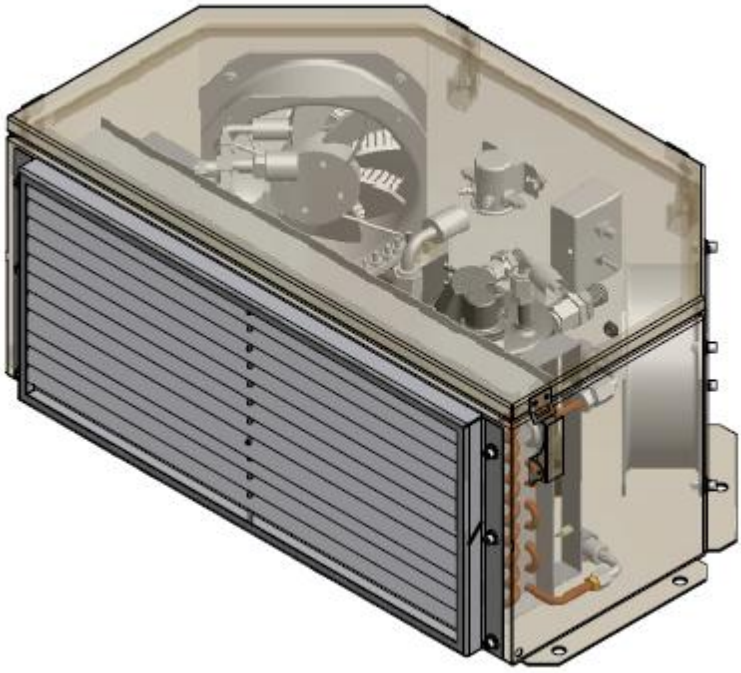




REMOTE COMPRESSOR / CONDENSER



CREATING
VALUE

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RCC and A/C Familiarization

- **By the end of this training you will be familiar with the RCC components and their purpose as well as standard A/C practices**
- **Topics include**
 - Component descriptions
 - Refrigerant flow characteristics
 - Superheat & Sub-cooling
 - Refrigerant reclamation
 - Refrigerant charging
 - Pressure testing
 - Evacuation
 - Charging

Standard Issues Leading to Service

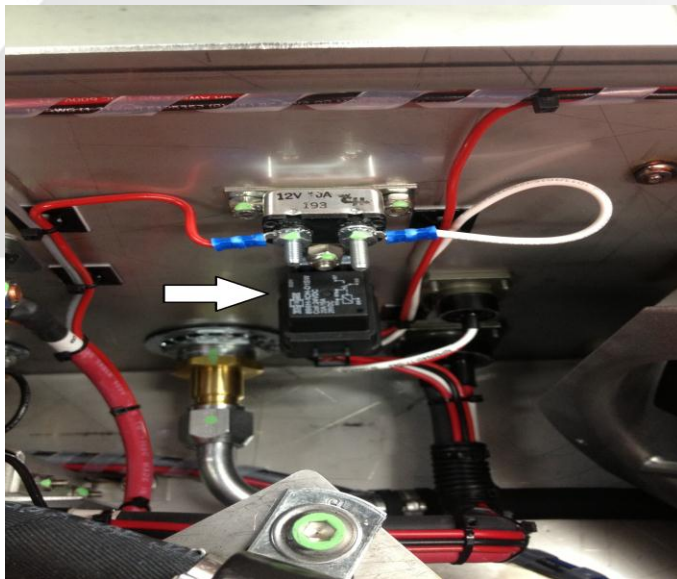
- **The number one cause of unit failure is improper installation**
- **The number two cause of unit failure is lack of maintenance**
- **Upon arrival to the unit the first thing you should check are the cab air filters and that the controller is set to the desired setting and temperature**
- **The next step is a visual inspection of the RCC including electrical components and refrigerant hosing. If nothing is visibly wrong then proceed to electrical and refrigerant troubleshooting**

