Johnson Controls	PACKAGED ROOFTOP AIR CONDITIONING UNITS	
INSTALLATION INSTRUCTIONS	Supersedes: 100.50-N25 (1211)	Form 100.50-N25 (215)

035-21040-500

YPAL MOD C
MODULATING GAS HEAT TO STAGED GAS HEAT CONVERSION KIT INSTRUCTIONS

00566VIP

Issue Date:
February 11, 2015

IMPORTANT!

READ BEFORE PROCEEDING!

GENERAL SAFETY GUIDELINES

This equipment is a relatively complicated apparatus. During rigging, installation, operation, maintenance, or service, individuals may be exposed to certain components or conditions including, but not limited to: heavy objects, refrigerants, materials under pressure, rotating components, and both high and low voltage. Each of these items has the potential, if misused or handled improperly, to cause bodily injury or death. It is the obligation and responsibility of rigging, installation, and operating/service personnel to identify and recognize these inherent hazards, protect themselves, and proceed safely in completing their tasks. Failure to comply with any of these requirements could result in serious damage to the equipment and the property in which it is situated, as well as severe personal injury or death to themselves and people at the site.

This document is intended for use by owner-authorized rigging, installation, and operating/service personnel. It is expected that these individuals possess independent training that will enable them to perform their assigned tasks properly and safely. It is essential that, prior to performing any task on this equipment, this individual shall have read and understood the on-product labels, this document, and any referenced materials. This individual shall also be familiar with and comply with all applicable industry and governmental standards and regulations pertaining to the task in question.

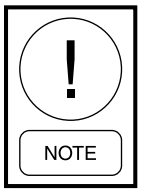
SAFETY SYMBOLS

The following symbols are used in this document to alert the reader to specific situations:

Indicates a possible hazardous situation which will result in death or serious injury if proper care is not taken.

Identifies a hazard which could lead to damage to the machine, damage to other equipment and/or environmental pollution if proper care is not taken or instructions and are not followed.

Indicates a potentially hazardous situation which will result in possible injuries or damage to equipment if proper care is not taken.



Highlights additional information useful to the technician in completing the work being performed properly.

External wiring, unless specified as an optional connection in the manufacturer's product line, is not to be connected inside the control cabinet. Devices such as relays, switches, transducers and controls and any external wiring must not be installed inside the micro panel. All wiring must be in accordance with Johnson Controls' published specifications and must be performed only by a qualified electrician. Johnson Controls will NOT be responsible for damage/problems resulting from improper connections to the controls or application of improper control signals. Failure to follow this warning will void the manufacturer's warranty and cause serious damage to property or personal injury.

CHANGEABILITY OF THIS DOCUMENT

In complying with Johnson Controls' policy for continuous product improvement, the information contained in this document is subject to change without notice. Johnson Controls makes no commitment to update or provide current information automatically to the manual or product owner. Updated manuals, if applicable, can be obtained by contacting the nearest Johnson Controls Service office or accessing the Johnson Controls QuickLIT website at http://cgproducts.johnsoncontrols.com.

It is the responsibility of rigging, lifting, and operating/service personnel to verify the applicability of these documents to the equipment. If there is any question regarding the applicability of these documents, rigging, lifting, and operating/service personnel should verify whether the equipment has been modified and if current literature is available from the owner of the equipment prior to performing any work on the chiller.

CHANGE BARS

Revisions made to this document are indicated with a line along the left or right hand column in the area the revision was made. These revisions are to technical information and any other changes in spelling, grammar or formatting are not included.

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

SECTION 1 - GENERAL INFORMATION

PURPOSE

This procedure is intended to supply the information required to convert a YPAL unit with the OptiLogic Controller and Modulating gas heat to staged gas heat.

CONVERSION KIT PART NUMBER

There are three different kits available based on the number of heat sections in the unit. The following kits are available through Baltimore Parts.

Single Heat Section – Part Number 385-10059-001

Double Heat Section – Part Number 385-10059-002

Triple Heat Section – Part Number 385-10059-003

TOOLS REQUIRED

1. Diagonal Cutters
2. Drill
3. Philips Screw Driver
4. Wire Stripping Tool
5. 5/16” Magnetic Socket
6. Needle Nose Pliers
7. Crimping Tool

MATERIALS NEEDED (OPTIONAL)

The following materials may be needed to sucessfully complete the retrofit.

1. Pipe Thread Sealant
2. Miscellaneous Electrical Connections
3. Miscellaneous Gas Pipe Fittings
4. Outdoor Rated Water Tight Flexible Conduit and Fittings

   This material could possibly make installing the new power wiring harness and control wiring harness simpler. Please inspect the two wiring harnesses provided with the kit to determine the proper size conduit needed. The instructions state to pull the new harnesses through the existing conduit, which has proven to be rather difficult.

TABLE 1 - SINGLE HEAT EXCHANGER KIT – PART NUMBER 385-10059-001

ITEM NUMBER	PART NUMBER	QUANTITY	DESCRIPTION
1	025-36283-001	1	Gas Heat Control Harness
2	025-36284-002	1	Gas Heat Power Harness
3	026-43333-500	1	Gas Heat Section Manifold/Burner Assembly
4	325-36145-001	1	Gas Heat Control Panel
5	021-30530-001	4	Screw #10 Self Driller
6	025-10535-000	2	Inline Splice
7	025-36462-000	4	Wire Nut
8	035-18301-000	1	Staged Gas Heat Wiring Label YPAL 50 - 65
9	035-18301-002	1	Staged Gas Heat Wiring Label YPAL 070 - 105
10	025-23763-001	15	Tie Wrap - 8 Inch
11	025-23765-001	20	Tie Wrap - 4 Inch
12	023-20058-000	1	1-1/2 Sch 40 X 8 Inch Black Steel Pipe Nipple
13	023-20063-000	1	1-1/2 Sch 40 X16-3/8 Inch Black Steel Pipe Nipple
14	035-21040-500	1	YPAL Mod C Modulating Gas Heat To Staged Gas Heat Conversion Kit Instructions
15	035-13467-001	1	Component Map - YPAL050 - 065 Staged Gas Heat
16	035-13467-002	1	Component Map - YPAL070 - 105 Staged Gas Heat

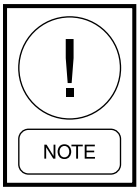
TABLE 2 - DOUBLE HEAT EXCHANGER KIT – PART NUMBER 385-10059-002

ITEM NUMBER	PART NUMBER	QUANTITY	DESCRIPTION
1	025-36283-001	1	Gas Heat Control Harness
2	025-36284-002	1	Gas Heat Power Harness
3	026-43333-500	1	Gas Heat Section Manifold/Burner Assembly
4	325-36145-001	2	Gas Heat Control Panel
5	021-30530-001	8	Screw #10 Self Driller
6	025-10535-000	2	Inline Splice
7	025-36462-000	4	Wire Nut
8	035-18301-000	1	Staged Gas Heat Wiring Label YPAL 50 - 65
9	035-18301-002	1	Staged Gas Heat Wiring Label YPAL 070 - 105
10	025-23763-001	15	Tie Wrap - 8 Inch
11	025-23765-001	20	Tie Wrap - 4 Inch
12	023-20058-000	1	1-1/2 Sch 40 X 8 Inch Black Steel Pipe Nipple
13	023-20063-000	1	1-1/2 Sch 40 X16-3/8 Inch Black Steel Pipe Nipple
14	035-21040-500	1	YPAL Mod C Modulating Gas Heat To Staged Gas Heat Conversion Kit Instructions
15	035-13467-001	1	Component Map - YPAL050 - 065 Staged Gas Heat
16	035-13467-002	1	Component Map - YPAL070 - 105 Staged Gas Heat

