

Installation and Operation Instructions for

Pennant™

Hydronic Boiler Model PNCH

Water Heater Model PNCV

Sizes 500-2000

U.S. Reg. 2,765,423

FOR YOUR SAFETY: This product must be installed and serviced by a professional service technician, qualified in hot water boiler installation and maintenance. Improper installation and/or operation could create carbon monoxide gas in flue gases which could cause serious injury, property damage, or death. Improper installation and/or operation will void the warranty. For indoor installations, as an additional measure of safety, Laars strongly recommends installation of suitable Carbon Monoxide detectors in the vicinity of this appliance and in any adjacent occupied spaces.

⚠ WARNING

If the information in this manual is not followed exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

WHAT TO DO IF YOU SMELL GAS

- Do not try to light any appliance.
- Do not touch any electrical switch; do not use any phone in your building.
- Immediately call your gas supplier from a nearby phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

Installation and service must be performed by a qualified installer, service agency, or gas supplier.

⚠ AVERTISSEMENT

Assurez-vous de bien suivre les instructions données dans cette notice pour réduire au minimum le risque d'incendie ou d'explosion ou pour éviter tout dommage matériel, toute blessure ou la mort.

Ne pas entreposer ni utiliser d'essence ni d'autres vapeurs ou liquides inflammables dans le voisinage de cet appareil ou de tout autre appareil.

QUE FAIRE SI VOUS SENTEZ UNE ODEUR DE GAZ:

- Ne pas tenter d'allumer d'appareils.
- Ne touchez à aucun interrupteur. Ne pas vous servir des téléphones dans le bâtiment où vous vous trouvez.
- Appelez immédiatement votre fournisseur de gaz depuis un voisin. Suivez les instructions du fournisseur.
- Si vous ne pouvez rejoindre le fournisseur de gaz, appelez le service des incendies.

L'installation et l'entretien doivent être assurés par un installateur ou un service d'entretien qualifié ou par le fournisseur de gaz.

SECTION 1. General Information

USING THIS MANUAL – Because the Pennant Boilers and Pennant Water Heaters are identical appliances, with the exception of materials of manufacture, labels and ultimate use application, this manual provides information for the proper installation, operation and maintenance of both products. Where differences exist between the application of the appliances and their operation, the sections pertinent to only one appliance or the other will be so identified.

In the Commonwealth of Massachusetts, this appliance must be installed by a licensed plumber or gas fitter.

⚠ WARNING

The Pennant hydronic, boiler or water heater **must** be installed in accordance with the procedures detailed in this manual, or the Laars Heating Systems warranty may be voided. The installation must conform to the requirements of the local jurisdiction having authority, and, in the United States, to the latest edition of the National Fuel Gas Code, ANSI Z223.1/NFPA54. In Canada, the installation must conform to the latest edition of the Natural Gas and Propane Installation Code, CSA B149.1 and/or local codes. Where required by the authority having jurisdiction, the installation of Pennant appliances must conform to the Standard for Controls and Safety Devices for Automatically Fired Boilers, ANSI/ASME CSD-1. Any modifications to the boiler, its gas controls, or wiring may void the warranty. If field conditions require modifications, consult the factory representative before initiating such modifications.

1.1 Introduction

This manual provides information necessary for the installation, operation, and maintenance of Laars Heating Systems Pennant copper tube appliances. Read it carefully before installation.

All application and installation procedures should be reviewed completely before proceeding with the installation. Consult the Laars Heating Systems factory, or local factory representative, with any issues or questions regarding this equipment. Experience has shown that most operating issues are caused by improper installation.

The Pennant appliance is protected against over pressurization. A pressure relief valve is fitted to all appliances. It is installed on the outlet header, at the water outlet of the appliance.

IMPORTANT: The inlet gas pressure to the appliance must not exceed 13" w.c. (3.2kPa).

All installations must be made in accordance with:

- 1) In the U.S., the "National Fuel Gas Code" ANSI Z223.1/NFPA54, Latest Edition and all applicable local codes as required by the Authorities Having Jurisdiction (AHJ), or
- 2) In Canada, the "Natural Gas and Propane Installation Code", CSA B149.1, latest edition and all applicable local codes as required by the AHJ.

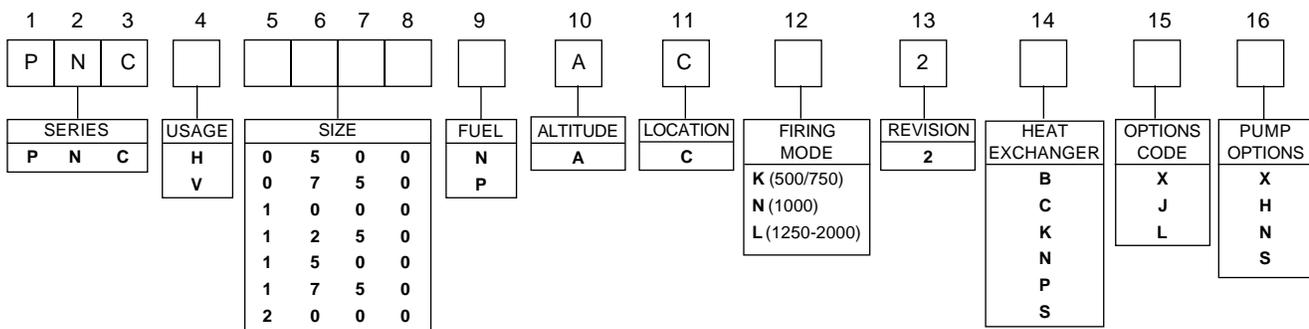
All electrical wiring is to be done in accordance with:

- 1). In the U.S., the "National Electrical Code" (NEC), ANSI/NFPA 70, latest Edition and all applicable local codes as required by the AHJ, or
- 2). In Canada, the "Canadian Electrical Code - Part 1", CSA STD. C22.1 and all applicable local codes as required by the AHJ.

This appliance must be electrically grounded in accordance with the applicable codes and standards referenced above.

1.2 Model Identification

Consult the rating plate on the unit. The following information describes the model number structure.



Model Character Designation

1-3 Model Series Designation

P N C = Pennant

4 Usage

H = Hydronic

V = Volume Water

5-8 Size

0 5 0 0 = 500,000 BTU/h input

0 7 5 0 = 750,000 BTU/h input

1 0 0 0 = 999,000 BTU/h input

1 2 5 0 = 1,250,000 BTU/h input

1 5 0 0 = 1,500,000 BTU/h input

1 7 5 0 = 1,750,000 BTU/h input

2 0 0 0 = 1,999,000 BTU/h input

9 Fuel

N = Natural Gas

P = Propane

10 Altitude

A = 0-10,000 feet

11 Location

C = Indoor and Outdoor

12 Firing Mode

K = Two-stage (models 500 & 750)

N = Three-stage (model 1000)

L = Four-stage (models 1250 - 2000)

13 Revision

2 = Second version

14 Heat Exchanger

B = Glass-lined CI / copper / brz trim (std. PNCV)

C = Glass-lined cast iron / copper (standard PNCH)

K = Bronze / copper

N = Glass-lined cast iron / cu-nickel

P = Glass-lined cast iron / cu-nickel / brz trim

S = Bronze / cu-nickel

15 Option Code

X = Standard unit

J = CSD-1, FM, IRI, IL

L = MN and LDS (Indoor units only)

16 Pump Options

X = No Pump

H = Pump mounted, hard water pump

N = Pump mounted, normal pump

S = Pump mounted, soft water pump

1.3 Warranty

Laars Heating Systems' Pennant appliances are covered by a limited warranty. The owner should fill out the warranty registration card and return it to Laars Heating Systems.

All warranty claims must be made to an authorized Laars Heating Systems representative or directly to the factory. Claims must include the serial number and model (this information can be found on the rating plate), installation date, and name of the installer. Shipping costs are not included in the warranty coverage.

Some accessory items are shipped in separate packages. Verify receipt of all packages listed on the packing slip. Inspect everything for damage immediately upon delivery, and advise the carrier of any shortages or damage. Any such claims should be filed with the carrier. The carrier, not the shipper, is responsible for shortages and damage to the shipment whether visible or concealed.

1.4 Dimensions

See Figure 1.

1.5 Locating the Appliance

The appliance should be located to provide clearances on all sides for maintenance and inspection. It should not be located in an area where leakage of any connections will result in damage to the area adjacent to the appliance or to lower floors of the structure.

When such a location is not available, it is recommended that a suitable drain pan, adequately drained, be installed under the appliance.

The appliance is design certified by CSA-International for installation on combustible flooring; in basements; in closets, utility rooms or alcoves. **Pennant Boilers or Water Heaters must never be installed on carpeting.** The location for the appliance should be chosen with regard to the vent pipe lengths and external plumbing. The unit shall be installed such that the gas ignition system components are protected from water (dripping, spraying, rain, etc.) during operation and service (circulator replacement, control replacement, etc.). When vented vertically, the Pennant must be located as close as practical to a chimney or outside wall. If the vent terminal and/or combustion air terminal terminate through a wall, and there is potential for snow accumulation in the local area, both terminals should be installed at an appropriate level above grade.

The dimensions and requirements that are shown in Table 1 should be met when choosing the locations for the appliance.

