



Air Conditioning and Heating

Section 05-04

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Scope of This Publication

This publication contains general and specific safety precautions to be followed when working on the AC unit. The operator and maintenance personnel should read these safety precautions carefully and understand them before operating or performing maintenance operations to the machine.

Safety

This publication contains special instructions that pertain to safety, operation, maintenance, and repair of the machine. Listed below are the signal words and symbols that precede these instructions and their meanings:


DANGER

- The danger label indicates a hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

- The warning label indicates a hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

- The caution label, used with the safety alert symbol indicates a hazardous situation which, if not avoided, could result in minor or moderate injury (includes the safety alert symbol ).

CAUTION

- The caution label (without safety alert symbol) is used to address practices not related to personal injury, only equipment damage.

NOTICE

The NOTICE graphic is to indicate areas of importance to the reader that are not related to personal injury or machine damage.

Safety, Warnings, and Cautions

WARNING

MULTIPLE HAZARDS

- Multiple hazards exist when working on a running machine. Special conditions and considerations must be made locally to determine the best procedure for working on this system while the machine is running. Rotating equipment, hot components, moving components, machine movement, as well as other hazards exist when working on a running machine, which could cause serious injury or death.

CRUSH HAZARD

- Crush hazard exists if the frame lock is not locked to prevent machine articulation while personnel are in the machine articulation area. Do not enter this area unless you have verified that the operator has control over the steering and that you have good communication with the operator. Crush hazard is possible if personnel are in this area while the machine is articulated, which could result in serious injury or death.
- Crush hazard exists by the lift arms or bucket if all personnel are not cleared from the bucket and lift arm area before using the hydraulic hoist and bucket pilot pressure bleed down valves to relieve pressure from the hoist and bucket pilot circuit. Clear all personnel from the area around the bucket and lift arms before operating hydraulic hoist and bucket pilot pressure bleed down valves. Using the hydraulic bleed down valves could result in some movement of the lift arms and bucket which could cause injury or death.

CRUSH, SHOCK, OR OTHER HAZARDS

- Crush, shock, or other hazards exist if stored energy is not removed or isolated prior to working on the machine. Stored energy (hydraulic, electrical, pneumatic, mechanical, etc.) may be present if not isolated or released prior to working on the machine. Do not work on the machine without removing this stored energy (suspended loads, electrical power, air pressure, etc.). Risk of crushing, shock, or other physical injury exists if stored energy is not removed or isolated prior to working on the machine which could result in serious injury or death.

ADDITIONAL HAZARDS**EXPLOSION HAZARD**

- All containers with refrigerant are under pressure (to contain the refrigerant). Any heat will increase that pressure. The containers are not designed to withstand excessive heat even when empty, and should never be exposed to high heat or flame, because they can explode. Containers must be certified as meeting DOT CFR Title 49 requirements.

CHEMICAL EXPOSURE

- Anti-freeze is a petroleum based liquid that can irritate the eyes and the skin. Use care in handling anti-freeze. Wear appropriate personal protective equipment (PPE) to avoid chemical exposure from antifreeze. Antifreeze is also toxic if ingested. Do not ingest. Failure to wear appropriate PPE can cause a chemical exposure hazard resulting in injury. .

FIRE HAZARD/EXPLOSION

- Fire and explosion hazards exist under certain conditions with R-134a. A combustible mixture can form when air pressures are above atmospheric pressure and a mixture of air and R-134a exist. Do not pressure test air conditioning systems with compressed air. Do not use an open flame around the ac system when it is being worked on or repaired.

INHALATION HAZARD

- Inhalation hazards exist when working with refrigerants. Always provide plenty of ventilation when working with refrigerants. Avoid breathing refrigerant vapor or lubricant mist. Failure to provide proper ventilation and cause inhalation hazards resulting in serious injury or death.

**CAUTION****BURN HAZARDS**

- Burn hazards exist when working on the AC system. High pressure side components, fittings, and high pressure lines and hoses can be hot enough to burn the skin if they are touched during operation. This includes the compressor, clutch, hoses, condenser, receiver-drier, and any control devices or metal tubing. Always wear proper personal protective equipment (PPE). The low pressure side will be cool to the touch. When the AC system is under load, high side

pressures normally range between 150 and 250 pounds per square inch for R-12 and higher for other refrigerants. Failure to avoid touching components under high pressure can cause burn hazards resulting in injury.

CUTS AND ABRASION HAZARDS

- Cut and abrasion hazards exist when working with ac condensers or evaporators. Always wear work gloves when working with condensers or evaporators. The aluminum edges can be sharp and cause serious cuts. Failure to wear gloves can cause cuts and abrasions resulting in injury.

NOTICE

ENVIRONMENTAL HAZARDS

- The air conditioning and heating unit have engine coolant circulated during the heating mode. Use caution to avoid spilling antifreeze into the environment when working on the system. An environmental spill is possible when working on the system.
- Do not vent the compressed gas R-134a into the environment. It shall be captured by using appropriate equipment when the need to evacuate the system occurs.

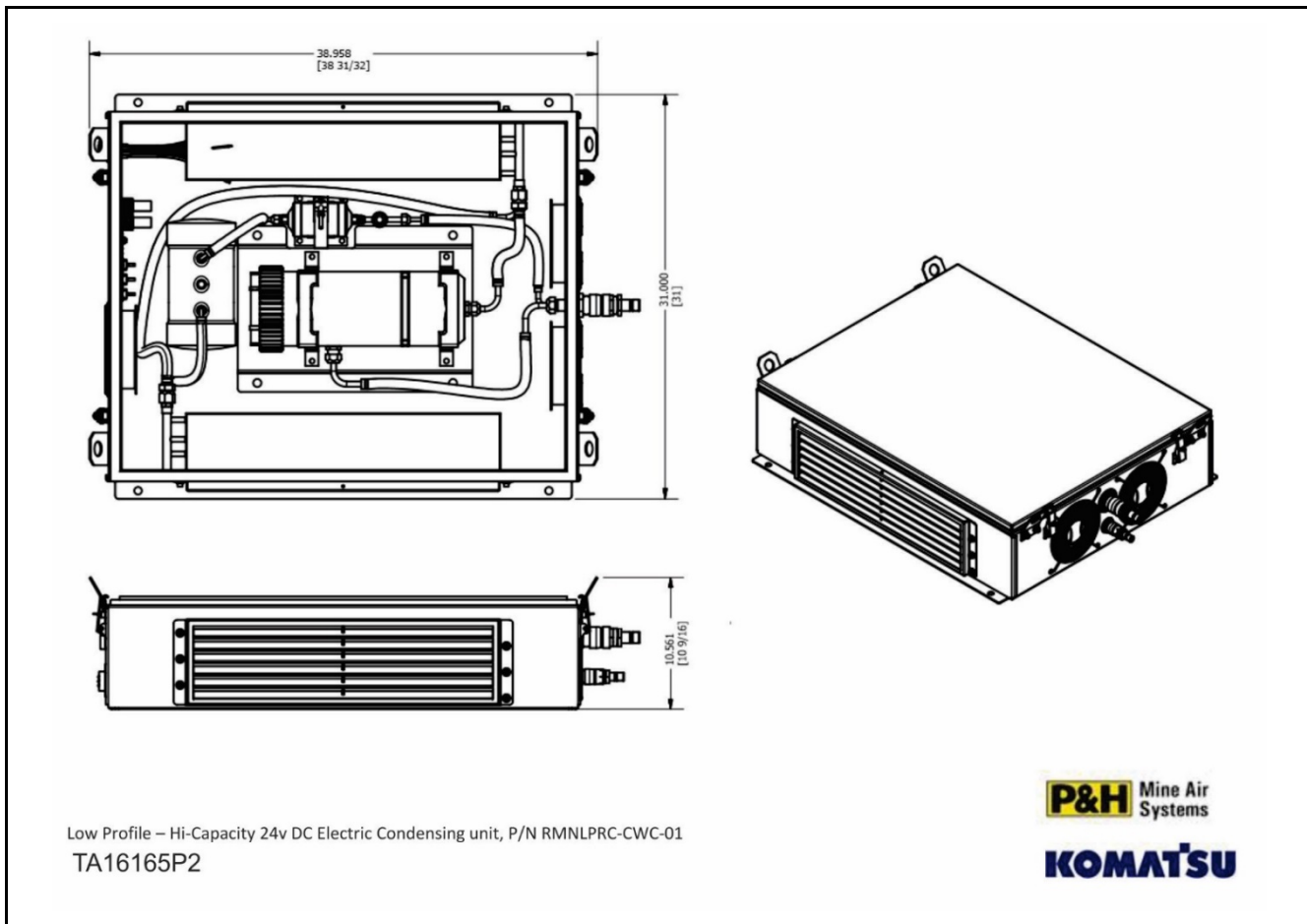


Figure 1. Mine Air (MAS) LPRC

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Circuit Descriptions (Mine Air)

