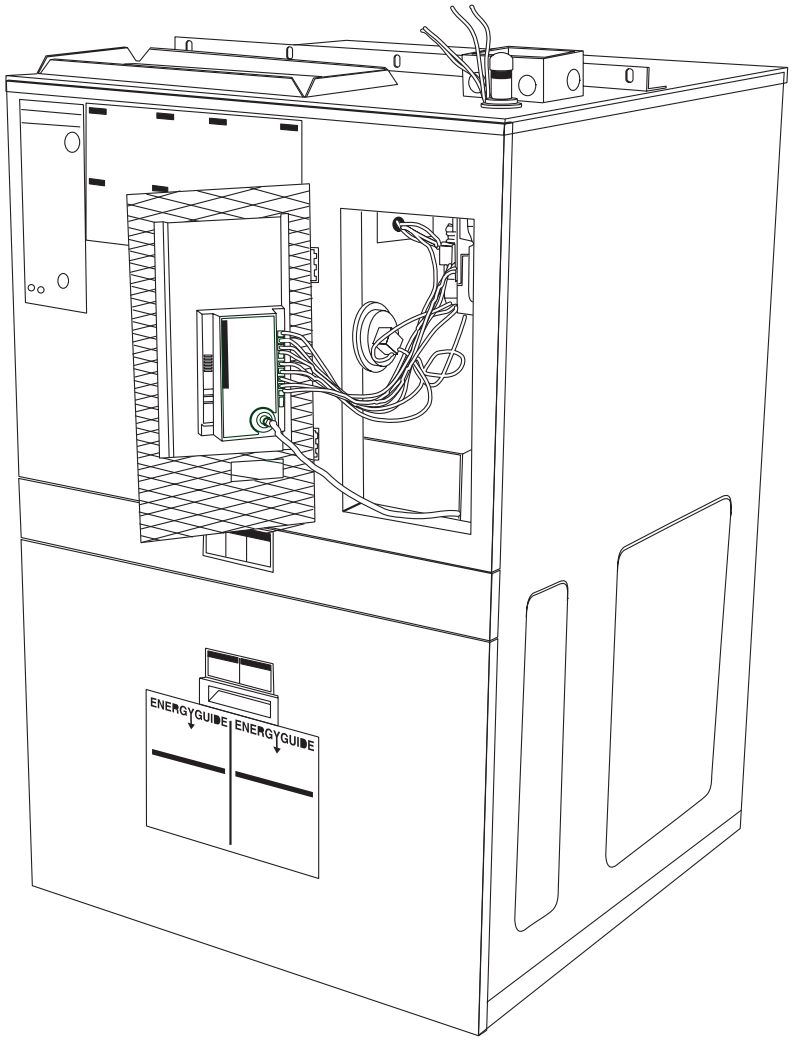
Service Reference Manual

HWC Thru-the-Wall Units

Models:
HWC Premier
122, 182, 242, 302
123, 183, 243, 303



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Disclaimer

This manual presents information and guidelines for proper installation, adjustment, operation and maintenance of Armstrong Magic-Pak HW/HWC Thru-the-Wall units. Read this manual before attempting assembly, installation, start-up, adjustment or operation of the unit. If you have any questions about the operation of the unit or a particular safety device, call or write Armstrong Air Conditioning Inc., 421 Monroe Street, Bellevue, Ohio USA 44811. Telephone: 419-483-4840 Fax: 419-483-3557

The documentation and drawings contained in this manual are intended as a general guide, and may not reflect exactly the current designs, or all of the options available to our customers. Please call or write Armstrong Air Conditioning Inc. regarding specific details of a particular furnace model, configuration or installation.

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Section 1	Performance, electrical data and cabinet dimensions.
Section 2	Sequence of operation descriptions with accompanying schematics.
Section 3	Complete description of unit disassembly.
Section 4	Locations of major components of HW/HWC models.
Section 5	Illustrations and specifications for individual components including valves, blowers, ignition controls and blower control boards.
Section 6	Installation requirements and startup guidelines.
Section 7	Complete listing of all Armstrong accessories available, including wall sleeves, louvers and gas conversion kits.
Section 8	Complete service parts lists for all HW and HWC models.
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Section 1 - Specifications

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Models Covered By This Manual

HWC Gas Heating/Electric Cooling Units

HW122, 123
HW182,183
HW242, 243
HW302, 303

HW Gas Heating Only Units

26HW
38HW
51HW
64HW

Model Number Guide

HW/HWC Models	26 H W C 12 2 – 2A

26 = Rated Input BTU/Hr x 1000

H = Gas Heat

W = Thru-the-Wall

C = Cooling

12 = Nominal Cooling BTU/Hr x 1000

2 = Cooling Efficiency 2 - 9.7 SEER

2A = Revision Code

Product Serial Numbers, Beginning 1993

84	95	A	12345

84 = Armstrong Factory Number

95 = Year (ex: 1995)

A = Month (see list below)

12345 = Sequential Number

A = Jan	B = Feb	C = Mar	D = Apr
E = May	F = June	G = July	H = Aug
J = Sept	K = Oct	L = Nov	M = Dec

Summary of Model Revisions/Variations

Table 1-1 Heating Configurations of HW/HWC Units

Model	Configuration	AFUE	Ignition/Blower Control	Ignition Type
(All) HWC (123, 183, 243, 303) -1	Gas Heat/ Electric Cool	80	UTech Combination Ignition/Blower Control 1097	DSI
(All) HW -9	Gas Heat Only	80	UTech Combination Ignition/Blower Control 1097	DSI
(All) HWC (122, 182, 242, 302) -11, -10, -9, -8, -7, -6, -5	Gas Heat/ Electric Cool	80	Ignition Control: Fenwal Triton 2461D Blower Control: Heatcraft IBCH4C401, Tridelta 920B0048 or UTech 1010	DSI
(All) HWC (122, 182, 242, 302) -4, -3, -2, -1	Gas Heat/ Electric Cool	80	Ignition Control: Fenwal 05-29 Blower Control: Heatcraft IBCH4C401, Tridelta 920B0048 or UTech 1010	DSI

Table 1-2 Cooling Configurations of HWC Units

Model	Configuration	Tonnage	SEER	Compressor Type*	Metering Device
(All) HWC 123-1	Gas Heat/Electric Cool	1	9.7	Tecumseh Rotary	Capillary Tube/Filter Drier
(All) HWC183-1	Gas Heat/Electric Cool	1.5	9.7	Tecumseh Reciprocating	Capillary Tube/Filter Drier
(All) HWC 243-1	Gas Heat/Electric Cool	2	9.7	Copeland Scroll	Capillary Tube/Filter Drier
(All) HWC 303-1	Gas HeatElectric Cool	2.5	9.7	Copeland Scroll	Capillary Tube/Filter Drier
(All) HWC 182-11, -9, -7, -6	Gas Heat/Electric Cool	1.5	9.7	Tecumseh Reciprocating	Capillary Tube/Filter Drier
(All) HWC 242-11, -9	Gas Heat/Electric Cool	2	9.7	Copeland Scroll	Capillary Tube/Filter Drier
(All) HWC 122-10, -8, -5, -4, -3, -1	Gas Heat/Electric Cool	1	9.7	Tecumseh Rotary	Capillary Tube/Filter Drier
(All) HWC 242-10, -8, -5, -4, -3, -1	Gas Heat/Electric Cool	2	9.7	Copeland Scroll	Capillary Tube/Filter Drier
(All) HWC 302-9	Gas Heat/Electric Cool	2.5	9.5	Copeland Scroll	Capillary Tube/Filter Drier
(All) HWC 182-8, -5, -4, -3, -2	Gas Heat/Electric Cool	1.5	9.7	Tecumseh Rotary	Capillary Tube/Filter Drier
(All) HWC 302-8, -5, -4, -3, -1	Gas Heat/Electric Cool	2.5	9.5	Copeland Scroll	Capillary Tube/Filter Drier
(All) HWC 182-1	Gas Heat/Electric Cool	1.5	9.5	Copeland Scroll	Capillary Tube/Filter Drier

* For more information on the compressors used in HWC units, see the Unit Components section, beginning on page 5-28.

HW/HWC

Physical and Electrical

Table 1-3 Physical and Electrical Specifications - HWC Units

Model	Voltage/ Hz/Phase	Normal Voltage Range	Min. Circuit Ampacity	Max. Fuse/HACR Brkr. (amps)	Comp. Rated Load (amps)	Comp. Locked Rotor (amps)	O.D. Fan Dia. (in.)	Nom. RPM	Outside Fan Rated Load (amps)	Rated HP	Indoor Wheel dia. x width (in.)	Blower Rated HP	Refrig. Charge (oz.)	Weight (lbs.)
26HWC122/123	208-230/60/1	197-253	8.3	15	5.0	26.3	18	1075	0.9	1/8	10 X 4	1/6	42	325
38HWC122/123	208-230/60/1	197-253	8.3	15	5.0	26.3	18	1075	0.9	1/8	10 X 4	1/6	42	325
38HWC182/183	208-230/60/1	197-253	13.6	20	8.3	45.0	18	1075	0.9	1/8	10 X 4	1/3	56	350
51HWC182/183	208-230/60/1	197-253	13.6	20	8.3	45.0	18	1075	0.9	1/8	10 X 4	1/3	56	350
64HWC182/183	208-230/60/1	197-253	13.6	20	8.3	45.0	18	1075	0.9	1/8	10 X 4	1/3	56	350
36HWC242/243	208-230/60/1	197-253	18.6	25	11.6	62.5	18	1075	1.8	1/4	10 X 4	1/3	58	360
51HWC242/243	208-230/60/1	197-253	18.6	25	11.6	62.5	18	1075	1.8	1/4	10 X 4	1/3	58	360
64HWC242/243	208-230/60/1	197-253	18.6	25	11.6	62.5	18	1075	1.8	1/4	10 X 4	1/3	58	360
51HWC302	208-230/60/1	197-253	22.4	30	14.6	76.0	18	1075	1.8	1/4	10 X 4	1/3	59	380
64HWC302	208-230/60/1	197-253	22.4	30	14.6	76.0	18	1075	1.8	1/4	10 X 4	1/3	59	380
51HWC303	208-230/60/1	197-253	21.9	30	14.1	73.0	18	1075	1.8	1/4	10 X 4	1/3	59	380
64HWC303	208-230/60/1	197-253	21.9	30	14.1	73.0	18	1075	1.8	1/4	10 X 4	1/3	59	380

Performance Ratings

Table 1-4 Performance Ratings - HWC122/123

		Outdoor Air Temperature Entering Outdoor Coil																			
		85°					95°					105°					115°				
Enter. Wet Bulb	Total Air Vol. (CFM)	Total Cooling Capacity (Btuh)	Comp. Watts Input	S/T at 75° Dry Bulb	S/T at 80° Dry Bulb	S/T at 85° Dry Bulb	Total Cooling Capacity (Btuh)	Comp. Watts Input	S/T at 75° Dry Bulb	S/T at 80° Dry Bulb	S/T at 85° Dry Bulb	Total Cooling Capacity (Btuh)	Comp. Watts Input	S/T at 75° Dry Bulb	S/T at 80° Dry Bulb	S/T at 85° Dry Bulb	Total Cooling Capacity (Btuh)	Comp. Watts Input	S/T at 75° Dry Bulb	S/T at 80° Dry Bulb	S/T at 85° Dry Bulb
63°	400	12600	820	.78	.92	1.00	12000	910	.80	.95	1.00	11400	1000	.82	.95	1.00	10800	1090	.85	1.00	1.00
	450	12800	820	.82	.97	1.00	12200	910	.85	1.00	1.00	11600	1000	.87	1.00	1.00	11000	1090	.90	1.00	1.00
	500	13100	820	.87	1.00	1.00	12400	910	.90	1.00	1.00	11800	1000	.92	1.00	1.00	11200	1090	.95	1.00	1.00
67°	400	13400	820	.59	.74	.89	12700	910	.60	.76	.91	12100	1010	.62	.79	1.00	11500	1110	.63	.81	.96
	450	13600	820	.62	.78	.94	12900	910	.64	.80	.97	12300	1010	.65	.83	1.00	11700	1110	.67	.86	1.00
	500	13900	820	.65	.82	.99	13200	910	.67	.84	1.00	12600	1010	.69	.88	1.00	11900	1110	.70	.91	1.00
71°	400	14200	830	.40	.56	.72	13500	920	.40	.57	.74	12800	1020	.41	.58	.76	12100	1120	.41	.59	.78
	450	14400	830	.42	.59	.76	13700	920	.42	.60	.78	13000	1020	.43	.62	.80	12300	1120	.43	.63	.82
	500	14700	830	.44	.62	.80	14000	920	.44	.63	.82	13300	1020	.45	.65	.84	12600	1120	.45	.66	.87

Note: All values are gross capacities and do not include blower motor heat deduction.

Performance Ratings (continued)

Table 1-5 Performance Ratings - HWC182/183

		Outdoor Air Temperature Entering Outdoor Coil																			
		85°					95°					105°					115°				
Enter. Wet Bulb	Total Air Vol. (CFM)	Total Cooling Capacity (Btuh)	Comp. Watts Input	S/T at 75° Dry Bulb	S/T at 80° Dry Bulb	S/T at 85° Dry Bulb	Total Cooling Capacity (Btuh)	Comp. Watts Input	S/T at 75° Dry Bulb	S/T at 80° Dry Bulb	S/T at 85° Dry Bulb	Total Cooling Capacity (Btuh)	Comp. Watts Input	S/T at 75° Dry Bulb	S/T at 80° Dry Bulb	S/T at 85° Dry Bulb	Total Cooling Capacity (Btuh)	Comp. Watts Input	S/T at 75° Dry Bulb	S/T at 80° Dry Bulb	S/T at 85° Dry Bulb
63°	550	18400	1370	.75	.90	1.00	17100	1470	.78	.92	1.00	15700	1550	.82	.96	1.00	14400	1640	.86	.96	1.00
	600	18700	1380	.78	.93	1.00	17400	1480	.81	.96	1.00	16000	1560	.85	1.00	1.00	14600	1650	.89	1.00	1.00
	650	18900	1390	.81	.96	1.00	17600	1490	.84	.99	1.00	16200	1570	.88	1.00	1.00	14800	1660	.92	1.00	1.00
67°	550	19800	1410	.58	.72	.87	18500	1510	.59	.74	.89	17100	1600	.62	.78	.94	15600	1700	.64	.80	.96
	600	20100	1420	.60	.75	.90	18800	1520	.62	.77	.93	17400	1610	.64	.81	.98	15900	1710	.66	.83	1.00
	650	20400	1430	.62	.78	.93	19000	1530	.64	.80	.96	17600	1620	.66	.84	1.00	16100	1720	.68	.86	1.00
71°	550	21200	1450	.40	.55	.69	19700	1550	.40	.56	.72	18300	1650	.41	.58	.75	16700	1750	.41	.60	.78
	600	21500	1460	.42	.57	.72	20000	1560	.42	.59	.75	18600	1660	.43	.61	.78	17000	1760	.43	.62	.81
	650	21800	1470	.43	.59	.74	20300	1570	.43	.60	.78	18800	1670	.44	.63	.81	17200	1770	.44	.64	.84

Note: All values are gross capacities and do not include blower motor heat deduction.

Table 1-6 Performance Ratings - HWC242/243

		Outdoor Air Temperature Entering Outdoor Coil																			
		85°					95°					105°					115°				
Enter. Wet Bulb	Total Air Vol. (CFM)	Total Cooling Capacity (Btuh)	Comp. Watts Input	S/T at 75° Dry Bulb	S/T at 80° Dry Bulb	S/T at 85° Dry Bulb	Total Cooling Capacity (Btuh)	Comp. Watts Input	S/T at 75° Dry Bulb	S/T at 80° Dry Bulb	S/T at 85° Dry Bulb	Total Cooling Capacity (Btuh)	Comp. Watts Input	S/T at 75° Dry Bulb	S/T at 80° Dry Bulb	S/T at 85° Dry Bulb	Total Cooling Capacity (Btuh)	Comp. Watts Input	S/T at 75° Dry Bulb	S/T at 80° Dry Bulb	S/T at 85° Dry Bulb
63°	700	24300	1870	.74	.88	1.00	23200	2110	.76	.89	1.00	21800	2380	.78	.94	1.00	21000	2710	.80	.95	1.00
	800	24700	1870	.78	.93	1.00	23600	2110	.80	.94	1.00	22200	2380	.82	.99	1.00	21300	2710	.84	1.00	1.00
	900	25200	1880	.82	.98	1.00	24100	2120	.85	.99	1.00	22600	2390	.87	1.00	1.00	21700	2720	.89	1.00	1.00
67°	700	25900	1890	.57	.71	.85	24700	2130	.58	.72	.86	23600	2400	.59	.75	.91	22400	2750	.60	.76	.92
	800	26300	1890	.60	.75	.90	25100	2130	.61	.76	.91	24000	2400	.62	.79	.96	22800	2750	.63	.80	.97
	900	26800	1900	.63	.79	.95	25600	2140	.64	.80	.96	24500	2410	.66	.84	1.00	23200	2760	.67	.85	1.00
71°	700	27300	1910	.40	.55	.69	26100	2150	.40	.55	.70	24900	2430	.40	.56	.72	23700	2770	.40	.57	.74
	800	27700	1910	.42	.58	.73	26500	2150	.42	.58	.74	25300	2430	.42	.59	.76	24100	2770	.42	.60	.78
	900	28300	1920	.44	.61	.77	27000	2160	.44	.61	.78	25800	2440	.44	.62	.80	24600	2780	.44	.63	.82

Note: All values are gross capacities and do not include blower motor heat deduction.

Table 1-7 Performance Ratings - HWC302/303

		Outdoor Air Temperature Entering Outdoor Coil																			
		85°					95°					105°					115°				
Enter. Wet Bulb	Total Air Vol. (CFM)	Total Cooling Capacity (Btuh)	Comp. Watts Input	S/T at 75° Dry Bulb	S/T at 80° Dry Bulb	S/T at 85° Dry Bulb	Total Cooling Capacity (Btuh)	Comp. Watts Input	S/T at 75° Dry Bulb	S/T at 80° Dry Bulb	S/T at 85° Dry Bulb	Total Cooling Capacity (Btuh)	Comp. Watts Input	S/T at 75° Dry Bulb	S/T at 80° Dry Bulb	S/T at 85° Dry Bulb	Total Cooling Capacity (Btuh)	Comp. Watts Input	S/T at 75° Dry Bulb	S/T at 80° Dry Bulb	S/T at 85° Dry Bulb
63°	775	28500	2150	.72	.84	.97	27300	2390	.73	.87	1.00	26100	2670	.74	.89	1.00	24800	2990	.76	.90	1.00
	850	28900	2160	.74	.87	1.00	27600	2400	.76	.90	1.00	26400	2680	.77	.93	1.00	25100	3000	79	.93	1.00
	925	29300	2170	.77	.90	1.00	28000	2410	.79	.93	1.00	26800	2690	.80	.96	1.00	25400	3010	.82	.96	1.00
67°	775	30400	2190	.56	.69	.82	29000	2440	.57	.71	.84	27800	2720	.58	.73	.88	26400	3050	.59	.73	.88
	850	30800	2200	.58	.71	.85	29400	2450	.59	.73	.87	28100	2730	.60	.75	.91	26700	3060	.61	.76	.91
	925	31200	2210	.60	.73	.87	29800	2460	.61	.76	.90	28500	2740	.62	.78	.94	27100	3070	.63	.79	.94
71°	775	32200	2220	.40	.54	.68	30800	2480	.41	.55	.69	29300	2760	.41	.56	.71	28000	3090	.42	.57	.73
	850	32600	2230	.41	.56	.70	31200	2490	.42	.57	.71	29700	2770	.42	.58	.73	28300	3100	.43	.59	.75
	925	33000	2240	.42	.57	.72	31600	2500	.43	.58	.73	30100	2780	.43	.60	.76	28700	3110	.45	.61	.78

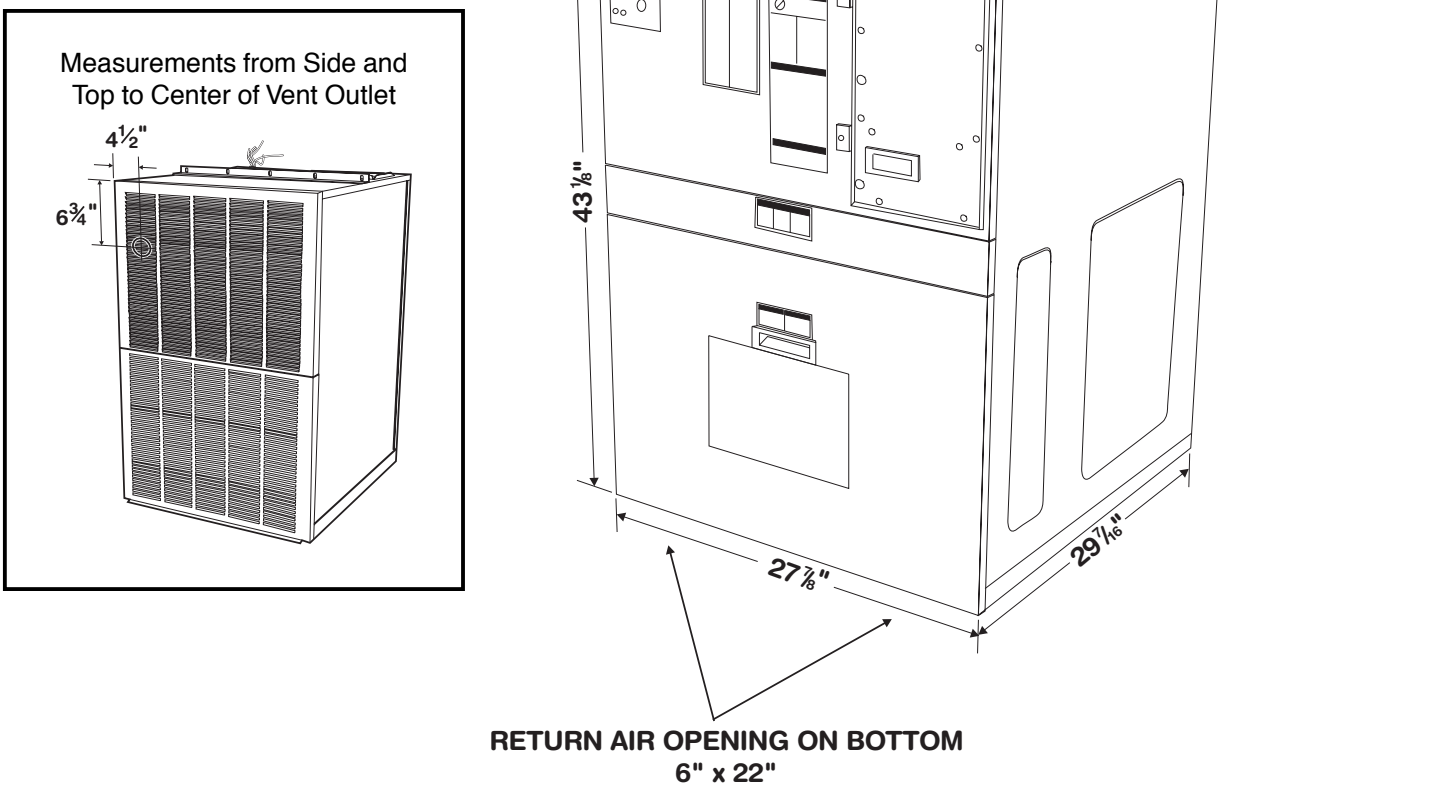
Note: All values are gross capacities and do not include blower motor heat deduction.

Blower Performance

Table 1-8 Blower Performance - HWC Units

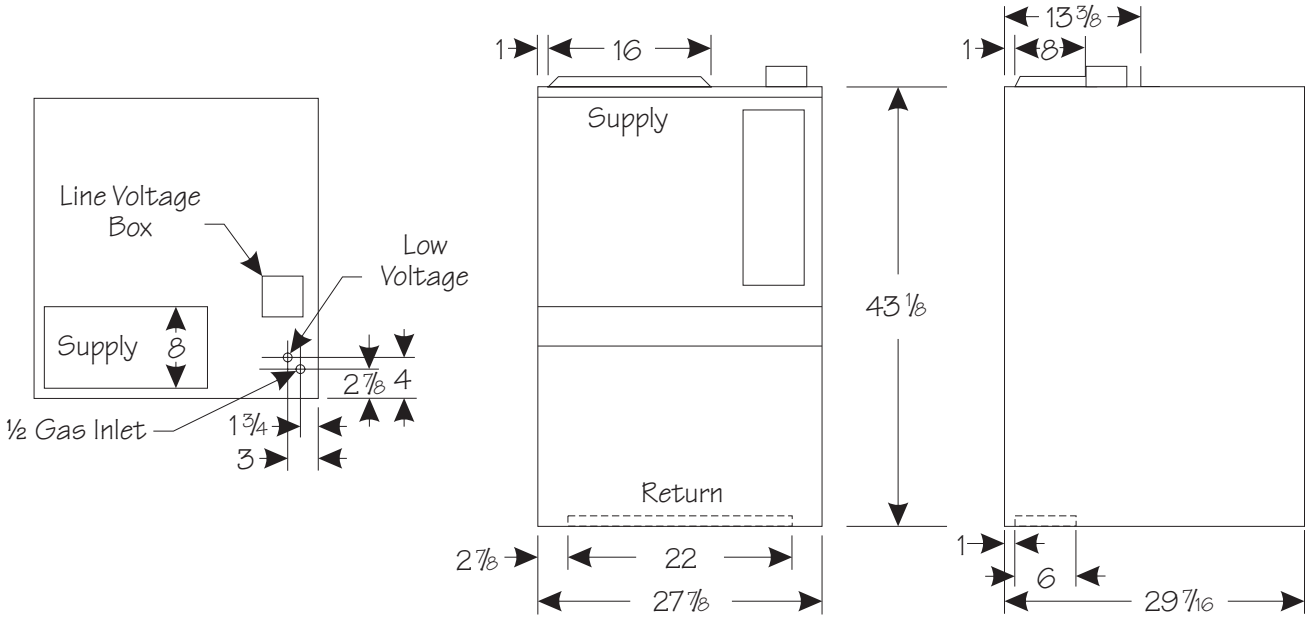
Model	Blower Speed	CFM @ ext. static pressure - in. w.c. with filter(s)			
		0.2	0.3	0.4	0.5
HWC122/123	Hi	650	615	575	540
	Med	475	450	425	400
	Low	415	405	390	380
HWC182,242,302 HWC183,243,303	Hi	875	825	775	725
	Med	850	805	760	710
	Low	630	605	575	550

Dimensions *(all measurements in inches)*

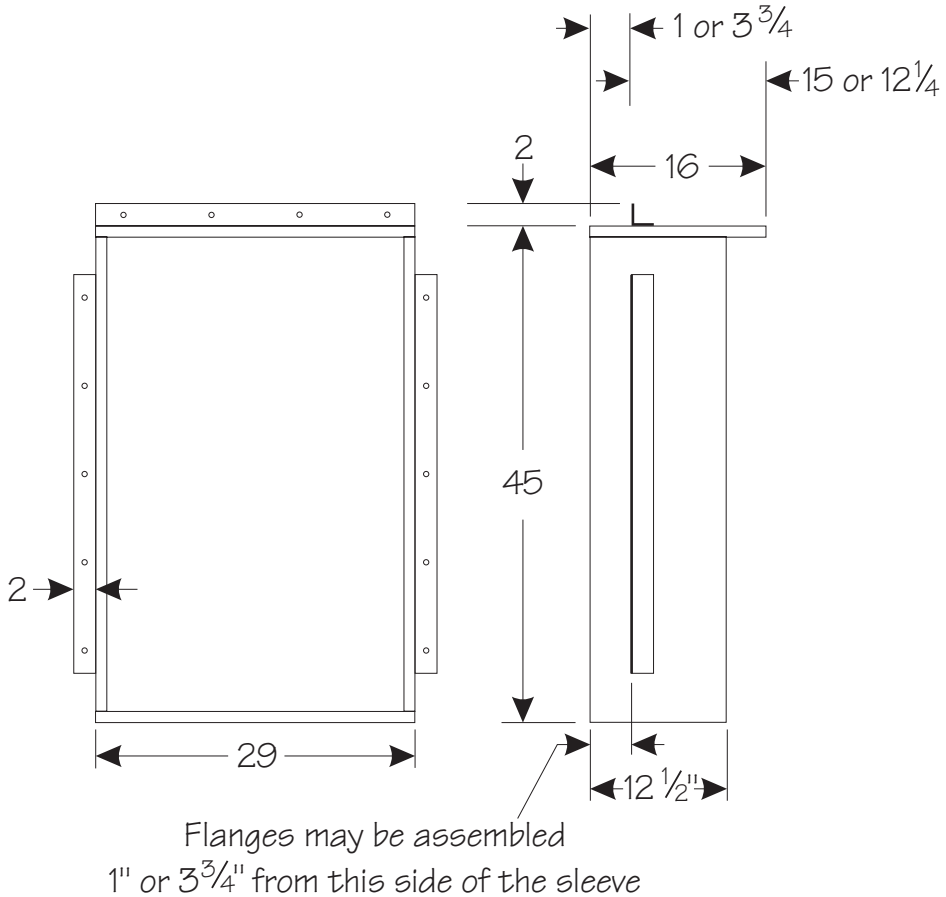


Measurements from Side and Top to Center of Vent Outlet

Dimensions (cont.)



Wall Sleeve *(all measurements in inches)*



Flanges may be assembled
1" or 3¾" from this side of the sleeve

Section 2 - Sequence of Operation

HWC123,183,243,303 2-4
Simplified Sequence 2-5
Detailed Sequence 2-6
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PRESSURE SWITCH OPENS (BLOCKED FLUE) 2-7
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HWC122,182,242,302
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w/Low Ambient Control 2-36

HWC122,182,242,302
w/Low Ambient Control 2-38

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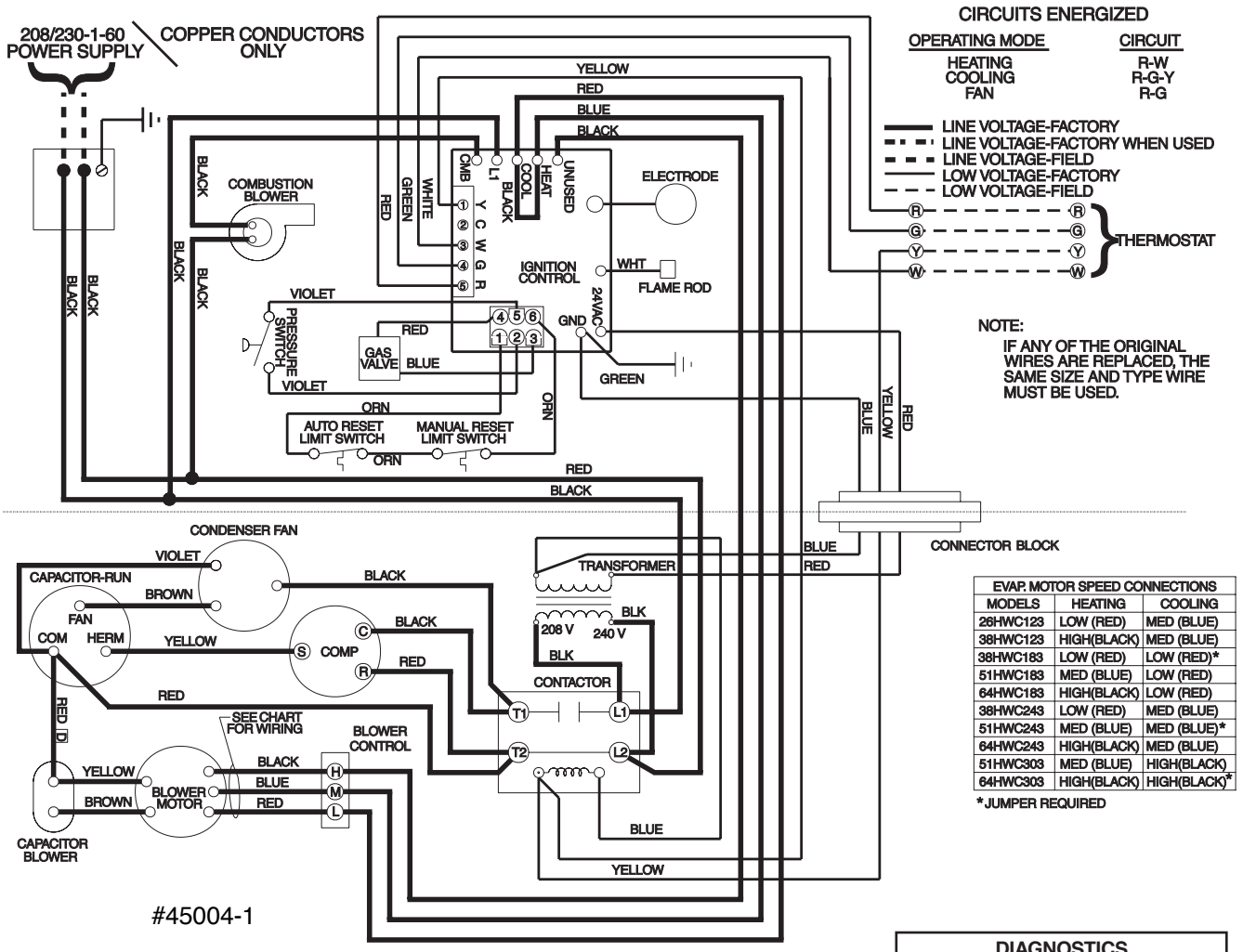
HWC123, 183, 243, 303
(w/United Technologies 1097 Spark Ignition System)



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EVAP. MOTOR SPEED CONNECTIONS		
MODELS	HEATING	COOLING
26HWC123	LOW (RED)	MED (BLUE)
38HWC123	HIGH(BLACK)	MED (BLUE)
38HWC183	LOW (RED)	LOW (RED)*
51HWC183	MED (BLUE)	LOW (RED)
64HWC183	HIGH(BLACK)	LOW (RED)
38HWC243	LOW (RED)	MED (BLUE)
51HWC243	MED (BLUE)	MED (BLUE)*
64HWC243	HIGH(BLACK)	MED (BLUE)
51HWC303	MED (BLUE)	HIGH(BLACK)
64HWC303	HIGH(BLACK)	HIGH(BLACK)*

*JUMPER REQUIRED

Note: On units that are equipped with a low ambient switch (designated with an "SA" in the model number), sequence of operation during cooling call is modified when **outdoor** temperatures fall below the normal operating range. For more information on the low ambient switch equipped version of this unit, see the section beginning on page 2-36.

DIAGNOSTICS

The following blower/ignition control board LED codes will indicate normal or abnormal operations:

SLOW FLASH	Normal Operation, No Call for Heat
FAST FLASH	Normal Operation, Call for Heat
2 FLASH	System Lockout - Failed to Detect or Sustain Flame
3 FLASH	Pressure Switch Open or Closed
4 FLASH	High Limit or Rollout Switch Open
5 FLASH	Flame Sensed and Gas Valve Not Energized
STEADY	Internal Failure (Micro-controller Failure; Self-check)

FIGURE 2-1 Connection Diagram

Simplified Sequence - HWC123,183, 243, 303
Refer to Figure 2-1

- 208/230V power is supplied to the junction box on top of the unit
- 24V power is supplied from the unit transformer to the thermostat

CALL FOR HEAT

1. The thermostat closes the R-W circuit, sending a 24-volt signal to the unit.
2. The 24-volt signal energizes the combustion blower, causing the pressure switch to close.
3. The combustion blower runs for 30 seconds as a pre-purge to trial for ignition.
4. The ignition control energizes the spark ignition and opens the gas valve, causing the burners to light. When the gas valve energizes, a 30-second circulating air blower “on” delay begins.
5. Flame sense is sent to the ignition control through the flame sensor and flame sense wire.
6. After the 30-second delay, the circulating air blower energizes and runs until the heat call is satisfied.
7. When the heat call is satisfied, the gas valve de-energizes. This shuts down the burners.
8. A 5-second combustion blower post-purge delay and a 120-second circulating air blower “off” delay start.
9. After the delay times elapse, the combustion blower and the circulating air blower stop.

FLAME SENSE

1. After the burners have been lit, the ignition control starts a 10-second trial for ignition delay.
2. If after 10 seconds a flame has not been sensed by the ignition control, the ignition control de-energizes the gas valve and the spark ignitor.
3. The unit initiates three trials for ignition (flame sense) before system lockout.
4. System lockout lasts 60 minutes or until power is reset to unit (whichever comes first).

CALL FOR COOLING

1. The thermostat energizes the R, Y and G circuit, sending a 24-volt signal to the cooling contactor and the ignition control to start the cooling sequence.
2. The contactor closes immediately, causing the compressor and the condenser fan to run.
3. The 24-volt Y signal starts a 5-second circulating air blower “on” delay.
4. After 5 seconds, the circulating air blower starts and runs until the R, Y and G circuit is interrupted by the thermostat.
5. When the R, Y and G circuit is interrupted, the cooling contactor immediately de-energizes. This causes the compressor and the condenser fan to stop.
6. The ignition control starts a 90-second circulating air blower “off” delay.
7. After 90 seconds, the circulating air blower stops.

FAN ON

1. The thermostat energizes the R-G circuit, causing the circulating air blower to energize in cooling speed.
2. The circulating air blower remains running in cooling speed until the thermostat is switched to the “AUTO” position.

Detailed Sequence follows

Detailed Sequence - HWC123, 183, 243, 303
Refer to Figure 2-1

POWER

Line Voltage

With the unit at rest (no call from the **thermostat**), line voltage will be present:

L1 Power
1. Through the **L1** black lead to the **L1** terminal on the **ignition control**
2. At the **L1 contactor** terminal
3. At the **transformer** terminal marked **208-240V**

L2 Power
1. Through the **L2** black lead to the **induced draft blower**
2. At the **L2 contactor** terminal
3. A **transformer** common terminal
4. At the **T2 contactor** terminal
5. At the **R** terminal of the **compressor**
6. At the **capacitor** common terminals

Low Voltage (24 VAC)

With the unit at rest (no call from the **thermostat**), 24 volts A/C will be present:

1. From the **transformer** 24V terminal to pin 4 of the 6-pin chassis low voltage harness
2. From pin 4 of the chassis low voltage harness to the **24VAC** hot terminal on the **ignition control**
3. From the **24VAC** hot terminal to pin 5 of the 5-pin thermostat harness (internal to board)
4. From the **24VAC** hot terminal also to pin 6 of the 6-pin ignition wire harness
5. From pin 6 of the ignition wire harness through the auto reset **limit switch** and the manual reset **rollout switch** to pin 1 of the 6-pin ignition wire harness

Note: While the unit is at rest, the green LED shows consistent slow flash. This indicates normal operation - system at rest (standby mode).

CALL FOR HEAT

Line Voltage

The **ignition control** receives a signal from the **R-W** circuit indicating a call for heat.

1. The **combustion blower** relay energizes, sending **L1** power to **CMB BLWR** terminal on the **ignition control**. This causes the **combustion blower** to start by completing the line voltage circuit through the **L2** wire connection in the unit.
2. As the 24-volt signal is sent to pin 4 of the 6-pin ignition wire harness by the i**gnition control**, a 30-second **circulating air blower** "on" delay starts. After the delay, the **ignition control** energizes the heat speed blower relay. This sends **L1** power to the **ACB HEAT** terminal on the **ignition control**.
3. **L1** power is then sent to the **circulating air blower terminal block** where it is connected to the blower motor. The **circulating air blower** starts by completing the **L1-L2** circuit through the **L2** connection at the blower motor capacitor.
4. The **combustion blower** and the **circulating air blower** continue to run until the **R-W** circuit is interrupted. After a 5-second post-purge delay, the **CMB BLWR** terminal on the **ignition control** de-energizes. This interrupts L1 power to the **combustion blower**. After a 120-second **circulating air blower** "off" delay, the **ACB HEAT** terminal de-energizes. This interrupts L1 to the **circulating air blower**. As L1 power is interrupted, the blowers shut off.

Low Voltage

1. A call for heat closes the **R-W** circuit, sending a 24-volt signal to the low voltage white wire in the unit.
2. The 24-volt signal is received at pin 3 of the 5-pin thermostat harness on the **ignition control**.
3. The 24-volt signal causes the **combustion blower** relay to close, causing the **combustion blower** to run. At this time, a 24-volt signal is also sent out through pin 2 of the 6-pin ignition wire harness.
4. The 24-volt signal from pin 2 of the 6-pin ignition wire harness energizes one side of the Normally Open **pressure switch**. As the **induced draft blower** reaches full speed, the **pressure switch** closes and a 24-volt signal is sent to pin 5 of the 6-pin ignition wire harness.
5. When the 24-volt signal is received at pin 5 of the 6-pin ignition wire harness, the **ignition control** starts a 30-second pre-purge delay.
6. After the 30-second pre-purge, the **ignition control** initiates a trial for ignition. The **spark ignition cable** terminal and pin 4 of the 6-pin ignition wire harness energize simultaneously.
7. When the 24-volt signal is present at pin 4 of the 6-pin ignition wire harness, the **ignition control** starts a 30-second **circulating air blower** "on" delay.
8. The 24-volt signal from pin 4 of the 6-pin ignition wire harness is received at the **gas valve**, causing it to open and the burners to ignite.

9. After 30-second "on" delay, the **circulating air blower** relay energizes the heat terminal and the **circulating air blower** is energized.
10. The unit will continue to operate normally until the **R-W** circuit is interrupted.
11. When the heat call is satisfied, the **thermostat** will interrupt the **R-W** circuit. This causes the 24-volt signal to the white wire in the unit to be de-energized.
12. The **gas valve** closes immediately as 24V through pin 4 of the 6-pin ignition wire harness is de-energized by the **ignition control**.
13. The **ignition control** initiates a 120-second **circulating air blower** "off" delay and 5-second **combustion blower** post-purge delay.
14. After 5 seconds, the **combustion blower** shuts off.
15. After 120 seconds, the **circulating air blower** shuts off and the system returns to standby mode.

Note: During a call for heat, the green LED shows consistent fast flash (as long as the **R-W** circuit is closed). When the **R-W** circuit is interrupted (indicating the heat call has been satisfied), the green LED returns to a consistent slow flash.

LIMIT/ROLLOUT OPENS

In all modes of operation, 24VAC is supplied to the **ignition control 24VAC** hot terminal and is passed through the **ignition control** to pin 6 of the 6-pin ignition wire harness.

1. A 24-volt signal is sent from pin 6 of the 6-pin ignition wire harness to one side of the Normally Closed manual reset **rollout switch**, across the r**ollout switch** to one side of the Normally Closed auto reset **limit switch** and across the **limit switch** to pin 1 of the 6-pin ignition wire harness.
2. This circuit energizes whenever line voltage power is supplied to the unit.
3. If the circuit is interrupted by either switch opening, the 24-volt signal to pin 1 of the 6-pin ignition wire harness de-energizes.
4. This causes the **combustion blower** relay to energize, sending L1 power to the **CMB BLWR** terminal on the **ignition control**. It also causes the **circulating air blower** heat speed relay to energize, sending L1 power to the **ACB HEAT** terminal on the **ignition control**. This causes both blowers to start immediately.
5. The **ignition control** lockouts the **spark ignition cable** terminal and pin 4 of the 6-pin ignition wire harness until the 24-volt signal is restored at pin 1 of the 6-pin ignition wire harness.
6. The **circulating air blower** and the **combustion blower** are energized until the 24-volt signal is restored at pin 1 of the 6-pin ignition wire harness.
7. The green ignition control LED shows a 4 flash fault code (indicating **limit switch**/**rollout switch** open).
8. When the 24-volt signal is restored at pin 1 of the 6-pin ignition wire harness, the **ignition control** starts a 5-second **combustion blower** post-purge delay and a 120-second **circulating air blower** "off" delay.
9. Once the delays have timed out, both blowers stop and the green LED flashes a consistent slow flash if no heat call is present. (A consistent fast flash appears if there is a call for heat.)

Note: The **limit switch** resets automatically when temperatures are acceptable, but the **rollout switch** must be manually reset by pushing in on the small button on top of the switch.

The reason why the switches opened must be determined before any corrective action is taken.

PRESSURE SWITCH OPENS (BLOCKED FLUE)

When the **R-W** circuit is energized, a 24-volt signal is sent to the **ignition control**. This starts the call for heat.

1. The 24-volt signal from the **R-W** circuit energizes the **combustion blower** relay, sending L1 power to the **CMB BLWR** terminal on the **ignition control**. This starts the **ignition control**.
2. At the same time the **combustion blower** relay energizes, the 24-volt signal is sent to pin 2 of the 6-pin ignition wire harness and from pin 2 to one side of the Normally Open **pressure switch**.
3. When the **combustion blower** causes the **pressure switch** to close, a 24-volt signal is sent across the switch to pin 5 of the 6-pin ignition wire harness. The 24-volt signal energizes at pin 5 and the ignition sequence continues.
4. If the **combustion blower** fails to close the **pressure switch**, the 24-volt signal is not sent to pin 5 of the 6-pin ignition wire harness and the **ignition control** does not initiate a 30-second pre-purge delay.
5. No signal is sent to the **spark ignition cable** terminal on the **ignition control** or to the **gas valve** through pin 4 of the 6-pin ignition wire harness.
6. The **combustion blower** continues to run for 60 seconds. After 60 seconds, the **ignition control** automatically de-energizes the **combustion blower** relay. This interrupts L1 power to the **CMB BLWR** terminal on the **ignition control**.
7. The **combustion blower** remains de-energized for approximately six minutes. During this 6-minute lockout, the green LED flashes three times (indicating pressure switch fault—open or closed).

8. The 24-volt signal will only be supplied to the **limit switch** circuit through pin 6 of the 6-pin ignition wire harness and to the **pressure switch** circuit through pin 2 of the 6-pin ignition wire harness.
9. The system will repeat this sequence until the **pressure switch** closes and the 24-volt signal is restored at pin 5 of the 6-pin ignition wire harness.

FAILED FLAME SENSE/TRIAL FOR IGNITION

When the **pressure switch** closes and a 24-volt signal is sent to pin 5 of the 6-pin ignition wire harness, the **spark ignition cable** terminal and pin 4 of the 6-pin ignition wire harness energize.

1. As spark voltage is supplied to the **ignitor electrodes**, the **gas valv**e opens and this causes the burners to ignite.
2. The **ignition control** continues to energize spark voltage until a flame sense signal is supplied to the flame terminal on the **ignition control**.
3. If a flame sense signal is not received at the flame terminal on the **ignition control**, the **spark ignition cable** terminal remains energized for 10 seconds.
4. After the 10-second trial for ignition, the **ignition control** de-energizes the **spark ignition cable** terminal and pin 4 of the 6-pin ignition wire harness. This causes the **gas valve** to close and the electrode spark to stop.
5. Once the 24-volt signal is sent to pin 4 of the 6-pin ignition wire harness, a 30-second **circulating air blower** "on" delay starts. After the delay is timed out, the **circulating air blower** starts.
6. After the **spark ignition cable** terminal de-energizes, the **ignition control** initiates a 30-second **combustion blower** inter-purge delay.
7. After 30-second inter-purge, the **ignition control** energizes the **spark ignition cable** terminal and pin 4 of the 6-pin ignition wire harness. If the flame sense signal is received at the flame terminal of the **ignition control**, the unit continues heat call.
8. If the flame sense signal is not received, the system goes through three trials following the above sequence.
9. After three trials, the system goes into lockout and only the **high limit switch** circuit and **pressure switch** circuit remain energized during the 60-minute lockout period.
10. If the flame sense is lost during the heat cycle, the **gas valve** de-energizes immediately and the system goes into the trial sequence.

CALL FOR COOLING

Line Voltage

1. L2 power passes through the fixed closed **L2-T2** terminals on the **contactor** to the **RUN** terminal of the **compressor** and the **COMMON** terminal of the **capacitor**.
2. L1 power is sent to the **L1** terminal of the **contactor**. When the **Y** signal energizes the **contactor**, the **T2** terminal becomes energized. L1 power is sent to the **compressor COMMON** terminal and the **condenser fan**. This energizes the **compressor** and **condenser fan** motors.
3. When pin 1 (**Y** terminal) of the 5-pin thermostat harness receives a 24-volt signal from the **thermostat**, a 5-second **circulating air blower** delay starts.
4. After the 5-second delay, the **ignition control** energizes the cooling speed relay. This sends L1 power to the **ACB COOL** terminal of the **ignition control**.
5. L1 power is sent to the **circulating air blower** terminal block, energizing the **circulating air blower** motor.
6. When the **R**, **Y** and **G** circuit is interrupted by the **thermostat**, the **contactor** is immediately de-energized. This interrupts L1 power to the **compressor** and **condenser fan** motors, stopping both.
7. The **ignition control** starts a 90-second **circulating air blower** "off" delay, after which the **ACB COOL** terminal de-energizes. This interrupts L1 power to the **circulating air blower** motor, causing it to stop.

Low Voltage

1. The **thermostat** energizes the **R**, **Y** and **G** circuit, sending a 24-volt signal to the **contactor** coil and to pin 1 of the 5-pin thermostat harness connected to the **ignition control**.
2. The **contactor** closes immediately upon receiving the 24-volt signal, causing the **compressor** and **condenser fan** motors to start.
3. The 24-volt signal is also sent to pin 1 of the 5-pin thermostat harness, initiating a 5-second **circulating air blower** "on" delay.
4. After the 5-second delay, the **ignition control** energizes the cooling speed relay and the **circulating air blower** starts.
5. When the cooling call is satisfied, the **thermostat** interrupts the **R**, **Y** and **G** circuit. The **contactor** de-energizes immediately, causing the **compressor** and the **condenser fan** to stop. The **ignition control** starts a 90-second **circulating air blower** "off" delay.

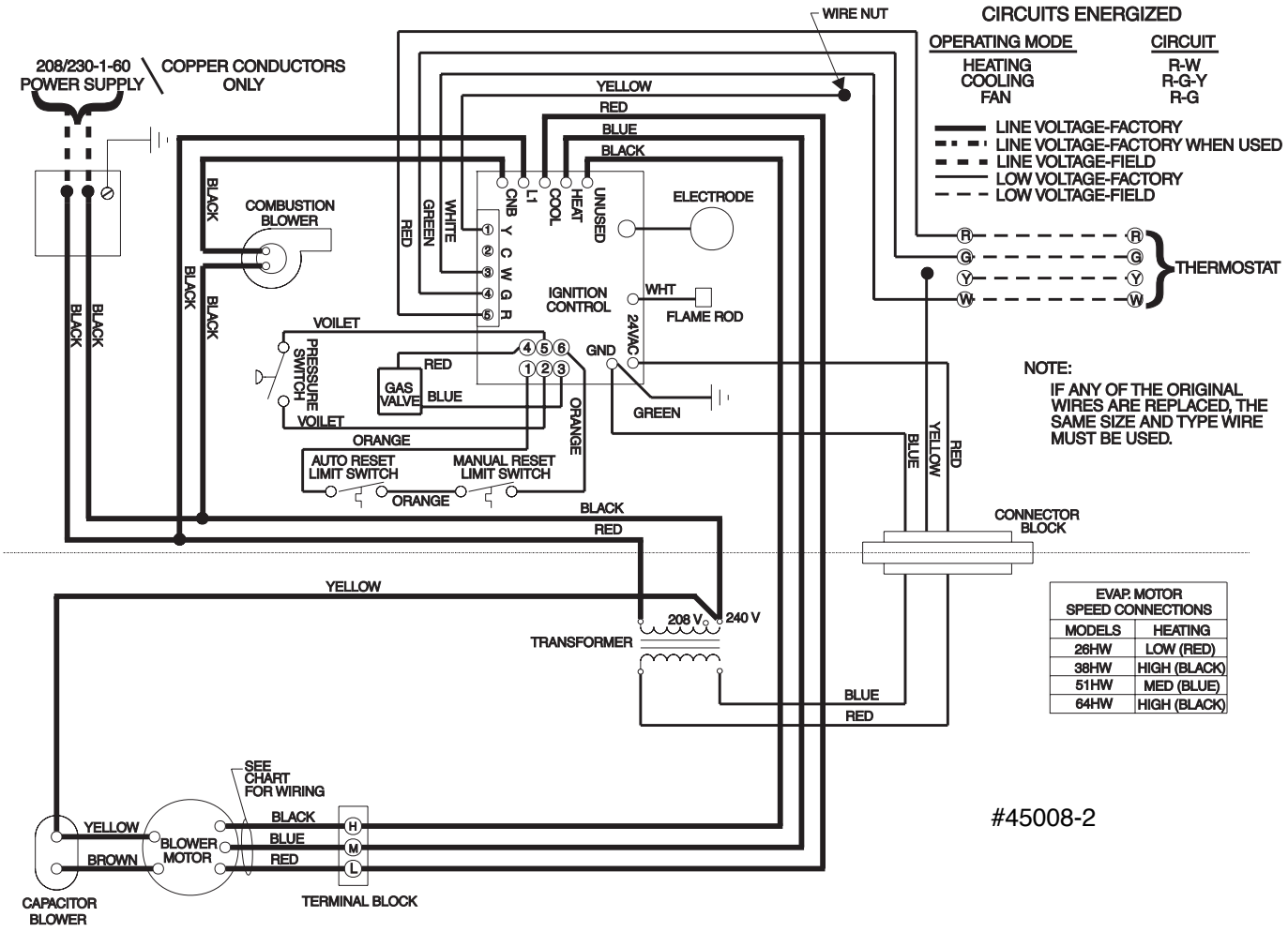
6. After the 90-second delay, the **ignition control** de-energizes the cooling speed relay and the **circulating air blower** stops.

FAN ON

1. When the **thermostat** is switched to the "FAN ON" position, the **R-G** circuit sends a 24-volt signal to pin 4 of the 5-pin thermostat harness.
2. The 24-volt signal energizes the cooling speed relay, sending L1 power to the **ACB COOL** terminal of the **ignition control**.
3. L1 power is sent to the **circulating air blower** terminal block, causing the **circulating air blower** to run in cooling speed.
4. The **circulating air blower** continues to run in cooling speed until the **thermostat** is switched to "AUTO", interrupting the **R-G** circuit.

Note: With the **thermostat** in the "FAN ON" position during heat call, **ignition control** will not energize the heat speed relay. The **circulating air blower** continues to run in cooling speed unless the **limit switch** circuit opens, which would cause the heat speed relay and the **induced draft blower** relay to become energized. This would de-energize the cooling speed relay until either the **limit switch** circuit is closed or the **thermostat** is switched to the "AUTO" position.

HW (Heating Only)
(w/United Technologies 1097 Spark Ignition System)



DIAGNOSTICS

The following blower/ignition control board LED codes will indicate normal or abnormal operations:

SLOW FLASH	Normal Operation, No Call for Heat
FAST FLASH	Normal Operation, Call for Heat
2 FLASH	System Lockout - Failed to Detect or Sustain Flame
3 FLASH	Pressure Switch Open or Closed
4 FLASH	High Limit or Rollout Switch Open
5 FLASH	Flame Sensed and Gas Valve Not Energized
STEADY	Internal Failure (Micro-controller Failure; Self-check)

FIGURE 2-2 Connection Diagram

Simplified Sequence - HW (w/UTEC 1097 Board)
Refer to Figure 2-2

CALL FOR HEAT

1. The indoor thermostat energizes the R-W circuit, sending a 24-volt signal to the ignition control.
2. The 24-volt signal causes the induced draft blower to start, which closes the pressure switch.
3. Once the pressure switch closes, a 30-second induced draft blower pre-purge starts.
4. After the 30-second induced draft blower pre-purge, the gas valve opens and the burners ignite. This starts a 30-second circulating air blower “on” delay.
5. The unit continues to operate in the heat mode until the indoor thermostat setting is reached. At that time, the R-W circuit is interrupted.
6. The 24-volt signal to the ignition control is interrupted, causing the gas valve to close and the burners to shut down.
7. A 5-second post-purge starts and following that the induced draft blower stops.
8. A 120-second circulating air blower “off” delay starts. After the elapsed time, the circulating air blower stops.

FAN ON

1. When the thermostat is switched to the “FAN ON” position, a 24-volt signal is sent to the ignition control.
2. The ignition control immediately energizes the cooling speed of the circulating air blower.
3. The circulating air blower runs in the cooling speed until the thermostat fan switch is moved back to the “AUTO” position. At this time, the circulating air blower stops.

During the call for “FAN ON”, the circulating air blower heat speed will not be energized by the ignition control unless the limit switch circuit is interrupted.

Detailed Sequence follows

Detailed Sequence - HW (w/UTEC 1097 Board)
Refer to Figure 2-2

POWER

Line Voltage

With the unit at rest (no call from the **thermostat**), line voltage will be present:

L1 Power
1. Through the **L1** black lead to the **L1** terminal on the **ignition control**
2. At the **transformer** terminal marked **208-240V**

L2 Power
1. Through the **L2** black lead to the **induced draft blower**
2. **Transformer** common terminal
3. At the **circulating air blower capacitor** terminal

Low Voltage (24 VAC)

With the unit at rest (no call from the **thermostat**), 24 volts A/C will be present:

1. At the **transformer** 24V terminal
2. At the **24VAC** hot terminal on the **ignition control**
3. At pin 5 of the 5-pin thermostat harness (red wire pin)
4. At pin 6 of the 6-pin ignition wire harness
5. Through the auto reset **limit switch** and the manual reset **rollout switch** to pin 1 of the 6-pin ignition wire harness

Note: While the unit is at rest, the green LED shows consistent slow flash. This indicates normal operation - system at rest (standby mode).

