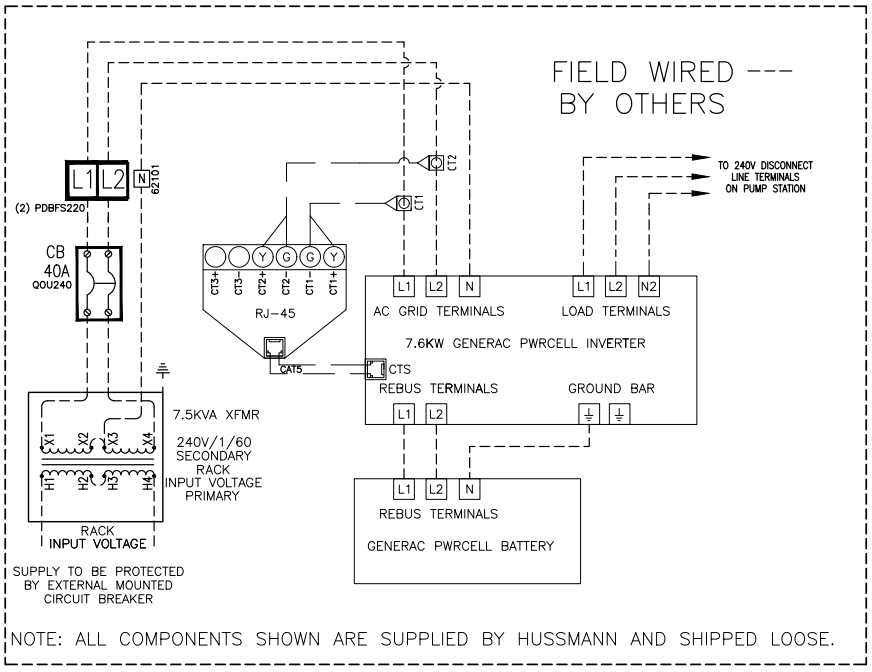

Note: While these minimum distances must be observed for proper operation, ensure additional space is provided for maintenance and service where needed.

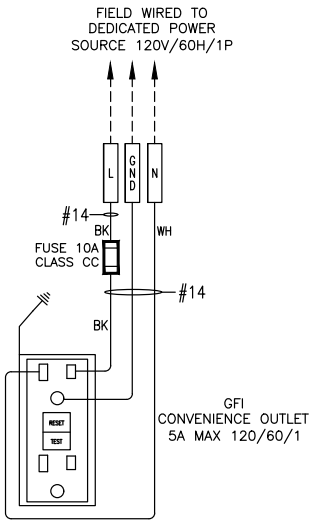
## Wiring Diagrams

Electrical schematics are included with each unit. Wiring diagrams featured in this manual are for example only and may vary based on unit configuration. Always consult the wiring schematics shipped with the unit before attempting any related installation or service procedure.

