MODULAR

HIGH CAPACITY REMOTE CONDENSER w/ COMPRESSOR

MANUAL

APPLICABLE UNIT PART NUMBER:
RMNHCRC-CWC-01

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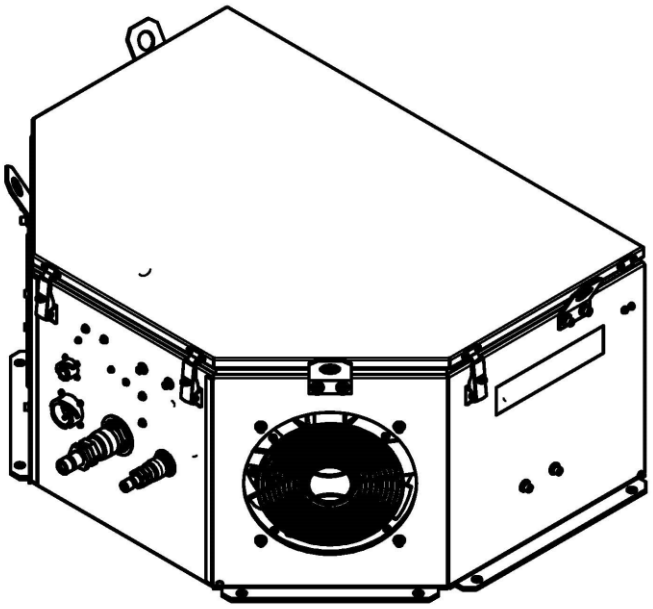
1.0 Overview

- The HCRC (high ambient remote condenser) is an electric 24VDC compressor and condensing unit. The HCRC is designed a replacement for conventional engine mounted, belt or hydraulic driven compressor and condenser arrangement on mobile mining equipment. It is suitable for installation on a wide variety of mobile diesel-powered mining equipment including haul trucks, graders, dozers, loaders and underground equipment. The HCRC is designed to tie into the existing OEM air conditioning system and utilizes the existing dash mounted OEM controller, evaporator coil, expansion device, blower fan, ducting and vents. It can also be installed using a Mine Air Systems remote evaporator.

- The HCRC improves air conditioning system performance and equipment availability by replacing the typical engine mounted, belt or hydraulic driven compressor/condenser system with a modular 24VDC remote compressor/condenser unit.

- Reduces maintenance costs associated with engine mounted belt or hydraulic driven compressor/condenser systems that can interfere with engine maintenance access.

- It is a modular unit that can be exchanged in less than 1 hour with no refrigerant loss if problems are encountered.