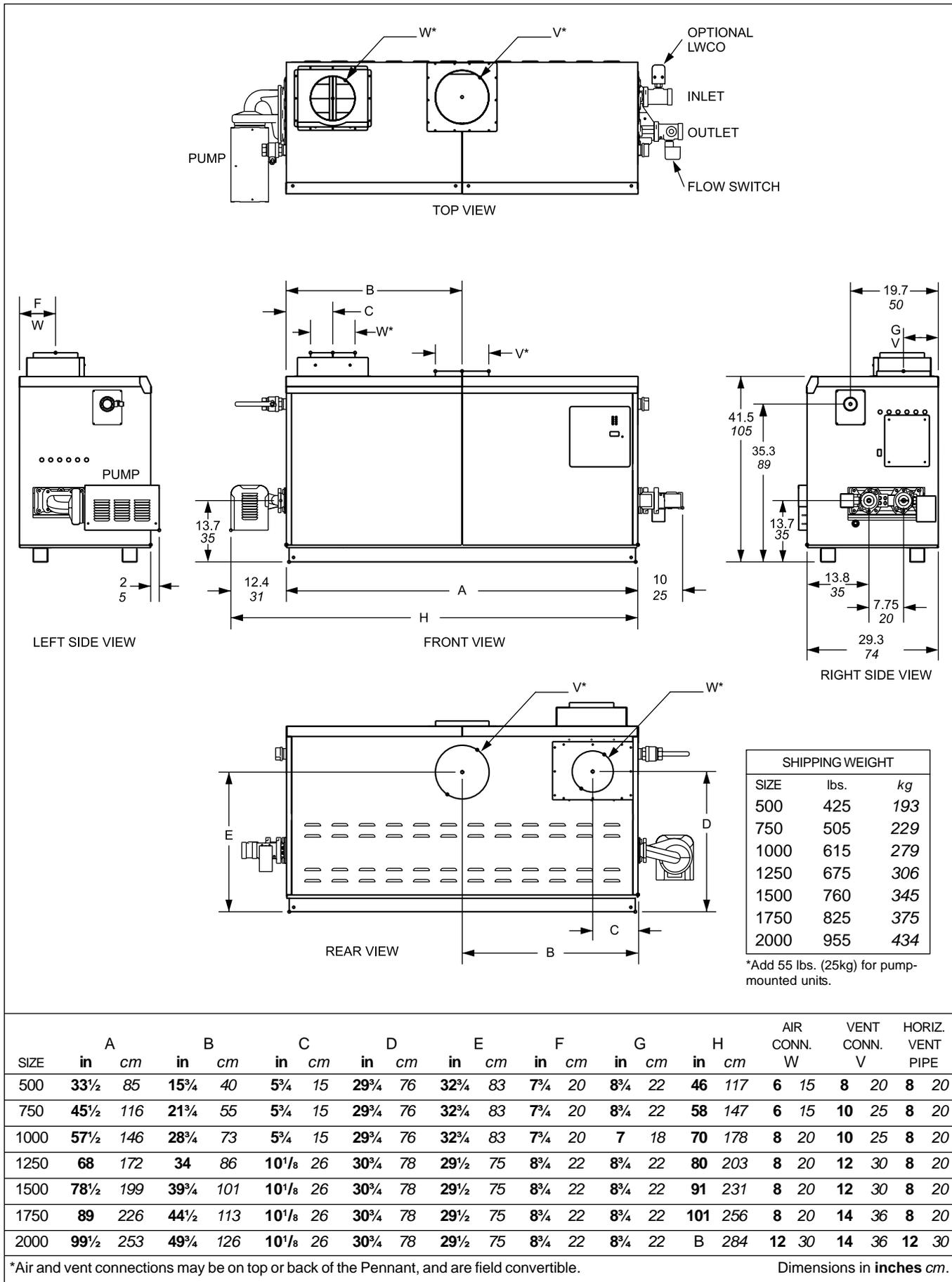


Figure 1. Dimensional Data.