RCC Component Descriptions

- **Condenser Fan Relay and**

Part 31 – MN2000Z123

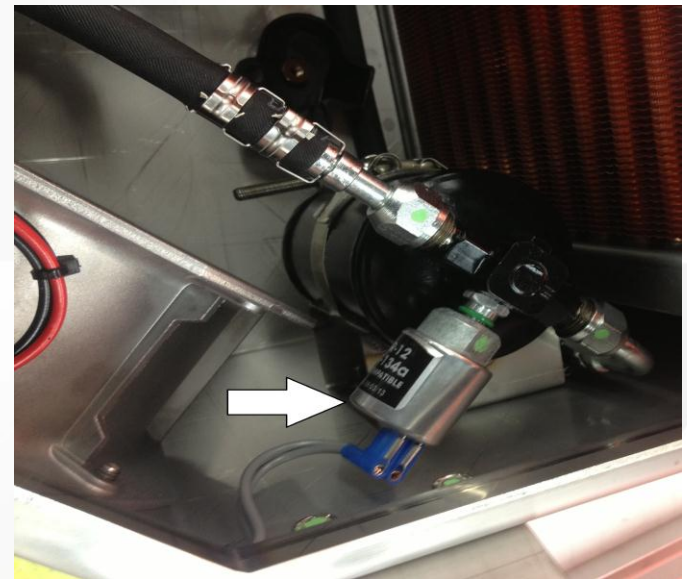
RELAY 24VDC



- **Binary Switch**

Part 16 – MN62-13-004

350 Binary Pressure Switch

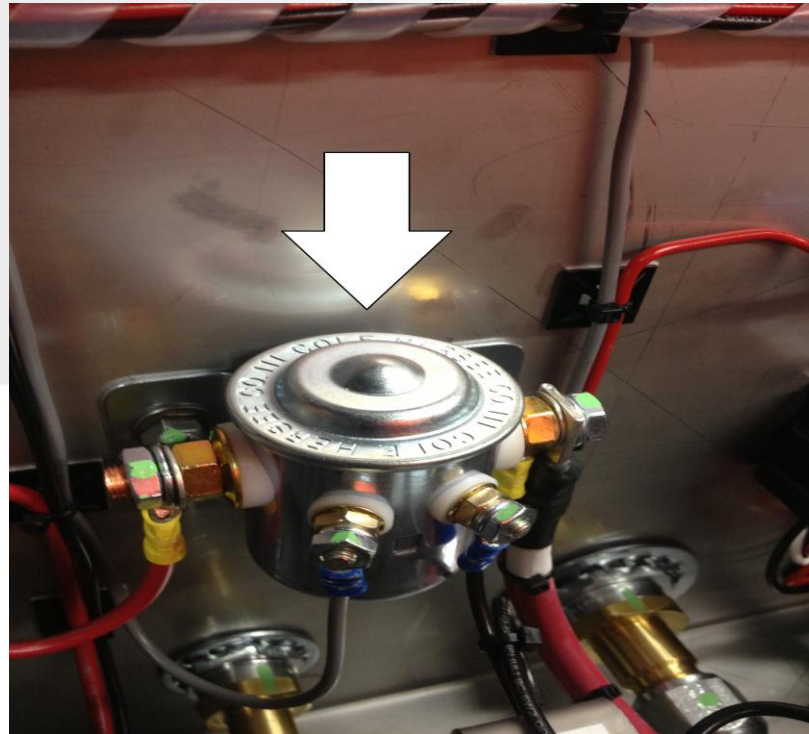


The condenser fan relay coil and binary switch receive a 24VDC signal from the thermostat in cooling mode. The condenser fan starts if main power is present. If the binary switch is not open on a high or low pressure condition, then the 24VDC signal is then sent to the Compressor Contactor Solenoid.