Unit Specifications Low Profile Remote Condenser (LPRC) (Mine Air)

CAUTION

****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.**

System Capacity

- Cooling: 15,250 BTUH @ 95F (35C)

System Specifications

- Type: R-134A
- Charge: 6.5 lbs (2.95 kg)
- Test Pressure: 250PSI (17.24 bar)
- Oil Type: POE**
- Oil Charge: 4.4oz (135.1235 ml)

Electrical Specifications

- Volts: 24V DC
- Max Circuit: 80 Amps



Figure 2. Air conditioner unit location (typical)

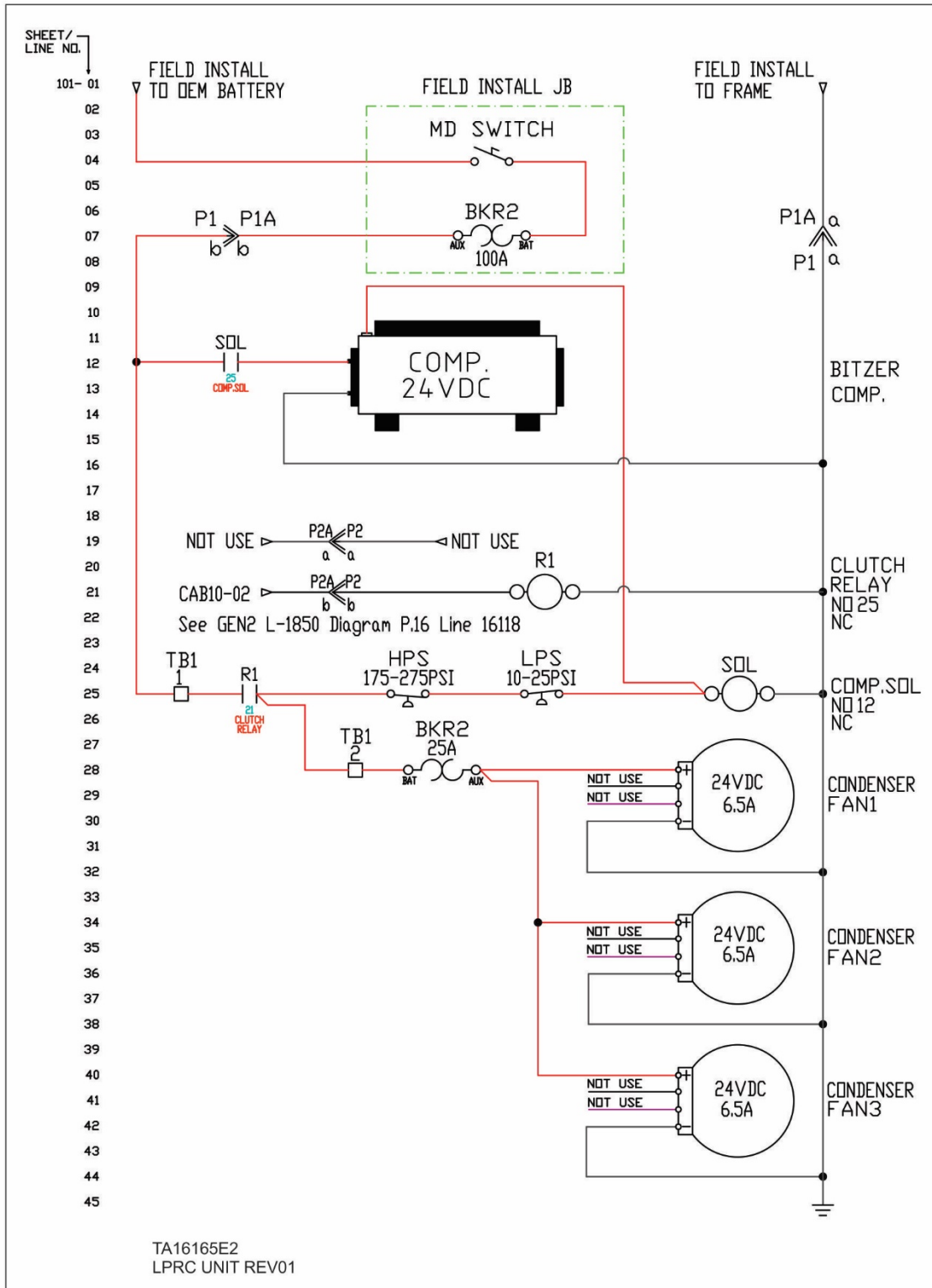


Figure 3. Air conditioning schematic LPRC (typical) 1 of 3

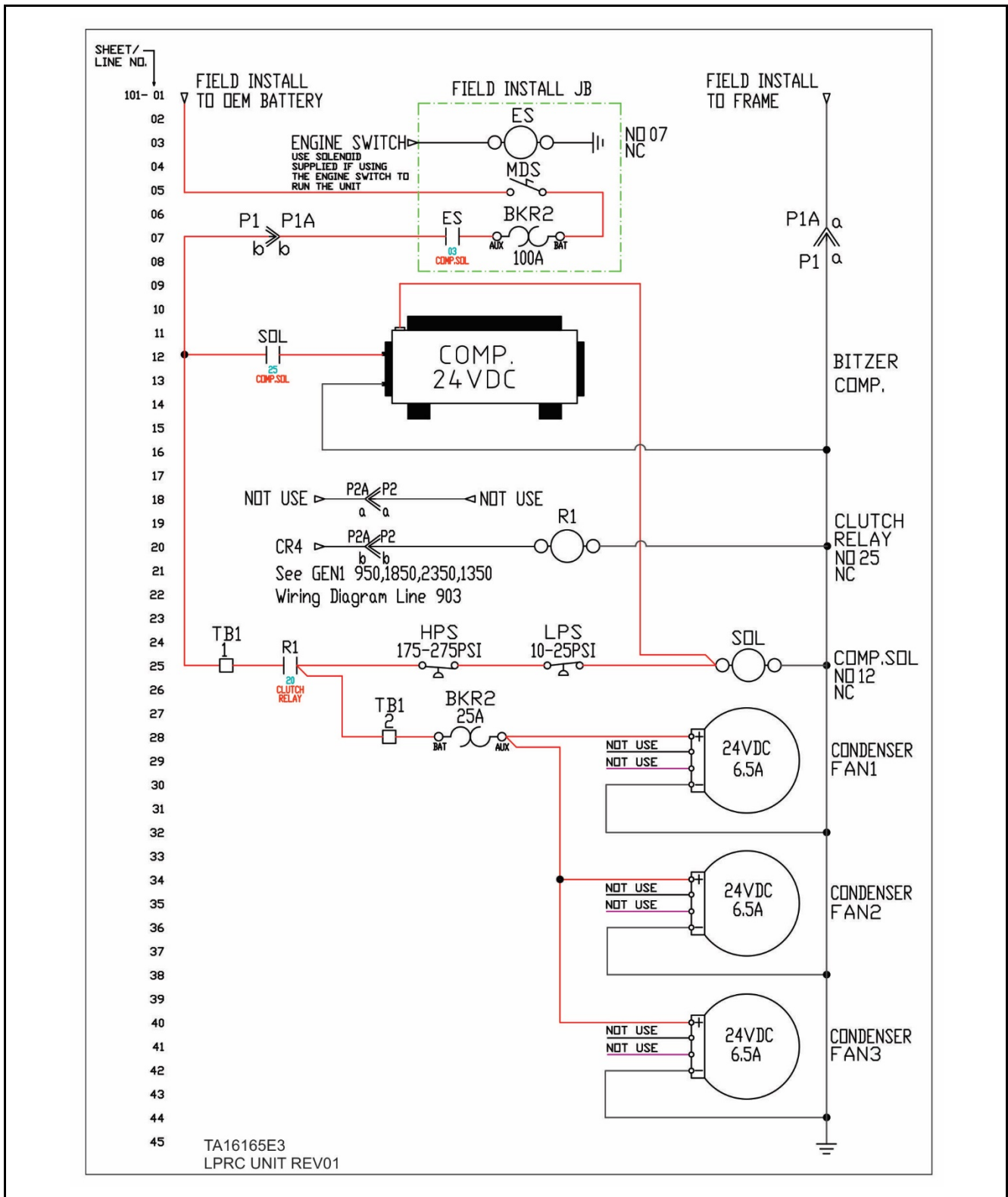


Figure 4. Air conditioning schematic (typical) 2 of 3

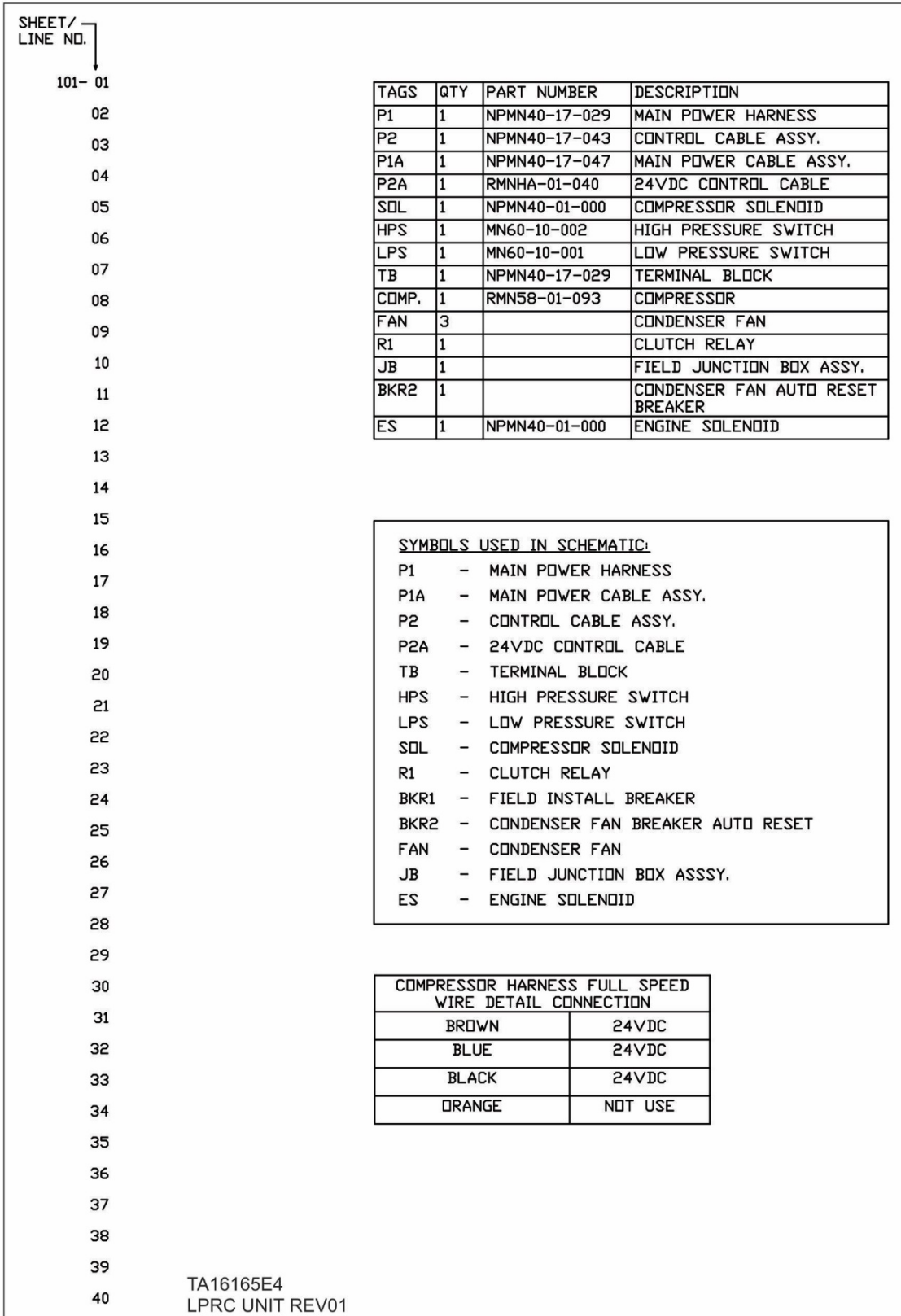


Figure 5. Air conditioning schematic (typical) 3 of 3

Settings and Adjustments (Mine Air)

Charge Type and Amount (Mine Air)

Refrigerant	Pounds (lbs) to charge	Grams (g) to charge
R-134A	6.5	2948.35

Table 1. Refrigerant and charge amount

Recommended Maintenance Procedure (Mine Air)

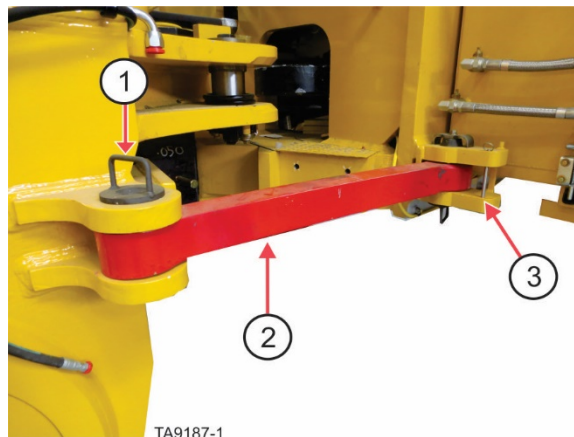
To be completed every 3 months or every 500 hour PM (whichever comes first)

- a. Stop the wheel loader on flat level ground.

WARNING

Crush hazard exists if the frame lock is not locked to prevent machine articulation while personnel are in the machine articulation area. Do not enter this area unless you have verified that the operator has control over the steering and that you have good communication with the operator. Crush hazard is possible if personnel are in this area while the machine is articulated, which could result in serious injury or death.

- b. Move the frame lock to the locked position so that the frame cannot be steered.



- 1) Retaining pin for locked position, 2) Frame lock – shown in locked position, 3) Retaining pin bracket for un-locked position

Figure 6. Frame Lock Shown in locked position