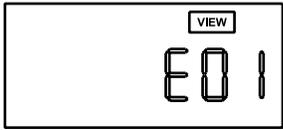
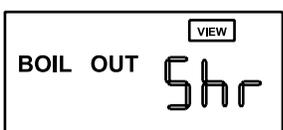
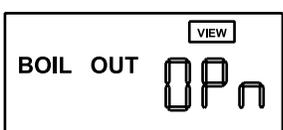
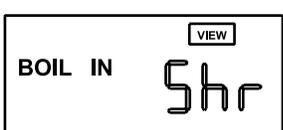
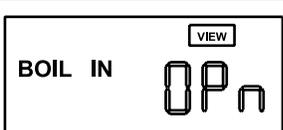
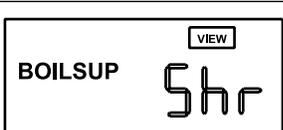
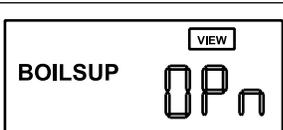
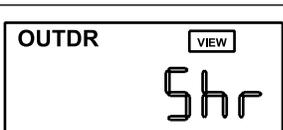
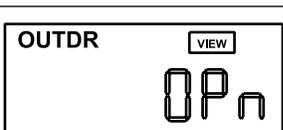
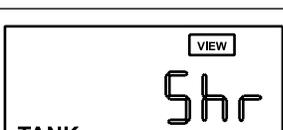
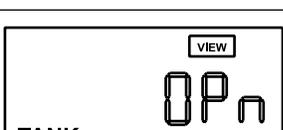
ERROR DISPLAYED	DESCRIPTION OF ERROR
	<p>The control was unable to read a piece of information from its EEPROM. The control will stop operation until all settings in the Adjust menu have been checked by the user or installer.</p>
	<p>The control is no longer able to read the boiler outlet sensor due to a short circuit. In this case, if the boiler inlet sensor is present and operational, the control will operate using the boiler inlet sensor. Otherwise, the control will not operate the boiler stages.</p>
	<p>The control is no longer able to read the boiler outlet sensor due to an open circuit. In this case, if the boiler inlet sensor is present and operational, the control will operate using the boiler inlet sensor. Otherwise, the control will not operate the boiler stages.</p>
	<p>The control is no longer able to read the boiler inlet sensor due to a short circuit. In this case, the control will continue operation.</p>
	<p>The control is no longer able to read the boiler inlet sensor due to an open circuit. In this case, the control will continue operation.</p>
	<p>The control is no longer able to read the boiler supply sensor due to a short circuit. In this case, if the boiler outlet sensor is present and operational, the control will operate based on the boiler outlet sensor. If the boiler outlet sensor is not available and the boiler inlet sensor is present and operational, the control will operate using the boiler inlet sensor. Otherwise, the control will not operate the boiler stages.</p>
	<p>The control is no longer able to read the boiler supply sensor due to an open circuit. In this case, if the boiler outlet sensor is present and operational, the control will operate based on the boiler outlet sensor. If the boiler outlet sensor is not available and the boiler inlet sensor is present and operational, the control will operate using the boiler inlet sensor. Otherwise, the control will not operate the boiler stages.</p>
	<p>The control is no longer able to read the outdoor sensor due to a short circuit. In this case, the control assumes an outdoor temperature of 32°F and continues operation.</p>
	<p>The control is no longer able to read the outdoor sensor due to an open circuit. In this case, the control assumes an outdoor temperature of 32°F and continues operation.</p>
	<p>The control is no longer able to read the tank sensor due to a short circuit. In this case the control will not operate the boiler stages.</p>
	<p>The control is no longer able to read the tank sensor due to an open circuit. In this case the control will not operate the boiler stages.</p>

Table 12. Troubleshooting Error Codes.

Item	Description	Size 500	Size 750	Size 1000	Size 1250	Size 1500	Size 1750	Size 2000
Internal Components								
See Figures 35 and 34								
17	Base Assembly	5C1020	7C1020	10C1020	12C1020	15C1020	17C1020	20C1020
18	Chamber, Front	5C2003	7C2003	10C2003	12C2003	15C2003	17C2003	20C2003
18A	Chamber, Left Side, Front	5C2015	5C2015	5C2015	5C2015	5C2015	5C2015	5C2015
18B	Chamber, Right Side, Front	5C2016	5C2016	5C2016	5C2016	5C2016	5C2016	5C2016
19	Chamber, Rear	5C2006	7C2006	10C2006	12C2006	15C2006	17C2006	20C2006
20	Chamber Assembly, Left, Bottom	5C2602	5C2602	5C2602	5C2602	5C2602	5C2602	5C2602
21	Chamber Assembly, Right, Bottom	5C2200	5C2200	5C2200	5C2200	5C2200	5C2200	5C2200
22	Chamber, Top	5C2001	7C2001	10C2001	12C2001	15C2001	17C2001	20C2001
23	Chamber, Side, Top	5C2002	5C2002	5C2002	5C2002	5C2002	5C2002	5C2002
24	Exhaust Plenum	5C2007	10C2007	10C2007	20C2007	20C2007	20C2007	20C2007
25	Bracket, Chamber, Front	5C2009	7C2009	10C2009				
	Bracket, Chamber, Front Left				12C2011	15C2011	17C2011	20C2011
26	Bracket, Chamber, Front Right				12C2009	15C2009	17C2009	20C2009
27	Divider, Chamber, Front						15C2010	20C2002
27A	Divider, Upper, Chamber, Front				15C2005	15C2005		
27B	Divider, Lower, Chamber, Front				15C2002	15C2002		
28	Cover, Chamber	5C2004	7C2004					
	Cover, Chamber, Front Left			10C2004	12C2010	15C2004	17C2010	20C2010
29	Door, Chamber Access	5C2005	5C2005	5C2005	5C2005	5C2005	5C2005	5C2005
		(1)	(1)	(1)	(2)	(2)	(2)	(2)
30	Cover, Chamber, Front Right			10C2010	12C2008	15C2004	17C2008	20C2008
32	Ignitor, Hot Surface, with Gasket	2400-286	2400-286	2400-286	2400-286	2400-286	2400-286	2400-286
		(1)	(1)	(2)	(2)	(2)	(2)	(2)
33	Tile, Side (Right and Left)	T2015600	T2015600	T2015600	T2015600	T2015600	T2015600	T2015600
		(2)	(2)	(2)	(2)	(2)	(2)	(2)
34	Tile, Front	T2017300						
		(1)						
35	Tile, Front, Left Side		T2016200	T2016800	T2016800	T2016800	T2016800	T2016800
			(1)	(1)	(1)	(1)	(1)	(1)
35A	Tile, Front, Right Side		T2016300	T2017100	T2017900	T2017100	T2017900	T2017100
			(1)	(1)	(1)	(1)	(1)	(1)