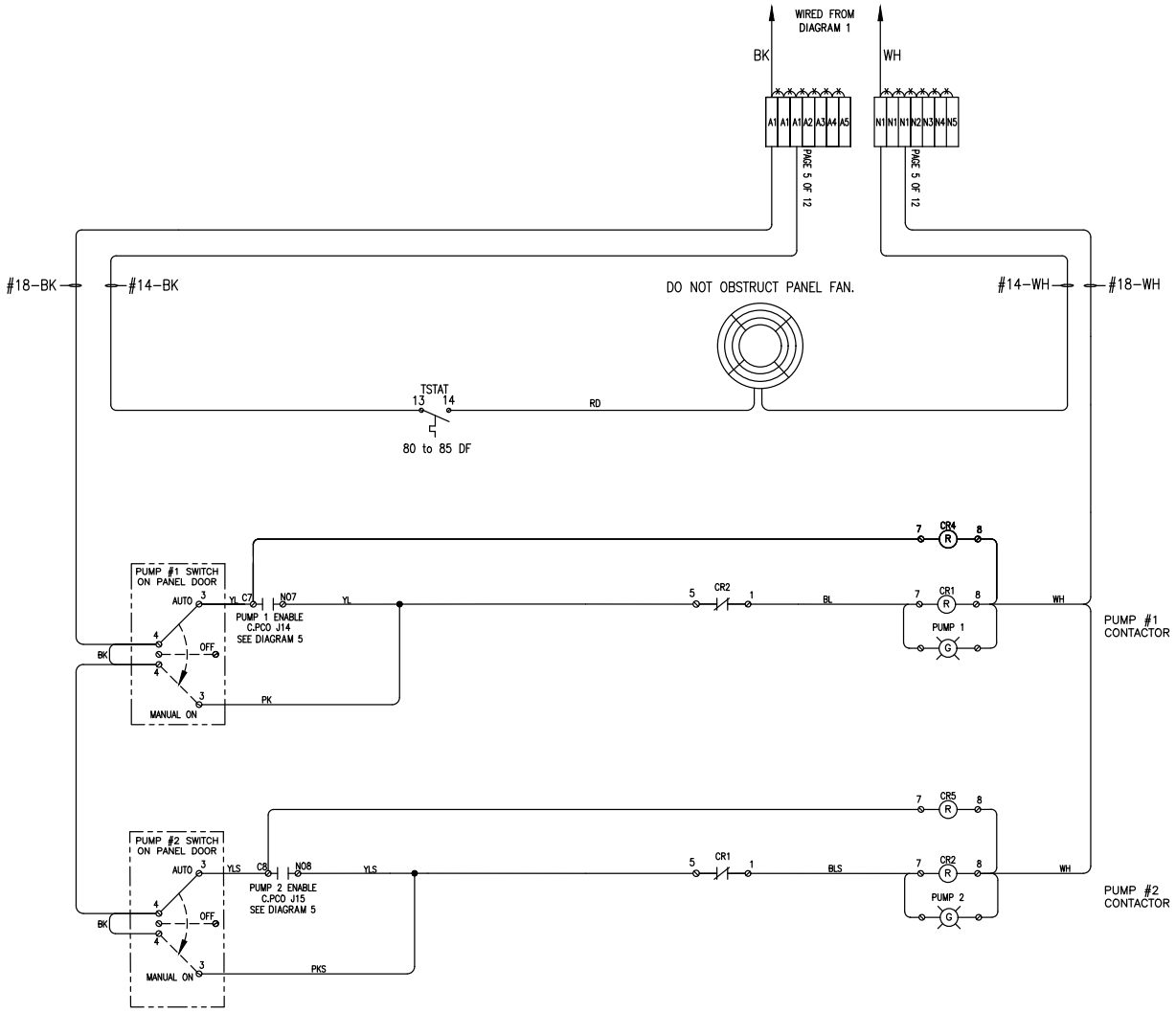
### Main Power (diagram 1)