- c. Set bucket flat and level on the ground.
- d. Place wheel chocks in front and behind each wheel.
 - Chocking against motion must be done using chocks rated for the equipment being chocked. Heavy mobile equipment must be chocked with appropriate chocks. Factors such as machine weight, size, wheel diameter, ground grade and others must be considered when selecting chocks
- e. Set the parking brakes.

⚠ WARNING

Crush, shock, or other hazards exist if stored energy is not removed or isolated prior to working on the machine. Stored energy (hydraulic, electrical, pneumatic, mechanical, etc.) may be present if not isolated or released prior to working on the machine. Do not work on the machine without removing this stored energy (suspended loads, electrical power, air pressure, etc.). Risk of crushing, shock, or other physical injury exists if stored energy is not removed or isolated prior to working on the machine which could result in serious injury or death.

- f. Shut off the engine.
- g. Turn the engine isolation switch to the off position and install locks on the isolation switch. Lock out the machine's starting capability before performing any cleaning, inspections, or installation and repair procedure.

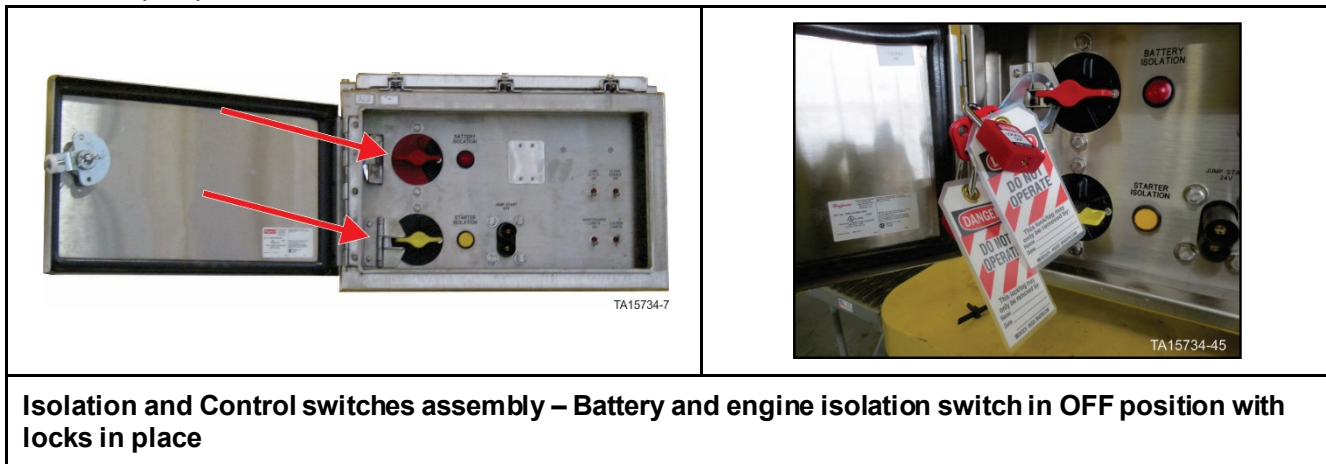


Figure 7. Isolation and control switches assembly

⚠ WARNING

Crush hazard exists by the lift arms or bucket if all personnel are not cleared from the bucket and lift arm area before using the hydraulic hoist and bucket pilot pressure bleed down valves to relieve pressure from the hoist and bucket pilot circuit. Clear all personnel from the area around the bucket and lift arms before operating hydraulic hoist and bucket pilot pressure bleed down valves. Using the hydraulic bleed down valves could result in some movement of the lift arms and bucket which could cause injury or death.