Item	Description	Model 500	Model 750	Model 1000	Model 1250	Model 1500	Model 1750	Model 2000
	High Limit, Auto Reset, PNCV, 210F Max.	E2217700	E2217700	E2217700	E2217700	E2217700	E2217700	E2217700
71	High Limit, Manual Reset, PNCH	RE0015900	RE0015900	RE0015900	RE0015900	RE0015900	RE0015900	RE0015900
	High Limit, Manual Reset, PNCV, 210F Max.	E2217800	E2217800	E2217800	E2217800	E2217800	E2217800	E2217800
72	Relay, Pump (SPST)	E0098300	E0098300	E0098300	E0098300	E0098300	E0098300	E0098300
	Relay, Fan (DPDT)	E0076600	E0076600	E0076600	E0076600	E0076600	E0076600	E0076600
		(2)	(2)	(2)	(2)	(2)	(2)	(2)
73	Terminal Bus (12 Position)	E2342600	E2342600	E2342600	E2342600	E2342600	E2342600	E2342600
74	Transformer	E2310400	E2310400	E2310400	E2312800	E2312800	E2312800	E2312800
			(2)	(2)	(2)	(2)	(2)	(2)
75A	Circuit Breaker, non-CSD-1	E22106200	E22106200	E22106200	E2318800	E2318800	E2318900	E2318900
75B	Circuit Breaker, CSD-1	E22106200	E2318800	E2318800	E2318900	E2318900	E2318900	E2318900
	Switch, Rocker, 30A 125VAC	E2343300	E2343300	E2343300	E2343300	E2343300	E2343300	E2343300
	Sensor, Universal (shipped loose)	R2014800	R2014800	R2014800	R2014800	R2014800	R2014800	R2014800
Gas Train Components								
See Figure 34								
76	Manifold, Gas Supply	5C6700	7C6700	10C6700	12C6700	15C6700	17C6700	20C6700
77	Valve, Ball	V2003100	V2003100	V2003200	V2003300	V2003300	V2003300	V2003300
Burner Trays								
Note: Burner Manifold Assemblies contain item numbers 78 through 81.								
	Burner Manifold Assy, 3 Burners, Right, Nat	5C6600	5C6600	5C6600	5C6600	5C6600	5C6600	5C6600
		(1)	(1)	(2)	(2)	(1)	(1)	(1)
	Burner Manifold Assy, 3 Burners, Left, Nat	5C6500	5C6500	5C6500	5C6500	5C6500	5C6500	5C6500
		(1)	(2)	(3)	(3)	(1)	(2)	(2)
	Burner Manifold Assy, 4 Burners, Right, Nat	10C6600	10C6600	10C6600	10C6600	10C6600	10C6600	10C6600
		(1)	(1)	(1)	(1)	(1)	(1)	(2)
	Burner Manifold Assy, 4 Burners, Left, Nat	10C6500	10C6500	10C6500	10C6500	10C6500	10C6500	10C6500
		(2)	(2)	(2)	(2)	(2)	(2)	(4)
	Burner Manifold Assy, 3 Burners, Right, LP	5C6620	5C6620	5C6620	5C6620	5C6620	5C6600	5C6600
		(1)	(1)	(1)	(2)	(1)	(1)	(1)
	Burner Manifold Assy, 3 Burners, Left, LP	5C6520	5C6520	5C6520	5C6520	5C6520	5C6500	5C6500
		(1)	(1)	(3)	(3)	(1)	(2)	(2)

NOTE: Model 2000 shown for reference.

