MAXXPOWER™ BATTERY-POWERED HVAC SYSTEM

Diagnostics/ Troubleshooting Guide

COMPONENTS YOU TRUST FROM THE PEOPLE YOU KNOW

!!Attention!!

Before performing diagnostics:

Wiring diagrams on pages 25 - 30 are for reference only. For detailed vehicle wiring refer to Navistar documents.

Check for Fault Codes using the information display or Diamond Logics Builder!

Technicians are responsible for verifying all truck batteries are in good condition and are properly charged. Do not proceed with any diagnostics without checking batteries and connections!

Links:

Current Approved Manufacturers and Websites for Additional Information;

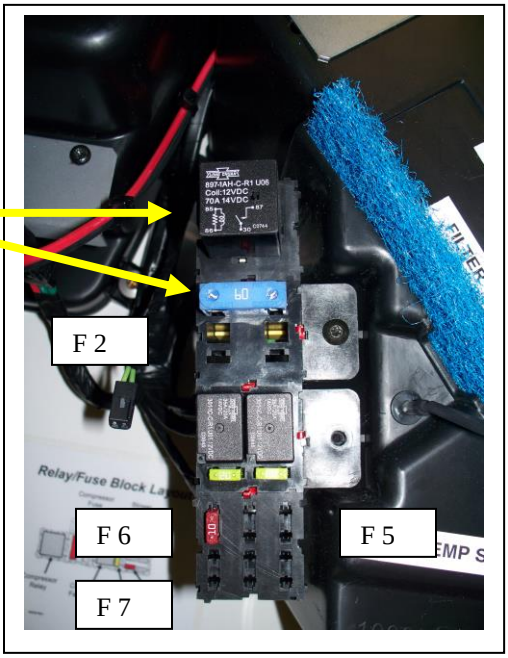
- Exide Technologies / www.exide.com

Table of Contents

Appendix

A: **F2** Fuse 60 Amp (Maxi)

This fuse provides short circuit protection for the **compressor**.
Location: On the control center.
NOTE: Compressor relay change as of June 2014. This change eliminates F2 compressor fuse



B: **F7** Fuse 10 Amp (Mini)

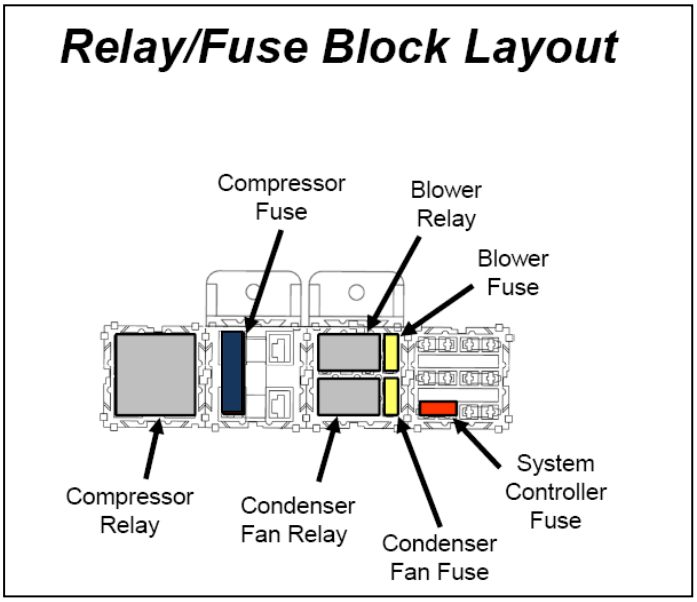
This fuse provides short circuit protection for the unit controls.
Location: On the control center

C: **F5** Fuse 20 Amp (Mini)

This fuse provides short circuit protection for the evaporator blower.
Location: On the control center

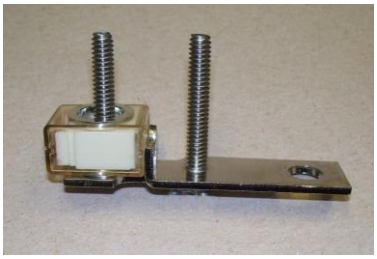
D: **F6** Fuse 20 Amp (Mini)

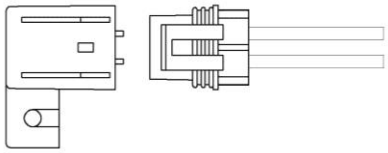
This fuse provides short circuit protection for the condenser fan.
Location: On the control center



Navistar main system fuses

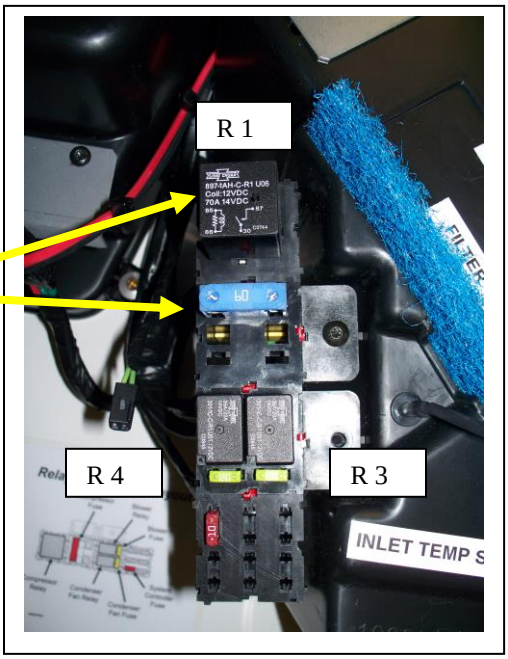
Location: Inside battery box
These fuses are identified on the wiring diagram as cube fuse/inline fuse.





E: **Relays:**

Location: On the control center

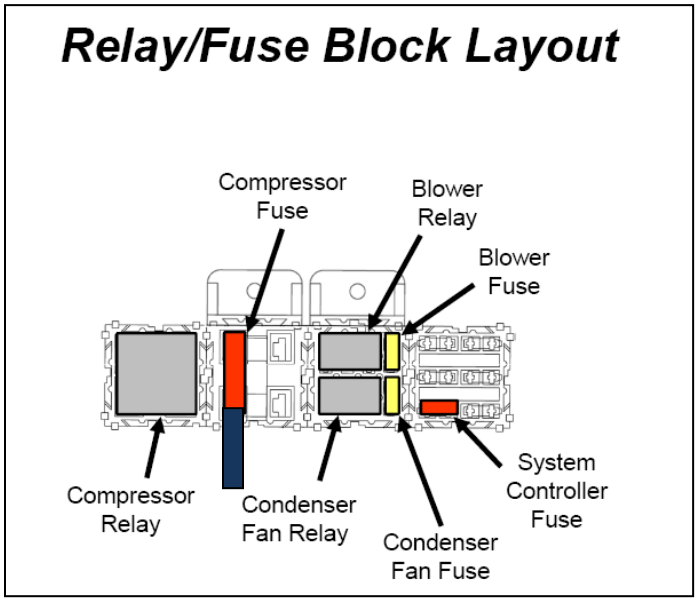


R1. This relay controls the voltage to the compressor controller.
(ENGINE OFF MODE)

NOTE: Compressor relay change as of June 2014. This change eliminates F2 compressor fuse

R4. This relay controls the voltage to the condenser fan.
(ENGINE OFF MODE)

R3. This relay controls the voltage to the evaporator blower.
(ENGINE OFF and ENGINE ON MODE)



F: Switches / Fan and Temp Control Display

COOL / No Idle switch:

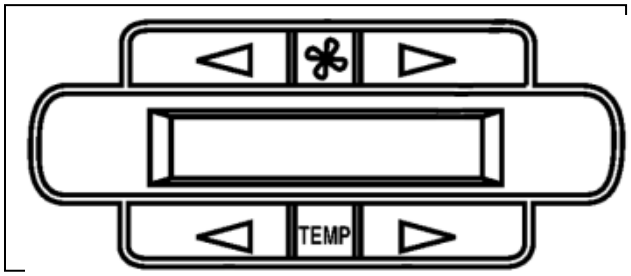
Lights up and starts the MaxxPower A/C unit at default settings in the parked mode.

Heat / No Idle switch:

Lights up and starts the MaxxPower unit and auxiliary coolant heater at default settings in the parked mode.

LED Display:

Allows for temperature and Blower speed adjustment of the MaxxPower unit when operating in A/C or heat mode.



Operates like standard Auxiliary HVAC when the engine is running.

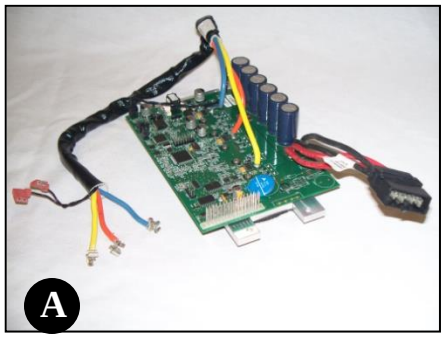
MaxxPower A/C Unit and Auxiliary Coolant Heater - stop when, engine is started, unit is shut off or batteries are depleted.

G: System Controller:

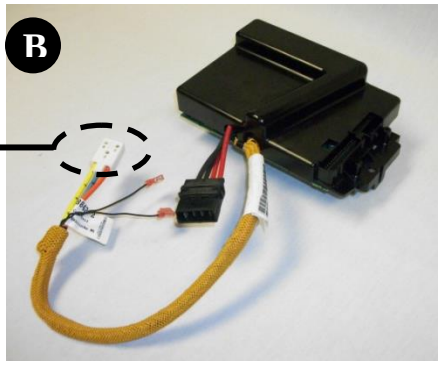
This device stores the operating program and controls the MaxxPower unit.

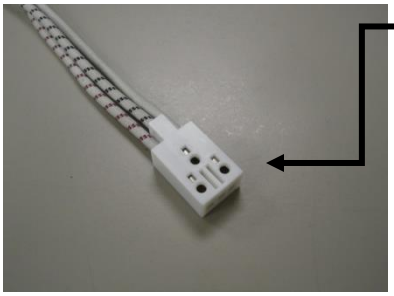
H: **Compressor Controller:**

This device controls the output voltage to the variable speed compressor. It is located on the top/rear area under a plastic access cover. Units ending C92, C93 and C94 use flag terminals (A).



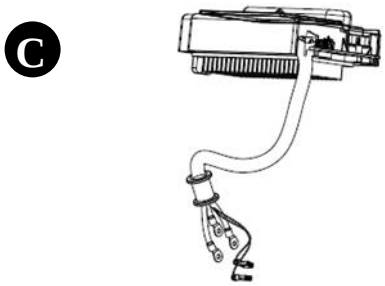
Maxxpower units from C95/C98 continuing to 10-17-2016 use cluster block connection (B).





Beginning 10-17-2016:

Maxxpower units with serial number prefix CQH have a part number ending with **C91** now use a (ring terminal) phase harness. (C) Also see pages 35-38.



I: **Linear Power Module:**

This module controls the amount of voltage delivered to the evaporator blower creating variable blower speeds.

J: **Blend Door Actuator:**

This actuator operates the blend door, changing the air flow path through the MaxxPower evaporator coil and heater core.

K: Inlet Temp Sensor:

This sensor monitors the return air temperature in front of the evaporator coil.

L: Discharge Temperature Sensor - Freeze Switch:

This sensor monitors the evaporator outlet temperature as it enters the vehicle duct system.

M: Evaporator Blower:

This blower pulls air through the evaporator coil or heater core and blows conditioned air into the interior of the sleeper. This blower operates with parked and engine driven systems.