- h. Use the hydraulic hoist and bucket pressure bleed down valves located in the front frame underneath the Husco valves to bleed any stored pressure in the hoist and bucket circuit.
- Turn each valve slowly counterclockwise as shown below and allow the pressure to bleed down.
 - Open the valve completely and leave it open during repairs.

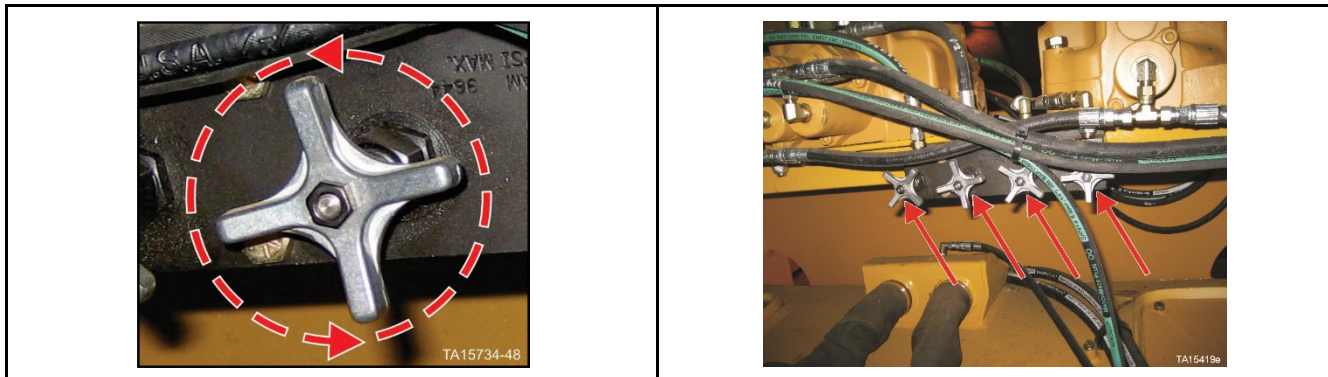


Figure 8. Hydraulic oil hoist and bucket bleed valve assembly valves

- i. Install refrigerant gauges on the hose fittings.
- j. Check and record the standing pressure. Compare this with a Pressure Temperature Chart for R134A. The pressure should match the ambient temperature/refrigerant relationship.
- k. Blow out dust from condenser coil and unit case.
- l. Check the lid gasket. It should be pliable and properly sealed against the lip.
- m. Tighten electrical connections.
- n. Ensure condenser fans are both working.
- o. Soap all test refrigeration fittings.
- p. Tighten refrigerant fittings 18-25 ft/lbs (24.4-33.9 N•m) max.
- q. Visually inspect the LPRC hoses and fittings for signs of refrigerant oil.
- r. Remove the lid while the LPRC is operating. Remove the sight glass cover and view the receiver sight glass immediately, to ensure 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.

NOTICE

Do not operate the unit with the top removed during normal operation. Due to the lack of air flow through the coils, condensing will not occur properly. Always make sure the lid gasket seal is properly sealed during operation. The gasket should be pliable and conform to the shape of the sealing lip.

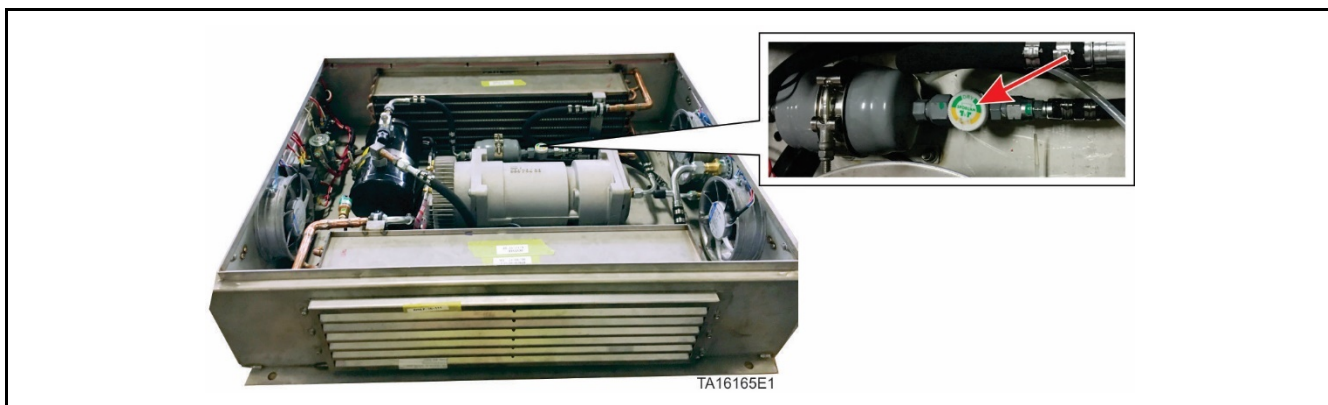


Figure 9. Sight glass

- s. With the LPRC operating, confirm a heat transfer is taking place. Feel the suction line going into the LPRC, it should be cold. Feel the liquid line leaving the LPRC, it should be warm.
- t. With the LPRC operating, check the current draw on the main power cable. It should be anywhere from 30-75 amps DC depending on the outside ambient temperature.
- u. Check and record the low and high side refrigerant pressures while the LPRC is operating.
 - The pressures vary with the ambient temperature and load inside the cab.
- v. Return the machine to operating condition by following all local lockout tagout procedures, which should include turning on the battery and engine isolation switches.

Climate Control Switches

Numbers in parentheses refer to “Climate control switches”. Refer to Vendor Literature for more information.

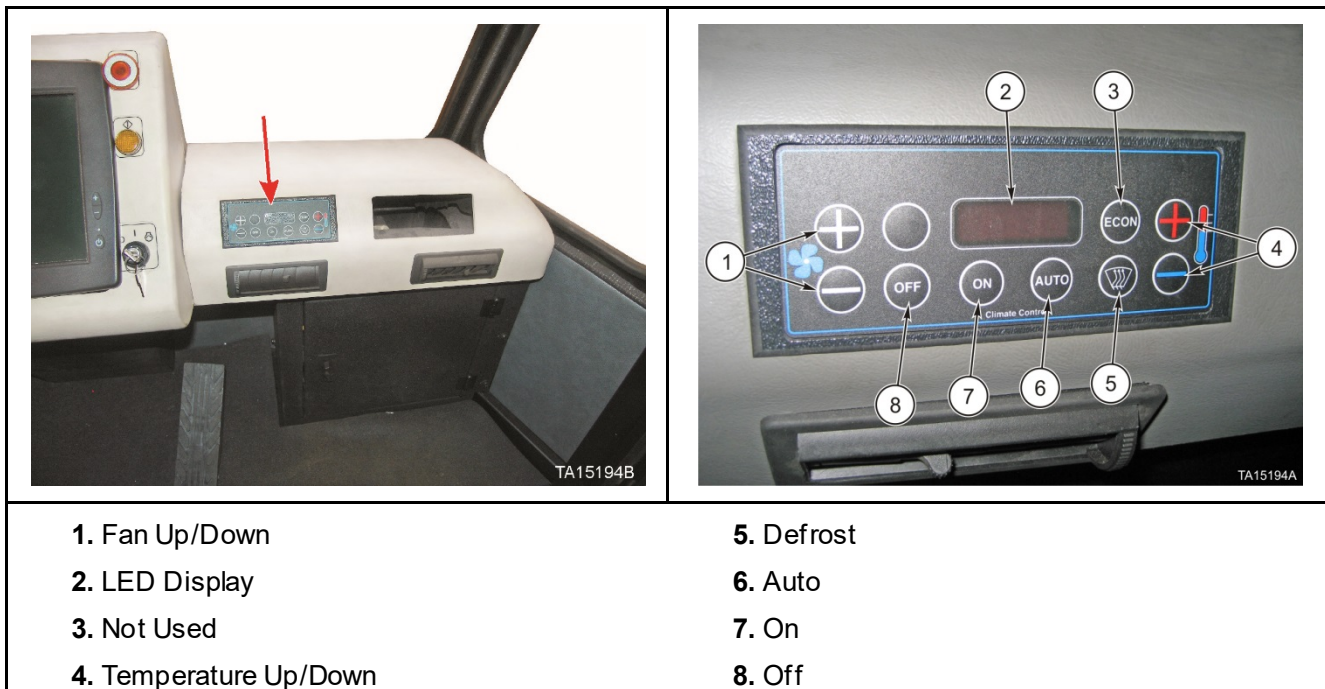


Figure 10. Climate control switches

FAN UP/DOWN (1) – Overrides the automatic fan speed control feature. Increments fan speed up or down in eleven (11) steps. The digital display indicates the fan speed setting as a percentage or “HI” when maximum fan speed is reached or “LO” when minimum fan speed is reached then returns to normal display five (5) seconds after either key is depressed. The set point fan speed is maintained until it is changed or if the AUTO key is depressed.