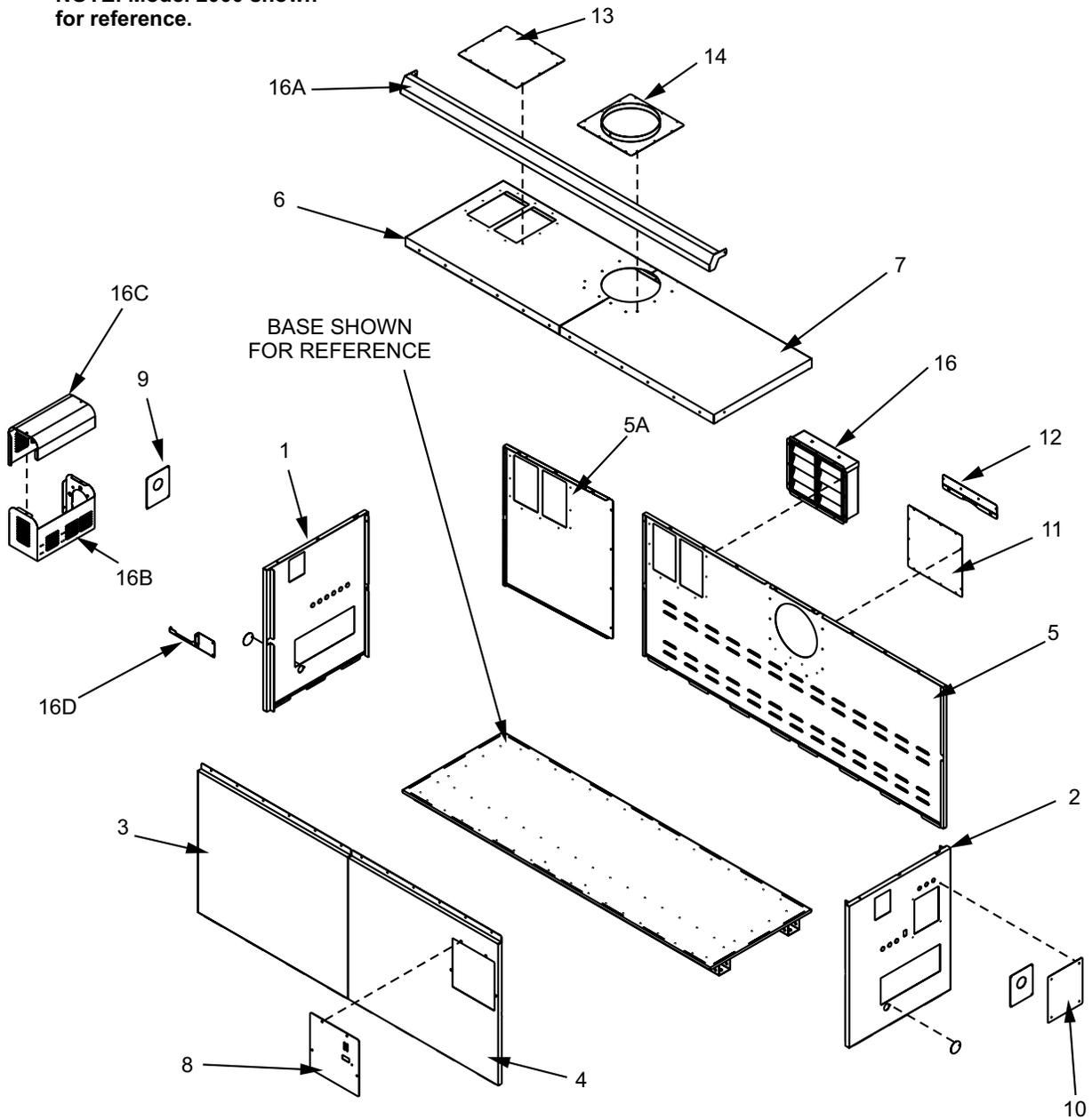


Figure 33. Sheet Metal Components.