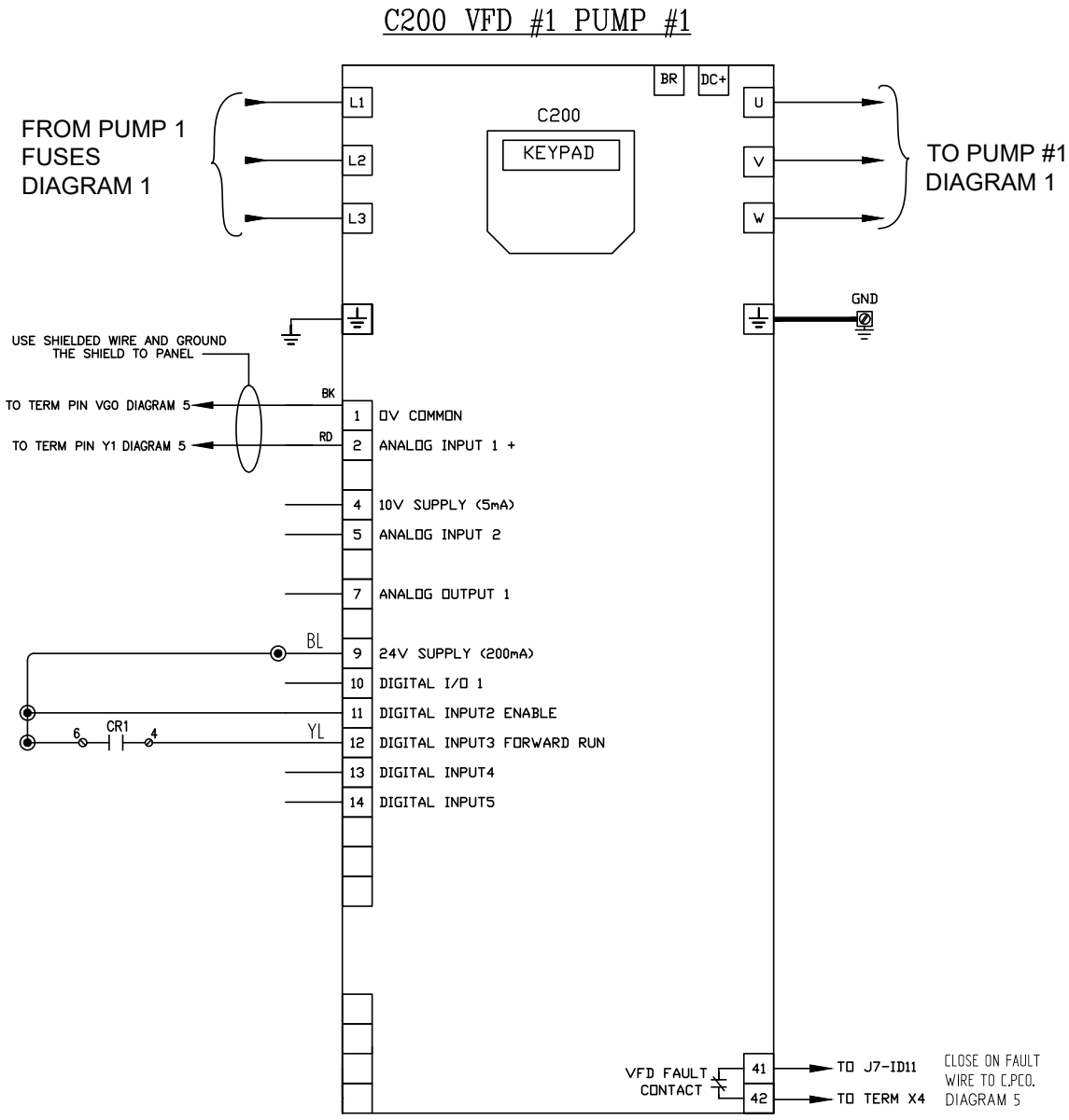
## Panel Switches (diagram 2)