TABLE 3 - TRIPLE HEAT EXCHANGER KIT – PART NUMBER 385-10059-003

ITEM NUMBER	PART NUMBER	QUANTITY	DESCRIPTION
1	025-36283-001	1	Gas Heat Control Harness
2	025-36284-002	1	Gas Heat Power Harness
3	026-43333-500	1	Gas Heat Section Manifold/Burner Assembly
4	325-36145-001	3	Gas Heat Control Panel
5	021-30530-001	12	Screw #10 Self Driller
6	025-10535-000	2	Inline Splice
7	025-36462-000	4	Wire Nut
8	035-18301-000	1	Staged Gas Heat Wiring Label YPAL 50 - 65
9	035-18301-002	1	Staged Gas Heat Wiring Label YPAL 070 - 105
10	025-23763-001	15	Tie Wrap - 8 Inch
11	025-23765-001	20	Tie Wrap - 4 Inch
12	023-20058-000	1	1-1/2 Sch 40 X 8 Inch Black Steel Pipe Nipple
13	023-20063-000	1	1-1/2 Sch 40 X16-3/8 Inch Black Steel Pipe Nipple
14	035-21040-500	1	YPAL Mod C Modulating Gas Heat To Staged Gas Heat Conversion Kit Instructions
15	035-13467-001	1	Component Map - YPAL050 - 065 Staged Gas Heat
16	035-13467-002	1	Component Map - YPAL070 - 105 Staged Gas Heat

SECTION 2 - INSTALLATION



It is recommended that before beginning the retrofit, the technician should thoroughly read the entire retrofit procedure and become familiar with the component locations and the scope of the work required.

INSTALLATION PROCEDURE

1. Remove all electrical power to the unit. Follow proper "Lock Out / Tag Out" procedure to make sure the unit does not restart while the revisions are being made.
2. Shut off the gas supply to the unit, and install a valve locking device to prevent the gas from being turned on while performing the retrofit.

Remove the Gas Manifold from the Unit

3. Disconnect the unit gas manifold piping assembly from the building gas supply.
4. Open the union(s) that connect the gas manifold assembly piping to each of the gas heat sections.
5. Remove the gas manifold piping assembly from the unit. Retain this assembly.

Remove the Wiring from the Modulating Gas Heat Section**

6. Remove the wires from the Modulating Gas Valve Signal Conditioner.
   a. Remove wire 602 from terminal 1 of the Signal Conditioner.
   b. Remove wire 603 from terminal 2 of the Signal Conditioner.
   c. Remove wire 662 from terminal 3 of the Signal Conditioner.
   d. Remove wire 663 from terminal 4 of the Signal Conditioner.
   e. Remove wire 660 from terminal 5 of the Signal Conditioner.
   f. Remove wire 661 from terminal 6 of the Signal Conditioner.
   g. Remove the Modulating Gas Valve Signal Conditioner from the unit.
7. Remove the wires from the Roll Out Switches.
   a. Remove wire 610 from the Section 1A (right side) RS7 Roll Out Switch.
   b. Remove wire 611 from the Section 1A (right side) RS7 Roll Out Switch.
   c. Remove wire 627 from the Section 1B (left side) RS8 Roll Out Switch.
8. Remove the wires from the Limit Switches.
   a. Remove wire 608 from the LS6 Limit Switch at the front of the Heat Exchanger Assembly.
   b. Remove wire 609 from the LS6 Limit Switch at the front of the Heat Exchanger Assembly.
   c. Remove wire 625 from the LS7 Limit Switch at PSW terminal of the IC5 ignition module on the Modulating Heat Control Assembly.
   d. Remove wire 618 from the normally open contact of the 27R-2 relay on the Heat Modulating Heat Control Assembly.
9. Remove the wires from the Section 1A (bottom) 2-Stage Gas Valve. (4GV)
   a. Remove wire 611 from the low fire terminal of the 2-Stage Gas Valve. (4GV)
   b. Remove wire 612 from the high fire terminal of the 2-Stage Gas Valve. (4GV)
   c. Remove wire 614 from the common terminal of the 2-Stage Gas Valve. (4GV)
10. Remove the wires from the Section 1B (top) 2-Stage Gas Valve. (5GV)

    Remove wire 629 from the common terminal of the 2-Stage Gas Valve. (5GV)
11. Remove the 606 wire from the Flame Sensing Rod on the Section 1A (right side) of the Gas Heat Burner Assembly. (IC4)
12. Remove the orange igniter wire from the Igniter on the Section 1A (right side) of the Gas Heat Burner Assembly. (IC4)
13. Remove the 623 wire from the Flame Sensing Rod on the Section 1B (left side) of the Gas Heat Burner Assembly. (IC5)

**All wire numbers used are from DWG 035-13577-002 Revision C.

14. Remove the orange igniter wire from the Igniter on the Section 1B (left side) of the Gas Heat Burner Assembly. (IC5)
15. Remove the green/yellow ground wire from the Burner Manifold Assembly.
16. Remove the wires from the Section 1 Control Module that run to the Section 1 Inducer Motor.
    a. Remove the red wire from the normally closed contact of the 26R-1 relay. (LOW SPD)
    b. Remove the black wire from the normally open contact of the 26R-1 relay. (HI SPD)
    c. Remove the white wire from the in-line splice connector with wire number 501.

Remove the Section 1 Modulating Gas Heat Control Panel

17. Remove the control voltage wires from the Modulating Gas Heat Control Assembly.
    a. Separate the J60/P60 3 pin connector.
    b. Remove wire 664 from the in-line splice connector. Wire 664 connects to the PS8 pressure switch located in the blower compartment, as shown in *Figure 5 on page 21*.
    c. Remove wire 665 from the in-line splice connector. Wire 665 connects to the PS8 pressure switch located in the blower compartment.
    d. Separate the P57/J57 2 pin connector.
    e. Remove the green/yellow wire from the ground lug.
18. Remove the power wires from the Modulating Gas Heat Control Assembly.

    Remove wire 500 from the common terminal of the 27R-1 relay.
19. If a second heat section is installed,
    a. Remove wire 669 from terminal 11 (#2 STATUS) of the TB2 terminal block of the Furnace Controller.
    b. Remove wire 670 from terminal 10 (1B STATUS) of the TB2 terminal block of the Furnace Controller.
    c. Remove wire 632 from terminal 2 (#2 START) of the TB1 terminal block of the Furnace Controller.
    d. Remove wire 633 from terminal 4 (#2 HIGH) of the TB1 terminal block of the Furnace Controller.
20. If a third heat section is installed,
    a. Remove wire 669 from terminal 11 (#2 STATUS) of the TB2 terminal block of the Furnace Controller.
    b. Remove wire 668 from terminal 12 (#3 STATUS) of the TB2 terminal block of the Furnace Controller.
    c. Remove wire 647 from terminal 7 (#3 START) of the TB1 terminal block of the Furnace Controller.
    d. Remove wire 648 from terminal 5 (#3 HIGH) of the TB1 terminal block of the Furnace Controller.
21. Remove the tubing from the pressure switches.
    a. Remove the tube from the PS4 Pressure Switch.
    b. Remove the tube from the PS5 Pressure Switch.
22. Remove the Modulating Gas Heat Control Panel from the unit.