Compressor Contactor Solenoid

Part 32 – NPMN40-01-000

SOLENOID – CONTINUOUS DUTY 24V, 85a



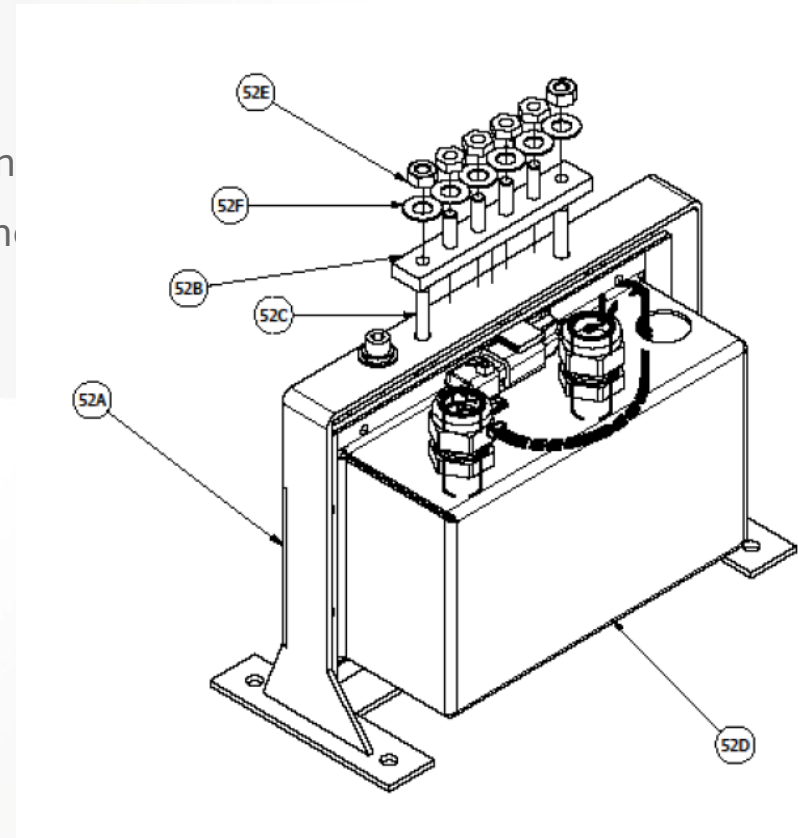
- The 24 volt signal from the *Binary Switch* powers the internal coil in the solenoid which closes its contacts and allows the 24VDC line power through to the inverter / controller.

Compressor Inverter / Controller

Part 52 – NPMN53-04-000-KIT

RCC 24V/48V DC CONTROLLER ENCLOSURE KIT

The inverter / controller is fed 24VDC from the solenoid contactor. It then converts the power to 3 phase 24VDC to power the compressor. The controller also reads the systems operations and relays failure flash codes viewed through a sight glass. Flash code descriptions are found in the operations manual.



Compressor

8 – NPMN65-01-003 (*p/n for HC compressor will be different*)

24VDC COMPRESSOR ASSEMBLY

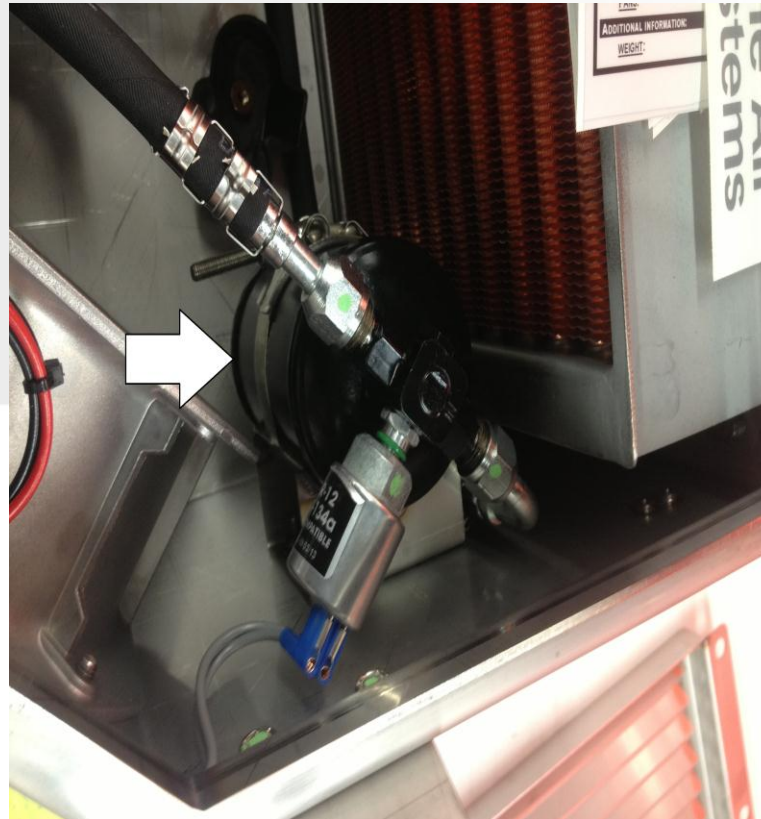


The A/C compressor is the heart of the system, it is what generates the pressure difference between the high side (condenser) and the low side (evaporator). Refrigerant flowing through the system absorbs heat from the interior of the cab and discharges it to the exterior.