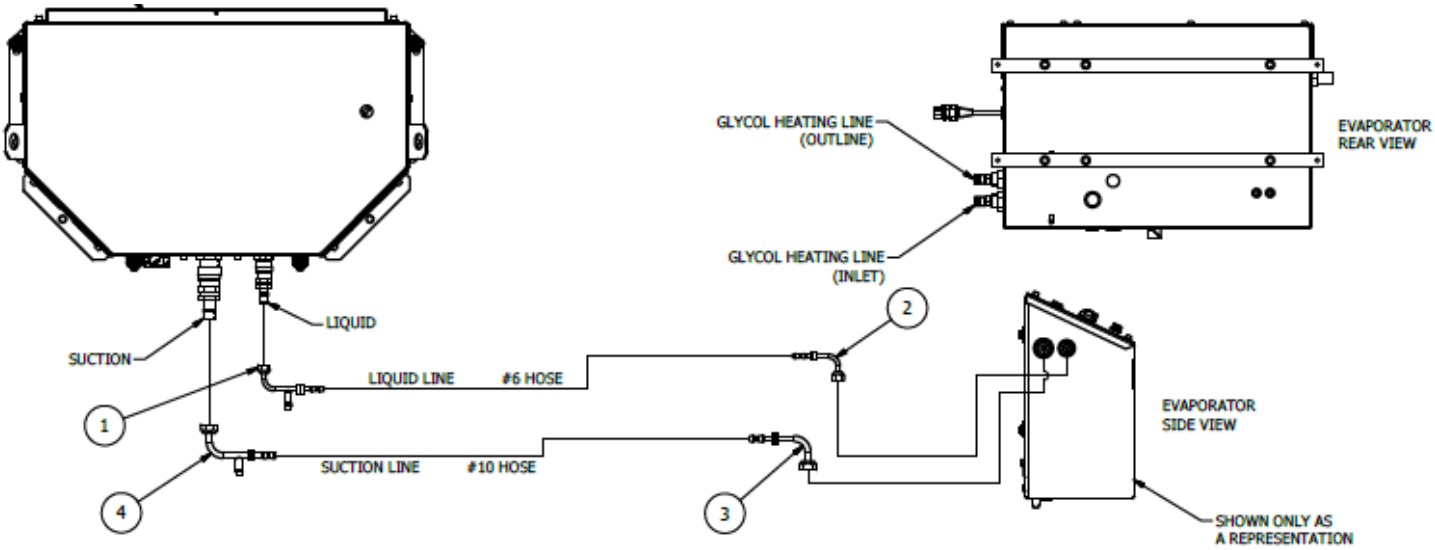
2.0 Unit Installation

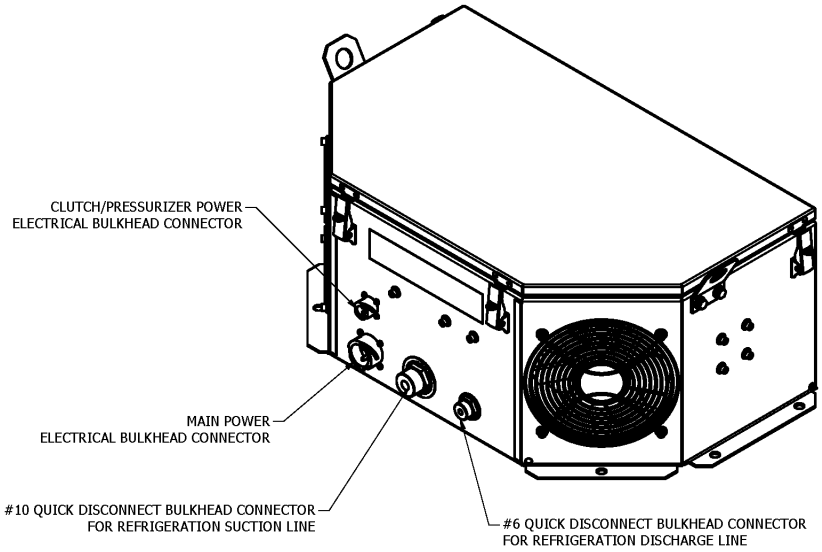
- The HCRC unit can be installed on a variety of mobile mining equipment. It is typically installed close to the operator's cab however it can be mounted up to 25ft away from the cab. The HCRC can also be installed directly onto a RCC roof rack using the 6 bolt pattern on the inside of the HCRC. Roof racks and mounting plates are available.

2.1 Mounting Examples

2.2 Refrigerant Line Set Connections

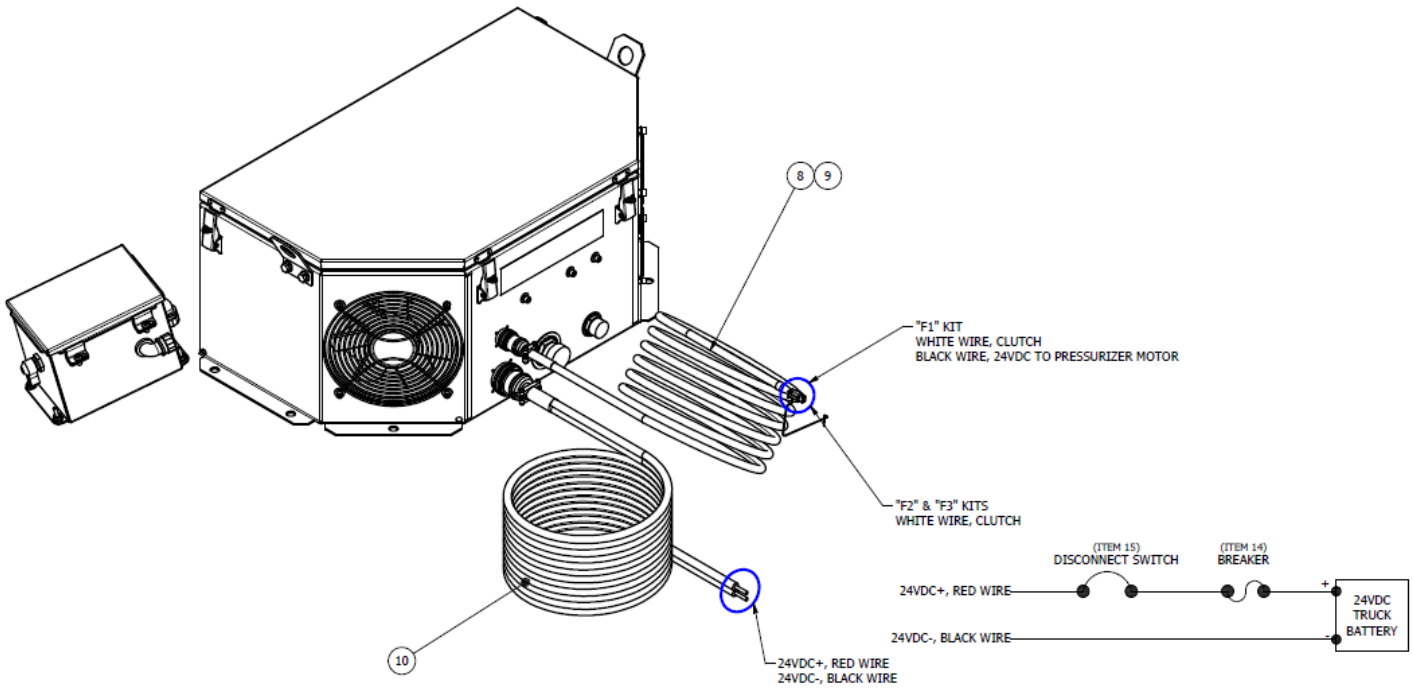
- A refrigerant line set is installed between the HCRC unit and the cab evaporator. The HCRC ties into the existing OEM air conditioning system and utilizes the existing dash mounted OEM controller, evaporator coil, expansion device, blow, ducting and vents. It can also be installed using a Mine Air Systems remote evaporator.