LED DISPLAY (2) – Displays error codes and other pertinent information.

NOT USED (3)

TEMPERATURE UP/DOWN (4) – Increments the set point temperature up or down. The system will control the electronic water valve and/or the A/C compressor clutch to hold the cab temperature as closely as possible to the set point temperature.

DEF (5) (Defrost icon) – Energizes the A/C system to allow for rapid de-humidification of the cab. The A/C will be enabled even if the set point temperature requires heat. A panel indicator light indicates when this mode is active.

AUTO (6) – Places the system in a fully automatic temperature control mode including fan speed. A panel indicator light indicates when this mode is active. The system will adjust the blower fan speed to the lowest setting necessary to maintain the cab temperature at the displayed set point temperature.

ON/OFF (7) (8) – Powers vehicle HVAC control system on or off. The LED numeric display is illuminated when the unit is turned on. The display will show the current set point temperature.

Special Key Functions

To display diagnostics, depress the ON key three (3) times. The digital display will then display any active fault codes. See Troubleshooting section of the vendor literature for fault code explanations.

To change the display from Fahrenheit to Celsius or back, depress the TEMPERATURE UP/DOWN (+, -) keys simultaneously.

Replacing the Control Panel

NOTICE

When the Automatic Temperature Control (ATC) panel for the unit is replaced, the system must be programmed. Refer to Vendor Information “VL 111C - ATC Instructions” for programming instructions.

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Troubleshooting (Mine Air)

PROBLEM:	POSSIBLE CAUSE:
<ul style="list-style-type: none"> ▪ Low or high pressure switch Open 	<ul style="list-style-type: none"> ▪ Low system pressure ▪ High system pressure ▪ Faulty switch
<ul style="list-style-type: none"> ▪ Low system pressure 	<ul style="list-style-type: none"> ▪ Low refrigerant charge ▪ Restriction in the drier, metering device or quick disconnect. ▪ Dirty evaporator filter ▪ Frozen evaporator
<ul style="list-style-type: none"> ▪ High system pressure 	<ul style="list-style-type: none"> ▪ Refrigerant overcharge ▪ Condenser coil dirty ▪ Condenser fans not working ▪ Non condensables in system ▪ Check the lid gasket for proper sealing.
<ul style="list-style-type: none"> ▪ Restriction in the drier or metering device 	<ul style="list-style-type: none"> ▪ Moisture in the system do to improper evacuation. Evacuate to 500 microns or less ▪ Dirt or debris in the refrigeration system
<ul style="list-style-type: none"> ▪ Condenser fans not working 	<ul style="list-style-type: none"> ▪ Faulty fan ▪ Faulty fan relay ▪ Faulty fan breaker ▪ No clutch or main power
<ul style="list-style-type: none"> ▪ Non condensables in system 	<ul style="list-style-type: none"> ▪ Air or nitrogen in the system due to improper evacuation. Evacuate to 500 microns or less
<ul style="list-style-type: none"> ▪ LPRC is running but it does not cool 	<ul style="list-style-type: none"> ▪ 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 ▪ Faulty heat valve is allowing engine coolant to flow through the heat coil while the A/C is on ▪ Check the lid gasket for proper sealing.
<ul style="list-style-type: none"> ▪ High suction and high discharge pressure 	<ul style="list-style-type: none"> ▪ 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
<ul style="list-style-type: none"> ▪ High suction and low discharge pressure 	<ul style="list-style-type: none"> ▪ Compressor scroll not seating properly and compressor will not pump
<ul style="list-style-type: none"> ▪ Low suction and low discharge pressure 	<ul style="list-style-type: none"> ▪ 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

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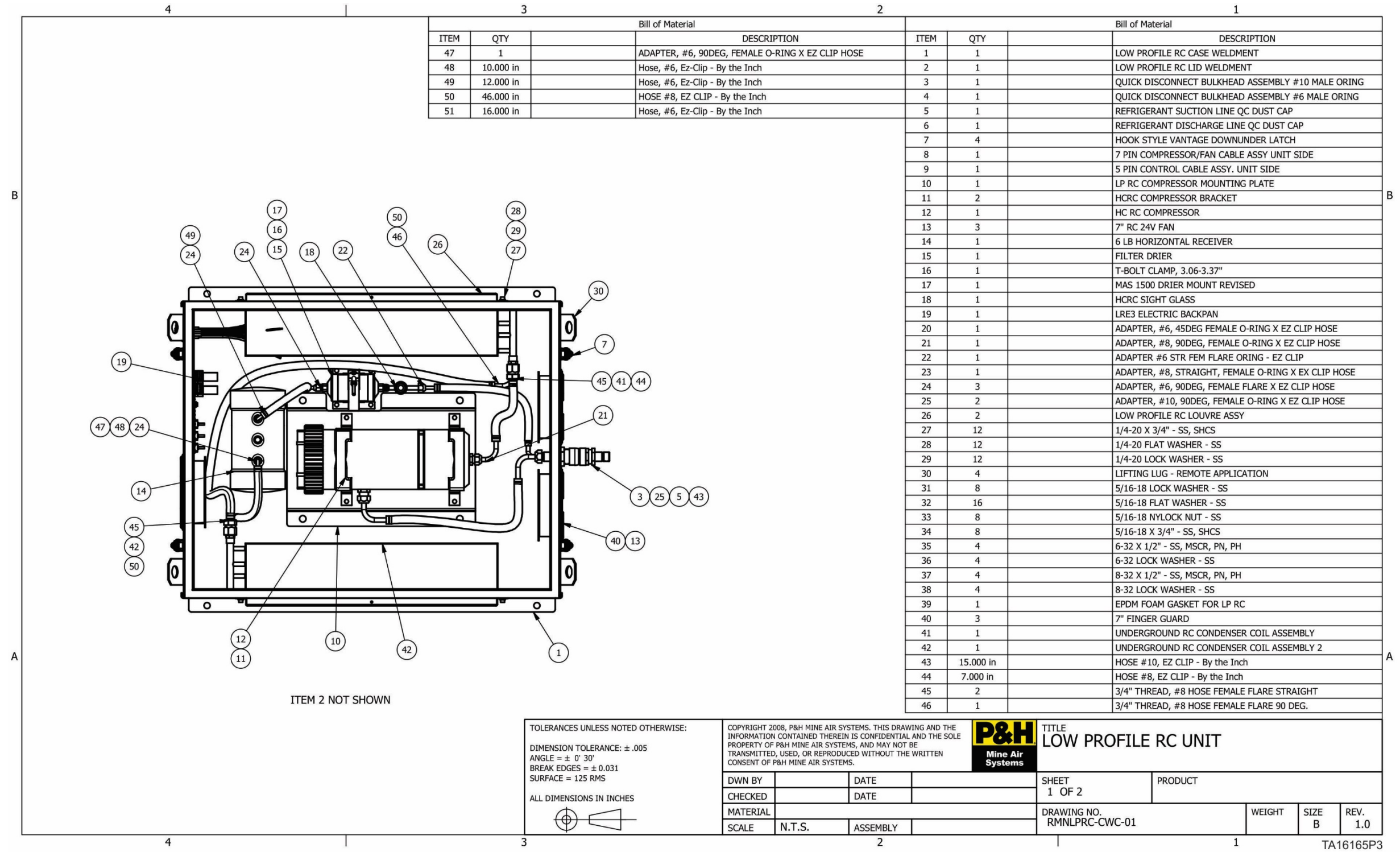
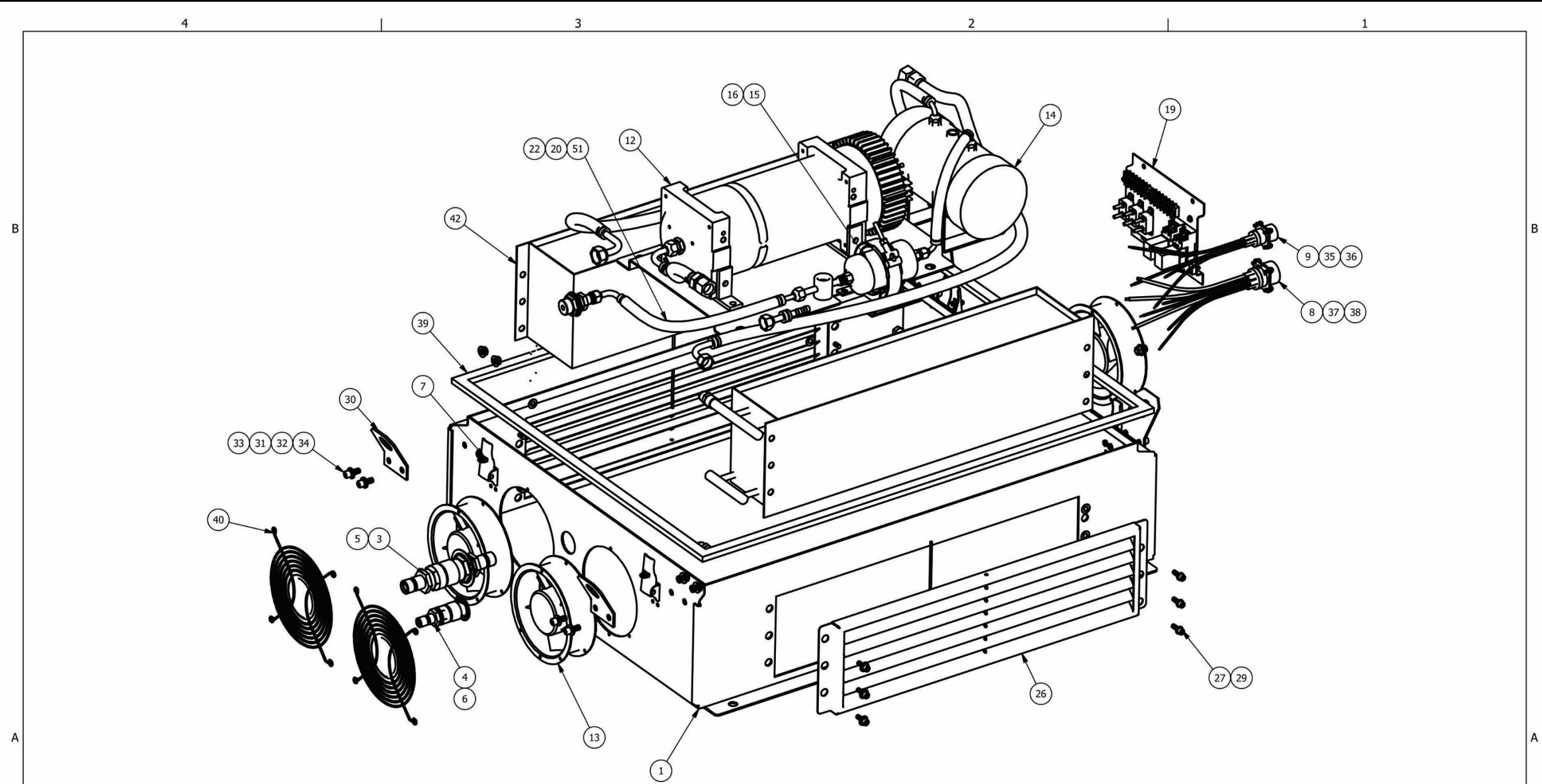
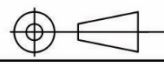