CALL FOR HEAT

Line Voltage

The **ignition control** receives a signal from the **R-W** circuit indicating a call for heat.

1. The **combustion blower** relay energizes, sending **L1** power to **CMB BLWR** terminal on the **ignition control**. This causes the **combustion blower** to start.
2. As the 24-volt signal is sent to pin 4 of the 6-pin ignition wire harness by the i**gnition control**, a 30-second **circulating air blower** "on" delay starts. After the delay, the **ignition control** energizes the heat speed blower relay. This sends **L1** power to the **ACB HEAT** terminal on the **ignition control**.
3. **L1** power is then sent to the **circulating air blower terminal block** where it is connected to the blower motor, starting the **circulating air blower**.
4. The **combustion blower** and the **circulating air blower** continue to run until the **R-W** circuit is interrupted. After a 5-second post-purge delay, the **CMB BLWR** terminal on the **ignition control** de-energizes. This interrupts L1 power to the **combustion blower**. After a 120-second **circulating air blower** "off" delay, the **ACB HEAT** terminal de-energizes. This interrupts L1 to the **circulating air blower**. As L1 power is interrupted, the blowers shut off.

Low Voltage

1. A call for heat closes the **R-W** circuit, sending a 24-volt signal to the low voltage white wire in the unit.
2. The 24-volt signal is received at pin 3 of the 5-pin thermostat harness on the **ignition control**.
3. The 24-volt signal causes the **combustion blower** relay to close, causing the **combustion blower** to run. At this time, a 24-volt signal is also sent out through pin 2 of the 6-pin ignition wire harness.
4. The 24-volt signal from pin 2 of the 6-pin ignition wire harness energizes one side of the Normally Open **pressure switch**. As the **induced draft blower** reaches full speed, the **pressure switch** closes and a 24-volt signal is sent to pin 5 of the 6-pin ignition wire harness.
5. When the 24-volt signal is received at pin 5 of the 6-pin ignition wire harness, the **ignition control** starts a 30-second pre-purge delay.
6. After the 30-second pre-purge, the **ignition control** initiates a trial for ignition. The **spark ignition cable** terminal and pin 4 of the 6-pin ignition wire harness energize simultaneously.
7. When the 24-volt signal is present at pin 4 of the 6-pin ignition wire harness, the **ignition control** starts a 30-second **circulating air blower** "on" delay.
8. The 24-volt signal from pin 4 of the 6-pin ignition wire harness is received at the **gas valve**, causing it to open and the burners to ignite.
9. After 30-second "on" delay, the **circulating air blower** relay energizes the heat terminal and the **circulating air blower** is energized.
10. The unit will continue to operate normally until the **R-W** circuit is interrupted.
11. When the heat call is satisfied, the **thermostat** will interrupt the **R-W** circuit. This causes the 24-volt signal to the white wire in the unit to be de-energized.

12. The **gas valve** closes immediately as 24V through pin 4 of the 6-pin ignition wire harness is de-energized by the **ignition control**.
13. The **ignition control** initiates a 120-second **circulating air blower** "off" delay and 5-second **combustion blower** post-purge delay.
14. After 5 seconds, the **combustion blower** shuts off.
15. After 120 seconds, the **circulating air blower** shuts off and the system returns to standby mode.

Note: During a call for heat, the green LED shows consistent fast flash (as long as the **R-W** circuit is closed). When the **R-W** circuit is interrupted (indicating the heat call has been satisfied), the green LED returns to a consistent slow flash.

LIMIT/ROLLOUT OPENS

In all modes of operation, 24VAC is supplied to the **ignition control 24VAC** hot terminal and is passed through the **ignition control** to pin 6 of the 6-pin ignition wire harness.

1. A 24-volt signal is sent from pin 6 of the 6-pin ignition wire harness to one side of the Normally Closed manual reset **rollout switch**, across the **rollout switch** to one side of the Normally Closed auto reset **limit switch** and across the **limit switch** to pin 1 of the 6-pin ignition wire harness.
2. This circuit energizes whenever line voltage power is supplied to the unit.
3. If the circuit is interrupted by either switch opening, the 24-volt signal to pin 1 of the 6-pin ignition wire harness de-energizes.
4. This causes the **combustion blower** relay to energize, sending L1 power to the **CMB BLWR** terminal on the **ignition control**. It also causes the **circulating air blower** heat speed relay to energize, sending L1 power to the **ACB HEAT** terminal on the **ignition control**. This causes both blowers to start immediately.
5. The **ignition control** lockouts the **spark ignition cable** terminal and pin 4 of the 6-pin ignition wire harness until the 24-volt signal is restored at pin 1 of the 6-pin ignition wire harness.
6. The **circulating air blower** and the **combustion blower** are energized until the 24-volt signal is restored at pin 1 of the 6-pin ignition wire harness.
7. The green ignition control LED shows a 4 flash fault code (indicating **limit switch/rollout switch** open).
8. When the 24-volt signal is restored at pin 1 of the 6-pin ignition wire harness, the **ignition control** starts a 5-second **combustion blower** post-purge delay and a 120-second **circulating air blower** "off" delay.
9. Once the delays have timed out, both blowers stop and the green LED flashes a consistent slow flash if no heat call is present. (A consistent fast flash appears if there is a call for heat.)

Note: The **limit switch** resets automatically when temperatures are acceptable, but the **rollout switch** must be manually reset by pushing in on the small button on top of the switch.

The reason why the switches opened must be determined before any corrective action is taken.

PRESSURE SWITCH OPENS (BLOCKED FLUE)

When the **R-W** circuit is energized, a 24-volt signal is sent to the **ignition control**. This starts the call for heat.

1. The 24-volt signal from the **R-W** circuit energizes the **combustion blower** relay, sending L1 power to the **CMB BLWR** terminal on the **ignition control**. This starts the **ignition control**.
2. At the same time the **combustion blower** relay energizes, the 24-volt signal is sent to pin 2 of the 6-pin ignition wire harness and from pin 2 to one side of the Normally Open **pressure switch**.
3. If the **combustion blower** causes the **pressure switch** to close, a 24-volt signal is sent across the switch to pin 5 of the 6-pin ignition wire harness. The 24-volt signal energizes at pin 5 and the ignition sequence continues.
4. If the **combustion blower** fails to close the **pressure switch**, the 24-volt signal is not sent to pin 5 of the 6-pin ignition wire harness and the **ignition control** does not initiate a 30-second pre-purge delay.
5. No signal is sent to the **spark ignition cable** terminal on the **ignition control** or to the **gas valve** through pin 4 of the 6-pin ignition wire harness.
6. The **combustion blower** continues to run for 60 seconds. After 60 seconds, the **ignition control** automatically de-energizes the **combustion blower** relay. This interrupts L1 power to the **CMB BLWR** terminal on the **ignition control**.
7. The **combustion blower** remains de-energized for approximately six minutes. During this 6-minute lockout, the green LED flashes three times (indicating pressure switch fault—open or closed).
8. The 24-volt signal will only be supplied to the **limit switch** circuit through pin 6 of the 6-pin ignition wire harness and to the **pressure switch** circuit through pin 2 of the 6-pin ignition wire harness.
9. The system will repeat this sequence until the **pressure switch** closes and the 24-volt signal is restored at pin 5 of the 6-pin ignition wire harness.

FAILED FLAME SENSE/TRIAL FOR IGNITION

When the **pressure switch** closes and a 24-volt signal is sent to pin 5 of the 6-pin ignition wire harness, the **spark ignition cable** terminal and pin 4 of the 6-pin ignition wire harness energize.

1. As spark voltage is supplied to the **ignitor electrodes**, the **gas valv**e opens and this causes the burners to ignite.
2. The **ignition control** continues to energize spark voltage until a flame sense signal is supplied to the flame terminal on the **ignition control**.
3. If a flame sense signal is not received at the flame terminal on the **ignition control**, the **spark ignition cable** terminal remains energized for 10 seconds.
4. After the 10-second trial for ignition, the **ignition control** de-energizes the **spark ignition cable** terminal and pin 4 of the 6-pin ignition wire harness. This causes the **gas valve** to close and the electrode spark to stop.
5. Once the 24-volt signal is sent to pin 4 of the 6-pin ignition wire harness, a 30-second **circulating air blower** "on" delay starts. After the delay is timed out, the **circulating air blower** starts.
6. After the **spark ignition cable** terminal de-energizes, the **ignition control** initiates a 30-second **combustion blower** inter-purge delay.
7. After 30-second inter-purge, the **ignition control** energizes the **spark ignition cable** terminal and pin 4 of the 6-pin ignition wire harness. If the flame sense signal is received at the flame terminal of the **ignition control**, the unit continues heat call.
8. If the flame sense signal is not received, the system goes through three trials following the above sequence.
9. After three trials, the system goes into lockout and only the **limit switch** circuit and **pressure switch** circuit remain energized during the 60-minute lockout period.
10. If the flame sense is lost during the heat cycle, the **gas valve** de-energizes immediately and the system goes into the trial sequence.

FAN ON

1. When the **thermostat** is switched to the "FAN ON" position, the **R-G** circuit sends a 24-volt signal to pin 4 of the 5-pin thermostat harness.
2. The 24-volt signal energizes the cooling speed relay, sending L1 power to the **ACB COOL** terminal of the **ignition control**.
3. L1 power is sent to the **circulating air blower** terminal block, causing the **circulating air blower** to run in cooling speed.
4. The **circulating air blower** continues to run in cooling speed until the **thermostat** is switched to "AUTO", interrupting the **R-G** circuit.

Note: With the **thermostat** in the "FAN ON" position during heat call, **ignition control** will not energize the heat speed relay. The **circulating air blower** continues to run in cooling speed unless the **limit switch** circuit opens, which would cause the heat speed relay and the **induced draft blower** relay to become energized. This would de-energize the cooling speed relay until either the **limit switch** circuit is closed or the **thermostat** is switched to the "AUTO" position.

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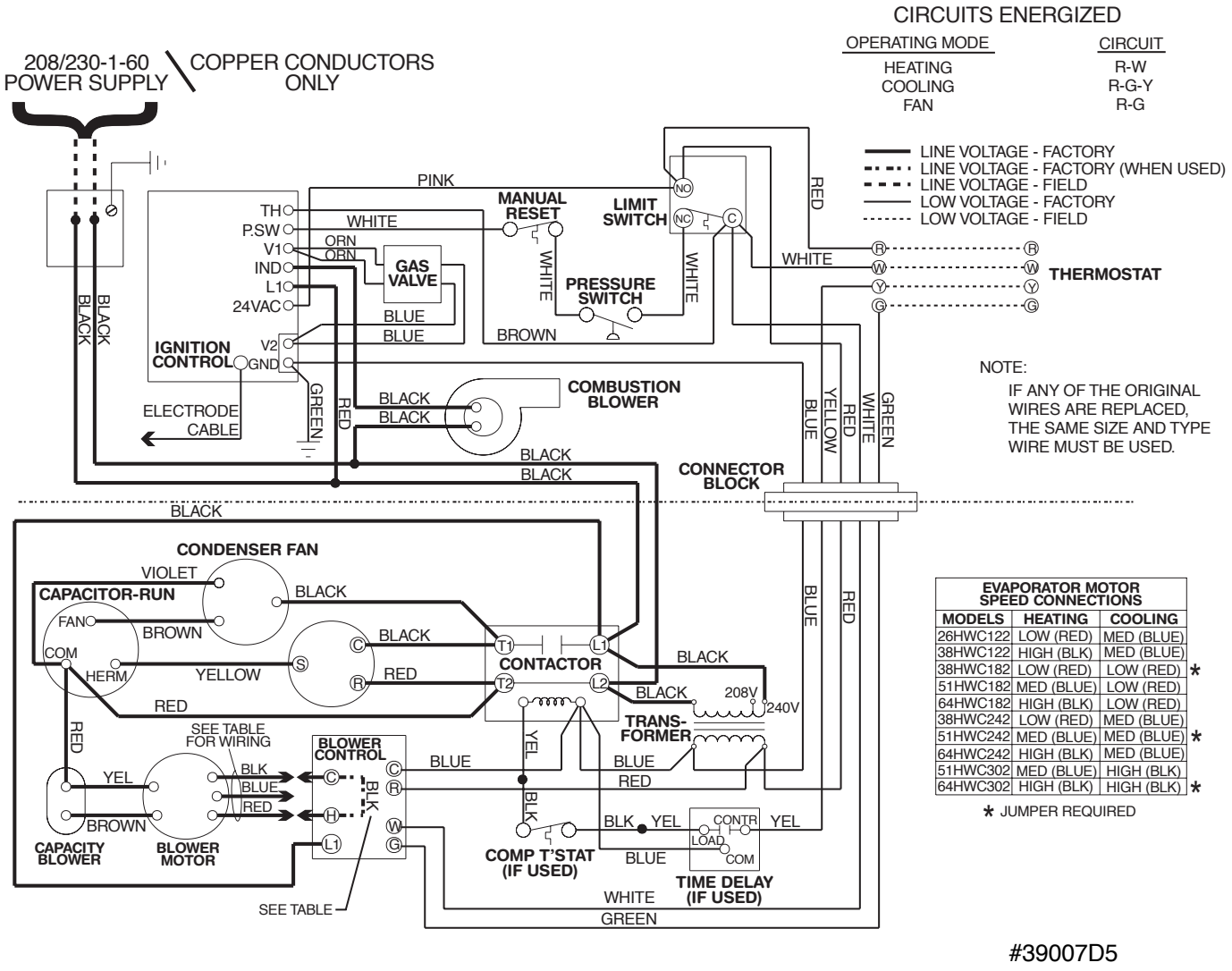
HWC122, 182, 242, 302
(w/Fenwal Triton 2461D DSI Ignition Control)



EVAPORATOR MOTOR SPEED CONNECTIONS		
MODELS	HEATING	COOLING
26HWC122	LOW (RED)	MED (BLUE)
38HWC122	HIGH (BLK)	MED (BLUE)
38HWC182	LOW (RED)	LOW (RED) *
51HWC182	MED (BLUE)	LOW (RED)
64HWC182	HIGH (BLK)	LOW (RED)
38HWC242	LOW (RED)	MED (BLUE)
51HWC242	MED (BLUE)	MED (BLUE) *
64HWC242	HIGH (BLK)	MED (BLUE)
51HWC302	MED (BLUE)	HIGH (BLK)
64HWC302	HIGH (BLK)	HIGH (BLK) *

* JUMPER REQUIRED

#39007D5

Note: On units that are equipped with a low ambient switch (designated with an "SA" in the model number), sequence of operation during cooling call is modified when **outdoor** temperatures fall below the normal operating range. For more information on the low ambient switch equipped version of this unit, see the section beginning on page 2-38.

FIGURE 2-3 Connection Diagram

Simplified Sequence - HWC122,182, 242, 302 (w/Fenwal Triton 2461D DSI Ignition Control)

Refer to Figure 2-3

CALL FOR HEAT

1. A call for heat closes the circuit between wires R (red) and W (white) on the unit's thermostat connections.
2. A low voltage (24 volts) signal is sent to the ignition control, closing a relay which sends line voltage to the induced draft blower. At the same time, a 24-volt signal is also sent to the blower control board. This causes the blower control board to begin the countdown to closing the relay that starts the circulating air blower.
3. After the induced draft blower creates enough negative pressure, the pressure switch closes.
4. When the pressure switch closes, the 24-volt signal is sent to the ignition control. This starts a 30-second pre-purge countdown, after which a trial for ignition is made.
5. At the same time that the trial for ignition is made, the gas valve energizes and gas flows to the burners.
6. With the burners in operation, the trial for ignition continues for seven seconds. At the end of this time, the ignition control stops sparking.
7. Approximately 30 seconds after the burners ignite, the timer on the blower control board closes a relay, sending line voltage to and starting the circulating air blower.
8. The unit continues to operate as long as there is a 24-volt signal between R and W. When the call for heat is satisfied, the 24-volt signal between R and W discontinues. When W de-energizes, the power to the induced draft blower and the gas valve is interrupted. The 24-volt signal to the blower control board is also interrupted, causing the module to start the countdown to blower "off" (approximately 90 seconds).
9. If at any time during a call for heat the limit switch opens, the 24-volt signal to the white wire going to terminal P.SW on the ignition control is interrupted. This de-energizes the gas valve immediately. The circulating air blower and the induced draft blower continue to run. When the unit cools down enough for the limit switch to close, the 24-volt signal is again sent to the P.SW terminal on the ignition control. With terminal P.SW energized, the ignition control again makes a trial for ignition and relights the burners.

CALL FOR COOLING

1. A call for cooling closes the circuit from R to Y and G.
2. A 24-volt signal is sent to blower control board terminal G and to the compressor contactor. The contactor closes, sending line voltage to the compressor and the outdoor condenser fan.
3. With a 24-volt signal at terminal G on the blower control board, the circulating air blower starts in cooling speed approximately 15 seconds later (or immediately - see note below).
4. When the cooling call is completed, G and Y de-energize. The contactor opens immediately, stopping the compressor and the outdoor cooling fan. When G de-energizes, the timer to turn off the circulating air blower starts. The circulating air blower turns off after 90 seconds (see note below).

FAN ON

1. When the thermostat switch is moved to the "FAN ON" position, the circuit between R and G closes.
2. The 24-volt signal from G goes to the blower control board which starts the timer.
3. Fifteen seconds after terminal G on the blower control board energizes (or immediately after - see note below), the circulating air blower starts.
4. When terminal G on the blower control board de-energizes, the timer to turn off the circulating air blower starts. The circulating air blower turns off after 90 seconds (see note below).

Note: **Heatcraft** blower control boards have a G "on" delay of 15 seconds and an "off" delay of 90 seconds. **Tridelta** blower control boards have no "on" time delay and a 60 -130 second "off" delay.

Detailed Sequence follows

Detailed Sequence - HWC122, 182, 242, 302 (w/Fenwal Triton 2461D DSI Ignition Control)

Refer to Figure 2-3

POWER

Line Voltage

When the service disconnect switch is closed, power is sent to the unit (unit in standby, no signal from the **thermostat**). Power (208 - 230 volts A/C) is supplied to both black wires located in the junction block on top of the unit.

Line voltage will be present at the following locations:

First black wire
1. **L-1** on the **ignition control**
2. **L-1** on the **contactor**
3. **L-1** on the **blower control board**
4. Terminal on the **transformer** marked **208V** or **240V** (whichever is being used)

Second black wire
1. Supplies power to the **induced draft blower**
2. **L-2** on the **contactor**
3. Common terminal on the **transformer**
4. **T-2** on the **contactor**
5. Red wire on the **R** terminal of the **compressor**
6. Red wire to the common terminals on the **capacitors**

Low Voltage (24 VAC)

With the unit at rest (no call from the **thermostat**), 24 volts A/C will be found at these points:

1. Red wire exiting the top of the unit
2. Terminal marked **24 VAC** on the **ignition control**
3. Terminal **R** on the **blower control board**

CALL FOR HEAT

Line Voltage

The **thermostat** closes the circuit between **R** and **W**.

The following is the sequence of operation for the line voltage side of the unit:

1. Terminal **TH** (24-volt) energizes on the **ignition control**, causing the relay in the **ignition control** to close. This sends line voltage to the terminal marked **IND**, causing the **induced draft blower** to start.
2. When **W** energizes, a 24-volt signal is also sent to the **W** terminal on the **blower control board**. The 24-volt signal to the **blower control board** starts the timer on the board. After 60 seconds, the heat speed relay on the **blower control board** closes. This sends line voltage from the terminal marked **HEAT** to the **circulating air blower,** starting the blower. The **induced draft blower** and the **circulating air blower** continue to operate until the heat call is satisfied, interrupting the circuit between **R** and **W**. The **W** terminal de-energizes, causing the blower relay to open approximately 90 seconds later. This interrupts the line voltage to the **circulating air blower** and the blower shuts down.

Low Voltage

1. A call for heat closes the circuit in the **thermostat** between **R** and **W**, sending a 24-volt signal to the white wire on the unit.
2. The white wire goes to the **C** terminal on the **limit switch**, **ignition control** terminal **TH** and terminal **W** on the **blower control board**.
3. When **W** energizes, the timer starts a countdown to blower “on”. The blower starts in approximately 60 seconds.
4. The 24-volt signal sent to terminal **TH** closes the relay in the **ignition control**. This starts the **induced draft blower** by energizing terminal **IND** on the **ignition control**.
5. As the **induced draft blower** comes up to speed and creates enough negative pressure, the **pressure switch** closes. The 24-volt signal from the **pressure switch** energizes terminal **P.SW**, causing the **ignition control** to start a trial for ignition (sparking).
6. As the trial for ignition starts, the **V1** terminal on the **ignition control** energizes. At the same time, a 24-volt signal is sent to the **gas valve**, opening the valve. The unit continues to operate as long as **W** is energized.
7. When the call for heat is satisfied, the circuit between **R** and **W** is interrupted.
8. With **W** de-energized, the **gas valve** closes immediately and the **induced draft blower** shuts down several seconds later.
9. The **blower control board** starts a countdown to blower “off”. Approximately 90 seconds later, the blower shuts down.

LIMIT OPENS

If the **limit switch** opens for any reason during a call for heat, the following happens:

1. If the **limit switch** senses that the temperature in the unit is too high, the contacts between terminals **C** and **NC** on the **limit switch** open and the contacts between **C** and **NO** close. This interrupts the 24-volt signal to the **pressure switch** and also de-energizes terminal **P.SW** on the **ignition control**. The **gas valve** closes immediately, as the 24-volt signal to terminal **P.SW** is no longer present. The **induced draft blower** and the **circulating air blower** continue to run. Power to **blower control board** terminal **W** is maintained. The blowers continue to run until the **limit switch** closes or the heat call at the **thermostat** is satisfied.
2. When the **limit switch** senses that temperatures in the unit are normal, the contacts between terminals **C** and **NO** open, the contacts between terminals **C** and **NC** close and operation of the unit returns to normal.

PRESSURE SWITCH OPENS (BLOCKED FLUE)

1. If blockage of the flue occurs, the negative pressure in the **induced draft blower** is reduced. At the set point of the **pressure switch**, the contacts open. This interrupts the 24-volt signal to terminal **P.SW** on the **ignition control**. The **gas valve** closes immediately, as the relay in the **ignition control** opens and interrupts the signal to terminal **V2** of the **ignition control**.
2. Terminal **W** on the **blower control board** stays energized and the **circulating air blower** continues to run. If the negative pressure is restored, the **pressure switch** closes and sends a 24-volt signal to the **P.SW** terminal on the **ignition control**. The **ignition control** makes a trial for ignition again and operation returns to normal.

Note: If the **P.SW** and **TH** terminals energize at the same time, the **ignition control** will not respond. A **pressure switch** being stuck closed is an example of what would cause this to happen.

ROLLOUT SWITCH ACTIVATED

1. If the conditions in the burner compartment cause the **rollout switch** to trip, the contacts on the switch open, interrupting the 24-volt signal going to terminal **P.SW** on the **ignition control**. This causes the **ignition control** to de-energize terminal **V1**, interrupting the 24-volt signal to the **gas valve** and immediately closing it.
2. The reason the **rollout switch** was tripped must be determined before corrective action is taken.
3. The signal to terminal **P.SW** can only be restored if the **rollout switch** is reset, which can only be done manually. The **W** terminal on the **blower control board** remains energized and the **circulating air blower** continues to operate. Once the **rollout switch** is reset, the operation of the unit returns to normal.

CALL FOR COOLING

Line Voltage

On a call for cooling, the thermostat closes the circuit between **Y**, **G** and **R**.

1. With **Y** energized, the **contactor** closes. This sends line voltage to **compressor** terminal **C**, causing the **compressor** to start. The **outdoor fan** also starts, drawing air through the **outdoor coil**.
2. Terminal **G** on the **blower control board** also energizes at the same time as **Y**. This starts the timer on the **blower control board**. Approximately 15 seconds later (or immediately - see note on page 2-20), the terminal marked **COOL** energizes. This sends line voltage to the **circulating air blower**, starting the blower.
3. The unit continues cooling as long as both **Y** and **G** are energized. When the cooling call is satisfied, the circuit between **Y**, **G** and **R** is interrupted. The **contactor** immediately opens, interrupting power to the **compressor** and the **outdoor cooling fan**.
4. With the low voltage signal to terminal **G** on the **blower control board** interrupted, the board starts a countdown to blower “off”. After approximately 90 seconds (see note on page 2-20), the cooling speed relay opens and the **circulating air blower** shuts down.

Low Voltage

1. On a call for cooling, the **thermostat** closes the circuit between **R** and terminals **G** and **Y**.
2. The 24-volt signal energizes terminal **G** on the **blower control board**, starting the fan “on” timer. Approximately 15 seconds later (or immediately - see note on page 2-20), the relay closes. This sends line voltage to the **COOLING** speed terminal on the **blower control board**, which starts the **circulating air blower**.
3. The signal from **Y** energizes the **contactor**, starting the **compressor** and the **outdoor cooling fan**.
4. When the cooling call is satisfied, both **G** and **Y** are de-energized. The **contactor** opens immediately, causing the **compressor** and the **outdoor cooling fan** to stop.

5. The **circulating air blower** shuts off approximately 90 seconds after **G** terminal on the **blower control board** is de-energized (see note below).

FAN ON

Low Voltage

1. When the switch on the **thermostat** is moved to the "FAN ON" position, a 24-volt signal is sent to **G**.
2. With **G** energized, the **blower control board** starts a countdown to fan "on". After approximately 15 seconds, the fan starts (see note below).
3. The **blower control board** closes a relay on the board, sending line voltage to the terminal marked **COOL** on the board. This starts the **circulating air blower**.
4. When the switch at the **thermostat** is moved to the "OFF" position, the 24-volt signal to the **blower control board** is interrupted. With no signal at the **G** terminal, the **blower control board** starts a countdown to fan "off". Approximately 90 seconds later, a relay on the **blower control board** opens (see note below). This interrupts the power to and stops the **circulating air blower**.

Note: **Heatcraft** blower control boards have a **G** "on" delay of 15 seconds and an "off" delay of 90 seconds. **Tridelta** blower control boards have no "on" time delay and a 60 -130 second "off" delay.

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HW (Heating Only)
(w/Fenwal Triton 2461D DSI Ignition Control)

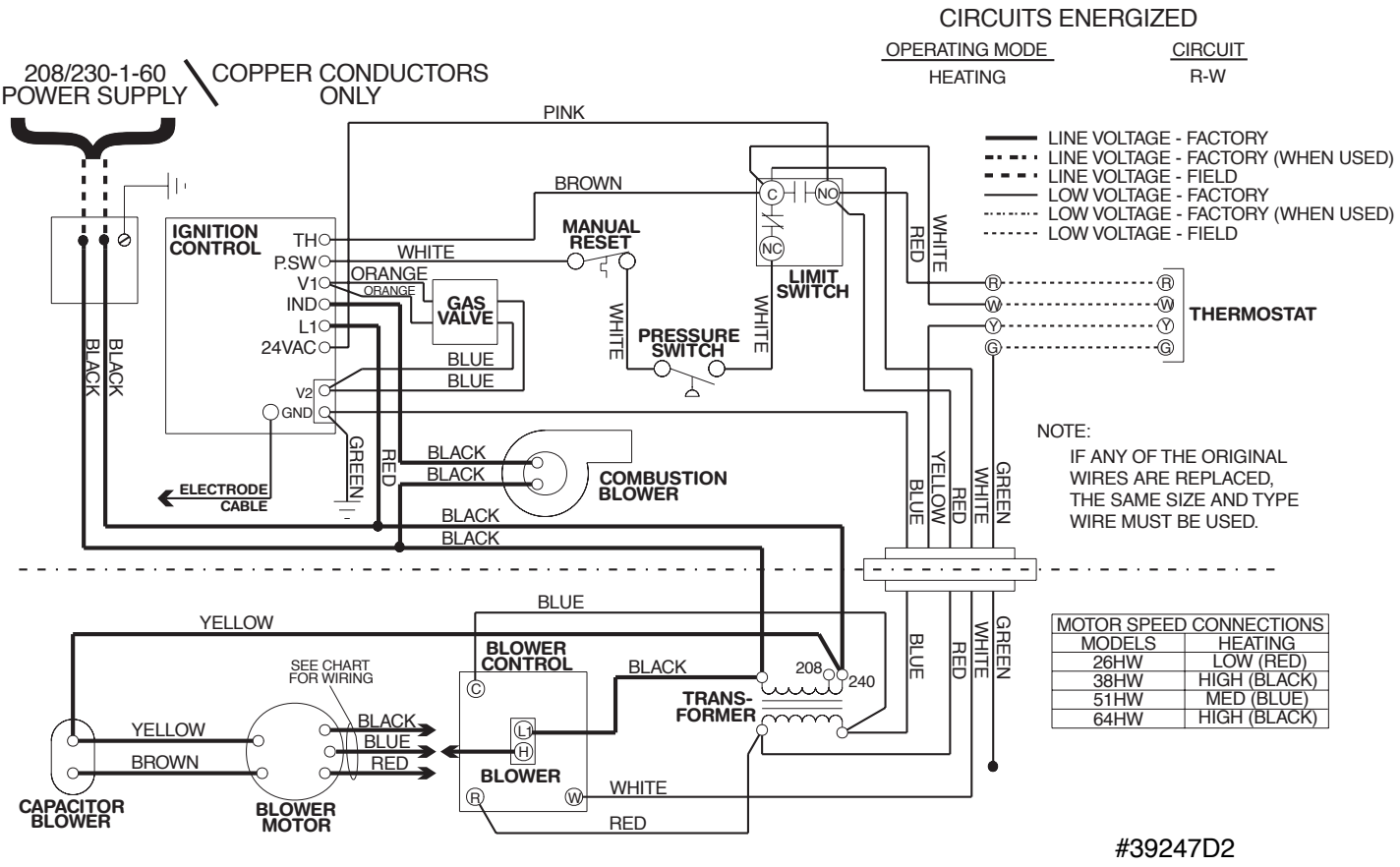


FIGURE 2-4 Connection Diagram

Simplified Sequence - HW (w/Fenwal 2461D Board)

Refer to Figure 2-4

CALL FOR HEAT

1. A call for heat closes the circuit between R and W on the thermostat. This sends a 24-volt signal to the white wire on the unit.
2. The 24-volt signal energizes terminal TH on the ignition control and the W terminal on the blower control board.
3. With the TH terminal energized, the ignition control closes an internal relay. This sends line voltage from terminal IND to the induced draft blower, starting the inducer.
4. After a pre-purge cycle of approximately 30 seconds, the ignition control makes a trial for ignition. Terminal V1 energizes at this time, opening the gas valve. The ignition control initiates a spark at the burner to light the main burners.
5. The trial for ignition lasts seven seconds, at which time the ignition control stops sparking. The ignition control looks at the flame sense to determine if the main burners have ignited. If flame sense is not proven, the ignition control goes through another pre-purge cycle (approximately 30 seconds) and makes another trial for ignition. It does this three times. If the three trials for ignition fail, the ignition control locks out for approximately 60 minutes. After 60 minutes, the ignition control again makes three trials for ignition. This continues as long as there is a call for heat from the thermostat.
6. When W energizes, the blower control board starts a countdown to fan “on”. Approximately 60 seconds after the thermostat initiates a call for heat, the circulating air blower starts.
7. The unit continues to operate as long as there is a call for heat from the thermostat.
8. When the heat call is satisfied, the circuit between R and W is interrupted. With the white wire de-energized, the ignition control interrupts the 24-volt signal to the gas valve. This closes the gas valve immediately and opens the internal relay that de-energizes terminal IND. The induced draft blower shut downs several seconds later.
9. The W terminal on the blower control board de-energizes. This causes the blower control board to start a countdown to blower “off”. Approximately 90 seconds later, the circulating air blower shuts down. This completes the heating cycle.

Detailed Sequence follows

Detailed Sequence - HW (w/Fenwal Triton 2461D Ignition Control)

Refer to Figure 2-4

POWER

Line Voltage

When the service disconnect switch is closed, power is sent to the unit (unit in standby, no signal from **thermostat**). Power (208 - 230 volts A/C) is supplied to the two black wires located in the junction block on top of the unit.

Line voltage will be present at the following locations:

First black wire
1. **L-1** on the **ignition control**
2. Terminal on the **transformer** marked **208V** or **240V** (whichever is being used)
3. Common terminal on the **blower capacitor**

Second black wire
1. Supplies power to the one side of the **induced draft blower**
2. Common terminal on the **transformer**
3. **L** terminal on the **blower control board**

Low Voltage (24 VAC)

With the unit at rest (no call from the **thermostat**), 24 volts A/C will be found at the following points:

1. Red wire exiting the top of the unit
2. Terminal marked **NO** on the **limit switch**
2. Terminal marked **24VAC** on the **ignition control**
3. Terminal **R** on the **blower control board**

CALL FOR HEAT

Line Voltage

The **thermostat** closes the circuit between **R** and **W**.

The following is the sequence of operation for the line voltage side of the unit:

1. Terminal **TH** on the **ignition control** energizes, causing a relay in the **ignition control** to close. This sends line voltage to terminal **IND** on the **ignition control**, causing the **induced draft blower** to start.
2. When **W** is energized, a 24-volt signal is also sent to the **W** terminal on the **blower control board**. Approximately 60 seconds after **W** terminal energizes, the timer on the **blower control board** closes the heat speed relay on the board. This sends line voltage to the **H** terminal on the **blower control board**, which starts the **circulating air blower**.
3. The **induced draft blower** and the **circulating air blower** continue to operate as long as **W** is energized.
4. When **W** de-energizes, a relay in the **ignition control** opens. Terminal **IND** de-energizes and the **induced draft blower** shuts down. Approximately 90 seconds later, the **circulating air blower** also shuts down.

Low Voltage

The following is the sequence of operation for the low voltage side of the unit on a heat call:

1. A call for heat closes the circuit in the **thermostat** between **R** and **W**, sending a 24-volt signal to the white wire on the unit.
2. The white wire goes to the **C** terminal on the **limit switch**.
3. The 24-volt signal is sent from the **C** terminal (brown wire) on the **limit switch** to terminal **TH** on the **ignition control**. This causes the **ignition control** to close the line voltage relay, starting the **induced draft blower**. When the **induced draft blower** comes up to speed and creates enough negative pressure, the **pressure switch** closes.
4. With the **pressure switch** closed, the 24-volt signal goes to the **rollout switch** located over the burners.
5. The 24-volt signal from the **rollout switch** goes to the terminal marked **P.SW** on the **ignition control**, causing the **ignition control** to make a trial for ignition (sparking). Terminal **V1** on the **ignition control** also energizes at this time, causing the **gas valve** to open.
6. At the same time that the **C** terminal on the **limit switch** energizes, a 24-volt signal is also sent to the **W** terminal on the **blower control board**. This starts the timer on the **blower control board**. Approximately 30 seconds after the main burners ignite, the **blower control board** closes a relay; this sends line voltage to the **circulating air blower**, starting the blower.
7. As long as **W** (white wire) is energized, the unit continues to operate.
8. When the heat call is satisfied, the circuit between **R** and **W** is interrupted.

9. When **W** de-energizes, the **gas valve** immediately shuts down and the **induced draft blower** also stops after several seconds.
10. The **blower control board** starts a countdown to blower "off". Approximately 90 seconds later, the **circulating air blower** shuts down.

LIMIT OPENS

If the **limit switch** opens for any reason during a call for heat, the following happens:

1. If the **limit switch** senses that the temperature in the unit is too high, the circuit between terminals **C** and **NC** on the **limit switch** opens. This closes the circuit between terminals **C** and **NO** on the **limit switch**, interrupting the 24-volt signal to the **pressure switch** and the **rollout switch** and causing terminal **P.SW** on the **ignition control** to de-energize. The **gas valve** immediately closes, as there is no longer a 24-volt signal at terminal **V1** on the **ignition control**. With 24 volts still going to the **blower control board** and terminal **TH** on the **ignition control**, the **circulating air blower** and **induced draft blower** continue to run.
2. The **circulating air blower** and the **induced draft blower** continue to run as long as there is a call for heat from the **thermostat** or the **limit switch** remains open.
3. When the **limit switch** senses that the temperature in the unit is low enough, the circuit between **C** and **NO** opens and the circuit between **C** and **NC** closes.
4. With the **limit switch** closed, the unit again makes a trial for ignition and returns to normal operation.

PRESSURE SWITCH OPENS (BLOCKED FLUE)

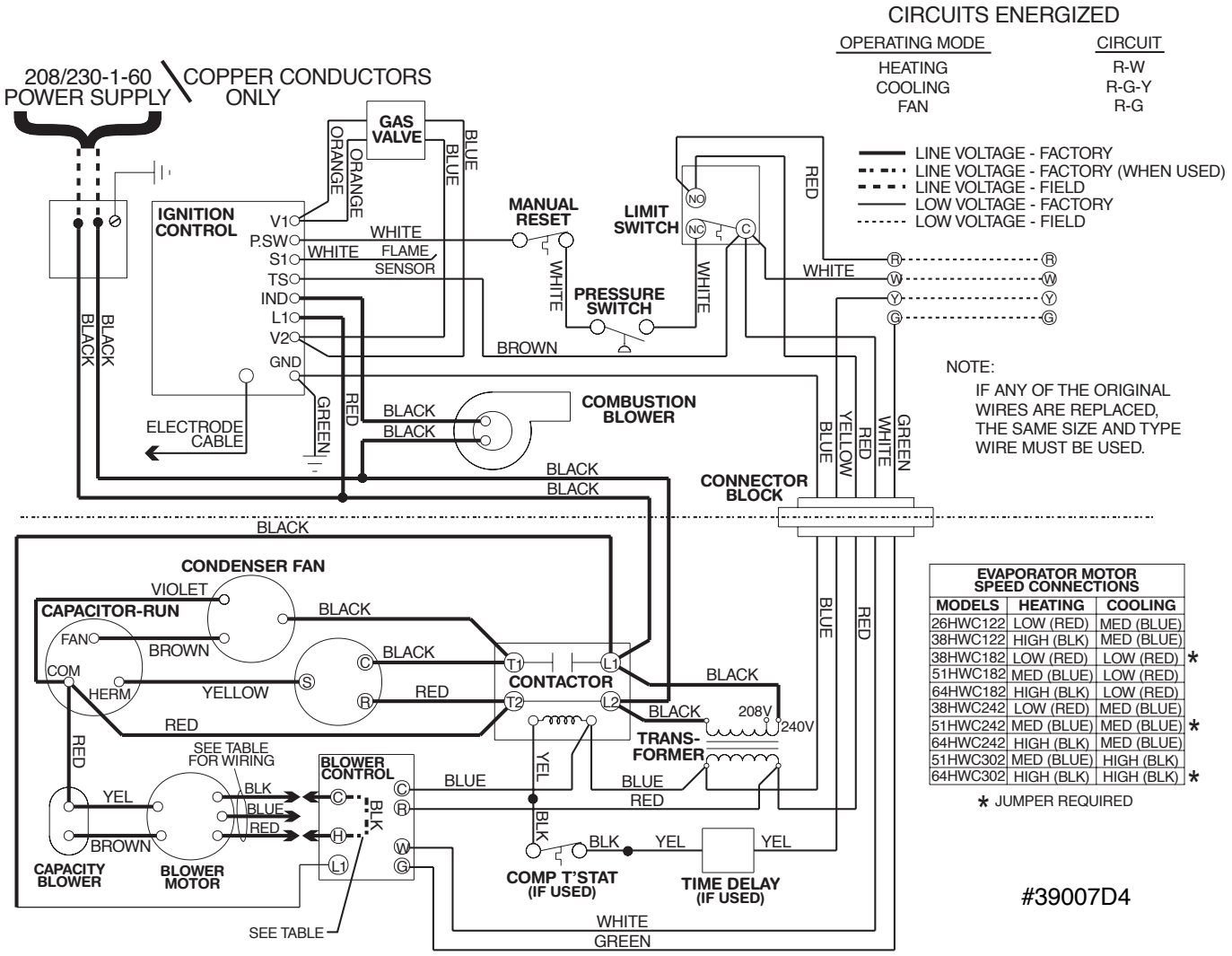
1. If blockage of the flue occurs, the negative pressure in the **induced draft blower** is reduced. At the set point of the **pressure switch**, the contacts open. This interrupts the 24-volt signal coming from terminal **NC** on the **limit switch**. Terminal **P.SW** on the **ignition control** de-energizes, as does terminal **V1**. With loss of the 24-volt signal to the **gas valve**, the valve closes immediately.
2. Terminals **TH** on the **ignition control** and **W** on the **blower control board** remain energized. The **induced draft blower** and the **circulating air blower** continue to run.
3. When the **pressure switch** senses that there is enough negative pressure within the flue, it will again close the circuit between the l**imit switch** and terminal **P.SW** on the **ignition control**.
4. The unit makes a trial for ignition and returns to normal operation.

Note: If the **P.SW** and **TH** terminals energize at the same time, the **ignition control** will not respond. A **pressure switch** being stuck closed is an example of what would cause this to happen.

ROLLOUT SWITCH ACTIVATED

1. If the conditions in the burner compartment cause the **rollout switch** to trip, the contacts on the switch open. This interrupts the 24-volt signal going to terminal **P.SW** on the **ignition control**, causing terminal **V1** on the **ignition control** to de-energize. This interrupts the 24-volt signal to the **gas valve** and immediately closes it. Since terminal **TH** on the **ignition control** and **W** on the **blower control board** remain energized, the **induced draft blower** and the **circulating air blower** continue to run.
2. The 24-volt signal to the **ignition control** can only be restored if the **rollout switch** is manually reset.
3. Once the cause of the **rollout switch** being tripped has been determined, the switch can be reset.
4. With the **rollout switch** reset, terminal **P.SW** on the **ignition control** again energizes. The **ignition control** makes a trial for ignition and operation returns to normal.

HWC122, 182, 242, 302
(w/Fenwal 05-29 Ignition Control)



EVAPORATOR MOTOR SPEED CONNECTIONS

MODELS	HEATING	COOLING	
26HWC122	LOW (RED)	MED (BLUE)	
38HWC122	HIGH (BLK)	MED (BLUE)	
38HWC182	LOW (RED)	LOW (RED)	*
51HWC182	MED (BLUE)	LOW (RED)	
64HWC182	HIGH (BLK)	LOW (RED)	
38HWC242	LOW (RED)	MED (BLUE)	
51HWC242	MED (BLUE)	MED (BLUE)	*
64HWC242	HIGH (BLK)	MED (BLUE)	
51HWC302	MED (BLUE)	HIGH (BLK)	
64HWC302	HIGH (BLK)	HIGH (BLK)	*

* JUMPER REQUIRED

Note: On units that are equipped with a low ambient switch (designated with an “SA” in the model number), sequence of operation during cooling call is modified when **outdoor** temperatures fall below the normal operating range. For more information on the low ambient switch equipped version of this unit, see the section beginning on page 2-38.

FIGURE 2-5 Connection Diagram

Simplified Sequence - HWC122, 182, 242, 302 (w/Fenwal 05-29 Ignition Control)

Refer to Figure 2-5

CALL FOR HEAT

1. The thermostat energizes the R-W circuit, sending a 24-volt signal to the W wire at the unit.
2. The 24-volt signal is sent to the ignition control, closing the combustion blower relay and causing the combustion blower to run.
3. The 24-volt signal is also sent to the blower control board, starting a 30-second circulation air blower "on" delay.
4. As the combustion blower reaches full speed, it closes the pressure switch.
5. A 24-volt signal is sent from the pressure switch to the ignition control. Following a 30-second pre-purge delay, this signal energizes the spark terminal.
6. The gas valve solenoid energizes at the same time as the spark terminal, causing the gas valve to open and the burners to light.
7. The spark ignitor continues to spark for approximately six seconds or until flame is sensed by the flame sensor electrode.
8. The unit will operate normally until the R-W circuit is de-energized by the thermostat, interrupting the 24-volt signal to the unit.
9. When the signal is interrupted, the gas valve de-energizes and closes immediately.
10. The combustion blower relay de-energizes several seconds later, causing the combustion blower to stop.
11. The blower control board starts a 90-second circulating air blower "off" delay.
12. Following the 90-second delay, the circulating air blower stops.

FLAME SENSE

1. After the spark electrode has lit the main burners, the ignition control waits approximately six seconds for a flame sense signal.
2. If a flame sense signal is not received after approximately six seconds, the ignition control de-energizes the spark terminal and gas valve.
3. The thermostat R-W circuit sends a 24-volt signal to the blower control board, starting the circulating air blower (after a 30-second delay).
4. The unit initiates three trials for ignition (flame sense) before system lockout.

CALL FOR COOLING

1. A call for cooling closes the circuit from R to Y and G.
2. A 24-volt signal is sent to blower control board terminal G and to the compressor contactor. The contactor closes, sending line voltage to the compressor and the outdoor condenser fan.
3. With a 24-volt signal at terminal G on the blower control board, the circulating air blower starts in cooling speed 15 seconds later (see note below).
4. When the cooling call is completed, G and Y de-energize. The contactor opens immediately, stopping the compressor and the outdoor cooling fan. When G de-energizes, the timer to turn off the circulating air blower starts. The blower turns off after 90 seconds (see note below).

FAN ON

1. When the thermostat switch is moved to the "FAN ON" position, the circuit between R and G closes.
2. The 24-volt signal from G goes to the blower control board which starts the timer.
3. Fifteen seconds after terminal G on the blower control board energizes (or immediately after - see note below), the circulating air blower starts.
4. When terminal G on the blower control board de-energizes, the timer to turn off the circulating air blower starts. The blower turns off after 90 seconds (see note below).

Note: **Heatcraft** blower control boards have a G "on" delay of 15 seconds and an "off" delay of 90 seconds. **Tridelta** blower control boards have no "on" time delay and a 60 -130 second "off" delay.

Detailed Sequence follows

Detailed Sequence - HWC122, 182, 242, 302 (w/Fenwal 05-29 Ignition Control)

Refer to Figure 2-5

POWER

Line Voltage

When the service disconnect switch is closed, power is sent to the unit (unit in standby, no signal from the **thermostat**). Power (208 - 230 volts A/C) is supplied to both black wires located in the junction block on top of the unit.

Line voltage will be present at the following locations:

First black wire
1. **L-1** on the **ignition module**
2. **L-1** on the **contactor**
3. **L-1** on the **blower control board**
4. Terminal on the **transformer** marked **208V** or **240V** (whichever is being used)

Second black wire
1. Supplies power to the **induced draft blower**
2. **L-2** on the **contactor**
3. Common terminal on the **transformer**
4. **T-2** on the **contactor**
5. Red wire on the **R** terminal of the **compressor**
6. Red wire to the common terminals on the **capacitors**

Low Voltage (24 VAC)

With the unit at rest (no call from the **thermostat**), 24 volts A/C will be found at these points:

1. Red wire exiting the top of the unit
2. Terminal marked **24VAC** on the **ignition control**
3. Terminal R on the **blower control board**

CALL FOR HEAT

Line Voltage

The **thermostat** closes the circuit between **R** and **W**.

The following is the sequence of operation for the line voltage side of the unit:

1. Terminal **TS** (24-volt) energizes on the **ignition control**, causing a relay in the **ignition control** to close. This sends line voltage to the terminal marked **IND**, causing the **induced draft blower** to start.
2. When **W** is energized, a 24-volt signal is also sent to the **W** terminal on the **blower control board**. The 24-volt signal starts the timer on the **blower control board**. After 60 seconds, the heat speed relay on the **blower control board** closes. This sends line voltage from the terminal marked **HEAT** to the **circulating air blower,** starting the blower. The **induced draft blower** and the **circulating air blower** continue to operate until the heat call is satisfied, interrupting the circuit between **R** and **W**. The **W** terminal de-energizes, causing the blower relay to open approximately 90 seconds later. This interrupts the line voltage to the **circulating air blower** and the blower shuts down.

Low Voltage

1. A call for heat closes the circuit in the **thermostat** between **R** and **W**, sending a 24-volt signal to the white wire on the unit.
2. The white wire goes to the **C** terminal on the **limit switch**, **ignition control** terminal **TS** and terminal **W** on the **blower control board**.
3. When **W** energizes, the timer starts a countdown to **circulating air blower** “on”. The blower starts in approximately 60 seconds.
4. The 24-volt signal sent to the **TS** terminal closes a relay in the **ignition control**. This starts the **induced draft blower** by energizing terminal **IND** on the **ignition control**.
5. As the **induced draft blower** comes up to speed and creates enough negative pressure, the **pressure switch** closes. The 24-volt signal is sent from the **pressure switch** to one side of the Normally Closed **manual reset rollout switch**. If the **rollout switch** is closed, the 24-volt signal is passed through the switch to the **P.SW** terminal on the i**gnition control**. This initiates a 30-second pre-purge period.
6. After the 30-second pre-purge period, a trial for ignition starts by energizing the **spark** terminal and the **V1** terminal simultaneously. The 24-volt signal from **V1** energizes the **gas valve** solenoid, causing it to open. These actions cause the burners to light.
7. After the burners are lit, a flame sense is picked up by the **flame sense rod** located at the opposite end of the burner rack from the **spark electrodes**. The flame sense signal is sent to the **S1** terminal of the **ignition control**. The unit continues to operate as long as **W** is energized.
8. When the call for heat is satisfied, the circuit between **R** and **W** is interrupted, de-energizing **W**.

9. With **W** de-energized, the **gas valve** closes immediately and the **induced draft blower** stops several seconds later.
10. The **blower control board** starts a 90-second **circulating air blower** "off" delay. Approximately 90 seconds later, the blower stops.

FLAME SENSE

1. During a call for heat, the **spark** terminal is energized and the **gas valve** is opened to light the burners.
2. The **ignition control** energizes the **spark** terminal and the **gas valve** for approximately six seconds. If a flame is not sensed in this time period, the **ignition control** de-energizes the **spark** terminal and the **gas valve**. This causes the **gas valve** to close and the burners to shut off.
3. Since the 24-volt signal has been sent to the **blower control board**, the **circulating air blower** times "on" in approximately 60 seconds.
4. The **induced draft blower** continues to run for approximately 30 seconds, then another trial for ignition begins.
5. The **ignition control** runs three trials for ignition. If a flame is not sensed during these three trials, the **ignition control** will lockout.
6. The **circulating air blower** continues to run until the **R-W** circuit at the **thermostat** is interrupted.
7. The **ignition control** remains in lockout until 24-volt power to the **ignition control** is reset.

LIMIT OPENS

If the **limit switch** opens for any reason during a call for heat, the following happens:

1. If the **limit switch** senses that the temperature in the unit is too high, the contacts between terminals **C** and **NC** on the **limit switch** open and the contacts between **C** and **NO** close. This interrupts the 24-volt signal to the **pressure switch** and also de-energizes terminal **P.SW** on the **ignition control**. The **gas valve** closes immediately, as the 24-volt signal to terminal **P.SW** is no longer present. The **induced draft blower** and the **circulating air blower** continue to run. Power to **blower control board** terminal **W** is maintained. The blower continues to run until the **limit switch** closes or the heat call at the **thermostat** is satisfied.
2. When the **limit switch** senses that the temperatures in the unit are normal, the contacts between terminals **C** and **NO** open, the contacts between terminals **C** and **NC** close and the operation of the unit returns to normal.

PRESSURE SWITCH OPENS (BLOCKED FLUE)

1. If blockage of the flue occurs, negative pressure in the **induced draft blower** is reduced. At the set point of the **pressure switch**, the contacts open. This interrupts the 24-volt signal to terminal **P.SW** on the **ignition control**. The **gas valve** closes immediately, as a relay in the **ignition control** opens and interrupts the signal to terminal **V2** of the **ignition control**.
2. Terminal **W** on the **blower control board** stays energized and the **circulating air blower** continues to run. If negative pressure is restored, the **pressure switch** closes and sends a 24-volt signal to the **P.SW** terminal on the **ignition control**. The **ignition control** makes a trial for ignition again and the operation returns to normal.

ROLLOUT SWITCH ACTIVATED

1. If conditions in the burner compartment cause the **rollout switch** to trip, the contacts on the switch open, interrupting the 24-volt signal going to terminal **P.SW** on the **ignition control**. This causes the **ignition control** to de-energize terminal **V1**, interrupting the 24-volt signal to the **gas valve** and immediately closing it.
2. The reason the **rollout switch** was tripped must be determined before any corrective action is taken.
3. The signal to terminal **P.SW** can only be restored if the **rollout switch** is reset, which can only be done manually. The **W** terminal on the **blower control board** remains energized and the **circulating air blower** continues to operate. Once the **rollout switch** is reset, the operation of the unit returns to normal.

CALL FOR COOLING

Line Voltage

On a call for cooling, the **thermostat** closes the circuit between **Y, G** and **R**.

1. With **Y** energized, the **contactor** closes. This sends line voltage to **compressor** terminal **C**, causing the **compressor** to start. The **outdoor fan** also starts, drawing air through the **outdoor coil**.
2. Terminal **G** on the **blower control board** also energizes at same time as **Y**. This starts the timer on the **blower control board**. Approximately 15 seconds later (or immediately - see note on page 2-30), the terminal marked **COOL** energizes. This sends line voltage to the **circulating air blower**, starting the blower**.**

3. The unit continues cooling as long as both **Y** and **G** are energized. When the cooling call is satisfied, the circuit between **Y**, **G** and **R** is interrupted. The **contactor** immediately opens, interrupting power to the **compressor** and the **outdoor cooling fan**.
4. With the low voltage signal to terminal **G** on the **blower control board** interrupted, the board starts a countdown to blower "off". After approximately 90 seconds, the cooling speed relay opens and the **circulating air blower** shuts down (see note at the end of this section).

Low Voltage

1. On a call for cooling, the **thermostat** closes the circuit between **R** and terminals **G** and **Y.**
2. The 24-volt signal energizes terminal **G** on the **blower control board**, starting the fan "on" timer. After approximately 15 seconds, the relay closes (see note at the end of this section). This sends line voltage to the **COOLING** speed terminal on the board, which starts the **circulating air blower.**
3. The signal from **Y** energizes the **contactor**, starting the **compressor** and the **outdoor cooling fan**.
4. When the cooling call is satisfied, both **G** and **Y** de-energize. The **contactor** opens immediately, causing the **compressor** and the **outdoor cooling fan** to stop.
5. The **circulating air blower** stops approximately 90 seconds after the **G** terminal on the **blower control board** de-energizes (see note at the end of this section).

FAN ON

Low Voltage

1. When the switch on the **thermostat** is moved to the "FAN ON" position, a 24-volt signal is sent to the **G** terminal on the **blower control board**.
2. With **G** energized, the **blower control board** starts a countdown to fan "on". Approximately 15 seconds later (or immediately - see note at the end of this section), the fan starts.
3. The **blower control board** closes a relay on the board, sending line voltage to the terminal on the board marked **COOL**. This starts the **circulating air blower**.
4. When the switch at the **thermostat** is moved to the "OFF" position, the 24-volt signal to the **blower control board** is interrupted. With no signal at the **G** terminal, the **blower control board** starts a countdown to fan "off". Approximately 90 seconds later, a relay on the **blower control board** opens (see note at the end of this section). This interrupts the power to and stops the **circulating air blower**.

Note: **Heatcraft** blower control boards have a **G** "on" delay of 15 seconds and an "off" delay of 90 seconds. **Tridelta** blower control boards have no "on" time delay and a 60 -130 second "off" delay.