2.3 Electrical connections

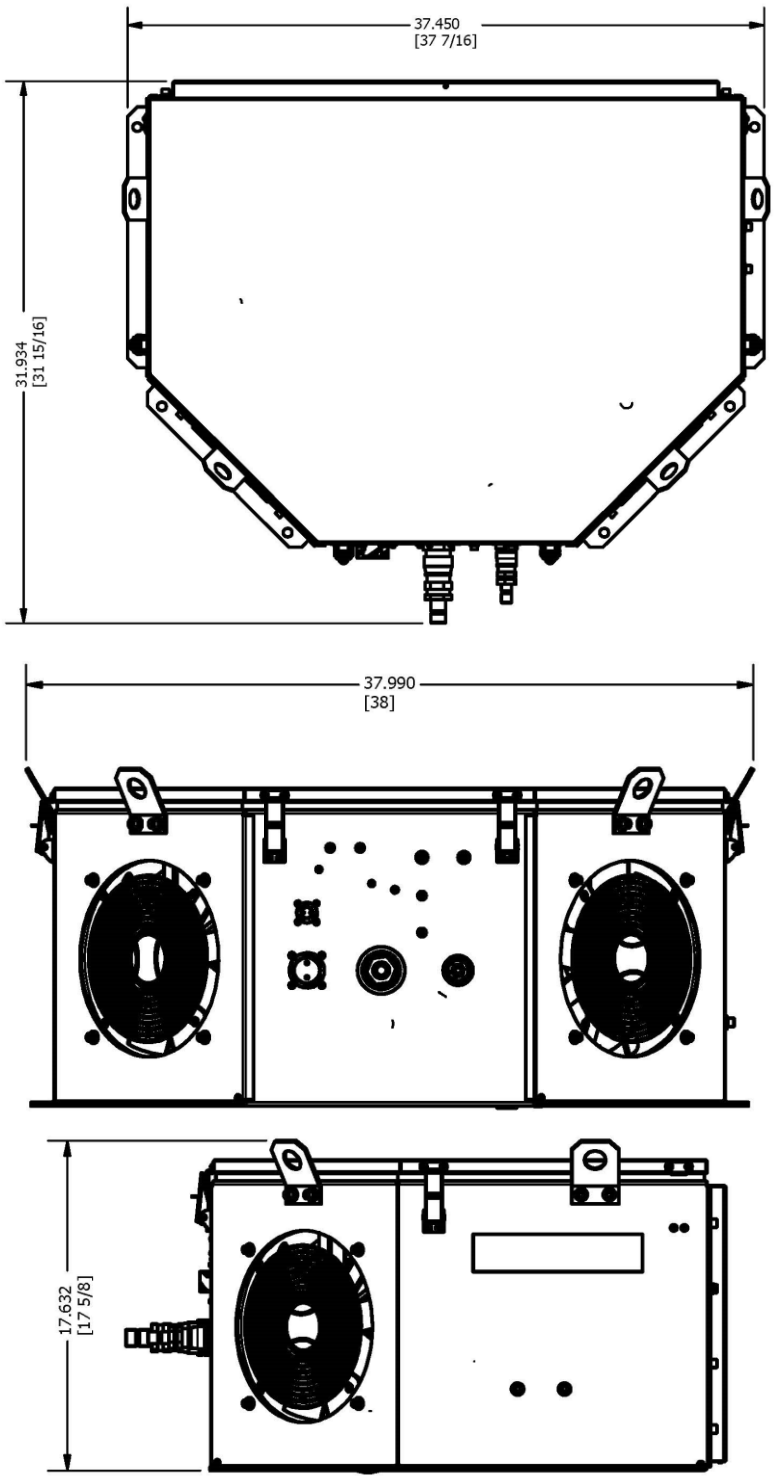
- A main power cable connects the HCRC to the starter batteries providing 24 VDC.
- A “clutch cable” connects the HCRC to the cab HVAC control system. This signal wire turns the HCRC on/off.