Remove the Wiring from the Section 2 Gas Heat Section (if Installed)

23. Remove the wires from the Roll Out Switches.
    a. Remove wire 639 from the RS9 Roll Out Switch.
    b. Remove wire 641 from the RS10 Roll Out Switch.
24. Remove the wires from the Limit Switches.
    a. Remove wire 635 from the LS8 Limit Switch at the front of the Heat Exchanger Assembly.
    b. Remove wire 637 from the PS6 Pressure Switch in the Second Section Gas Heat Control Box.
25. Remove the wires from the Section 2, 2-Stage Gas Valve. (6GV)
    a. Remove wire 641 from the low fire terminal of the 2-Stage Gas Valve. (6GV)
    b. Remove wire 642 from the high fire terminal of the 2-Stage Gas Valve. (6GV)

c. Remove wire 644 from the common terminal of the 2-Stage Gas Valve. (6GV)

26. Remove the 630 wire from the Flame Sensing Rod on Section 2 of the Gas Heat Burner Assembly. (IC6)
27. Remove the orange igniter wire from the IGN connection on the IC6 Ignition Control.
28. Remove the wires from the Section 2 Control Module that run to the Section 2 Inducer Motor.
    a. Remove the black wire from the IND terminal of the IC6 Ignition Control.
    b. Remove the white wire from the in-line splice connector with wire number 501.
29. Remove the green/yellow wire from the Manifold/Burner Assembly.

Remove the Section 2 Gas Heat Control Panel (if Installed)

30. Remove the power wires from the Section 2 Control Assembly.
    a. Separate the P58/J58 2 pin connector.
    b. Remove wire 500 from the L1 connection on the IC6 Ignition Control.
31. Remove the tubing from the PS6 Pressure Switch.
32. Remove the Section 2 Control Panel from the unit.

Remove the Wiring from the Section 3 Gas Heat Section (if Installed)

33. Remove the wires from the Roll Out Switches.
    a. Remove wire 654 from the RS11 Roll Out Switch.
    b. Remove wire 656 from the RS12 Roll Out Switch.
34. Remove the wires from the Limit Switches.
    a. Remove wire 650 from the LS10 Limit Switch at the front of the Heat Exchanger Assembly.
    b. Remove wire 652 from the PS7 Pressure Switch in the Third Section Gas Heat Control Box.
35. Remove the wires from the Section 2, 2-Stage Gas Valve. (7GV)
    a. Remove wire 656 from the low fire terminal of the 2-Stage Gas Valve. (7GV)
    b. Remove wire 657 from the high fire terminal of the 2-Stage Gas Valve. (7GV)
    c. Remove wire 659 from the common terminal of the 2-Stage Gas Valve. (7GV)
36. Remove the 645 wire from the Flame Sensing Rod on Section 2 of the Gas Heat Burner Assembly. (IC7)
37. Remove the orange igniter wire from the IGN connection on the IC7 Ignition Control.
38. Remove the green/yellow wire from the Manifold/Burner Assembly.
39. Remove the wires from the Section 3 Control Module that run to the Section 3 Inducer Motor.
    a. Remove the black wire from the IND terminal of the IC7 Ignition Control.
    b. Remove the white wire from the in-line splice connector with wire number 501.

Remove the Section 3 Gas Heat Control Panel (if Installed)

40. Remove the power wires from the Section 3 Control Assembly.
    a. Remove wire 500 from the L1 connection on the IC7 Ignition Control.
    b. Separate the P59/J59 2 pin connector.
41. Remove the tubing from the PS6 Pressure Switch.
42. Remove the Section 3 Control Panel from the unit.

Remove the Transformer Panel from the Unit

43. Remove wire 500 from the 15 FU fuse block.
44. Remove wire 501 from the 15 FU fuse block.
45. Remove the green/yellow wire from the ground screw on the panel.
46. Remove the transformer panel and connected harness.

Remove the Modulating Gas Heat Gas Manifold/Burner Assembly

47. Remove the orange igniter wire connected to the igniter and retain for use in Step 74a.
48. Remove the ¾" – 1-1/2" pipe nipple and union from one of the gas valves. Retain to reinstall in Step 52.
49. Remove the screws that attach the modulating gas heat manifold assembly to the vestibule panel.
50. Retain these screws for use in Step 51.

Install the Replacement Burner/Manifold Assembly

51. Install the replacement staged gas heat manifold assembly, Item 3, to the stage 1 gas heat section using the screws removed in Step 50.
52. Install the ¾" by 1-1/2 pipe nipple and union, removed in Step 48, to the gas valve. Support the valve with a backup wrench during the installation. Use a pipe sealant that is approved for use with natural gas to seal the joints.

Install the Gas Manifold for a Single Heat Section

53. Modify and install the gas heat manifold for a single heat section.
    a. Use *Figure 1 on page 19* of the Appendix to reconfigure the manifold assembly removed in Step 5.
    b. Use pipe sealant approved for use with natural gas to seal all the joints.
    c. Install the revised manifold assembly in the unit, and connect to the field gas supply and the heat section manifold/burner assembly.
    d. Turn on the gas supply to the unit.
    e. Use a soap solution to verify the leak integrity of all the gas piping joints.

Install the Gas Manifold for a Double Heat Section on a Model YPAL050 - 065

54. Modify and install the gas heat manifold for a single heat section.
    a. Use *Figure 2 on page 19* of the Appendix to reconfigure the manifold assembly removed in Step 5.
    b. Use pipe sealant approved for use with natural gas to seal all the joints.
    c. Install the revised manifold assembly in the unit, and connect to the field gas supply and the heat section manifold/burner assembly.
    d. Turn on the gas supply to the unit.
    e. Use a soap solution to verify the leak integrity of all the gas piping joints.

Install the Gas Manifold for a Double Heat Section on a Model YPAL070 - 105

55. Modify and install the gas heat manifold for a double heat section.
    a. Use *Figure 3 on page 20* of the Appendix to reconfigure the manifold assembly removed in Step 5.
    b. Use pipe sealant approved for use with natural gas to seal all the joints.
    c. Install the revised manifold assembly in the unit, and connect to the field gas supply and the heat section manifold/burner assembly.
    d. Turn on the gas supply to the unit.
    e. Use a soap solution to verify the leak integrity of all the gas piping joints.

Install the Gas Manifold for a Triple Heat Section

56. Modify and install the gas heat manifold for a triple heat section.
    a. Use *Figure 4 on page 20* of the Appendix to reconfigure the manifold assembly removed in Step 5.
    b. Use pipe sealant approved for use with natural gas to seal all the joints.
    c. Install the revised manifold assembly in the unit, and connect to the field gas supply and the heat section manifold/burner assembly.
    d. Turn on the gas supply to the unit.
    e. Use a soap solution to verify the leak integrity of all the gas piping joints.