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HW (Heating Only)
(w/Fenwal 05-29 Ignition Control)

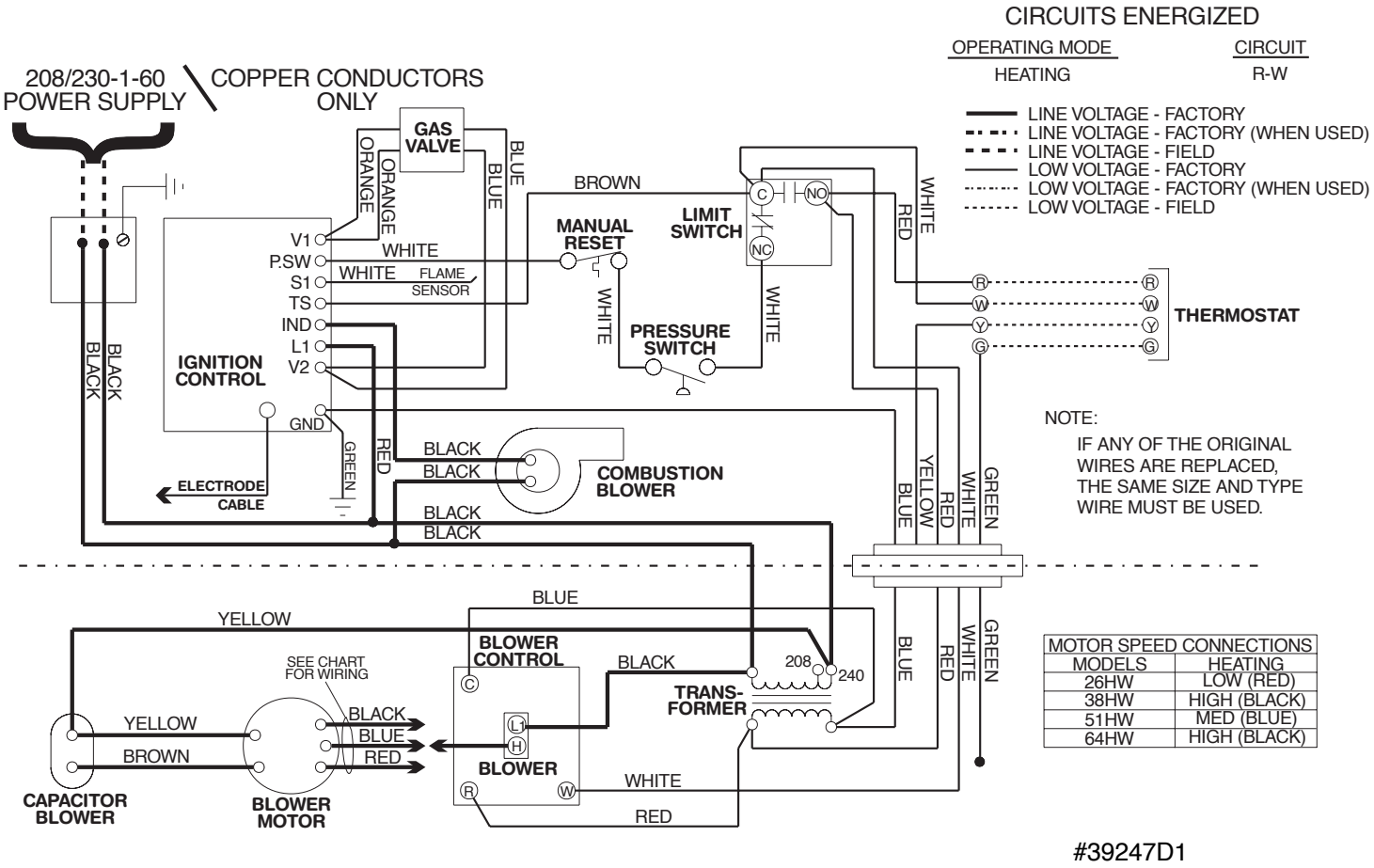


FIGURE 2-6 Connection Diagram

Simplified Sequence - HW (w/Fenwal 05-29 Board)

Refer to Figure 2-6

CALL FOR HEAT

1. The indoor thermostat calls for heat by energizing the R-W circuit.
2. This sends a 24-volt signal to the ignition control, causing the induced draft blower to run.
3. A 24-volt signal is also sent to the blower control board at this time, starting a 60-second circulating air blower “on” delay. The circulating air blower starts 60 seconds after the initial call for heat.
4. The induced draft blower causes the pressure switch to close which starts a 30-second pre-purge. After the pre-purge period, the burners ignite.
5. The unit operates in the heating mode until the indoor thermostat setting is reached and the R-W circuit is interrupted.
6. When the R-W circuit is interrupted, the 24-volt signal to the ignition control and the signal to the blower control board are interrupted.
7. The induced draft blower stops within several seconds and a 90-second circulating air blower “off” delay starts. Following the delay period, the circulating air blower shuts off.

Detailed Sequence follows

Detailed Sequence - HW (w/Fenwal 05-29 Ignition Control)

Refer to Figure 2-6

POWER

Line Voltage

When the service disconnect switch is closed, power is sent to the unit (unit in standby, no signal from the **thermostat**). Power (208 - 230 volts A/C) is supplied to both black wires located in the junction block on top of the unit.

Line voltage will be present at the following locations:

First black wire
1. **L-1** on the **ignition module**
2. Terminal on the **transformer** marked **208V** or **240V** (whichever is being used)
3. **Circulating air blower capacitor** terminal

Second black wire
1. Supplies power to the **induced draft blower**
2. Common terminal on the **transformer**
3. Terminal **L-1** on the **blower control board**

Low Voltage (24 VAC)

With the unit at rest (no call from the **thermostat**), 24 volts A/C will be found at these points:

1. Red wire exiting the top of the unit
2. Terminal **R** on the **blower control board**
3. Terminal **NO** on the **limit switch**
4. Terminal on the **transformer** marked **24V**

CALL FOR HEAT

Line Voltage

The **thermostat** closes the circuit between **R** and **W**.

The following is the sequence of operation for the line voltage side of the unit:

1. Terminal **TS** (24-volt) energizes on the **ignition control**, causing a relay in the **ignition control** to close. This sends line voltage to the terminal marked **IND**, causing the **induced draft blower** to start.
2. When **W** is energized, a 24-volt signal is also sent to the **W** terminal on the **blower control board**. The 24-volt signal starts the timer on the **blower control board**. After 60 seconds, the relay on the **blower control board** closes. This sends line voltage from the terminal marked **L-1** to the terminal marked **H** on the **blower control board**, starting the **circulating air blower**. The **induced draft blower** and the **circulating air blower** continue to operate until the heat call is satisfied, interrupting the circuit between **R** and **W**. The **ignition control** de-energizes the **induced draft blower** relay, interrupting L-1 power to the **induced draft blower**. The **induced draft blower** stops several seconds later. The **W** terminal on the **blower control board** de-energizes, starting a 90-second blower "off" delay. This interrupts the line voltage to the **circulating air blower** and after 90 seconds, the blower shuts down.

Low Voltage

1. A call for heat closes the circuit in the **thermostat** between **R** and **W**, sending a 24-volt signal to the white wire on the unit.
2. The white wire goes to the **C** terminal on the **limit switch**, **ignition control** terminal **TS** and terminal **W** on the **blower control board**.
3. When **W** energizes, the timer starts a countdown to **circulating air blower** "on". The blower starts in approximately 60 seconds.
4. The 24-volt signal sent to the **TS** terminal closes a relay in the **ignition control**. This starts the **induced draft blower** by energizing terminal **IND** on the **ignition control**.
5. As the **induced draft blower** comes up to speed and creates enough negative pressure, the **pressure switch** closes. The 24-volt signal is sent from the **pressure switch** to one side of the Normally Closed **manual reset rollout switch**. If the **rollout switch** is closed, the 24-volt signal is passed through the switch to the **P.SW** terminal on the **ignition control**. This initiates a 30-second pre-purge period.
6. After the 30-second pre-purge period, a trial for ignition starts by energizing the **spark** terminal and the **V1** terminal simultaneously. The 24-volt signal from **V1** energizes the **gas valve** solenoid, causing it to open. These actions cause the burners to light.
7. After the burners are lit, a flame sense is picked up by the **flame sense rod** located at the opposite end of the burner rack from the **spark electrodes**. The flame sense signal is sent to the **S1** terminal of the **ignition control**. The unit continues to operate as long as **W** is energized.

8. When the call for heat is satisfied, the circuit between **R** and **W** is interrupted, de-energizing **W**.
9. With **W** de-energized, the **gas valve** closes immediately and the **induced draft blower** stops several seconds later.
10. The **blower control board** starts a 90-second blower "off" delay. Approximately 90 seconds later, the blower stops.

FLAME SENSE

1. During a call for heat, the **spark** terminal is energized and the **gas valve** is opened to light the burners.
2. The **ignition control** energizes the **spark** terminal and the **gas valve** for approximately six seconds. If a flame is not sensed in this time period, the **ignition control** de-energizes the **spark** terminal and the **gas valve**. This causes the **gas valve** to close and the burners to shut off.
3. Since the 24-volt signal has been sent to the **blower control board**, the **circulating air blower** times on in approximately 60 seconds.
4. The **induced draft blower** continues to run for approximately 30 seconds, then another trial for ignition begins.
5. The **ignition control** runs three trials for ignition. If a flame is not sensed during these three trials, the **ignition control** will lockout.
6. The **circulating air blower** continues to run until the **R-W** circuit at the **thermostat** is interrupted.
7. The **ignition control** remains in lockout until 24-volt power to the **ignition control** is reset.

LIMIT OPENS

If the **limit switch** opens for any reason during a call for heat, the following happens:

1. If the **limit switch** senses that the temperature in the unit is too high, the contacts between terminals **C** and **NC** on the **limit switch** open and the contacts between **C** and **NO** close. This interrupts the 24-volt signal to the **pressure switch** and also de-energizes terminal **P.SW** on the **ignition control**. The **gas valve** closes immediately, as the 24-volt signal to terminal **P.SW** is no longer present. The **induced draft blower** and the **circulating air blower** continue to run. Power to **blower control board** terminal **W** is maintained. The blower continues to run until the **limit switch** closes or the heat call at the **thermostat** is satisfied.
2. When the **limit switch** senses that the temperatures in the unit are normal, the contacts between terminals **C** and **NO** open, the contacts between terminals **C** and **NC** close and the operation of the unit returns to normal.

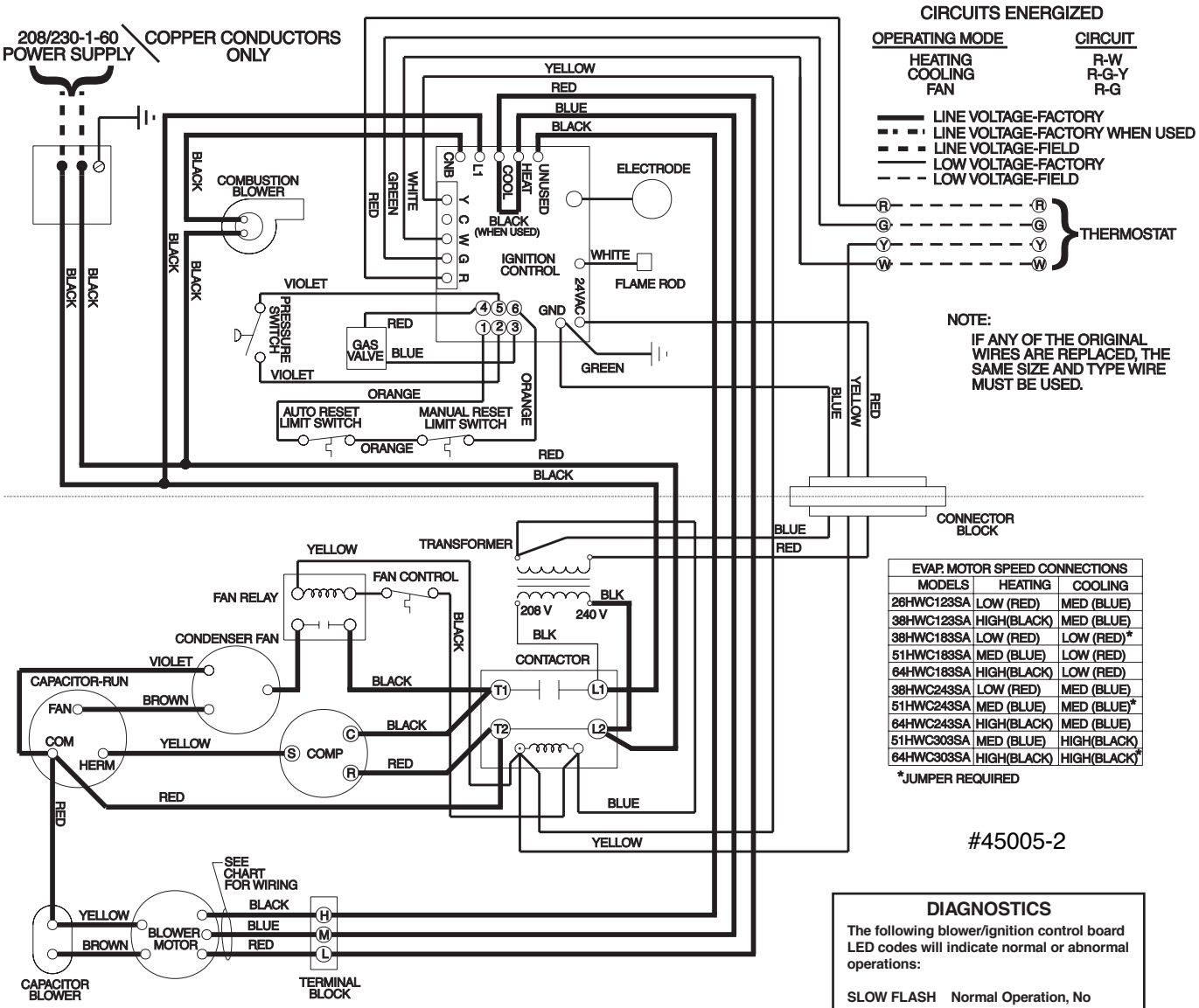
PRESSURE SWITCH OPENS (BLOCKED FLUE)

1. If blockage of the flue occurs, negative pressure in the **induced draft blower** is reduced. At the set point of the **pressure switch**, the contacts open. This interrupts the 24-volt signal to terminal **P.SW** on the **ignition control**. The **gas valve** closes immediately, as a relay in the **ignition control** opens and interrupts the signal to terminal **V2** of the **ignition control**.
2. Terminal **W** on the **blower control board** stays energized and the **circulating air blower** continues to run. If negative pressure is restored, the **pressure switch** closes and sends a 24-volt signal to the **P.SW** terminal on the **ignition control**. The **ignition control** makes a trial for ignition again and the operation returns to normal.

ROLLOUT SWITCH ACTIVATED

1. If conditions in the burner compartment cause the **rollout switch** to trip, the contacts on the switch open, interrupting the 24-volt signal going to terminal **P.SW** on the **ignition control**. This causes the **ignition control** to de-energize terminal **V1**, interrupting the 24-volt signal to the **gas valve** and immediately closing it.
2. The reason the **rollout switch** was tripped must be determined before any corrective action is taken.
3. The signal to terminal **P.SW** can only be restored if the **rollout switch** is reset, which can only be done manually. The **W** terminal on the **blower control board** remains energized and the **circulating air blower** continues to operate. Once the **rollout switch** is reset, the operation of the unit returns to normal.

HWC123, 183, 243, 303 Low Ambient
(w/United Technologies 1097 Spark Ignition System)



EVAP. MOTOR SPEED CONNECTIONS		
MODELS	HEATING	COOLING
26HWC123SA	LOW (RED)	MED (BLUE)
38HWC123SA	HIGH(BLACK)	MED (BLUE)
38HWC183SA	LOW (RED)	LOW (RED)*
51HWC183SA	MED (BLUE)	LOW (RED)
64HWC183SA	HIGH(BLACK)	LOW (RED)
38HWC243SA	LOW (RED)	MED (BLUE)
51HWC243SA	MED (BLUE)	MED (BLUE)*
64HWC243SA	HIGH(BLACK)	MED (BLUE)
51HWC303SA	MED (BLUE)	HIGH(BLACK)
64HWC303SA	HIGH(BLACK)	HIGH(BLACK)*

*JUMPER REQUIRED

DIAGNOSTICS

The following blower/ignition control board LED codes will indicate normal or abnormal operations:

SLOW FLASH	Normal Operation, No Call for Heat
FAST FLASH	Normal Operation, Call for Heat
2 FLASH	System Lockout - Failed to Detect or Sustain Flame
3 FLASH	Pressure Switch Open or Closed
4 FLASH	High Limit or Rollout Switch Open
5 FLASH	Flame Sensed and Gas Valve Not Energized
STEADY	Internal Failure (Micro-controller Failure; Self-check)

FIGURE 2-7 Connection Diagram

HWC123,183, 243, 303
Low Ambient Model
Refer to Figure 2-7

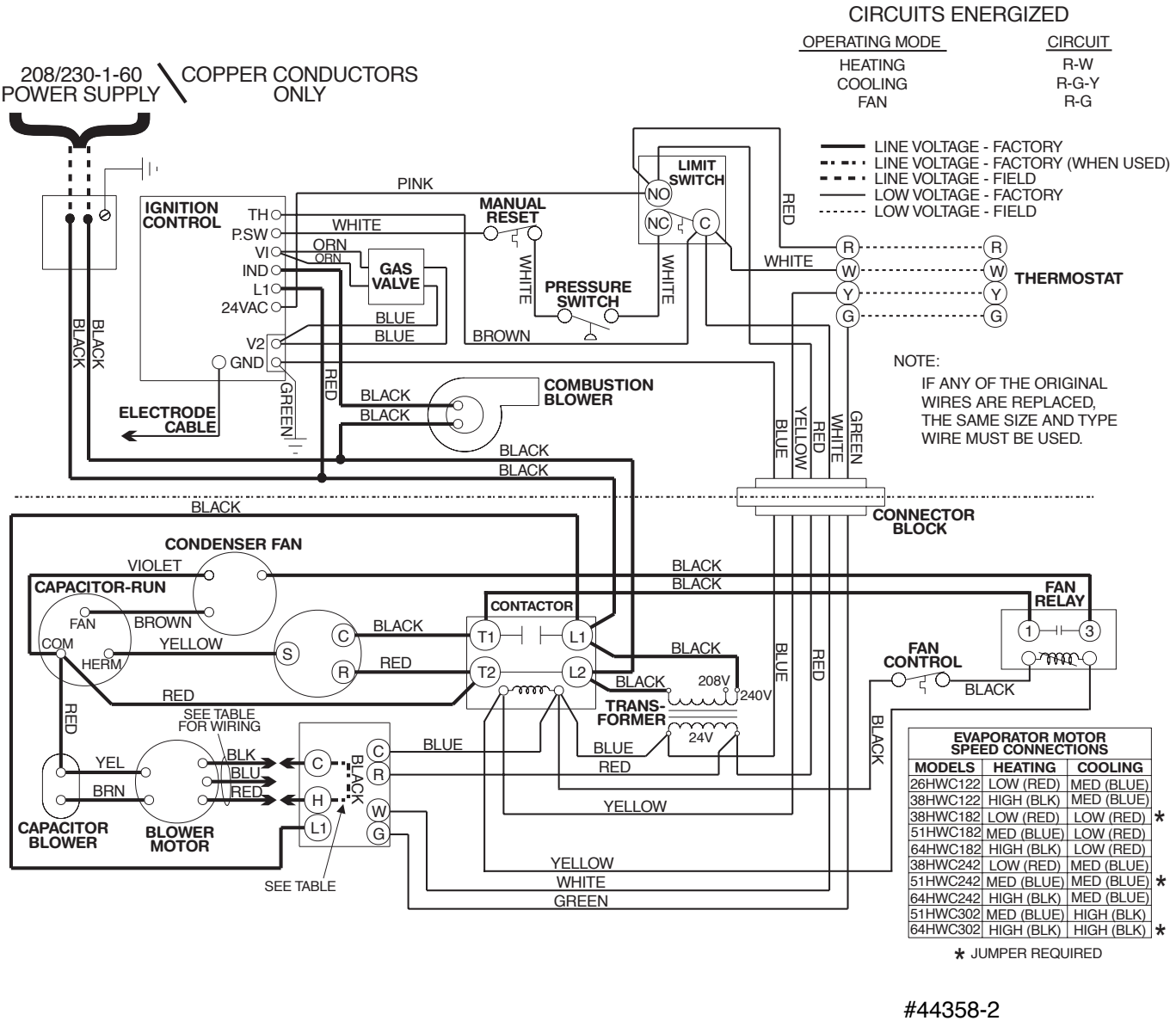
The low ambient switch is designed to allow the operation of the air conditioning unit below the normal operating range. On units equipped with this switch, sequence of operation during a cooling call is modified when **outdoor** temperatures fall below the normal operating range.

The switch will interrupt the operation of the outdoor cooling fan when the temperature of the liquid line coming in from the outdoor coil falls below 55° F. When the temperature of the liquid line rises to 95° F, the switch will close and the outdoor fan will resume operation.

The low ambient switch does not affect any other facet of the operation of the unit.

To see simplified and detailed sequences of operation for the HWC123, 183, 243, 303 models, refer to pages 2-5 to 2-9.

HWC122, 182, 242, 302 Low Ambient



EVAPORATOR MOTOR SPEED CONNECTIONS			
MODELS	HEATING	COOLING	
26HWC122	LOW (RED)	MED (BLUE)	
38HWC122	HIGH (BLK)	MED (BLUE)	
38HWC182	LOW (RED)	LOW (RED)	*
51HWC182	MED (BLUE)	LOW (RED)	
64HWC182	HIGH (BLK)	LOW (RED)	
38HWC242	LOW (RED)	MED (BLUE)	
51HWC242	MED (BLUE)	MED (BLUE)	*
64HWC242	HIGH (BLK)	MED (BLUE)	
51HWC302	MED (BLUE)	HIGH (BLK)	
64HWC302	HIGH (BLK)	HIGH (BLK)	*

* JUMPER REQUIRED

#44358-2

FIGURE 2-8 Connection Diagram

HWC122,182, 242, 302
Low Ambient Model
Refer to Figure 2-8

The low ambient switch is designed to allow the operation of the air conditioning unit below the normal operating range. On units equipped with this switch, sequence of operation during a cooling call is modified when **outdoor** temperatures fall below the normal operating range.

The switch will interrupt the operation of the outdoor cooling fan when the temperature of the liquid line coming in from the outdoor coil falls below 55° F. When the temperature of the liquid line rises to 95° F, the switch will close and the outdoor fan will resume operation.

The low ambient switch does not affect any other facet of the operation of the unit.

To see simplified and detailed sequences of operation for the HWC122, 182, 242, 302 models equipped with the Fenwal Triton 2461D DSI Ignition Control, refer to pages 2-17 to 2-20.

To see simplified and detailed sequences of operation for the HWC122, 182, 242, 302 models equipped with the Fenwal 05-29 Ignition Control, refer to pages 2-27 to 2-30.

Section 3 - Unit Tear Down

Heating Section

Heat Exchanger Removal 3-2
Induced Draft Blower Removal 3-2

Cooling Section

Chassis Removal 3-4
Evaporator Blower Assembly Removal 3-6

UNIT TEAR DOWN

HWC units are comprised of two major sections.

The **heating section** is located in the top half of the unit. It contains the heat exchanger and the majority of the components associated with the heating function: controls, burners, switches, etc.... The total heating section is not removable as a complete unit. The heat exchanger may be removed separately for service (see below).

The **cooling section** is located in the lower half of the unit. It contains the compressor, coils and motors that make up the refrigeration system. The cooling section is referred to as the "chassis" of the cooling system. The chassis is removable as a complete unit. Removal of the chassis allows service to be performed away from the job site, thus allowing a spare chassis to be installed to reduce downtime at a residence. Bench tests may be performed on chassis. See the Performance Test section beginning on page 9-11 for chassis performance data of both bench tested and installed units.

Heating Section

Heat Exchanger Removal:

The heat exchanger may be removed from the unit through the front side. Refer to the following directions and Figure 3-1.

To remove the heat exchanger:

1. Disconnect all power to the unit.
2. Shut off and disconnect the gas supply.
3. Open the burner access panel.
4. Remove the burner tray and the gas valve.
5. Remove the front heat section panel.
6. Remove the vestibule panel.
7. Remove the heat exchanger.

Induced Draft (Combustion) Blower Removal:

Refer to the following directions and Figure 3-1.

To remove the induced draft blower:

1. Disconnect all power to the unit.
2. Shut off and disconnect the gas supply.
3. Remove the plate mounting screws.
4. Slide the induced draft blower out.

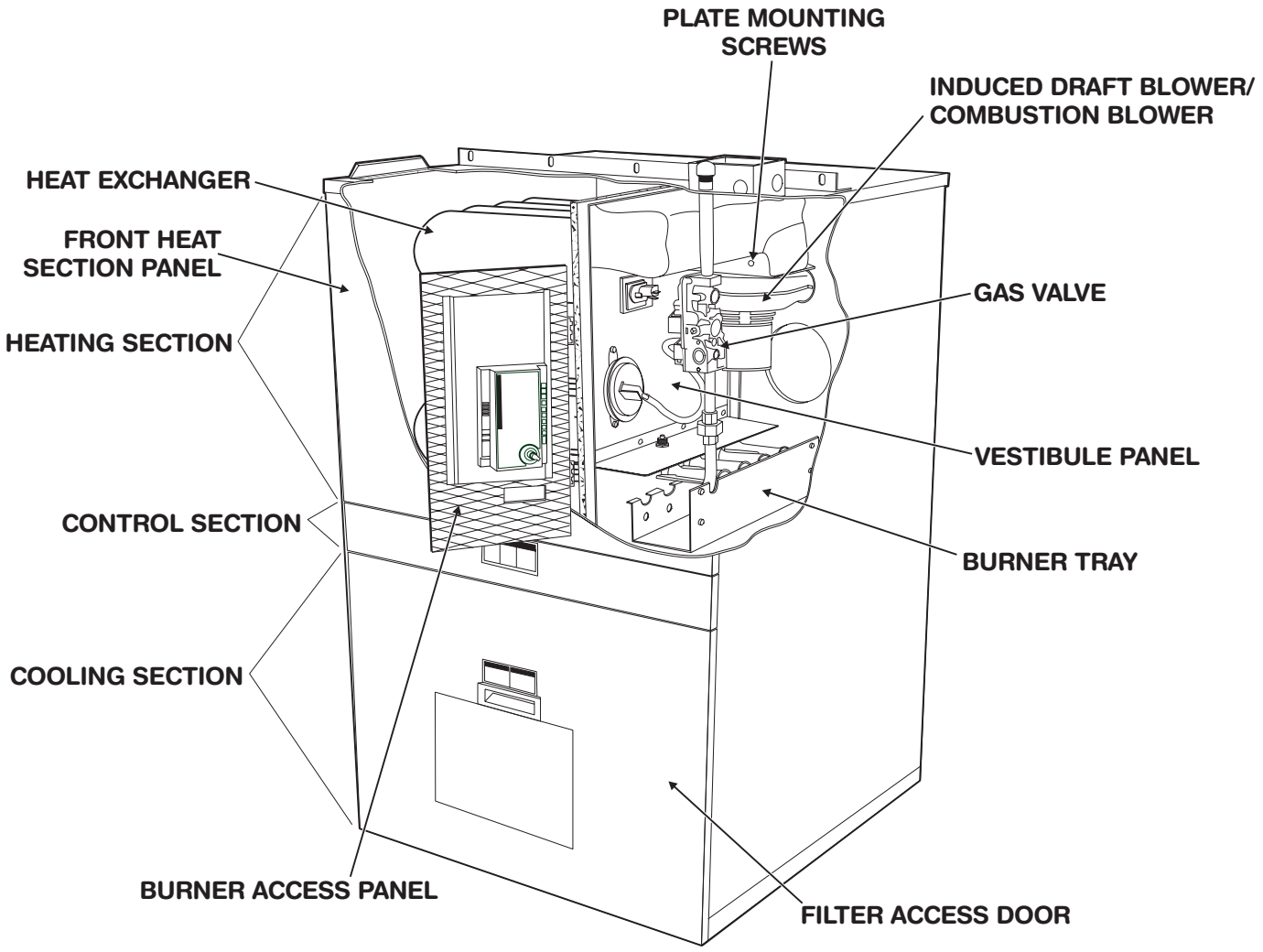


PLATE MOUNTING SCREWS
INDUCED DRAFT BLOWER/ COMBUSTION BLOWER
HEAT EXCHANGER
FRONT HEAT SECTION PANEL
HEATING SECTION
GAS VALVE
VESTIBULE PANEL
CONTROL SECTION
BURNER TRAY
COOLING SECTION
BURNER ACCESS PANEL
FILTER ACCESS DOOR

Figure 3-1

Cooling Section

Chassis Removal:

The cooling chassis may be removed from behind the filter access door. Refer to the following directions and Figures 3-1 to 3-4.

To remove the cooling chassis:

1. Disconnect all power to the unit.
2. Shut off and disconnect the gas supply.
3. Remove the filter access door (Figure 3-1).
4. Disconnect L1 and L2 from the compressor contactor (Figure 3-2).
5. Disconnect the 6-pin low voltage molex plug (Figure 3-2).
6. Remove the filler panel by removing the four hold down screws (Figure 3-2).
7. Remove the right side chassis screw (Figure 3-2).
8. Remove the permagum seal on the base rails of the chassis (Figure 3-4).
9. Disconnect the drain tube from the evaporator drain pan (Figure 3-3).
10. Remove the chassis from the front of the unit, pulling it toward yourself (Figure 3-4).

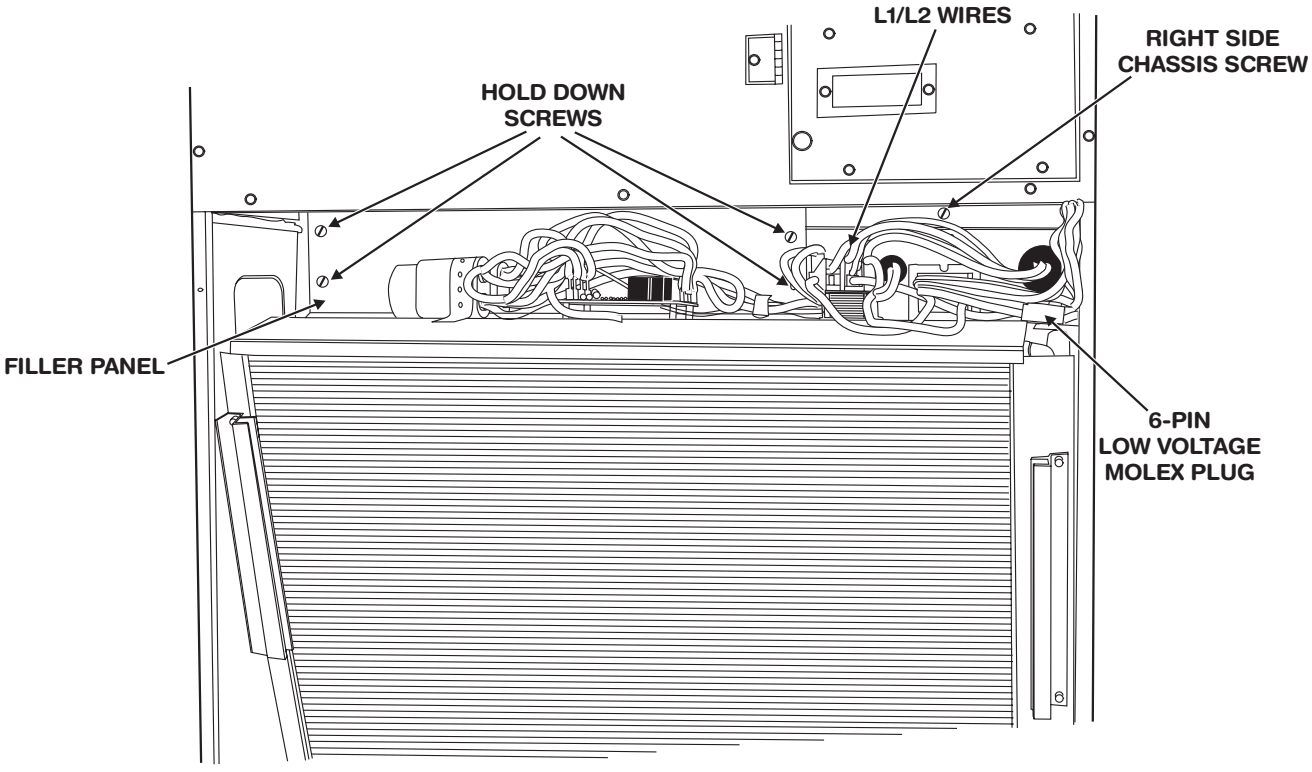


Figure 3-2

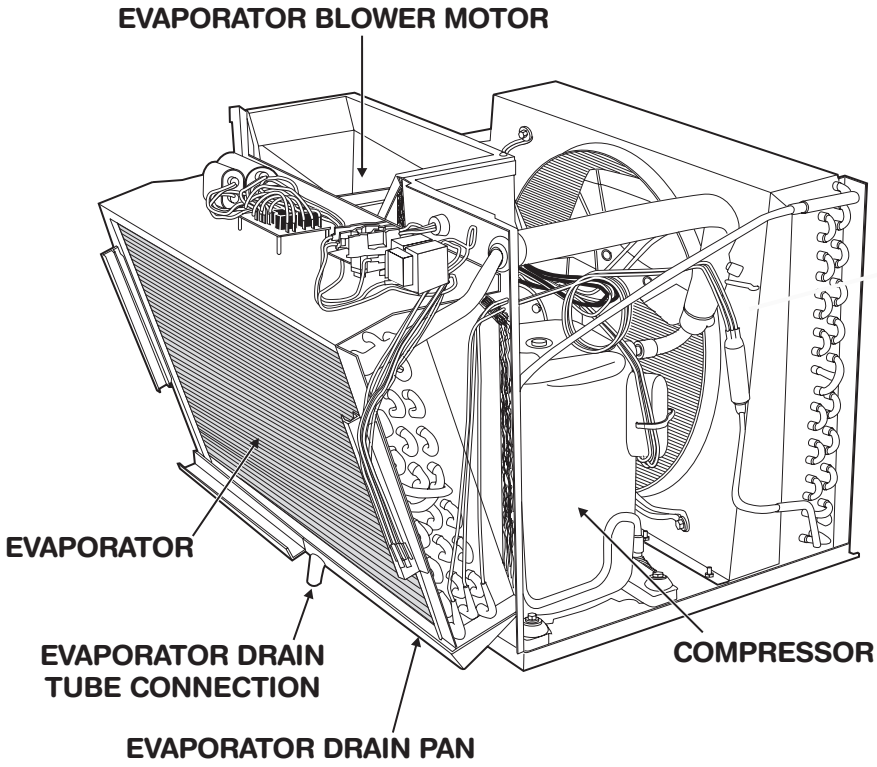


Figure 3-3

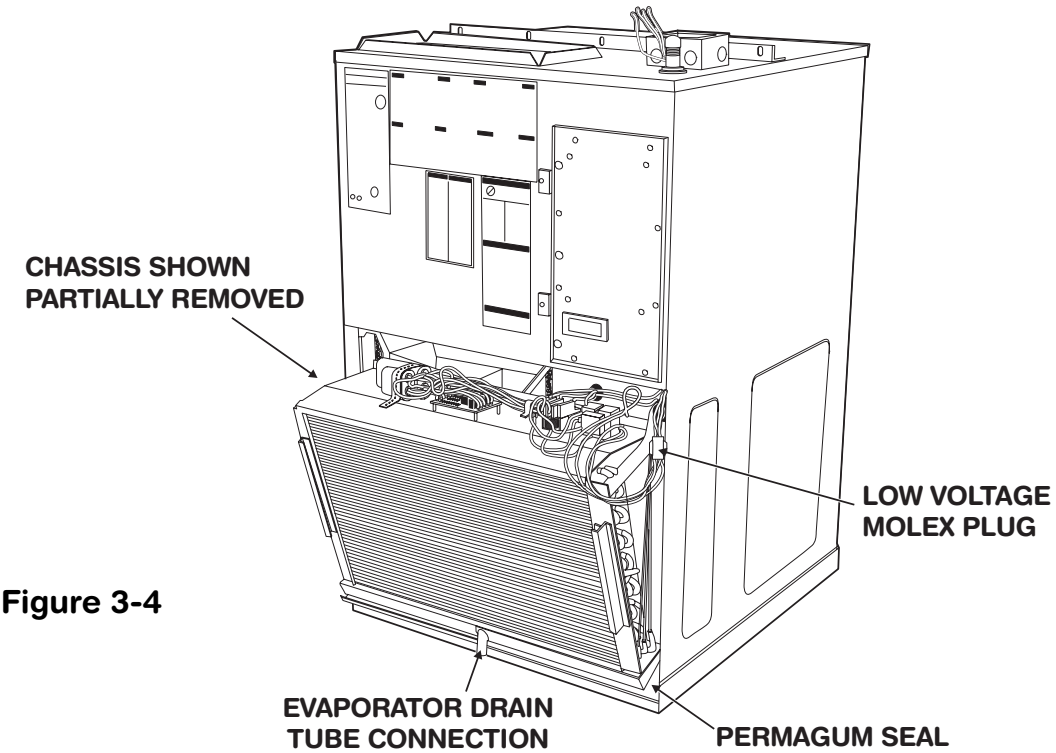


Figure 3-4

DRAIN HOSE (NOT PICTURED)
ARMSTRONG P/N 03613A001
17" LONG
.63" (5/8") I.D.
.13" WALL THICKNESS

Evaporator Blower Assembly Removal:

The evaporator blower assembly is removable as one complete section. To remove the assembly, the chassis must be removed first (see page 3-4). Refer to the following directions and Figure 3-5.

To remove the evaporator blower assembly:

1. Remove the four mounting screws from the blower assembly.
2. Remove the four control panel screws.
3. Slide control panel toward yourself about 1".
4. Disconnect the electrical wiring to the motor.
5. Pull blower assembly up and out from chassis.

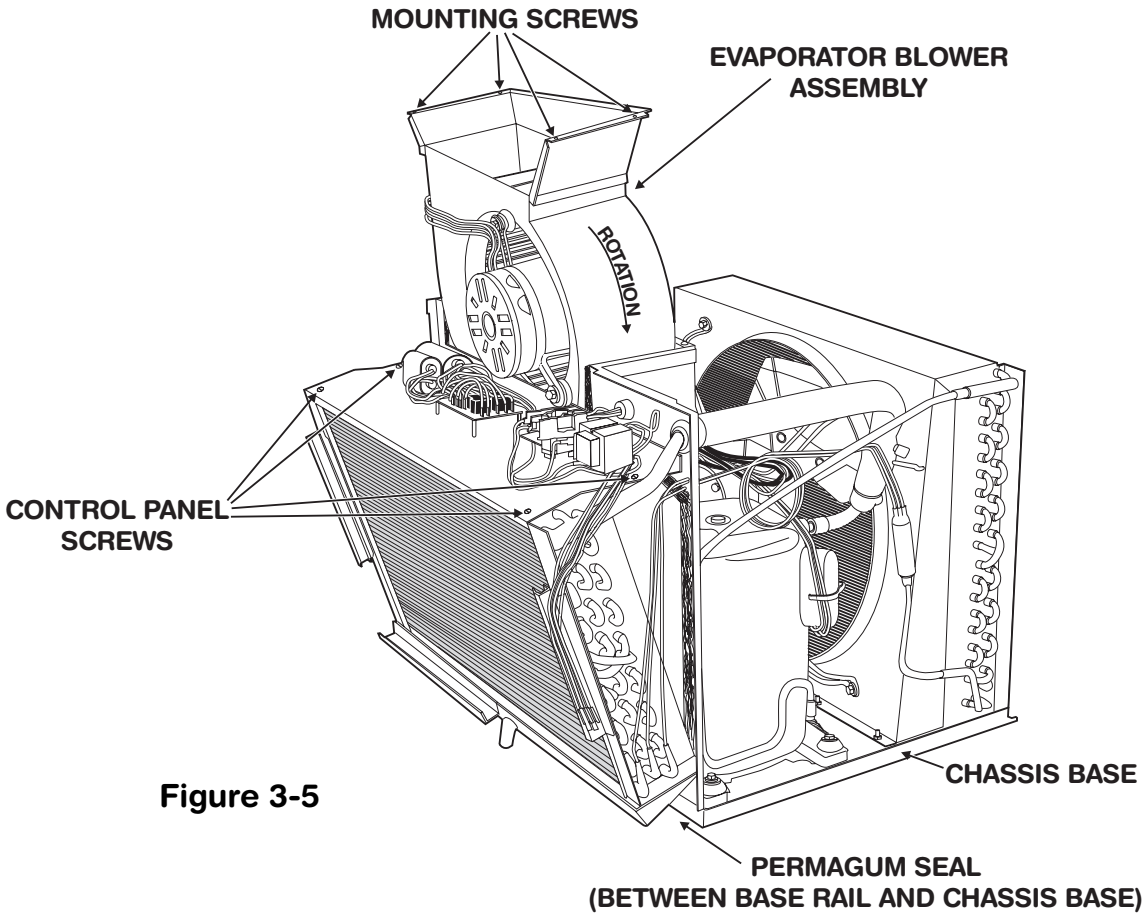


Figure 3-5

Section 4 - Component Location Illustrations

HW/HWC(3) Unit 4-2

HW/HWC(2) Unit 4-3

HW/HWC - Panels 4-4

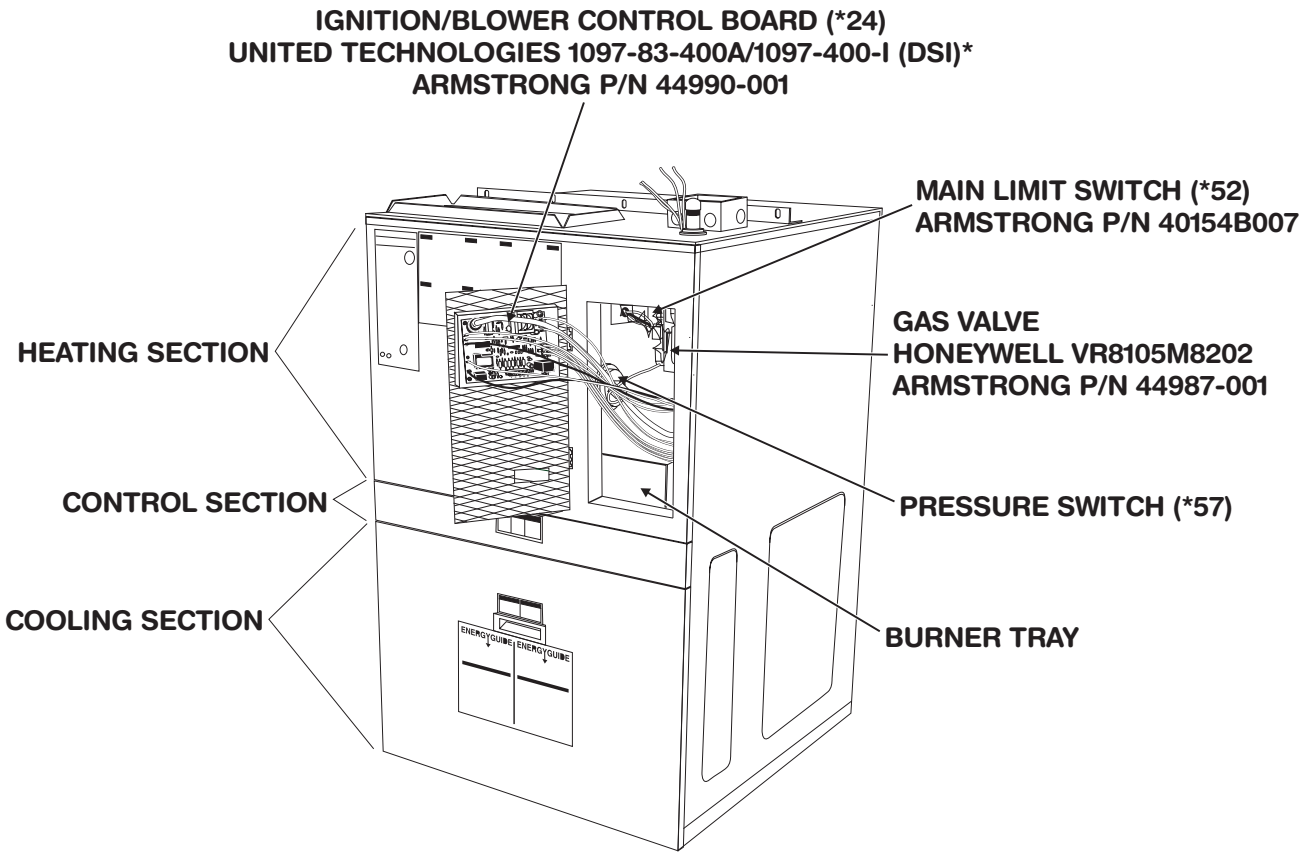
HW/HWC - Exterior Louver/Grill Panel .. 4-5

HWC Chassis Assembly 4-6

HWC Chassis Assembly - Top View 4-7

HWC Chassis Assembly -
Circulating Air Blower Partially Removed 4-8

HW/HWC123,183,243,303



* SEE COMPONENT SECTION FOR FURTHER DETAIL OF IGNITION/BLOWER CONTROL

FIGURE 4-1

The numbers in parentheses in the drawing above refer to the section number each part is assigned. These numbers are provided here to aid in locating the parts in the Parts List section found beginning on page 8-1.

HW/HWC122, 182, 242, 302

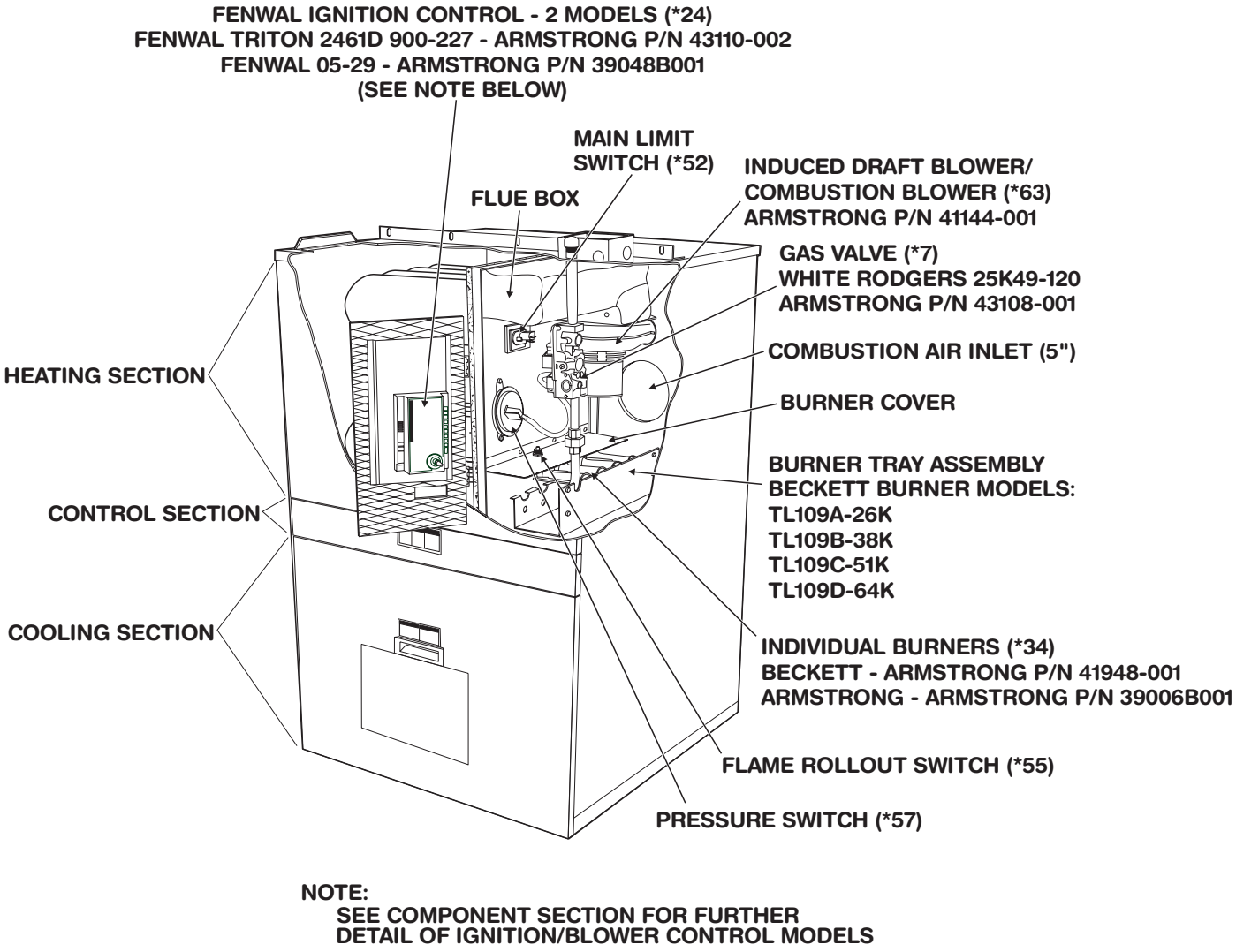


FIGURE 4-2

The numbers in parentheses in the drawing above refer to the section number each part is assigned. These numbers are provided here to aid in locating the parts in the Parts List section found beginning on page 8-1.

HW/HWC - Panels

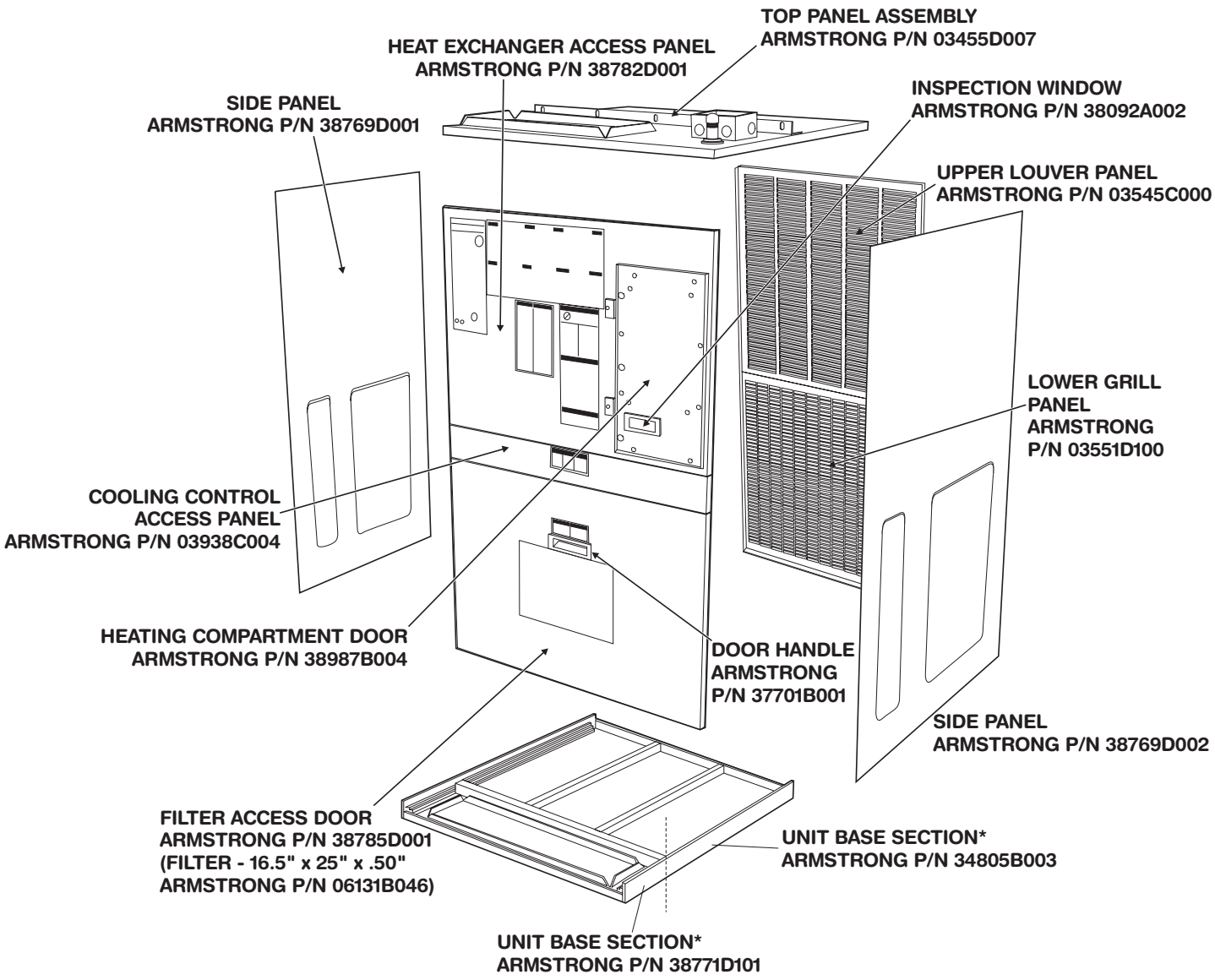


FIGURE 4-3

Note: Panels and other associated parts found in the drawing above are not listed in the Parts List section that begins on page 8-1.

HW/HWC Exterior Louver/Grill Panel

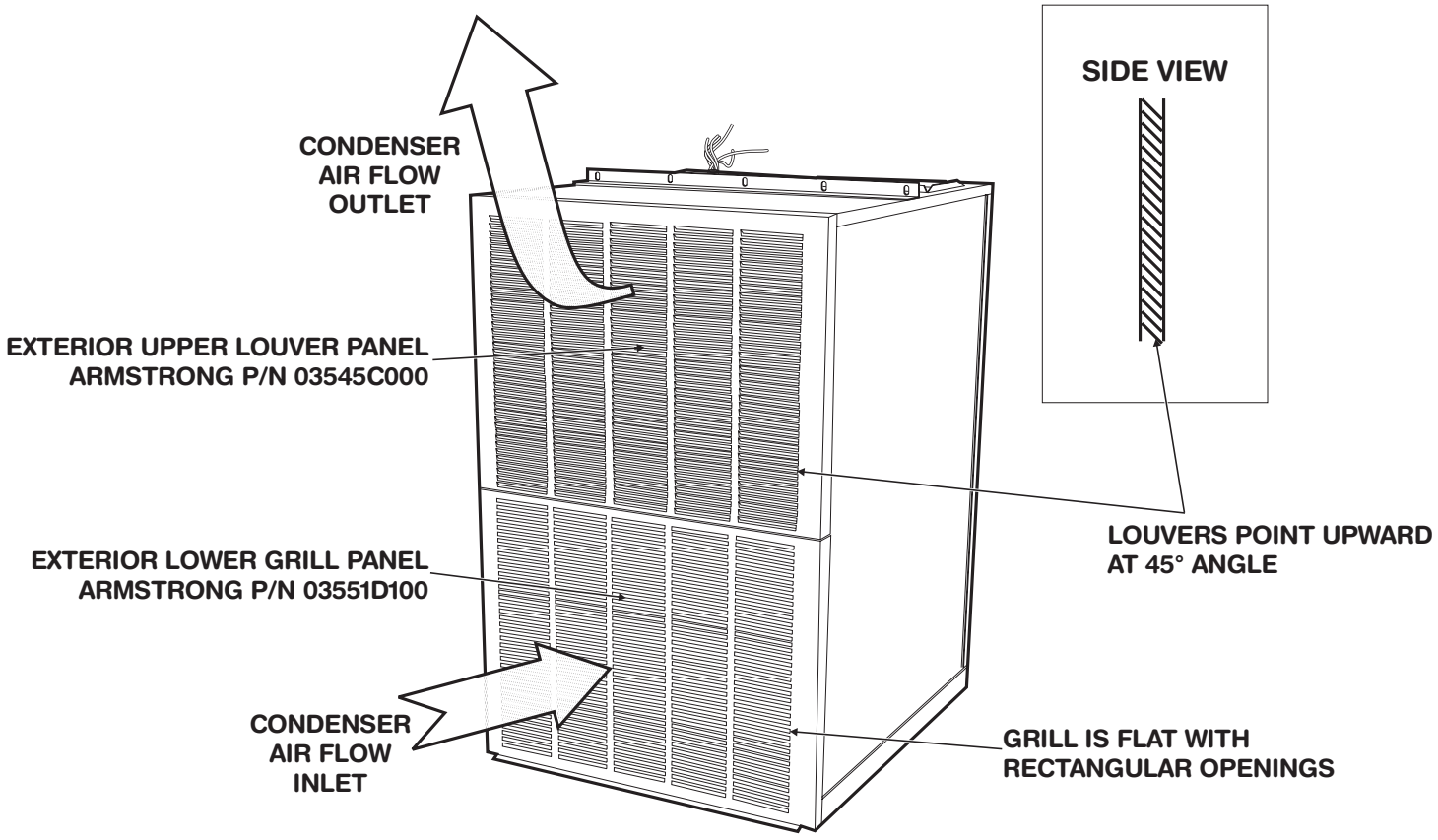


FIGURE 4-4

Note: Panels found in the drawing above are not listed in the Parts List section that begins on page 8-1.