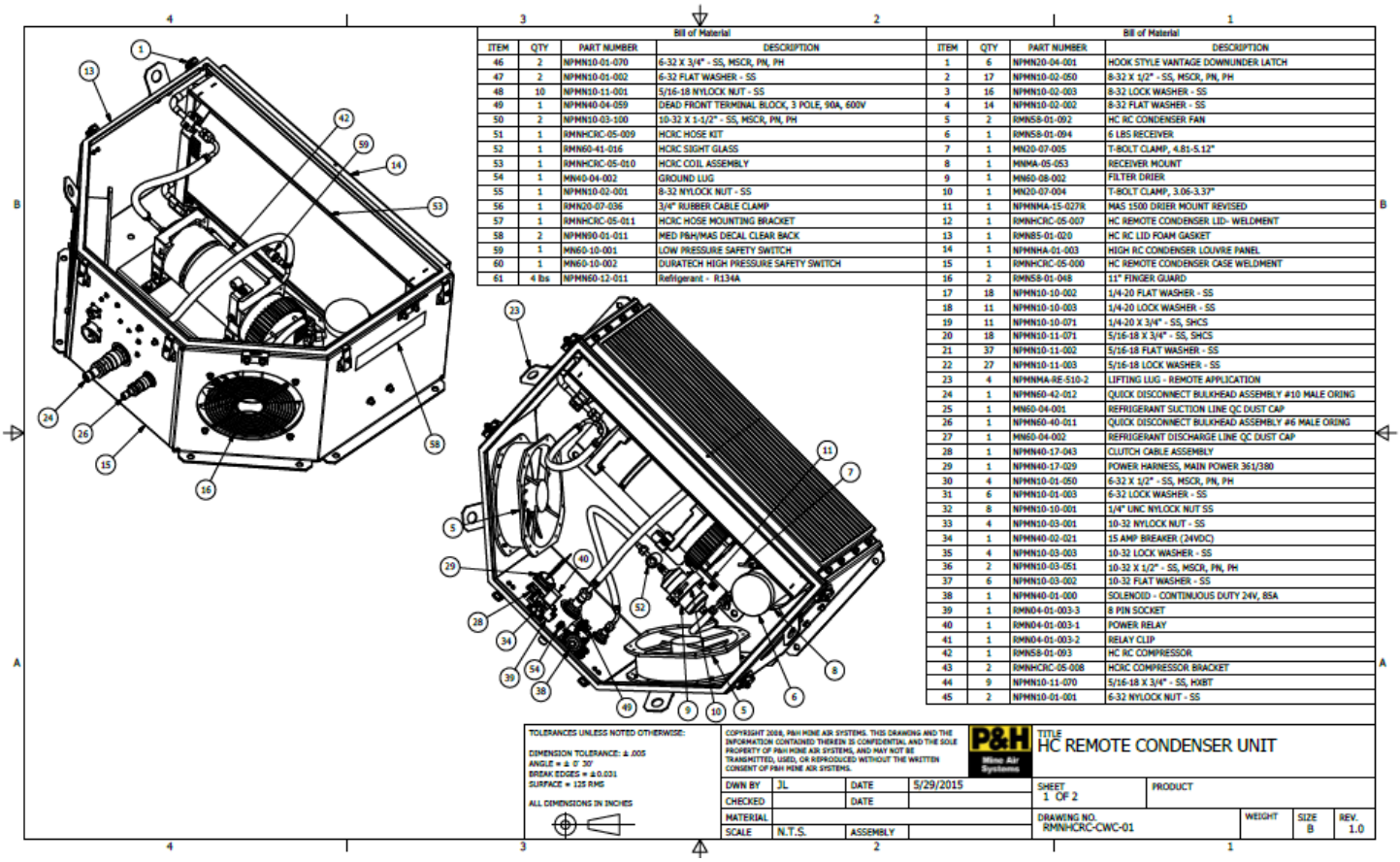
2.4 Installation Kits

- Various installation kits are available depending on installation. Contact your Mine Air Systems representative for further details.