Install the Replacement Gas Heat Control Panel for Heat Section 1

Refer to new wiring labels for the rest of the install.

57. Use 4 of item 5, #10 Self Driller Screw, to attach one of item 4, Gas Heat Control Panel, to the left hand side of Gas Heat Section 1. The transformer should be positioned in the upper right hand corner.

58. Connect wire GVH from the panel to the high fire solenoid of the gas valve. (1GV)
59. Connect wire GVL-B from the panel to the low fire solenoid of the gas valve. (1GV)
60. Connect wire COM to the common connection of the gas valve. (1GV)
61. Connect wire S1 from the panel to the flame sensing rod of the burner assembly.
62. Connect wire GVL-A from the panel to the RS2 Flame Roll Out Switch.
63. Connect wire R1 from the panel to the RS1 Flame Roll Out Switch.
64. Connect wire R2 between the RS1 and RS2 Flame Roll Out Switches.
65. Connect LMT1 to the LS1 Limit Switch located to the bottom right of the heat exchanger vestibule panel.
66. Use one of Item 6, Inline Splice, to connect wire 625 removed in Step 8c to wire LMT2 of the control panel.
67. Connect wire 618 removed in Step 8d to the other terminal of the LS1 Limit Switch.
68. Connect the green/yellow wire from the Control Panel to the Section 2 Burner/Manifold Assembly.
69. Connect the black wire from the inducer, removed in Step 16b, to the IND terminal of the IC1 Ignition Control.
70. Connect the white wire from the inducer, removed in Step 16c, to the common terminal of the 7T transformer.
71. Remove the terminal from the red wire from the inducer, removed in Step 16a, and place one of Item 7, wire nut, on the wire.
72. If the unit voltage is 208 (-17 voltage indicator in the model number), move the L1 wire on the 7T transformer from the 240V connection to the 208V connection.
73. Connect the Pressure Switch Tubing
    a. Remove the tee from the Pressure Switch Tubing removed in Step 21a and b.
    b. Connect the tube from the gas heat section to the pressure tap on the PS Pressure Switch.
74. Connect the orange igniter wire.
    a. Connect the orange igniter wire, removed in Step 47, to the IGN connection of the IC1 ignition module.
    b. Connect the other end of the cable to the igniter on the manifold/burner assembly.
    c. Use Item 10, 8-in. Tie Wrap, to isolate the igniter cable from the manifold pipe.
75. Use Item 10 and Item 11, 8-in. and 4-in. Tie Wraps, to bundle the wires between the control Box and the Burner Assembly to prevent them from coming in contact with any sharp edges or hot surfaces of the Burner Assembly.

Install the Replacement Gas Heat Control Panel for Heat Section 2 (if Required)

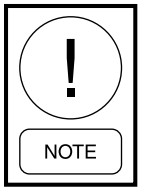
76. Use 4 of Item 5, #10 Self Driller Screw, to attach one of item 4, Gas Heat Control Panel, to the left hand side of Gas Heat Section 2. The transformer should be positioned in the upper right hand corner.
77. Connect wire GVH from the panel to the high fire solenoid of the gas valve. (2GV)
78. Connect wire GVL-B from the panel to the low fire solenoid of the gas valve. (2GV)
79. Connect wire COM to the common connection of the gas valve. (2GV)
80. Connect wire S1 from the panel to the flame Sensing Rod of the Burner Assembly.
81. Connect wire GVL-A from the panel to the RS4 Flame Roll Out Switch.
82. Connect wire R1 from the panel to the RS3 Flame Roll Out Switch.
83. Connect wire R2 between the RS3 and RS4 Flame Roll Out Switches.
84. Connect LMT2 to the LS3 Limit Switch located to the bottom right of the heat exchanger vestibule panel.
85. Use one of Item 6, Inline Splice, to connect wire 637, removed in Step 24b, to wire LMT1 of the control panel.
86. Connect the green/yellow wire from the control panel to the Section 2 Burner/Manifold Assembly.
87. Connect the black wire from the inducer, removed in Step 28a, to the IND terminal of the IC2 ignition control.

88. Connect the white wire from the inducer, removed in Step 28b, to the common terminal of the 8T transformer.
89. If the unit voltage is 208 (-17 voltage indicator in the model number), move the L1 wire on the 8T transformer from the 240V connection to the 208V connection.
90. Install the pressure switch tube removed in Step 31 to the PS Pressure Switch.
91. Connect the orange igniter wire, removed in Step 27, to the IGN connection of the IC2 ignition module.
92. Use Item 10 and Item 11, 8-in. and 4-in. Tie Wraps, to bundle the wires between the Control Box and the Burner Assembly to prevent them from coming in contact with any sharp edges or hot surfaces of the Burner Assembly.

Install the Replacement Gas Heat Control Panel for Heat Section 3 (if Required)

93. Use 4 of item 5, #10 Self Driller Screw, to attach one of item 4, Gas Heat Control Panel, to the left hand side of Gas Heat Section 3. The transformer should be positioned in the upper right hand corner.
94. Connect wire GVH from the panel to the high fire solenoid of the gas valve. (3GV)
95. Connect wire GVL-B from the panel to the low fire solenoid of the gas valve. (3GV)
96. Connect wire COM to the common connection of the gas valve. (3GV)
97. Connect wire S1 from the panel to the Flame Sensing Rod of the Burner Assembly.
98. Connect wire GVL-A from the panel to the RS6 Flame Roll Out Switch.
99. Connect wire R1 from the panel to the RS5 Flame Roll Out Switch.
100. Connect wire R2 between the RS5 and RS6 Flame Roll Out Switches.
101. Connect LMT2 to the LS5 Limit Switch located to the bottom right of the heat exchanger vestibule panel.
102. Use one of Item 6, Inline Splice, to connect wire 652, removed in Step 34b, to wire LMT1 of the control panel.
103. Connect the green/yellow wire from the control panel to the Section 3 Burner/Manifold Assembly.
104. Connect the black wire from the inducer, removed in Step 39a, to the IND terminal of the IC3 ignition control.
105. Connect the white wire from the inducer, removed in Step 39b, to the common terminal of the 9T transformer.
106. If the unit voltage is 208 (-17 voltage indicator in the model number), move the L1 wire on the 8T transformer from the 240V connection to the 208V connection.
107. Install the pressure switch tube removed in Step 41 to the PS Pressure Switch.
108. Connect the orange igniter wire, removed in Step 37, to the IGN connection of the IC2 ignition module.
109. Use Item 10 and Item 11, 8-in. and 4-in. Tie Wraps, to bundle the wires between the Control Box and the Burner Assembly to prevent them from coming in contact with any sharp edges or hot surfaces of the Burner Assembly.

Remove the Wires Between the Gas Heat Section and the Main Control Box



This section is optional. If using the old wires to assist in pulling the new wires, please perform the steps in this section. If installing new flexible conduit, this section can be skipped, as the wires will be disconnected on both ends.

110. Remove the covers from the race way that connects the blower section of the unit to the main control box. Retain the screws to reinstall the cover in either Step 114 or Step 115. Some units may be built with conduit between the blower section and the main control box.
111. Remove the control wiring harness from the unit.
    a. Disconnect the J34/P34 connector in the right hand side of the main control box. The connector is located on the same divider panel the low voltage terminal block is fastened to, as shown in *Figure 6 on page 21*.
    b. Remove the P34 end of the connector and harness that ran to the gas heat section.