HWC Chassis Assembly

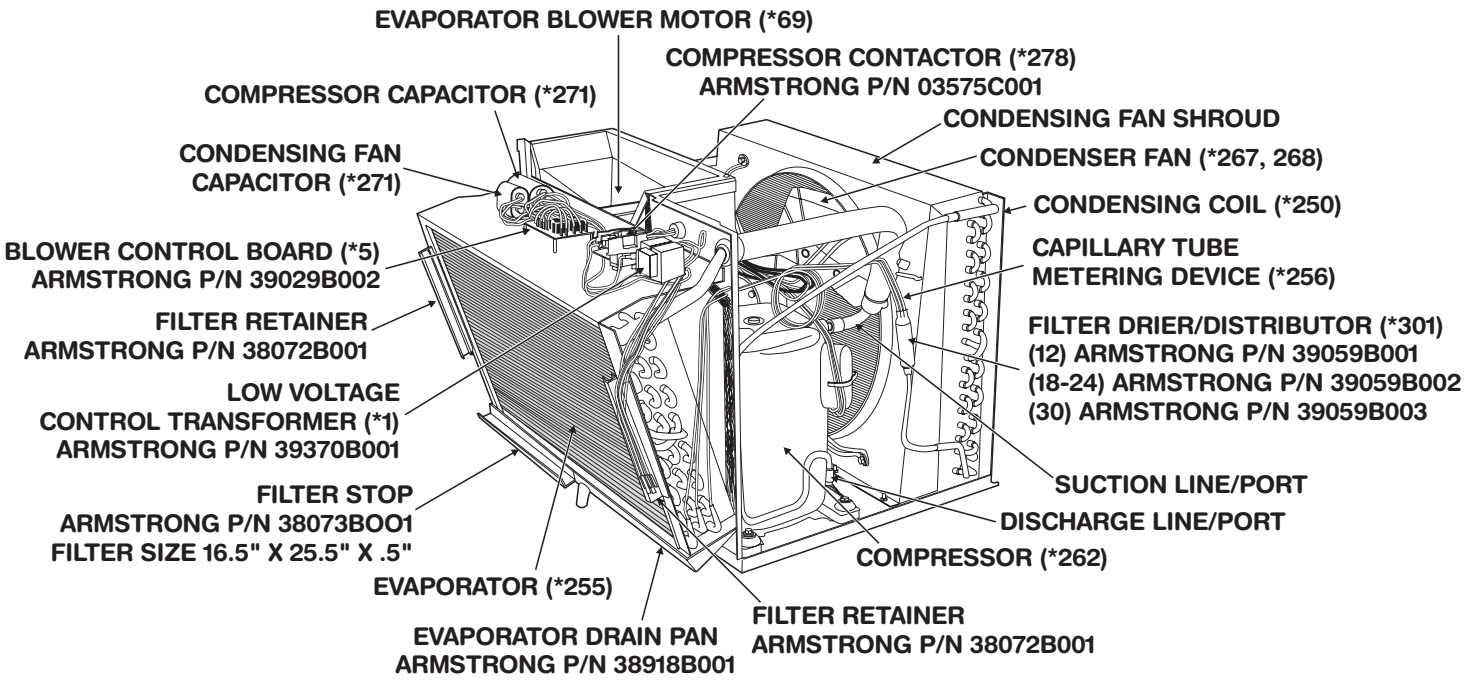


FIGURE 4-5

The numbers in parentheses in the drawing above refer to the section number each part is assigned. These numbers are provided here to aid in locating the parts in the Parts List section found beginning on page 8-1.

HWC Chassis Assembly - Top View

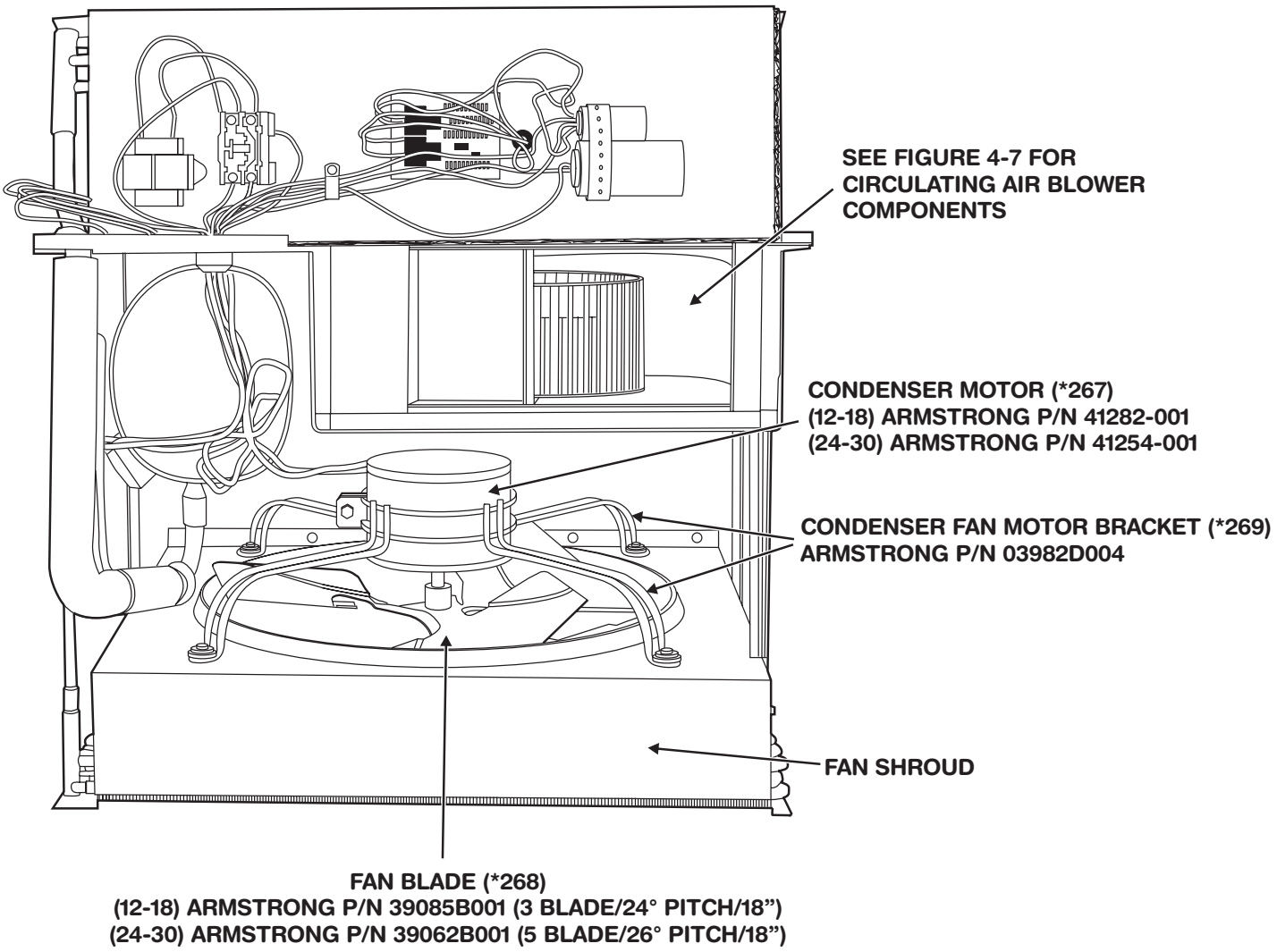
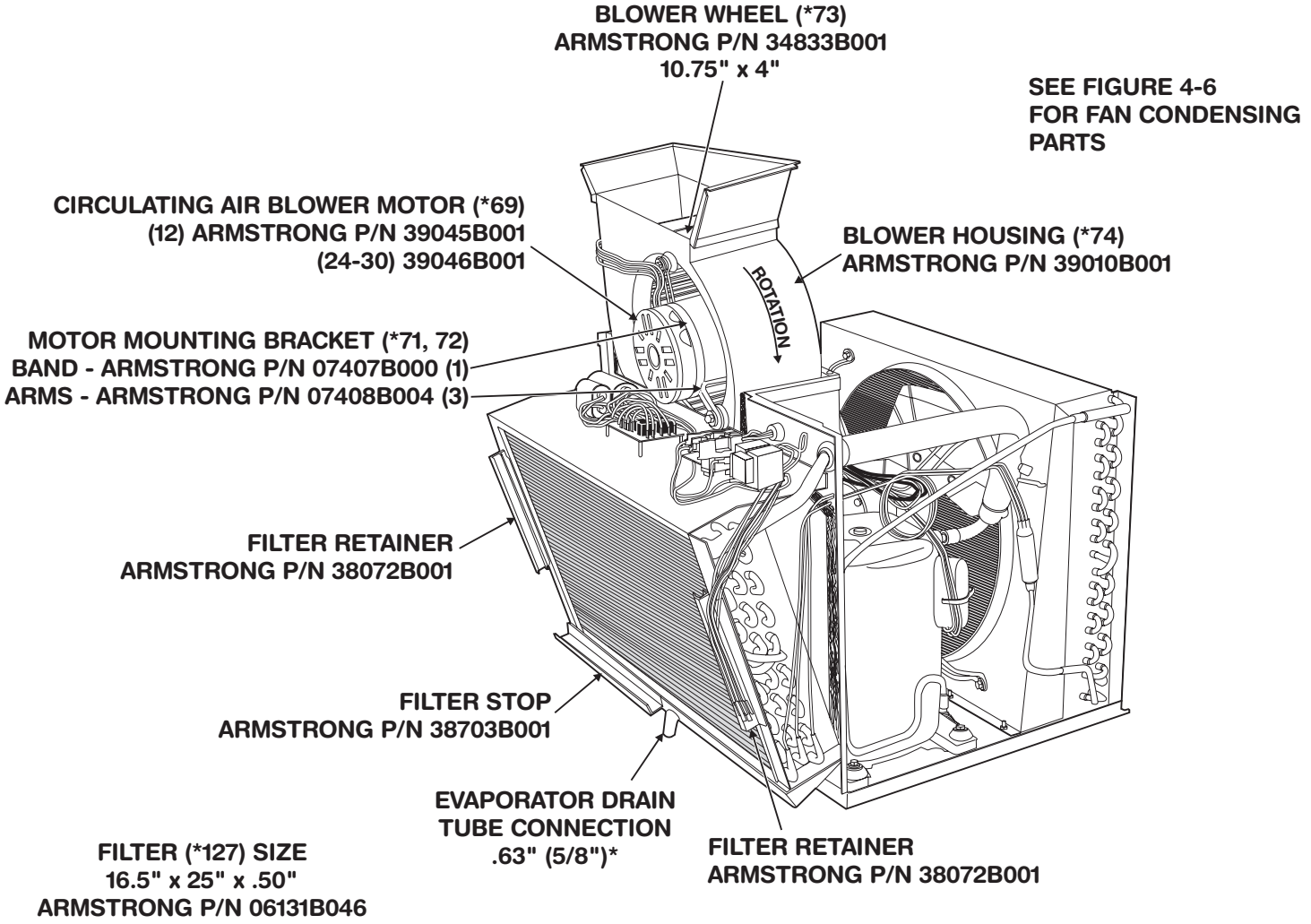


FIGURE 4-6

The numbers in parentheses in the drawing above refer to the section number each part is assigned. These numbers are provided here to aid in locating the parts in the Parts List section found beginning on page 8-1.

HWC Chassis Assembly - Circulating Air Blower Partially Removed



NOTE:

WHEN USING A REPLACEMENT FILTER WITH A MANUFACTURED FRAME, THE DIMENSIONS MAY NEED TO BE REDUCED FOR PROPER FIT. TAKE AND RECORD MEASUREMENTS FOR PROPER FIT.

* REQUIRES (5/8") I.D. DRAIN HOSE
ARMSTRONG P/N 03613A001 (NOT SHOWN)

FIGURE 4-7

The numbers in parentheses in the drawing above refer to the section number each part is assigned. These numbers are provided here to aid in locating the parts in the Parts List section found beginning on page 8-1.

Section 5 - Unit Components

Transformer 5-3

Gas Valves 5-4
- White-Rodgers 25K49 5-4
- Honeywell 8105 5-5

Blower Control Boards 5-6
- United Technologies Model 1010-611 5-6
- Heatcraft Model IBC-H4C401 5-7

Ignition Controls 5-8
- Fenwal Triton 2461D 5-8
- Fenwal 05-29 DSI 5-10

Integrated Blower/Ignition Controls 5-11

Induced Draft Blower 5-14

Burners 5-15

Manifold Orifices 5-17

Contactor 5-18

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Flame Rollout Switch 5-20

Pressure Switch 5-21
- Pressure Switch Problems 5-23
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Compressors 5-28
- Tecumseh 5-30
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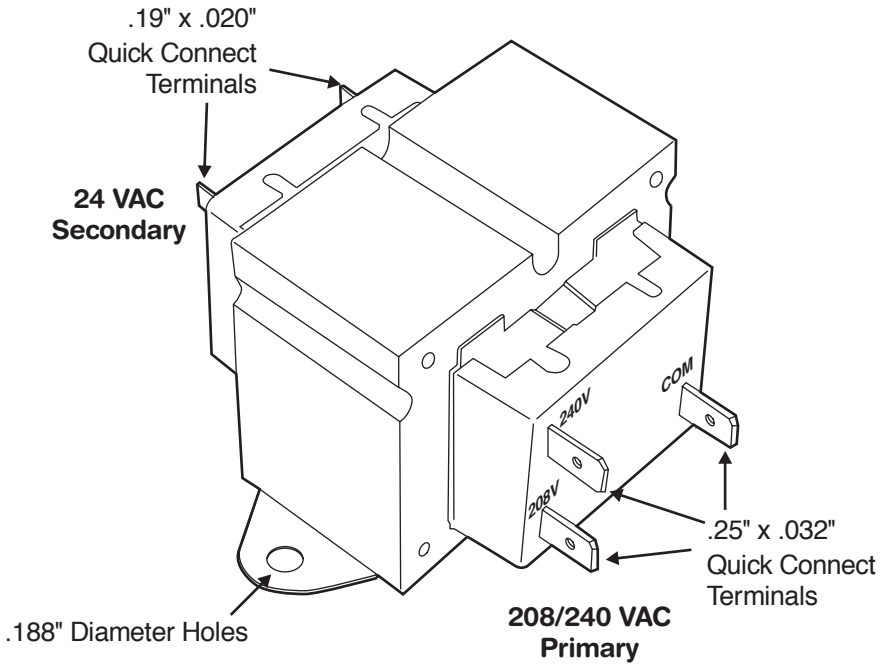
Unit Components

This section provides a brief description of the most important components within the Magic-Pak HW/HWC units. The information presented here is not intended to take the place of the instructions and printed literature packed with each component by the original manufacturer. The section number for each component is listed in parentheses following the component name. This number refers to the section number assigned to each part in the Parts List section beginning on page 8-1.

Transformer (*1)

The transformer supplies 24 VAC from its secondary winding to operate the blower control board, gas valve and ignition control depending on the particular model. Transformers are typically rated at 40 VA, 50/60 Hz.

Transformer Specifications
Manufacturer: Basler Electric
Model: 31264-GEK
Armstrong P/N 39370B001
Primary: 208/240V
Secondary: 24V
Rating: 40VA
Dimensions: 2.28" W x 1.94" H x 3.12" D
Base - 3.25" W (2.81" between I.D. of holes)



Note: Secondary leads may exit from top of transformer.

FIGURE 5-1 24-volt Transformer (Typical Configuration)

Gas Valves (*7)

White-Rodgers 25K49-120

Gas Valve Specifications
Manufacturer: White-Rodgers
Model: 25K49-120
Armstrong P/N 43108-001
Dimensions: 1.97" W x 5.31" L
Nominal Operating Currents: 25VAC/60Hz/.5A
Regulator set at 3.50 +/– .02" W.C. at 55.6 cubic Ft./Hr of air at standard conditions (with valve in vertical position, inlet up).

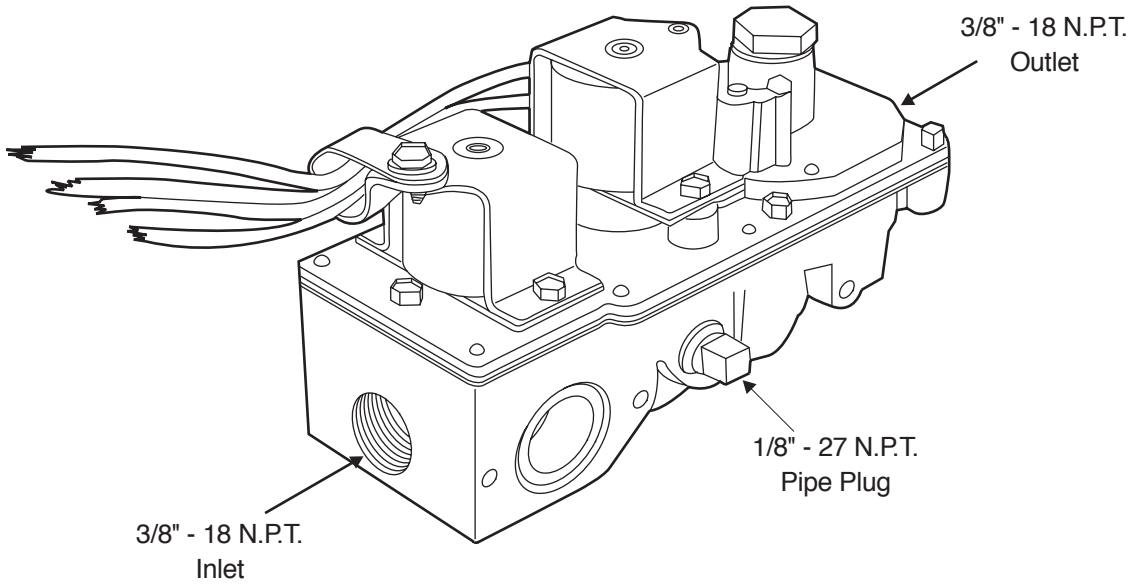


FIGURE 5-2 White-Rodgers Gas Valve

Honeywell 8105 Series

Gas Valve Specifications
Manufacturer: Honeywell
Model: VR8105M8202
Armstrong P/N 44987-001
Dimensions: 2.70" W x 4.75" L
Nominal Operating Currents: 25VAC/60Hz/.5A
Regulator Setting: 3.50 +/– .3" W.C.
Pipe Size: .50" Inlet x .375" Outlet
Valve Amp Draw: .5 A
1" Drop Capacity: 85,000 Btuh
Max. Regulator Capacity: 120,000 Btuh
Temperature Rating: – 40°F to +175°F

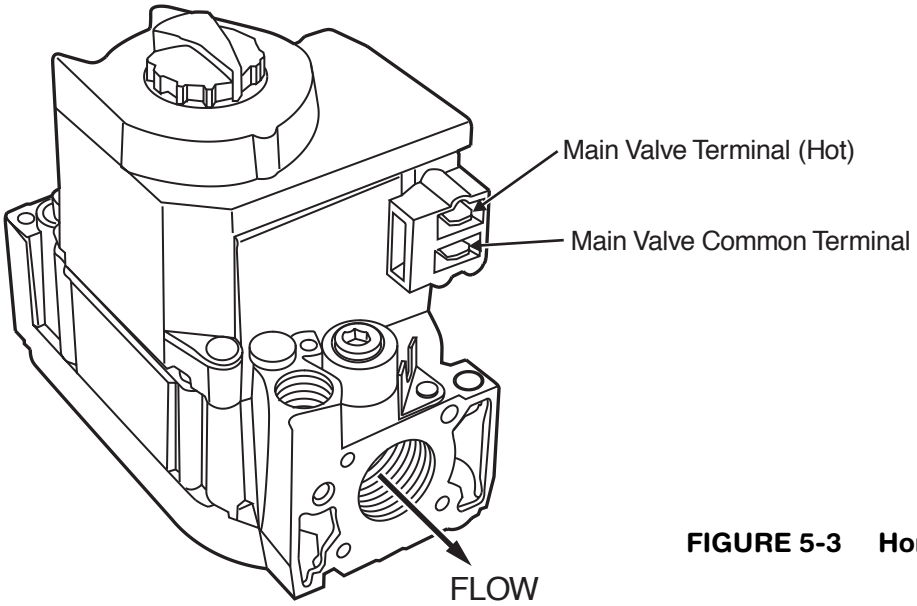
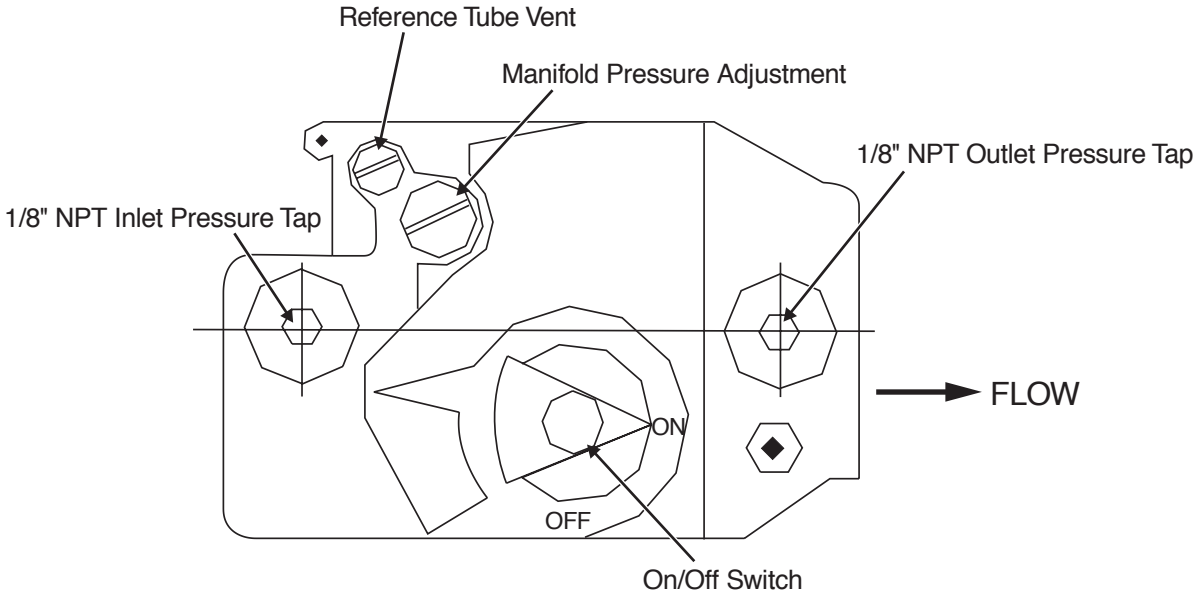


FIGURE 5-3 Honeywell Gas Valve



Blower Control Boards (*5)

A separate blower control board is used in the Magic-Pak HW/HWC models that do not use integrated ignition/blower control boards. Blower control boards from two different manufacturers are used in these HW and HWC units. The two blower control boards are explained in detail in the following pages.

United Technologies Model 1010-611

Blower Control Board Specifications
Manufacturer: United Technologies
Model: 1010-611
Armstrong P/N 39029B002
Operating Voltage: 18-30VAC 60 Hz
60 Hz Power Requirement: 4 VA max.
Operating Temperature: – 40°F to +170°F
Wiring Connections: All Male .250" x .032" Quick Connect Tabs

Performance Specifications (all timings +/– 1 second):

Heating: On Delay Timing - 60 seconds
Off Delay Timing - 90 seconds

Cooling: On Delay Timing - 15 seconds
Off Delay Timing - 90 seconds

Heating and Cooling Output Rating:

12 F.L.A., 30 L.R.A. at 120VAC for 100,000 Cycles
10 F.L.A., 30 L.R.A. at 240VAC for 100,000 Cycles

Both heat and cool outputs cannot be energized simultaneously.

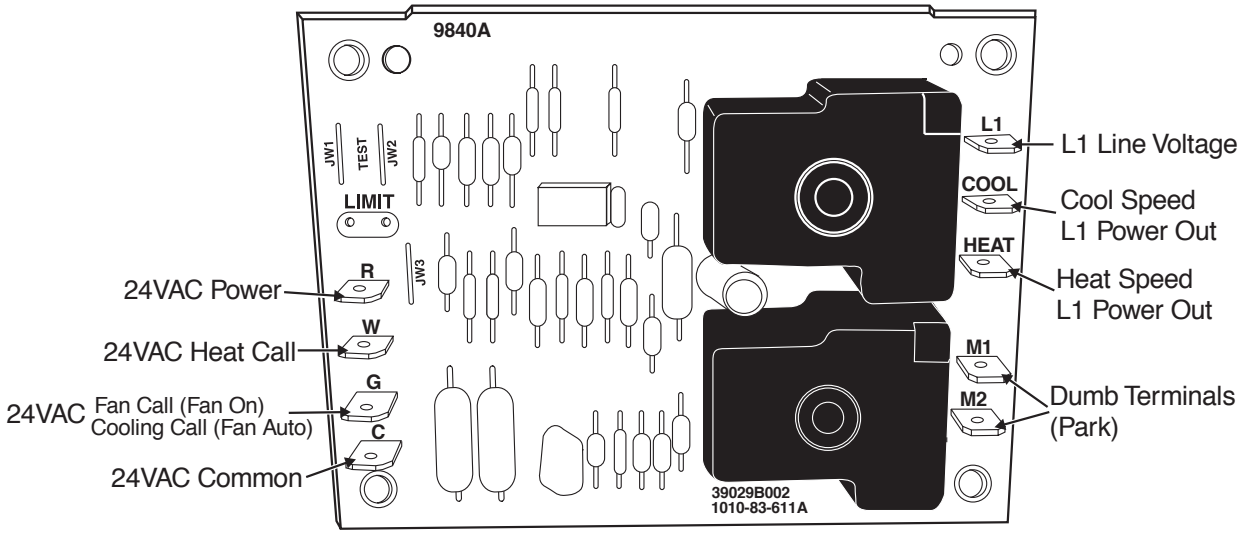


FIGURE 5-4 United Technologies Blower Control Board 1010-611

Heatcraft Model IBC-H4C401

Blower Control Board Specifications
Manufacturer: United Technologies
Model: 1010-611
Armstrong P/N 39029B002
Operating Voltage: 18-30VAC 60 Hz
60 Hz Power Requirement: 4 VA max.
Operating Temperature: – 40°F to +170°F
Wiring Connections: All Male .250" x .032" Quick Connect Tabs

Performance Specifications (all timings +/– 1 second):

Heating: On Delay Timing - 60 seconds
Off Delay Timing - 90 seconds

Cooling: On Delay Timing - 15 seconds
Off Delay Timing - 90 seconds

Heating and Cooling Output Rating:

12 F.L.A., 30 L.R.A. at 120VAC for 100,000 Cycles
10 F.L.A., 30 L.R.A. at 240VAC for 100,000 Cycles

Both heat and cool outputs cannot be energized simultaneously.

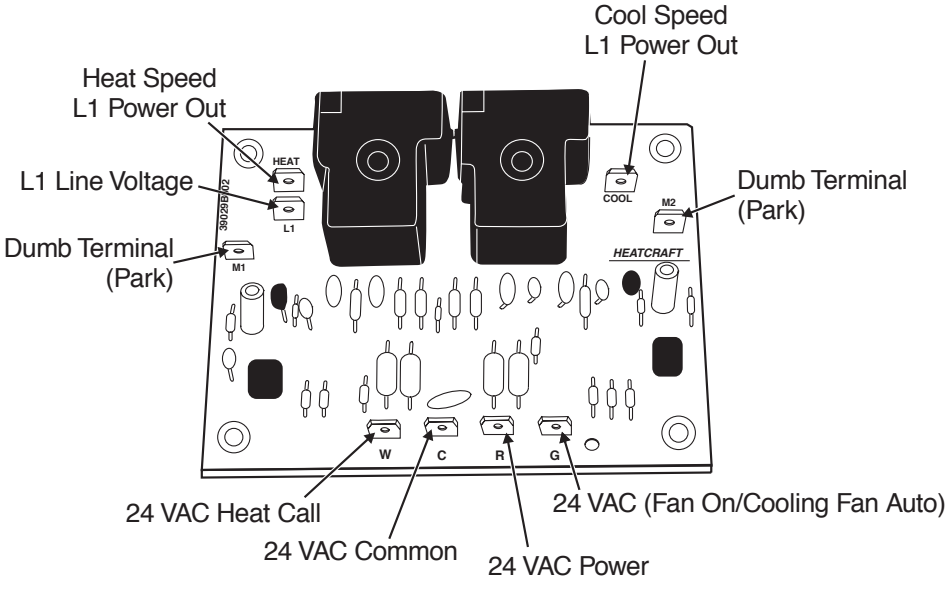


FIGURE 5-5 Heatcraft Blower Control Board IBC-H4C401

Ignition Controls (*24)

Fenwal Triton 2461D

Ignition Control Specifications
Manufacturer: Fenwal
Model: Triton 2461D
Armstrong P/N 43110-002
Pre-purge: 30 seconds
Ignition: 15 seconds
Input: 24VAC, 50/60 Hz 300 mA
Valve: 24VAC, 2.0 A max.
Inducer: 120VAC, 3.0 A or 240VAC, 1.5 A, 1/4 HP
Ambient: – 40°F to +160°F
ANSI Z21.20-1993 CAN/CSA-C22.2 No. 199-M89

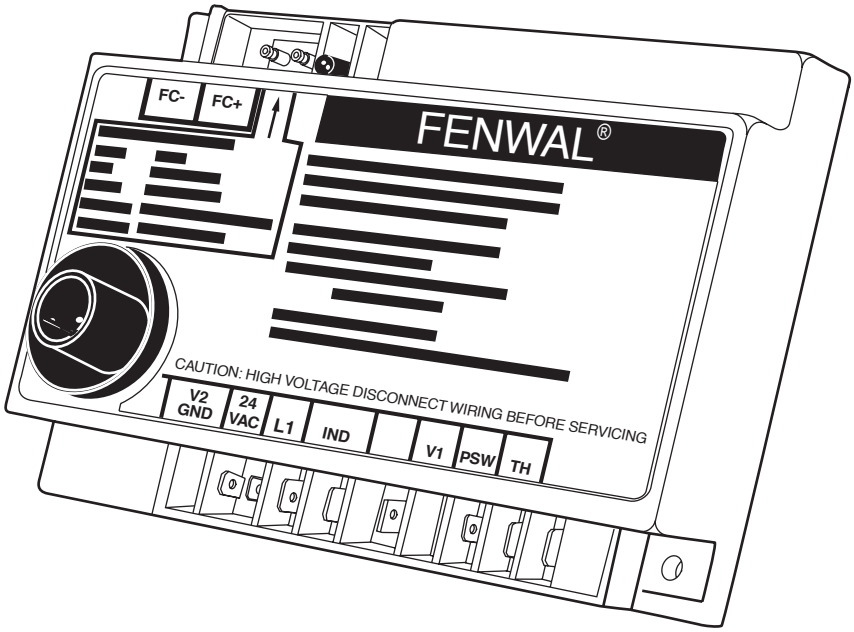


FIGURE 5-6 Fenwal Triton 2461D Ignition Control

Diagnostics (Fenwal Triton 2461D)

1. Diagnostic LED flash rate is 1/4 second “ON”, 1/4 second “OFF” followed by up to four seconds “OFF” before repeating the code.

2. Only one code is displayed at a time.

3. During a “STEADY ON” code, the LED may blink off momentarily.

4. Diagnostic codes may be reset by removing the power from the control for three seconds, then reapplying power. (Cycle thermostat “OFF” for three seconds, then back “ON”.)

The following ignition control board LED codes indicate normal or abnormal operations:

TABLE 5-1 Triton 2461D Diagnostic Flash Code

STEADY ON	This code is used for up to four seconds at startup each time the control is powered to indicate that the control is performing a self diagnostic check. If a problem is detected, the self diagnosis will repeat for a total of five times which equals twenty seconds. If LED is on steady for 20 seconds, this indicates a control failure.
ONE FLASH	Indicates an air flow fault. Used only on models with a pressure switch input (PSW). This code is active only if the PSW input is in the improper state after a predetermined time delay. For example: If the PSW input was powered when the call for heat begins (closed contacts), the control will allow a fixed time for the PSW input to go off otherwise the LED flash will commence. Conversely, if he PSW input is not powered within a fixed delay time after the inducer motor is energized, the LED flash will commence. If the PSW input is removed during a heating cycle, power will be removed from the gas valve immediately. If the PSW power input is not reapplied within a fixed time, the LED flash will commence.
TWO FLASHES	Indicates a flame detected out of sequence or with no call for heat. LED will flash twice as soon as flame is detected out of sequence and continue as long as the flame is present. Controls with an inducer control circuit will also power the inducer circuit when flame is detected out of sequence.
THREE FLASHES	Indicates ignition lockout after all ignition tries have been completed. This code will continue as long as the call for heat remains. On models equipped with one hour automatic reset, the code will stop when a new ignition attempt begins.

Fenwal 05-29 DSI

Ignition Control Specifications
Manufacturer: Fenwal
Model: 05-29 DSI
Armstrong P/N 39048B001
Relative Humidity Rating: 5 to 90% RH at 95°F
Flame Current: 3 mA min.
Spark Gap: 1/8"
Trial for Ignition: 6.8 seconds
Pre-purge: 30 seconds
Input: 24VAC from TS and P.SW to ground
Gas Valve Contacts: 24VAC, 600 mA max.
Blower Output: Relay between L1 and IND, 10 A at 250VAC
Ambient: – 40°F to +150°F

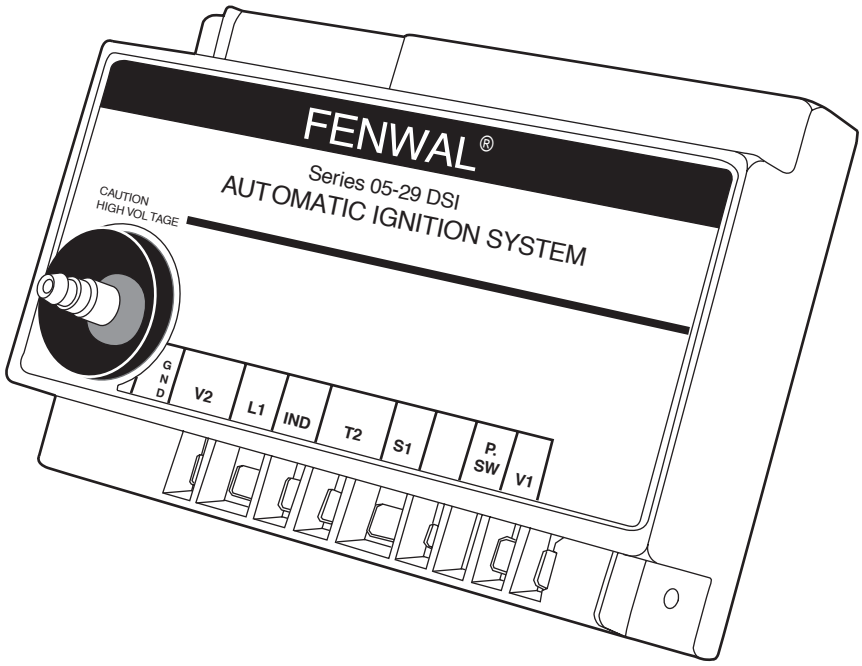


FIGURE 5-7 Fenwal 05-29 Ignition Control

Integrated Blower/Ignition Control (*24)

United Technologies Model 1097-400-1

The integrated control combines the actions and purposes of the individual ignition and blower control boards found on other units. It automatically monitors and controls the operation of the gas burners, gas valve, induced draft blower and circulating blower.

The control has a built-in diagnostic function, quick gas valve shutoff and automatic ignition retry when it detects that a fault condition has been corrected. If a fault is detected, the controls goes into fault mode and flashes the single LED indicator at a preset rate for that particular fault condition. (See Diagnostic Flash Code found in Table 4-1 on page 4-8 or Diagnostic Indicator code printed on unit label.)

Integrated Control Specifications
Manufacturer: United Technologies
Model: 1097-400-1
Armstrong P/N 44990-001
Operating Temperature: – 40°F to +175°F
Timing Tolerance: +/– 10%
Input Voltage: 18-30VAC, 50/60 Hz
Combustion Blower: 1/8 HP @ 120/240VAC
Circulating Blower: 1/2 HP @ 120VAC, 1 HP @ 240VAC
Gas Valve: 24VAC, 60 Hz, 1.0 A

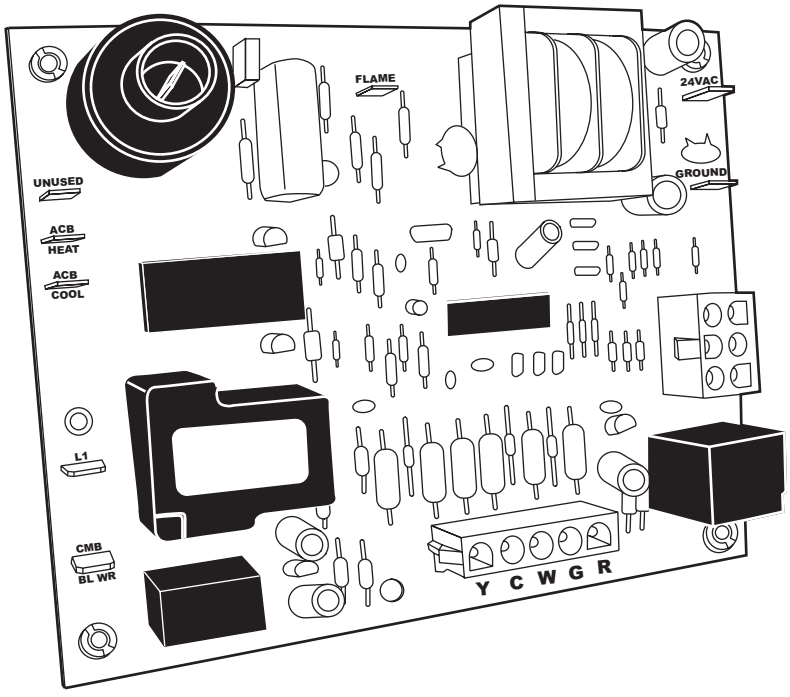


FIGURE 5-8 United Technologies Model 1097 Integrated Control

Diagnostics (United Technologies 1097-400-1)

The following blower/ignition control board LED codes indicate normal or abnormal operations:

TABLE 5-2 UTech Model 1097 Diagnostic Flash Code

SLOW FLASH	Normal Operation, No Call for Heat
FAST FLASH	Normal Operation, Call for Heat
2 FLASH	System Lockout - Failed to Detect or Sustain Flame
3 FLASH	Pressure Switch Open or Closed
4 FLASH	High Limit or Rollout Switch Open
5 FLASH	Flame Sensed and Gas Valve Not Energized
STEADY	Internal Failure (Micro-controller Failure; Self-check)

United Technologies Model 1097-400-1 (cont.)

Quick Connect Terminal Descriptions

1 24VAC HOT - from Transformer
2 GROUND = 24VAC Return
4 CMB BLWR = Combustion Blower (Line Voltage)
5 L1 = Line Voltage
9 ACB COOL = Air Circulating Blower Cool Speed (Line Voltage)
10 ACB HEAT = Air Circulating Blower Heat Speed (Line Voltage)
11 UNUSED (Park)
12 FLAME = Flame Probe

Molex/Amp Plug-in Description

1 Roll-out Switch Return
2 Hi Limit Return/Pressure Switch Out
3 Gas Valve Common
4 Gas Valve Out
5 Pressure Switch Return
6 Roll-out Switch Out

Thermostat Input

R 24VAC to Thermostat (RED)
G Manual Fan Input from Thermostat (GREEN)
W Heat Demand Input from Thermostat (WHITE)
C Common Ground to Thermostat
Y Cool Demand Input from Thermostat (YELLOW)

United Technologies Model 1097-400-1 (cont.)

Heat Mode

Pre-purge	30 seconds
Inter-purge	30 seconds
Post-purge	5 seconds
Trial Time	10 seconds
# of Trials	3

Board to reset from lockout after 60 minutes.

Fan On Delay

Cool	5 seconds (fixed)
Heat	30 seconds (fixed)

Fan Off Delay

Cool	90 seconds (fixed)
Heat	120 seconds (fixed)

Induced Draft Blower (*63)

The induced draft blower is also referred to as a “combustion” blower, since its purpose is to establish flow of combustion air through the heat exchanger. Mounted at the outlet of the secondary heat exchanger, the blower establishes a negative pressure within the heat exchanger and exhausts the flue products outside the structure.

Blower motors operate at a fixed speed.

Induced Draft Blower Specifications
Manufacturer: Magnetek
Model: JBIMI37NS
Armstrong P/N 41144-001
208/240VAC, 60 Hz, Single Phase, .55 FLA, 3000 RPM, .031 HP
Rotation CW LE
Continuous Duty
Features: Ball Bearing; Stainless Steel Shaft;
Motor Grounded to Blower Housing

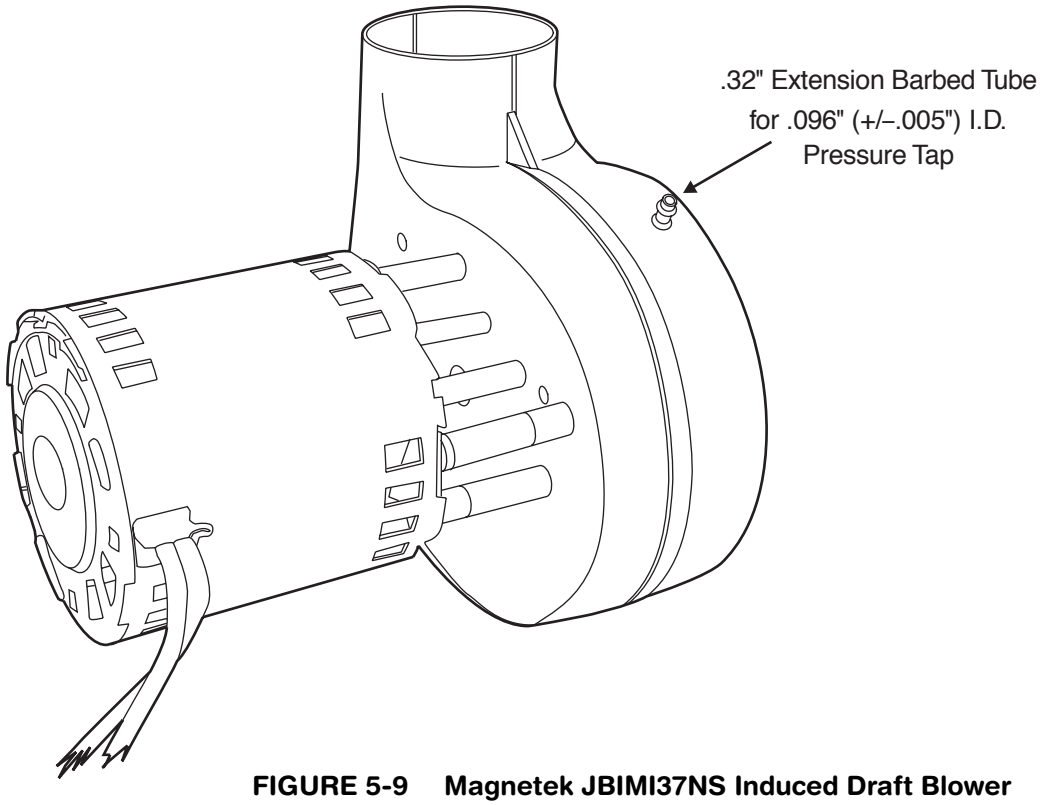


FIGURE 5-9 Magnetek JBIMI37NS Induced Draft Blower

Burners (*34)

The Magic-Pak HW and HWC units covered in this manual use a burner design called the “inshot” type. No adjustment is provided for primary or secondary air. For best operation, keep the burners clean. Use the correct orifice size and adjust the manifold pressure for the fuel being used and the operating altitude.

Burner Specifications
Manufacturer: Beckett Gas
Model: AR086
Armstrong P/N 41948-001
Burner Dimensions: 4.50" x 2.48"

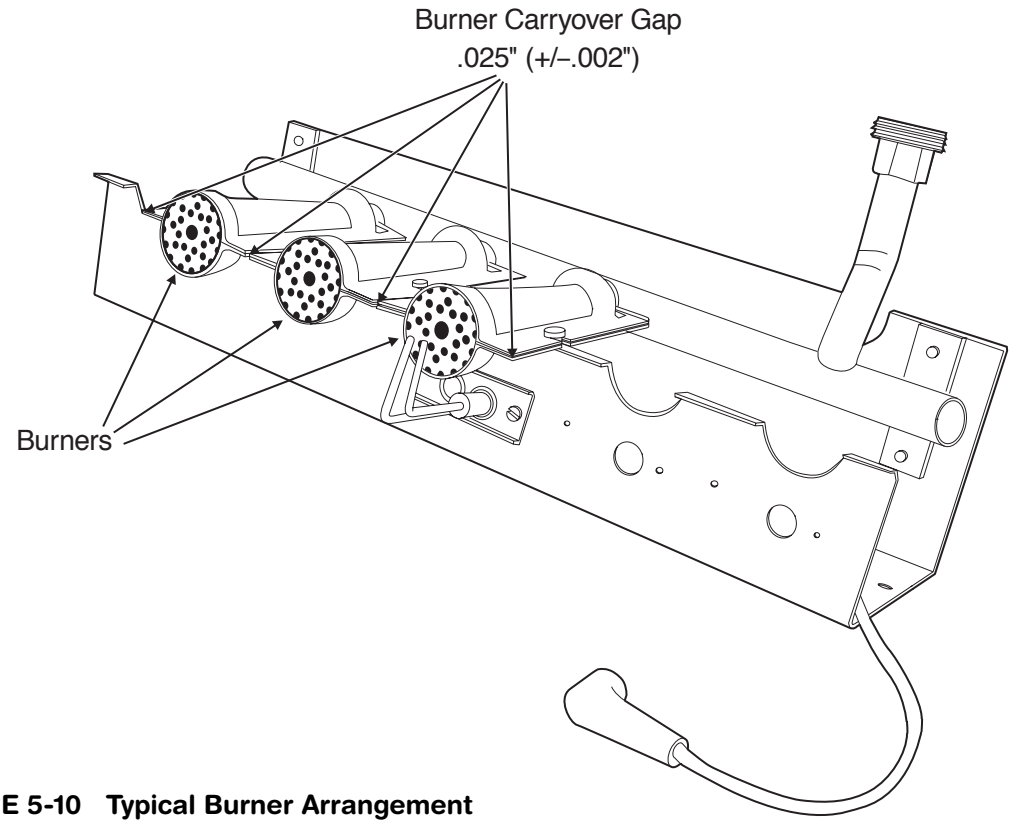


FIGURE 5-10 Typical Burner Arrangement

Flame Carryover Problems

During ignition, the flame must travel uninterrupted from one burner to the rest of the burners.

Causes:

- Carryover “wing” on burner is plugged with insects or debris
- Improper gap setting on wings
- Incorrect gas pressure

The burner wing has a specified gap (typically 0.025" +/– .002"), which must carry gas and a small flame to allow flame carryover from one burner to the next. Check the gap settings on all burners.

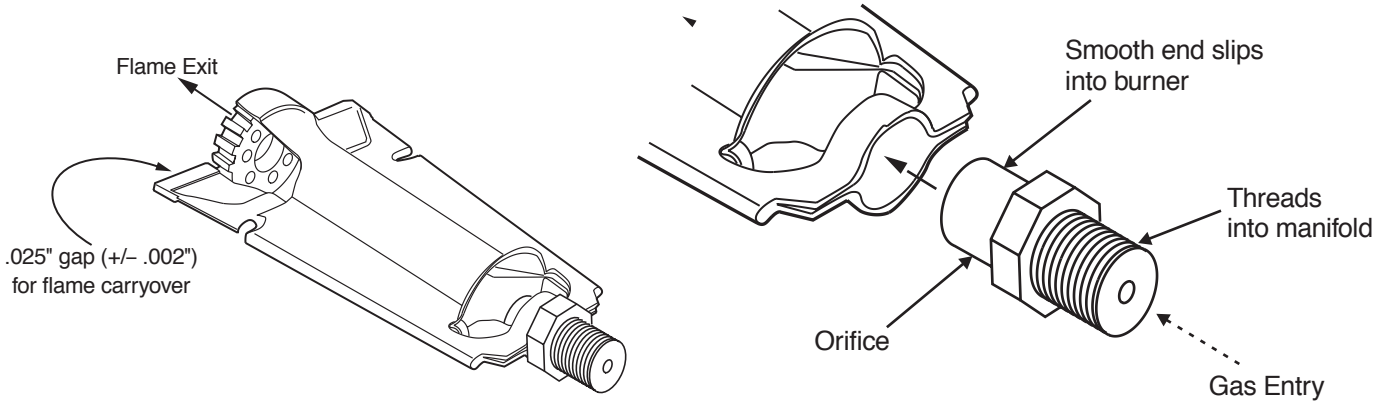


FIGURE 5-11 Inshot Burners

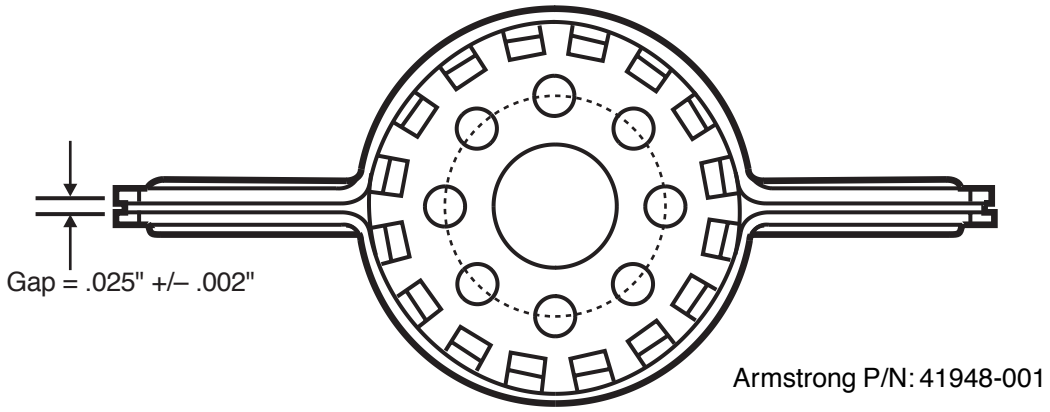


FIGURE 5-12 Burner Wing Gap

Manifold Orifices (*13)

TABLE 5-3 Manifold Orifice Specifications

Armstrong P/N	Hole Diameter Drill Size	Hole Diameter (inches)
39030B001	Blank	Blank
39030B002	51	.0670
39030B003	52	.0635
39030B004	53	.0595
39030B005	54	.0550
39030B006	61	.0390
39030B007	52	.0380
39030B008	63	.0370
39030B009	44	.0860
39030B010	47	.0785
39030B011	55	.0520
39030B012	56	.0465
39030B013	65	.0350
39030B014	64	.0360
39030B015	37	.1040
39030B016	41	.0960
39030B017	40	.0980
39030B018	43	.0890
39030B019	42	.0935

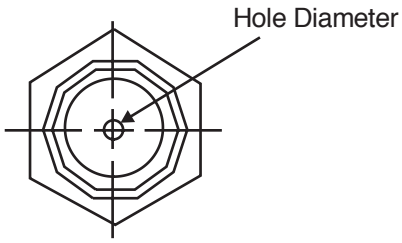


FIGURE 5-13 Manifold Orifice

Contactor (*278)

Contactor Specifications
Manufacturer: Honeywell
Model: R8242A-1008
Armstrong P/N 7535C001
Single-phase, Single-pole, 25 F.L.A., 125 L.R.A
Coil: 24VAC, 50/60 Hz
Line Voltage: 240/277
Coil Resistance at 70°F: 8 - 10 ohms

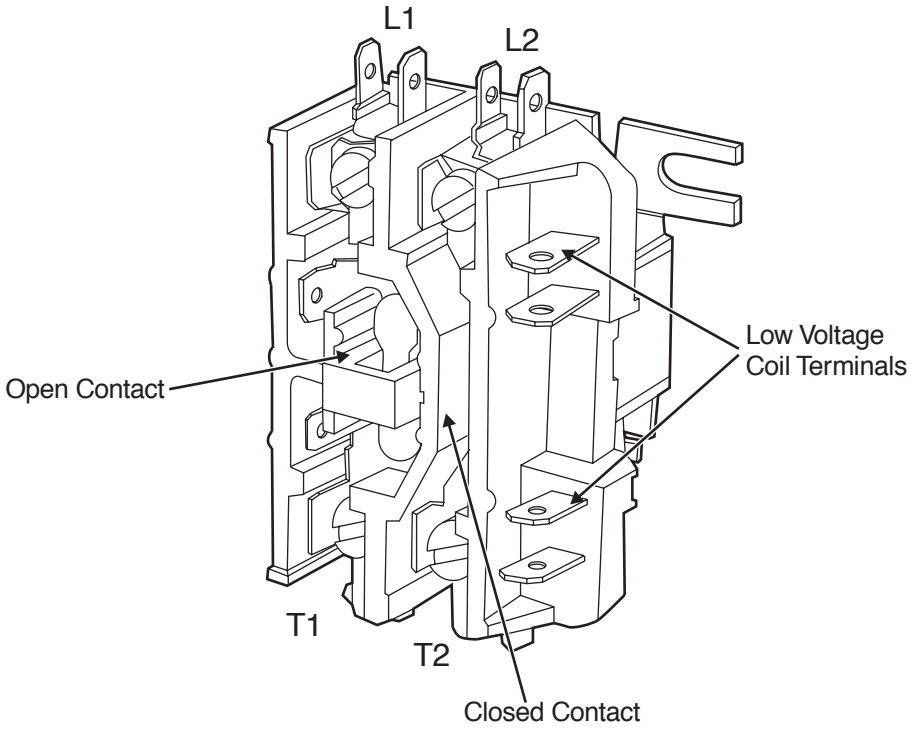


FIGURE 5-14 Honeywell Contactor Model R8242A-1008

Main (High) Limit Switch (*52)

A Normally Closed control that opens if abnormally high circulating air temperatures occur. It is an automatic reset control.

Note: Several different main limit switches are used. **Refer to the parts list for the correct limit switch.**

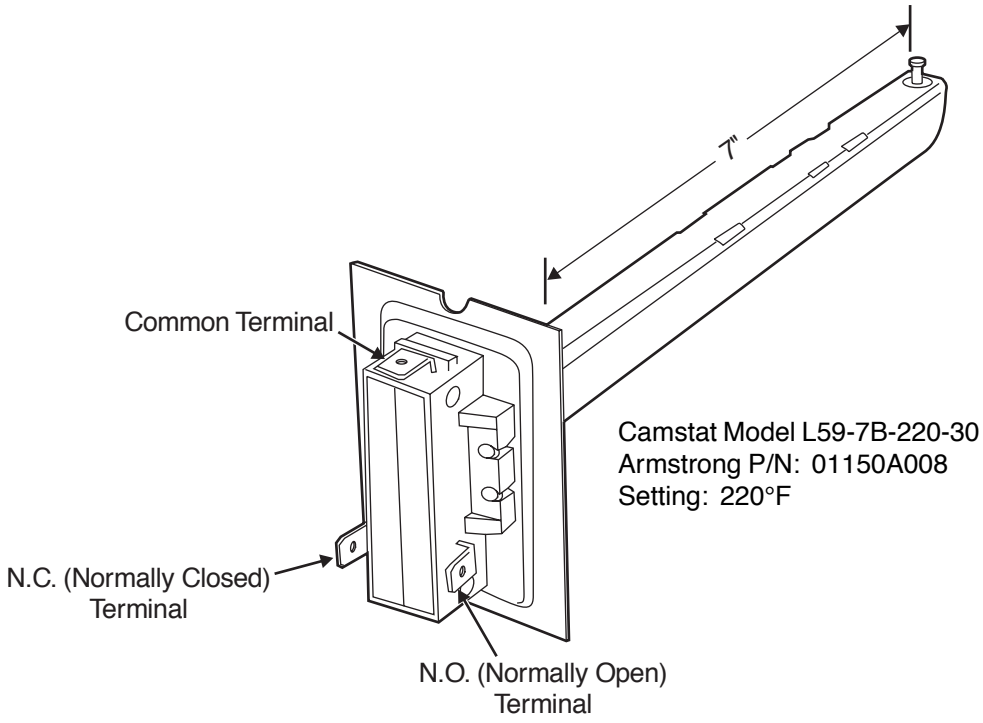


FIGURE 5-15 Camstat Main Limit Switch

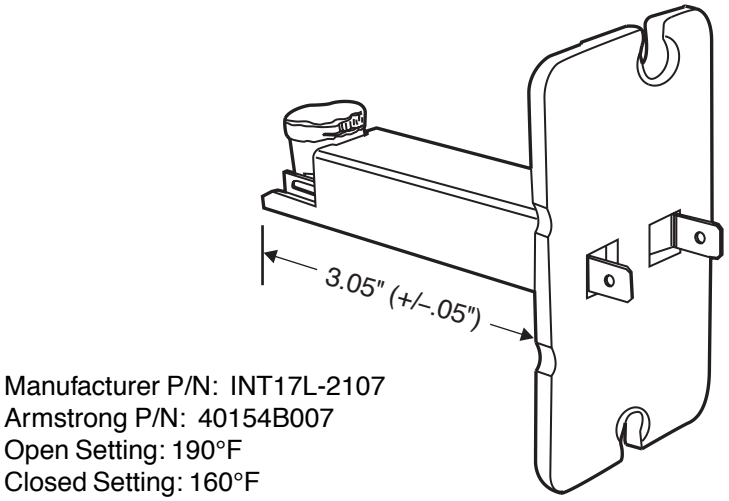
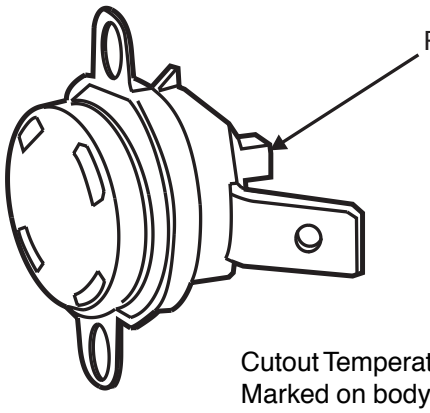


FIGURE 5-16 Main Limit Switch

Flame Rollout Switch (*55)

A Normally Closed switch that opens when abnormal temperatures occur in the burner area, caused by a restricted heat exchanger, causing main burner flame to “roll out” into the vestibule area.