Figure 11. Mine Air System (MAS) LPRC (1 of 2)

NOTICE

For the latest parts, always reference the Parts Manual. The figure "Mine Air System (MAS) LPRC" is for general terminology when referencing the Parts Manual.



TOLERANCES UNLESS NOTED OTHERWISE: DIMENSION TOLERANCE: ± .005 ANGLE = ± 0° 30' BREAK EDGES = ± 0.031 SURFACE = 125 RMS ALL DIMENSIONS IN INCHES 			COPYRIGHT 2008, P&H MINE AIR SYSTEMS. THIS DRAWING AND THE INFORMATION CONTAINED THEREIN IS CONFIDENTIAL AND THE SOLE PROPERTY OF P&H MINE AIR SYSTEMS, AND MAY NOT BE TRANSMITTED, USED, OR REPRODUCED WITHOUT THE WRITTEN CONSENT OF P&H MINE AIR SYSTEMS.			 TITLE LOW PROFILE RC UNIT			
DWN BY	JL	DATE	9/8/2016		SHEET		PRODUCT		
CHECKED		DATE			2 OF 2				
MATERIAL					DRAWING NO.		WEIGHT	SIZE	REV.
SCALE	N.T.S.	ASSEMBLY			RMNLPRC-CWC-01			B	1.0

Mine Air System (MAS) LPRC (2 of 2)

Vendor Literature

VL 111Cr1 – ATC Instructions

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LeTourneau Automatic Temperature Control

BTL-9014 REV B

Description:

The Automatic Temperature Control (ATC) is the latest in electronic controllers. The ATC allows for true interior cab temperature control and continuously variable blower fan speed through the use of advanced microprocessor and sensor technology.

Product Features:

- Custom Backlit Operator Panel
- Embossed Touchpad with Tactile Feedback
- .3" High Red Led, 3 ½ Digit Digital Display
- Display in Degrees Fahrenheit or Celsius (Operator Selectable)
- Five Wire Interface between Control Panel and Power Interface Module
- On-Board Diagnostics
- Resume Last Setting on Startup Memory Feature
- Press and hold down to Increment Temperature and Fan Speed Settings (The settings will increment as long as the key is depressed)
- Electronic Evaporator Freeze Protection
- A/C clutch cycling limited to 4 cycles/minute maximum

Control Operation Specifications:

Temperature Control Range: 60° to 90°F (16 to 32 C)

Blower Fan Control: Pulse Width Modulation, Max Current - 30 Amps at 12V, 16 Amps at 24V

Sensors: -Temperature:

- Unit Fresh Air Inlet or Ambient (Outside) Temperature (optional)
- Cab Temperature
- Evaporator Core Probe
- Duct Temperature (optional)

Controlled Devices:

- A/C Compressor Clutch Circuit
- Blower Fan Motor
- Heater Water Valve

Major System Components:

- ECU/Power/Interface Controller Module
- Operator Control Panel
- Electronic Water Valve
- Wire Harness
- Air Temperature Sensor
- Evaporator Probe
- Relay Rear Evap

Operator Control Panel Description:



ON / OFF - Powers vehicle HVAC control system on or off. The LED numeric display is illuminated when the unit is turned on. The display will show the current set point temperature.

AUTO - Places the system in a fully automatic temperature control mode including fan speed. A panel indicator light indicates when this mode is active. The system will adjust the blower fan speed to the lowest setting necessary to maintain the cab temperature at the displayed set point temperature.

DEF (Defrost icon) –Energizes the A/C system to allow for rapid de-humidification of the cab. Opens Fresh Air Door. The A/C will be enabled even if the set point temperature requires heat. A panel indicator light indicates when this mode is active.

FAN UP / DOWN - Overrides the automatic fan speed control feature. Increments fan speed up or down in 11 steps. The digital display indicates the fan speed setting as a percentage or “HI” when maximum fan speed is reached or “LO” when minimum fan speed is reached then returns to normal display 5 seconds after either key is depressed. The set point fan speed is maintained until it is changed or if the AUTO key is depressed.



- Not Used

TEMPERATURE UP / DOWN - Increments the set point temperature up or down. The system will control the electronic water valve and/or the A/C compressor clutch to hold the cab temperature as closely as possible to the set point temperature.

SPECIAL KEY FUNCTIONS

To display diagnostics depress the ON key three times. The digital display will then display any active fault codes. See Troubleshooting section for fault code explanations.