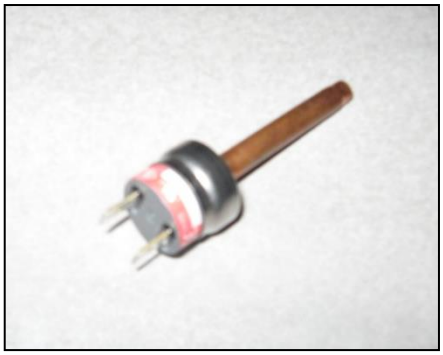
N: Condenser Fan:

This blower draws air from outside the truck, through a section of the louvered door on the passenger side and pushes it through the condenser coil to cool the refrigerant flowing through the system. The hot air is exhausted out the same louver panel on the passenger side of the truck. Also see pages 31-34.

INTERNAL COMPONENTS

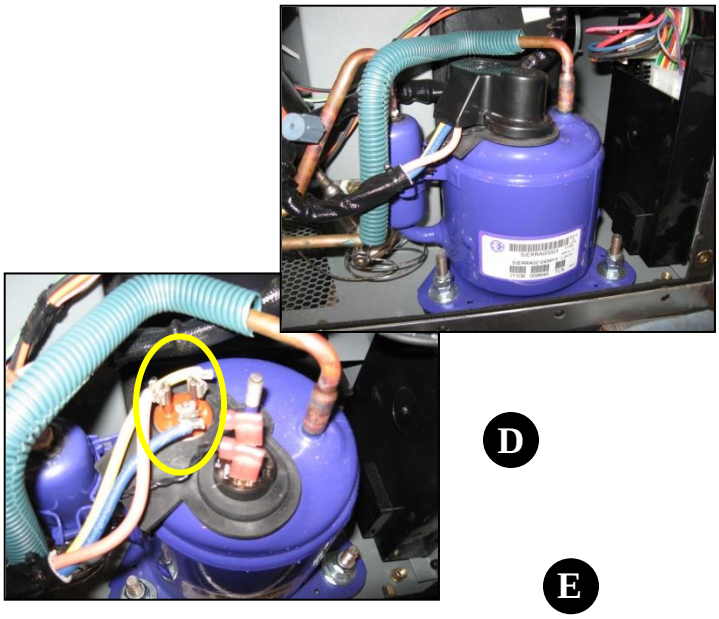
O: **High Pressure Switch:**

This brazed pressure switch will open and prevent the operation of the compressor due to high internal pressure. It is NOT serviceable.



P: **Compressor:**

This unit is part of the hermetically sealed refrigeration system. **Compressor D** uses flag terminals.



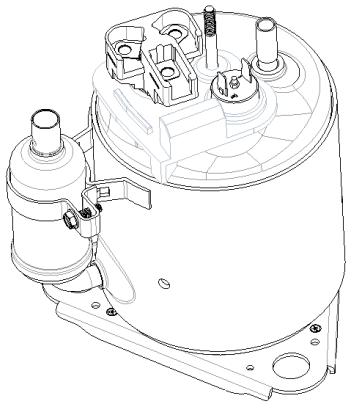
D

E

Compressor E uses cluster block connections

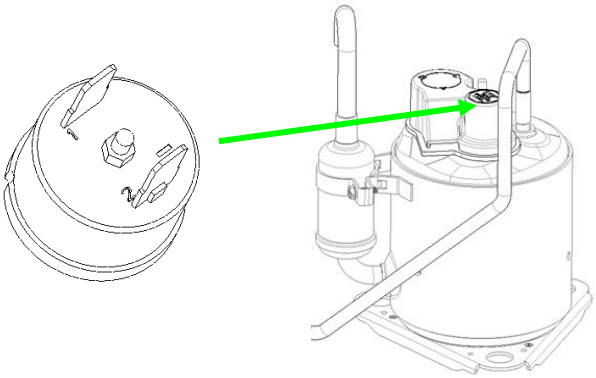
F

Compressor F beginning 10-17-2016 uses ring terminal connections. Also see pages 35-38.



Q: **Thermal Limit Switch on Compressor:**

This is a normally closed (auto reset) switch to protect the compressor from high temperature.



R: **Evaporator inlet filter:**

This filter protects the evaporator coil from dust and debris. It is washable and should be serviced every other month by washing dust and debris off with warm water. In environments with pets or dusty environments the filter may need more frequent washing. Failure to do so will affect the performance of the unit and could lead to drain tube clogging.

MaxxPower System Diagnostic Table

Removing fuse F7 for 5-10 seconds will reset the main system controller to factory default settings.

PROBLEM	POSSIBLE CAUSE	CORRECTIVE ACTION / SEE APPENDIX
Test with Engine Off! Brakes SET - if Key on ACC! **Unit Will Not Run or Turn On**	1. Loose connection 2. No power is available at the unit. 3. Blown fuse or fuses 4. Check Voltage path to controller and switches 5. Defective Switch on Control panel. 6. System Controller defective. 7. Park brake switch defective or wrong logics 8. Broken wire or defective wire harness 9. Check for Fault code	1. Confirm all connections are tight, including ground lugs, and terminals crimped on wires and battery cables. 2. Check **All** batteries for Voltage. Low voltage disconnect 11.8 3. Check all fuses. CUBE fuse/inline fuse are Navistar fuses in the battery box. See page 5 for photo. 4. Check for 12 volt through inline fuse continuing through control fuse F7 to R3 and R4 relay coils, pin 32 of the system controller and to the control panel switches as vbat. See appendix A,B, and J. 5. Check switch continuity. See appendix B. 6. Test System Controller. See Appendix J. 7. Only relevant if key is in ACC position. Always perform initial diagnostics. **ENG Off/ KEY OFF** See appendix J. 8. Inspect wiring harness and all ground wires. 9. View faults on the information display or check communication using Diamond Logic Builder.
Test with Engine Off! Brakes SET - if Key in ACC! **Unit Runs - But Does Not Blow Cold Air**	1. Airflow blockage. 2. Compressor Fuse or Relay. 3. Compressor controller connections/ defective compressor. 4. System controller. 5. High pressure switch 6. Evaporator discharge temp sensor/Freeze switch defective 7. Compressor thermal switch 8. Blend door position. 9. Evaporator blower 10. Loss of charge (refrigerant system not serviceable).	1. Clear any blockage from recirculation grill or louvers. Also check condenser inlet and outlet for restriction (outside truck). 2. Check F2 compressor fuse and R1 compressor relay. See appendix C, E and K. 3. Confirm all wire harness plugs are connected. Test compressor controller. See appendix K. 4. Check System Controller and compressor speed signal from System controller to the compressor controller. See appendix J and K. 5. Check high pressure switch and condenser fan. See appendix D and L. 6. Check sensor. See appendix F. 7. Check normally closed thermal switch. See appendix I. 8. Check blend door operation. See appendix H. 9. Check Evaporator blower and linear power module. See appendix M. 10. If all tests check OK, a loss of refrigerant charge may have occurred. NOTE. This unit has a dual core evaporator. It uses refrigerant from the engine driven compressor during engine running mode. If all electrical components work, including the electric refrigerant compressor and the unit does not cool, please call Navistar dealer. You can try operating the unit ENGINE running.
ENGINE RUNNING **MaxxPower unit Runs - But Does Not Blow Cold Air**	1. Airflow blockage 2. Blend door 3. Engine driven system charge level.	1. Clear any blockage from recirculation filter, grill or louvers. Also check condenser inlet and outlet for restriction (outside truck). 2. Check blend door operation. See appendix H. 3. Check refrigeration charge level and engine driven compressor.

MaxxPower System Diagnostic Table

PROBLEM	POSSIBLE CAUSE	CORRECTIVE ACTION / SEE APPENDIX
Unit Cycles On And Off	1. Poor electrical connection. 2. Condenser fan inoperative. 3. Air flow blockage causing high pressure or freeze condition.	1. Check all electrical connections. 2. Check condenser fan. See appendix L. also pages 31-34 3. Check for restricted airflow outside truck at condenser inlet and outlet and at louvers and recirculation grill. Check pressure switch, thermal limit and/or discharge temperature sensor. See appendix D, F and I.
Unit Blows Cold Air, But Low Airflow	1. Check all duct work connections. 2. Air flow restricted 3. Evaporator Blower motor inoperative.	1. Make sure all ducts are connected, sealed and secure. 2. Check for airflow at louvers and recirculation grill. 3. Check evaporator blower motor and linear power module. See appendix M.
Unit Runs Correctly, But Less Than Expected Run Time	1. Ground terminal(s). 2. Batteries weak or not charged correctly. 3. High amperage draw	1. Inspect and tighten ALL connections. 2. Check batteries for condition and state of charge. See appendix A. 3. Use DC ammeter to check amps when running. Excessive amperage could signal compressor or internal component issue. Amperage ranges 40 to 75 depending on conditions.
Unit is Noisy or Vibrates	1. Evaporator Blower motor. 2. Condenser fan motor. 3. Compressor mounting. 4. Compressor internal.	1. Check evaporator blower. See appendix M. 2. Check condenser fan. See appendix L, also pages 31-34 3. Check rubber compressor mounts. See appendix N. 4. If rubber compressor mounts check out acceptable, and compressor vibrates excessively, call Navistar Dealer.
Unit runs but does not blow hot air	1. Heater power and ground 2. Heater fuse 3. Wiring harness 4. Heater enable signal 5. Blend Door	1. Check for power at the heater pins 1 & 2 2. Check heater fuse F3. See page 5 3. Check wiring harness connectors and physical condition 4. Check for heater enable 12V at heater pin 7 from system controller pin 23. 5. See appendix H

NOTE: Heater diagnostics can be performed using Espar's EDITH diagnostics lap top based program. You must have the ISO cable adapter for the Espar Hydronic heater. This heater uses the standard 8 pin Hydronic 5 adapter.

Appendix

A. Battery Condition and Performance:

Battery Voltage is critical for system operation. Special attention should be given to both sets of batteries.

Attention: Poor quality batteries or a weak alternator will have a negative impact on **MaxxPower** unit run time. Always maintain the best possible batteries and charging system. Standard alternator 320 Amp.

Load test and maintain batteries as required by the manufacturer.

B. LED Control Display and COOL - No Idle Switch Testing: Attention! Conduct the initial test with ENGINE OFF/ KEY OFF AND BRAKES SET!!!

Turn the MaxxPower unit on by pressing the Cool No/Idle momentary switch.

Pushing the COOL – No Idle momentary switch will signal the MaxxPower unit to start. The led light in the switch will illuminate. At this time the display will also light up and the MaxxPower unit will start at its default setting and will indicate this by the rows of bars showing on the display. Pushing the temperature or blower speed buttons will increase or decrease these settings higher or lower.

If, pushing the COOL – No Idle momentary switch the unit doesn't start, check for 12 volts at the switch terminals. Wire (vbat) should have 12 volts. This voltage comes from the 10 amp F7 control fuse, through pin A1 of the 32 pin harness connector. Pushing the COOL No Idle momentary switch sends power from the switch, through pin B 13 of the 32 pin harness connector to pin 6 of the system controller.

If you have 12 volts at pin 6 on the System controller and the unit does not start, you're system controller is defective.