3.0 HCRC Dimensions



4.0 Unit Assembly and Parts List



Bill of Material

ITEM	QTY	PART NUMBER	DESCRIPTION
46	2	NPMN10-01-070	6-32 X 3/4" - SS, MSCR, PN, PH
47	2	NPMN10-01-002	6-32 FLAT WASHER - SS
48	10	NPMN10-11-001	5/16-18 NYLOCK NUT - SS
49	1	NPMN40-04-059	DEAD FRONT TERMINAL BLOCK, 3 POLE, 90A, 600V
50	2	NPMN10-03-100	10-32 X 1-1/2" - SS, MSCR, PN, PH
51	1	RMNHCRC-05-009	HCRC HOSE KIT
52	1	RMN60-41-016	HCRC SIGHT GLASS
53	1	RMNHCRC-05-010	HCRC COIL ASSEMBLY
54	1	MN40-04-002	GROUND LUG
55	1	NPMN10-02-001	8-32 NYLOCK NUT - SS
56	1	RMN20-07-036	3/4" RUBBER CABLE CLAMP
57	1	RMNHCRC-05-011	HCRC HOSE MOUNTING BRACKET
58	2	NPMN90-01-011	MED P&H/MAS DECAL CLEAR BACK
59	1	MN60-10-001	LOW PRESSURE SAFETY SWITCH
60	1	MN60-10-002	DURATECH HIGH PRESSURE SAFETY SWITCH
61	4 lbs	NPMN60-12-011	Refrigerant - R134A

Bill of Material

ITEM	QTY	PART NUMBER	DESCRIPTION
1	6	NPMN20-04-001	HOOK STYLE VANTAGE DOWNUNDER LATCH
2	17	NPMN10-02-050	8-32 X 1/2" - SS, MSCR, PN, PH
3	16	NPMN10-02-003	8-32 LOCK WASHER - SS
4	14	NPMN10-02-002	8-32 FLAT WASHER - SS
5	2	RMNS8-01-092	HC RC CONDENSER FAN
6	1	RMNS8-01-094	6 LBS RECEIVER
7	1	MN20-07-005	T-BOLT CLAMP, 4.81-5.12"
8	1	MNMA-05-053	RECEIVER MOUNT
9	1	MN60-08-002	FILTER DRIER
10	1	MN20-07-004	T-BOLT CLAMP, 3.06-3.37"
11	1	NPMNMA-15-027R	MAS 1500 DRIER MOUNT REVISED
12	1	RMNHCRC-05-007	HC REMOTE CONDENSER LID- WELDMENT
13	1	RMNBS-01-020	HC RC LID FOAM GASKET
14	1	NPMNHA-01-003	HIGH RC CONDENSER LOUVRE PANEL
15	1	RMNHCRC-05-000	HC REMOTE CONDENSER CASE WELDMENT
16	2	RMNS8-01-048	11" FINGER GUARD
17	18	NPMN10-10-002	1/4-20 FLAT WASHER - SS
18	11	NPMN10-10-003	1/4-20 LOCK WASHER - SS
19	11	NPMN10-10-071	1/4-20 X 3/4" - SS, SHCS
20	18	NPMN10-11-071	5/16-18 X 3/4" - SS, SHCS
21	37	NPMN10-11-002	5/16-18 FLAT WASHER - SS
22	27	NPMN10-11-003	5/16-18 LOCK WASHER - SS
23	4	NPMNMA-RE-510-2	LIFTING LUG - REMOTE APPLICATION
24	1	NPMN60-42-012	QUICK DISCONNECT BULKHEAD ASSEMBLY #10 MALE ORING
25	1	MN60-04-001	REFRIGERANT SUCTION LINE QC DUST CAP
26	1	NPMN60-40-011	QUICK DISCONNECT BULKHEAD ASSEMBLY #6 MALE ORING
27	1	MN60-04-002	REFRIGERANT DISCHARGE LINE QC DUST CAP
28	1	NPMN40-17-043	CLUTCH CABLE ASSEMBLY
29	1	NPMN40-17-029	POWER HARNESS, MAIN POWER 361/380
30	4	NPMN10-01-050	6-32 X 1/2" - SS, MSCR, PN, PH
31	6	NPMN10-01-003	6-32 LOCK WASHER - SS
32	8	NPMN10-10-001	1/4" UNC NYLOCK NUT SS
33	4	NPMN10-03-001	10-32 NYLOCK NUT - SS
34	1	NPMN40-02-021	15 AMP BREAKER (24VDC)
35	4	NPMN10-03-003	10-32 LOCK WASHER - SS
36	2	NPMN10-03-051	10-32 X 1/2" - SS, MSCR, PN, PH
37	6	NPMN10-03-002	10-32 FLAT WASHER - SS
38	1	NPMN40-01-000	SOLENOID - CONTINUOUS DUTY 24V, 85A
39	1	RMN04-01-003-3	8 PIN SOCKET
40	1	RMN04-01-003-1	POWER RELAY
41	1	RMN04-01-003-2	RELAY CLIP
42	1	RMNS8-01-093	HC RC COMPRESSOR
43	2	RMNHCRC-05-008	HCRC COMPRESSOR BRACKET
44	9	NPMN10-11-070	5/16-18 X 3/4" - SS, HXBT
45	2	NPMN10-01-001	6-32 NYLOCK NUT - SS