Receiver / Dryer

Part 15 – MN60-08-003

RECEIVER / DRYER - 350

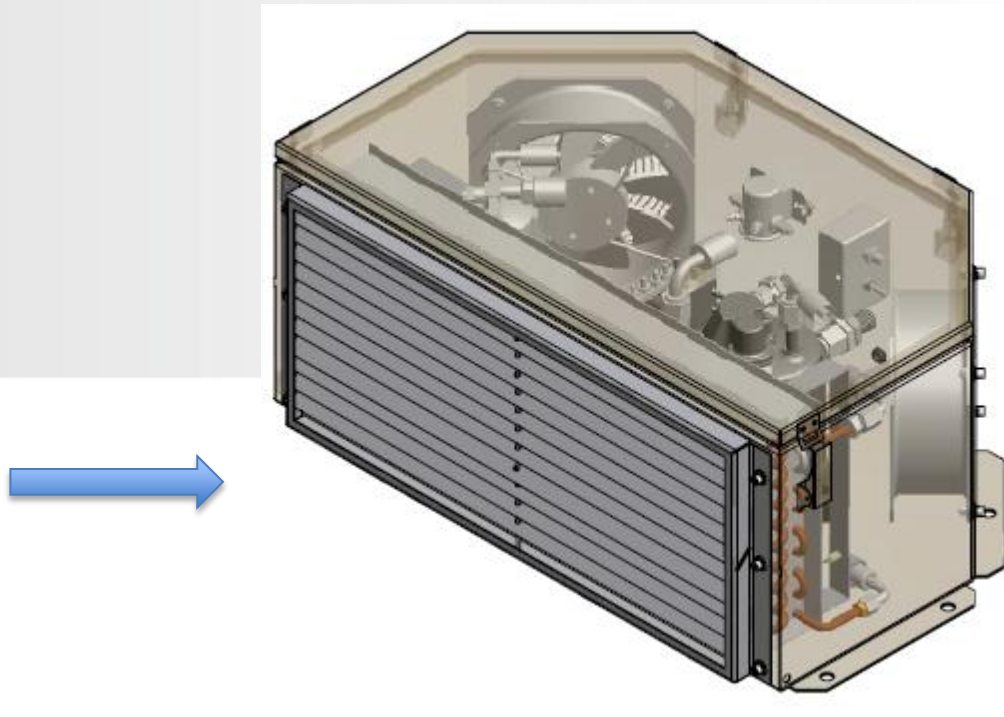


The receiver / dryer is a dual purpose component. It has the ability to hold extra refrigerant during low load conditions as well as filtering non condensables from the system.

Condenser Coil

Part 2 – NPMNRC-05-005

COIL ASSEMBLY

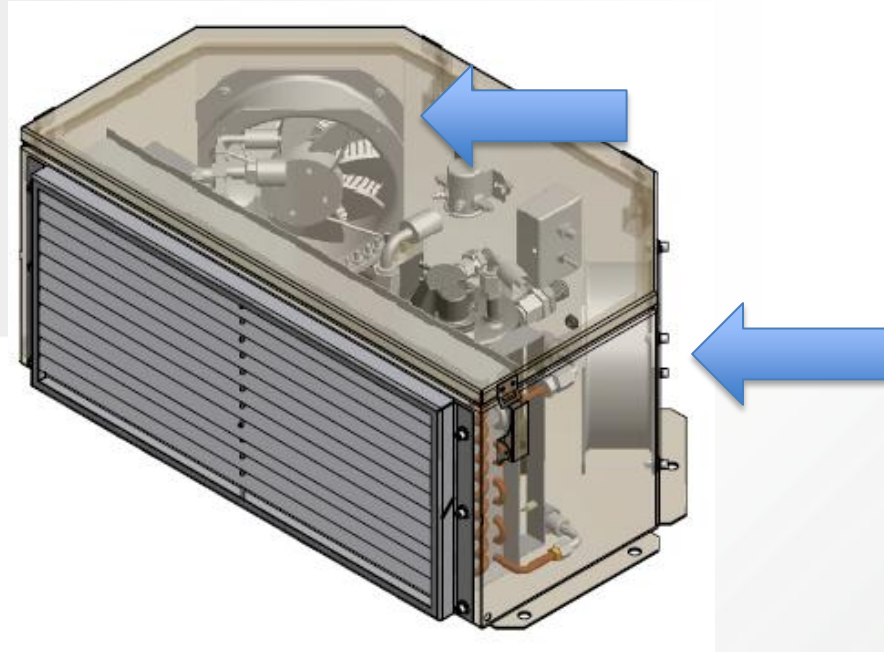


The condenser coil is the component that removes the heat from the A/C system using outdoor air from the condenser fans to cool the coil.