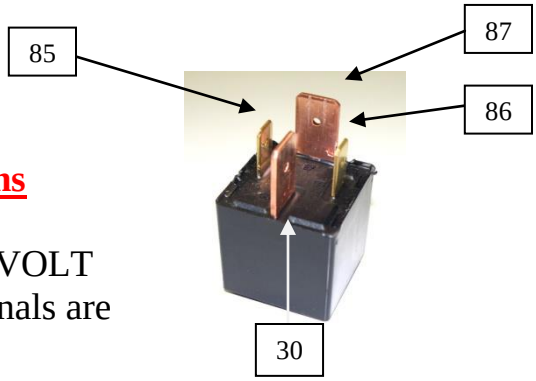
If you have 12 volts at pin 6 and the unit starts but the display does not come on, check for proper voltage at the LED display, pin connection 7 (pos) coming from fuse F5 through pin A11 of the 32 pin harness connector. Use pin 8 (neg) at the display, coming from chassis ground, through pin A2 of the 32 pin harness connector, to check for this voltage. You should have 12 volts.

(continued next page)

Now check the dimmer to panel signal, pin 15 on the display. You should have 1.5V at the controller from pin 18 of the system controller passing

through pin (a 12) of the 32 pin harness connector. If you do not have the dimmer signal you may have a bad system controller or harness.

After a few seconds, the display will dim and the bars for temperature and blower speed will not show. As soon as you push the increase or decrease buttons the display will wake up.



C. Relay Testing:

NOTE: new 150 amp compressor relay (shown on page 6) relay coil is 35-40 ohms

With relay unplugged, confirm there is 12 VOLT on the sockets where 85 and 30 relay terminals are connected **NOTE**

If you do not have 12 VOLT here check fuses, wiring and battery connections.

Now, with relay unplugged, check across terminals 85 and 86 of the relay, using an OHM meter. You should have 80 to 100 ohms. This is measuring the resistance through the relay coil. If you do not, replace relay.

Starting the MaxxPower system…as soon as you turn the COOL – No Idle switch on, terminals 86 on R3, and R4 relays become connected to ground internally on the System controller pin **3**. Also, R1 relay terminal 86 connects to ground internally at pin **2** on the system controller. When this happens the relays will pull in the contacts and allow voltage through the relays. You should now have 12 VOLT passing through the relays on spade terminals 87 of the relays. This provides power to fuses F5, F6 and F2, continuing to the evaporator blower, condenser fan and the compressor controlling section of the Compressor Controller Assembly.

With relay plugged in: TURN THE UNIT ON.

If you do not have 12 VOLT on terminal 87, check across terminals 85 (+) an 86 (-). You should have 12 VOLT. If you do not, you may have a defective harness or system controller. If you have 12 VOLT here and do not have 12 VOLT on terminal 87 your relay is defective. The internal coil of the relay is energized but the contacts are not closing. Replace the relay.

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If you have 12 VOLT on terminal 87 and the compressor, condenser fan or evaporator blower does not run you could have a defective component such as evaporator blower, condenser fan or compressor controller. See testing evaporator blower Appendix M, Condenser Fan, Appendix L, Compressor / Controller, Appendix K.

D. Pressure Switch Testing: You must remove the top compressor controller cover of the MaxxPower unit to access the switch.

The brazed switch (see photo page 9) is not removable. This switch is **normally closed.** When the unit is off for a few minutes, unplug the System Controller and check between pins 28 and 17, you should always have continuity. If you do not, you may have a broken wire, bad connection, high pressure situation or defective switch. If the pressure, harness and connections are ok, the MaxxPower unit will have to be replaced. Call Navistar.

E. Check continuity across fuse body (fuse does not look blown)
Remove fuse from fuse holder. Using a meter, check for continuity across the fuse. You can check for voltage at and through the fuse using a dc volt meter, with the fuse installed.

F. Discharge Temperature Sensor/Freeze Switch Testing: Location: Top of unit, at evaporator blower outlet.

IF THE SENSOR OR CIRCUIT HAS A SHORT OR OPEN a fault code will be seen on J1939. IF THE SENSOR IS DEFECTIVE THE COMPRESSOR WILL NOT OPERATE!

The freeze switch is a temperature sensor. To verify the condition you will need a Volt/OHM meter.

If a freeze condition occurs, the unit will stop the compressor. If the freeze condition leaves, the compressor will restart and the **MaxxPower** unit will continue to run.

Check resistance (ohms) value at the system controller with the 32 pin connector disconnected. You should read a resistance across terminals 26 (pos) and17 (neg) within the range listed on the (continued next page)

table page 21. If you cannot read the resistance, check at the sensor connection. If you read the resistance here, and it's within the range allowed, you have a defective harness. If you cannot read the resistance or it is not within the given range, your sensor is defective.

G. Inlet Temperature Sensor:

IF THE SENSOR OR CIRCUIT HAS A SHORT OR OPEN a fault code will be seen on J1939. IF THE SENSOR IS DEFECTIVE THE unit will default to a cab temperature of 70 F and operate accordingly.

This sensor monitors the return air temperature.

Check resistance (ohms) value at the system controller with the 32 pin connector disconnected. You should read a resistance across terminals 24 (pos) and 17 (neg) within the range listed on the table page 21. If you cannot read the resistance, check at the sensor connection. If you read the resistance here, and it's within the range allowed, you have a defective harness. If you cannot read the resistance or it is not within the given range, your sensor is defective.

H. Blend Door Actuator:

Physical inspection of the door can be seen through the top of the unit by removing the evaporator blower. Removing the F7 fuse will reset the unit and the blend door.

This actuator motor drives the blend door. When in the heat mode the blend door will direct recycled air through the heater core as directed by the Digital Control Panel in order to maintain a preset temperature. The Espar Hydronic coolant heater will provide a constant flow of heated coolant through the heater core for internal bunk heat as well as engine heat.

First, check for 12 volts (pos) on terminal 10 of the actuator, coming from fuse F5. Ground is terminal 7 on the actuator. If you do not have power here you may have a defective harness or system controller.

If you have power here, check for the move signal at pin 8 on the actuator, coming from pin 25 of the system controller. This is a variable signal ranging from 11 volts at max. cold to 0 volts full heat. If this voltage is not there or the voltage does not change, you have a defective system controller or harness.

(continued next page)

If this voltage is present and variable, and the door does not operate, you may have a defective actuator or inoperative blend door.

I. Compressor Thermal Limit Switch: You must remove the top compressor controller cover of the MaxxPower unit to access the switch.

This device is a normally closed switch. If the compressor gets too hot, the thermal limit switch will open and the compressor will stop. Checking with a meter you should always have continuity between the two terminals when it is cool.

J. System Controller:
Do not attempt to test the controller until you have completely eliminated all other possibilities.

The **MaxxPower** System controller is the device that stores the operating program for the system and controls most input and output functions. This controller is powered through the F 7 control fuse to pin 32 on the controller. Pin 31 is the ground. If you have 12 volts here, the system controller is waiting for an input from the COOL or HEAT No Idle switch for startup.

If you do not have 12 volts here, check cube fuses/inline fuses in battery box, also check for chassis ground.

If you have 12 volts here and the unit will not run, check for the input from the COOL No Idle momentary switch at pin 6 on the system controller. If you have this 12 volt signal on pin 6 when the switch is depressed (this is a momentary switch) and the unit does not run, check the sensors, pressure switch, and compressor thermal high limit. Also check battery voltage (LVD). If all safety devices are ok, your controller is defective. Replace the controller.

K. Compressor Controller: This device controls the refrigerant compressor. When the MaxxPower system is powered up, the compressor controller is waiting for the system to call for conditioned air. Once the system calls for conditioned air, the system controller will connect relay R 1 terminal 86 to ground at pin 3 of the system controller. This will close R 1 relay contacts and allow main power through fuse F 7 to the compressor controller. Even though main power is sent to this controller, it will not start the compressor until it receives a speed signal at pin C16 from the system controller pin 1.

Once it has received the speed signal the compressor controller will start the refrigerant compressor. The compressor will operate as long as the thermal limit on the compressor is closed and the system continues to call for conditioned air.

Attention: Removing the phase harness for testing

Operating the system for troubleshooting purposes with the phase harness disconnected can result in a locked out system.

With no active fault codes, the controller should always attempt to start the compressor up to 10 times in a period of approx. 2 minutes; even when the phase harness is disconnected. If the controller does not see the compressor start after 10 attempts, it will time out and stop sending voltage to the compressor. The controller will remain in locked out mode until power is cycled. Please make sure the time does not expire during the test procedure. If necessary, cycling the power switch off and back on will reset the controller. NOTE: "The compressor could take up to 2 minutes to start up after the power switch has been cycled.

See pages 35-38 for additional service information concerning the compressor and controller!

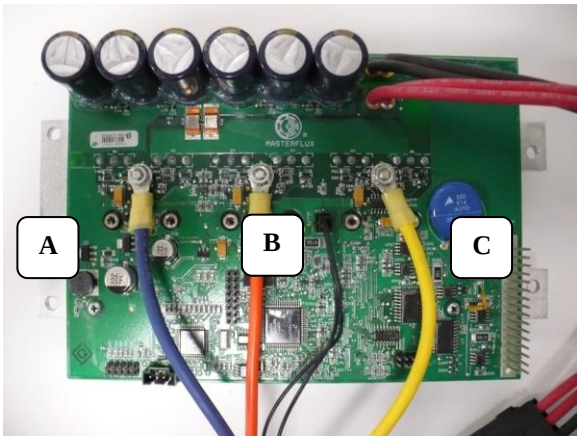
Check for 12 VOLT from F2, 60 amp fuse, continuing through the packard connector to the compressor controller. If you have 12 volts here, check for the speed signal at pin C16. You should have a voltage here ranging from 3.2 on high to 3.9 volts on low. If you have this speed signal, you should have voltage out on the three wires connected to the compressor.

NOTES if cluster block is removed –always replace

Disconnect the three wires from the compressor. You will have to remove plastic cap from the top of compressor.

Using a volt meter check each wire, positive on (blue, orange or yellow) negative to battery ground. If you do not have a 6 volt pulse voltage out on each wire, replace the controller. Pulse voltage means the controller will cycle to each colored wire.

If you do have a 6 volt pulse voltage out and the compressor does not run you have a defective compressor. Call Navistar dealer.



Blue **Orange** **Yellow**

Controller phase harness connections - blue to A, orange to B, and yellow to C. Wires must always be connected in this order and torqued to 12-14 inlbs.

L. Condenser Fan Motor Testing: First do a visual inspection of all fan parts. For condenser fan location see Navistar documents.

Turn the **MaxxPower** unit on**,** you should have 12 volts across terminals A and B at the condenser fan connector. If you do not have 12 volt at the fan, check fuse F 6 and relay R4. If you have 12 VOLT main power, check for the signal voltage at the condenser fan connector pin C coming from pin 29 of the system controller. You should have between 3.1 volts on low speed and 4.8 volts on high. If all voltages are correct, (the plug needs to be connected in order to read the signal voltages) and the fan does not run, it is defective, and needs to be replaced. Using a DC ammeter you can check the amperage draw of the blower. Normal amps approx**. 6 to 10 Amps** max.

Caution: If attempting to connect fan to an outside power source, internal electronic components are sensitive to arcing or reverse polarity! Damage will occur!!

M. Evaporator Blower Motor and Linear Power Module Testing:
First do a visual inspection of all blower parts.
For evaporator fan location see Navistar documents.

The evaporator blower speed is controlled by the **LPM**, Linear Power Module, item I page 8.

Turn the **MaxxPower** unit on, you should have 12 volt at the **LPM** pins 6 (pos) and pin 5 (neg), if you do not, check fuse F 5 and relay R 3. If you have 12 VOLT main power, check for the speed signal voltage on the **LPM** at pin 3 coming from the system controller pin 30. You should have approx. 4.5V at low speed and approx. 2.5V at high speed. If all of these voltages are correct, (the plug needs to be connected in order to read the signal voltages) check the output voltage from the **LPM** pins 1 and 2 going to the blower. You should have approx 6.5V in low and 10.6V in high to the motor depending on the speed signal from the system controller. If all voltages are correct, reconnect the plug.