To change the display from Fahrenheit to Celsius or back, depress the

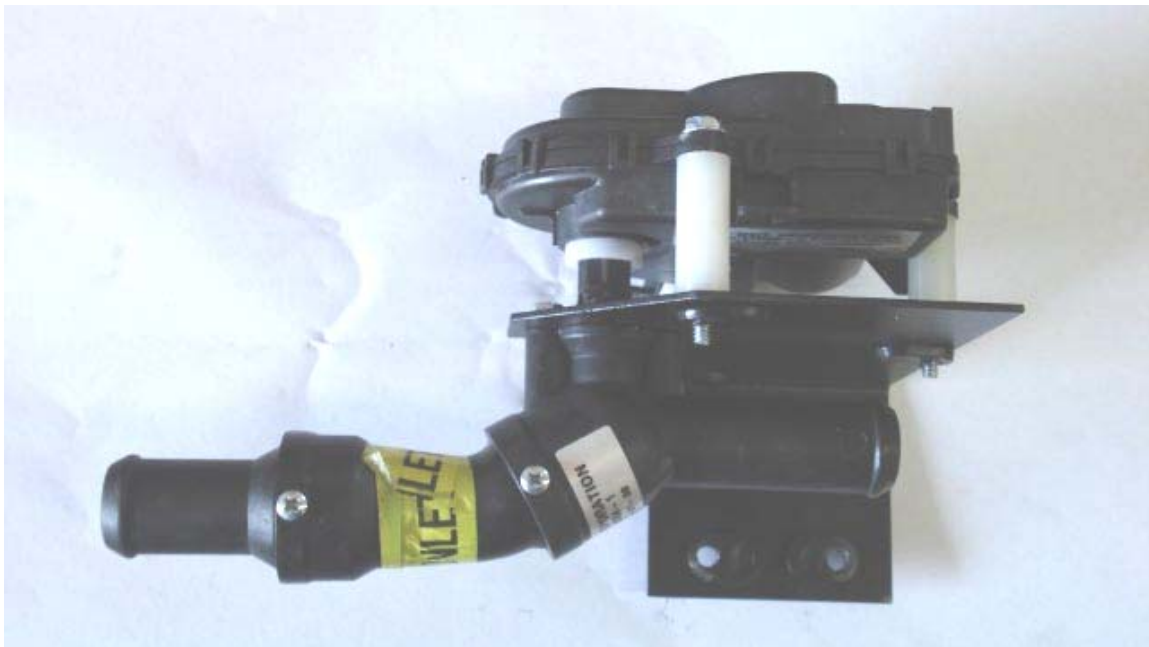
TEMPERATURE UP / DOWN keys simultaneously.

Installation Instructions:

HEATER WATER VALVE

This system utilizes an electronic proportional water valve. The valve will control the engine coolant flow into the HVAC heater core. The valve is fully sealed and can be located in the engine compartment of the vehicle. Note: Flow Direction of Valve.

Side view of Heater Control Valve



SENSOR LOCATIONS AND INSTALLATION

***Cab sensor** - This connector on this sensor should be inserted into the white four pin connector on the wire harness. A fan is incorporated into the sensor to produce a continuous flow of air across the temperature sensing element. The sensor can be located anywhere in the cab of the vehicle where the location reflects the average cab temperature.

Evaporator probe – Electronic sensor in evap.

Parts List

LeTourneau Automatic Temperature Control

Part Number	Description	Qty
RD-3-7385-0	Evaporator Probe Assy	1
RD-5-9216-0M	Air Temp Sensor Assy	1
RD-1-2654-1	Electric Water Valve	1
RD-6-4952-1	Control Panel Assy & Light tube	1
RD-6-5414-0	Electronic Control Unit Assy	1
BT1-0055-1	Touch Pad Decal	1
BT1-0505	Ferrite Choke	1



RD-6-4952-1



RD-6-5414-0



RD-5-9216-0M



RD-3-7385-0
In Evaporator



RD-1-2654-1



BT1-0055-1



BT1-0505

Parts Not Shown: BT1-0059 Wire Harness and BT2-0008 ABS Control Panel Housing.

Resistance Chart

Temp (°F)	Cab Temperature (Ohms)	Evap Temperature Probe (Ohms)
0	90794	45397
5	76459	38230
10	66022	33011
15	56137	28069
20	48468	24234
25	41591	20795
30	35904	17952
35	31082	15541
40	26838	13419
45	23436	11718
50	20244	10122
55	17825	8913
60	15521	7760
61	15151	7575
62	14781	7390
63	14411	7206
64	14041	7021
65	13671	6836
66	13302	6651
67	12932	6466
68	12562	6281
69	12277	6139
70	11993	5996
71	11708	5854
72	11423	5712
73	11139	5569
74	10854	5427
75	10569	5285
76	10285	5142
77	10000	5000 (Nominal Resistance)
78	9779	4890
79	9559	4779
80	9338	4669
81	9117	4559
82	8897	4448
83	8676	4338
84	8455	4228
85	8235	4117
86	8014	4007
87	7842	3921
88	7669	3835
89	7497	3749
90	7325	3662
91	7152	3576
92	6980	3490
93	6808	3404
94	6635	3318
95	6463	3231
96	6327	3164
97	6191	3096
98	6055	3028
99	5920	2960
100	5784	2892
105	5133	2567
110	4597	2299
115	4105	2053

Troubleshooting

Fault Codes:

To display fault codes depress the ON key three times in rapid succession. The digital display will then display any active fault codes. Pressing the ON key again repeatedly will scroll through any existing error codes. After 5 seconds without further key presses, the system will exit the diagnostics mode and return to normal operation.

No Faults Detected	Displayed: E0
Cab Sensor Shorted	Displayed: E1
Cab Sensor Open	Displayed: E2
Evap Probe Shorted	Displayed: E3
Evap Probe Open	Displayed: E4
Outlet Sensor Shorted	Displayed: E5
Outlet Sensor Open	Displayed: E6
Ambient Sensor Shorted	Displayed: E7
Ambient Sensor Open	Displayed: E8
Water Valve Shorted	Displayed: E9
Water Valve Open	Displayed: E10
No Communications with ECU	Displayed: E17

Advanced Diagnostics:

The Red Dot ATC Advanced Diagnostics control panel allows the technician to see real time system information on the control panel display that will assist in A/C-heater servicing. This real time information can help the service technician diagnose certain system problems.

To display advanced diagnostics, depress the ON key three times in rapid succession (fault codes displayed) then immediately press and hold the ON key for 5 seconds. The text "CAB" will be displayed. After a few seconds, the real time value of the cab temperature measured by the ATC is displayed. This value, as well as any other value displayed by the control panel, will continuously update. Pressing the ON key again repeatedly will scroll through all of the available diagnostics information.

CAB	Cab Air Temperature
EVAP	Evaporator Core Temperature
A-C	A/C Clutch Request (On/Off)
HEAT	Water Valve Position (0 to 100% Open)
FAN	Blower Fan Output (0 to 100% Maximum)

Note that the system can be operated normally while in advanced diagnostics mode, including changing the temperature set point or changing the blower fan speed, to evaluate the response of the system.

The firmware revision display mode is activated by pressing and holding the "ON" key for five seconds while the advanced diagnostics display mode is active. Press the "ON" key to cycle between the following displays:

ECU	ECU module revision.
CTRL	Control panel revision.

To exit the advanced diagnostic mode, turn the system OFF.

Additional Troubleshooting

No Display

- Turn on Control Panel with the ON key.
- Check to see if the display illuminates.
- Verify that the Control Panel is plugged into the wire harness.
- Check to see if wire harness is wired into vehicle properly.

No Fan

- Turn up fan with the Fan UP key.
- Make sure fan is plugged into wire harness, verify all wiring connections. The blower fan is controlled by the ATC on the GROUND side of the fan motor.
- Verify that the circuit breakers or fuses are intact.
- If all other functions work properly, replace Electronic Control Unit (ECU).

No Heat

- Turn up heat with the Temperature UP key. Use the advanced diagnostics to verify that the water valve is commanded open.
- Inspect and verify all wiring connections.
- Verify that any coolant shut off valves on the engine are open.
- Verify that warm coolant is flowing into the heater core by testing the heater hoses.
- Inspect and replace the electronic water valve if necessary.
- Inspect and replace ECU if necessary.

No Cooling

- Turn down heat with the Temperature DOWN key and enable the defrost mode. Use the advanced diagnostics to verify that the A/C clutch is requested ON.
- Verify that the system is fully charged with refrigerant.
- Verify that voltage is present at the compressor clutch
- Inspect and verify all wiring connections.
- Inspect and replace refrigerant high pressure and/or low pressure cut out switches if necessary.
- Inspect compressor and clutch assembly and replace clutch if necessary.
- Inspect and replace ECU if necessary.

The system is not controlling the cab temperature properly.

- Inspect the Cab Air Temperature sensor. Verify that the sensor fan is spinning freely.
- Make sure that the Cab Air Temperature sensor is located properly.
- Change the setpoint temperature in small increments.
- Verify that the water valve is working properly (see No Heat)
- Verify that the compressor clutch is working properly (see No Cooling)

The evaporator core is icing up and restricting airflow.