Condenser Fans

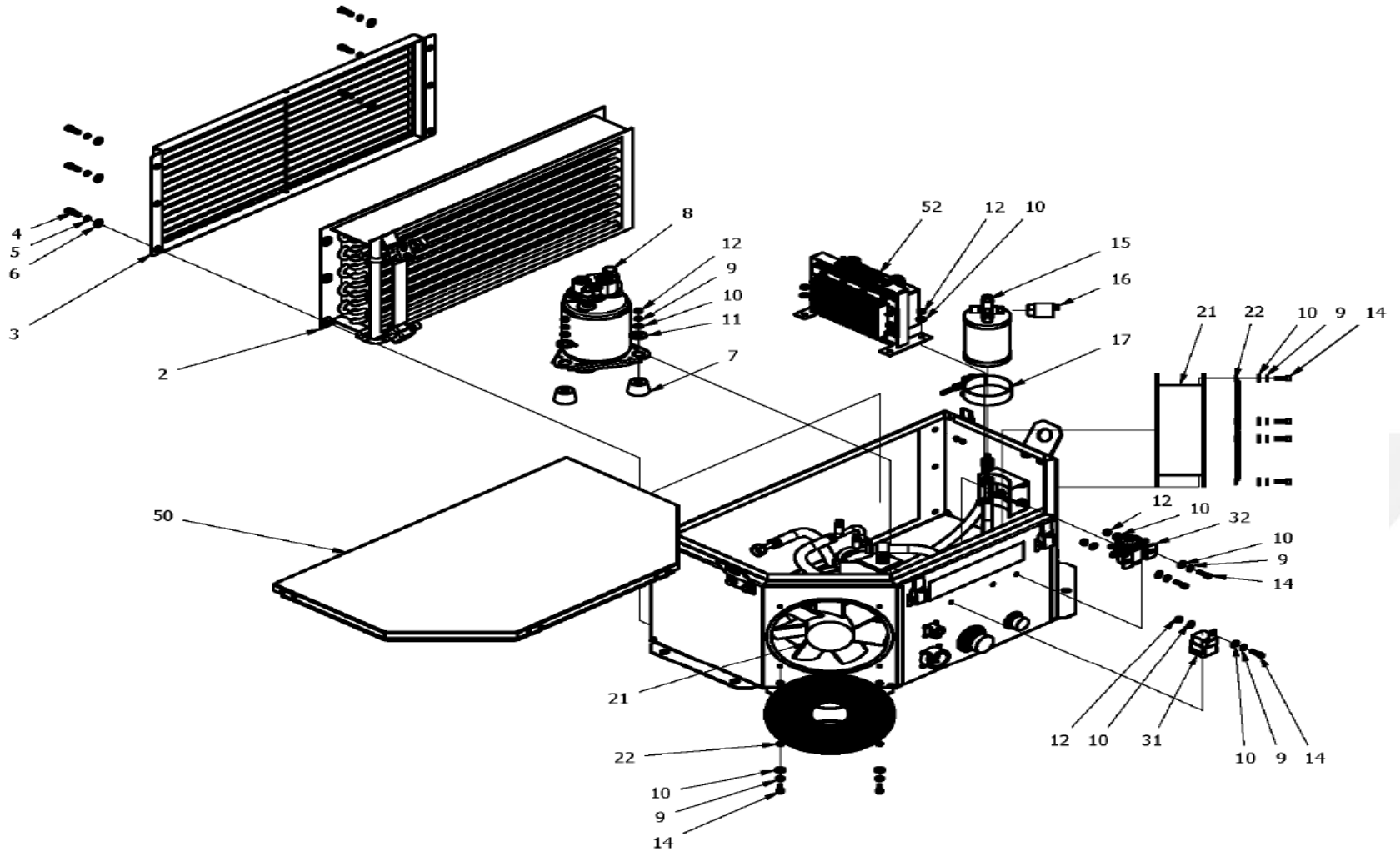
Part 21 – NPMN07-01-007

BLOWERS-AXIAL, 200mm, 24VDC, VGC24 200V

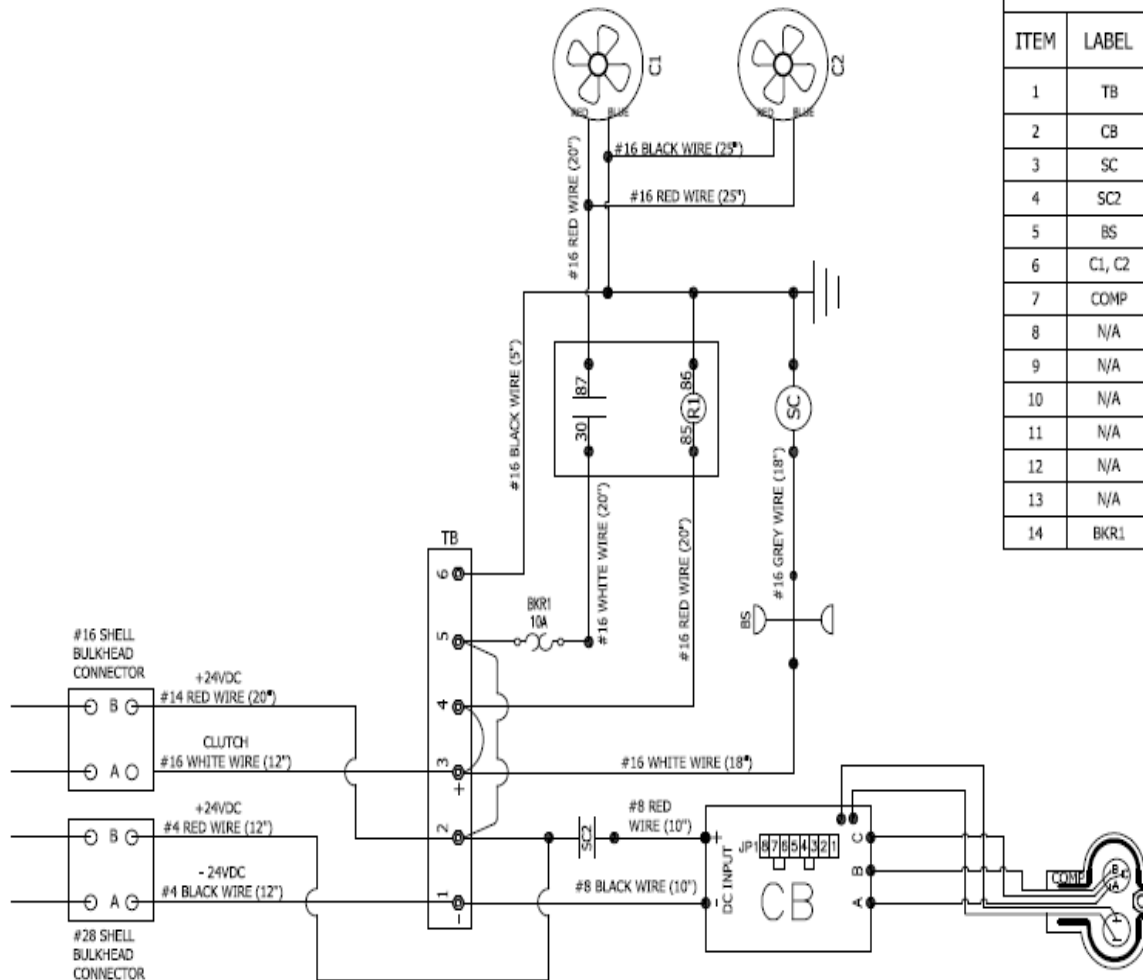


There are two condenser fans used to induce airflow across the condenser coil. The air flows in through the fans, across the internal components, and then through the condenser coil.

Component Layout



MRC5 WIRING DIAGRAM



BOM

| ITEM | LABEL | PART NO. | DESCRIPTION |
|------|--------|-------------|-----------------------------------|
| 1 | TB | 53-01-003 | 4 GANG TERMINAL BLOCK-SINGLE STUD |
| 2 | CB | 53-01-001 | 24/28VDC CONTROLLER FOR 65-01-001 |
| 3 | SC | 41-01-000 | SOLENOID CONTINUOUS DUTY 25V,85A |
| 4 | SC2 | 41-01-000 | SOLENOID CONTACT |
| 5 | BS | 62-13-004 | BINARY SWITCH-350 |
| 6 | C1, C2 | 07-01-007 | CONDENSER FAN 24VDC |
| 7 | COMP | 65-01-001 | COMPRESSOR MASTERFLUX 24VDC |
| 8 | N/A | 40-11-005 | #8 TEW BLACK (FINE STRAND) |
| 9 | N/A | 40-11-008 | #8 TEW RED (FINE STRAND) |
| 10 | N/A | 40-11-028 | #16 TEW WHITE (FINE STRAND) |
| 11 | N/A | 40-11-021 | #16 TEW BLACK (FINE STRAND) |
| 12 | N/A | 40-11-024 | #16 TEW GREY (FINE STRAND) |
| 13 | N/A | 40-11-027 | #16 TEW RED (FINE STRAND) |
| 14 | BKR1 | MN40-02-001 | 10A AUTO RESET BREAKER |