If fan does not run, it is defective, and needs to be replaced.

Using a DC ammeter you can check the amperage draw of the blower. Normal amps will range from 4 to 10 amps.

Caution: If attempting to connect blower to an outside power source, internal electronic components are sensitive to arcing or reverse polarity! Damage will occur!!

N. Compressor Rubber Mounts:
Visual inspection of the compressor rubber mounts may be necessary if excessive vibration is present. Check for loose mounting nuts. If mounting nuts and captive studs are Ok, vibration could be from the internal part of the compressor. If so call Navistar dealer.

DISCHARGE SENSOR/AIR INLET SENSOR CHART

TEMP (°C)	R (min)	R (cent)	R (max)	R (min)	R (max)
-30	84.45	86.75	89.11	-2.7%	2.7%
-29	79.39	81.51	83.68	-2.6%	2.7%
-28	74.68	76.62	78.61	-2.5%	2.6%
-27	70.28	72.06	73.89	-2.5%	2.5%
-26	66.16	67.80	69.48	-2.4%	2.5%
-25	62.32	63.82	65.36	-2.4%	2.4%
-24	58.72	60.10	61.51	-2.3%	2.3%
-23	55.35	56.62	57.92	-2.2%	2.3%
-22	52.20	53.37	54.55	-2.2%	2.2%
-21	49.25	50.32	51.41	-2.1%	2.2%
-20	46.49	47.47	48.47	-2.1%	2.1%
-19	43.89	44.80	45.71	-2.0%	2.0%
-18	41.46	42.29	43.13	-2.0%	2.0%
-17	39.18	39.94	40.71	-1.9%	1.9%
-16	37.04	37.74	38.44	-1.8%	1.9%
-15	35.03	35.67	36.32	-1.8%	1.8%
-14	33.14	33.73	34.32	-1.7%	1.8%
-13	31.37	31.90	32.45	-1.7%	1.7%
-12	29.70	30.19	30.69	-1.6%	1.6%
-11	28.13	28.58	29.03	-1.6%	1.6%
-10	26.65	27.06	27.48	-1.5%	1.5%
-9	25.26	25.64	26.02	-1.5%	1.5%
-8	23.95	24.30	24.64	-1.4%	1.4%
-7	22.72	23.03	23.35	-1.4%	1.4%
-6	21.56	21.84	22.13	-1.3%	1.3%
-5	20.46	20.72	20.98	-1.3%	1.3%
-4	19.43	19.66	19.90	-1.2%	1.2%
-3	18.45	18.67	18.88	-1.2%	1.2%
-2	17.53	17.73	17.92	-1.1%	1.1%
-1	16.66	16.84	17.01	-1.1%	1.1%
0	15.84	16.00	16.16	-1.0%	1.0%
1	15.05	15.21	15.37	-1.1%	1.1%
2	14.30	14.46	14.62	-1.1%	1.1%
3	13.60	13.75	13.91	-1.1%	1.2%
4	12.93	13.09	13.24	-1.2%	1.2%
5	12.30	12.46	12.61	-1.2%	1.3%
6	11.70	11.86	12.01	-1.3%	1.3%
7	11.14	11.29	11.45	-1.3%	1.4%
8	10.61	10.76	10.91	-1.4%	1.4%
9	10.10	10.25	10.40	-1.4%	1.5%
10	9.626	9.771	9.918	-1.5%	1.5%
11	9.174	9.316	9.461	-1.5%	1.5%
12	8.745	8.885	9.027	-1.6%	1.6%
13	8.339	8.477	8.616	-1.6%	1.6%
14	7.954	8.089	8.226	-1.7%	1.7%
15	7.589	7.722	7.856	-1.7%	1.7%
16	7.243	7.373	7.504	-1.8%	1.8%
17	6.914	7.041	7.170	-1.8%	1.8%
18	6.602	6.727	6.853	-1.9%	1.9%
19	6.306	6.428	6.552	-1.9%	1.9%
20	6.025	6.144	6.265	-1.9%	2.0%
21	5.758	5.875	5.993	-2.0%	2.0%
22	5.504	5.618	5.734	-2.0%	2.1%
23	5.263	5.374	5.488	-2.1%	2.1%
24	5.034	5.142	5.253	-2.1%	2.2%
25	4.816	4.922	5.030	-2.2%	2.2%
26	4.608	4.712	4.818	-2.2%	2.2%
27	4.411	4.512	4.615	-2.2%	2.3%

TEMP (°C)	R (min)	R (cent)	R (max)	R (min)	R (max)
28	4.223	4.322	4.422	-2.3%	2.3%
29	4.044	4.140	4.239	-2.3%	2.4%
30	3.874	3.968	4.064	-2.4%	2.4%
31	3.711	3.803	3.897	-2.4%	2.5%
32	3.557	3.646	3.738	-2.5%	2.5%
33	3.410	3.497	3.586	-2.5%	2.5%
34	3.269	3.354	3.441	-2.5%	2.6%
35	3.135	3.218	3.303	-2.6%	2.6%
36	3.007	3.088	3.171	-2.6%	2.7%
37	2.886	2.964	3.045	-2.7%	2.7%
38	2.769	2.846	2.925	-2.7%	2.8%
39	2.658	2.733	2.810	-2.7%	2.8%
40	2.553	2.625	2.700	-2.8%	2.8%
41	2.451	2.522	2.595	-2.8%	2.9%
42	2.355	2.424	2.495	-2.9%	2.9%
43	2.262	2.330	2.399	-2.9%	3.0%
44	2.174	2.240	2.307	-2.9%	3.0%
45	2.090	2.154	2.219	-3.0%	3.0%
46	2.009	2.072	2.136	-3.0%	3.1%
47	1.932	1.993	2.055	-3.0%	3.1%
48	1.859	1.918	1.978	-3.1%	3.2%
49	1.788	1.846	1.905	-3.1%	3.2%
50	1.721	1.777	1.834	-3.2%	3.2%
51	1.656	1.711	1.767	-3.2%	3.3%
52	1.594	1.647	1.702	-3.2%	3.3%
53	1.535	1.587	1.640	-3.3%	3.4%
54	1.478	1.529	1.581	-3.3%	3.4%
55	1.424	1.473	1.524	-3.3%	3.4%
56	1.372	1.420	1.469	-3.4%	3.5%
57	1.322	1.369	1.417	-3.4%	3.5%
58	1.274	1.320	1.367	-3.4%	3.6%
59	1.228	1.273	1.318	-3.5%	3.6%
60	1.185	1.228	1.272	-3.5%	3.6%
61	1.142	1.184	1.228	-3.5%	3.7%
62	1.102	1.143	1.185	-3.6%	3.7%
63	1.063	1.103	1.144	-3.6%	3.7%
64	1.026	1.065	1.105	-3.6%	3.8%
65	0.9902	1.028	1.067	-3.7%	3.8%
66	0.9559	0.993	1.031	-3.7%	3.8%
67	0.9229	0.9589	0.9960	-3.7%	3.9%
68	0.8913	0.9263	0.9630	-3.8%	3.9%
69	0.8609	0.8950	0.9304	-3.8%	4.0%
70	0.8317	0.8649	0.8994	-3.8%	4.0%
71	0.8036	0.8360	0.8697	-3.9%	4.0%
72	0.7766	0.8082	0.8410	-3.9%	4.1%
73	0.7506	0.7815	0.8135	-3.9%	4.1%
74	0.7257	0.7558	0.7870	-4.0%	4.1%
75	0.7017	0.7310	0.7615	-4.0%	4.2%
76	0.6786	0.7072	0.7369	-4.0%	4.2%
77	0.6564	0.6843	0.7133	-4.1%	4.2%
78	0.6351	0.6622	0.6905	-4.1%	4.3%
79	0.6145	0.6410	0.6686	-4.1%	4.3%
80	0.5947	0.6206	0.6475	-4.2%	4.3%
81	0.5756	0.6009	0.6271	-4.2%	4.4%
82	0.5573	0.5819	0.6075	-4.2%	4.4%
83	0.5396	0.5636	0.5886	-4.3%	4.4%
84	0.5226	0.5460	0.5704	-4.3%	4.5%
85	0.5062	0.5290	0.5528	-4.3%	4.5%

Fault Codes

If a logable fault occurs during parked operation, it will be transmitted to the ESC module after the next successful communication handshake.

Faults may be viewed on the information display or by using the EZ-Tech (Diamond Logic Builder)

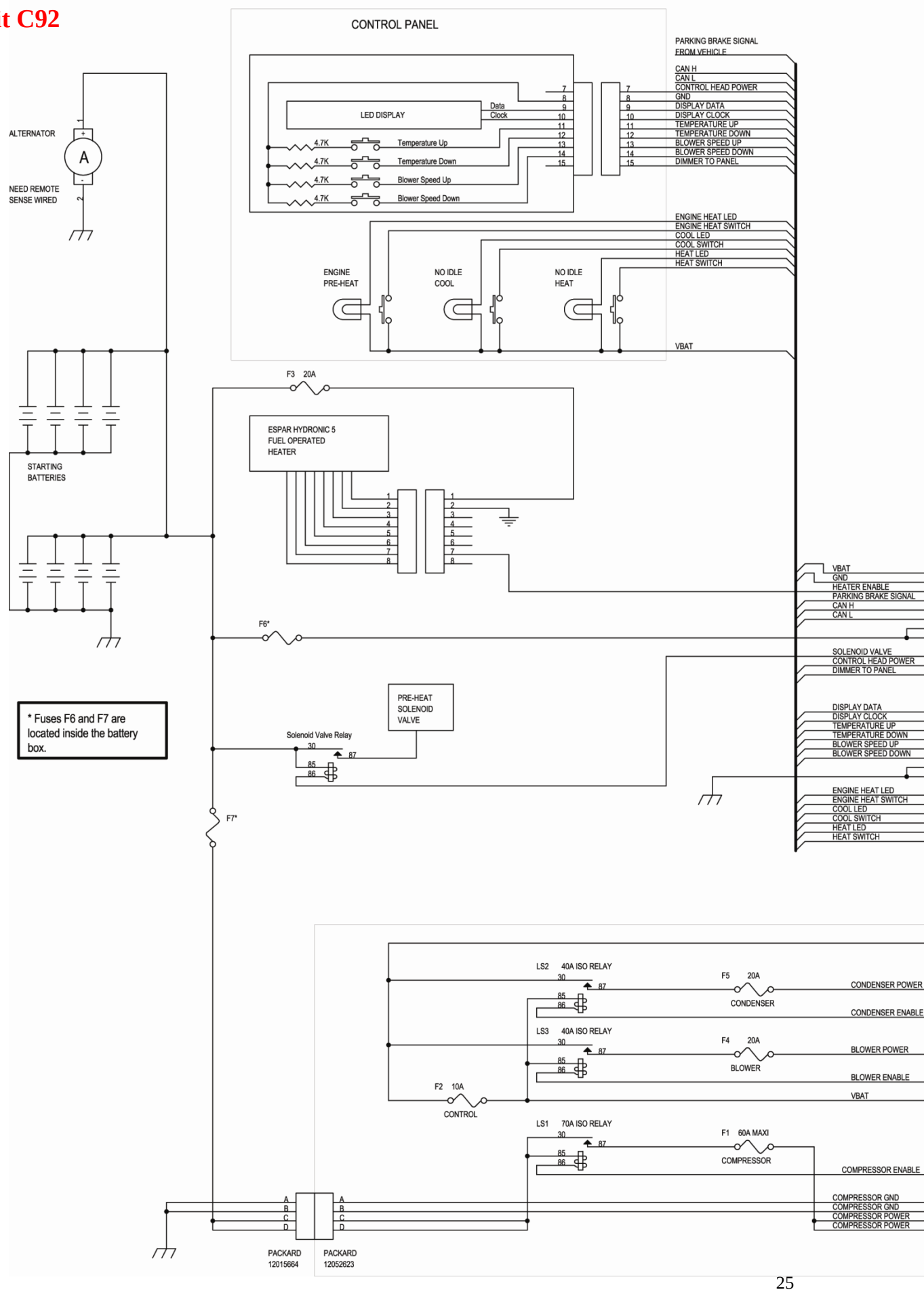
Fault	Description	Potential Causes
3	Blower Motor Relay Fault	• Blower relay failure • Relay enable signal from system controller shorted to power
5	Discharge Temp Sensor High	• Discharge sensor wire shorted to power • Discharge sensor missing or open circuit in sensor wiring • Discharge sensor faulty
6	Discharge Temp Sensor Low	• Discharge sensor wire shorted to ground • Discharge sensor faulty
9	Battery Voltage High	• Charging circuit
10	Battery Voltage Low	• Battery or charging circuit
11	Recirculation Sensor High	• Recirculation sensor wire shorted to power • Recirculation sensor missing or open circuit in sensor wiring • Recirculation sensor faulty
12	Recirculation Sensor Low	• Recirculation sensor wire shorted to ground • Recirculation sensor faulty
15	Compressor Relay Fault	• Compressor and Condenser relay failure • Relay enable signal from system controller shorted to power
17	Condenser Fan Relay Fault	• Compressor and Condenser relay fault • Relay enable signal from system controller shorted to power
19	High Refrigerant Pressure	• High refrigerant pressure in system • Pressure sensor unplugged or open circuit in sensor wiring • Pressure sensor faulty