To reset the switch, push the button on top. The button is a different color from the body.



Cutout Temperature:
Marked on body of switch
Nominal Switch Contact Rating:
15 A @ 120VAC

FIGURE 5-17 Flame Rollout Switch

Pressure Switch (*57)

These are Normally Open switches that react to a difference in pressure on an internal diaphragm. It will not allow ignition to start if the induced draft blower cannot produce sufficient negative pressure relative to atmospheric pressure or pressure in a sealed burner box. Its electrical contacts will open in reaction to inadequate negative pressure resulting from excessive venting system restriction or a failed induced draft blower, thus providing protection from a change in safe, stable furnace operation.

The Armstrong part number is stamped on the body of the switch. A label on the switch carries the manufacturer's model number. Always verify the proper switch number from the parts list.

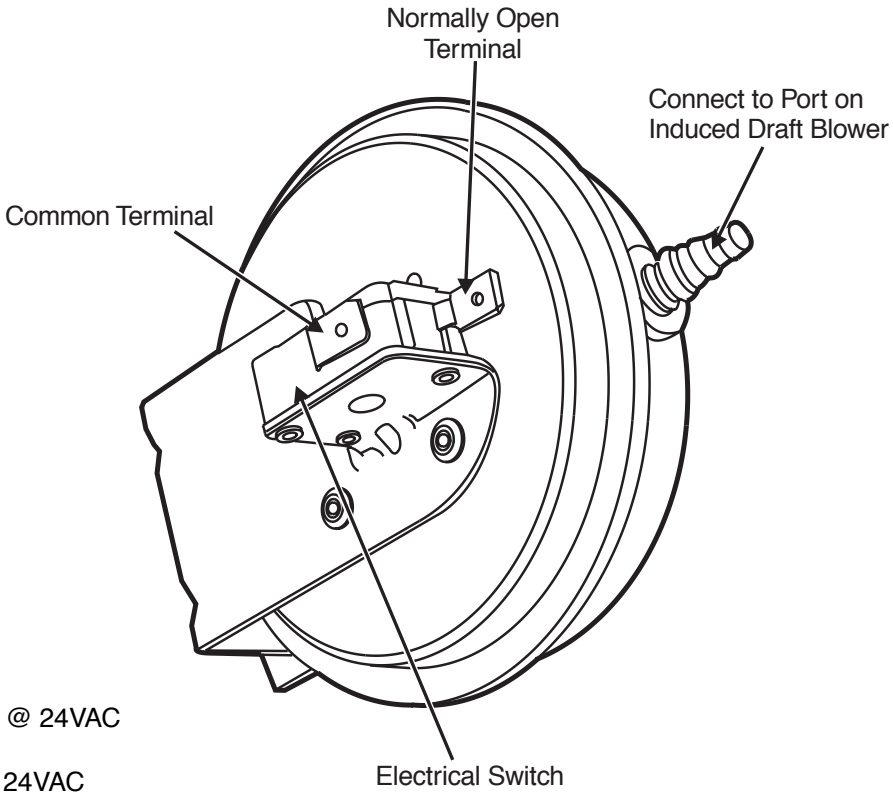


FIGURE 5-18 Pressure Switch

Pressure Switch Specifications
Manufacturer: Tridelta Industries
Electrical Rating:
SPDT Elec. Load: 28 VA Pilot Duty @ 24VAC
3 FLA, 18 LRA @ 24VAC
SPST Elec. Load: 5 A Resistive @ 24VAC
Electrical Switch: Single Pole, Normally Open, Snap Acting Contacts
Electrical Connectors: Common (C), Normally Open (NO) 1/4" x .032" thick quick connect terminals
Maximum Pressure: 3" W.C.
Operating Temperature Range: – 40° to 190°F
Sample Line Connector: Negative; barb type for use with 3/16" or 1/4" I.D. tubing with .016" +/– .004" bleed hole

TABLE 5-4 Pressure Switches

Armstrong P/N	Vendor	Model Number	Switch Opens (inches W.C.)	Color Code
41862-001	Tridelta Industries	FS6080A-1889	.40	Red
41862-002	Tridelta Industries	FS6080A-1891	.27	Green
41862-003	Tridelta Industries	FS6080A-1890	.45	White
44819-001	Tridelta Industries	PPS10090-2614	.25 +/– .05	Purple
44819-002	Tridelta Industries	PPS10090-2615	.35 +/– .05	Blue
44819-003	Tridelta Industries	PPS10090-2616	.45 +/– .05	Pink
44819-004	Tridelta Industries	PPS10090-2617	.55 +/– .05	Red
44819-005	Tridelta Industries	PPS10090-2618	.60 +/– .06	Green
44819-006	Tridelta Industries	PPS10090-2619	.70 +/– .06	White
44819-007	Tridelta Industries	PPS10090-2620	.80 +/– .07	Gray
44819-008	Tridelta Industries	PPS10090-2621	.50+/– .05	Red
44819-009	Tridelta Industries	PPS10090-2622	.30 +/– .05	Orange
44819-010	Tridelta Industries	PPS10090-2623	.10 +/– .05	Yellow
44819-011	Tridelta Industries	PPS10090-2624	.40 +/– .05	Light Blue
44819-012	Tridelta Industries	PPS10090-2625	.65 +/– .05	Brown

Pressure Switch Problems

The negative pressure developed in the combustion chamber is directly related to airflow. During furnace operation, the switch will react to conditions that reduce airflow, such as: blocked or restricted intake (combustion air piping), blockage of vent (flue) piping, blockage of the condensate drain piping, plugged pressure tap ports, leaking hoses or a failure of the induced draft blower motor.

If the pressure switch has already been replaced and problems are still being experienced, follow the procedure, Checking Pressure Switch Operation (found on page 5-24).

If the measured static pressure reading does not meet the switch specifications, check these items:

1. Pressure switch hose/tubing for cracks or loose connections
2. Induced draft blower wheel for corrosion or loose blades
3. Induced draft blower for tight bearings or loose inducer wheel

The measured static pressure reading should be compared to the pressure switch specifications. If the measured static pressure meets or exceeds the specifications and switch contacts will not transfer, check the following items:

- Switch out of calibration
- Defective pressure switch
- Moisture in pressure switch tubing
- Incorrect switch installed

⚠ WARNING

DO NOT try to repair a pressure switch. Use an identical replacement. The use of an improperly repaired or malfunctioning pressure switch could result in property damage, personal injury or death.

⚠ WARNING

Never try to adjust a pressure switch or jumper the switch to allow the furnace to operate. Doing so could allow the furnace to operate under hazardous conditions, potentially causing property damage, personal injury or death.

Blocked Intake

Blocked intake is any condition that blocks or restricts the flow of intake (combustion) air to a point where the pressure fall reaches the calibrated open setting of the pressure switch.

Potential Causes:

- Rodents
- Spiders
- Nest building in the intake opening
- Debris or trash that has been pulled into the intake opening

Symptoms:

- Excessive negative pressure in the burner box area. The furnace cycles on and off quite frequently, typically within 60 seconds or so.
- Inability of unit to stay on for a complete call for heat.

For a blocked intake or blocked flue, connect the incline manometer as shown on in Figure 5-20 on page 5-27 for the specific model groups.

Blocked Flue

Blocked flue is any condition that blocks or restricts the flue (vent) pipe to a point where the pressure fall reaches the calibrated open setting of the pressure switch.

Potential Causes:

- Rodents
- Spiders
- Nest building in the flue pipe
- Outlet screens with excessive restriction
- High wind conditions exceeding 40 mph

Symptoms:

- Low negative pressure on the induced draft (combustion) blower. The unit cycles on and off quite frequently, typically coming back on within 60 seconds.
- Inability of unit to stay on for a complete call for heat.

Units cycling on pressure switch re-ignite sooner than a main limit switch can reset.

Tip: With all wiring connected and unit running, use your volt meter across the pressure switch terminals. No voltage reading = switch closed. Voltage present = switch open.

Checking Pressure Switch Operation

It is easy to check a pressure switch as it operates within the overall system. These test procedures make it possible to pinpoint the opening and closing actions of the pressure switch.

⚠ WARNING

DO NOT try to repair a pressure switch. Use an identical replacement. The use of an improperly repaired or malfunctioning pressure switch could result in property damage, personal injury or death.

⚠ WARNING

Never try to adjust a pressure switch or jumper the switch to allow the furnace to operate. Doing so could allow the furnace to operate under hazardous conditions, potentially causing property damage, personal injury or death.

What Is Needed for the Tests

- A good general-purpose incline manometer with a range of 0 - 3" W.C. (Dwyer 1227 or equivalent).
- Use the parts list to verify that the proper pressure switch is installed in the unit. Look for the Armstrong part number stamped on the metal housing. A label on the housing shows the manufacturer's model number.
- Find the Switch Open value for the pressure switch in Table 5-4 on page 22.
- Assorted lengths of plastic tubing and tees to make the connections to the manometer including the following: 1/8" I.D. high temperature silicone tubing, 1/4" I.D. vinyl tubing, 1/8" tee and 1/4" tee.

Note: For each procedure, the schematic shows the original factory tubing with solid black lines. The tees to be installed for pressure sampling are shown within the dashed circles.

Terminology

Terms related to pressure switch operation and incline manometer testing are shown below in Figure 5-19.

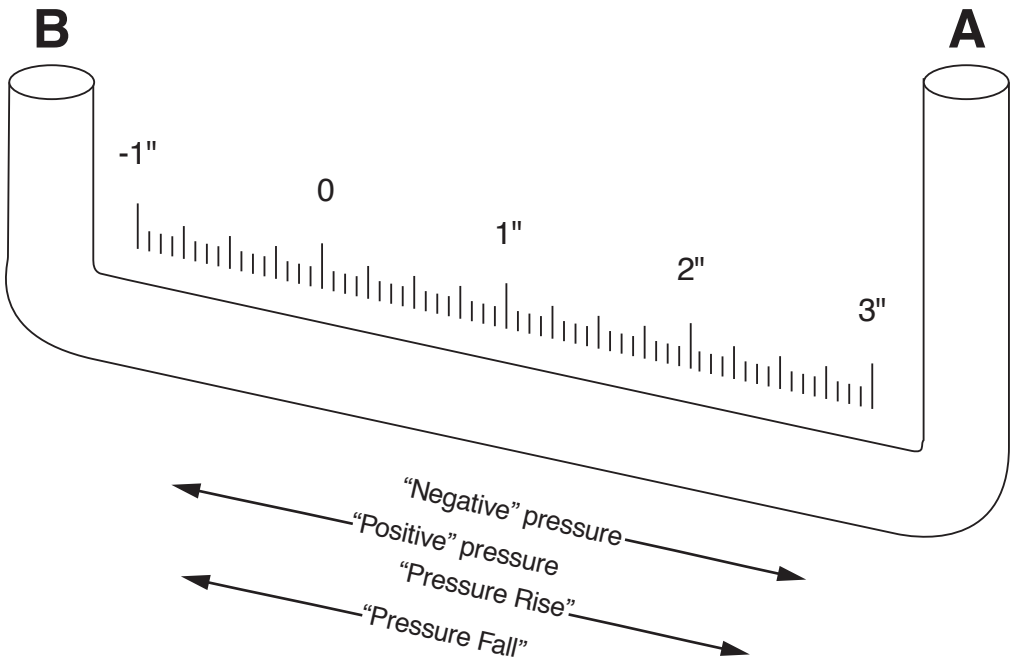


FIGURE 5-19 Incline Manometer

A Word About the "Switch Closed" Value

Switch Closed is the pressure at which the contacts close as the induced draft blower comes up to speed. It is calculated by adding – 0.1" W.C. to the sum of the switch's Open value and its upper tolerance.

For example, for a Armstrong P/N 44819-005 switch:

– 0.1" + (– .60" + – .06") = – 0.76" W.C.

On a system operating correctly, it is likely that the manometer reading will go to a value that is more than enough to close the switch.

A Word About the "Switch Open" Value

Switch Open is the pressure at which the contacts open as the negative pressure decreases (pressure fall).

Procedure for Checking Pressure Switch

1. Position the manometer so it can be watched easily during testing. Balance and zero the manometer according to the manufacturer's instructions.

2. Insert a test line with tee between the pressure switch and blower. One piece of the tubing connects the pressure switch to the fitting at the back side of the induced draft blower housing. Connect the tee to the manometer as shown in Figure 5-20.

   Note: Always keep the pressure switch in the circuit when measuring. Switches incorporate internal bleeds to keep moisture out of the pressure switch line.

3. Using Table 5-4 on page 5-22 and the formula provided above, calculate the close value for the switch being worked with.

4. Start the furnace to call for heat. Observe the manometer reading increase (increasing pressure rise) as the induced draft blower comes up to speed. Ignition should start at a reading that is approximately the Close value that was earlier determined for the specific switch in Step 3.

5. With the furnace running in the full heat cycle, observe the pressure reading. Note this reading and compare it to the Open value shown for that switch in Table 5-4 on page 5-22.

Using Armstrong P/N 44819-005 pressure switch for an example, the reading on pressure fall when the contacts open can be between – 0.54" W.C. and – 0.66" W.C.

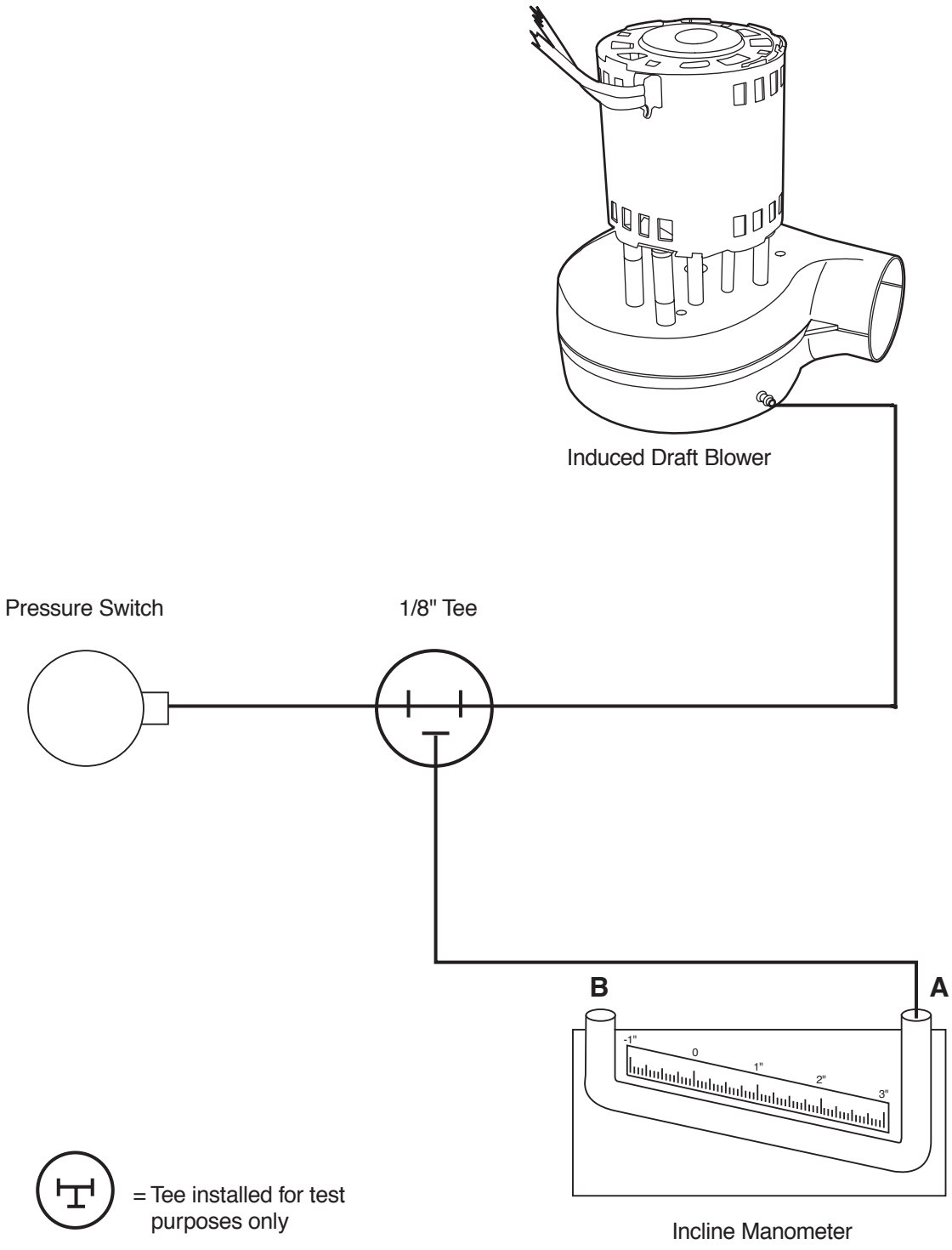


FIGURE 5-20 Incline Manometer Connection

Compressors (*262)

TABLE 5-5 Compressor Specifications (continued on next page)

Model	Compressor Type	Compressor Model	B/M (Tecumseh Only)	Armstrong P/N	
(All) HWC123-1	Tecumseh Rotary	RKA5512EXD	RK147-ET-002-A4	39008C001	1
(All) HWC183-1	Tecumseh Recriprocating	AWF5517EXN	AW501-ET-089-A4	35125C009	2
(All) HWC243-1	Copeland Scroll	ZR24KC PFV-130	--	42811-005	3
(All) HWC303-1	Copeland Scroll	ZR28KC PFV-130	--	42811-006	4
(All) HWC182-11, -9, -7, -6	Tecumseh Recriprocating	AWF5517EXN	AW501-ET-089-A4	35125C009	5
(All) HWC242-11, -9	Copeland Scroll	ZR24KC PFV-130	--	42811-005	6
(All) HWC122-10, -8, -5, -4, -3, -1	Tecumseh Rotary	RKA5512EXD	RK147-ET-002-A4	39008C001	7
(All) HWC242-10, -8, -5, -4, -3, -1	Copeland Scroll	ZR23K1 PFV	--	35136C005	8
(All) HWC302-9	Copeland Scroll	ZR28KC PFV-130	--	42811-006	9
(All) HWC182-8, -5, -4, -3, -2	Tecumseh Rotary	RKA5518EXD	RK233-ET-009-A4	39008C002	10
(All) HWC302-8, -5, -4, -3, -1	Copeland Scroll	ZR28K1 PFV	--	35136C001	11
(All) HWC182-1	Copeland Scroll	ZR18K1 PFV	--	35136C004	12

	Voltage	Phase	RLA	LRA	Run Cap.	Armstrong P/N	Winding Res. S/R	Oil Type	Oil Charge	Suction Line	Discharge Line
1	208/230	1		26.3	25/370	38514D002	N/A	Mineral 200 Viscosity	12 oz.	.50 (1/2)"	.315 (5/16)"
2	208/230	1		48.3	35/370	38514D004	N/A	Mineral 200 Viscosity	32 oz.	.753 (3/4)"	.378 (3/8)"
3	208/230	1	13.2	59.0	35/370	38514D004	2.45/1.17	Mineral 200 Viscosity	25 oz.	.75 (3/4)"	.50 (1/2)"
4	208/230	1	15.7	73.0	35/440	38514D010	2.74/.93	Mineral 200 Viscosity	38 oz.	.75 (3/4)"	.50 (1/2)"
5	208/230	1		48.3	35/370	38514D004	N/A	Mineral 200 Viscosity	32 oz.	.753 (3/4)"	.378 (3/8)"
6	208/230	1	13.2	59.0	35/370	38514D004	2.45/1.17	Mineral 200 Viscosity	25 oz.	.75 (3/4)"	.50 (1/2)"
7	208/230	1		26.3	25/370	38514D002	N/A	Mineral 200 Viscosity	12 oz.	.50 (1/2)"	.315 (5/16)"
8	208/230	1	12.9	62.5	30/370	38514D003	3.03/.98	Mineral 200 Viscosity	26 oz.	.75 (3/4)"	.50 (1/2)"
9	208/230	1	15.7	73.0	35/440	38514D010	2.74/.93	Mineral 200 Viscosity	38 oz.	.75 (3/4)"	.50 (1/2)"
10	208/230	1		45.0	25/370	38514D002	N/A	Mineral 200 Viscosity	12 oz.	.63 (5/8)"	.315 (5/16)"
11	208/230	1	15.0	76.0	35/370	38514D004	2.53/.77	Mineral 200 Viscosity	26 oz.	.75 (3/4)"	.50 (1/2)"
12	208/230	1	10.7	50.0	25/370	38514D002	4.91/1.29	Mineral 200 Viscosity	24 oz.	.75 (3/4)"	.50 (1/2)"

Manufacturer: Tecumseh

TABLE 5-6 Tecumseh Rotary Compressor Specifications

Armstrong P/N	Supplier Model Number	Supplier B/M Number	A	B	C	D	Cap. Req'd MDF-VAC	Oil (oz.)
39008C001	RKA5512EXD	RK147ET-002-A4	10.62	10.06	.500	8.56	25/370	12
39008C002	RKA5518EXD	RK233ET-009-A4	11.50	10.94	.630	8.78	25/370	12

All measurements in inches unless otherwise specified.

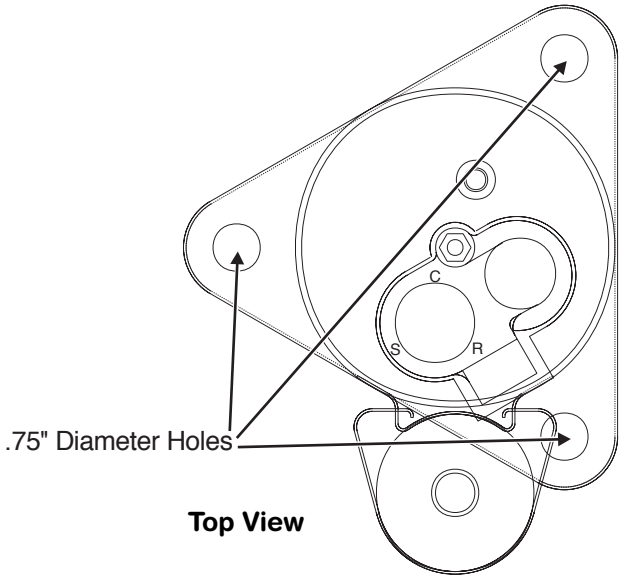
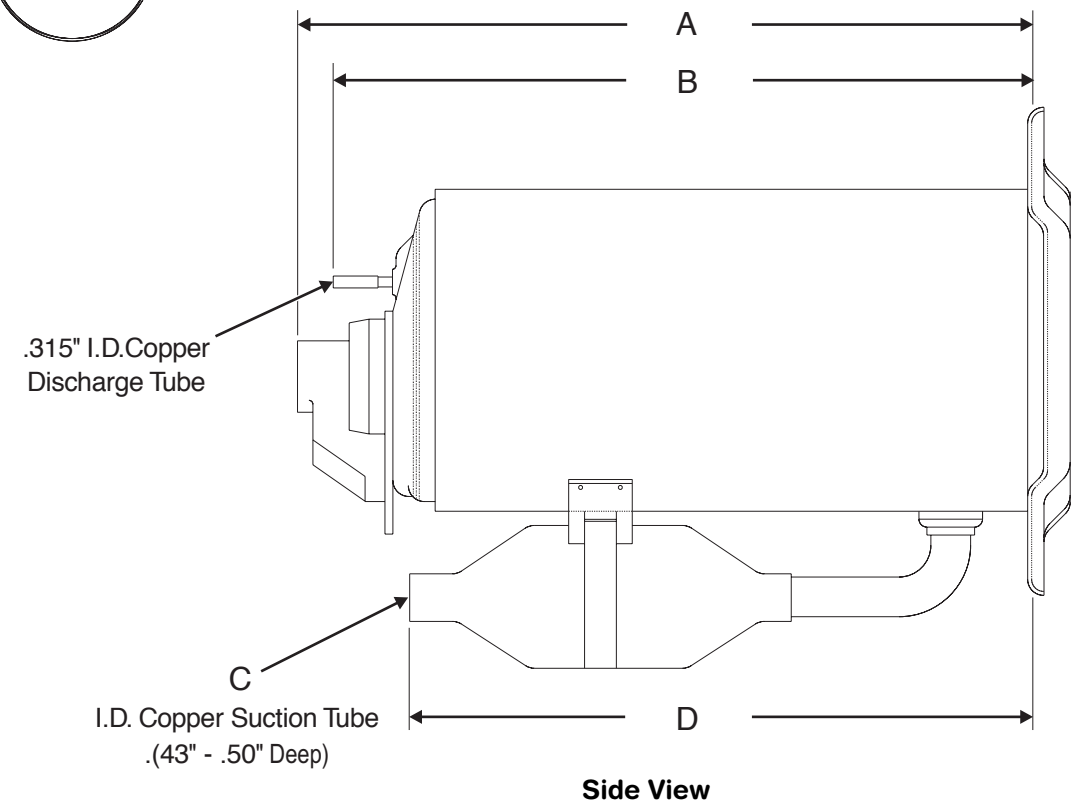


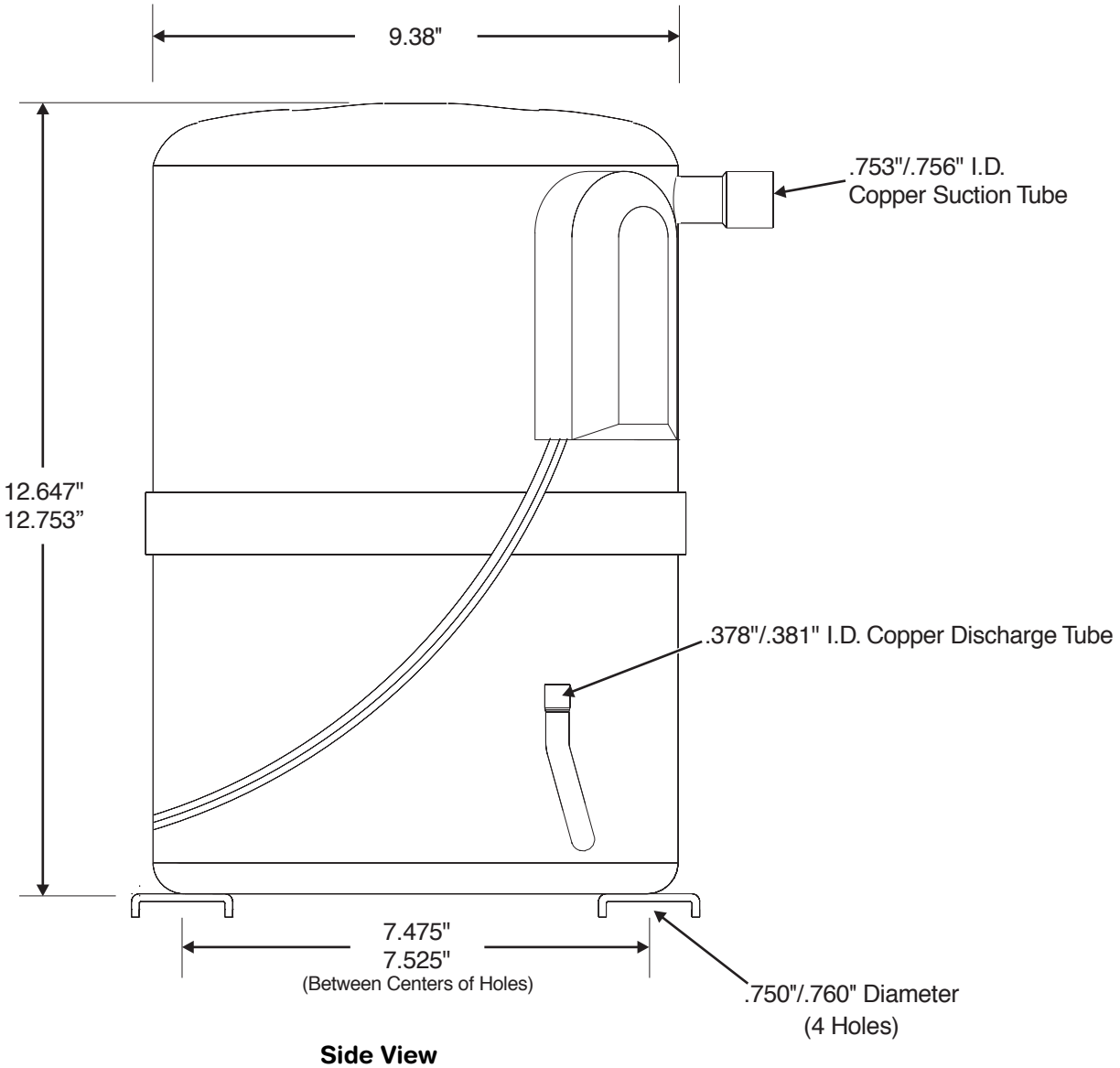
FIGURE 5-21 Tecumseh Rotary Compressor



Manufacturer: Tecumseh

TABLE 5-7 Tecumseh Reciprocating Compressor Specifications

Armstrong P/N	Supplier Model Number	Supplier B/M Number	Voltage	Hz.	Crankcase Heater	L.R.A.	P.H.	Cap. Req'd
35125C009	AWF5517EXN	AW501ET-089-A4	208/230	60	No	48.3	1	35 MFD @ 370V



Side View

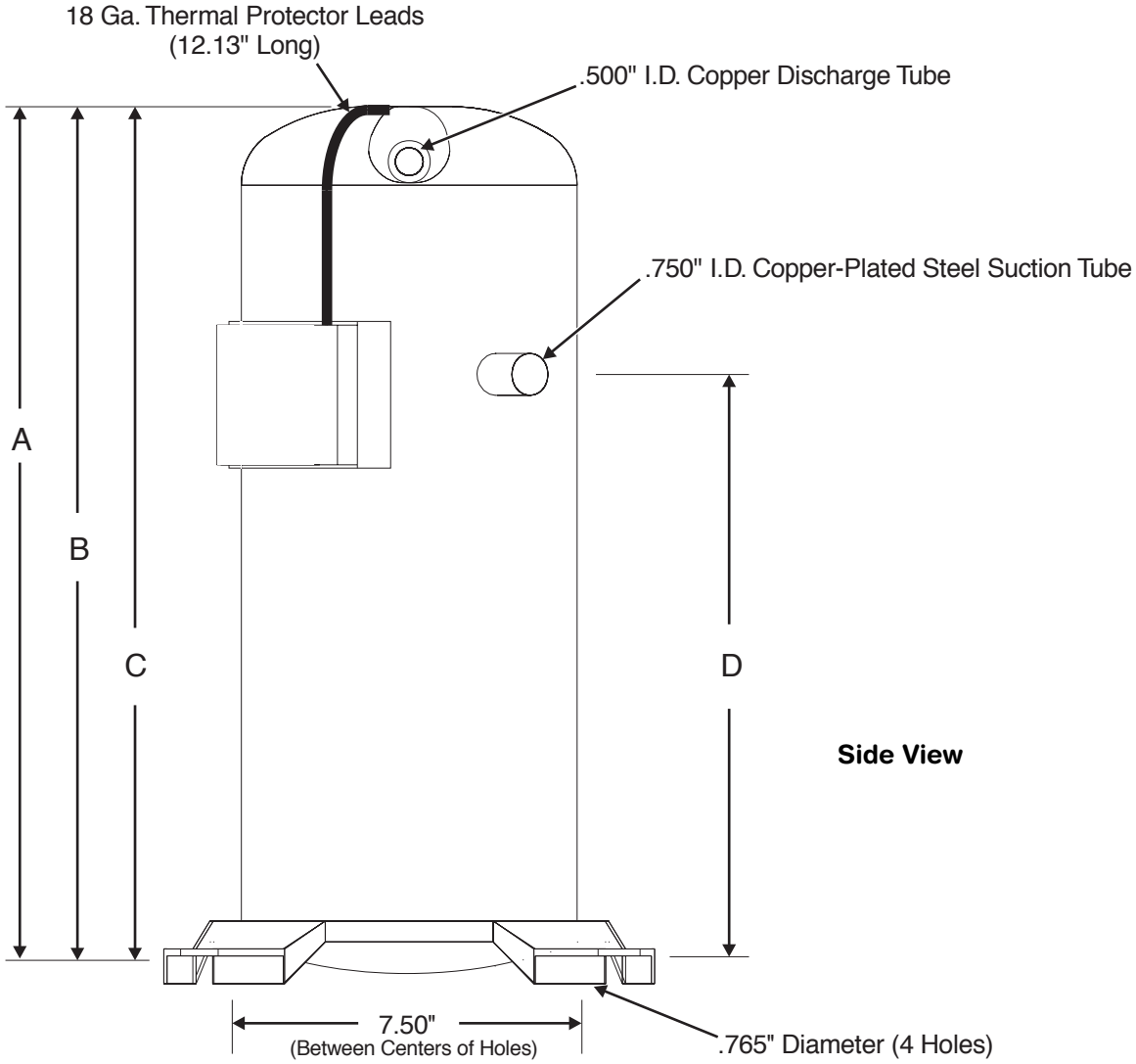
FIGURE 5-22 Tecumseh Reciprocating Compressor

Manufacturer: Copeland

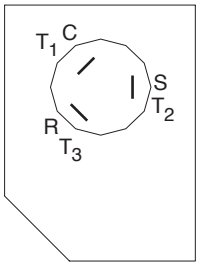
TABLE 5-8 Copeland Compressor Specifications

Armstrong P/N	Supplier Model Number	A	B	C	D	Cap. Req'd MFD-VAC
35136C001	ZR28K1-PFV	14.06/14.31	13.32	7.72/7.95	9.63	35/370

All measurements in inches unless otherwise specified.



Side View



Typical T'Box Layout

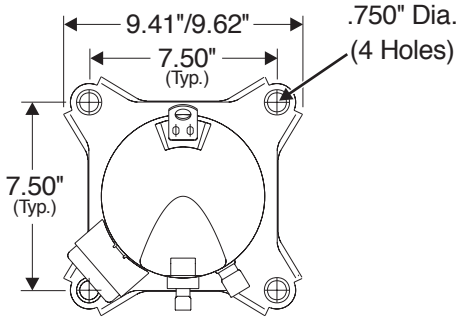
FIGURE 5-23 Copeland Compressor

Manufacturer: Copeland

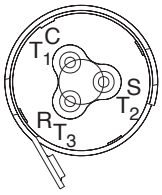
TABLE 5-9 Copeland Compressor Specifications

Armstrong P/N	Supplier Model Number	Rating Voltage-PH-Hz	A	B	C	D	E	Cap. Req'd MFD-VAC
42811-005	ZR24KC-PFV-130	208/230-1-60	14.21/14.45	13.32	9.63	8.53/8.77	5.47	35/370
42811-006	ZR28KC-PFV-130	208/230-1-60	14.21/14.45	13.32	9.63	7.97	6.52	35/370

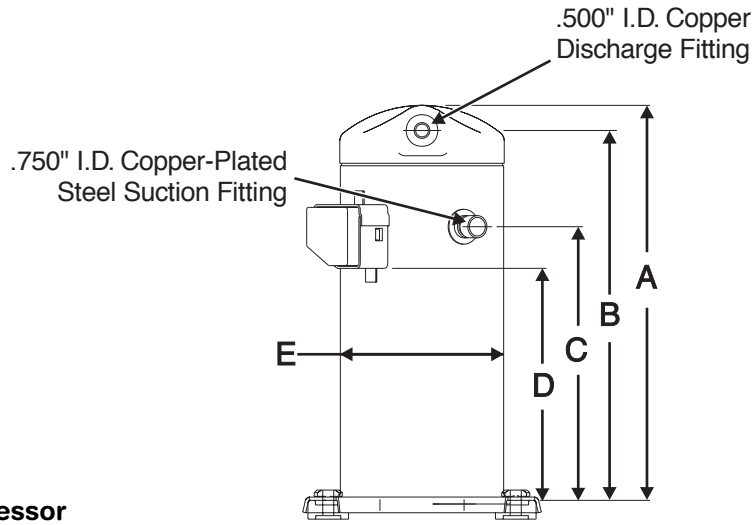
All measurements in inches unless otherwise specified.



Top View



Top View



Side View

FIGURE 5-24 Copeland Compressor

Drier-Filters (*301)

TABLE 5-10 Drier-Filter Specifications

Armstrong Part Number	Supplier	Supplier Part Number	A	B
39059B001	Spinco	100307-1	.108" / .111"	2
	Parker	032151-00		
39059B002	Spinco	100307-2	.114" / .117"	3
	Parker	032150-00		
39059B003	Spinco	100307-3	.108" / .111"	4
	Parker	032181-00		

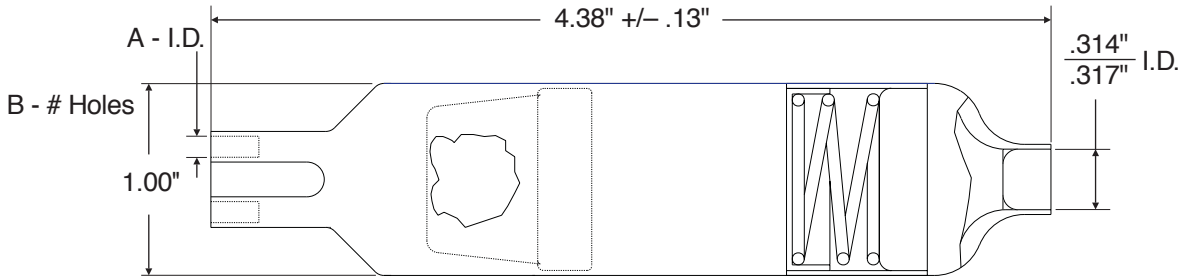


FIGURE 5-25 Drier-Filter

HWC Capillary Tubes (*256)

TABLE 5-11 HWC Capillary Tube Specification Tables*

Models	Assy. + Drier	Drier Only**	Cap. Tubes Only***	Ind. Cap. Tube	Cap. I.D.	Cap. O.D.	Cap. Length	# Tubes
123-1	43271-001	39059B001	43267-001	05302B001	0.054"	0.106"	35"	2
183-1	43271-002	39059B002	43267-002	05302B025	0.054"	0.106"	44"	3
243-1	43271-003	39059B002	43267-003	05302B024	0.059"	0.112"	46"	3
303-1	43375-001	39059B003	43281-001, 43280-001	05302B025	0.054"	0.106"	44"	4
122-10	43271-001	39059B001	43267-001	05302B001	0.054"	0.106"	35"	2
122-1 to -8	39058B001	39059B001	39102B001	05302B001	0.054"	0.106"	35"	2
182-1 to -9	39058B002	39059B002	39102B002	05302B025	0.054"	0.106"	44"	3
242-4 to -8	39058B003	39059B002	39102B003	05302B024	0.059"	0.112"	46"	3
242-9 to -11	43271-003	39059B002	43267-003	05302B024	0.059"	0.112"	46"	3
302-1 to -3	39057B001	39059B003	39103B001, 39298B001	05302B025	0.054"	0.106"	44"	4
302-4 to -8	40650-001	39059B003	40652-001, 40651-001	05302B025	0.054"	0.106"	44"	4
302-9	43375-001	39059B003	43281-001, 43280-001	05302B025	0.054"	0.106"	44"	4

* All part numbers provided are Armstrong part numbers.
** See page 5-34 for drier information.
*** See the figures beginning on page 5-36 for detailed drawings of the capillary tubes.

Notes:

- All bends 90° unless otherwise noted.
- Do not kink or flatten during forming.
- Tape tubes together with masking tape.

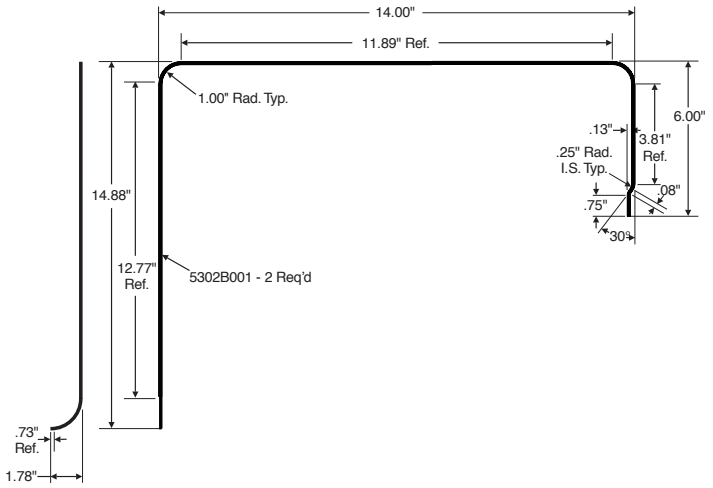


FIGURE 5-26 43267-001 Capillary Tubes

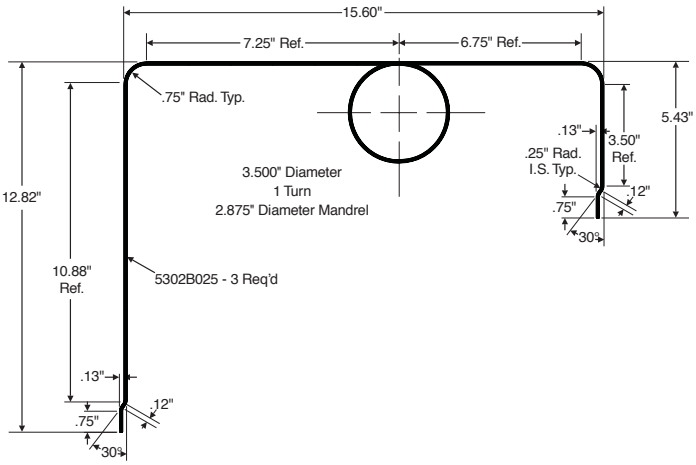


FIGURE 5-27 43267-002 Capillary Tubes

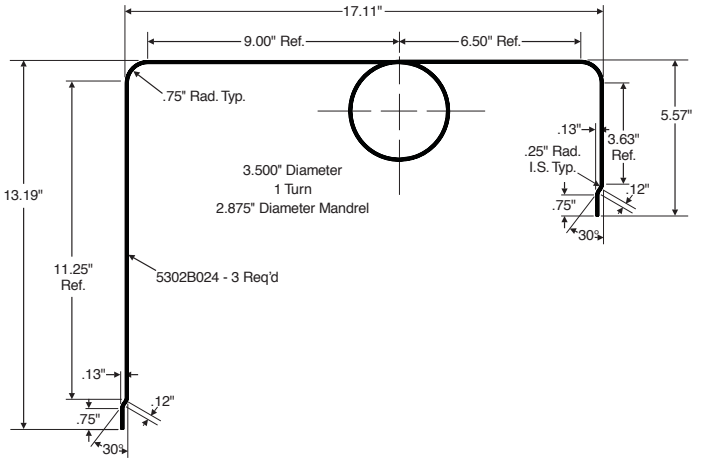


FIGURE 5-28 43267-003 Capillary Tubes

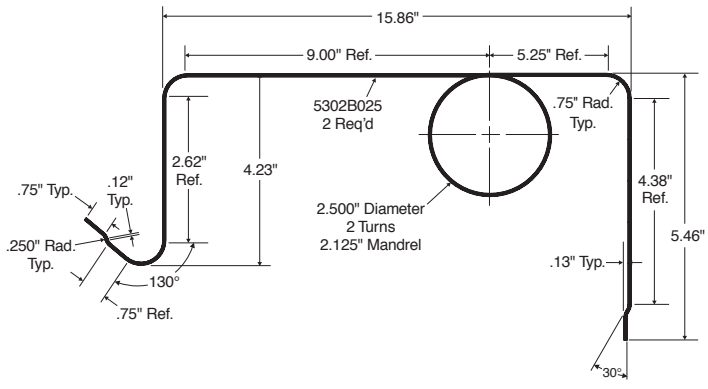


FIGURE 5-29 43280-001 Capillary Tubes

Notes:

- All bends 90° unless otherwise noted.
- Do not kink or flatten during forming.
- Tape tubes together with masking tape.

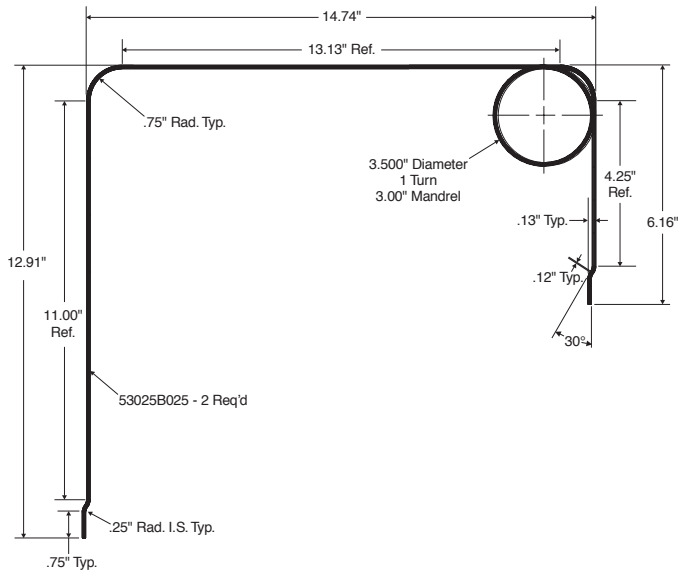


FIGURE 5-30 43281-001 Capillary Tubes

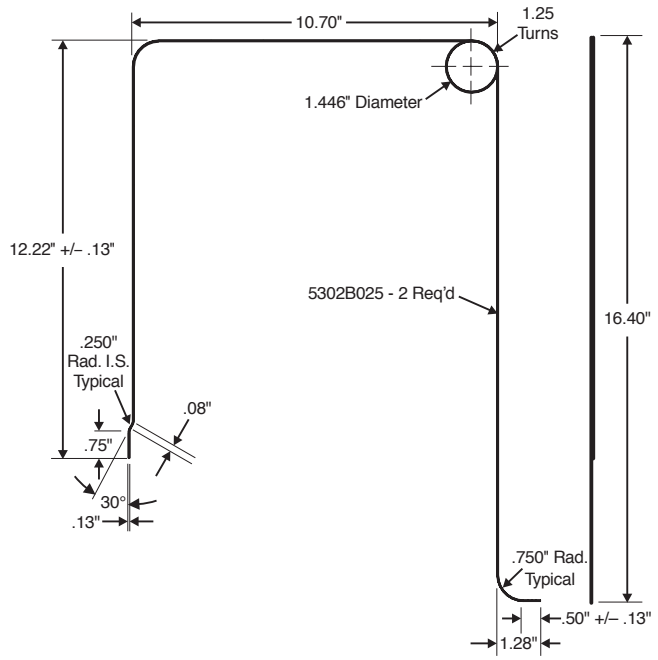


FIGURE 5-31 40651-001 Capillary Tubes

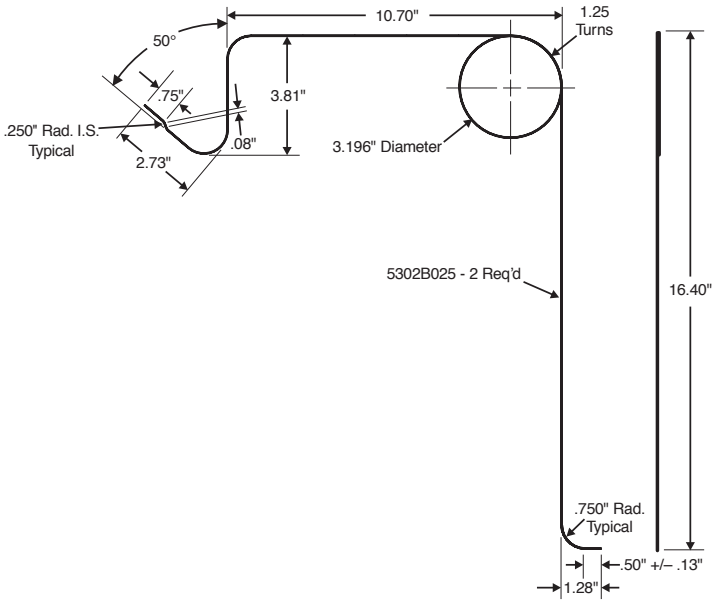


FIGURE 5-32 40652-001 Capillary Tubes

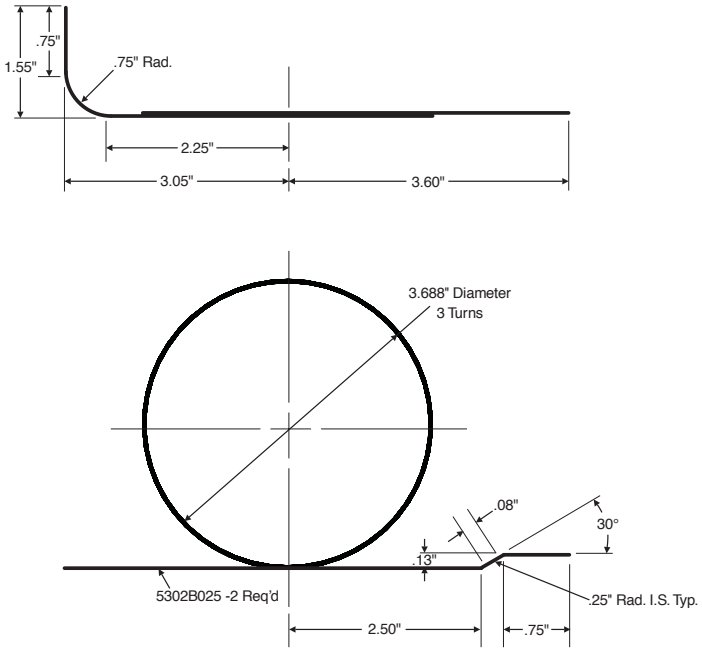


FIGURE 5-33 39103B001 Capillary Tubes

Notes:

- All bends 90° unless otherwise noted.
- Do not kink or flatten during forming.
- Tape tubes together with masking tape.

TABLE 5-12 39102B001 Specifications

Armstrong P/N	A	B	C	D
39102B001	3.530"	2	5302B001	2
39102B002	3.281"	3	5302B025	3
39102B003	3.500"	3	5302B024	3

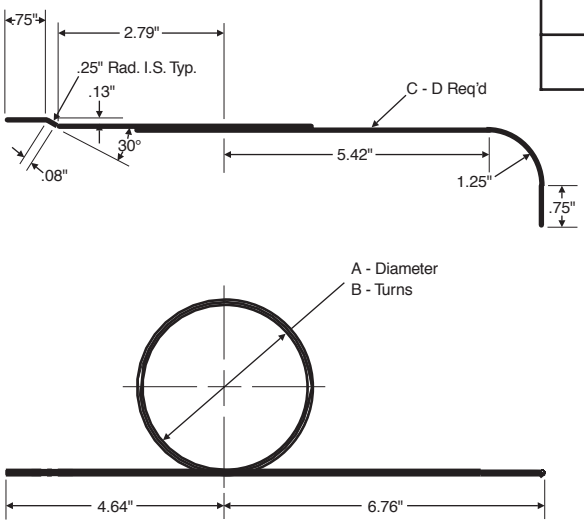


FIGURE 5-34 39102B001 Capillary Tubes

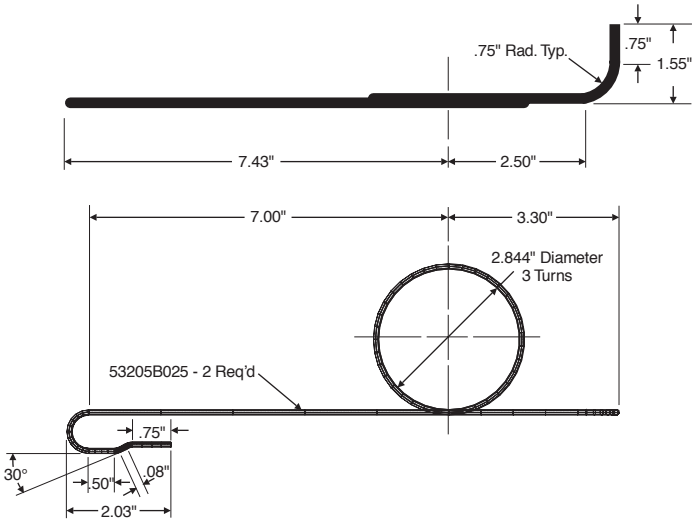


FIGURE 5-35 39298B001 Capillary Tubes

Capacitors (*271)

TABLE 5-13 Capacitor Ratings

Armstrong P/N	Rating	
	MFD	Volts
38514D001	20/5	370
38514D002	25/5	370
38514D003	30/5	370
38514D004	35/5	370
38514D005	40/5	370
38514D006	40/5	440
38514D007	40/7.5	440
38514D008	45/7.5	440
38514D009	35/7.5	440
38514D010	35/5	440
38514D011	45/5	370
38514D012	55/7.5	440
38514D013	60/7.5	370
38514D014	80/7.5	370
38514D015	45/5	440
38514D016	60/5	370
38514D017	80/5	370
38514D018	50/5	370
38514D019	50/7.5	440
38514D020	55/5	370
38514D021	70/5	370
38514D022	60/5	440

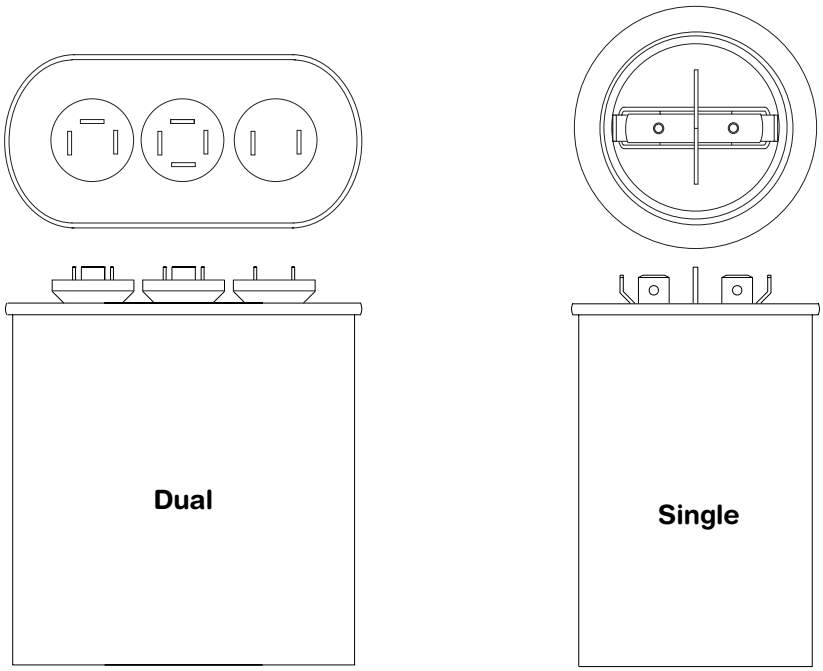


FIGURE 5-36 Capacitors

Evaporator Blower Motor - Indoor Blower (*69)

TABLE 5-14 Evaporator Blower Motor Specifications

Armstrong P/N	FLA (v/hz/ph)	RPM	# of Speeds	HP	Capacitor
39045B001	1.1 (208-230/60/1)	1000	3	1/6	4/370
39046B001	2.3 (208-230/60/1)	1120	3	1/3	7.5/370

Notes:

- FLA and capacitor ratings may vary. Always check FLA and capacitor ratings on the motor data plate.
- Motor diameter - 5.70", shaft size - .50", rotatin - CW lead end
- See parts list for correct selection of motor and capacitor.

Condenser Fan Motor - Outdoor Motor (*267)

TABLE 5-15 Condenser Fan Motor Specifications

Armstrong P/N	FLA (v/hz/ph)	RPM	# of Speeds	HP	Capacitor
39044B001	1.8 (208-230/60/1)	1075	1	1/4	5/370
39084B001	.9 (208-230/60/1)	1075	1	1/8	5/370
41282-001	.9 (208-230/60/1)	1075	1	1/8	5/370
41254-001	1.8 (208-230/60/1)	1075	1	1/4	5/370

Notes:

- FLA and capacitor ratings may vary. Always check FLA and capacitor ratings on the motor data plate.
- Motor diameter - 5.70", shaft size - .50", rotatin - CW lead end
- See parts list for correct selection of motor and capacitor.