112. Remove the power harness from the unit.

a. Remove wire 500 from the bottom of the 13 FU fuse, as shown in *Figure 7 on page 22*.

b. Remove wire 501 from the bottom of the 13 FU fuse.

c. Remove the green/yellow ground wire that is part of this harness.

d. Remove the harness from the unit.

113. Remove the pressure switch harness from the unit.

a. Remove the wires 664 and 665 from the PS8 Pressure Switch located above the supply fan blower.

b. Remove the PS8 Pressure Switch from the unit.

c. Remove wires 664 and 665 between the Pressure Switch and the Gas Heat Section.

Install the Power Wiring Harness from the Main Control Panel to the Heat Control Panels

114. Install the power wiring harness in the unit.

a. Route the Gas Heat Power Harness, Item 2, from the main control box to the gas heat section using either the existing conduit or new conduit.

b. Connect wire 500 to the bottom of the 13 FU fuse.

c. Connect wire 501 to the bottom of the other 13 FU fuse.

d. Connect the green/yellow ground wire where the wire was removed in Step 112c.

e. If the unit voltage is 208 (-17 voltage indicator in the model number), connect the other end of wire 500 to the 208 terminal of the transformer in each of the gas heat control panels.

f. If the unit voltage is other than 208, connect the other end of wire 500 to the 240 terminal of the transformer in each of the gas heat control panels.

g. If there is only a single heat section, cut the 500 wire leaving the terminal connected in Step 114e, and use one of Item 7, wire nut, to cap the wire.

h. If there are two heat sections, cut the 500 wire leaving the connection on the transformer of the second heat section control assembly, and use one of Item 7, wire nut, to cap the wire.

i. Connect the other end of wire 501 to the COM terminal of the transformers in each of the gas heat control panels.

j. If there is only a single heat section, cut the 501 wire leaving the terminal connected in Step 114i and use one of Item 7, wire nut, to cap the wire.

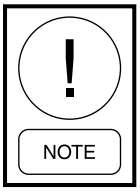
k. If there are two heat sections, cut the 501 wire leaving the connection on the transformer of the second heat section control assembly and use one of Item 7, wire nut, to cap the wire.

l. Connect the other end of the green/yellow wire to the ground screw in each of the gas heat control panels.

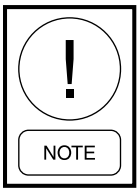
m. If there is only a single heat section, cut the green/yellow wire leaving the terminal connected in Step 114l, and use one of Item 7, wire nut, to cap the wire.

n. If there are two heat sections, cut the green/yellow wire laving the connection on the transformer of the second heat section control assembly and use of Item 7, wire nut, to cap the wire.

Install the Control Wiring Harness from the Main Control Panel to the Gas Heat Control Panels



If installing new flexible conduit, please ensure the power and control wires are installed in separate conduits.



When installing the control harness, it is simpler to cut off the ends containing the three 4 pins plugs (ensure the wires are labeled for easier re-connection) and then pulling the wires through the conduit, either existing or new. After the wires have been pulled, reconnect the wires using field provided wiring connectors.

115. Install the control wiring harness.

    a. Route the control wiring harness between the control box and the gas heat section using either the existing conduit or new conduit.

    b. Connect the long end of Item 1, Gas Heat Control Harness, to the J33 connector in the right hand side of the main control box. The connector is located on the same divider panel the low voltage terminal block is fastened to.

    c. Connect the plug identified as Gas Module 1 to the Heat Section 1 gas heat control panel.

    d. Connect the plug identified as Gas Module 2 to the Heat Section 2 gas heat control panel. If the unit only has a single heat section, tie-wrap the second and third plugs to the harness using one of Item 11, 4-in. Tie-Wrap.

    e. Connect the plug identified as Gas Module 3 to the Heat Section 3 gas heat control panel. If the unit only has a double heat section, tie-wrap the third plug to the harness using one of Item 11, 4-in. Tie-Wrap.

    f. Use Items 10 and 11, 8-in. and 4-in.Tie-Wraps, to bundle all the wires to prevent contact with a sharp edge and in a neat and orderly fashion.

    g. Reinstall the race way cover removed in Step 110.

Install the Replacement Gas Heat Wiring Labels

116. On the YPAL050 - 065, cover the existing modulating gas heat wiring label with the new staged gas heat wiring label, and cover the component map for modulating gas heat with the new component map for staged gas heat, Item 15.

117. On the YPAL070 - 105, cover the existing modulating gas heat wiring label with the new staged gas heat wiring label, and cover the component map for modulating gas heat with the new component map for staged gas heat, Item 16.

Restore Power to the Unit

118. Remove the “Tag Out/Lock Out” device installed in *Installation Procedure on page 9*.

119. Place the rocker switch in the “OFF” position.

Reprogram the Optilogic Control

120. Turn power back on to the unit.

121. Under the “Configuration” key, change the “Heating Type” from HYD to Gas.

122. Under the “Configuration” key, change the “# Of Heat Steps” to 2 for a single heat section, 4 for a double heat section, or 6 for a triple heat section.

123. Verify that under the “Unit Setup” key, “Heating Mode Enable” is set to ON.

124. If the Unit Type is set to “VAV”, verify that under the “Unit Setup” key, “VAV Occupied Heat” is set to ON.

Verify the Heat Section Operation

125. Unit type is Constant Volume with thermostat.

    a. Place the rocker switch in the "ON" position.

    b. Raise the heating setpoint on the thermostat high enough to ensure all heating sections will fire.

    c. After proper operation is observed, return thermostat to the original setting.

126. Unit type is Constant Volume with zone sensor.

    a. Place the rocker switch in the "ON" position.

    b. Under the "Operation" key "Space Temperature", record the current Space Temperature.

    c. Under the "Setpoints" key, raise the "Occupied Heating" value to 5.0 degrees above the Space Temperature.

    d. The heat section should start to stage up.

    e. After proper operation is observed, return Occupied Heating valve to the original setpoint.

127. Unit type is VAV.

    a. Place the rocker switch in the "ON" position.

    b. Under the "Operation" key "Space Temperature", record the current Space Temperature.

    c. Under the "Operation" key "RA Temp", record the current Return Air Temperature.

    d. Under the "Setpoints" key, raise the "VAV Sp For Sat Reset" until it is 4 degrees above the current Space Temperature.

    e. Under the "Setpoints" key, raise the "Warm-UP-RAT" until it is 4 degrees above the current Return Air Temperature.

    f. The heat will stage on.

    g. After proper operation is observed, return the VAV SP for SAT Rest and Warm-Up back to the original values.

128. Unit type is FlexSys.

    The heat section will only work when the unit is placed in the Morning Warm Up mode.

129. Leak Check the gas piping.

    While the unit is firing, use a soap solution to verify the leak integrity of all the joints in the unit gas piping.

130. Place new nameplate label over existing label.

    The new nameplate will signify that the unit now has staged gas heat instead of modulating gas heat. The label should have been ordered through Product Technical Support at the same time the retrofit kit was ordered.