TOLERANCES UNLESS NOTED OTHERWISE:
DIMENSION TOLERANCE: ± .005
ANGLE = ± 0° 30'
BREAK EDGES = ±0.031
SURFACE = 125 RMS
ALL DIMENSIONS IN INCHES

DWN BY	JL	DATE	5/29/2015
CHECKED		DATE	
MATERIAL			
SCALE	N.T.S.	ASSEMBLY	

TITLE: HC REMOTE CONDENSER UNIT

SHEET 1 OF 2 | PRODUCT

DRAWING NO. RMNHCRC-CWC-01 | WEIGHT | SIZE B | REV. 1.0

ITEM	QTY	PART NUMBER	DESCRIPTION
1	6	NPMN20-04-001	HOOK STYLE VANTAGE DOWNUNDER LATCH
2	17	NPMN10-02-050	8-32 X 1/2" - SS, MSCR, PN, PH
3	16	NPMN10-02-003	8-32 LOCK WASHER - SS
4	14	NPMN10-02-002	8-32 FLAT WASHER - SS
5	2	RMN58-01-092	HC RC CONDENSER FAN
6	1	RMN58-01-094	6 LBS RECEIVER
7	1	MN20-07-005	T-BOLT CLAMP, 4.81-5.12"
8	1	MNMA-05-053	RECEIVER MOUNT
9	1	MN60-08-002	FILTER DRIER
10	1	MN20-07-004	T-BOLT CLAMP, 3.06-3.37"
11	1	NPMNMA-15-027R	MAS 1500 DRIER MOUNT REVISED
12	1	RMNHCRC-05-007	HC REMOTE CONDENSER LID- WELDMENT
13	1	RMN85-01-020	HC RC LID FOAM GASKET
14	1	NPMNHA-01-003	HIGH RC CONDENSER LOUVRE PANEL
15	1	RMNHCRC-05-000	HC REMOTE CONDENSER CASE WELDMENT
16	2	RMN58-01-048	11" FINGER GUARD
17	18	NPMN10-10-002	1/4-20 FLAT WASHER - SS
18	11	NPMN10-10-003	1/4-20 LOCK WASHER - SS
19	11	NPMN10-10-071	1/4-20 X 3/4" - SS, SHCS
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25	1	MN60-04-001	REFRIGERANT SUCTION LINE QC DUST CAP
26	1	NPMN60-40-011	QUICK DISCONNECT BULKHEAD ASSEMBLY #6 MALE ORING
27	1	MN60-04-002	REFRIGERANT DISCHARGE LINE QC DUST CAP
28	1	NPMN40-17-043	CLUTCH CABLE ASSEMBLY
29	1	NPMN40-17-029	POWER HARNESS, MAIN POWER 361/380
30	4	NPMN10-01-050	6-32 X 1/2" - SS, MSCR, PN, PH
31	6	NPMN10-01-003	6-32 LOCK WASHER - SS

ITEM	QTY	PART NUMBER	DESCRIPTION
32	8	NPMN10-10-001	1/4" UNC NYLOCK NUT SS
33	4	NPMN10-03-001	10-32 NYLOCK NUT - SS
34	1	NPMN40-02-021	15 AMP BREAKER (24VDC)
35	4	NPMN10-03-003	10-32 LOCK WASHER - SS
36	2	NPMN10-03-051	10-32 X 1/2" - SS, MSCR, PN, PH
37	6	NPMN10-03-002	10-32 FLAT WASHER - SS
38	1	NPMN40-01-000	SOLENOID - CONTINUOUS DUTY 24V, 85A
39	1	RMN04-01-003-3	8 PIN SOCKET
40	1	RMN04-01-003-1	POWER RELAY
41	1	RMN04-01-003-2	RELAY CLIP
42	1	RMN58-01-093	HC RC COMPRESSOR
43	2	RMNHCRC-05-008	HCRC COMPRESSOR BRACKET
44	9	NPMN10-11-070	5/16-18 X 3/4" - SS, HXBT
45	2	NPMN10-01-001	6-32 NYLOCK NUT - SS
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60	1	MN60-10-002	DURATECH HIGH PRESSURE SAFETY SWITCH
61	4 lbs	NPMN60-12-011	Refrigerant - R134A