Capacitors-Run (*86)

TABLE 5-16 Run Capacitor Ratings

Armstrong P/N	Rating	
	MFD	Volts
34001D001	4	370
34001D002	5	370
34001D003	6	370
34001D004	7.5	370
34001D005	8	370
34001D006	8	440
34001D007	10	370
34001D008	12.5	370
34001D009	15	440
34001D010	20	440
34001D011	25	370
34001D012	25	440
34001D013	30	440
34001D014	35	370
34001D015	35	440
34001D016	40	370
34001D017	40	440
34001D018	45	440
34001D024	15	370
34001D025	20	370
34001D026	30	370
34001D027	10	440
34001D028	20	370
34001D029	25	370
34001D030	30	370
34001D031	35	370
34001D032	40	370
34001D033	55	440

Fan Blades (*268)

Notes:

1. 26° Pitch, 5 Blades
2. Material: 24 Ga. Galvalume
3. Set Screw: (2) 5/16"-24 x 5/8" long square head, cup point

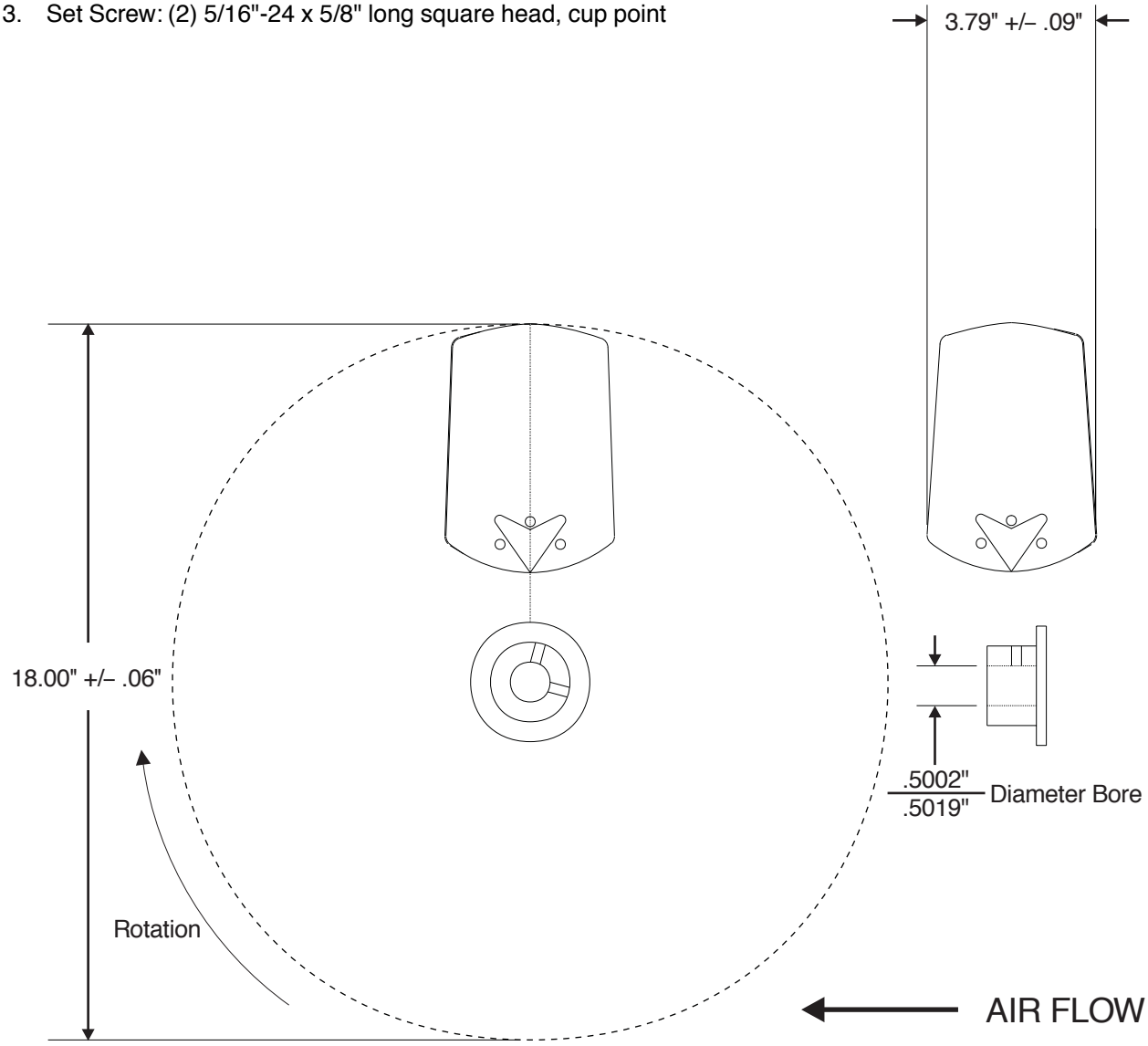


FIGURE 5-37 Fan Blades - HWC Models 122, 182 & 123, 183

Notes:

1. 24° Pitch, 3 Blades
2. Material: 24 Ga. Galvalume
3. Set Screw: (2) 5/16"-24 x 5/8" long square head, cup point

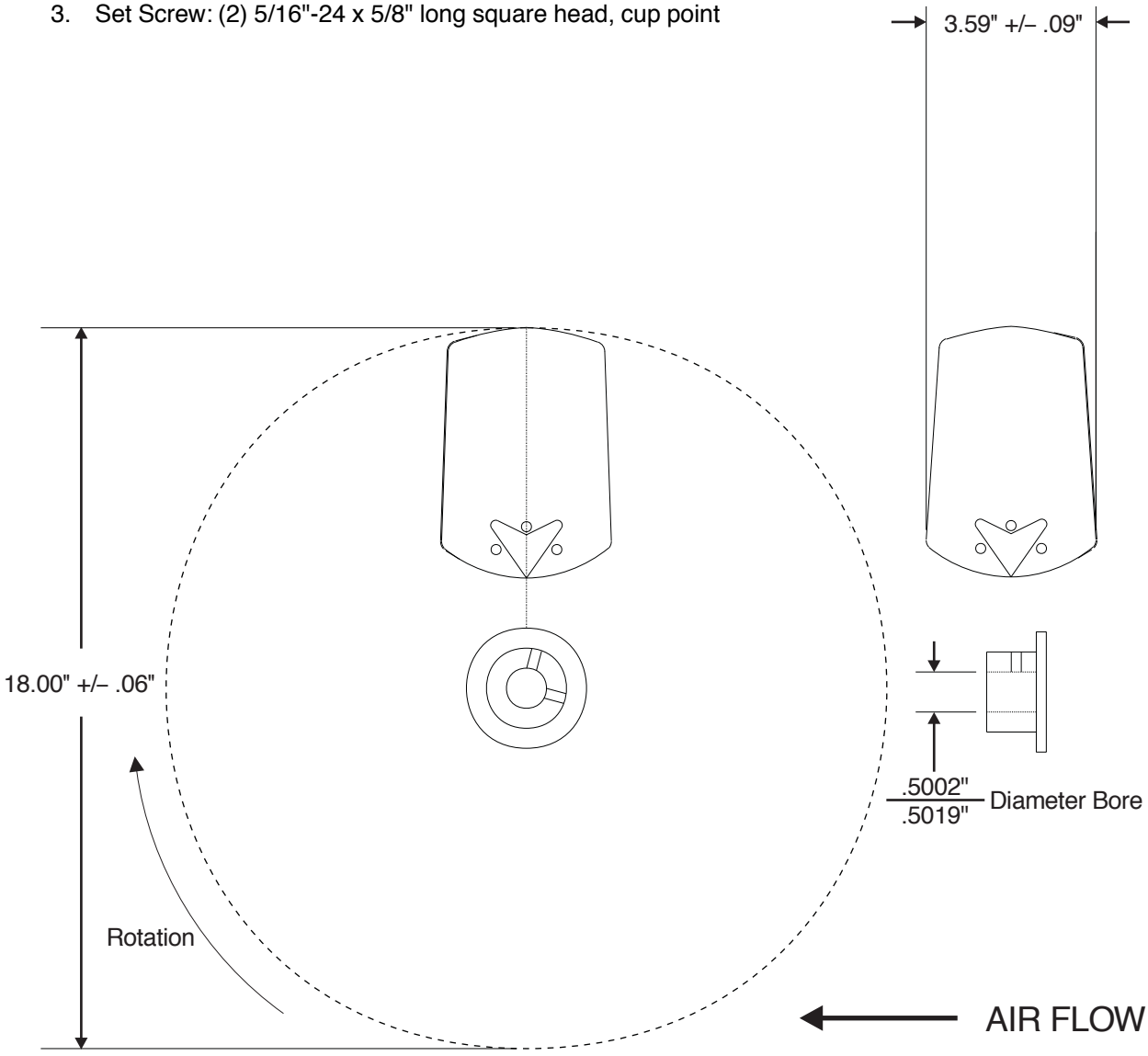
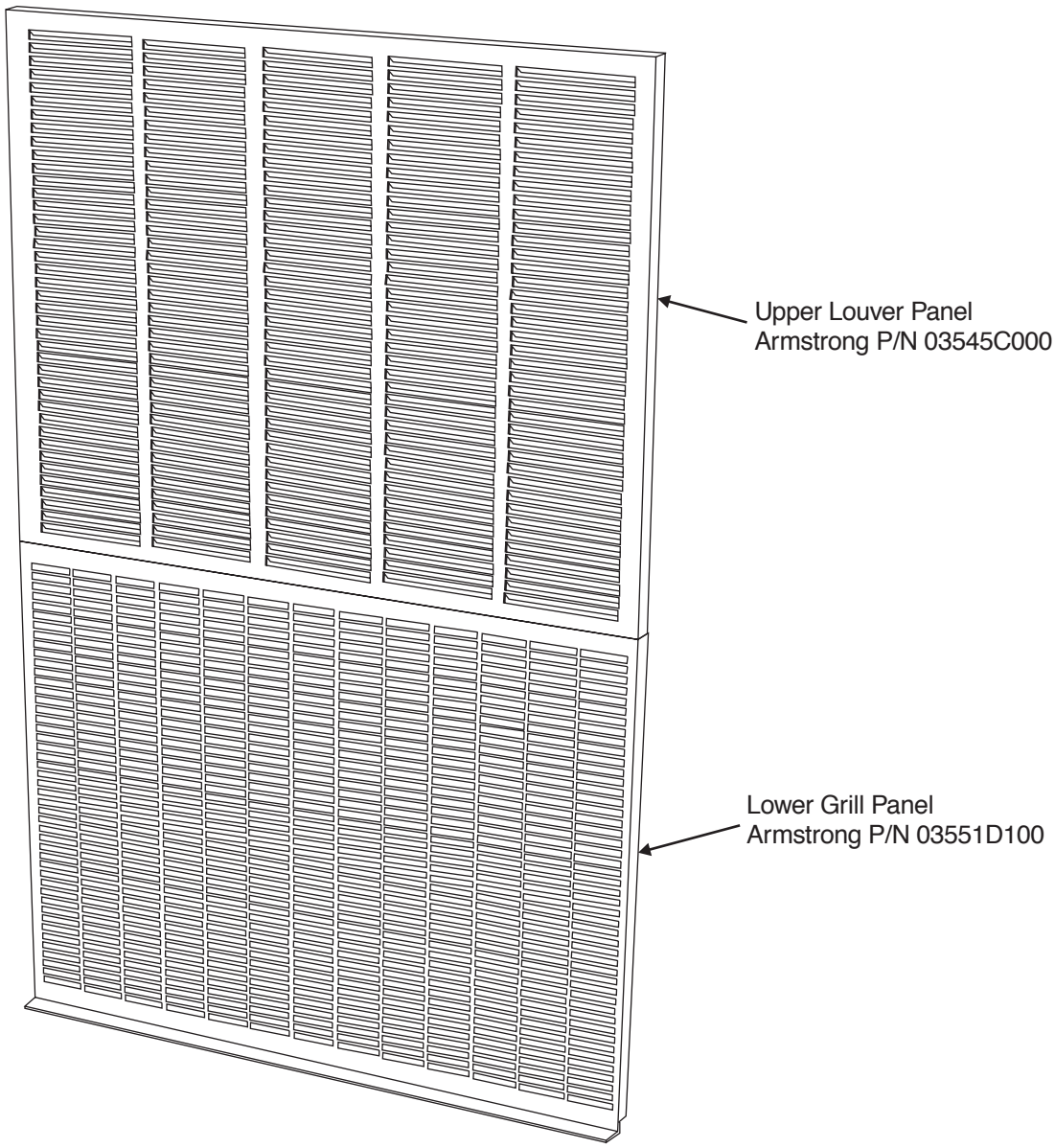


FIGURE 5-38 Fan Blades - HWC Models 242, 302 & 243, 303

Exterior Grill Panels (Not Listed in the Parts Lists)



Refer to the Component Location Illustrations section beginning on page 4-1 for further detail of the exterior grill panels and other panels.

FIGURE 5-39 Exterior Grill Panels

Section 6 - Installation

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Installation

IMPORTANT:
READ THIS FIRST

Information in this section is provided for the convenience of the service technician, for the purpose of evaluating the installation during service and troubleshooting. It does not take the place of the complete Armstrong Installation and Maintenance Instructions that are shipped with every Magic-Pak unit. If you are installing an Armstrong product and need a copy of the Installation and Maintenance Instructions, consult the table below and contact the Armstrong factory.

TABLE 6-1 HW/HWC Installation and Maintenance Instructions

Armstrong Publication P/N	Date	Description
45042B099	2/99	(All) HWC (123, 183, 243, 303)-1 & HW -9 w/UTech 1097 Board
39025G097	7/97	(All) HWC (122, 182, 243, 303) -11, -10, -9, -8, -7, -6, -5 & HW w/Fenwal 2461D Board
39025G094	7/94	(All) HWC (122, 182, 243, 303) -4, -3, -2, -1 & HW w/Fenwal 05-29 Board

Location

Magic-Pak HW/HWC units are designed and certified for through-the-wall installations only and must not be installed in any other type of application. The interior portions of the unit may be surrounded by a closet with clearances to combustible material held to 0" at sides, 2" top and 1" front and plenum. Adequate clearance must be provided to install the union and manual shutoff valve as well as providing accessibility to the field wiring junction box. Do not install directly on carpeting, tile or other combustible material other than wood flooring.

Magic-Pak HW/HWC units should be installed in an outside building wall that is clear of obstructions which might impede the free intake and discharge of condenser air.

A building wall should be no closer to an opposite building wall than 2' for every floor or Magic-Pak unit in a vertical array facing the wall. For example, a one-story building with a Magic-Pak HW/HWC unit should be a minimum of 2' from the wall facing the unit, and if the facing wall also has a Magic-Pak unit, the two walls should be at least 4' apart.

A six-story building with six Magic-Pak units in a vertical array should be at least 12' from the opposite building wall, and if that building wall also contains Magic-Pak units, the building should be at least 24' apart.

Buildings taller than six stories need not exceed the separation needed for six-story buildings.

If three or more adjacent walls form an air shaft with Magic-Pak HW/HWC units facing each other in each wall, the separation between opposite walls should be increased by 20%.

These “rule-of-thumb” dimensions are intended to minimize possibilities for recirculation of condenser air, or interaction between units. However, these numbers are not exact for every application, and other considerations might suggest that the designer consult the factory about desired alternatives.

The grille side of the unit may be flush with, or extend beyond, the face of the exterior wall, but should not be recessed more than 2" from the face of the building and should not be obstructed with trees, landscape materials or building structure.

There is no minimum clearance required on locating the unit to an interior corner of a building.

Due to the through-the-wall design, HW/HWC units will always have some portion of the unit cabinet extending into the interior of the building. The amount of cabinet exposed to the interior will depend on the wall thickness and the depth the unit is installed into the wall.

Often mechanical rooms and closets are designed into the building structure to accommodate the interior portions and duct connections. These rooms or closets must allow ample clearance for regular service and maintenance.

A 30" wide minimum clearance opening is required in front of the filter access door. This will allow for easy removal of the door and replacement of the filter. Electrical conduit, gas lines, duct work and building structures places within this opening will complicate removal of the filter access door that may result in a lack of proper maintenance and diminished performance.

The cooling section of an HWC unit is built on a sliding chassis that can only be removed through the filter access door. Any service that must be done to the condenser section, evaporator fan or refrigeration circuit requires removal of the chassis from the unit. Therefore, a 30" horizontal minimum clear opening is required in front of the filter access door to facilitate removal of the entire cooling chassis.

It is recommended that the doorway to any closet or room containing a Magic-Pak HW/HWC unit be a minimum of 36" wide to allow some tolerance for chassis removal and service.

If the unit is installed in a residential garage, it must be located or protected to avoid physical damage by vehicles. This unit must be installed so that no electrical components are exposed to water.

Installing units in a relatively inaccessible location for easy chassis removal should be avoided, if for no other reason than to keep the air filter accessible for easy and timely cleaning by the occupants or maintenance personnel.

Installing With a Wall Sleeve

⚠ CAUTION

The sleeve is not intended as the sole support for the unit. Additional support must be provided near the return opening on the unit for adequate support. The use of vibration isolation material between the unit and the support is recommended.

Refer to the installation instructions packed with the wall sleeve and Figure 6-1 for guidance in assembly and mounting using a wall sleeve. See also the Accessories section beginning on page 7-3 for further details on wall sleeve installations.

Refer to page 6-6 for information concerning additional support under the HW/HWC unit.

Make sure the gaskets attached to the sleeve are not damaged.

Seal the space between the wall sleeve and the building opening with non-hardening caulking compound. The seal must be weathertight to prevent entrance of moisture and water into the building.

Assure that the unit is completely seated against the gaskets on the wall sleeve.

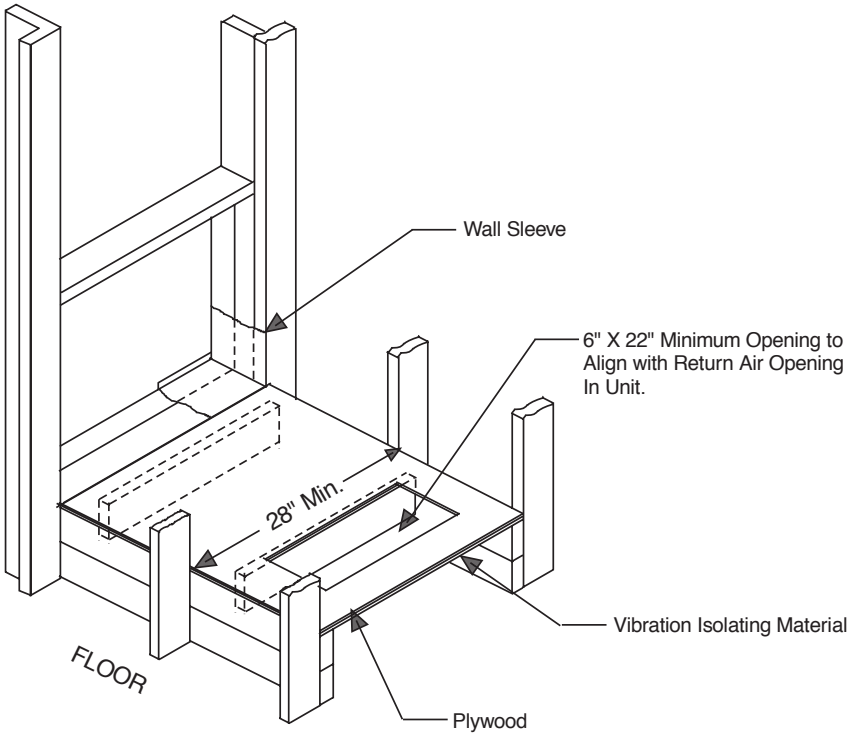

FIGURE 6-1 HW/HWC Installation

Installing Without a Wall Sleeve

Refer to the following directions and Figure 6-1 on page 6-5 for guidance in installing the unit without a wall sleeve:

1. Measure the size of the unit and provide an opening in an outside wall that will accept the unit. Local ordinances may require a steel lintel to support the wall above the opening. The opening must be square in all four corners.

2. Position the unit so that the grilles on the outside face of the unit are flush or extend beyond the face of the exterior wall, but not recessed more than 2" from the face of the building. **Provide a support under the unit, inside the building**. Make sure that the inside support does not block the return air. The unit should be installed level or pitched slightly to the outside of the building so that rain water will drain away.

3. Seal the space between the unit and building opening using a non-hardening caulking compound. The seal must be weathertight to prevent entrance of moisture and water into the building. Make sure the drain holes in the base are not plugged with caulking.

Support

In general, the wall sleeves will support the Magic-Pak HW/HWC units on any wall. The wall, however, must be adequate to support the unit. Otherwise, one must provide additional support between the unit and the floor. The center of gravity is between the bottom return-air opening rear flange and the wall sleeve. When additional support for the unit is desirable, it should be near this center of gravity and applied evenly across the bottom of the unit through adjustable legs to the floor.

A supplementary support can be made for this purpose. It should consist of two steel channels, 28" long, one placed under the unit and one on the floor. They are separated by 3/4" pipe and “all-thread” rod, with nuts and washers, to provide the adjustment pressure. Vibration-isolation blocks or pads are also required to minimize transmission of vibration into the floor.

Even though the wall may be adequate to support the unit, experience has shown the desirability of supplementary support to reduce the possibility of vibration being transmitted into the wall and to other parts of the structure.

Two 1" diameter holes are located near the front of the Magic-Pak HW/HWC units, on either side of the return-air opening. These holes are intended to allow a condensate drain tube to exit the return-air duct cavity whenever a closed return duct and flexible collar are used. **These should not be used to support the unit.** The sheet metal in the cabinet in this area is not heavy enough to act as a support without distorting and interfering with proper retention of the filter access cover.

Condensate Drain (HWC Models)

Install the plastic drain tube (furnished) over the 5/8" O.D. fitting welded to the center of the condensate pan. Connect the other end of the drain tube to the open trap (see Figure 6-2). The plastic drain connection is provided so that it may be disconnected from the permanent drain tubing in the building in the event it becomes necessary to remove the cooling chassis assembly.

The drain line should pitch gradually downward at least 1" per 10 feet of horizontal run to the open drain trap.

Be certain that the plastic drain tube has free drainage and is not crimped or flattened at any bend.

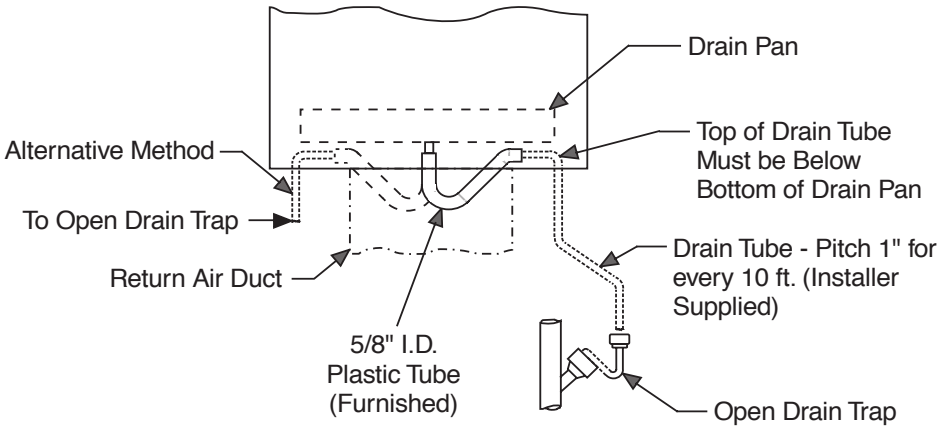

FIGURE 6-2 HWC Drain Installation

Venting

The venting system is an integral part of the appliance. The venting system must not be modified or added on to.

HW/HWC units are direct vent forced air central furnaces which draw fresh air from outside through a combustion air opening beneath the vent into the combustion chamber. The combustion products are then drawn out of the heat exchanger by an exhaust fan and are forced to the outdoors.

No special provisions are required for supplying combustion air.

The vent outlet must not be altered or extended in any way.

This appliance should be installed in a location such that the vent system complies with the National Fuel Gas Code Z223.1 or CAN/CGA-B149.1 & .2.

Special provisions must be made concerning the location of the vent termination with relation to building air inlets. A building air inlet is considered to be any door, moveable window, gravity fresh air inlet or other opening where fresh outdoor air can be brought into the building. See Table 6-2 for the clearances required.

TABLE 6-2 HW/HWC Installation and Maintenance Instructions

Units	Clearance
26, 38HW/HWC	9 Inches
51, 64HW/HWC	12 Inches

The vent system must also terminate at least 3 feet above any forced air inlet within 10 feet of it.

These clearances do not apply to the combustion air inlet of the appliance because the combustion air does not enter the air of the building.

Clearance to windows applies to openable windows and not to windows constructed only of glass with no movable parts such as picture windows.

The vent system must terminate a minimum horizontal distance of 4 feet away from public walkways, electrical meters, regulators and relief equipment.

The venting system is designed for proper operation under all weather conditions and for winds up to 40 m.p.h.

Figure 6-3 shows the required clearances of direct vent to building air inlets.

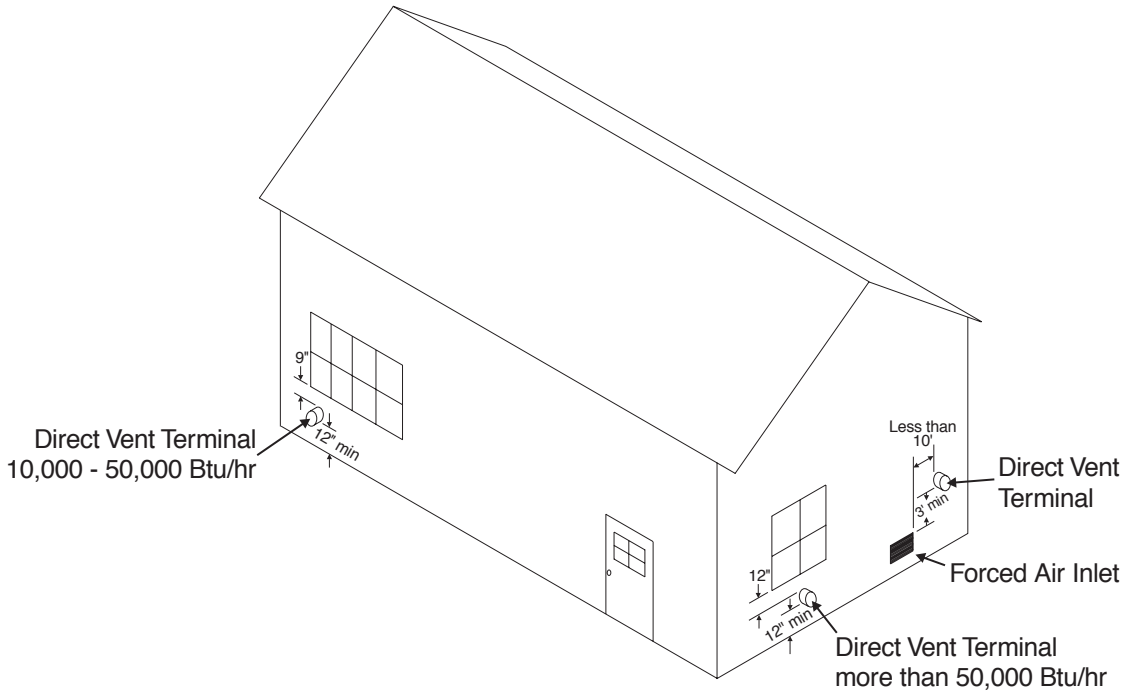

FIGURE 6-3 Required Clearances for Direct Vent Terminals

Removal of Unit from Common Venting System

When an existing furnace is removed from a common venting system serving other appliances, the venting system is likely to be too large to properly vent the remaining attached appliances. The following test should be conducted with each appliance while the other appliances connected to the common venting system are not in operation.

1. Seal any unused openings in the common venting system.

2. Visually inspect the venting system for proper size and horizontal pitch and determine there is no blockage or restriction, leakage, corrosion or other deficiencies which could cause an unsafe condition.

3. Insofar as is practical, close all building doors and windows between the space in which the appliances remaining connected to the common venting system are located and other spaces in the building. Turn on clothes dryers and any appliance not connected to the common venting system. Turn on exhaust fans, such as range hoods and bathroom exhausts, so they will operate at maximum speed. Do not operate a summer exhaust fan. Close fireplace dampers.

4. Following the lighting instructions, place the unit being inspected in operation. Adjust the thermostat so the appliance will operate continuously.

5. Test for spillage at the draft control relief opening after five minutes of main burner operation. Use the flame of a match or candle.

6. Follow the preceding steps for each appliance connected to the common venting system.

7. After it has been determined that each appliance remaining connected to the common venting system properly vents when tested as outlined above, return doors, windows, exhaust fans, fireplace dampers and any other fuel burning appliance to their previous condition of use.
8. If improper venting is observed during any of the above tests, the common venting system must be corrected. **See National Fuel Gas Code, ANSI Z223.1 (latest edition) or CAN/CGA B149.1 & .2 Canadian Installation Codes to correct improper operation of common venting system.**

Gas Connections

The gas line to the unit should be adequately sized to prevent undue pressure drop and should never be smaller than the manual valve used. Consult the local utility or National Fuel Gas Code for complete details on special requirements in sizing gas piping.

The units supplied for operation with natural gas contain a gas regulator which must be operated with inlet gas pressures specified on the rating plate. If gas line pressure exceeds this figure, an additional high pressure regulator must be installed to reduce this pressure.

Units for operation with propane must be converted with a kit supplied by the manufacturer and require for operation an inlet pressure of 11" W.C. minimum and 14" W.C. maximum. A regulator is also required on the propane tank.

When converting a low NO_x unit (designated by an L in the model number) to propane, **the NO_x inserts must be removed**. After removing the burners, remove the screw holding each insert and pull the insert from the combustion chamber (see Figure 6-4). The screws **must be reinstalled** in the vest panel after the inserts are removed.

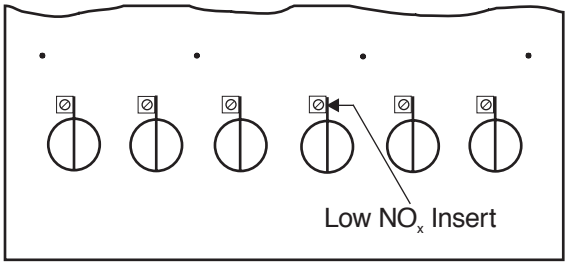

FIGURE 6-4 NO_x Insert Removal

⚠ WARNING

Never use a flame to check for gas leaks. Explosion causing injury or death may occur.

⚠ WARNING

The furnace must be isolated from the gas supply piping system by closing the individual manual shutoff valve during any pressure testing of gas supply piping system at test pressures equal to or less than 1/2 psig or 14" W.C. If the piping system is to be tested at pressures in excess of 1/2 psig, the furnace and its individual shutoff valve must be disconnected from the gas supply piping system. The gas valve supplied with this furnace is rated at 1/2 psig. Any higher pressure may rupture the pressure regulator diaphragm which will cause over firing of the burners and improper burner operation. This action may produce a high concentration of carbon monoxide which can result in asphyxiation.

A manual shutoff valve must be located outside the unit. The use of a union located upstream of the controls is recommended, between the controls and the manual shutoff valve. This will facilitate removal of controls and manifold. See Figure 6-5 for recommended placement of the union.

Provide a drip leg in the supply piping located exterior to the unit. Piping must be tight and non-hardening. Pipe compound resistant to propane must be used.

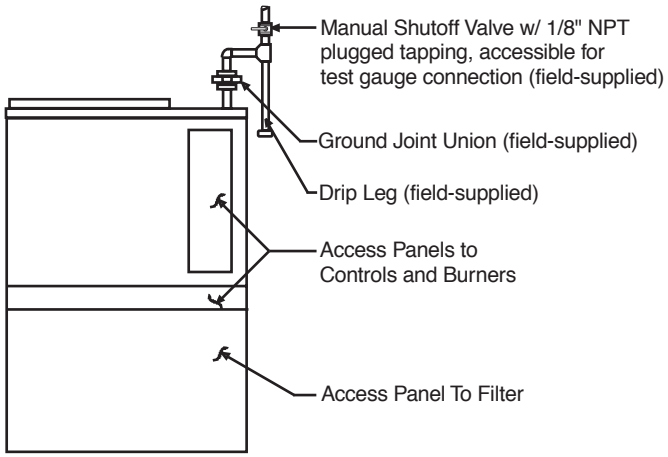

FIGURE 6-5 Gas Supply Piping

Electrical Connections

All wiring must be done in accordance with the National Electrical Code, ANSI/NFPA No. 70 (latest edition); Canadian Electrical Code Part 1, CSA C22.1 (latest edition); or local codes, where they prevail. Any alteration of internal wiring will void certification and warranty.

The rating plate indicates the operating voltage, phase, ampacity, maximum fuse size and minimum voltage. Units must never be installed where voltage exceeds 10% over the voltage indicated on the rating plate.

Units are factory wired for a 230 volt power supply. If power supply is 208 volts, it will be necessary to change a wire connection on unit transformer from 240 volt terminal to 208 volt terminal as shown on the wiring diagram.

Failure of the compressor as a result of operation on improper voltage voids the compressor replacement warranty.

A separate electric line with wire having a temperature rating of 60°C should be run directly from the main supply panel to the leads in the unit. Refer to the rating plate located on the unit for proper fuse or breaker size. Make sure the unit is electrically grounded in accordance with local codes or, in the absence of local codes, with the National Electrical Code, ANSI/NFPA No. 70 (latest edition) for installations in the U.S. or the Canadian Electrical Code Part 1, CSA C22.1 (latest edition) for installations in Canada.

See Table 6-3 and the Specifications section beginning on page 1-1 for correct wire ampacity for the cooling chassis required, and size the wire accordingly.

For HW (heating only units): When sizing wire, keep in mind that an air conditioning chassis may be added in the future.

TABLE 6-3 Minimum Circuit Ampacity

Clg. Chassis Model	Min. Circuit Ampacity
18A	16
24A	24
30A	27
181	13.3
241	21
301	23.6
122, 123	8.3
182, 183	13.6 Rotary/15.4 Scroll
242, 243	18.6
302, 303	22.4

Thermostat

Install the thermostat according to the directions furnished with it. The thermostat must be located on an inside wall where it will not be affected by drafts, sunlight or any other heat producing appliances. Connect the thermostat wires to the low voltage leads on top of the unit following the wiring diagram attached to the unit. The heat anticipator setting is 0.50 Amp.

Supply and Return Ducts

Provide ducts sized sufficiently to handle the larger of the air volumes for heating or cooling provided by the unit.

Connect the supply duct to the top of the unit using canvas connections or other flexible connections to prevent noise transmission into the duct system.

The supply duct should have a removable access panel. The opening should be accessible when the furnace is installed and should be large enough and located such that the heat exchanger can be inspected for leaks. The cover must be attached in such a manner as to prevent air leaks.

To connect the return duct to the system, use a straight piece of duct 22" wide by 6" deep. Insert the duct into the return opening in the bottom of the unit and flange the duct over the existing flanges around the opening

inside the unit. Make sure that all sides of the duct are flanged over to permit removal of the cooling chassis if required. Use a flexible connection to attach the remainder of the return duct. The return duct should be sealed to the unit casing and terminate outside the space containing the furnace.

Air Filter

All indoor return air must be filtered. A permanent-type filter is furnished with the unit, located directly behind the access panel. Removing the panel permits access to the filter.

If an installation is made in which it is more desirable to mount the filter exterior to the unit, in the return duct work or elsewhere, the permanent filter can be used or replaced with a disposable filter. If a disposable filter is used, refer to Table 6-4 when sizing the disposable filter.

TABLE 6-4 Minimum Required Surface Area for Disposable Filters

Model Number	Filter Area (minimum)	Supplied Filter Size
HWC122, 123	300 square inches	16.5" x 25.5" x .50"
HWC182, 183	480 square inches	16.5" x 25.5" x .50"
HWC242, 243	480 square inches	16.5" x 25.5" x .50"
HWC302, 303	480 square inches	16.5" x 25.5" x .50"
26 HW	300 square inches	16.5" x 25.5" x .50"
38 HW	300 square inches	16.5" x 25.5" x .50"
51 HW	480 square inches	16.5" x 25.5" x .50"
64 HW	480 square inches	16.5" x 25.5" x .50"

Adjustments - Heating Section

Temperature Rise

At the time of installation, the temperature rise must be adjusted to be within the range specified on the unit rating plate.

Pressure Regulator

The gas input must not exceed the figures shown on the rating plate. The unit is equipped for rated inputs with manifold pressures of: **3.5" W.C. for natural gas and 10.0" W.C. for propane.**

The manifold pressure can be measured by removing the pipe plug in the automatic gas valve. Connect a water manometer and measure the pressure.

Only small variations in gas input may be made by adjusting the regulator. **In no case should the final manifold pressure vary more than 0.3" W.C. for natural gas or 0.7" W.C. for propane.**

To adjust the regulator, turn the adjusting screw on the regulator clockwise to increase pressure and input or counterclockwise to decrease pressure and input.

For natural gas installations, check the burner rate by observing the gas meter (making sure that all other gas appliances are turned off). The test hand on the meter should be timed for at least one revolution. Note the number of seconds for one revolution.

$$\text{BTU/HR INPUT} = \frac{\text{Cubic Feet Per Revolution}}{\text{\# Seconds Per Revolution}} \times 3600 \times \text{Heating Value}$$

Adjustments - Cooling Section (HWC models)

No adjustments are required or should be attempted regarding any of the components of the cooling chassis. The chassis should be checked to see that none of the wiring is loose or missing.

Blower

The unit contains a direct-drive, multispeed blower. The proper speeds have been preset at the factory for heating and cooling. Refer to the wiring diagram for recommended heating/cooling speeds for specific models. Direct-drive blower motors are permanently lubricated and do not require oiling.

Limit Control

A fixed-temperature limit control is provided which will shut off the gas to the main burners if the unit is overheated for any reason. The control must not be adjusted or relocated.

High Altitude Adjustments (U.S. Installations)

Ratings shown on the rating plate are for elevations up to 2000 feet. For elevations above 2000 feet, ratings should be reduced at a rate of 4% for each 1000 feet above sea level. Refer to the National Fuel Gas Code Z223.1 (latest edition) for further explanation.

High Altitude Adjustments (Canadian Installations)

High altitude conversions may be made by the manufacturer's authorized representative, in accordance with the requirement of the manufacturer, provincial or territorial authorities having jurisdiction, and in accordance with the requirements of CAN/CGA B149.1 or B149.2 Installation Code. A high altitude conversion kit, available from the manufacturer and approved for this purpose, must be used (see the Accessories section beginning on page 7-15).

Installation and Operation in Extremely Cold Weather Areas

In areas where extremely cold (below – 20°F) outdoor temperatures can be expected, some additional installation and operating precautions should be taken. The following precautions are taken to prevent possible vent system ice blockage that could result in safety shutdown of the burners:

1. Adjust to the highest achievable temperature rise within the rise and static pressure ranges specified on the rating plate. Depending on specific model, it may be possible to change to a lower heating blower speed tap to get a higher temperature rise. This also increases comfort.

2. Make sure there are no leaks of outside air into the return air system.

3. Keep the outside louver grille as free as possible of any ice that may form and obstruct the flue outlet.

Section 7 - Accessories

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Accessories

There are a number of accessories available to increase the performance or versatility of the Armstrong Magic-Pak HW/HWC units. This section provides a general description of each.

Note: Complete instructions are packaged with each kit or its components and accessories. These instructions should be read carefully prior to installation. The instructions are intended as a general guide only, for use by qualified personnel, and do not supersede any national or local codes in any way.

TABLE 7-1 HW/HWC Accessory Kit Index

PART NUMBER	DESCRIPTION	UNIT MODELS
CA-239	Knocked Down Wall Sleeve Kit*	All HW/HWC Models
A242-1	Wall Sleeve Adaptor Kit	All HW/HWC Models
ALVR42	Architectural Extruded Aluminum Louver Facade*	All HW/HWC Models
34961A001	Compressor Vibration Isolator/Spring In Grommet Kit	All HW/HWC Models
ALPKT389-2	L.P. Gas Conversion Kit**	26, 38, 51, 64HW/HWC Models
AHALT390-1	High Altitude Conversion Kit**	26, 38, 51, 64HW/HWC Models
ATIMR466-1	Nuisance Blower Operation Repair Kit	All HW/HWC Series 2 Models
ADAPT420-2	Chassis Conversion Kit	All HW/HWC Models
43110-001	Ignition Control Conversion Kit	All HW/HWC Series 2 Models
TL109A	Burner Tray Assembly Kit	26HW/HWC
TL109B	Burner Tray Assembly Kit	38HW/HWC
TL109C	Burner Tray Assembly Kit	51HW/HWC
TL109D	Burner Tray Assembly Kit	64HW/HWC
AMUFFKT494-1	Tecumseh 'AW' Model Compressor Sound Reduction Kit	HWC182

* Does not apply to 121, 181, 241 and 301 (48" tall series units use sleeve CA241).
** Does not apply to 12, 18, 24 and 30 or 121, 181, 241 and 301 units.

CA-239 Wall Sleeve Kit

The CA-239 wall sleeve kit is designed to facilitate the installation of Magic-Pak units by providing an accurate opening to properly accept a Magic-Pak unit. During the construction of a building, the wall sleeve allows for the unit to remain off-site until the construction is completed.

The wall sleeve is comprised of four assemblies (top, bottom and left and right sides) which assemble easily to form a correctly sized rectangular box to receive a Magic-Pak unit.

When installed and securely fastened to the supporting wall, the wall sleeve provides easy access to the finish wall for weather sealing.

The wall sleeve must always be fastened to the supporting wall and never to the finished wall.

Inspection of Shipment

Upon receipt of equipment, carefully inspect it for possible shipping damage. If damage is found, it should be noted on the carrier's freight bill. Damage claims should be filed with the carrier immediately. Claims of shortages should be filed with the seller within five days.

Wall Sleeve Assembly

To assemble the wall sleeve, refer to the following directions and Figure 7-1 on page 7-4.

1. Slide top panel over side panels until retaining clips are engaged in slotted openings.

2. Place side and top assembly down with the front flange against floor and slide bottom panel into side panel slip strips until tabs on bottom panels are locked in place.

3. Attach squaring braces to top and side panels using existing holes. (Do not remove braces until wall sleeve is secured to building.)

4. Attach the support angles to top and side panels using the #8 x 3/8" screws provided. Two sets of holes are provided in the panels for attaching the support angles. The row of holes nearest the front of sleeve will locate the support angles for 1" spacing and the second set of holes will locate the angles for 3-3/4" spacing.

5. **Wall sleeve must be square in opening before securing sleeve to building.** This is required to assure Magic-Pak unit will slide into the sleeve.

6. Caulk all seams where bottom panel joins to side panels including the front corners of bottom panel and the top of side panel slip joints. Caulk sealing is best accomplished after the wall sleeve is assembled but before it is placed in the wall opening.

TABLE 7-2 CA-239 Parts List

Description	Quantity
Top Panel	1
Bottom Panel	1
Right Side Panel	1
Left Side Panel	1
Squaring Brace	2
1/4" x 3/4" Screw	5
#8 x 3/8" Screw	24
1/4" Flat Washer	5
Side Support Angle	2
Top Support Angle	1

Assembled Wall Sleeve Dimensions: 45" high x 29" wide x 12.5" deep

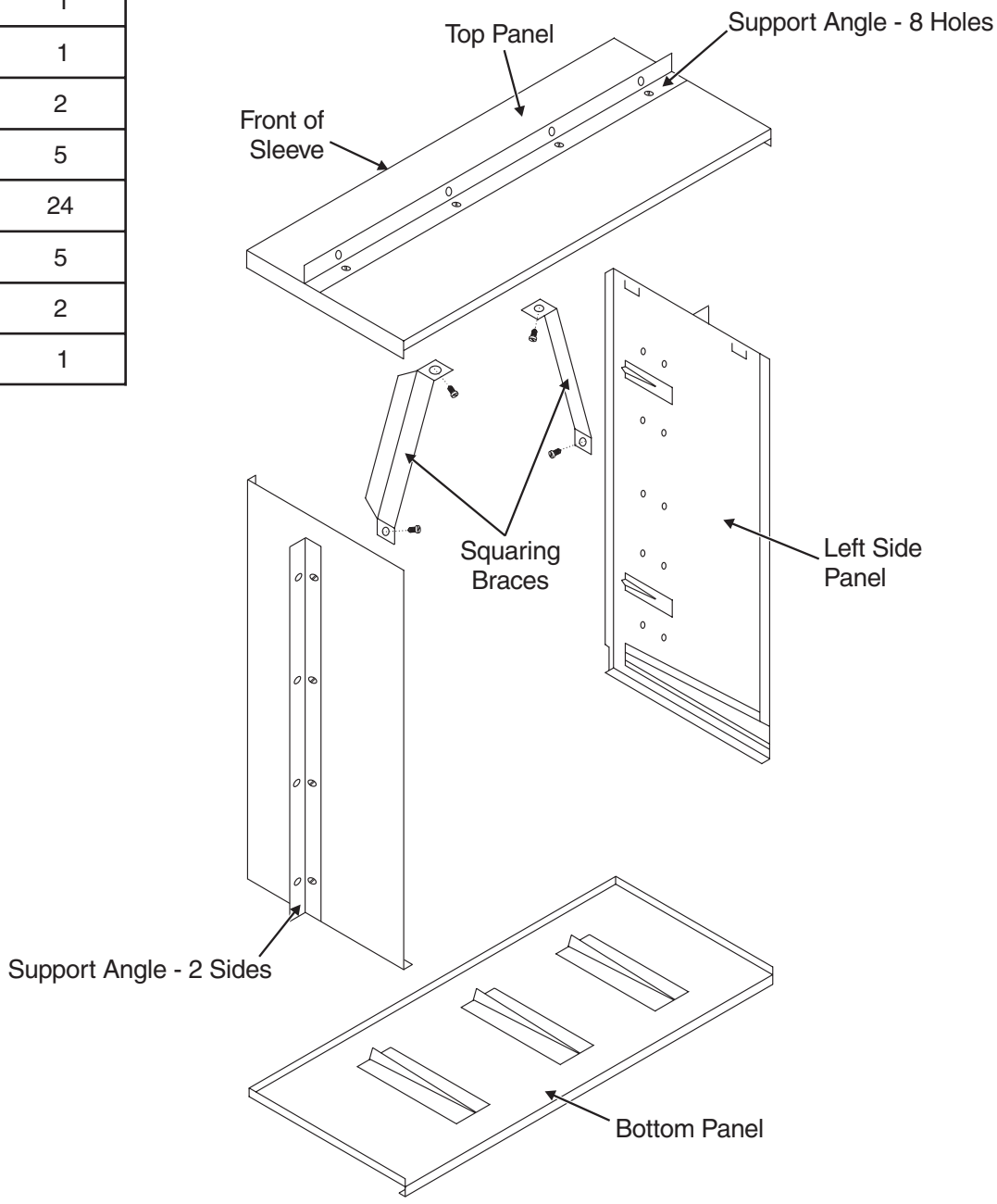

FIGURE 7-1 CA-239 Wall Sleeve Kit Assembly

Wall Sleeve Installation

The wall sleeve can be installed from either the inside or the outside of the building. In any case, proper considerations must be made for final weather sealing of the wall sleeve and the Magic-Pak unit.

Whether installing from the inside or outside of a building, the wall sleeve may be secured to the supporting wall through the top and side support angles or directly through the wall sleeve side panels. When securing the wall sleeve directly through the side panels, the top and side angle supports are often used as “stops” to assure proper alignment before final securing of the wall sleeve is accomplished.

The top and side support angles can be adjusted to allow the unit to protrude through the outside of the supporting wall by 1" or 3-3/4" inches. This will also change the depth that the unit protrudes through the inside wall. This adjustment is designed to allow for final sealing of the wall sleeve to various finish types.

The top and side support angles can be removed altogether and the wall sleeve secured directly through the side panels, provided that the installer performs a proper alignment of the wall sleeve.

⚠ WARNING

The further the wall sleeve is extended past the finished wall the more difficult it becomes to accomplish final sealing from the inside of the building. Adequate safety precautions must be considered to protect personnel.

Whether installing from the inside or the outside of the building, the wall sleeve should extend at least 3/8" - 1" beyond the finished wall to allow for proper weather sealing. When installing during wall construction, consideration must be made to allow for final weather sealing to the type of finish wall that will be constructed later.

Recessed Wall Sleeve Installation

In some applications, the thickness of the wall or architectural design will dictate that the wall sleeve be recessed in the finished wall. This can be done, but it is not recommended if the wall opening is required to be the same size as the wall sleeve opening.

Recessed installation can be done if the wall opening is 2" larger vertically than the wall sleeve. The wall sleeve may then be placed on a sill 2" higher than the bottom of the finished wall opening.

The sill must be recessed 3/8" - 1" inside of the outer edge of the wall sleeve. This permits weather sealing of the bottom edge without plugging the drain holes in the bottom of the wall sleeve.

The top of the finished wall opening should extend above the top of the wall sleeve by a dimension equal to or greater than the dimension that the wall sleeve is recessed.

Magic-Pak Installation

Before installing the Magic-Pak unit in the wall sleeve, it is important to consider the possibility of sound and vibration transmission through the wall. It is recommended that vibration isolation pads be installed evenly spaced across the outer edge of the bottom panel of the wall sleeve. The vibration isolator pads should be approximately 4" x 4" x 7/8" and constructed of one piece of cork rubber with pieces of neoprene rubber adhered to the top and bottom.

Once the wall sleeve is properly secured to the supporting wall and the vibration isolators are in place, the Magic-Pak unit can be slid into the wall sleeve. The unit must be slid completely forward so that the outer edges of the unit touch the inside flanges of the wall sleeve. The unit can then be secured to the wall sleeve by bolting the top flange of the unit to the top turned-down flange of the wall sleeve with 1/4" x 3/4" bolts and washers.

Note: In applications where vibration isolation is of particular importance, rubber grommets (Armstrong P/N 9015A) can be inserted between the top flanges.

The wall sleeve alone is not adequate support for the full weight of the Magic-Pak unit. Additional, field-fabricated support must be provided between the rear flange of the return opening and the wall sleeve.

The use of vibrator isolator pads is required between the unit and the support and between the floor and the support.

Please refer to installation instructions and application manual for details on field-fabricated additional supports.

Weather Sealing

After assembling the wall sleeve, it is recommended that all panel connections and joints be sealed with caulk to prevent water and wind infiltration into the building.

Once the Magic-Pak is installed and secured to the wall sleeve, it is important to seal any gaps between the wall sleeve and the unit with caulk. This includes both sides, top and bottom. Sealing these gaps will prevent water and wind from leaking into the building between the unit and wall sleeve.

The outside of the wall sleeve must also be sealed with caulk on all four sides whether it is installed recessed or protruding.

A242-1 Wall Sleeve Adaptor Kit

The A242-1 wall sleeve adaptor kit is designed to allow for the installation of current 43" tall HW/HWC units into 48" tall wall sleeves (CA241 wall sleeve kits). The CA241 wall sleeve kits were designed for use with HW/HWC121, 181, 241 and 301 units manufactured during the late 1980's. The HW/HWC series 1 units were approximately 48" tall.

If replacement of the wall sleeve is not feasible, use of the A-242-1 adaptor kit creates an insulated block-off panel at the top portion of the CA241 wall sleeve.

The adaptor kit also allows for easy mounting of the HW/HWC unit to the taller sleeve.

Whenever it is necessary to convert a CA241 wall sleeve to current unit dimensions, use of the A242-1 adaptor kit is required.

Inspection of Shipment

Upon receipt of equipment, carefully inspect it for possible shipping damage. If damage is found, it should be noted on the carrier's freight bill. Damage claims should be filed with the carrier immediately. Claims of shortages should be filed with the seller within five days.

Wall Sleeve Adaptor Kit Assembly

Once assembled, the A242-1 adaptor kit will form a rectangular box approximately 4-7/8" tall with approximately 7/8" overlapping the front and side of the top panel of the HW/HWC unit (see Figure 7-2 on page 7-9).

To assemble the adaptor kit:

1. Set top flanges of side and front panels on the floor or ground so that they are resting flat. The screw holes through the side flanges of front panel should align with the pilot holes in side panel.

2. Fasten two #8 x 1/2" screws in each side.

3. Place rear panel against the rear flanges of the side panels. The screw holes of the rear panel should align with the pilot holes in the side panel rear flanges.

4. The top and bottom flanges of the rear panel should be facing the front panel. The five 1/4" pilot holes should be positioned towards the bottom of the kit and the five oval screw holes should be positioned towards the top of the kit.

5. Fasten two #8 x 1/2" screws at each end of the rear panel.

Attachment to HW/HWC

After assembling the kit, it is ready to be attached to the top of the HW/HWC unit. To attach the kit to the HW/HWC unit:

1. Remove the two front screws (each side) that fasten the top panel side flanges to the side panels on each side of the HW/HWC unit.

2. Place the adaptor kit on top of the HW/HWC unit. The five pilot holes positioned towards the bottom of the kit's rear panel should align with the five oval screw holes in the HW/HWC mounting bracket (see Figure 7-2).

3. Fasten the five 1/4" x 3/4" screws and washers through the unit mounting bracket to the kit pilot holes.

4. Align the kit side panel oval screw holes to the screw holes in the side of the HW/HWC unit.

5. Re-fasten the screws that were removed in step 1.

Installing the HW/HWC Unit

After the adaptor kit is fastened to the HW/HWC unit, the unit is ready to be slid into the wall sleeve.

The top flange of the adaptor kit is designed to overlap the top of the wall sleeve. The five 1/4" x 3/4" mounting screws included with the wall sleeve kit can be fastened through the top flange of the kit into the turned-down flange of the wall sleeve.

The HW/HWC unit must be slid all the way forward so that the outer edges of the adaptor kit and HW/HWC unit are touching the outer flanges of the wall sleeve.

The HW/HWC unit and wall sleeve must be weather sealed according to the wall sleeve kit instructions, unit installation instructions or unit application manual.

For further information on installing HW/HWC units, refer to the Installation section beginning on page 6-1.

TABLE 7-3 A242-1 Parts List

Part	Quantity
Front Panel	1
Rear Panel	1
Right Side Panel	1
Left Side Panel	1
#8 x 1/2" Screw	8
1/4" x 3/4" Screw	5
1/4" Flat Washer	5

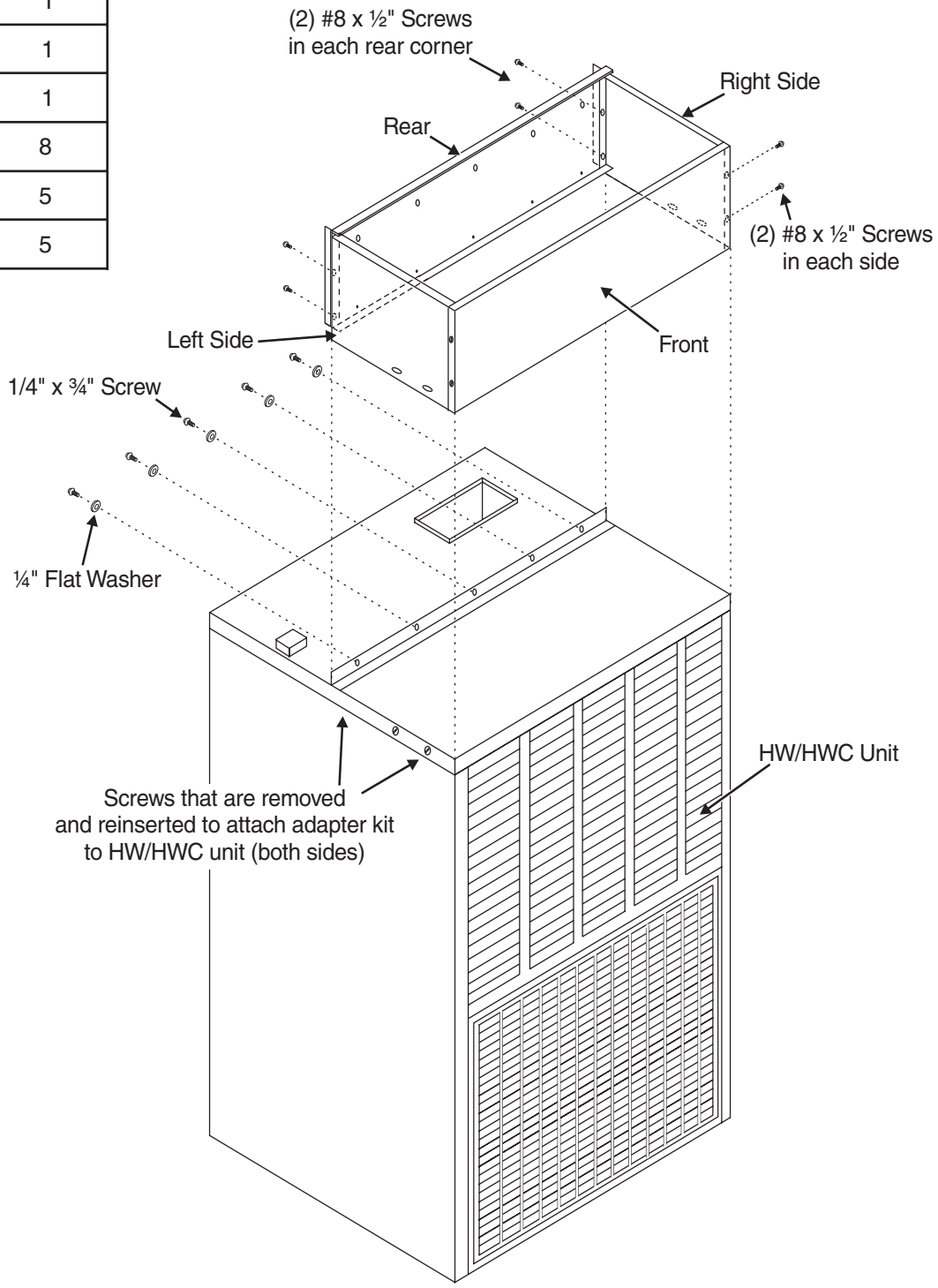

FIGURE 7-2 A242-1 Wall Sleeve Adaptor Kit Assembly

ALVR42 Architectural Aluminum Louver Facade

In many applications, architects and installers will choose to use facades over the front of Magic-Pak units. Often this is done to improve the appearance of a building. Properly constructed louver facades may also provide some degree of weather protection and sound deflection.