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APPENDIX

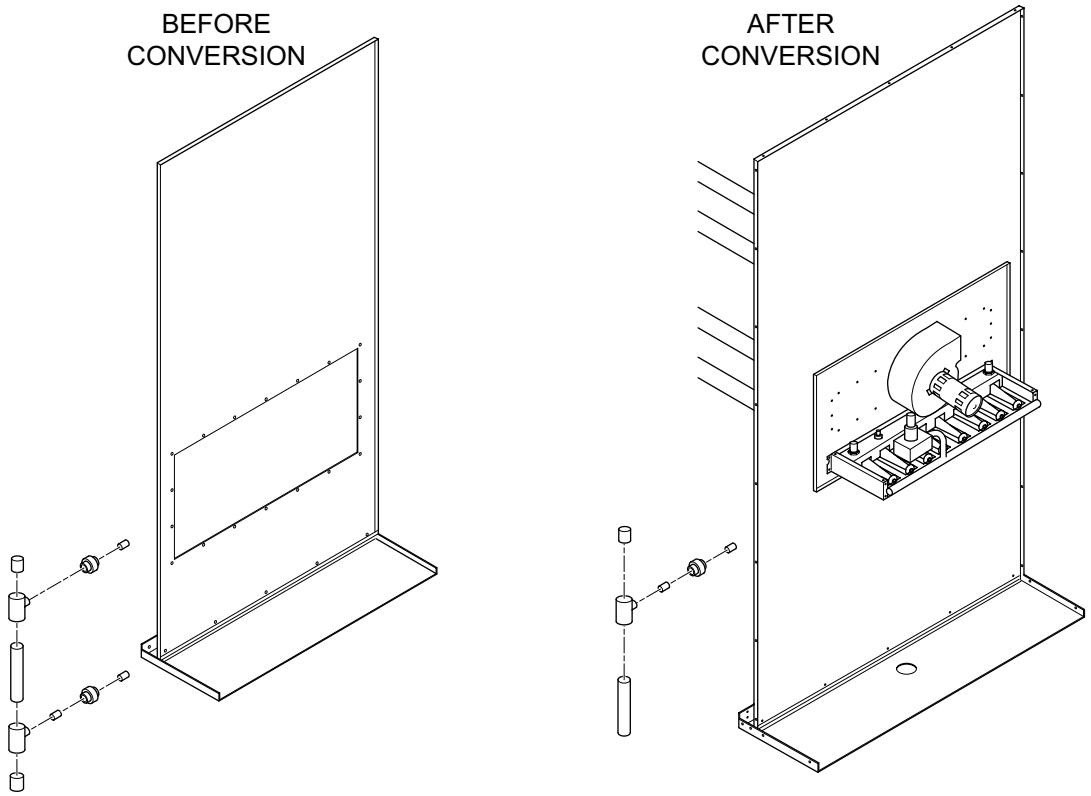

FIGURE 1 - GAS MANIFOLD FOR A SINGLE HEAT SECTION

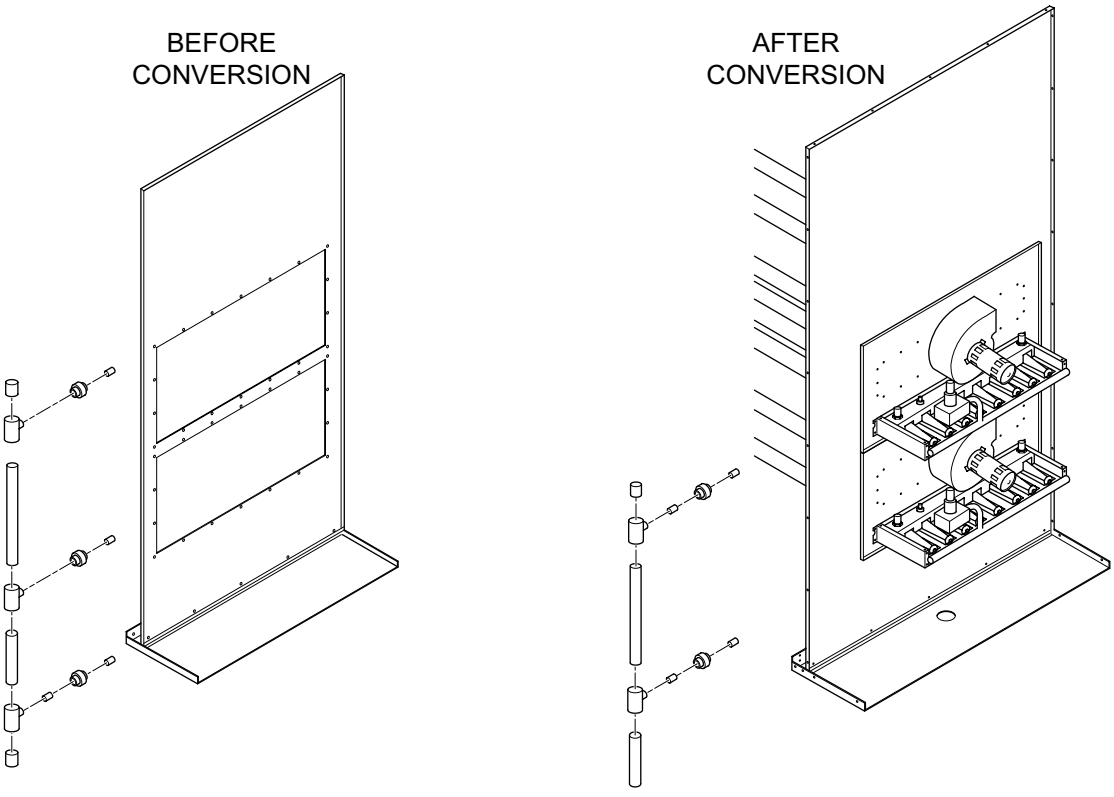

FIGURE 2 - GAS MANIFOLD FOR A DOUBLE HEAT SECTION ON A MODEL YPAL050 - 065

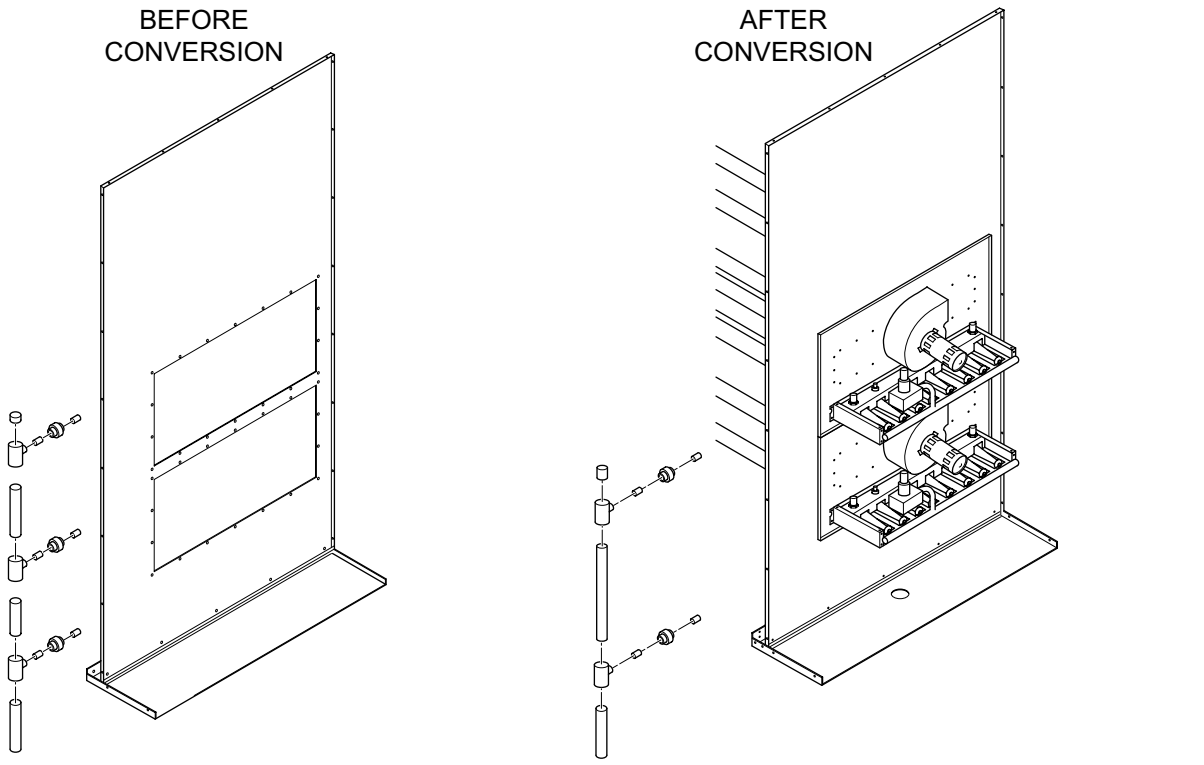