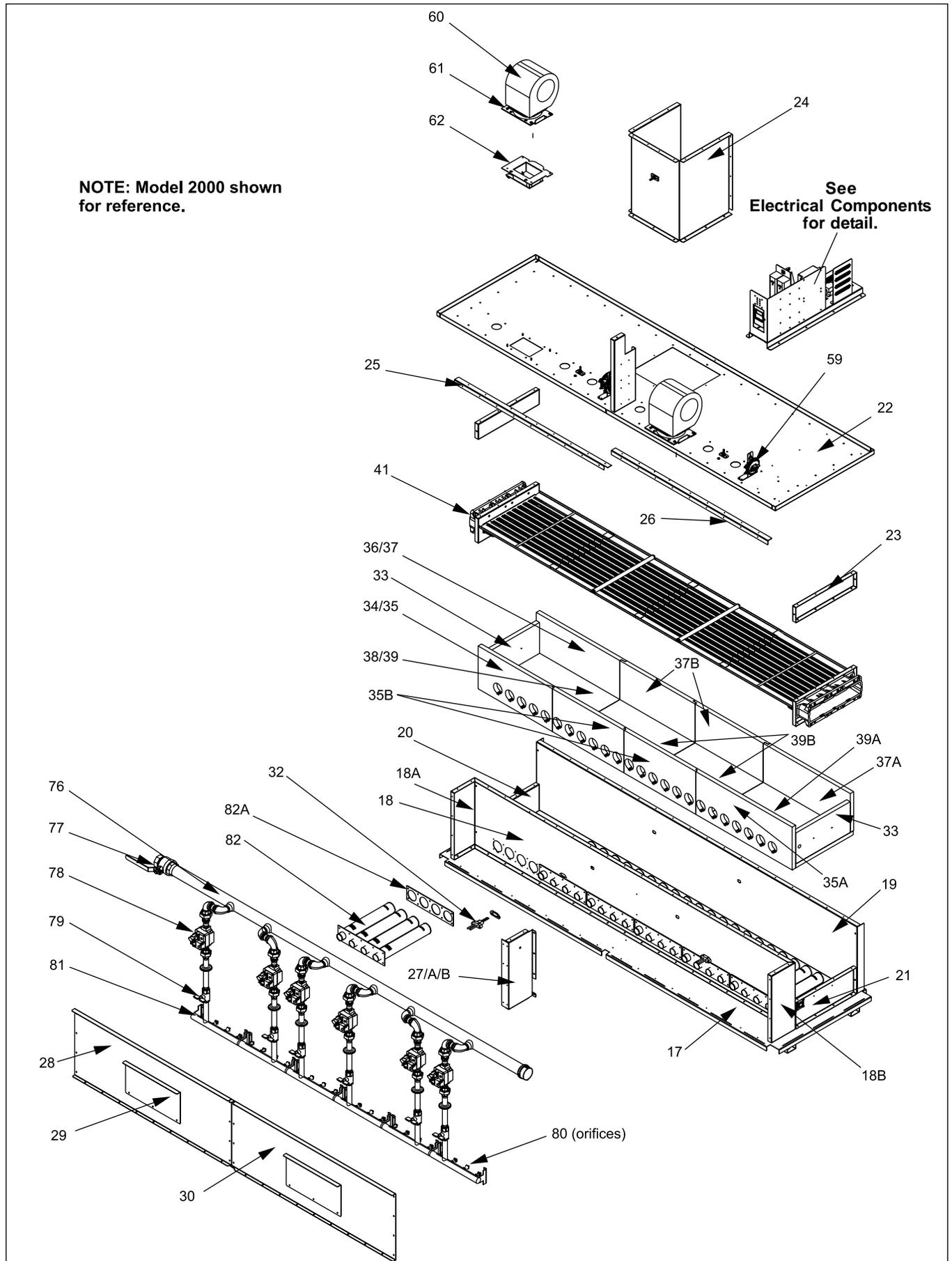
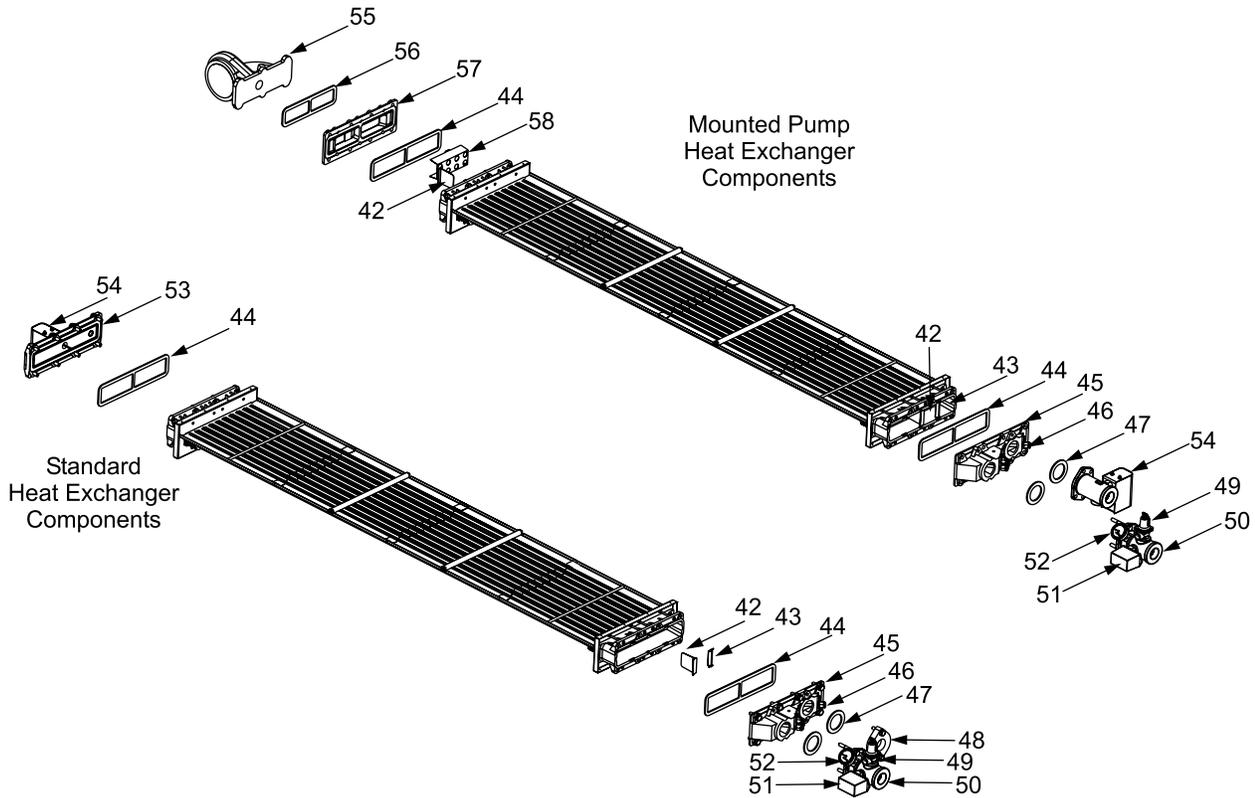


Figure 34. Internal Components.