PIN OUT CHART

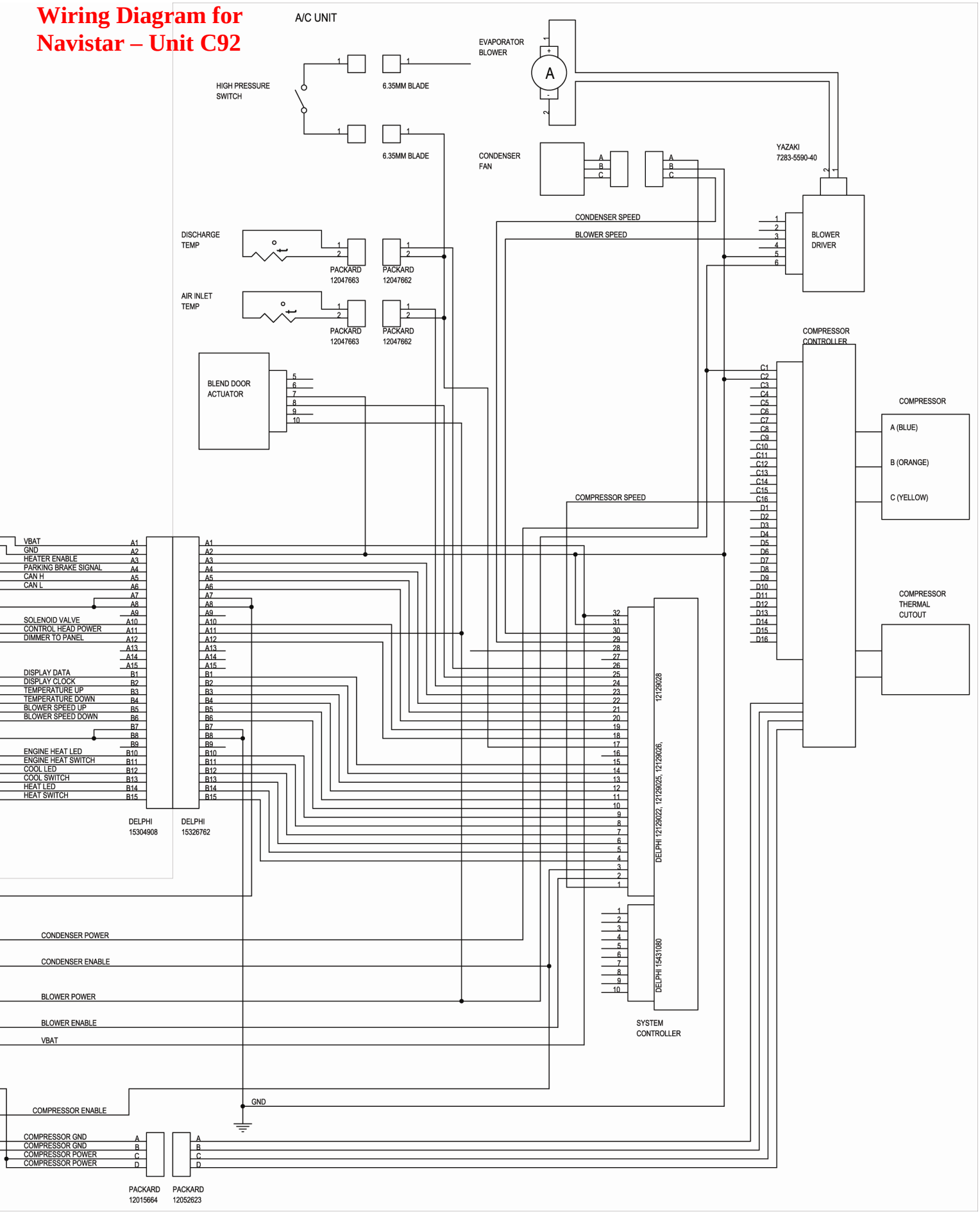
J1	Pin	Description	I/O/Power	Digital/Analog	Comments
	32	Vbat	Power	Power	+12VDC supply
	31	Ground	Power	Power	Ground from supply
	30	Blower Signal	Output	Digital	PWM output to blower LPM Low speed = 4.5V High speed = 2.5V
	29	Condenser Signal	Output	Digital	PWM output to condenser fan Low speed = 3.1V High speed = 4.8V
	28	Pressure Switch	Input	Digital	0V with pressure switch closed 12V with pressure swith open or missing
	27	Evaporator Temp	Input	Analog	Not used
	26	Discharge Temp	Input	Analog	5V with no discharge sensor attached
	25	Blend Door Signal	Output	Analog	Varies from 0V (max heat) to 11V (max cold)
	24	Sleeper Temp	Input	Analog	5V with no sleeper sensor attached
	23	Heater Enable	Output	Digital	12V when calling for heat 0V otherwise
	22	Parking Brake	Input	Digital	12V when parking brake engaged 0V otherwise
	21	CAN High	I/O	Differential	J1939 Databus
	20	CAN Low	I/O	Differential	J1939 Databus
	19	Coolant Valve Enable	Output	Digital	Not used
	18	Dimmer Out	Output	Digital	Voltage ranging from 0V to 5V depending on brightness level
	17	Sensor Ground	Power	Power	Overcurrent protected ground for sensors
	16	Actuator Power	Power	Power	Not used
	15	Display Data	Output	Digital	Databus with voltages varying from 0V to 5V
	14	Display Clock	Output	Digital	Databus with voltages varying from 0V to 5V
	13	Temperature Up Button	Input	Digital	0V when temperature UP button is pressed 5V when not pressed
	12	Temperature Down Button	Input	Digital	0V when temperature DOWN button is pressed 5V when not pressed
	11	Blower Up Button	Input	Digital	0V when blower UP button is pressed 5V when not pressed
	10	Blower Down Button	Input	Digital	0V when blower DOWN button is pressed 5V when not pressed
	9	Pre-Heat LED	Output	Digital	Switched to Ground when PRE-HEAT LED illuminated Floating otherwise
	8	Pre-Heat Switch	Input	Digital	12V when PRE-HEAT button is pressed 0V when not pressed
	7	Cool LED	Output	Digital	Switched to Ground when COOL LED illuminated Floating otherwise
	6	Cool Switch	Input	Digital	12V when COOL button is pressed 0V when not pressed
	5	Heat LED	Output	Digital	Switched to Ground when HEAT LED illuminated Floating otherwise
	4	Heat Switch	Input	Digital	12V when HEAT button is pressed 0V when not pressed
	3	Cond/Comp Relay Enable	Output	Digital	Switch to ground when compressor and condenser are requested
	2	Blower Relay Enable	Output	Digital	Switch to ground when blower is requested
	1	Compressor Signal	Output	Digital	PWM output to compressor controller Low speed = 3.9V High speed = 3.2V

J3	Pin	Description	I/O/Power	Digital/Analog	Comments
	1	APU Request	Output	Digital	Not used
	2	APU Feedback	Input	Digital	Not used
	3	Dimmer In	Input	Digital	Not used
	4	ISO9141	I/O	Digital	Not used
	5	Spare Relay 1	Output	Digital	Not used
	6	Spare Relay 2	Output	Digital	Not used
	7	Spare Input 1	Input	Digital	Not used
	8	Compressor Fault	Input	Digital	Not used
	9	Blower Fault	Input	Digital	Not used
	10	Condenser Fault	Input	Digital	Not used