FIGURE 3 - GAS MANIFOLD FOR A DOUBLE HEAT SECTION ON A MODEL YPAL070 - 105

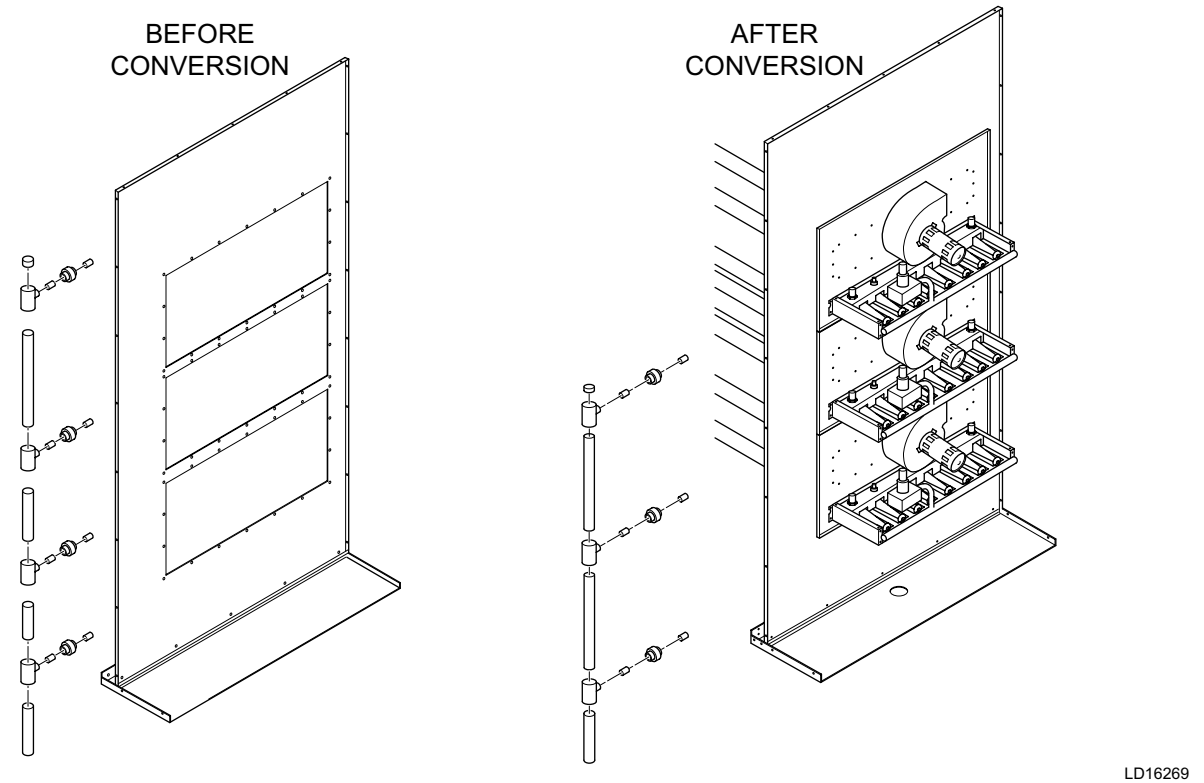

FIGURE 4 - GAS MANIFOLD FOR A TRIPLE HEAT SECTION

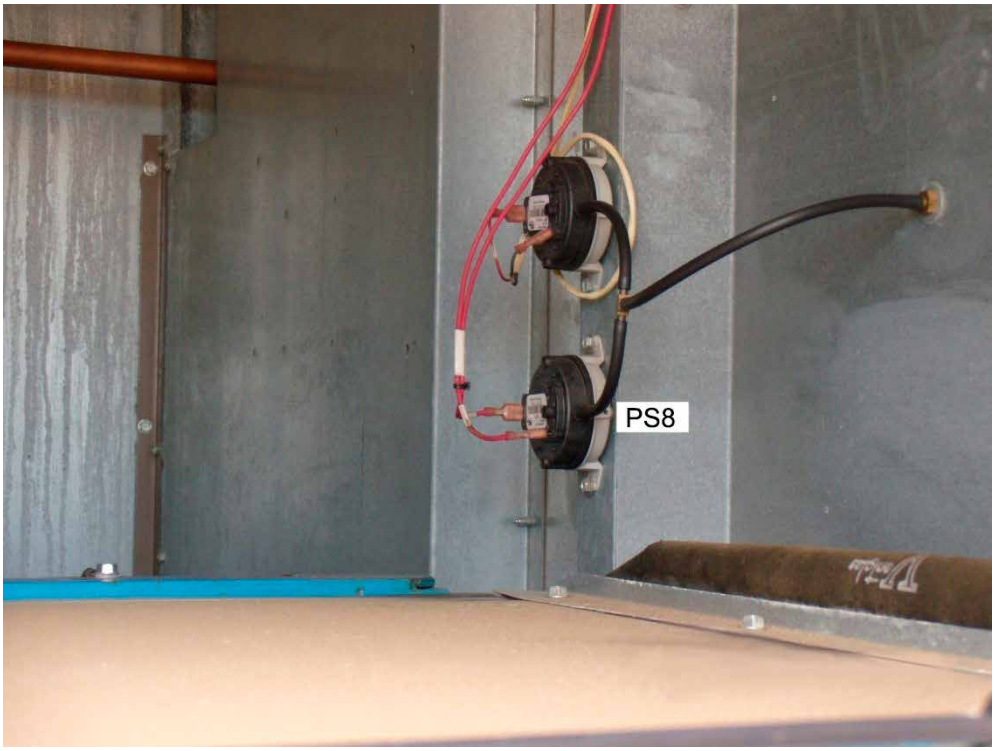

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FIGURE 5 - PS8 PRESSURE SWITCH