LED FAULT INDICATOR OUTPUT

- 1 FLASH - OVER CURRENT
- 2 FLASHES - OVER VOLTAGE
- 3 FLASHES - UNDER VOLTAGE
- 4 FLASHES - CONTROLLER OVERHEAT
- 5 FLASHES - MOTOR OVERHEAT
- 6 FLASHES - STALLED
- 7 FLASHES - LOW SPEED
- 8 FLASHES - STARTUP FAILED

A/C Refrigerant Theories

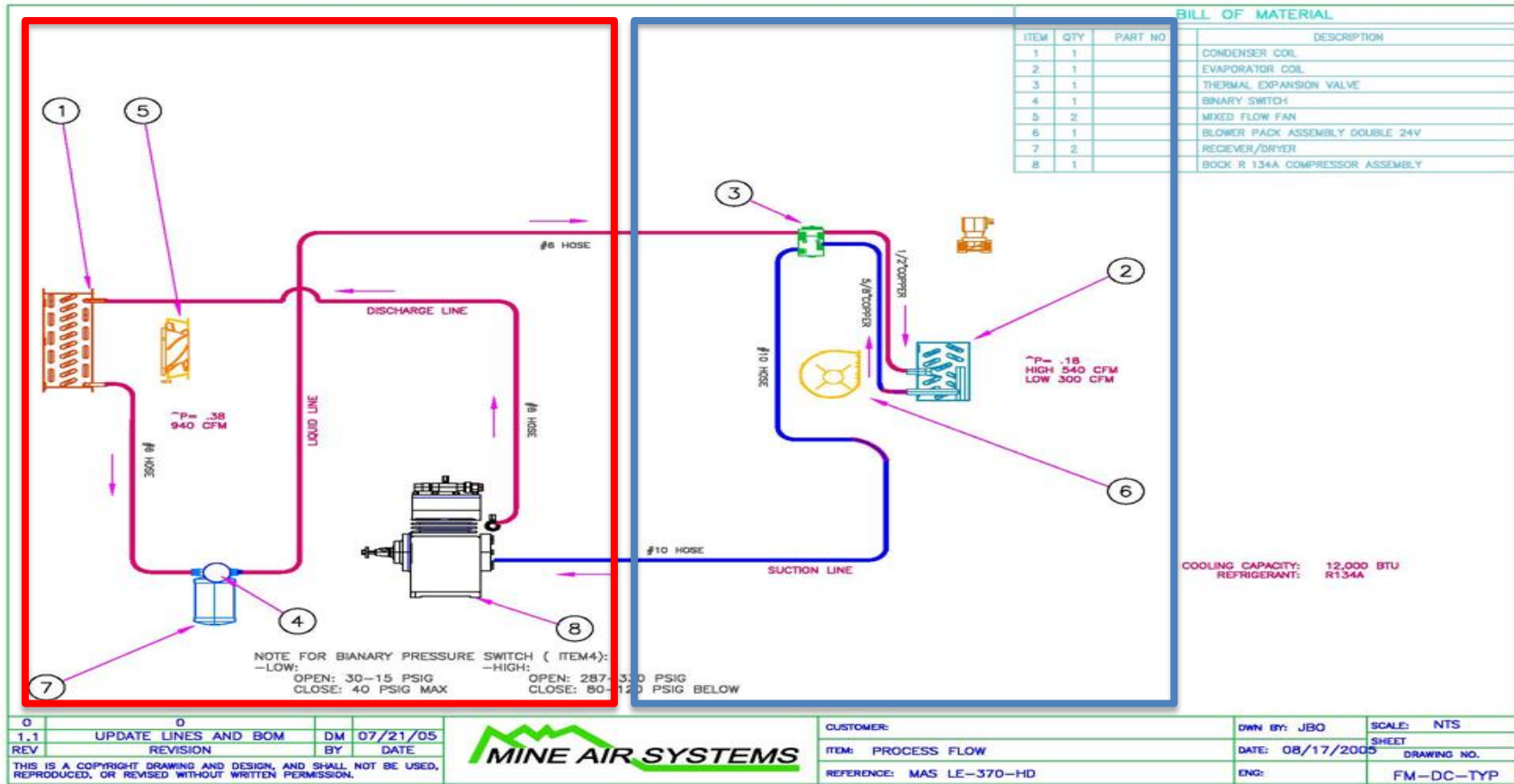


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Typical A/C Refrigerant Flow (Split System)