See pump chart below
for pump numbers.



Pennant Hydronic

SIZE	PUMPP/N
500	A2001700
750	A2001700
1000	A2001800
1250	A2001800
1500	A2001900
1750	A2001900
2000	A2109700

Pennant Water Heater

SIZE	PUMPP/N		
	Soft Water	Normal Water	Hard Water
500	A2001700	A2001700	A2001900
750	A2001700	A2001700	A2001900
1000	A2001700	A2001800	A2001900
1250	A2001700	A2001800	A2001900
1500	A2001700	A2001900	A2001900
1750	A2001900	A2001900	A2001900
2000	A2109700	A2109700	A2109700

Figure 35. Heat Exchanger Components.

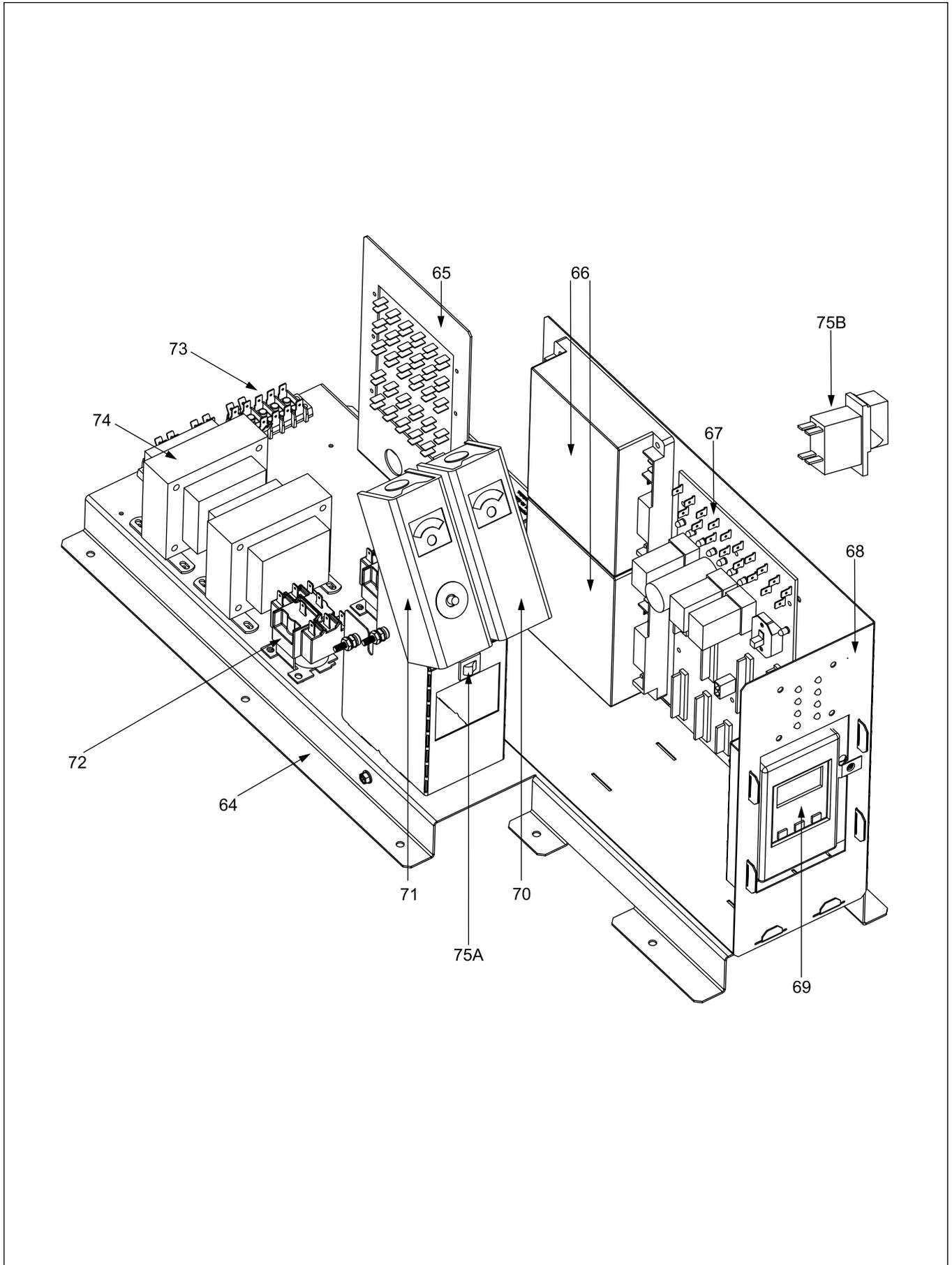


Figure 36. Electrical Components.

Laars Heating Systems Company reserves the right to change specifications, components, features, or to discontinue products without notice.



H2214400F



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