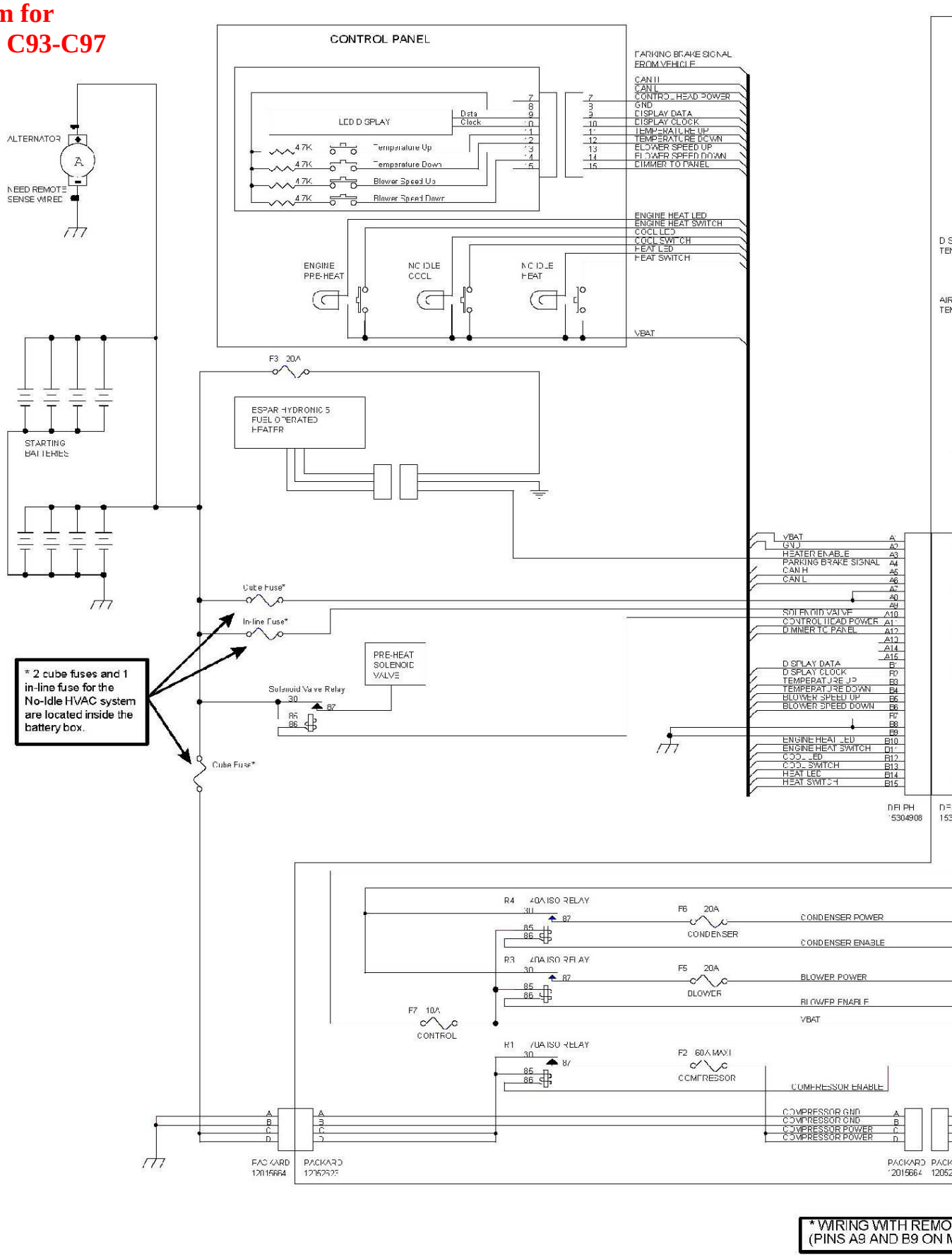
Wiring Diagram for Navistar – Unit C92



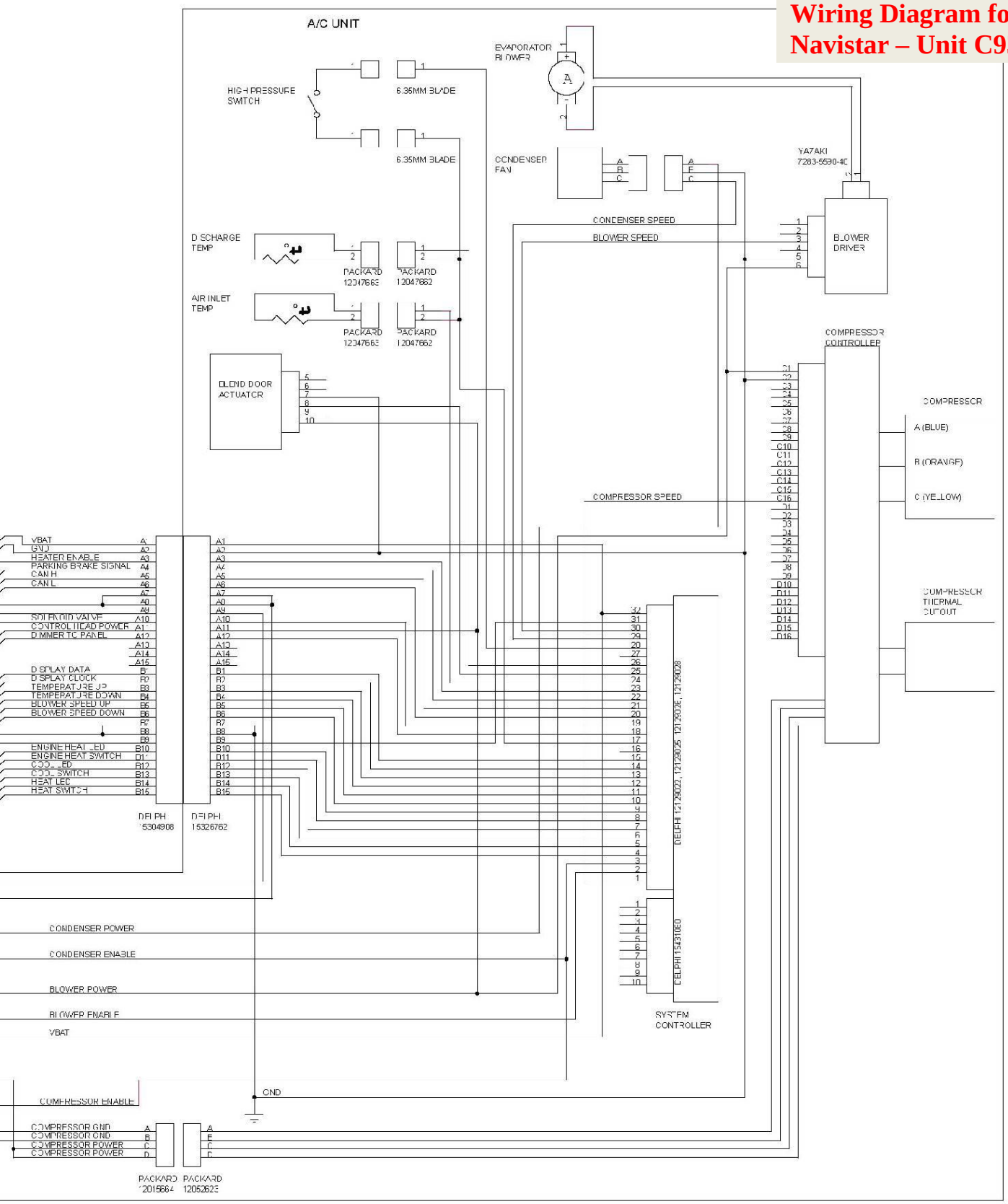
Wiring Diagram for Navistar – Unit C92



Wiring Diagram for Navistar – Unit C93-C97

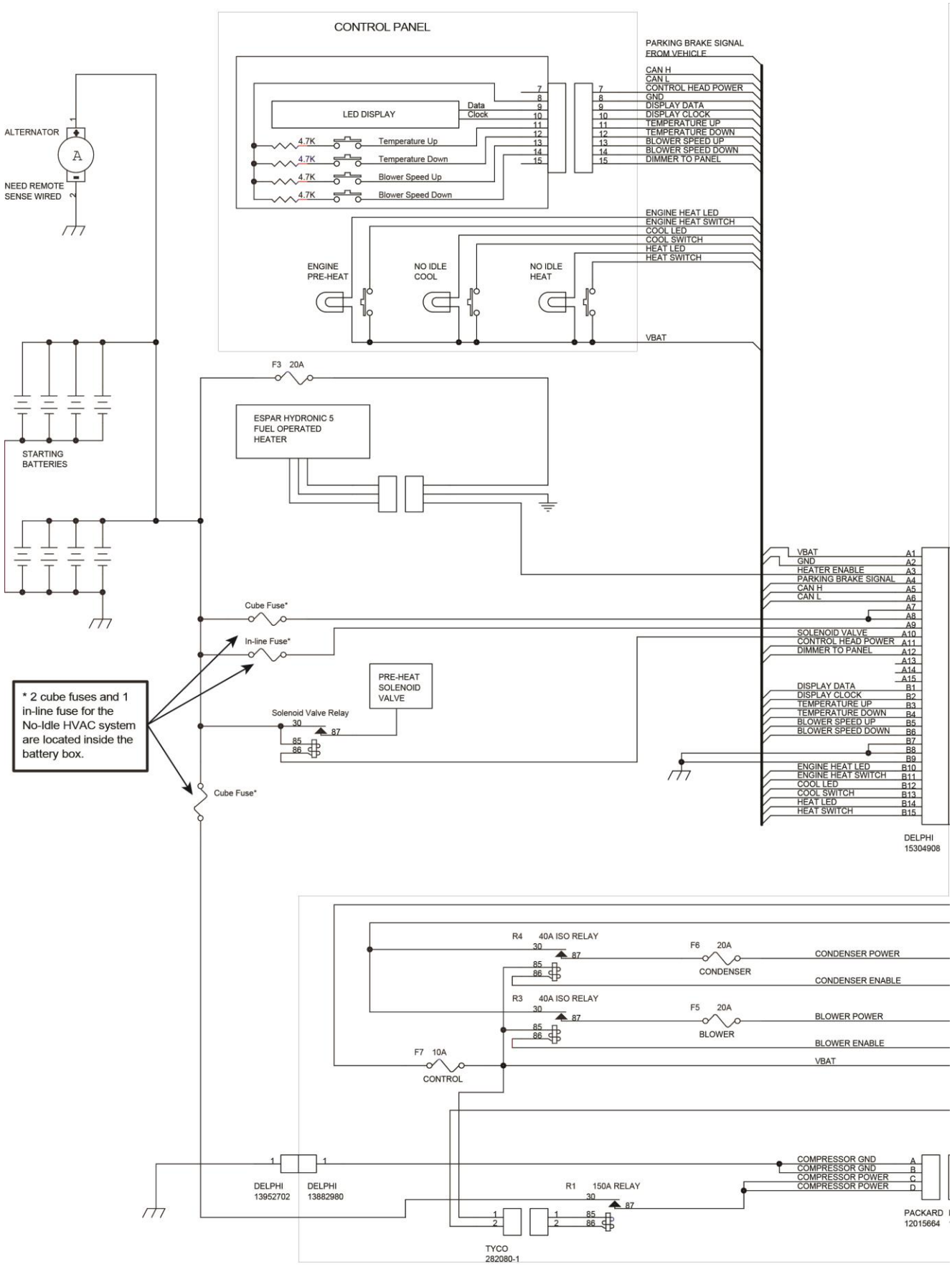


Wiring Diagram for Navistar – Unit C93-C97



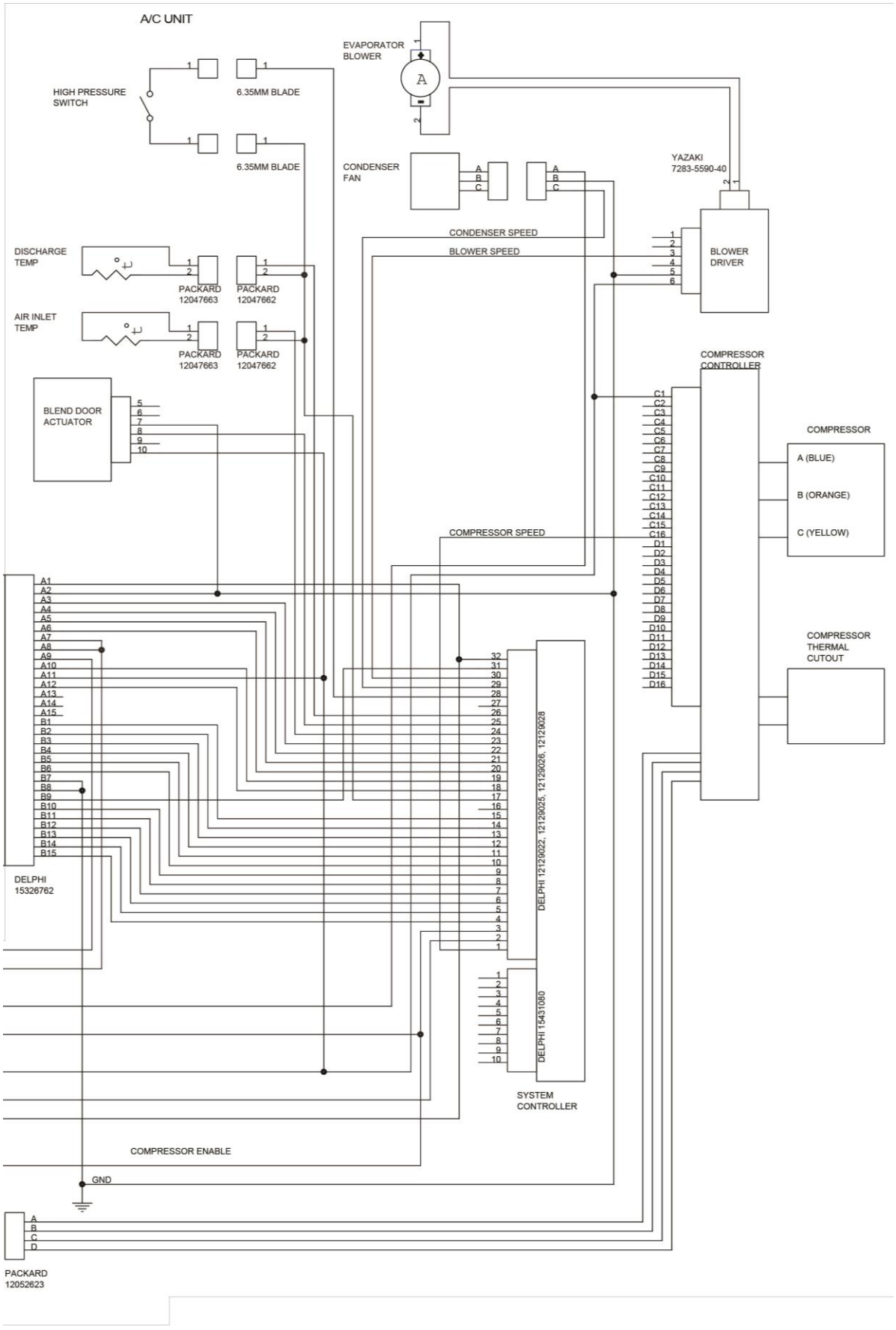
* WIRING WITH REMOTE VOLTAGE SENSING WIRES ADDED
(PINS A9 AND B9 ON MAIN 30-WAY CONNECTOR)