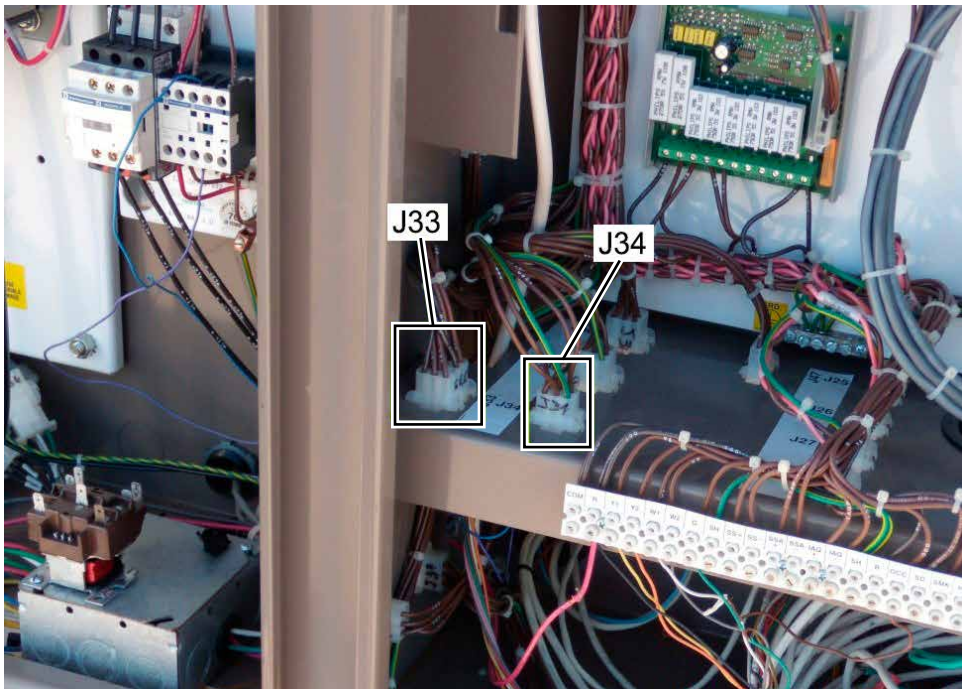

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FIGURE 6 - J33 AND J34 PLUG LOCATIONS

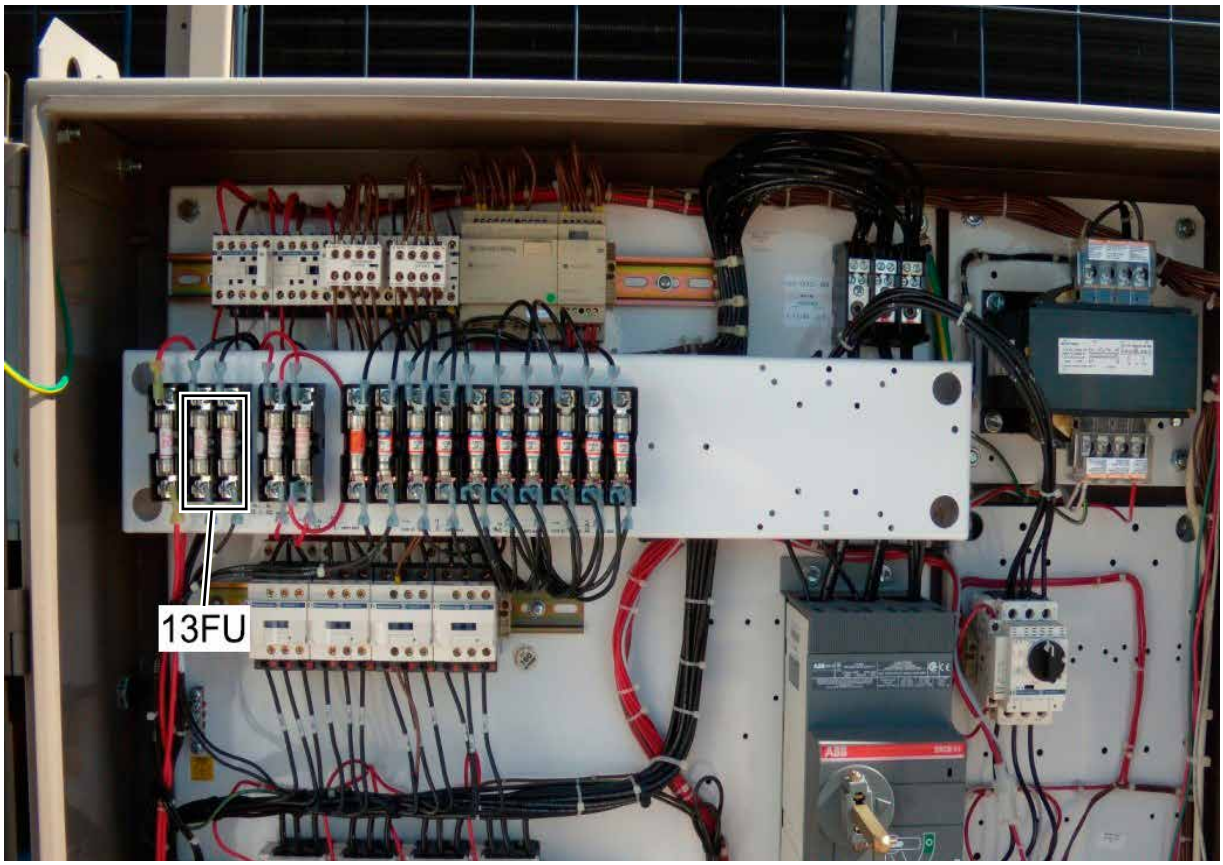

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FIGURE 7 - LOCATION OF FUSES 13FU

The following factors can be used to convert from English to the most common SI Metric values.

TABLE 4 - SI METRIC CONVERSION

MEASUREMENT	MULTIPLY ENGLISH UNIT	BY FACTOR	TO OBTAIN METRIC UNIT
Capacity	Tons Refrigerant Effect (ton)	3.516	Kilowatts (kW)
Power	Horsepower	0.7457	Kilowatts (kW)
Flow Rate	Gallons / Minute (gpm)	0.0631	Liters / Second (l/s)
Length	Feet (ft)	304.8	Meters (m)
	Inches (in)	25.4	Millimeters (mm)
Weight	Pounds (lbs)	0.4538	Kilograms (kg)
Velocity	Feet / Second (fps)	0.3048	Meters / Second (m/s)
Pressure Drop	Feet of Water (ft)	2.989	Kilopascals (kPa)
	Pounds / Square Inch (psi)	6.895	Kilopascals (kPa)

TEMPERATURE

To convert degrees Fahrenheit (°F) to degrees Celsius (°C), subtract 32° and multiply by 5/9 or 0.5556.

Example: (45.0°F - 32°) x 0.5556 = 27.2°C

To convert a temperature range (i.e., a range of 10°F) from Fahrenheit to Celsius, multiply by 5/9 or 0.5556.

Example: 10.0°F range x 0.5556 = 5.6 °C range

P.O. Box 1592, York, Pennsylvania USA 17405-1592

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800-861-1001
www.johnsoncontrols.com