- Inspect the Evaporator Core Probe.
- Verify that the probe is making good contact with the evaporator fins and is not loosely inserted.
- Reposition the probe and check the core temperature during operation using the advanced diagnostics.

Instructions for Advanced Diagnostics ATC System and Programming

Error code display is accessed by pressing the "ON" key three times quickly.
Press the "ON" key to cycle through all of the active error codes.
Wait five seconds to return to normal display mode.

The advanced diagnostics display mode is activated by pressing and holding the "ON" key for five seconds while the error code is active.

Press the "ON" key to cycle through the following displays:

"CAB"	Cab temperature display.
"EUAP"	Evaporator temperature display.
"DUCT"	Duct temperature display.
"HEAT"	Water valve position (percent).
"A-C"	A/C command (percent).
"FAN"	Fan speed (percent).

Press the "OFF" key to return to normal display mode.

The firmware revision display mode is activated by pressing and holding the "ON" key for five seconds while the advanced diagnostics display mode is active.

Press the "ON" key to cycle between the following displays:

"ECU"	ECU module revision.	.14 or Higher
"CTRL"	Control panel revision.	1.10 or Higher

Press the "OFF" key to return to normal display mode.

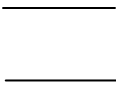
The parameter function is activated by pressing and holding the "OFF" key for five seconds while the advanced diagnostics display mode is active.

Press the "FAN UP/FAN DOWN" keys to select a config setting.

Press the "TEMP UP/TEMP DOWN" keys to change the selected setting
CFGF will globally set all 16 settings at once.

Press the "OFF" key to return to normal display mode.

Press the "TEMP UP" key and the "TEMP DOWN" keys simultaneously to change from Fahrenheit to Celsius.

Cfg0 Defrost AC Function: 0(none), 1(Force on), 2(Force off)  For Cfg0 & Cfg1
Cfg0.2 0(Defrost On/Off), 4(Defrost Off/50/On) add final #

Cfg1 Econ Function: 0(Econ), 1 (A/C), 2 (none)

Cfg1.2 0 (Normal Outside Button), 4 (Outside button controls Fresh/Recirc)

Cfg2 Use full blower in defrost mode: 1(yes), 2(No)

Cfg3 Cab Sensor: 0(1.0K), 1(2.83K), 2(3.0K),3(5.0K),4(10K),5(30K),8(NONE)

Cfg4 Evap Sensor:0(1.0K),1(2.3K),2(3.0K),3(5.0K),4(10K),5(30K),8(None)

Cfg5 Ambient Sensor: 0(1.0K), 1(2.83K), 2(3.0K), 3(5.0K), 4(10k),5(30K),8(None)

Cfg6 Duct Sensor: 0(1.0K),1(2.83K),2(3.0K),3(5.0K),4(10K),5(30K),8(None)

Load Shed: 0(None), 1(Vin),2(Input#1),3(Both)

Cfg8 High Press: 0(None), 1(PTtransducer-Triary),2(PT.Biarry),3(P.S. Switch)

Cfg9

Cfg10

Cfg11

Cfg12

Cfg13

Cfg14

Cfg15

Programming

1. Turn on.



2. Error code display mode is accessed by pressing the "ON" key three times quickly.



3. The advanced diagnostics display mode is activated by pressing and holding the "ON" key for five seconds while the error code display is active – Cab will display.



4. The parameter function is activated by pressing and holding the "OFF" key for five seconds. (As shown below)





Press the “FAN UP”/”FAN DOWN” keys to select a config setting.



Press the “TEMP UP”/”TEMP DOWN” keys to change the selected setting.

LeTourneau Programming

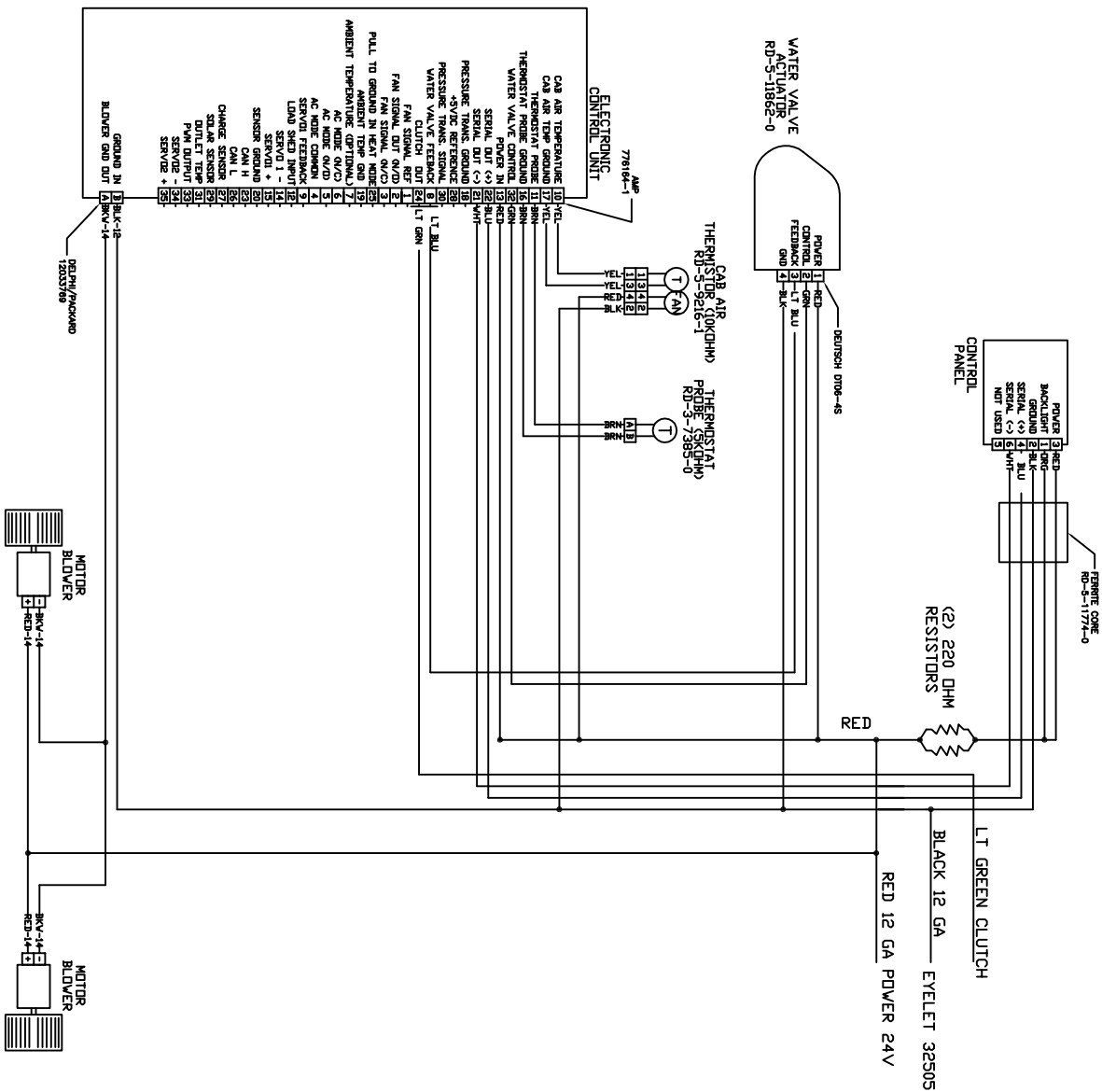
- P0-1
- P1-2
- P2-1
- P3-4
- P4-3
- P5-8
- P6-8
- P7-0
- P8-0
- P9-1
- PA-2
- PB-3
- PC-0
- PD-0
- PE-0
- PF-0

5. Turn off when done programming.



6. Check error code display by pressing the "ON" key three times quickly. Should read "E0"





UNLESS OTHERWISE SPECIFIED

BADGER TRUCK REFRIGERATION INC.
6302 TEXACO DRIVE EAU CLAIRE, WI. 54703
PHONE (715)874-6811

DRAWN **BK**

CHECKED

APPRVD.

1 PLACE DEC. ±.1
2 PLACE DEC. ±.03
3 PLACE DEC. ±.010

SCALE 1 = 4 DATE 6/25/08

SYM.	DESCRIPTION	DATE	E.C.N.	BY	APP. BY
A	220OHM RESISTOR WAS 270 OHM	7/25/08	222		BK

NAME: ELECTRICAL DIAGRAM LETOURNEAU

MATERIAL: SEE ABOVE

FINISH PER ENGR. SPEC. # NONE

CLASS CODE: FIRST MACH. DWG. SIZE: A

BT1-0059