Wiring Diagram for Navistar – as of 06/23/2014



* WIRING WITH REMOTE VOLTAGE SENSING WIRES ADDED
(PINS A9 AND B9 ON MAIN 30-WAY CONNECTOR)

Wiring Diagram for Navistar – as of 06/23/2014



International ProStar MaxxPower

See exploded view on page 4.

Subject: Diagnosis of Intermittent System Operation Resulting in Low or No Cooling Performance

Background

Various conditions can cause a system to operate intermittently and have little
or no cooling ability. When servicing a specified unit for operation or performace, it is necessary to make sure the condenser fan is operating correctly.

The condenser fan motor may exhibit “dead spots” prohibiting start-up when the HVAC unit is turned on. This motor is made-up of 24 cog positions roughly 1½ inches apart on the condenser blade.

Driver Observation

- MaxxPower no-idle system is not operating continuously or no cooling.

Diagnostic Procedure for Technicians (Estimated time – 10 minutes)

1. Follow manufacture safety guidelines when servicing this vehicle.
2. Start the MaxxPower no-idle system by adjusting to full cold and high blower speed. Visually inspect condenser fan to verify proper operation. If the condenser fan is not operating, verify for 12 volts across the red and black wires at the condenser fan plug. Also, verify signal voltage is present at the connector. **If the condenser fan has 12 volts and signal voltage but is not working properly please carry out the service replacement procedure. (See page 32).**

   Note: For complete fan diagnostics it is necessary to perform additional phase tests. This preliminary test in *step 2* only confirms the condenser fan operates on one phase of the motor.

   If the condenser fan appears to be working properly continue diagnostic and verify the following:

3. Check engine off, key off, parking brakes set, and MaxxPower no-idle system is turned off.
4. Remove the OEM condenser grill on the passenger side of the truck.
5. ⚠ Disconnect power to the condenser fan before advancing through the diagnostic procedure. Failure to follow this step may cause bodily injuries to yourself and/or others as well as damages to the specified unit. This warning is for your protection and information.
6. Mark “fan blade” with silver permanent marker as shown. This will be the home location.

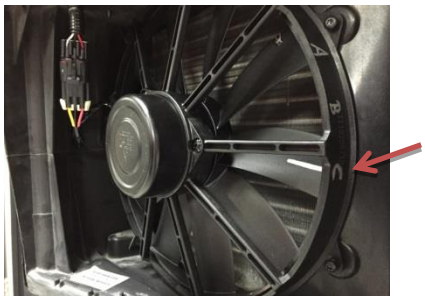
Location 1
(Home location)

Mark “A” as the first test location

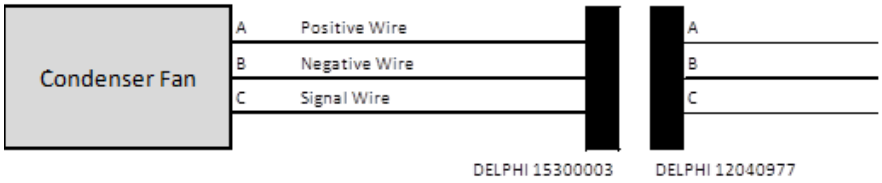
Diagnostic Procedure for Technicians (Estimated time – 10 minutes) - Continued

7. Rotate clockwise 1 cogging torque position and mark the second test location “B”.

8. Rotate clockwise 1 cogging torque position and mark the third test location “C”.



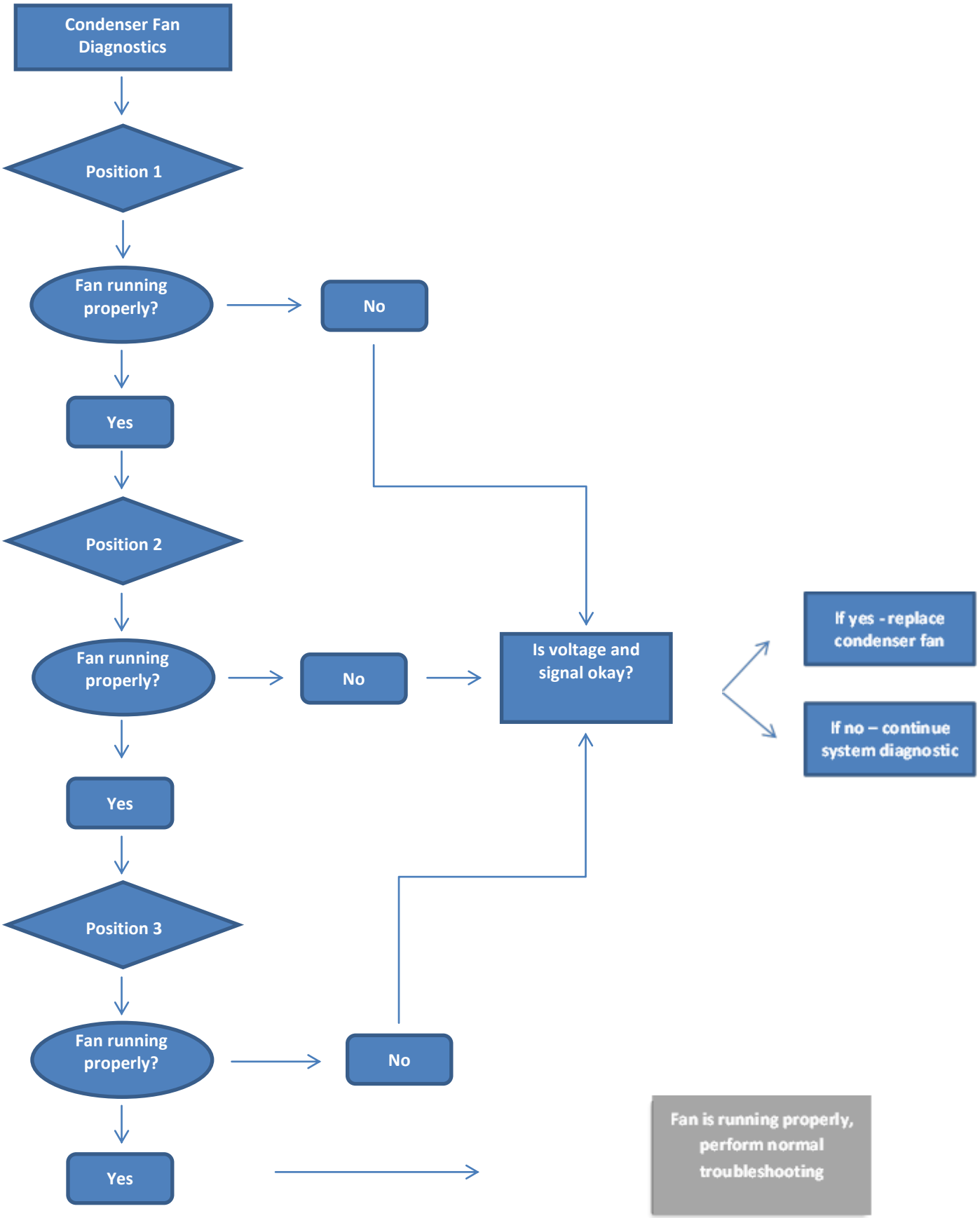
9. Return fan blade to the home location (“A”) and reconnect power to the condenser fan.
10. Start the MaxxPower no-idle system by adjusting to full cold and high blower speed. Visually inspect condenser fan to verify proper operation. If the condenser fan is not operating, verify for 12 volts across the red and black wires at the condenser fan plug. Also, verify signal voltage is present at the connector. **If the condenser fan has 12 volts and signal voltage but is not working properly please carry out the service replacement procedure.**



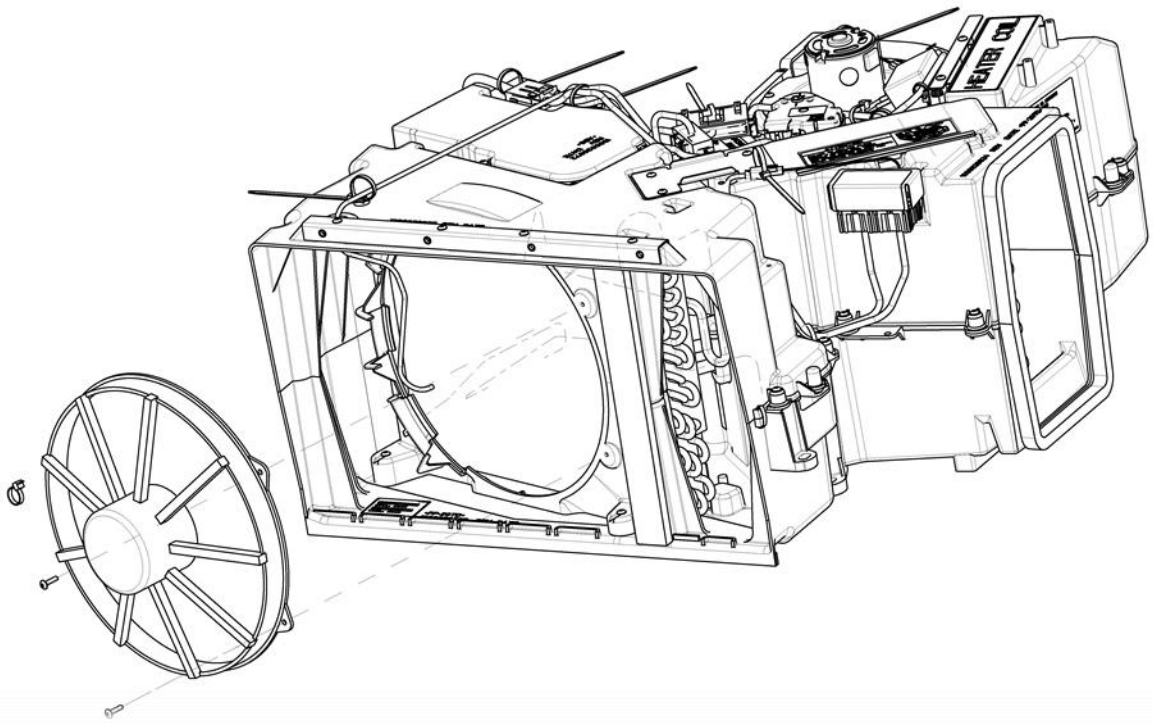
11. Once fan has been confirmed functional, shut down the MaxxPower no-idle system and disconnect power to the condenser fan.
12. Wait until the fan completely stops running.
13. Repeat steps 10-12 for test locations B and C.
14. If the condenser fan is working properly in positions A, B, and C the diagnostic procedure is complete. No further testing is required. Reconnect the condenser fan and reinstall the OEM condenser grill.