Louver facades can be designed by engineers and architects and integrated into the building construction by contractors in the field. However research and testing has shown that many designs may actually diminish the performance of the Magic-Pak units and in some cases even damage them.

For these reasons, Armstrong approved the ALVR42 architectural aluminum louver facade kit. The instructions provided with the kit should serve as a general guide for installation of the kit. For guidelines on designing louver facades, refer to the Magic-Pak Application Manual (Armstrong P/N MPA-100).

The ALVR42 is designed to be integrated into the construction of the finish wall or secured directly to the finish wall. Therefore, actual installation of the louvers will vary depending on the type of finish wall it is applied to.

The ALVR42 kit is available is many different colors to match finish walls. Color matching services are also available. For more information concerning color matching, please contact your supplier or Armstrong.

Assembly

The ALVR42 kit consists of two sections of louver fins. The top section is composed of fins angled approximately 30° upward while the bottom section consists of fins angled approximately 30° downward (see Figure 7-3). This design allows flue gases and condenser discharge air to be circulated away from the condenser inlet and burner compartment fresh air intake.

There is also a sealing gasket between the two louver sections to allow for separation of inlet and discharge air when the louver is secured directly to the front of the unit. When the louver is secured away from the unit, a separation bracket sealed to the unit and then to the louver kit must be field-fabricated and installed.

The ALVR42 louver is 45" tall to accommodate proper drainage of the unit and wall sleeve and proper discharge of condenser air and flue gases.

Installation

The ALVR42 is designed to be fastened to the finish wall, support wall or wall sleeve using field-supplied materials and techniques.

Whenever installing a louver facade of any type, special considerations must be made for proper drainage and air circulation. The drain holes of the wall sleeve and the unit must never be obstructed.

The louver will fit directly against the front of the unit. However, the lower lip of the unit will protrude into the louver. The louver must be positioned to accommodate the protruding lower lip.

The louver must be caulk sealed on all four sides and field-supplied flashing should be installed across the bottom of the louver. This will prevent water runoff directly onto the finish wall.

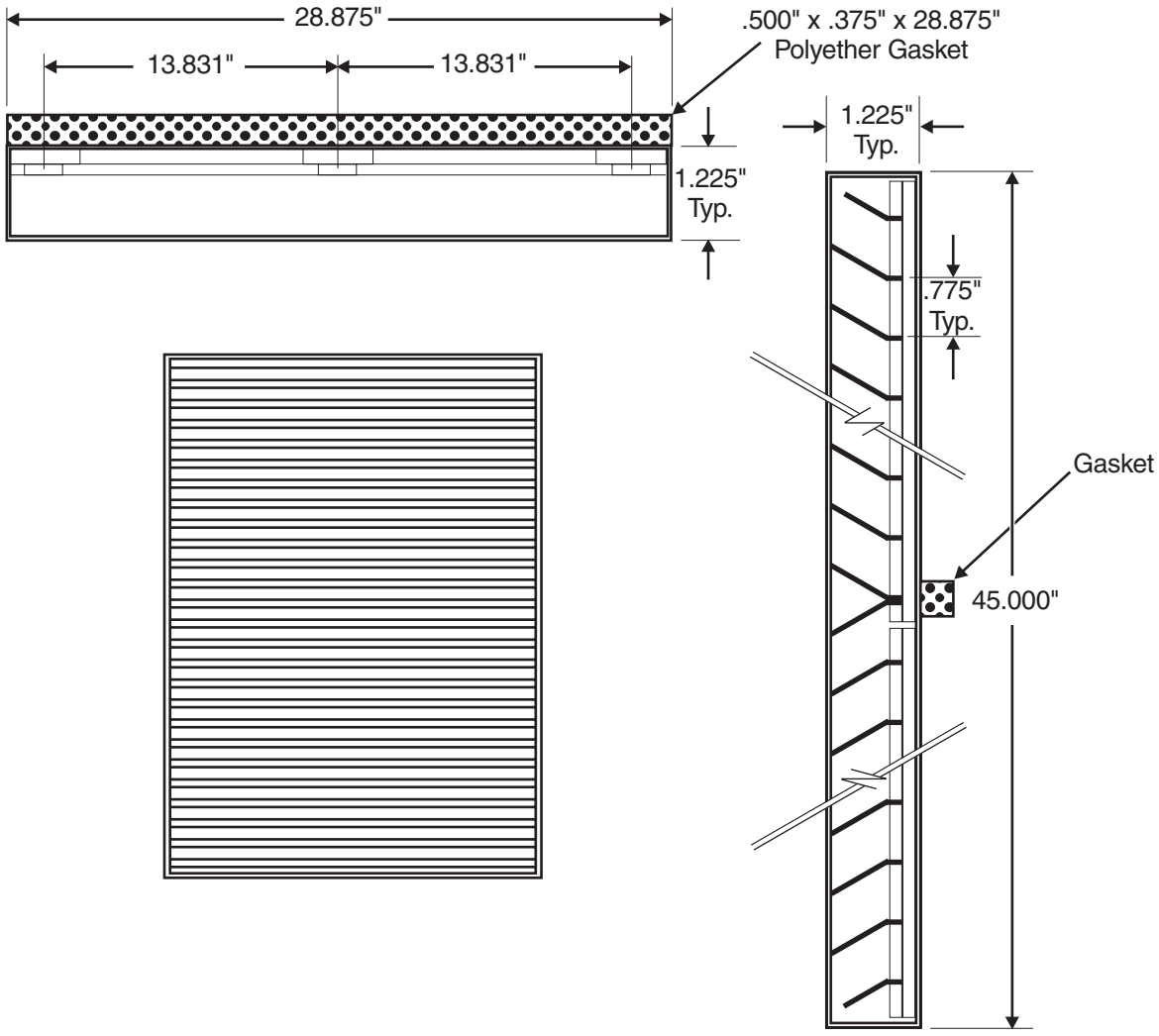

FIGURE 7-3 ALVR Architectural Aluminum Extended Louver

34961A001 Compressor Vibration Isolator Kit

The 34961A001 spring/grommet kit is designed to isolate vibrations common to most compressors away from the base of Magic-Pak units and building walls.

Some types of wall construction will be especially susceptible to vibration transmissions. In these instances, installers and building designers must make special considerations for isolating vibration.

Designing and constructing walls and wall openings in a particular manner to isolate vibration transmission is the recommended procedure for dealing with these instances. However, if further vibration isolation is necessary, the 34961A001 compressor vibration isolator kit should be used.

For instructions and recommendations on designing and constructing walls and wall openings, refer to the Magic-Pak Application Manual.

Installation

The Magic-Pak cooling chassis must be removed from the cabinet to perform the following installation procedures. Refer to the Chassis Removal section beginning on page 3-4 for instructions on proper chassis removal.

To install the 34961A001 kit:

1. Remove the factory-installed compressor mounting leg bolts from the base of the compressor.

2. Lift the compressor of the base of the chassis by inserting a large screwdriver or pry bar under the belly of the compressor.

3. Support the compressor by sliding a 3/4" to 1-1/4" thick wooden block or suitable material underneath the compressor belly.

The copper refrigerant tubing connected to the compressor will have some free movement. However, be careful not to kink or damage the tubing. Loss of refrigerant or lack of proper unit performance may result.

4. Remove the factory-installed rubber grommets from the compressor mounting legs.

5. Install the top rubber spacer in the compressor mounting legs.

6. Insert the bottom rubber spacer into the bottom of the spring and slide the spring between the upper spacer and chassis base.

7. Insert the metal sleeve through the top of the upper spacer, spring and lower spacer.

8. Re-install the bolts removed in step 1.

Use of spray lubricant or liquid soap will aid in the installation of rubber parts.

Compressor belly is rounded and can be “rocked” on the belly support. It is easiest to install one spring grommet at a time. Start with the most difficult to access compressor mounting leg and work in a crisscross pattern from back to front.

Compressor mounting bolts should be tightened down so that the metal sleeve is secured fast to the chassis base and bolt head. Before securing the final bolt, make sure that the wooden block or material supporting the belly of the compressor has been removed.

TABLE 7-4 34961A001 Parts List

Part	Quantity
Upper Rubber Spacer	4
Lower Rubber Spacer	4
Spring	4
Metal Sleeve	4

ALPKT389-2 L.P. Gas Conversion Kit

The ALPKT389-2 kit contains the following parts to convert the 26, 38, 51 and 64HW/HWC series gas furnace from natural gas to propane gas. For altitudes from 2000 - 4500 feet, a high altitude kit as supplied by the manufacturer must be used (see page 7-15).

TABLE 7-5 ALPKT389-2 Parts List

Part	Quantity
Conversion Plate	1
Gas Conversion Label	1
Air Shutter Adjustment Label	1
Installation Instructions	1
Adapter Kit for White-Rodgers 25K Gas Valve	1
#65 Main Burner Orifices	3
#64 Main Burner Orifices	4
#62 Main Burner Orifices	6
Gas Valve Conversion Label	1

Although the equipment is suitable for operation with propane gas (after the conversion kit has been installed), certain precautions must be observed because of the distinct burning characteristics of propane gas. The following problems may be encountered:

1. Burning back at the orifices with a loud roar
2. Loud popping upon extinction of the burner
3. Flame rollout at the time of the ignition

These problems can be caused by:

1. Low gas pressure
2. Improper air adjustment
3. Incorrect burning rate

The furnace has a regulator in the gas valve. A regulator is also required on the propane tank. Another regulator may be required at the house or the unit.

The minimum permissible gas supply pressure to the furnace is 11" W.C. for the purpose of input adjustment. The maximum permissible gas pressure to the gas valve is 14" W.C.

TABLE 7-6 ALPKT389-2 Orifices

Model	Propane Orifice Size
26HW/HWC	#65
38HW/HWC	#64
51HW/HWC	#62
64HW/HWC	#62

AHALT390-1 High Altitude Kit

The AHALT390-1 kit contains the following parts to convert the 26, 38, 51 and 64HW/HWC series units to high altitude for natural or propane gas. If the field conversion is for high altitude propane gas, be sure to install the appropriate gas valve conversion kit (see page 7-14).

TABLE 7-7 AHALT390-1 Parts List

Part	Quantity
Installation Instructions	1
High Altitude Conversion Plate	1
Air Shutter Adjustment Label	1
Burner Orifices #55 (Natural Gas)	3
Burner Orifices #54 (Natural Gas)	5
Burner Orifices #53 (Natural Gas)	6
Burner Orifices #65 (Propane Gas)	3
Burner Orifices #64 (Propane Gas)	4
Burner Orifices #63 (Propane Gas)	6

Regulator - Natural Gas

The minimum permissible gas supply pressure is 5.0" W.C. for purpose of input adjustment. Gas input must never exceed the input capacity shown on the rating plate. The furnace is equipped for rated inputs with manifold pressure of 3.5" W.C. for natural gas. Only small variations in gas input may be made by adjusting the regulator. In no case should the final manifold pressure vary more than 0.3" W.C. from the specified pressure.

To check this pressure:

1. Turn off the gas valve.

2. Remove the plug on the valve marked “OUTLET PRESSURE”.

3. Install a water manometer.

Turn gas valve “ON”. If manifold pressure must be adjusted, remove cap from pressure regulator and turn adjustment screw clockwise to increase pressure, counterclockwise to reduce pressure. After checking pressure, turn gas off, remove the manometer fitting and replace the pipe plug and regulator cap. Put furnace in operation and leak check plug for leaks using a soapy solution.

Check the furnace rate by observing the gas meter, when available, making sure all other gas appliances are turned off. The test hand on the meter should be timed for at least one revolution. Note the number of seconds for one revolution.

$$\text{BTU/HR INPUT} = \frac{\text{Cubic Feet Per Revolution}}{\text{\# Seconds Per Revolution}} \times 3600 \times \text{Heating Value}$$

The heating value of your gas can be obtained from your local utility.

With proper manifold pressure achieved, cycle main burners on and off. Ignition and extinction should be smooth and quiet. Burning back at the orifice or flame popping back to the orifice can be corrected by adjusting the air shutter to soften the flame.

Regulator - Propane

The furnace has a regulator in the gas valve. A regulator is also required on the propane tank. Another regulator may be required at the house or the unit.

The minimum permissible gas supply pressure to the furnace is 11" W.C. for the purpose of input adjustment.

If at any time ignition is slow and the burner does not seem to be operating correctly, check manifold pressure. It should be between 10" to 10.5" W.C.

The furnace is designed to obtain rated input at 10.0" W.C.

To check this pressure:

1. Turn off the gas valve.

2. Remove the plug on the valve.

3. Install a water manometer.

Turn gas valve “ON”. If manifold pressure must be adjusted, remove cap from pressure regulator and turn adjustment screw clockwise to increase pressure, counterclockwise to reduce pressure. After checking pressure, turn gas off, remove the manometer fitting and replace the pipe plug and regulator cap. Put furnace in operation and leak check plug for leaks using a soapy solution.

With proper manifold pressure achieved, cycle main burners on and off. Ignition and extinction should be smooth and quiet. Burning back at the orifice or flame popping back to the orifice can be corrected by adjusting the air shutter to soften the flame.

TABLE 7-8 AHALT390-1 Orifices

Model Size	Normal Input Btuh	High Altitude Input Btuh	High Altitude Output Btuh	Orifice Size	
				Natural	Propane
26HW/HWC	26,000	23,400	18,000	55	65
38HW/HWC	38,000	24,200	27,000	54	64
51HW/HWC	51,000	45,900	36,000	54	63
64HW/HWC	64,000	57,600	45,000	53	63

ATIMR466-1 Short Cycle Protector Kit

The ATIMR466-1 Short Cycle Protector Kit helps guard against compressor failure due to repeated, short interval on/off cycles. It is also referred to as the Nuisance Blower Operation Repair Kit.

The kit is designed to be used in conjunction with matching air conditioner or heat pumps for comfort cooling/heating applications as shown in the Armstrong specification information.

TABLE 7-9 ATIMR466-1 Parts List

Part	Quantity
Time Delay Relay	1
Fastener	1
Wires	3
Installation Instructions	1

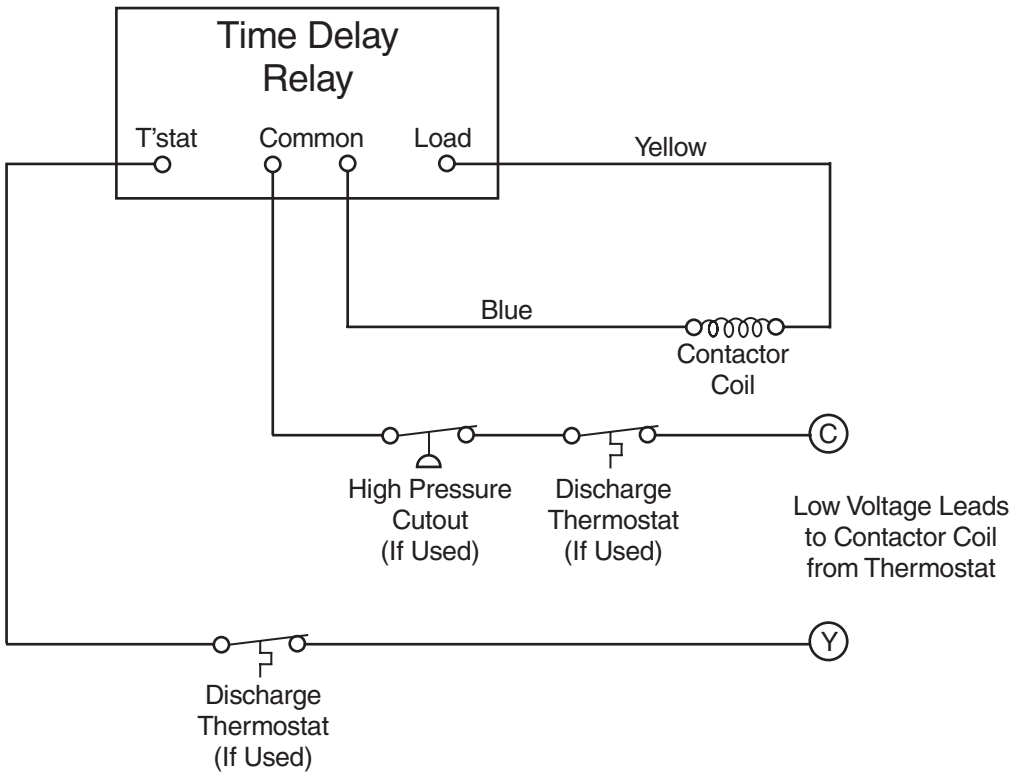

FIGURE 7-4 ATIMR466-1 Kit Wiring

ADAPT420-2 Chassis Conversion Kit

The ADAPT420-2 kit was designed to retrofit an HWC122, 182, 242 or 302 chassis onto a cabinet originally equipped with an HWC12, 18, 24 or 30 chassis. This kit cannot be used to replace an HWC181, 241 or 301.

TABLE 7-10 ADAPT420-2 Parts List

Part	Quantity
Installation Instructions	1
Filler Panel	1
Center Rear Panel (Filter Access Panel Support)	1
Foam Sealing Tape (12 inches)	1
Wiring Diagram Labels	2

When replacing the old chassis, the new chassis must have the same nominal cooling capacity. If the nominal cooing capacity of the new chassis is larger than the original, both the appliance internal line voltage wire and the field wiring must be checked for proper size. The fuse and/or breaker size must also be checked.

Fenwal Triton Ignition Control Kit

This kit enables the Fenwal “Triton” local sense, one-hour retry, direct spark ignition (DSI) control to be used as a service parts replacement for earlier versions of Fenwal DSI controls used on HW/HWC models.

The operation and features of this ignition control differ from the other types of DSI controls used. These features include:

- Longer trial for ignition (15 seconds nominal).
- One-hour retry feature (if main burner operation is not proved after three trials for ignition, control goes into lockout for one hour, then automatically initiates another ignition sequence; will repeat as long as call for heat exists).
- Senses flame through spark electrode (local flame sense) instead of through a separate flame sensor (remote flame sense).
- Diagnostic LED indicates certain ignition and venting system malfunctions (refer to control label for specific diagnostic codes).
- Includes flame current (FC) test terminals.

TABLE 7-11 Triton Ignition Control Kit Parts List

Part	Quantity
Fenwal "Triton" 2461D Series Direct Spark Gas Ignition Control	1
High Voltage Electrode Cable	1
Low Voltage Jumper Wire (May Be Pre-installed on Ignition Control Terminals)	1
Wiring Label	1
Installation Instructions	1

TL109 Burner Tray Kit

The TL109 Burner Tray Kit is designed for use in HW/HWC's that were originally equipped with single port inshot burners. Four kits are available, one for each natural gas heating input rating as follows:

- 26,000 BTUH (3 main burners)
- 38,000 BTUH (4 main burners)
- 51,000 BTUH (5 main burners)
- 64,000 BTUH (6 main burners)

Each kit includes:

- An assembled burner tray including manifold, natural gas orifices and 3, 4, 5 or 6 main burners (depending on heating input rating
- A three-rod combination igniter/sensor
- Installation instructions

The burner tray assembly included in this kit can be used with either the Fenwal remote sense ignition control (which uses a separate flame sensor lead), or the more recent Fenwal local sense ignition control (which does not use a separate flame sensor lead). When used with the remote sense ignition control, the three-rod combination igniter/sensor in the kit effectively makes this a "local sense" system.

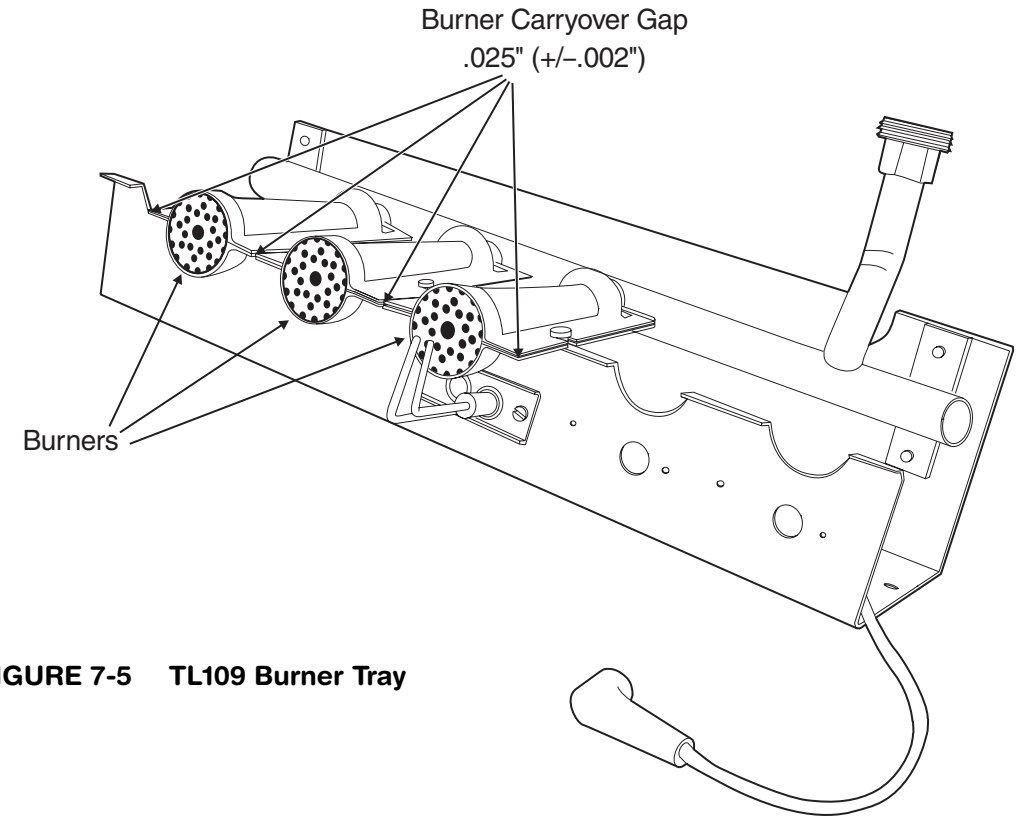

FIGURE 7-5 TL109 Burner Tray

AMUFFKT494-1 Discharge Muffler Kit

In the event that during operation an unacceptable noise occurs, a muffler kit (AMUFFKT494-1) may be installed in the discharge line*. The chamber of the muffler acts as a sound-absorbing chamber reducing compressor pulsation noises.

* AMUFFKT494-1 is designed to be used only with HWC182 units.

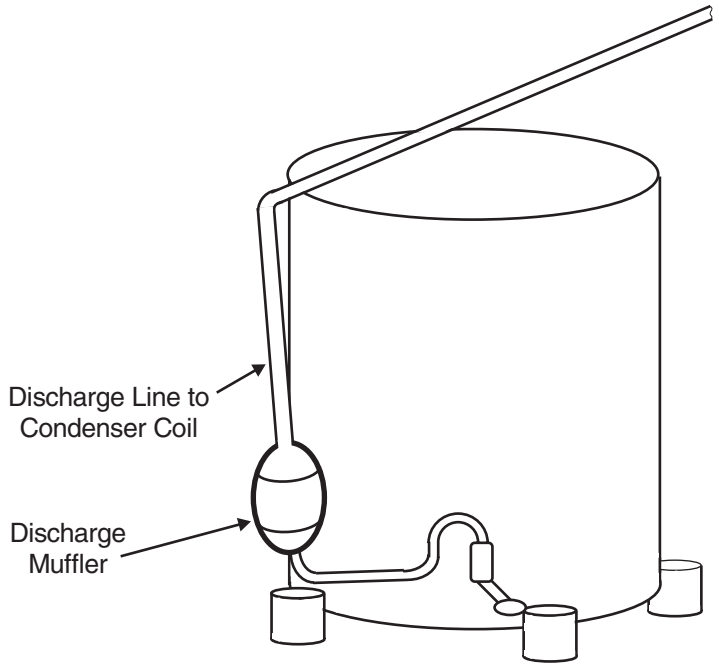

FIGURE 7-6 AMUFFKT494-1 Kit Discharge Muffler Installation

Section 8 - Parts Lists

HWC123, 183, 243, 303-1 8-2

HWC182, 242-11 8-5
HWC122, 242-10 8-7
HWC182-9 8-10
HWC242, 302-9 8-12
HWC122, 182, 242, 302-8 8-14
HWC182-6/7 8-17
HWC122, 282, 242, 302-5 8-19
HWC182, 302-4 8-22
HWC122, 182, 242, 302-3 8-25
HWC182-2 8-28
HWC122, 182, 242, 302–1 8-30
HW-1 8-33
HWA-9 8-35

HWC123, 183, 243, 303S-1
(Low Ambient)..... 8-37
HWC123, 183, 243, 303H-1
(High Altitude) 8-40

HWC3-A-1

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4-26-99

TO SELECT PART #

Last letter of the Model # is the Service Level.

64HWC303A-1**A**

First find Model #. ---------- >

64HWC303A-1**(*)**

Then match Service Level for desired part. ---------- >

REF	PART #	PART DESCRIPTION	REC STOCKING PART	SERVICE LEVEL = *	26HWC123A-1(*)	38HWC123A-1(*)	38HWC183A-1(*)	51HWC183A-1(*)	64HWC183A-1(*)	38HWC243A-1(*)	51HWC243A-1(*)	64HWC243A-1(*)	51HWC303A-1(*)	64HWC303A-1(*)
1	39370B001	TRANSFORMER	+	A	1	1	1	1	1	1	1	1	1	1
7	44987-001	VALVE-GAS HONEYWELL	+	A	1	1	1	1	1	1	1	1	1	1
11	42074-001	MANIFOLD		A	1									
11	42074-002	MANIFOLD		A		1	1			1				
11	42074-003	MANIFOLD		A				1			1		1	
11	42074-004	MANIFOLD		A					1			1		1
13	39030B003	ORIFICE #52 NATURAL GAS		A					6			6		6
13	39030B004	ORIFICE #53 NATURAL GAS		A		4	4	5		4	5		5	
13	39030B005	ORIFICE #54 NATURAL GAS		A	3					1				
20	44992-001	ELECTRODE	+	A	1	1	1	1	1	1	1	1	1	1
21	44993-001	WIRE-ELECTRODE	+	A	1	1	1	1	1	1	1	1	1	1
24	44990-001	CONTROL-IGNITION/BLOWER	+	A	1	1	1	1	1	1	1	1	1	1
34	41948-001	BURNER		A	3	4	4	5	6	4	5	6	5	6
38	38999D009	ASSEMBLY-HEAT EXCHANGER		A	1									
38	38999D010	ASSEMBLY-HEAT EXCHANGER		A		1	1			1				
38	38999D011	ASSEMBLY-HEAT EXCHANGER		A				1			1		1	
38	38999D012	ASSEMBLY-HEAT EXCHANGER		A					1			1		1
40	S38841B001	TURBULATOR		A	3	4	4	5	6	4	5	6	5	6
46	38977B001	GASKET-FLUE COVER	+	A	1	1	1	1	1	1	1	1	1	1
47	38978B001	GASKET-FLUE COL. END	+	A	2	2	2	2	2	2	2	2	2	2
52	40154B007	CONTROL-LIMIT	+	A	1	1	1	1	1	1	1	1	1	1
55	37520B004	SWITCH-ROLLOUT RED	+	A		1	1	1	1	1	1	1	1	1
55	37520B005	SWITCH-ROLLOUTGREEN	+	A	1									
57	44819-010	SWITCH-PRESSURE RED		A	1	1	1	1	1	1	1	1	1	1
63	41144-001	BLOWER-INDUCED DRAFT	+	A	1	1	1	1	1	1	1	1	1	1

HWC3-A-1 (cont.)

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4-26-99

TO SELECT PART #

Last letter of the Model # is the Service Level.

64HWC303A-1**A**

First find Model #. ---------- >

64HWC303A-1**(*)**

Then match Service Level for desired part. ---------- >

REF	PART #	PART DESCRIPTION	REC STOCKING PART	SERVICE LEVEL = *	26HWC123A-1(*)	38HWC123A-1(*)	38HWC183A-1(*)	51HWC183A-1(*)	64HWC183A-1(*)	38HWC243A-1(*)	51HWC243A-1(*)	64HWC243A-1(*)	51HWC303A-1(*)	64HWC303A-1(*)
69	39045B001	MOTOR 1/6 HP, 1 PHASE	+	A	1	1								
69	39046B001	MOTOR 1/3 HP, 1 PHASE	+	A			1	1	1	1	1	1	1	1
71	07407B000	BAND-MOTOR MOUNTING		A	1	1	1	1	1	1	1	1	1	1
72	07408B004	ARM-MOTOR MOUNTING		A	3	3	3	3	3	3	3	3	3	3
73	34833-001	WHEEL-BLOWER		A	1	1	1	1	1	1	1	1	1	1
74	S39010B001	ASSEMBLY-BLOWER HOUSING		A	1	1	1	1	1	1	1	1	1	1
86	34001D001	CAPACITOR-4 MFD@370 VAC	+	A	1	1								
86	34001D004	CAPACITOR-7.5 MFD@370 VAC	+	A			1	1	1	1	1	1	1	1
111	02764B000	BOARD-TERMINAL	+	A	1	1	1	1	1	1	1	1	1	1
124	45001-001	ASSEMBLY-WIRE HARNESS UPPER		A	1	1	1	1	1	1	1	1	1	1
125	45002-001	ASSEMBLY-WIRE HARNESS LOWER		A	1	1	1	1	1	1	1	1	1	1
127	06131B046	FILTER 16.5" X 25" X .50"	+	A	1	1	1	1	1	1	1	1	1	1
130	45004-001	LABEL-WIRING DIAGRAM		A	1	1	1	1	1	1	1	1	1	1
250	38982B001	COIL-OUTDOOR		A	1	1								
250	38983B001	COIL-OUTDOOR		A						1	1	1		
250	40649-001	COIL-OUTDOOR		A									1	1
250	41114-001	COIL-OUTDOOR		A			1	1	1					
255	38979B001	COIL-INDOOR		A	1	1								
255	38980B001	COIL-INDOOR		A			1	1	1	1	1	1		
255	40648-001	COIL-INDOOR		A									1	1
256	S43271-001	ASSY-CAP. TUBE W/FILTER-DRIER		A	1	1								
256	S43271-002	ASSY-CAP. TUBE W/FILTER-DRIER		A			1	1	1					
256	S43271-003	ASSY-CAP. TUBE W/FILTER-DRIER		A						1	1	1		
256	S43375-001	ASSY-CAP. TUBE W/FILTER-DRIER		A									1	1

HWC3-A-1 (cont.)

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4-26-99

TO SELECT PART #

Last letter of the Model # is the Service Level.

64HWC303A-1**A**

First find Model #. ---------- >

64HWC303A-1**(*)**

Then match Service Level for desired part. ---------- >

REF	PART #	PART DESCRIPTION	REC STOCKING PART	SERVICE LEVEL = *	26HWC123A-1(*)	38HWC123A-1(*)	38HWC183A-1(*)	51HWC183A-1(*)	64HWC183A-1(*)	38HWC243A-1(*)	51HWC243A-1(*)	64HWC243A-1(*)	51HWC303A-1(*)	64HWC303A-1(*)
262	35125C009	COMPRESSOR-AW501ET-089-A4		A			1	1	1					
262	39008C001	COMPRESSOR-RK147ET-002-A4		A	1	1								
262	42811-005	COMPRESSOR-ZR24KC-PFV-130		A						1	1	1		
262	42811-006	COMPRESSOR-ZR28KC-PFV-130		A									1	1
267	41254-001	MOTOR 1/4 HP, 1 PHASE	+	A						1	1	1	1	1
267	41282-001	MOTOR 1/8 HP, 1 PHASE	+	A	1	1	1	1	1					
268	39062B001	BLADE-FAN		A						1	1	1	1	1
268	39085B001	BLADE-FAN		A	1	1	1	1	1					
269	03982D004	BRACKET-MOTOR SUPPORT		A	1	1	1	1	1	1	1	1	1	1
271	38514D002	CAPACITOR-25/5 MFD@370 VAC	+	A	1	1								
271	38514D004	CAPACITOR-35/5 MFD@370 VAC	+	A			1	1	1	1	1	1	1	1
276	42725-001	PLUG-COMPRESSOR	+	A						1	1	1	1	1
278	07535C001	CONTACTOR	+	A	1	1	1	1	1	1	1	1	1	1
301	39059B001	FILTER-DRIER	+	A	1	1								
301	39059B002	FILTER-DRIER	+	A			1	1	1	1	1	1		
301	39059B003	FILTER-DRIER	+	A									1	1

HWC182-242A-11

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1-20-98

TO SELECT PART #

Last letter of the Model # is the Service Level.

38HWC242A-11**A**

First find Model #. ---------- >

38HWC242A-11**(*)**

Then match Service Level for desired part. ---------- >

REF	PART #	PART DESCRIPTION	REC STOCKING PART	SERVICE LEVEL = *	38HWC182A-11(*)	38HWC242A-11(*)
1	39370B001	TRANSFORMER	+	A-B	1	1
5	39029B001	CONTROL-BLOWER CENTER	+	A-B	1	1
7	43108-001	VALVE-GAS	+	A-B	1	1
11	42074-002	MANIFOLD		A-B	1	1
13	39030B004	ORIFICE #53 NATURAL GAS		A-B	4	4
20	41957-001	ELECTRODE	+	A-B	1	1
21	41583-001	WIRE-ELECTRODE	+	A-B	1	1
24	43110-001	CONTROL-IGNITION	+	A-B	1	1
34	41948-001	BURNER		A-B	4	4
38	38999D010	ASSEMBLY-HEAT EXCHANGER		A-B	1	1
40	S38841B001	TURBULATOR		A-B	4	4
46	38977B001	GASKET-FLUE COVER	+	A-B	1	1
47	38978B001	GASKET-FLUE COL. END	+	A-B	2	2
52	01150A008	CONTROL-LIMIT	+	A-B	1	1
54	39113B001	GASKET-LIMIT SWITCH		A-B	1	1
55	37520B004	SWITCH-ROLLOUT RED	+	A-B	1	1
57	43336-010	SWITCH-PRESSURE RED		A-B	1	1
63	41144-001	BLOWER-INDUCED DRAFT	+	A-B	1	1
69	39046B001	MOTOR 1/3 HP, 1 PHASE	+	A-B	1	1
71	07407B000	BAND-MOTOR MOUNTING		A-B	1	1
72	07408B004	ARM-MOTOR MOUNTING		A-B	3	3
73	34833B001	WHEEL-BLOWER		A-B	1	1
74	S39010B001	ASSY-BLOWER HOUSING		A-B	1	1
86	S39232D004	CAPACITOR-7.5 MFD@370 VAC	+	A-B	1	1
124	43109-001	ASSY-WIRE HARNESS UPPER		A-B	1	1

HWC182-242A-11 (cont.)

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1-20-98

TO SELECT PART #

Last letter of the Model # is the Service Level.

38HWC242A-11**A**

First find Model #. ---------- >

38HWC242A-11**(*)**

Then match Service Level for desired part. ---------- >

REF	PART #	PART DESCRIPTION	REC STOCKING PART	SERVICE LEVEL = *	38HWC182A-11(*)	38HWC242A-11(*)
125	39605B001	ASSY-WIRE HARNESS LOWER		A-B	1	1
126	39080B001	VALVE-GAS SHUT-OFF		A-B	1	1
127	06131B055	FILTER 16.5" X 25" X .50"	+	A-B	1	1
130	39007D006	LABEL-WIRING DIAGRAM		A-B	1	1
250	38983B001	COIL-OUTDOOR		A-B		1
250	41114-001	COIL-OUTDOOR		A-B	1	
255	38980B001	COIL-INDOOR		A-B	1	1
256	S43267-002	ASSY-CAPILLARY TUBE		A-B	1	
256	S43267-003	ASSY-CAPILLARY TUBE		A-B		1
262	35125C009	COMP-AW501ET-089-A4		A-B	1	
262	42811-005	COMP-ZR24KC-PFV-130		A-B		1
267	41254-001	MOTOR 1/4 HP, 1 PHASE	+	A-B		1
267	41282-001	MOTOR 1/8 HP, 1 PHASE	+	A-B	1	
268	39062B001	BLADE-FAN		A-B		1
268	39085B001	BLADE-FAN		A-B	1	
269	03982D004	BRACKET-MOTOR SUPPORT		A-B	1	1
271	38514D004	CAPACITOR-35/5 MFD@370 VAC	+	A-B	1	1
276	42725-001	ASSY-COMPRESSOR PLUG	+	A-B		1
278	07535C001	CONTACTOR	+	A-B	1	1

HWC122-242A-10

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4-26-99

TO SELECT PART #

Last letter of the Model # is the Service Level.

38HWC242A-10**A**

First find Model #. ---------- >

38HWC242A-10**(*)**

Then match Service Level for desired part. ---------- >

REF	PART #	PART DESCRIPTION	REC STOCKING PART	SERVICE LEVEL = *	26HWC122A-10(*)	38HWC122A-10(*)	38HWC242A-10(*)
1	39370B001	TRANSFORMER	+	A-B	1	1	1
5	39029B001	CONTROL-BLOWER CENTER	+	A-B	1	1	1
7	43108-001	VALVE-GAS	+	A-B	1	1	1
11	42074-001	MANIFOLD		A-B	1		
11	42074-002	MANIFOLD		A-B		1	1
13	39030B004	ORIFICE #53 NATURAL GAS		A-B		4	4
13	39030B005	ORIFICE #54 NATURAL GAS		A-B	3		
20	41957-001	ELECTRODE	+	A-B	1	1	1
21	41583-001	WIRE-ELECTRODE	+	A-B	1	1	1
24	43110-001	CONTROL-IGNITION	+	A-B	1	1	1
34	41948-001	BURNER		A-B	3	4	4
38	38999D009	ASSEMBLY-HEAT EXCHANGER		A-B	1		
38	38999D010	ASSEMBLY-HEAT EXCHANGER		A-B		1	1
40	S38841B001	TURBULATOR		A-B	3	4	4
46	38977B001	GASKET-FLUE COVER	+	A-B	1	1	1
47	38978B001	GASKET-FLUE COL. END	+	A-B	2	2	2
52	01150A008	CONTROL-LIMIT	+	A-B	1	1	1
54	39113B001	GASKET-LIMIT SWITCH		A-B	1	1	1
55	37520B004	SWITCH-ROLLOUT RED	+	A-B		1	1
55	37520B005	SWITCH-ROLLOUT GREEN	+	A-B	1		
57	43336-010	SWITCH-PRESSURE RED		A-B	1	1	1
63	41144-001	BLOWER-INDUCED DRAFT	+	A-B	1	1	1
69	39045B001	MOTOR 1/6 HP, 1 PHASE	+	A-B	1	1	
69	39046B001	MOTOR 1/3 HP, 1 PHASE	+	A-B			1
71	07407B000	BAND-MOTOR MOUNTING		A-B	1	1	1

HWC122-242A-10 (cont.)

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4-26-99

TO SELECT PART #

Last letter of the Model # is the Service Level.

38HWC242A-10**A**

First find Model #. ---------- >

38HWC242A-10**(*)**

Then match Service Level for desired part. ---------- >

REF	PART #	PART DESCRIPTION	REC STOCKING PART	SERVICE LEVEL = *	26HWC122A-10(*)	38HWC122A-10(*)	38HWC242A-10(*)
72	07408B004	ARM-MOTOR MOUNTING		A-B	3	3	3
73	34833B001	WHEEL-BLOWER		A-B	1	1	1
74	S39010B001	ASSEMBLY-BLOWER HOUSING		A-B	1	1	1
86	S39232D001	CAPACITOR-4 MFD@370 VAC	+	A-B	1	1	
86	S39232D004	CAPACITOR-7.5 MFD@370 VAC	+	A-B			1
124	43109-001	ASSEMBLY-WIRE HARNESS UPPER		A-B	1	1	1
125	39605B001	ASSEMBLY-WIRE HARNESS LOWER		A-B	1	1	1
126	39080B001	VALVE-GAS SHUT-OFF		A-B	1	1	1
127	06131B055	FILTER 16.5" X 25" X .50"	+	A-B	1	1	1
130	39007-006	LABEL-WIRING DIAGRAM		A-B	1	1	1
250	38982B001	COIL-OUTDOOR		A-B	1	1	
250	38983B001	COIL-OUTDOOR		A-B			1
255	38979B001	COIL-INDOOR		A-B	1	1	
255	38980B001	COIL-INDOOR		A-B			1
256	S43267-001	ASSEMBLY-CAPILLARY TUBE		A-B	1	1	
256	S43267-003	ASSEMBLY-CAPILLARY TUBE		A-B			1
262	35136C005	COMPRESSOR-ZR23K1-PFV		A-B			1
262	39008C001	COMPRESSOR-RK147ET-002-A4		A-B	1	1	
267	41254-001	MOTOR 1/4 HP, 1 PHASE	+	A-B			1
267	41282-001	MOTOR 1/8 HP, 1 PHASE	+	A-B	1	1	
268	39062B001	BLADE-FAN		A-B			1
268	39085B001	BLADE-FAN		A-B	1	1	
269	03982D004	BRACKET-MOTOR SUPPORT		A-B	1	1	1

HWC122-242A-10 (cont.)

REVISED
4-26-99

TO SELECT PART #

Last letter of the Model # is the Service Level.

38HWC242A-10**A**

First find Model #. ---------- >

38HWC242A-10**(*)**

Then match Service Level for desired part. ---------- >

REF	PART #	PART DESCRIPTION	REC STOCKING PART	SERVICE LEVEL = *	26HWC122A-10(*)	38HWC122A-10(*)	38HWC242A-10(*)
271	38514D002	CAPACITOR-25/5 MFD@370VAC	+	A-B	1	1	
271	38514D003	CAPACITOR-30/5 MFD@370VAC	+	A-B			1
278	07535C001	CONTACTOR	+	A-B	1	1	1

HWC182-9

REVISED
1-20-98

TO SELECT PART #

Last letter of the Model # is the Service Level.

64HWC182A-9**A**

First find Model #. ---------- >

64HWC182A-9**(*)**

Then match Service Level for desired part. ---------- >

REF	PART #	PART DESCRIPTION	REC STOCKING PART	SERVICE LEVEL = *	38HWC182A-9(*)	51HWC182A-9(*)	64HWC182A-9(*)
1	39370B001	TRANSFORMER	+	A-E	1	1	1
5	39029B002	CONTROL-BLOWER CENTER	+	A-E	1	1	1
7	39031D001	VALVE-GAS	+	A-C	1	1	1
7	43108-001	VALVE-GAS	+	E	1	1	1
11	42074-002	MANIFOLD		A-E	1	1	1
11	42074-003	MANIFOLD		A-E		1	1
11	42074-004	MANIFOLD		A-E		1	1
13	39030B003	ORIFICE #52 NATURAL GAS		A-E			6
13	39030B004	ORIFICE #53 NATURAL GAS		A-E	4	5	
20	41957-001	ELECTRODE	+	A-E	1	1	1
21	41583-001	WIRE-ELECTRODE	+	A-E	1	1	1
24	43110-001	CONTROL-IGNITION	+	A-E	1	1	1
34	41948-001	BURNER		A-E	4	5	6
38	38999D010	ASSEMBLY-HEAT EXCHANGER		A-E	1		
38	38999D011	ASSEMBLY-HEAT EXCHANGER		A-E		1	
38	38999D012	ASSEMBLY-HEAT EXCHANGER		A-E			1
40	S38841B001	TURBULATOR		A-E	4	5	6
46	38977B001	GASKET-FLUE COVER	+	A-E	1	1	1
47	38978B001	GASKET-FLUE COL. END	+	A-E	2	2	2
52	01150A008	CONTROL-LIMIT	+	A-E	1	1	1
54	39113B001	GASKET-LIMIT SWITCH		A-E	1	1	1
55	37520B004	SWITCH-ROLLOUT RED	+	A-E	1	1	1
57	43336-010	SWITCH-PRESSURE RED		A-E	1	1	1
63	41144-001	BLOWER-INDUCED DRAFT	+	A-E	1	1	1
69	39046B001	MOTOR 1/3 HP, 1 PHASE	+	A-E	1	1	1

HWC182-9 (cont.)

REVISED
1-20-98

TO SELECT PART #

Last letter of the Model # is the Service Level.

64HWC182A-9**A**

First find Model #. ---------- >

64HWC182A-9**(*)**

Then match Service Level for desired part. ---------- >

REF	PART #	PART DESCRIPTION	REC STOCKING PART	SERVICE LEVEL = *	38HWC182A-9(*)	51HWC182A-9(*)	64HWC182A-9(*)
71	07407B000	BAND-MOTOR MOUNTING		A-E	1	1	1
72	07408B004	ARM-MOTOR MOUNTING		A-E	3	3	3
73	34833B001	WHEEL-BLOWER		A-E	1	1	1
74	S39010B001	ASSY-BLOWER HOUSING		A-E	1	1	1
86	S39232D004	CAPACITOR 7.5 MFD@370VAC	+	A-E	1	1	1
124	43109-001	ASSY-WIRE HARNESS UPPER		A-E	1	1	1
125	39605B001	ASSY-WIRE HARNESS LOWER		A-E	1	1	1
126	39080B001	VALVE-GAS SHUT-OFF		A-E	1	1	1
127	06131B055	FILTER 16.5" X 25" X .50"	+	A-E	1	1	1
130	39007D006	LABEL-WIRING DIAGRAM		A-E	1	1	1
250	41114-001	COIL-OUTDOOR		A-E	1	1	1
255	38980B001	COIL-INDOOR		A-E	1	1	1
256	S39058B002	ASSY-CAP TUBE		A-B	1	1	1
256	S43627-002	ASSY-CAP TUBE		C-E	1	1	1
262	35125C009	COMP-AW201ET-033-A4		A-E	1	1	1
267	41282-001	MOTOR 1/8 HP, 1 PHASE	+	A-E	1	1	1
268	39085B001	BLADE-FAN		A-E	1	1	1
269	03982D004	BRACKET-MOTOR SUPPORT		A-E	1	1	1
271	38514D004	CAPACITOR 35/5 MFD@370VAC	+	A-E	1	1	1
278	07535C001	CONTACTOR	+	A-E	1	1	1

HWC242-302-9

REVISED
1-20-98

TO SELECT PART #

Last letter of the Model # is the Service Level.

64HWC302A-9**A**

First find Model #. ---------- >

64HWC302A-9**(*)**

Then match Service Level for desired part. ---------- >

REF	PART #	PART DESCRIPTION	REC STOCKING PART	SERVICE LEVEL = *	51HWC242A-9(*)	64HWC242A-9(*)	51HWC302A-9(*)	64HWC302A-9(*)
1	39370B001	TRANSFORMER	+	A-B	1	1	1	1
5	39029B002	CONTROL-BLOWER CENTER	+	A-B	1	1	1	1
7	43108-001	VALVE-GAS	+	A-B	1	1	1	1
11	42074-003	MANIFOLD		A-B	1		1	
11	42074-004	MANIFOLD		A-B		1		1
13	39030B003	ORIFICE #52 NATURAL GAS		A-B		6		6
13	39030B004	ORIFICE #53 NATURAL GAS		A-B	5		5	
20	41957-001	ELECTRODE	+	A-B	1	1	1	1
21	41583-002	WIRE-ELECTRODE	+	A-B	1	1	1	1
24	43110-001	CONTROL-IGNITION	+	A-B	1	1	1	1
34	41948-001	BURNER		A-B	5	6	5	6
38	38999D011	ASSEMBLY-HEAT EXCHANGER		A-B	1		1	
38	38999D012	ASSEMBLY-HEAT EXCHANGER		A-B		1		1
40	S38841B001	TURBULATOR		A-B	5	6	5	6
46	38977B001	GASKET-FLUE COVER	+	A-B	1	1	1	1
47	38978B001	GASKET-FLUE COL. END	+	A-B	2	2	2	2
52	01150A008	CONTROL-LIMIT	+	A-B	1	1	1	1
54	39113B001	GASKET-LIMIT SWITCH		A-B	1	1	1	1
55	37520B004	SWITCH-ROLLOUT RED	+	A-B	1	1	1	1
63	41144-001	BLOWER-INDUCED DRAFT	+	A-B	1	1	1	1
69	39046B001	MOTOR 1/3 HP, 1 PHASE	+	A-B	1	1	1	1
71	07407B000	BAND-MOTOR MOUNTING		A-B	1	1	1	1
72	07408B004	ARM-MOTOR MOUNTING		A-B	3	3	3	3
73	34833B001	WHEEL-BLOWER		A-B	1	1	1	1
74	S39010B001	ASSEMBLY -BLOWER HOUSING		A-B	1	1	1	1

HWC242-302-9 (cont.)

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1-20-98

TO SELECT PART #

Last letter of the Model # is the Service Level.

64HWC302A-9**A**

First find Model #. ---------- >

64HWC302A-9**(*)**

Then match Service Level for desired part. ---------- >

REF	PART #	PART DESCRIPTION	REC STOCKING PART	SERVICE LEVEL = *	51HWC242A-9(*)	64HWC242A-9(*)	51HWC302A-9(*)	64HWC302A-9(*)
86	S39232D004	CAPACITOR 7.5 MFD@370VAC	+	A-B	1	1	1	1
124	43109-001	ASSY-WIRE HARNESS UPPER		A-B	1	1	1	1
125	39605B001	ASSY-WIRE HARNESS LOWER		A-B	1	1	1	1
126	39080B001	VALVE-GAS SHUT-OFF		A-B	1	1	1	1
127	06131B055	FILTER 16.5" X 25" X .50"	+	A-B	1	1	1	1
130	39007D006	LABEL-WIRING DIAGRAM		A-B	1	1	1	1
250	38983B001	COIL-OUTDOOR		A-B	1	1		
250	40649-001	COIL-OUTDOOR		A-B			1	1
255	38980B001	COIL-INDOOR		A-B	1	1		
255	40648-001	COIL-INDOOR		A-B			1	1
256	S43271-002	ASSY-CAPILLARY TUBE		A-B	1	1		
256	S43280-001	ASSY-CAPILLARY TUBE		A-B			1	1
262	42811-005	COMP-ZR24KC-PFV-130		A-B	1	1		
262	42811-006	COMP-ZR28KC-PFV-130					1	1
267	41254-001	MOTOR 1/4 HP, 1 PHASE	+	A-B	1	1	1	1
268	39062B001	BLADE-FAN		A-B	1	1	1	1
269	03982D004	BRACKET-MOTOR SUPPORT		A-B	1	1	1	1
271	38514D004	CAPACITOR 35/5 MFD@370VAC	+	A-B	1	1	1	1
276	42725-001	PLUG-COMPRESSOR	+	A-B	1	1	1	1
278	07535C001	CONTACTOR	+	A-B	1	1	1	1

HWC-8

REVISED
1-20-98

TO SELECT PART #

Last letter of the Model # is the Service Level.

64HWC302-8**A**

First find Model #. ---------- >

64HWC302-8**(*)**

Then match Service Level for desired part. ---------- >

REF	PART #	PART DESCRIPTION	REC STOCKING PART	SERVICE LEVEL = *	26HWC122-8(*)	38HWC122-8(*)	38HWC182-8(*)	51HWC182-8(*)	64HWC182-8(*)	38HWC242-8(*)	51HWC242-8(*)	64HWC242-8(*)	51HWC302-8(*)	64HWC302-8(*)
1	39370B001	TRANSFORMER	+	A	1	1	1	1	1	1	1	1	1	1
5	39029B002	CONTROL-BLOWER CENTER	+	A	1	1	1	1	1	1	1	1	1	1
7	39031D001	VALVE-GAS	+	A	1	1	1	1	1	1	1	1	1	1
11	42074-001	MANIFOLD		A	1									
11	42074-002	MANIFOLD		A		1	1			1				
11	42074-003	MANIFOLD		A				1			1		1	
11	42074-004	MANIFOLD		A					1			1		1
13	39030B003	ORIFICE #52		A					6			6		6
13	39030B004	ORIFICE #53		A		4	4	5		4	5		5	
13	39030B005	ORIFICE #54		A	3									
20	41957-001	ELECTRODE	+	A	1	1	1	1	1	1	1	1	1	1
21	41583-001	WIRE-ELECTRODE	+	A	1	1	1	1	1	1	1	1	1	1
24	41582-002	CONTROL-IGNITION	+	A	1	1	1	1	1	1	1	1	1	1
34	41948-001	BURNER		A	3	4	4	5	6	4	5	6	5	6
38	38999D009	ASSY-HEAT EXCHANGER		A	1									
38	38999D010	ASSY-HEAT EXCHANGER		A		1	1			1				
38	38999D011	ASSY-HEAT EXCHANGER		A				1			1		1	
38	38999D012	ASSY-HEAT EXCHANGER		A					1			1		1
40	38841B001	TURBULATOR		A	3	4	4	5	6	4	5	6	5	6
46	38977B001	GASKET-FLUE COVER	+	A	1	1	1	1	1	1	1	1	1	1
47	38978B001	GASKET-FLUE COL END	+	A	2	2	2	2	2	2	2	2	2	2
52	01150A008	CONTROL-LIMIT	+	A	1	1	1	1	1	1	1	1	1	1
54	39113B001	GASKET-LIMIT SWITCH		A	1	1	1	1	1	1	1	1	1	1
55	37520B004	SWITCH-ROLLOUT RED	+	A		1	1	1	1	1	1	1	1	1
55	37520B005	SWITCH-ROLLOUT GREEN	+	A	1									

HWC-8 (cont.)

REVISED
1-20-98

TO SELECT PART #

Last letter of the Model # is the Service Level.

64HWC302-8**A**

First find Model #. ---------- >

64HWC302-8**(*)**

Then match Service Level for desired part. ---------- >

REF	PART #	PART DESCRIPTION	REC STOCKING PART	SERVICE LEVEL = *	26HWC122-8(*)	38HWC122-8(*)	38HWC182-8(*)	51HWC182-8(*)	64HWC182-8(*)	38HWC242-8(*)	51HWC242-8(*)	64HWC242-8(*)	51HWC302-8(*)	64HWC302-8(*)
57	41862-001	SWITCH-PRESS RED		A		1	1	1	1	1	1	1	1	1
57	41862-002	SWITCH-PRESS GREEN		A	1									
63	41144-001	BLOWER-INDUCED DRAFT	+	A	1	1	1	1	1	1	1	1	1	1
69	39045B001	MOTOR 1/6 HP, 1 PHASE	+	A	1	1								
69	39046B001	MOTOR 1/3 HP, 1 PHASE	+	A			1	1	1	1	1	1	1	1
71	07407B000	BAND-MOTOR MOUNTING		A	1	1	1	1	1	1	1	1	1	1
72	07408B004	ARM-MOTOR MOUNTING		A	3	3	3	3	3	3	3	3	3	3
73	34833B001	WHEEL-BLOWER		A	1	1	1	1	1	1	1	1	1	1
74	39010B001	ASSY-BLOWER HOUSING		A	1	1	1	1	1	1	1	1	1	1
86	39232D001	CAPACITOR-4 MFD@370V	+	A	1	1								
86	39232D004	CAPACITOR-7.5 MFD@370V	+	A			1	1	1	1	1	1	1	1
124	42268-001	ASSY-WIRE HARNESS UPPER		A	1	1	1	1	1	1	1	1	1	1
125	39605B001	ASSY-WIRE HARNESS LOWER		A	1	1	1	1	1	1	1	1	1	1
126	39080B001	VALVE-GAS SHUT-OFF		A	1	1	1	1	1	1	1	1	1	1
127	06131B046	FILTER 16.5" X 25" X .5"	+	A	1	1	1	1	1	1	1	1	1	1
128	06132B001	ROD-FILTER		A	1	1	1	1	1	1	1	1	1	1
130	39007D005	LABEL-WIRING DIAGRAM		A	1	1	1	1	1	1	1	1	1	1
250	38982B001	COIL-OUTDOOR		A	1	1								
250	38983B001	COIL-OUTDOOR		A						1	1	1		
250	40649-001	COIL-OUTDOOR		A									1	1
250	41114-001	COIL-OUTDOOR		A			1	1	1					
255	38979B001	COIL-INDOOR		A	1	1								
255	38980B001	COIL-INDOOR		A			1	1	1	1	1	1		
255	40648-001	COIL-INDOOR		A									1	1

HWC-8 (cont.)

REVISED
1-20-98

TO SELECT PART #

Last letter of the Model # is the Service Level.