# Liquid R-744 (CO2) Overfeed Rack

**Wiring Diagrams**

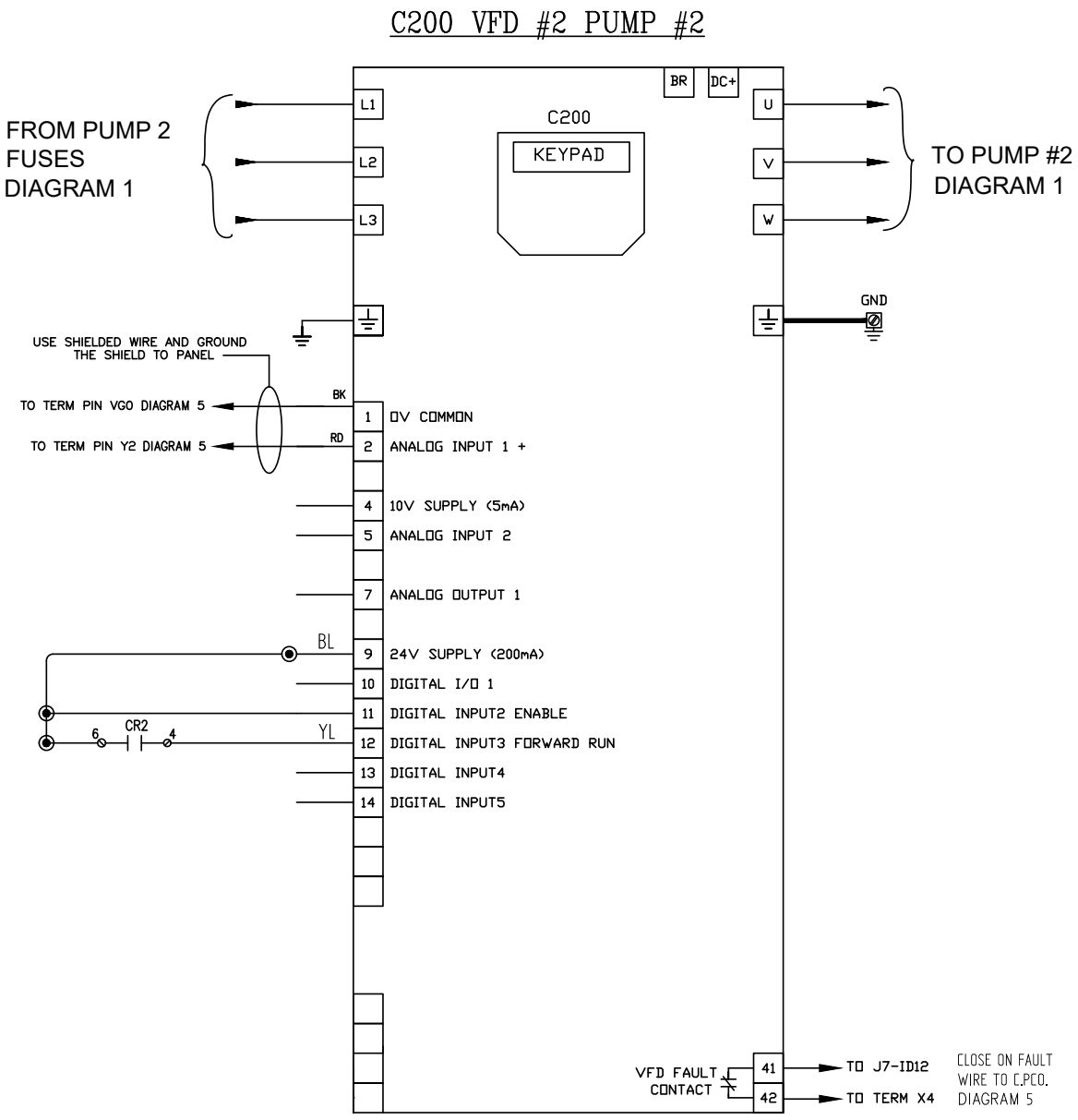
**Pump 1 VFD (diagram 3)**




208-230 V PUMP#1 VFD -C200-03200100A10101AB100