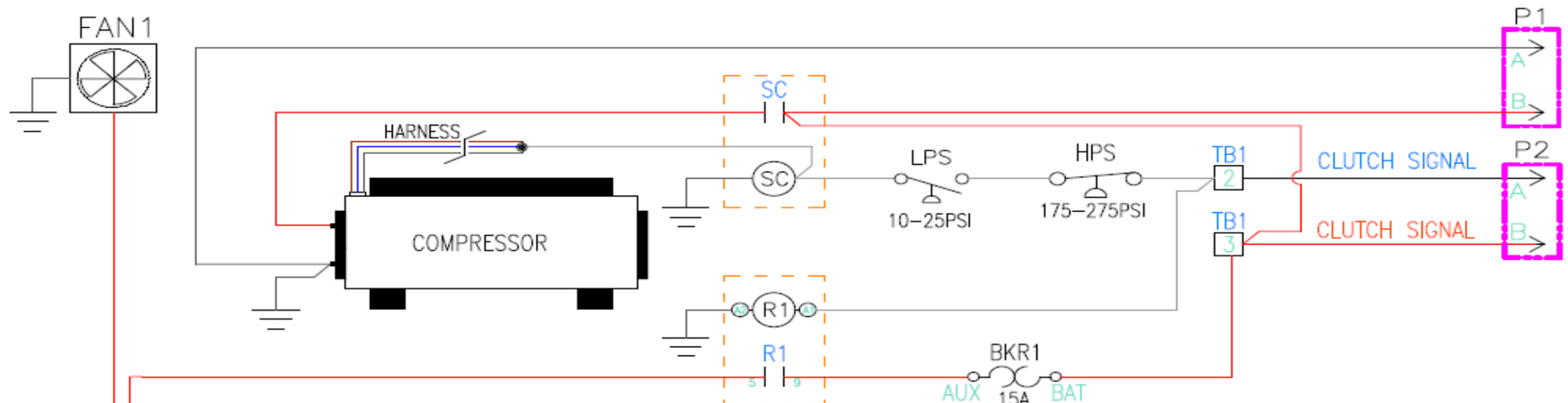
5.0 Unit Schematic

LEGEND:

LPS	LOW PRESSURE SWITCH
HPS	HIGH PRESSURE SWITCH
SC	SOLENOID
BKR1	15A BREAKER
TB1	TERMINAL BLOCK
P1	POWER HARNESS
P2	CLUTCH CABLE ASSEMBLY
R1	DPDT POWER RELAY 24VDC
FAN1,FAN2	CONDENSER FAN
COMPRESSOR	24VDC COMPRESSOR

BILL OF MATERIALS

PART NUMBER	QTY	DESCRIPTION
MN60-10-001	1	LOW PRESSURE SWITCH
MN60-10-002	1	HIGH PRESSURE SWITCH
NPMN40-01-000	1	SOLENOIDE, CONTINOUS DUTY 24C, 85A
NPMN40-02-021	1	15A BREAKER (24VDC)
NPMN40-04-059	1	TERMINAL BLOCK
NPMN40-17-029	1	MAIN POWER HARNESS
NPMN40-17-043	1	CLUTCH CABLE ASSEMBLY
RMN04-01-003	1	DPDT POWER RELAY 24VDC
RMN58-01-092	2	HC RC CONDENSER FAN
RMN58-01-093	1	HC RC COMPRESSOR



NOTE: COMPRESSOR HARNESS WIRE DETAILS CONNECTION:
BROWN, BLUE AND BLACK TOGETHER
ORANGE NOT USE.

DRAWN BY	NH	TITLE: HC REMOTE CONDENSER UNIT WIRING DIAGRAM	
CHECKED		SHEET 1 OF 1	PRODUCT: HC REMOTE COND. UNIT
DATE	07–09–2015	DRAWING NO. ES–RMNHCRC–CWC–01	SIZE A / REV. 1.0
SCALE	NO SCALE		

6.0 Recommended Spare Parts List

PART NO.	QTY/UNIT	DESCRIPTION
RMN58-01-092	2	HCRC CONDENSER FAN
RMN85-01-020	1	HCRC LID FOAM GASKET
NPMNHA-01-003	1	HIGH RC CONDENSER LOUVER PANEL
RMN58-01-048	2	11” FINGER GUARD
NPMN40-01-000	1	SOLENOID CONTINUOUS DUTY 24V 85A
RMN04-01-003-2	1	RELAY CLIP
RMN04-01-003-1	1	POWER RELAY
RMN58-01-093	1	HCRC COMPRESSOR
NPMN20-04-001	1	HOOK STYLE VANTAGE DOWNUNDER LATCH
RMNHCRC-05-007	1	HC REMOTE CONDENSER LID WELDMENT