Service Replacement Procedure (Only required for confirmed failures)

1. Verify the MaxxPower no-idle system is turned off and the condenser fan power harness has been disconnected.
2. Remove all the condenser fan mounting hardware and remove the fan from the assembly.
3. Mount the new condenser fan assembly and install the fasteners at 20 in/lbs torque. Do not overtighten.
4. Reconnect the condenser fan and reinstall the OEM condenser grill.
5. Retest Maxxpower unit – follow step 10 above.



International ProStar MaxxPower Exploded View



Service Instructions for Ring Terminal / Controller and Compressor

WARNING: To avoid potential property damage or personal injury, Read Important Safety Warnings and ALL instructions before attempting to install or service product.

CAUTION: Care must always be taken to install the control cover without bending the connector pins identified in **FIGURE 1**.

After the controller with phase harness has been removed from the unit, follow the below instructions to replace the phase harness.

1. Remove (3) nuts holding the ring terminals to the PCB

2. Remove and retain cover, cover screws, & (2) wiring grommets

3. Unplug 2-pin connector from PCB and remove old phase harness

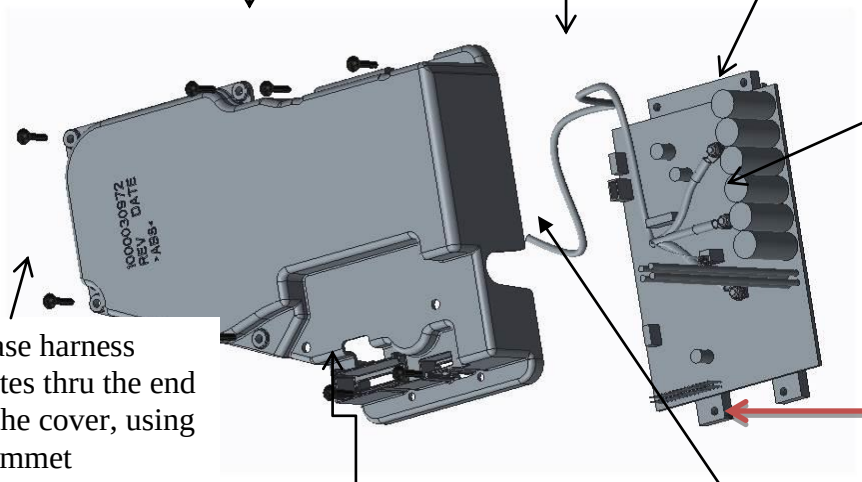


Figure 1

Service Instructions for Ring Terminal / Controller and Compressor

⚠ WARNING: To avoid potential property damage or personal injury, Read Important Safety Warnings and ALL instructions before attempting to install or service product.

CAUTION: Care must always be taken to install the control cover without bending the connector pins identified in **FIGURE 1**.

4. Slide (3) ring terminals of new harness over threaded posts of PCB and route wires as shown

   ⚠ Align each colored wire to specific threaded post identified only.

5. Secure wire terminals with (3) nuts. Torque to 12 to 14 in-lbs

   ⚠ Use the torque value specified.

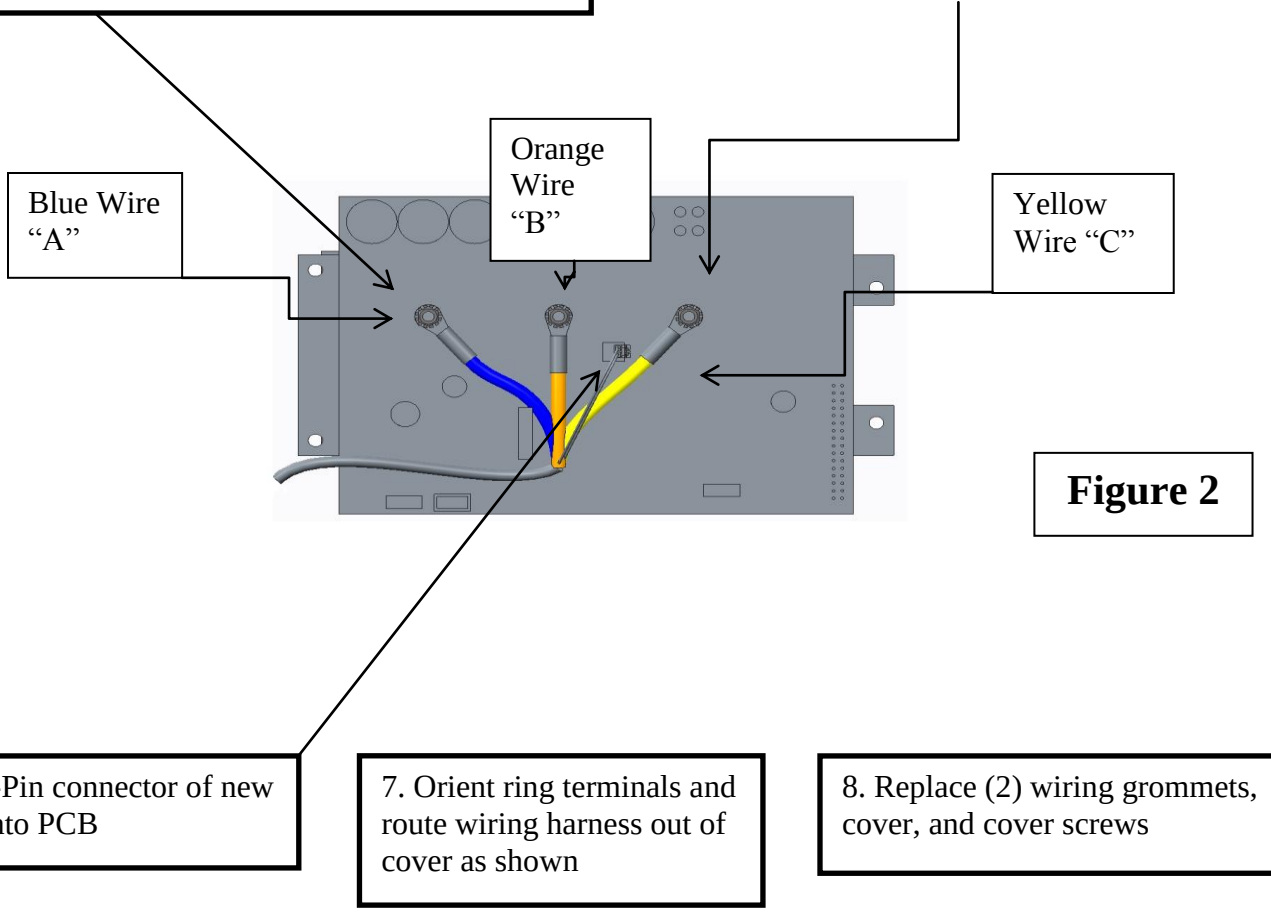


Figure 2

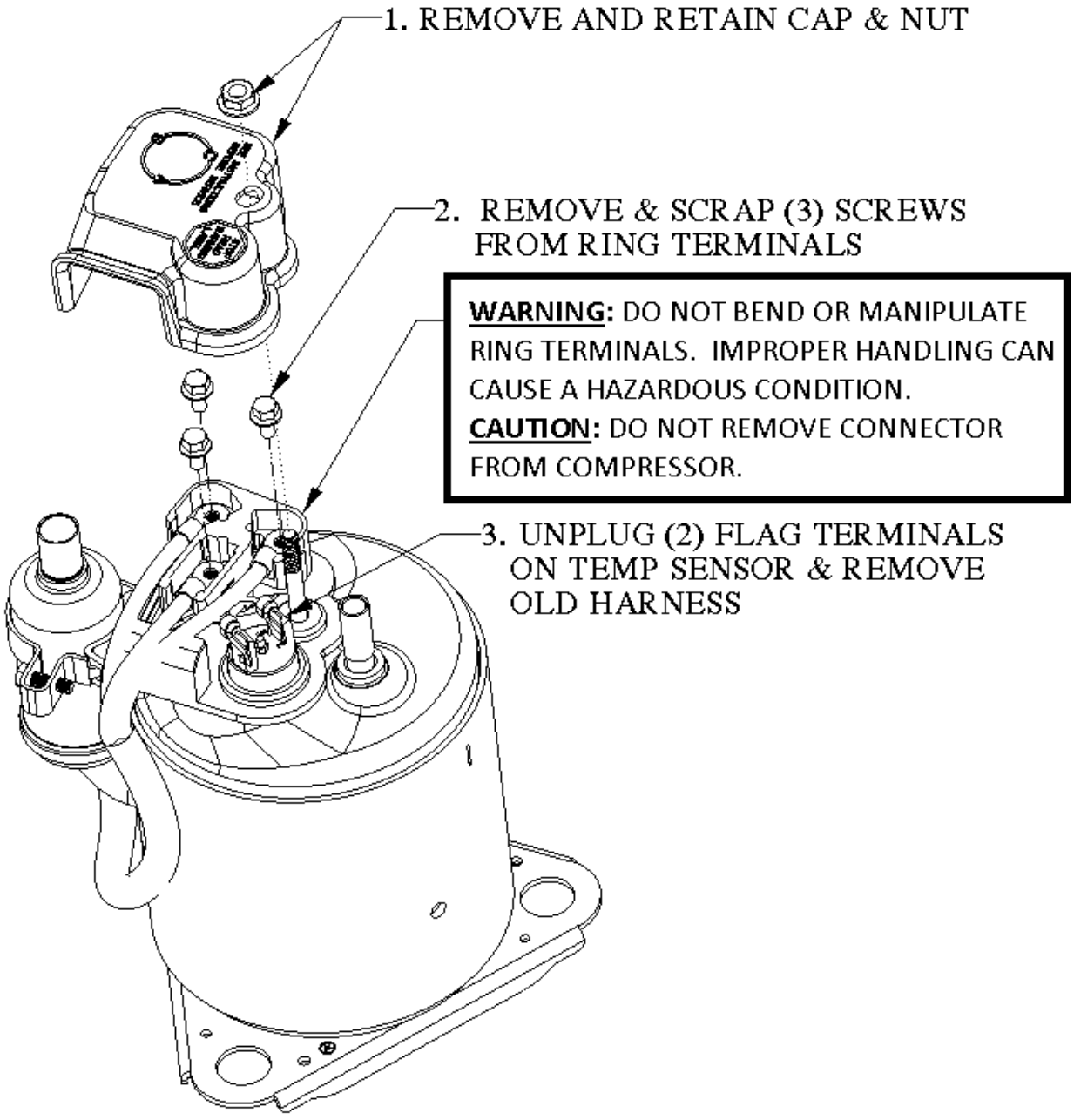
6. Plug 2-Pin connector of new harness into PCB

7. Orient ring terminals and route wiring harness out of cover as shown

8. Replace (2) wiring grommets, cover, and cover screws

Service Instructions for Ring Terminal / Controller and Compressor

WARNING: To avoid potential property damage or personal injury, Read Important Safety Warnings and ALL instructions before attempting to install or service product.



Service Instructions for Ring Terminal / Controller and Compressor

WARNING: To avoid potential property damage or personal injury, Read Important Safety Warnings and ALL instructions before attempting to install or service product.