460 V PUMP#1 VFD -C200-03400094A10101AB100

**Pump 2 VFD (diagram 4)**



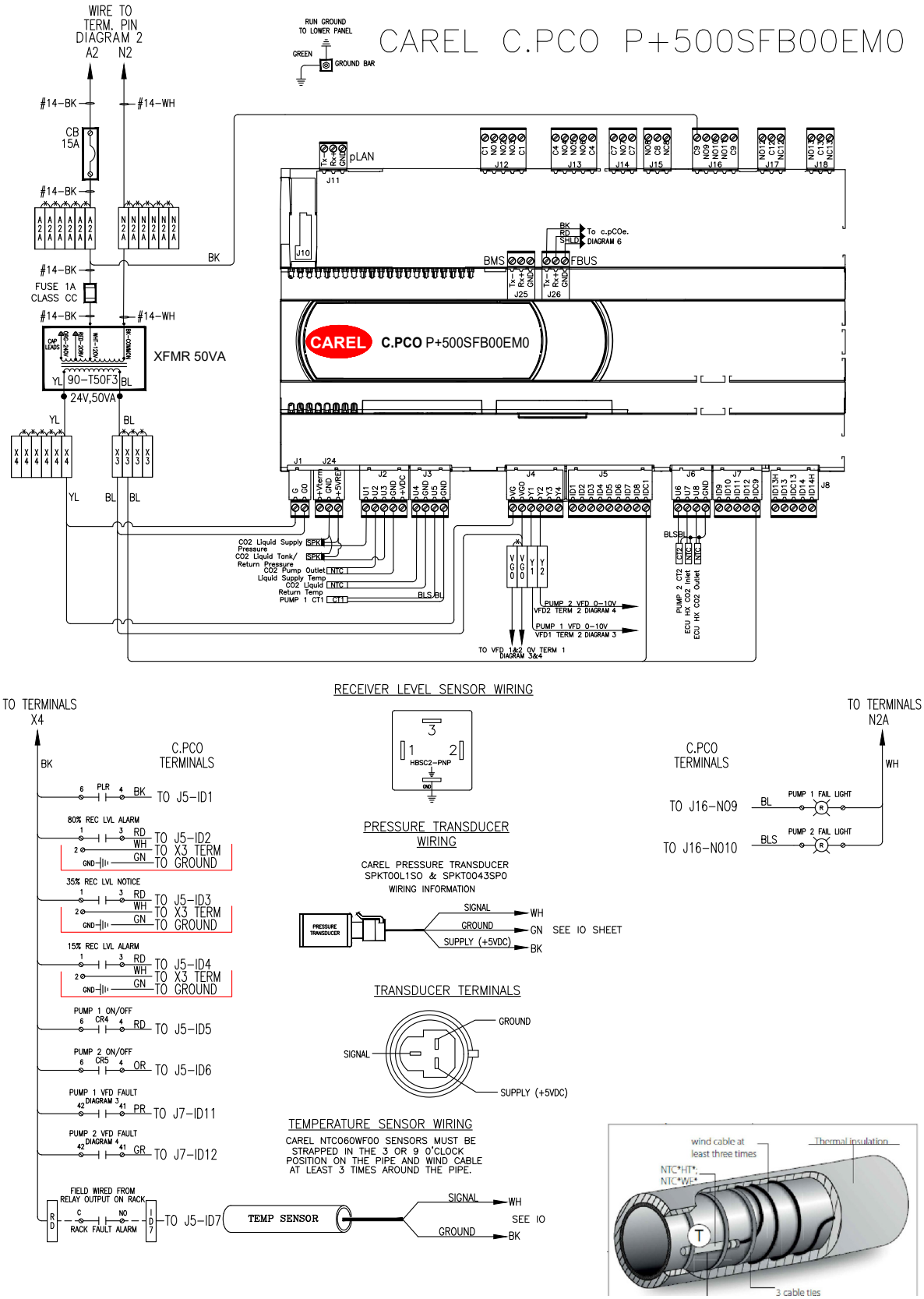

208-230 V PUMP#2 VFD -C200-03200100A10101AB100

460 V PUMP#2 VFD -C200-03400094A10101AB100