7.0 Recommended Maintenance Procedure

To be completed every 3 months or every PM (whichever comes first)

- Lockout/tagout the machine according to mine procedures.
- Install refrigerant gauges on the hose fittings.
- Check and record the standing pressure. Compare this with a Pressure Temperature Chart for R134A. The pressure should match the ambient temperature/refrigerant relationship.
- Blow out dust from condenser coil and unit case.
- Inspect and replace the evaporator filter if necessary.
- Test the cab HVAC controller to ensure the HCRC turns on when required and that all fan speeds and thermostat are working correctly.
- Tighten electrical connections.
- Ensure condenser fans are both working.
- Soap all test refrigeration fittings.
- Tighten refrigerant fittings 18-25 ft/lbs max.
- Visually inspect the HCRC hoses and fittings for signs of refrigerant oil.
- Remove locks and run test the HCRC.
- Remove the lid while the HCRC is operating. View receiver sight glass immediately to make sure it is clear. Vapor bubbles indicate a shortage of refrigerant. If the lid is left off for too long, the sight glass will show vapor bubbles due to a lack of condensing.
- With the HCRC operating, confirm a heat transfer is taking place. Feel the suction line going into the HCRC, it should be cold. Feel the liquid line leaving the HCRC, it should be warm.
- With the HCRC operating, check the current draw on the main power cable. It should be anywhere from 40-60 amps DC depending on the outside ambient temperature.
- Check and record the low and high side refrigerant pressures while the HCRC is operating. Remember that the pressures vary with the ambient temperature and load inside the cab.

8.0 Troubleshooting

PROBLEM:	POSSIBLE CAUSE:
▪ **Low or high pressure switch Open**	▪ Low system pressure ▪ High system pressure ▪ Faulty switch
▪ **Low system pressure**	▪ Low refrigerant charge ▪ Restriction in the drier, metering device or quick disconnect. ▪ Dirty evaporator filter ▪ Frozen evaporator
▪ **High system pressure**	▪ Refrigerant overcharge ▪ Condenser coil dirty ▪ Condenser fans not working ▪ Non condensables in system
▪ **Restriction in the drier or metering device**	▪ Moisture in the system do to improper evacuation. Evacuate to 500 microns or less ▪ Dirt or debris in the refrigeration system
▪ **Condenser fans not working**	▪ Faulty fan ▪ Faulty fan relay ▪ Faulty fan breaker ▪ No clutch or main power
▪ **Non condensables in system**	▪ Air or nitrogen in the system due to improper evacuation. Evacuate to 500 microns or less
▪ **HCRC is running but it does not cool**	▪ Dirty evaporator or condenser coil ▪ Frozen evaporator ▪ Faulty evaporator fans ▪ Refrigerant overcharge ▪ Refrigerant undercharge ▪ Faulty TXV Valve ▪ Very high outdoor ambient temperature ▪ Compressor scroll not seating properly. High suction pressure and low discharge pressure ▪ Non condensables in system
▪ **High suction and high discharge pressure**	▪ TX Valve wide open do to dirt or debris in valve seat ▪ Refrigerant overcharge ▪ Very high outdoor ambient temperature ▪ Non condensables in the system ▪ Recirculation of condenser air
▪ **High suction and low discharge pressure**	▪ Compressor scroll not seating properly and compressor will not pump
▪ **Low suction and low discharge pressure**	▪ Restricted metering device ▪ Restricted drier ▪ Low refrigerant charge ▪ Faulty evaporator fans ▪ Evaporator coil frozen ▪ Faulty freeze stat ▪ Restricted fresh air filter ▪ Low load on system

9.0 Unit Specifications

System Capacity

Cooling: 15,250 BTUH @ 95F

System Specifications

Type: R-134A

Charge: 4LBS*

Test Pressure: 250PSI

Oil Type: POE**

Oil Charge: 4.4oz

Weight: 175LBS

Electrical Specifications

Volts: 24V DC

Max Circuit: 65AMPS

Full system refrigerant charge will depend on the equipment the HCRC is coupled with

IT IS VITALLY IMPORTANT THAT ONLY POE OIL IS USED WITHIN ANY SYSTEM THIS VERSION OF REMOTE CONDENSER IS COUPLED TO. USING ANYTHING OTHER THAN THIS CAN RESULT IN EARLY COMPRESSOR FAILURE