(exit out of presentation view to open videos)

Superheat and Sub-Cooling Video (4 min)



Superheat & SubCooling.mp4

Refrigerant Reclaim Video (17 min)



Ref_Recovery_full.mp4

Refrigerant Charging Procedure

(includes pressure test, evacuation, and charging)

1. Connect nitrogen gauge to yellow hose from refrigerant gauge and connect refrigerant gauge (red and blue hoses) to A/C system (high and low side) and set A/C system pressure to 150 psi and let stand for 30 minutes to ensure that the system is leak free
2. Relieve system pressure and then connect refrigerant gauge (yellow hose) to vacuum pump and run until vacuum gauge reads below 500 microns. Ensure that the vacuum pump oil is changed prior to evacuating.
3. Close all valves, shut the vacuum pump off and remove the yellow hose from the pump and connect it to the refrigerant (R134a) cylinder. Slightly loosen the yellow hose end attached to the refrigerant gauge and slightly open the valve on the refrigerant cylinder to purge the air out of that hose. Tighten the hose connection and fully open the refrigerant cylinder valve.
4. Place the refrigerant cylinder on a weigh scale and reset the scale to zero. Now the system is ready to be charged.
5. Fully open the valve to the red hose (high side) to charge the system and weigh in the appropriate charge. If the system will not take the full charge then you will need to heat up the refrigerant cylinder to increase its pressure (either hot water or a heat gun works well).

REFRIGERANT R134A PRESSURE TEMPERATURE CHART

| Temp °F | R134 psig | R134 kPa | Temp °C | | Temp °F | R134 psig | R134 kPa | Temp °C |
|---------|-----------|----------|---------|--|---------|-----------|----------|---------|
| -50 | 18.7 | 129 | -45.6 | | 55 | 51.1 | 352.3 | 12.8 |
| -45 | 16.9 | 116.5 | -42.8 | | 60 | 57.3 | 413.7 | 45.6 |
| -40 | 14.8 | 102 | -40 | | 65 | 63.9 | 477.8 | 18.3 |
| -35 | 12.5 | 86.2 | -37.2 | | 70 | 71 | 489.5 | 21.1 |
| -30 | 9.8 | 67.6 | -34.4 | | 75 | 78.6 | 541.9 | 23.9 |
| -25 | 6.9 | 47.6 | -31.7 | | 80 | 85.6 | 590.2 | 26.7 |
| -20 | 3.7 | 25.5 | -28.9 | | 85 | 95.1 | 655.7 | 29.4 |
| -15 | 0.1 | 0.7 | -26.1 | | 90 | 104.2 | 718.4 | 32.2 |
| -10 | 1.9 | 13.1 | -23.3 | | 95 | 113.8 | 784.6 | 35 |
| -5 | 4.1 | 28.3 | -20.6 | | 100 | 124.1 | 855.6 | 37.8 |
| 0 | 6.5 | 44.8 | -17.8 | | 105 | 134.9 | 930.1 | 40.6 |
| 5 | 9.1 | 62.7 | -15 | | 110 | 146.3 | 1008.7 | 43.3 |
| 10 | 11.9 | 82 | -12.2 | | 115 | 158.4 | 1092.1 | 46.1 |
| 15 | 15 | 103.4 | -9.4 | | 120 | 171.1 | 1179.7 | 48.9 |
| 20 | 18.4 | 126.9 | -6.7 | | 125 | 184.5 | 1272.1 | 51.7 |
| 25 | 22.1 | 152.3 | -3.9 | | 130 | 198.7 | 1370 | 54.4 |
| 30 | 26 | 179.2 | -1.1 | | 135 | 213.6 | 1472.7 | 57.2 |
| 35 | 30.3 | 208.9 | 1.7 | | 140 | 229.3 | 1581 | 60 |
| 40 | 35 | 241.3 | 4.4 | | 145 | 245.7 | 1694 | 62.8 |
| 45 | 40 | 275.8 | 7.2 | | 150 | 263 | 1813.3 | 65.6 |
| 50 | 45.4 | 313 | 10 | | | | | |

QUESTIONS?