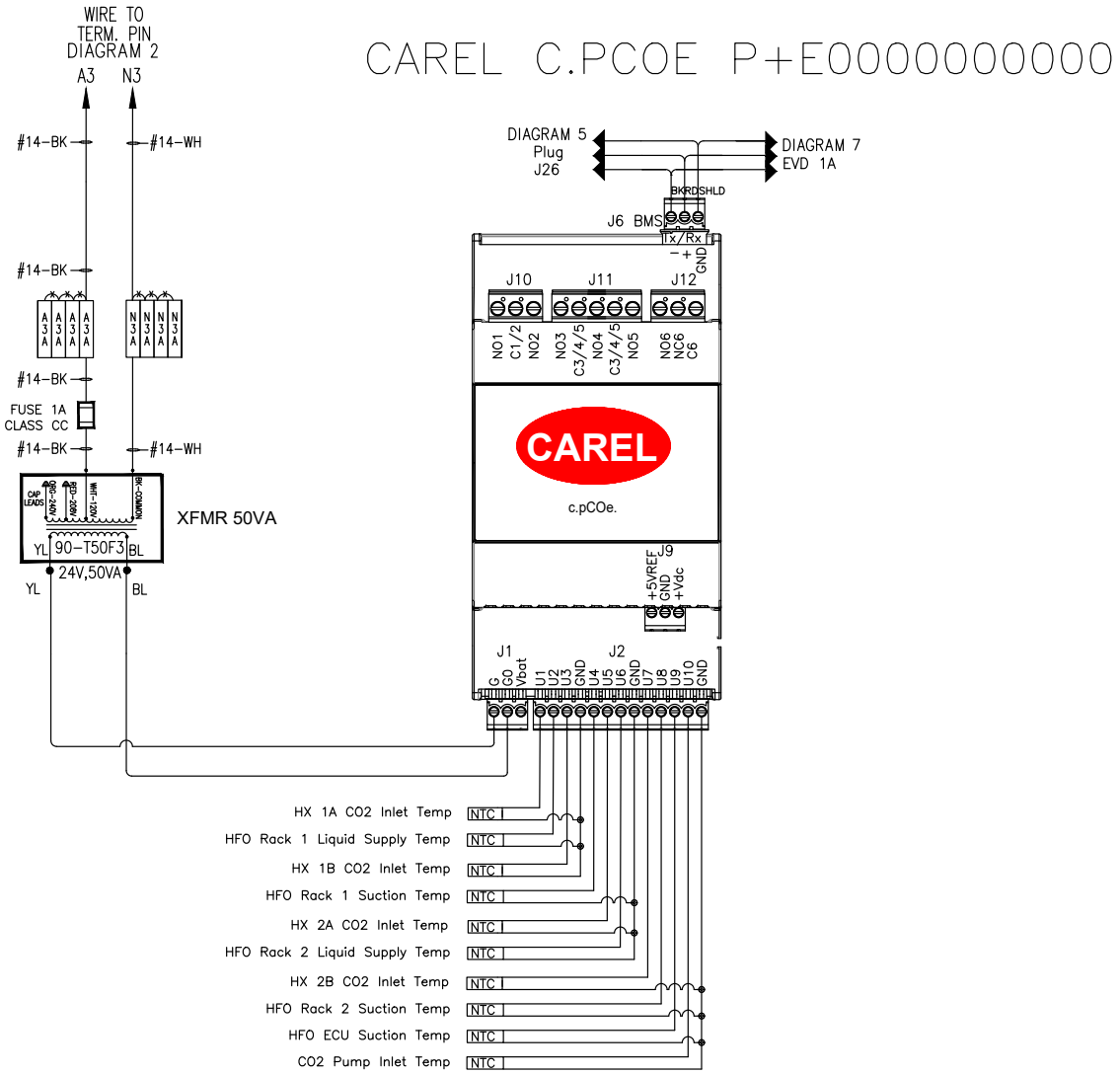
# Liquid R-744 (CO2) Overfeed Rack

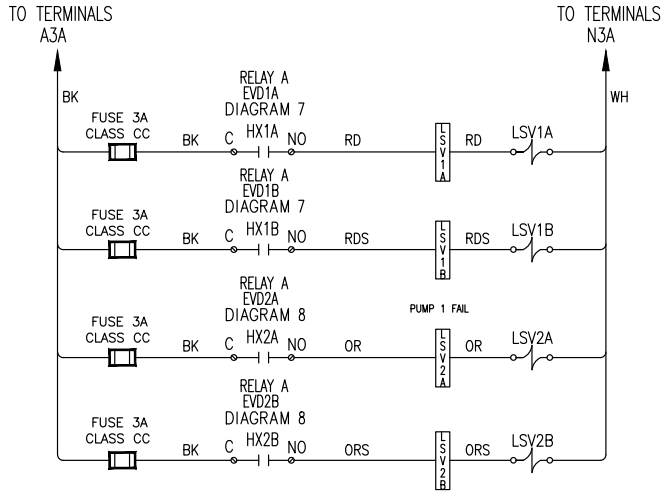
## Wiring Diagrams

### C.CPO (diagram 5)



### C.CPOE (diagram 6)

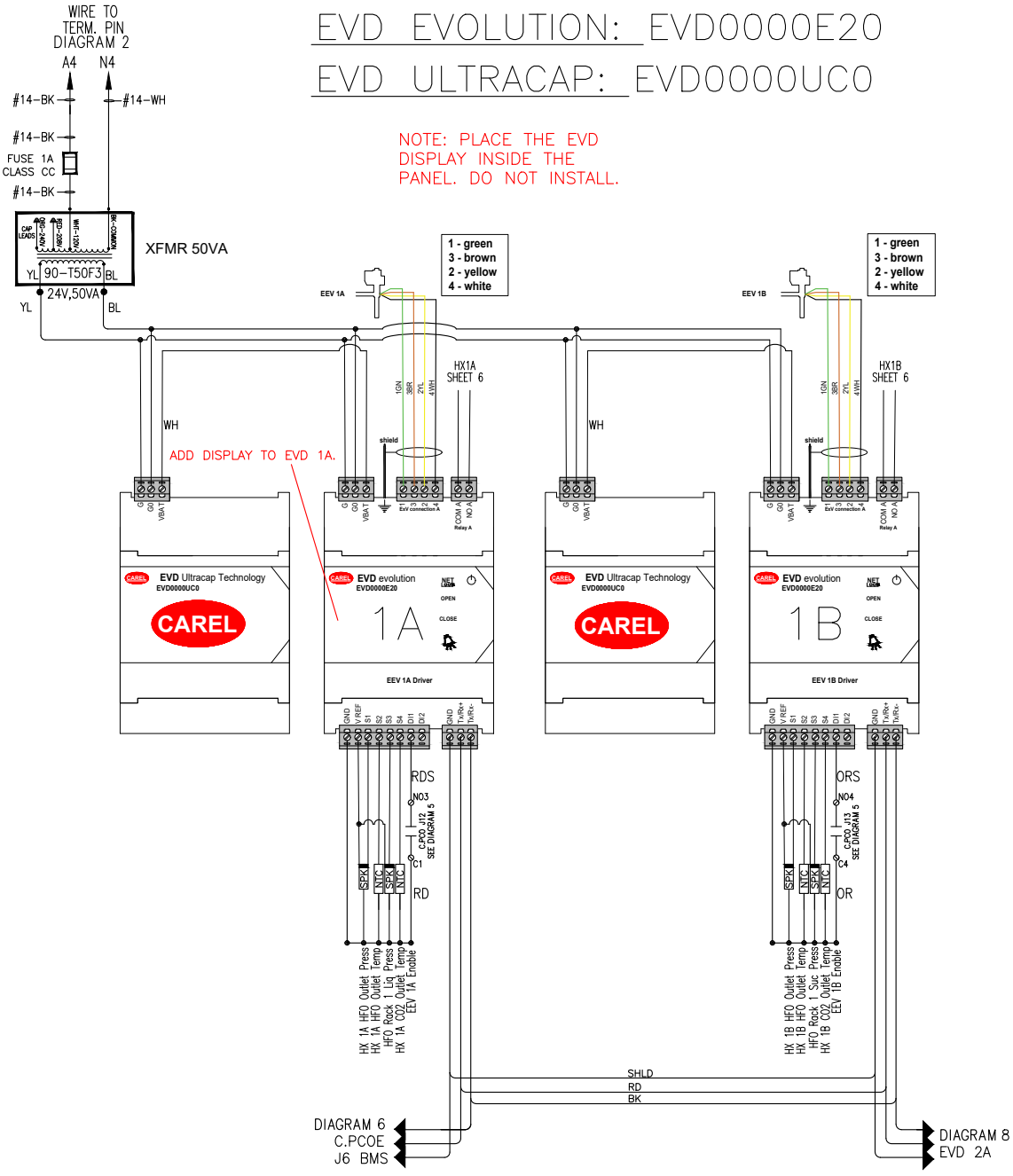


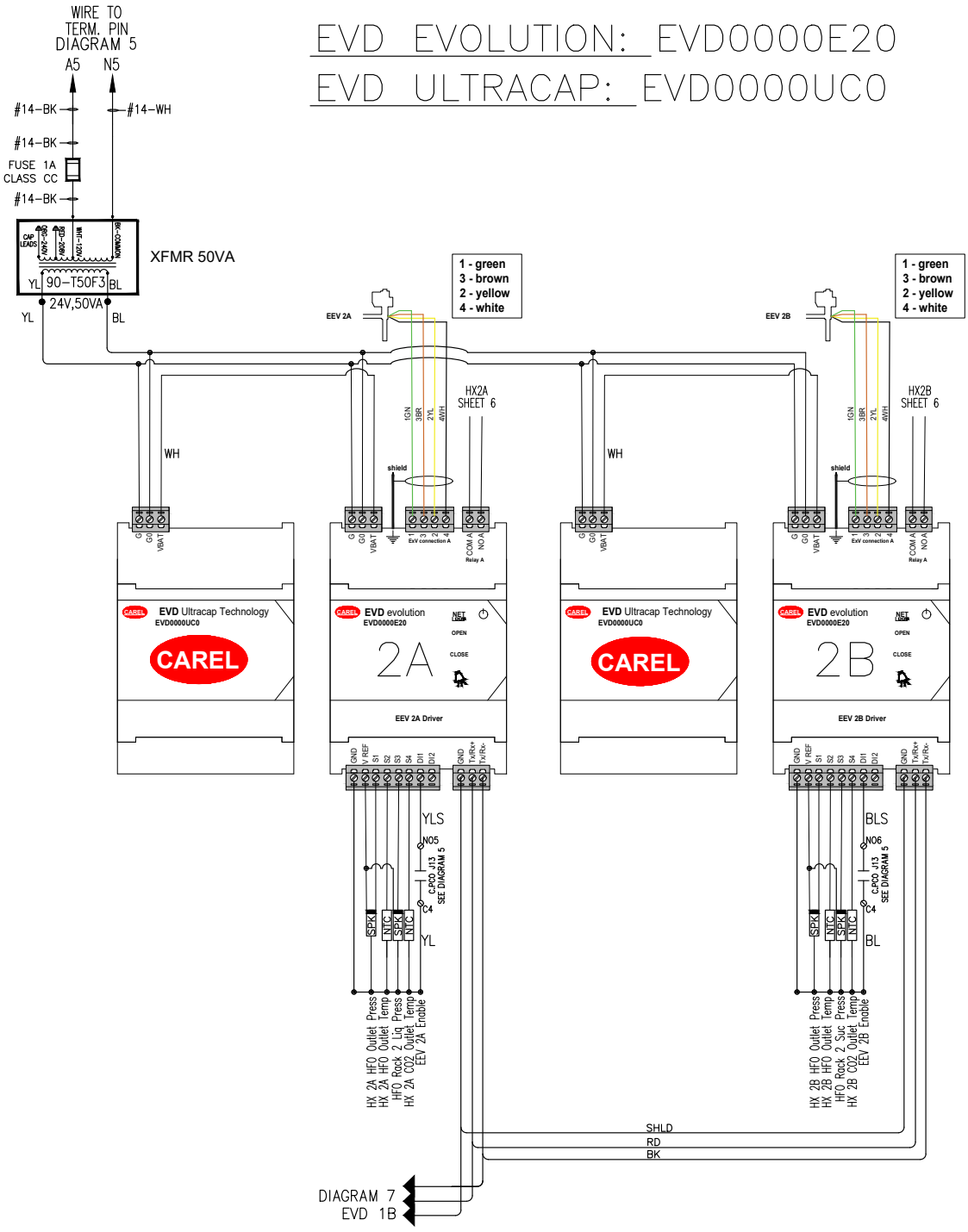
# Liquid R-744 (CO2) Overfeed Rack

## Wiring Diagrams

### EVD 1 (diagram 7)



## EVD 2 (diagram 8)



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**3248350 Revision History**

Revision A: (May 2026) Initial release

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