64HWC302-8**A**

First find Model #. ---------- >

64HWC302-8**(*)**

Then match Service Level for desired part. ---------- >

REF	PART #	PART DESCRIPTION	REC STOCKING PART	SERVICE LEVEL = *	26HWC122-8(*)	38HWC122-8(*)	38HWC182-8(*)	51HWC182-8(*)	64HWC182-8(*)	38HWC242-8(*)	51HWC242-8(*)	64HWC242-8(*)	51HWC302-8(*)	64HWC302-8(*)
256	39058B001	ASSY-CAP TUBE		A	1	1								
256	39058B002	ASSY-CAP TUBE		A			1	1	1					
256	39058B003	ASSY-CAP TUBE		A						1	1	1		
256	40650-001	ASSY-CAP TUBE		A									1	1
262	35136C001	COMP-ZR28K1-PFV		A									1	1
262	35136C005	COMP-ZR23K1-PFV		A						1	1	1		
262	39008C001	COMP-RK147ET-002-A4		A	1	1								
262	39008C002	COMP-RK233ET-009-A4		A			1	1	1					
267	41254-001	MOTOR 1/4 HP, 1 PHASE	+	A						1	1	1	1	1
267	41282-001	MOTOR 1/8 HP, 1 PHASE	+	A	1	1	1	1	1					
268	39062B001	BLADE-FAN		A						1	1	1	1	1
268	39085B001	BLADE-FAN		A	1	1	1	1	1					
269	03982D004	BRACKET-MOTOR SUPPORT		A	1	1	1	1	1	1	1	1	1	1
271	38514D002	CAPACITOR-25/5 MFD@370 VAC	+	A	1	1	1	1	1					
271	38514D003	CAPACITOR-30/5 MFD@370 VAC	+	A						1	1	1		
271	38514D004	CAPACITOR-35/5 MFD@370 VAC	+	A									1	1
278	07535C001	CONTACTOR	+	A	1	1	1	1	1	1	1	1	1	1
282	40715-001	RELAY-TIME DELAY	+	A						1	1	1	1	1

HWC-6/7

REVISED
1-20-98

TO SELECT PART #

Last letter of the Model # is the Service Level.

64HWC182-6**A**

First find Model #. ---------- >

64HWC182-6**(*)**

Then match Service Level for desired part. ---------- >

REF	PART #	PART DESCRIPTION	REC STOCKING PART	SERVICE LEVEL = *	38HWC182-7(*)	51HWC182-6(*)	64HWC182-6(*)
1	39370B001	TRANSFORMER	+	A	1	1	1
5	39029B001	CONTROL-BLOWER CENTER	+	A	1	1	1
7	39031D001	VALVE-GAS	+	A	1	1	1
11	38832B002	MANIFOLD-4 CELL		A	1		
11	38832B003	MANIFOLD-5 CELL		A		1	
11	38832B004	MANIFOLD-6 CELL		A			1
13	39030B003	ORIFICE #52 NATURAL GAS		A			6
13	39030B004	ORIFICE #53 NATURAL GAS		A	4	5	
20	39050B001	ELECTRODE	+	A	1	1	1
21	41583-001	WIRE-ELECTRODE	+	A	1	1	1
24	41582-002	CONTROL-IGNITION	+	A	1	1	1
34	39006B001	ASSY-BURNER		A	4	5	6
38	38999D010	ASSEMBLY-HEAT EXCHANGER		A	1		
38	38999D011	ASSEMBLY-HEAT EXCHANGER		A		1	
38	38999D012	ASSEMBLY-HEAT EXCHANGER		A			1
40	38841B001	TURBULATOR		A	4	5	6
46	38977B001	GASKET-FLUE COVER	+	A	1	1	1
47	38978B001	GASKET-FLUE COL. END	+	A	2	2	2
52	01150A008	CONTROL-LIMIT	+	A	1	1	1
54	39113B001	GASKET-LIMIT SWITCH		A	1	1	1
55	37520B004	SWITCH-ROLLOUT RED	+	A	1	1	1
57	41862-001	SWITCH-PRESS RED		A	1	1	1
63	41144-001	BLOWER-INDUCED DRAFT	+	A	1	1	1
69	39046B001	MOTOR 1/3 HP, 1 PHASE	+	A	1	1	1
71	07407B000	BAND-MOTOR MOUNTING		A	1	1	1

HWC-6/7 (cont.)

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1-20-98

TO SELECT PART #

Last letter of the Model # is the Service Level.

64HWC182-6**A**

First find Model #. ---------- >

64HWC182-6**(*)**

Then match Service Level for desired part. ---------- >

REF	PART #	PART DESCRIPTION	REC STOCKING PART	SERVICE LEVEL = *	38HWC182-7(*)	51HWC182-6(*)	64HWC182-6(*)
72	07408B004	ARM-MOTOR MOUNTING		A	3	3	3
73	34833B001	WHEEL BLOWER		A	1	1	1
74	39010B001	ASSY-BLOWER HOUSING		A	1	1	1
86	39232D004	CAPACITOR 7.5 MFD@370VAC	+	A	1	1	1
124	40231B001	ASSY-WIRE HARNESS FEMALE		A	1	1	1
125	39605B001	ASSY-WIRE HARNESS MALE		A	1	1	1
126	39080B001	VALVE-GAS SHUT-OFF		A	1	1	1
127	06131B046	FILTER 16.5" X 25" X .50"	+	A	1	1	1
128	06132B001	ROD-FILTER		A	1	1	1
130	39007D005	LABEL-WIRING DIAGRAM		A	1	1	1
250	41114-001	COIL-OUTDOOR		A	1	1	1
255	38980B001	COIL-INDOOR		A	1	1	1
262	35125C009	COMP-AW5517G		A	1	1	1
267	41282-001	MOTOR 1/8 HP, 1 PHASE		A	1	1	1
268	39085B001	BLADE-FAN		A	1	1	1
269	03982D004	BRACKET-MOTOR SUPPORT		A	1	1	1
271	38514D004	CAPACITOR 35/5 MFD@370VAC	+	A	1	1	1
278	07535C001	CONTACTOR	+	A	1	1	1

HWC-5

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1-20-98

TO SELECT PART #

Last letter of the Model # is the Service Level.

64HWC302-5**A**

First find Model #. ---------- >

64HWC302-5**(*)**

Then match Service Level for desired part. ---------- >

REF	PART #	PART DESCRIPTION	REC STOCKING PART	SERVICE LEVEL = *	26HWC122-5(*)	38HWC122-5(*)	38HWC182-6(*)	51HWC182-5(*)	64HWC182-5(*)	38HWC242-5(*)	51HWC242-4(*)	64HWC242-4(*)	51HWC302-5(*)	64HWC302-5(*)
1	39370B001	TRANSFORMER	+	A	1	1	1	1	1	1	1	1	1	1
5	39029B002	CONTROL-BLOWER CENTER	+	A	1	1	1	1	1	1	1	1	1	1
7	39031D001	VALVE-GAS	+	A	1	1	1	1	1	1	1	1	1	1
11	38832B001	MANIFOLD-3 CELL		A	1									
11	38832B002	MANIFOLD-4 CELL		A		1	1			1				
11	38832B003	MANIFOLD-5 CELL		A				1			1		1	
11	38832B004	MANIFOLD-6 CELL		A					1			1		1
13	39030B003	ORIFICE #52		A					6			6		6
13	39030B004	ORIFICE #53		A		4	4	5		4	5		5	
13	39030B005	ORIFICE #54		A	3									
20	39050B001	ELECTRODE	+	A	1	1	1	1	1	1	1	1	1	1
21	41583-001	WIRE-ELECTRODE	+	A	1	1	1	1	1	1	1	1	1	1
24	41582-002	CONTROL-IGNITION	+	A	1	1	1	1	1	1	1	1	1	1
34	39006B001	ASSY-BURNER		A	3	4	4	5	6	4	5	6	5	6
38	38999D009	ASSY-HEAT EXCHANGER		A	1									
38	38999D010	ASSY-HEAT EXCHANGER		A		1	1			1				
38	38999D011	ASSY-HEAT EXCHANGER		A				1			1		1	
38	38999D012	ASSY-HEAT EXCHANGER		A					1			1		1
40	38841B001	TURBULATOR		A	3	4	4	5	6	4	5	6	5	6
46	38977B001	GASKET-FLUE COVER	+	A	1	1	1	1	1	1	1	1	1	1
47	38978B001	GASKET-FLUE COL END	+	A	2	2	2	2	2	2	2	2	2	2
52	01150A008	CONTROL-LIMIT	+	A	1	1	1	1	1	1	1	1	1	1
54	39113B001	GASKET-LIMIT SWITCH	+	A	1	1	1	1	1	1	1	1	1	1
55	37520B004	SWITCH-ROLLOUT RED	+	A	1	1	1	1	1	1	1	1	1	1

HWC-5 (cont.)

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TO SELECT PART #

Last letter of the Model # is the Service Level.

64HWC302-5**A**

First find Model #. ---------- >

64HWC302-5**(*)**

Then match Service Level for desired part. ---------- >

REF	PART #	PART DESCRIPTION	REC STOCKING PART	SERVICE LEVEL = *	26HWC122-5(*)	38HWC122-5(*)	38HWC182-6(*)	51HWC182-5(*)	64HWC182-5(*)	38HWC242-5(*)	51HWC242-4(*)	64HWC242-4(*)	51HWC302-5(*)	64HWC302-5(*)
57	41862-001	SWITCH-PRESS RED		A		1	1	1	1	1	1	1	1	1
57	41862-002	SWITCH-PRESS GREEN		A	1									
63	41144-001	BLOWER-INDUCED DRAFT	+	A	1	1	1	1	1	1	1	1	1	1
69	39045B001	MOTOR 1/6 HP, 1 PHASE	+	A	1	1								
69	39046B001	MOTOR 1/3 HP, 1 PHASE	+	A			1	1	1	1	1	1	1	1
71	07407B000	BAND-MOTOR MOUNTING		A	1	1	1	1	1	1	1	1	1	1
72	07408B004	ARM-MOTOR MOUNTING		A	3	3	3	3	3	3	3	3	3	3
73	34833B001	WHEEL-BLOWER		A	1	1	1	1	1	1	1	1	1	1
74	39010B001	ASSY-BLOWER HOUSING		A	1	1	1	1	1	1	1	1	1	1
86	39232D001	CAPACITOR-4 MFD@370V	+	A	1	1								
86	39232D004	CAPACITOR-7.5 MFD@370V	+	A			1	1	1	1	1	1	1	1
124	40231B001	ASSY-WIRE HARNESS FEMALE		A	1	1	1	1	1	1	1	1	1	1
125	39605B001	ASSY-WIRE HARNESS MALE		A	1	1	1	1	1	1	1	1	1	1
126	39080B001	VALVE-GAS SHUT-OFF	+	A	1	1	1	1	1	1	1	1	1	1
127	06131B046	FILTER 16.5" X 25" X .5"	+	A	1	1	1	1	1	1	1	1	1	1
128	06132B001	ROD-FILTER		A	1	1	1	1	1	1	1	1	1	1
130	39007D005	LABEL-WIRING DIAGRAM		A	1	1	1	1	1	1	1	1	1	1
250	38982B001	COIL-OUTDOOR		A	1	1								
250	38983B001	COIL-OUTDOOR		A						1	1	1		
250	40649-001	COIL-OUTDOOR		A									1	1
250	41114-001	COIL-OUTDOOR		A			1	1	1					
255	38979B001	COIL-INDOOR		A	1	1								
255	38980B001	COIL-INDOOR		A			1	1	1	1	1	1		
255	40648-001	COIL-INDOOR		A									1	1

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TO SELECT PART #

Last letter of the Model # is the Service Level.

64HWC302-5**A**

First find Model #. ---------- >

64HWC302-5**(*)**

Then match Service Level for desired part. ---------- >

REF	PART #	PART DESCRIPTION	REC STOCKING PART	SERVICE LEVEL = *	26HWC122-5(*)	38HWC122-5(*)	38HWC182-6(*)	51HWC182-5(*)	64HWC182-5(*)	38HWC242-5(*)	51HWC242-4(*)	64HWC242-4(*)	51HWC302-5(*)	64HWC302-5(*)
256	39058B001	ASSY-CAP TUBE		A	1	1								
256	39058B002	ASSY-CAP TUBE		A			1	1	1					
256	39058B003	ASSY-CAP TUBE		A						1	1	1		
256	40650-001	ASSY-CAP TUBE		A									1	1
262	35136C001	COMP-ZR28K1-PFV		A									1	1
262	35136C005	COMP-ZR23K1-PFV		A						1	1	1		
262	39008C001	COMP-RK147ET-002-A4		A	1	1								
262	39008C002	COMP-RK233ET-009-A4		A			1	1	1					
267	41254-001	MOTOR 1/4 HP, 1 PHASE	+	A						1	1	1	1	1
267	41282-001	MOTOR 1/8 HP, 1 PHASE	+	A	1	1	1	1	1					
268	39062B001	BLADE-FAN		A						1	1	1	1	1
268	39085B001	BLADE-FAN		A	1	1	1	1	1					
269	03982D004	BRACKET-MOTOR SUPPORT		A	1	1	1	1	1	1	1	1	1	1
271	38514D002	CAPACITOR-25/5 MFD@370 VAC	+	A	1	1	1	1	1					
271	38514D003	CAPACITOR-30/5 MFD@370 VAC	+	A						1	1	1		
271	38514D004	CAPACITOR-35/5 MFD@370 VAC	+	A									1	1
278	07535C001	CONTACTOR	+	A	1	1	1	1	1	1	1	1	1	1
282	40715-001	RELAY-TIME DELAY	+	A						1	1	1	1	1

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TO SELECT PART #

Last letter of the Model # is the Service Level.

38HWC182-4**A**

First find Model #. ---------- >

38HWC182-4**(*)**

Then match Service Level for desired part. ---------- >

REF	PART #	PART DESCRIPTION	REC STOCKING PART	SERVICE LEVEL = *	38HWC182-4(*)	51HWC182-4(*)	64HWC182-4(*)	51HWC302-4(*)	64HWC302-4(*)
1	39370B001	TRANSFORMER	+	A	1	1	1	1	1
5	39029B002	CONTROL-BLOWER CENTER	+	A	1	1	1	1	1
7	39031D001	VALVE-GAS	+	A	1	1	1	1	1
11	38832B002	MANIFOLD		A	1				
11	38832B003	MANIFOLD		A		1		1	
11	38832B004	MANIFOLD		A			1		1
13	39030B003	ORIFICE #52 NATURAL GAS		A			6		6
13	39030B004	ORIFICE #53 NATURAL GAS		A	4	5		5	
19	39073B001	SENSOR-FLAME	+	A	1	1	1	1	1
20	39050B001	ELECTRODE	+	A	1	1	1	1	1
21	39049B001	WIRE-ELECTRODE	+	A	1				
21	39049B002	WIRE-ELECTRODE	+	A		1	1	1	1
24	39048B001	CONTROL-IGNITION	+	A	1	1	1	1	1
34	39006B001	BURNER END SHOT		A	4	5	6	5	6
38	38999D002	HEAT EXCHANGER		A	1				
38	38999D003	HEAT EXCHANGER		A		1		1	
38	38999D004	HEAT EXCHANGER					1		1
40	S38841B001	TURBULATOR		A	4	5	6	5	6
46	38977B001	GASKET-FLUE FRONT	+	A	1	1	1	1	1
47	38978B001	GASKET-FLUE SIDE	+	A	2	2	2	2	2
52	01150A008	CONTROL-LIMIT	+	A	1	1	1	1	1
54	39113B001	GASKET-LIMIT SWITCH	+	A	1	1	1	1	1
55	37520B004	SWITCH-ROLLOUT	+	A	1	1	1	1	1
57	39089B001	SWITCH-N.O. PRESSURE		A	1	1	1	1	1
63	39005B001	BLOWER-INDUCED DRAFT	+	A	1	1	1	1	1

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TO SELECT PART #

Last letter of the Model # is the Service Level.

38HWC182-4**A**

First find Model #. ---------- >

38HWC182-4**(*)**

Then match Service Level for desired part. ---------- >

REF	PART #	PART DESCRIPTION	REC STOCKING PART	SERVICE LEVEL = *	38HWC182-4(*)	51HWC182-4(*)	64HWC182-4(*)	51HWC302-4(*)	64HWC302-4(*)
69	39046B001	MOTOR 1/3 HP	+	A	1	1	1	1	1
71	07407B000	BAND-MOTOR MOUNTING		A	1	1	1	1	1
72	07408B004	ARM-MOTOR MOUNTING		A	3	3	3	3	3
73	34833B001	WHEEL-BLOWER		A	1	1	1	1	1
74	39010B001	HOUSING-BLOWER		A	1	1	1	1	1
86	39232D004	CAPACITOR 7.5 MFD@370VAC	+	A	1	1	1	1	1
124	40231B001	ASSY-FEMALE RECPT.		A	1	1	1	1	1
125	390650B001	ASSY-MALE RECPT.		A	1	1	1	1	1
126	39080B001	VALVE-GAS SHUT-OFF	+	A	1	1	1	1	1
127	06131B046	FILTER 16.5" X 25" X .50"	+	A	1	1	1	1	1
128	06132B001	ROD-FILTER		A	1	1	1	1	1
130	39007D003	WIRING DIAGRAM		A	1	1	1	1	1
250	40649-001	COIL-OUTDOOR		A				1	1
250	41114-001	COIL-OUTDOOR		A	1	1	1		
255	38980B001	COIL-INDOOR		A	1	1	1		
255	40648-001	COIL-INDOOR		A				1	1
256	39058B002	CAP TUBE ASSY-DRIER		A	1	1	1		
256	40650-001	CAP TUBE ASSY-DRIER		A				1	1
262	35136C001	COMPRESSOR		A				1	1
262	39008C002	COMPRESSOR		A	1	1	1		
267	39044B001	MOTOR 1/4 HP	+	A				1	1
267	39084B001	MOTOR 1/8 HP	+	A	1	1	1		
268	39062B001	BLADE-FAN		A				1	1
268	39085B001	BLADE-FAN		A	1	1	1		
269	03982D004	BRACKET-MOTOR SUPPORT		A	1	1	1	1	1

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TO SELECT PART #

Last letter of the Model # is the Service Level.

38HWC182-4**A**

First find Model #. ---------- >

38HWC182-4**(*)**

Then match Service Level for desired part. ---------- >

REF	PART #	PART DESCRIPTION	REC STOCKING PART	SERVICE LEVEL = *	38HWC182-4(*)	51HWC182-4(*)	64HWC182-4(*)	51HWC302-4(*)	64HWC302-4(*)
271	38514D002	CAPACITOR 25/5 MFD@370VAC	+	A	1	1	1		
271	38514D004	CAPACITOR 35/5 MFD@370VAC	+	A				1	1
278	07535C001	CONTACTOR	+	A	1	1	1	1	1
282	38065A001	RELAY-TIME DELAY	+	A				1	1
301	39059B002	DRIER	+	A	1	1	1		
301	39059B003	DRIER	+	A				1	1

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TO SELECT PART #

Last letter of the Model # is the Service Level.

64HWC302-3**A**

First find Model #. ---------- >

64HWC302-3**(*)**

Then match Service Level for desired part. ---------- >

REF	PART #	PART DESCRIPTION	REC STOCKING PART	SERVICE LEVEL = *	26HWC122-3(*)	38HWC122-3(*)	38HWC182-3(*)	51HWC182-3(*)	64HWC182-3(*)	38HWC242-3(*)	51HWC242-3(*)	64HWC242-3(*)	51HWC302-3(*)	64HWC302-3(*)
1	39370B001	TRANSFORMER	+	A	1	1	1	1	1	1	1	1	1	1
5	39029B001	CENTER BLO. CONT.	+	A	1	1	1	1	1	1	1	1	1	1
7	39031D001	VALVE-GAS	+	A	1	1	1	1	1	1	1	1	1	1
11	38832B001	MANIFOLD GAS		A	1									
11	38832B002	MANIFOLD GAS		A		1	1			1				
11	38832B003	MANIFOLD GAS		A				1			1		1	
11	38832B004	MANIFOLD GAS		A					1			1		1
13	39030B003	ORIFICE #52		A					6			6		6
13	39030B004	ORIFICE #53		A		4	4	5		4	5		5	
13	39030B005	ORIFICE #54		A	3									
19	39073B001	SENSOR-FLAME	+	A	1	1	1	1	1	1	1	1	1	1
20	39050B001	ELECTRODE-D.S.I.	+	A	1	1	1	1	1	1	1	1	1	1
21	39049B001	WIRE-ELECTRODE	+	A	1	1	1			1				
21	39049B002	WIRE-ELECTRODE	+	A				1	1		1	1	1	1
24	39048B001	CONTROL-IGNITION	+	A	1	1	1	1	1	1	1	1	1	1
34	39006B001	BURNER END SHOT		A	3	4	4	5	6	4	5	6	5	6
38	38999D001	HEAT EXCHANGER		A	1									
38	38999D002	HEAT EXCHANGER		A		1	1			1				
38	38999D003	HEAT EXCHANGER		A				1			1		1	
38	38999D004	HEAT EXCHANGER		A					1			1		1
40	38841B001	TURBULATOR		A	3	4	4	5	6	4	5	6	5	6
46	38977B001	GASKET FLUE FRONT	+	A	1	1	1	1	1	1	1	1	1	1
47	38978B001	GASKET FLUE SIDE	+	A	2	2	2	2	2	2	2	2	2	2
52	01150A008	CONTROL-LIMIT	+	A	1	1	1	1	1	1	1	1	1	1
54	39113B001	GASKET-LIMIT SWITCH	+	A	1	1	1	1	1	1	1	1	1	1

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TO SELECT PART #

Last letter of the Model # is the Service Level.

64HWC302-3**A**

First find Model #. ---------- >

64HWC302-3**(*)**

Then match Service Level for desired part. ---------- >

REF	PART #	PART DESCRIPTION	REC STOCKING PART	SERVICE LEVEL = *	26HWC122-3(*)	38HWC122-3(*)	38HWC182-3(*)	51HWC182-3(*)	64HWC182-3(*)	38HWC242-3(*)	51HWC242-3(*)	64HWC242-3(*)	51HWC302-3(*)	64HWC302-3(*)
55	37520B004	SWITCH-ROLLOUT	+	A	1	1	1	1	1	1	1	1	1	1
57	39086B001	SWITCH N.O. PRESSURE		A		1	1	1	1	1	1	1	1	1
57	39086B002	SWITCH N.O. PRESSURE		A	1									
63	39005B001	BLOWER-INDUCED DRAFT	+	A	1	1	1	1	1	1	1	1	1	1
69	39045B001	MOTOR 1/6 HP	+	A	1	1								
69	39046B001	MOTOR 1/3 HP	+	A			1	1	1	1	1	1	1	1
71	07407B000	BAND-MOTOR MOUNTING		A	1	1	1	1	1	1	1	1	1	1
72	07408B004	ARM-MOTOR MOUNTING		A	3	2	3	3	3	3	3	3	3	3
73	34833B001	WHEEL-BLOWER		A	1	1	1	1	1	1	1	1	1	1
74	39010B001	HOUSING-BLOWER		A	1	1	1	1	1	1	1	1	1	1
86	34001D001	CAPACITOR BLO 4	+	A	1	1								
86	34001D004	CAPACITOR BLO 7.5	+	A			1	1	1	1	1	1	1	1
124	39366B001	ASSY-FEMALE RECPT.		A	1	1	1	1	1	1	1	1	1	1
125	39605B001	MALE RECP. ASSY		A	1	1	1	1	1	1	1	1	1	1
126	39080B001	VALVE-GAS SHUT-OFF	+	A	1	1	1	1	1	1	1	1	1	1
127	06131B046	FILTER-AIR	+	A	1	1	1	1	1	1	1	1	1	1
128	06132B001	ROD-FILTER		A	1	1	1	1	1	1	1	1	1	1
130	39007D002	LABEL-WIRING DIAGRAM		A	1	1	1	1	1	1	1	1	1	1
250	38982B001	COIL-OUTDOOR		A	1	1								
250	38983B001	COIL-OUTDOOR		A			1	1	1	1	1	1		
250	38984B001	COIL-OUTDOOR		A									1	1
255	38979B001	COIL-INDOOR		A	1	1								
255	38980B001	COIL-INDOOR		A			1	1	1	1	1	1		
255	38981B001	COIL-INDOOR		A									1	1

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TO SELECT PART #

Last letter of the Model # is the Service Level.

64HWC302-3**A**

First find Model #. ---------- >

64HWC302-3**(*)**

Then match Service Level for desired part. ---------- >

REF	PART #	PART DESCRIPTION	REC STOCKING PART	SERVICE LEVEL = *	26HWC122-3(*)	38HWC122-3(*)	38HWC182-3(*)	51HWC182-3(*)	64HWC182-3(*)	38HWC242-3(*)	51HWC242-3(*)	64HWC242-3(*)	51HWC302-3(*)	64HWC302-3(*)
256	39057B001	CAP TUBE ASSY		A									1	1
256	39058B001	CAP TUBE ASSY		A	1	1								
256	39058B002	CAP TUBE ASSY		A			1	1	1					
256	39058B003	CAP TUBE ASSY		A						1	1	1		
262	35136C001	COMPRESSOR		A									1	1
262	35136C005	COMPRESSOR		A						1	1	1		
262	39008C001	COMPRESSOR		A	1	1								
262	39008C002	COMPRESSOR		A			1	1	1					
267	39044B001	MOTOR FAN 1/4 HP	+	A						1	1	1	1	1
267	39084B001	MOTOR FAN 1/8 HP	+	A	1	1	1	1	1					
268	39062B001	BLADE-FAN		A						1	1	1	1	1
268	39085B001	BLADE-FAN		A	1	1	1	1	1					
269	03982D004	BRACKET-MOTOR SUPPORT		A	1	1	1	1	1	1	1	1	1	1
271	38514D002	CAPACITOR-25/5 MFD@370 VAC	+	A	1	1	1	1	1					
271	38514D003	CAPACITOR-30/5 MFD@370 VAC	+	A						1	1	1		
271	38514D004	CAPACITOR-35/5 MFD@370 VAC	+	A									1	1
278	35658B001	CONTACTOR	+	A	1	1	1	1	1	1	1	1	1	1
282	38065A001	RELAY-TIME DELAY	+	A	1	1	1	1	1	1	1	1	1	1
301	39059B001	FILTER-DRIER	+	A	1	1								
301	39059B002	FILTER-DRIER	+	A			1	1	1	1	1	1		
301	39059B003	FILTER-DRIER	+	A									1	1

HWC-2

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TO SELECT PART #

Last letter of the Model # is the Service Level.

64HWC182-2**A**

First find Model #. ---------- >

64HWC182-2**(*)**

Then match Service Level for desired part. ---------- >

REF	PART #	PART DESCRIPTION	REC STOCKING PART	SERVICE LEVEL = *	38HWC182-2(*)	51HWC182-2(*)	64HWC182-2(*)
1	39031D001	VALVE-GAS WHITE-RODGERS	+	A	1	1	1
3	39049B001	WIRE-ELECTRODE	+	A	1		
3	39049B002	WIRE-ELECTRODE	+	A		1	1
4	39029B001	CENTER BLO. CONT.	+	A	1	1	1
5	39048B001	CONTROL-IGNITION	+	A	1	1	1
6	39073B001	SENSOR-FLAME	+	A	1	1	1
10	39050B001	ELECTRODE-D.S.I.	+	A	1	1	1
16	01150A008	CONTROL-LIMIT	+	A	1	1	1
18	36610B001	TRANSFORMER	+	A	1	1	1
25	38980B001	COIL-INDOOR		A	1	1	1
26	39058B002	CAP TUBE ASSY		A	1	1	1
28	39030B003	ORIFICE #52		A		5	6
28	39030B004	ORIFICE SPUD #53		A	4		
33	38999D002	HEAT EXCHANGER		A	1		
33	38999D003	HEAT EXCHANGER		A		1	
33	38999D004	HEAT EXCHANGER		A			1
35	38841B001	TURBULATOR		A	4	5	6
38	38977B001	GASKET FLUE FRONT	+	A	1	1	1
38	38978B001	GASKET FLUE SIDE	+	A	2	2	2
47	39006B001	BURNER END SHOT		A	4	5	6
48	38832B002	MANIFOLD GAS		A	1		
48	38832B003	MANIFOLD GAS		A		1	
48	38832B004	MANIFOLD GAS		A			1
55	39086B001	SWITCH N.O. PRESSURE		A	1	1	1
56	39005B001	BLOWER I.D.	+	A	1	1	1

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TO SELECT PART #

Last letter of the Model # is the Service Level.

64HWC182-2**A**

First find Model #. ---------- >

64HWC182-2**(*)**

Then match Service Level for desired part. ---------- >

REF	PART #	PART DESCRIPTION	REC STOCKING PART	SERVICE LEVEL = *	38HWC182-2(*)	51HWC182-2(*)	64HWC182-2(*)
62	37520B004	SWITCH ROLLOUT	+	A	1	1	1
69	39366B001	ASSY-WIRE HARNESS		A	1	1	1
73	39080B001	VALVE-GAS SHUT-OFF	+	A	1	1	1
74	39113B001	GASKET-LIMIT SWITCH	+	A	1	1	1
76	34001D004	CAPACITOR BLO 7.5	+	A	1	1	1
80	39046B001	MOTOR 1/3 HP	+	A	1	1	1
81	07407B000	BAND-MOTOR MOUNTING		A	1	1	1
82	07408B004	ARM-MOTOR MOUNTING		A	3	3	3
83	34833B001	WHEEL-BLOWER		A	1	1	1
84	39010B001	HOUSING-BLOWER		A	1	1	1
96	39007D001	WIRING DIAGRAM		A	1	1	1
97	06131B046	AIR FILTER	+	A	1	1	1
98	06132B001	ROD-FILTER		A	1	1	1
250	38983B001	COIL-OUTDOOR		A	1	1	1
255	35658B001	CONTACTOR	+	A	1	1	1
260	39008C002	COMPRESSOR		A	1	1	1
270	38514D002	CAPACITOR 25/5	+	A	1	1	1
272	39044B001	MOTOR FAN 1/4 HP	+	A	1	1	1
273	03982D004	BRACKET MOTOR SUPPORT		A	1	1	1
279	39062B001	BLADE-FAN		A	1	1	1
290	39118B001	MALE RECP. ASSY.		A	1	1	1
328	39059B002	DRIER	+	A	1	1	1
348	38065A001	RELAY-TIME DELAY	+	A	1	1	1

HWC-1

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TO SELECT PART #

Last letter of the Model # is the Service Level.

64HWC302-1**A**

First find Model #. ---------- >

64HWC302-1**(*)**

Then match Service Level for desired part. ---------- >

REF	PART #	PART DESCRIPTION	REC STOCKING PART	SERVICE LEVEL = *	26HWC122-1(*)	38HWC122-1(*)	38HWC182-1(*)	51HWC182-1(*)	64HWC182-1(*)	38HWC242-1(*)	51HWC242-1(*)	64HWC242-1(*)	51HWC302-1(*)	64HWC302-1(*)
1	39031D001	VALVE-GAS WHITE-RODGERS	+	A	1	1	1	1	1	1	1	1	1	1
3	39049B001	WIRE-ELECTRODE	+	A	1	1	1			1				
3	39049B002	WIRE-ELECTRODE	+	A				1	1		1	1	1	1
4	39029B001	CENTER BLO. CONT.	+	A	1	1	1	1	1	1	1	1	1	1
5	39048B002	CONTROL-IGNITION	+	A	1	1	1	1	1	1	1	1	1	1
6	39073B001	SENSOR-FLAME	+	A	1	1	1	1	1	1	1	1	1	1
10	39050B001	ELECTRODE-D.S.I.	+	A	1	1	1	1	1	1	1	1	1	1
16	01150A008	CONTROL-LIMIT	+	A	1	1	1	1	1	1	1	1	1	1
18	36610B001	TRANSFORMER	+	A	1	1	1	1	1	1	1	1	1	1
25	38979B001	COIL-INDOOR		A	1	1								
25	38980B001	COIL-INDOOR		A			1	1	1	1	1	1		
25	38981B001	COIL-INDOOR		A									1	1
26	39057B001	CAP TUBE ASSY		A									1	1
26	39058B001	CAP TUBE ASSY		A	1	1								
26	39057B002	CAP TUBE ASSY		A			1	1	1					
26	39057B003	CAP TUBE ASSY		A						1	1	1		
28	39030B003	ORIFICE #52		A				5	6		5	6	5	6
28	39030B004	ORIFICE SPUD #53		A		4	4			4				
28	39030B005	ORIFICE SPUD #54		A	3									
33	38999D001	HEAT EXCHANGER		A	1									
33	38999D002	HEAT EXCHANGER		A		1	1			1				
33	38999D003	HEAT EXCHANGER		A				1			1		1	
33	38999D004	HEAT EXCHANGER		A					1			1		1
35	38841B001	TURBULATOR		A	3	4	4	5	6	4	5	6	5	6

HWC-1 (cont.)

REVISED
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TO SELECT PART #

Last letter of the Model # is the Service Level.

64HWC302-1**A**

First find Model #. ---------- >

64HWC302-1**(*)**

Then match Service Level for desired part. ---------- >

REF	PART #	PART DESCRIPTION	REC STOCKING PART	SERVICE LEVEL = *	26HWC122-1(*)	38HWC122-1(*)	38HWC182-1(*)	51HWC182-1(*)	64HWC182-1(*)	38HWC242-1(*)	51HWC242-1(*)	64HWC242-1(*)	51HWC302-1(*)	64HWC302-1(*)
38	38977B001	GASKET FLUE FRONT		A	1	1	1	1	1	1	1	1	1	1
38	38978B001	GASKET FLUE SIDE		A	2	2	2	2	2	2	2	2	2	2
47	39006B001	BURNER END SHOT		A	3	4	4	5	6	4	5	6	5	6
48	38832B001	MANIFOLD GAS		A	1									
48	38832B002	MANIFOLD GAS		A		1	1			1				
48	38832B003	MANIFOLD GAS		A				1			1		1	
48	38832B004	MANIFOLD GAS		A					1			1		1
55	39086B001	SWITCH N.O. PRESSURE		A		1	1	1	1	1	1	1	1	1
55	39086B002	SWITCH N.O. PRESSURE		A	1									
56	39005B001	BLOWER I.D.	+	A	1	1	1	1	1	1	1	1	1	1
62	37520B004	SWITCH-ROLLOUT	+	A	1	1	1	1	1	1	1	1	1	1
69	39366B001	ASSY-WIRE HARNESS		A	1	1	1	1	1	1	1	1	1	1
73	39080B001	VALVE-GAS SHUT-OFF	+	A	1	1	1	1	1	1	1	1	1	1
74	39113B001	GASKET-LIMIT SWITCH	+	A	1	1	1	1	1	1	1	1	1	1
76	34001D001	CAPACITOR BLO 4	+	A	1	1								
76	34001D004	CAPACITOR BLO 7.5	+	A			1	1	1	1	1	1	1	1
80	39045B001	MOTOR 1/6 HP	+	A	1	1								
80	39046B001	MOTOR 1/3 HP	+	A			1	1	1	1	1	1	1	1
81	07407B000	BAND-MOTOR MOUNTING		A	1	1	1	1	1	1	1	1	1	1
82	07408B004	ARM-MOTOR MOUNTING		A	3	2	3	3	3	3	3	3	3	3
83	34833B001	WHEEL-BLOWER		A	1	1	1	1	1	1	1	1	1	1
84	39010B001	HOUSING-BLOWER		A	1	1	1	1	1	1	1	1	1	1
96	39007D001	WIRING DIAGRAM		A	1	1	1	1	1	1	1	1	1	1
97	06131B046	FILTER-AIR	+	A	1	1	1	1	1	1	1	1	1	1
98	06132B001	ROD-FILTER		A	1	1	1	1	1	1	1	1	1	1

HWC-1 (cont.)

REVISED
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TO SELECT PART #

Last letter of the Model # is the Service Level.

64HWC302-1**A**

First find Model #. ---------- >

64HWC302-1**(*)**

Then match Service Level for desired part. ---------- >

REF	PART #	PART DESCRIPTION	REC STOCKING PART	SERVICE LEVEL = *	26HWC122-1(*)	38HWC122-1(*)	38HWC182-1(*)	51HWC182-1(*)	64HWC182-1(*)	38HWC242-1(*)	51HWC242-1(*)	64HWC242-1(*)	51HWC302-1(*)	64HWC302-1(*)
250	38982B001	COIL OUTDOOR		A	1	1								
250	38983B001	COIL OUTDOOR		A			1	1	1	1	1	1		
250	38984B001	COIL OUTDOOR		A									1	1
255	35658B001	CONTACTOR		A	1	1	1	1	1	1	1	1	1	1
260	35136C001	COMPRESSOR		A									1	1
260	35136C004	COMPRESSOR		A			1	1	1					
260	35136C005	COMPRESSOR		A						1	1	1		
260	39008C001	COMPRESSOR		A	1	1								
270	38514D002	CAPACITOR-25/5 MFD@370 VAC	+	A	1	1	1	1	1					
270	38514D003	CAPACITOR-30/5 MFD@370 VAC	+	A						1	1	1		
270	38514D004	CAPACITOR-35/5 MFD@370 VAC	+	A									1	1
272	39044B001	MOTOR FAN 1/4 HP	+	A			1	1	1	1	1	1	1	1
272	39084B001	MOTOR FAN 1/8 HP	+	A	1	1								
273	03982D004	BRACKET MOTOR SUP.		A	1	1	1	1	1	1	1	1	1	1
279	39062B001	BLADE-FAN		A			1	1	1	1	1	1	1	1
279	39085B001	BLADE-FAN		A	1	1								
290	39118B001	MALE RECP. ASSY		A	1	1	1	1	1	1	1	1	1	1
328	39059B001	FILTER-DRIER	+	A	1	1								
328	39059B002	FILTER-DRIER	+	A			1	1	1	1	1	1		
328	39059B003	FILTER-DRIER	+	A									1	1
348	38065A001	RELAY-TIME DELAY	+	A	1	1	1	1	1	1	1	1	1	1

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TO SELECT PART #

Last letter of the Model # is the Service Level.

64HW-1**A**

First find Model #. ---------- >

64HW-1**(*)**

Then match Service Level for desired part. ---------- >

REF	PART #	PART DESCRIPTION	REC STOCKING PART	SERVICE LEVEL = *	26HW-1(*)	38HW-1(*)	51HW-1(*)	64HW-1(*)
1	39031D001	VALVE-GAS WHITE-RODGERS			1	1	1	1
3	39049B001	WIRE-ELECTRODE			1	1		
3	39049B002	WIRE-ELECTRODE					1	1
4	39248B001	CENTER BLO. CONT.			1	1	1	1
5	39048B001	CONTROL-IGNITION			1	1	1	1
6	39073B001	SENSOR-FLAME			1	1	1	1
10	39050B001	ELECTRODE-D.S.I.			1	1	1	1
16	01150A008	CONTROL-LIMIT			1	1	1	1
18	39370B001	TRANSFORMER			1	1	1	1
28	39030B003	ORIFICE #52					5	6
28	39030B004	ORIFICE SPUD				4		
28	39030B005	ORIFICE SPUD			3			
33	38999D001	HEAT EXCHANGER			1			
33	38999D002	HEAT EXCHANGER				1		
33	38999D003	HEAT EXCHANGER					1	
33	38999D004	HEAT EXCHANGER						1
35	38841B001	TURBULATOR			3	4	5	6
38	38977B001	GASKET FLUE FRONT			1	1	1	1
38	38978B001	GASKET FLUE SIDE			2	2	2	2
47	39006B001	BURNER END SHOT			3	4	5	6
48	38832B001	MANIFOLD GAS			1			
48	38832B002	MANIFOLD GAS				1		
48	38832B003	MANIFOLD GAS					1	
48	38832B004	MANIFOLD GAS						1

HW-1 (cont.)

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TO SELECT PART #

Last letter of the Model # is the Service Level.

64HW-1**A**

First find Model #. ---------- >

64HW-1**(*)**

Then match Service Level for desired part. ---------- >

REF	PART #	PART DESCRIPTION	REC STOCKING PART	SERVICE LEVEL = *	26HW-1(*)	38HW-1(*)	51HW-1(*)	64HW-1(*)
55	39086B001	SWITCH N.O. PRESSURE				1	1	1
55	39086B002	SWITCH N.O. PRESSURE			1			
56	39005B001	BLOWER-INDUCED DRAFT			1	1	1	1
62	37520B004	SWITCH ROLLOUT			1	1	1	1
69	39366B001	ASSY-WIRE HARNESS			1	1	1	1
73	39080B001	VALVE-GAS SHUT-OFF			1	1	1	1
74	39113B001	GASKET-LIMIT SWITCH			1	1	1	1
76	34001D001	CAPACITOR BLO 4			1	1		
76	34001D004	CAPACITOR BLO 7.5					1	1
80	39045B001	MOTOR 1/6 HP			1	1		
80	39046B001	MOTOR 1/3 HP					1	1
81	07407B000	BAND-MOTOR MOUNTING			1	1	1	1
82	07408B004	ARM-MOTOR MOUNTING			3	3	3	3
83	34833B001	WHEEL-BLOWER			1	1	1	1
84	39010B001	HOUSING-BLOWER			1	1	1	1
96	39247D001	WIRING DIAGRAM			1	1	1	1
97	06131B046	AIR FILTER			1	1	1	1
98	06132B001	ROD-FILTER			1	1	1	1

HWA-9

REVISED
4-26-99

TO SELECT PART #

Last letter of the Model # is the Service Level.

64HWA-9**A**

First find Model #. ---------- >

64HWA-9**(*)**

Then match Service Level for desired part. ---------- >

REF	PART #	PART DESCRIPTION	REC STOCKING PART	SERVICE LEVEL = *	26HWA-9(*)	38HWA-9(*)	51HWA-9(*)	64HWA-9(*)
1	39370B001	TRANSFORMER	+	A	1	1	1	1
7	44987-001	VALVE-GAS HONEYWELL	+	A	1	1	1	1
11	42074-001	MANIFOLD		A	1			
11	42074-002	MANIFOLD		A		1		
11	42074-003	MANIFOLD		A			1	
11	42074-004	MANIFOLD		A				1
13	39030B003	ORIFICE #52 NATURAL GAS		A				6
13	39030B004	ORIFICE #53 NATURAL GAS		A		4	5	
13	39030B005	ORIFICE #54 NATURAL GAS		A	3			
20	44992-001	ELECTRODE	+	A	1	1	1	1
21	44993-001	WIRE-ELECTRODE	+	A	1	1	1	1
24	44990-001	CONTROL-IGNITION/BLOWER	+	A	1	1	1	1
34	41948-001	BURNER		A	3	4	5	6
38	38999D009	ASSEMBLY-HEAT EXCHANGER		A	1			
38	38999D010	ASSEMBLY-HEAT EXCHANGER		A		1		
38	38999D011	ASSEMBLY-HEAT EXCHANGER		A			1	
38	38999D012	ASSEMBLY-HEAT EXCHANGER		A				1
40	S38841B001	TURBULATOR		A	3	4	5	6
46	38977B001	GASKET-FLUE COVER	+	A	1	1	1	1
47	38978B001	GASKET-FLUE COL. END	+	A	2	2	2	2
52	40154B007	CONTROL-LIMIT	+	A	1	1	1	1
55	37520B004	SWITCH-ROLLOUT RED	+	A		1	1	1
55	37520B005	SWITCH-ROLLOUT GREEN	+	A	1			
57	44819-010	SWITCH-PRESSURE RED		A	1	1	1	1
63	41144-001	BLOWER-INDUCED DRAFT	+	A	1	1	1	1

HWA-9 (cont.)

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TO SELECT PART #

Last letter of the Model # is the Service Level.

64HWA-9**A**

First find Model #. ---------- >

64HWA-9**(*)**

Then match Service Level for desired part. ---------- >

REF	PART #	PART DESCRIPTION	REC STOCKING PART	SERVICE LEVEL = *	26HWA-9(*)	38HWA-9(*)	51HWA-9(*)	64HWA-9(*)
69	39045B001	MOTOR 1/6 HP, 1 PHASE	+	A	1	1		
69	39046B001	MOTOR 1/3 HP, 1 PHASE	+	A			1	1
71	07407B000	BAND-MOTOR MOUNTING		A	1	1	1	1
72	07408B004	ARM-MOTOR MOUNTING		A	3	3	3	3
73	34833B001	WHEEL-BLOWER		A	1	1	1	1
74	S39010B001	ASSEMBLY-BLOWER HOUSING		A	1	1	1	1
86	34001D001	CAPACITOR-4 MFD@370 VAC	+	A	1	1		
86	34001D004	CAPACITOR-7.5 MFD@370 VAC	+	A			1	1
111	02764B000	BOARD-TERMINAL	+	A	1	1	1	1
124	45001-001	ASSEMBLY-WIRE HARNESS UPPER		A	1	1	1	1
127	06131B046	FILTER 16.5" X 25" X .50"	+	A	1	1	1	1
130	45008-001	LABEL-WIRING DIAGRAM		A	1	1	1	1

HWC3-S-1

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TO SELECT PART #

Last letter of the Model # is the Service Level.

64HWC303SA-1**A**

First find Model #. ---------- >

64HWC303SA-1**(*)**

Then match Service Level for desired part. ---------- >

REF	PART #	PART DESCRIPTION	REC STOCKING PART	SERVICE LEVEL = *	26HWC123SA-1(*)	38HWC123SA-1(*)	38HWC183SA-1(*)	51HWC183SA-1(*)	64HWC183SA-1(*)	38HWC243SA-1(*)	51HWC243SA-1(*)	64HWC243SA-1(*)	51HWC303SA-1(*)	64HWC303SA-1(*)
1	39370B001	TRANSFORMER	+	A	1	1	1	1	1	1	1	1	1	1
7	44987-001	VALVE-GAS HONEYWELL	+	A	1	1	1	1	1	1	1	1	1	1
11	42074-001	MANIFOLD		A	1									
11	42074-002	MANIFOLD		A		1	1			1				
11	42074-003	MANIFOLD		A				1			1		1	
11	42074-004	MANIFOLD		A					1			1		1
13	39030B003	ORIFICE #52 NATURAL GAS		A					6			6		6
13	39030B004	ORIFICE #53 NATURAL GAS		A		4	4	5		4	5		5	
13	39030B005	ORIFICE #54 NATURAL GAS		A	3									
20	44992-001	ELECTRODE	+	A	1	1	1	1	1	1	1	1	1	1
21	44993-001	WIRE-ELECTRODE	+	A	1	1	1	1	1	1	1	1	1	1
24	44990-001	CONTROL-IGNITION/BLOWER	+	A	1	1	1	1	1	1	1	1	1	1
34	41948-001	BURNER		A	3	4	4	5	6	4	5	6	5	6
38	38999D009	ASSEMBLY-HEAT EXCHANGER		A	1									
38	38999D010	ASSEMBLY-HEAT EXCHANGER		A		1	1			1				
38	38999D011	ASSEMBLY-HEAT EXCHANGER		A				1			1		1	
38	38999D012	ASSEMBLY-HEAT EXCHANGER		A					1			1		1
40	S38841B001	TURBULATOR		A	3	4	4	5	6	4	5	6	5	6
46	38977B001	GASKET-FLUE COVER	+	A	1	1	1	1	1	1	1	1	1	1
47	38978B001	GASKET-FLUE COL. END	+	A	2	2	2	2	2	2	2	2	2	2
52	40154B007	CONTROL-LIMIT	+	A	1	1	1	1	1	1	1	1	1	1
55	37520B004	SWITCH-ROLLOUT RED	+	A		1	1	1	1	1	1	1	1	1
55	37520B005	SWITCH-ROLLOUTGREEN	+	A	1									
57	44819-010	SWITCH-PRESSURE RED		A	1	1	1	1	1	1	1	1	1	1
63	41144-001	BLOWER-INDUCED DRAFT	+	A	1	1	1	1	1	1	1	1	1	1

HWC3-S-1 (cont.)

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TO SELECT PART #

Last letter of the Model # is the Service Level.

64HWC303SA-1**A**

First find Model #. ---------- >

64HWC303SA-1**(*)**

Then match Service Level for desired part. ---------- >

REF	PART #	PART DESCRIPTION	REC STOCKING PART	SERVICE LEVEL = *	26HWC123SA-1(*)	38HWC123SA-1(*)	38HWC183SA-1(*)	51HWC183SA-1(*)	64HWC183SA-1(*)	38HWC243SA-1(*)	51HWC243SA-1(*)	64HWC243SA-1(*)	51HWC303SA-1(*)	64HWC303SA-1(*)
69	39045B001	MOTOR 1/6 HP, 1 PHASE	+	A	1	1								
69	39046B001	MOTOR 1/3 HP, 1 PHASE	+	A			1	1	1	1	1	1	1	1
71	07407B000	BAND-MOTOR MOUNTING		A	1	1	1	1	1	1	1	1	1	1
72	07408B004	ARM-MOTOR MOUNTING		A	3	3	3	3	3	3	3	3	3	3
73	34833B001	WHEEL-BLOWER		A	1	1	1	1	1	1	1	1	1	1
74	S39010B001	ASSEMBLY-BLOWER HOUSING		A	1	1	1	1	1	1	1	1	1	1
86	34001D001	CAPACITOR-4 MFD@370 VAC	+	A	1	1								
86	34001D004	CAPACITOR-7.5 MFD@370 VAC	+	A			1	1	1	1	1	1	1	1
111	02764B000	BOARD-TERMINAL	+	A	1	1	1	1	1	1	1	1	1	1
124	45001-001	ASSEMBLY-WIRE HARNESS UPPER		A	1	1	1	1	1	1	1	1	1	1
125	45002-001	ASSEMBLY-WIRE HARNESS LOWER		A	1	1	1	1	1	1	1	1	1	1
127	06131B046	FILTER 16.5" X 25" X .50"	+	A	1	1	1	1	1	1	1	1	1	1
130	45005-001	LABEL-WIRING DIAGRAM		A	1	1	1	1	1	1	1	1	1	1
250	38982B001	COIL-OUTDOOR		A	1	1								
250	38983B001	COIL-OUTDOOR		A						1	1	1		
250	40649-001	COIL-OUTDOOR		A									1	1
250	41114-001	COIL-OUTDOOR		A			1	1	1					
255	38979B001	COIL-INDOOR		A	1	1								
255	38980B001	COIL-INDOOR		A			1	1	1	1	1	1		
255	40648-001	COIL-INDOOR		A									1	1
256	S43271-001	ASSY-CAP. TUBE W/FILTER-DRIER		A	1	1								
256	S43271-002	ASSY-CAP. TUBE W/FILTER-DRIER		A			1	1	1					
256	S43271-003	ASSY-CAP. TUBE W/FILTER-DRIER		A						1	1	1		
256	S43375-001	ASSY-CAP. TUBE W/FILTER-DRIER		A									1	1

HWC3-S-1 (cont.)

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4-26-99

TO SELECT PART #

Last letter of the Model # is the Service Level.

64HWC303SA-1**A**

First find Model #. ---------- >

64HWC303SA-1**(*)**

Then match Service Level for desired part. ---------- >

REF	PART #	PART DESCRIPTION	REC STOCKING PART	SERVICE LEVEL = *	26HWC123SA-1(*)	38HWC123SA-1(*)	38HWC183SA-1(*)	51HWC183SA-1(*)	64HWC183SA-1(*)	38HWC243SA-1(*)	51HWC243SA-1(*)	64HWC243SA-1(*)	51HWC303SA-1(*)	64HWC303SA-1(*)
262	35125C009	COMPRESSOR-AW501ET-089-A4		A			1	1	1					
262	39008C001	COMPRESSOR-RK147ET-002-A4		A	1	1								
262	42811-005	COMPRESSOR-ZR24KC-PFV-130		A						1	1	1		
262	42811-006	COMPRESSOR-ZR28KC-PFV-130		A									1	1
267	41254-001	MOTOR 1/4 HP, 1 PHASE	+	A						1	1	1	1	1
267	41282-001	MOTOR 1/8 HP, 1 PHASE	+	A	1	1	1	1	1					
268	39062B001	BLADE-FAN		A						1	1	1	1	1
268	39085B001	BLADE-FAN		A	1	1	1	1	1					
269	03982D004	BRACKET-MOTOR SUPPORT		A	1	1	1	1	1	1	1	1	1	1
271	38514D002	CAPACITOR-25/5 MFD@370 VAC	+	A	1	1								
271	38514D004	CAPACITOR-35/5 MFD@370 VAC	+	A			1	1	1	1	1	1	1	1
276	42725-001	PLUG-COMPRESSOR	+	A						1	1	1	1	1
278	07535C001	CONTACTOR	+	A	1	1	1	1	1	1	1	1	1	1
280	07489B007	RELAY-CONDENSER FAN MOTOR	+	A	1	1	1	1	1	1	1	1	1	1
291	36327B007	SWITCH-CONDENSER FAN	+	A	1	1	1	1	1	1	1	1	1	1
301	39059B001	FILTER-DRIER	+	A	1	1								
301	39059B002	FILTER-DRIER	+	A			1	1	1	1	1	1		
301	39059B003	FILTER-DRIER	+	A									1	1

HWC3-H-1

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4-26-99

TO SELECT PART #

Last letter of the Model # is the Service Level.

64HWC303HA-1**A**

First find Model #. ---------- >

64HWC303HA-1**(*)**

Then match Service Level for desired part. ---------- >

REF	PART #	PART DESCRIPTION	REC STOCKING PART	SERVICE LEVEL = *	26HWC123HA-1(*)	38HWC123HA-1(*)	38HWC183HA-1(*)	51HWC183HA-1(*)	64HWC183HA-1(*)	38HWC243HA-1(*)	51HWC243HA-1(*)	64HWC243HA-1(*)	51HWC303HA-1(*)	64HWC303HA-1(*)
1	39370B001	TRANSFORMER	+	A	1	1	1	1	1	1	1	1	1	1
7	44987-001	VALVE-GAS HONEYWELL	+	A	1	1	1	1	1	1	1	1	1	1
11	42074-001	MANIFOLD		A	1									
11	42074-002	MANIFOLD		A		1	1			1				
11	42074-003	MANIFOLD		A				1			1		1	
11	42074-004	MANIFOLD		A					1			1		1
13	39030B004	ORIFICE #53 NATURAL GAS		A					6			6		6
13	39030B005	ORIFICE #54 NATURAL GAS		A		4	4	5		4	5		5	
13	39030B011	ORIFICE #55 NATURAL GAS		A	3									
20	44992-001	ELECTRODE	+	A	1	1	1	1	1	1	1	1	1	1
21	44993-001	WIRE-ELECTRODE	+	A	1	1	1	1	1	1	1	1	1	1
24	44990-001	CONTROL-IGNITION/BLOWER	+	A	1	1	1	1	1	1	1	1	1	1
34	41948-001	BURNER		A	3	4	4	5	6	4	5	6	5	6
38	38999D009	ASSEMBLY-HEAT EXCHANGER		A	1									
38	38999D010	ASSEMBLY-HEAT EXCHANGER		A		1	1			1				
38	38999D011	ASSEMBLY-HEAT EXCHANGER		A				1			1		1	
38	38999D012	ASSEMBLY-HEAT EXCHANGER		A					1			1		1
40	S38841B001	TURBULATOR		A	3	4	4	5	6	4	5	6	5	6
46	38977B001	GASKET-FLUE COVER	+	A	1	1	1	1	1	1	1	1	1	1
47	38978B001	GASKET-FLUE COL. END	+	A	2	2	2	2	2	2	2	2	2	2
52	40154B007	CONTROL-LIMIT	+	A	1	1	1	1	1	1	1	1	1	1
55	37520B004	SWITCH-ROLLOUT RED	+	A		1	1	1	1	1	1	1	1	1
55	37520B005	SWITCH-ROLLOUTGREEN	+	A	1									
57	44819-010	SWITCH-PRESSURE RED		A	1	1	1	1	1	1	1	1	1	1
63	41144-001	BLOWER-INDUCED DRAFT	+	A	1	1	1	1	1	1	1	1	1	1

HWC3-H-1 (cont.)

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4-26-99

TO SELECT PART #

Last letter of the Model # is the Service Level.

64HWC303HA-1**A**

First find Model #. ---------- >

64HWC303HA-1**(*)**

Then match Service Level for desired part. ---------- >

REF	PART #	PART DESCRIPTION	REC STOCKING PART	SERVICE LEVEL = *	26HWC123HA-1(*)	38HWC123HA-1(*)	38HWC183HA-1(*)	51HWC183HA-1(*)	64HWC183HA-1(*)	38HWC243HA-1(*)	51HWC243HA-1(*)	64HWC243HA-1(*)	51HWC303HA-1(*)	64HWC303HA-1(*)
69	39045B001	MOTOR 1/6 HP, 1 PHASE	+	A	1	1								
69	39046B001	MOTOR 1/3 HP, 1 PHASE	+	A			1	1	1	1	1	1	1	1
71	07407B000	BAND-MOTOR MOUNTING		A	1	1	1	1	1	1	1	1	1	1
72	07408B004	ARM-MOTOR MOUNTING		A	3	3	3	3	3	3	3	3	3	3
73	34833B001	WHEEL-BLOWER		A	1	1	1	1	1	1	1	1	1	1
74	S39010B001	ASSEMBLY-BLOWER HOUSING		A	1	1	1	1	1	1	1	1	1	1
86	34001D001	CAPACITOR-4 MFD@370 VAC	+	A	1	1								
86	34001D004	CAPACITOR-7.5 MFD@370 VAC	+	A			1	1	1	1	1	1	1	1
111	02764B000	BOARD-TERMINAL	+	A	1	1	1	1	1	1	1	1	1	1
124	45001-001	ASSEMBLY-WIRE HARNESS UPPER		A	1	1	1	1	1	1	1	1	1	1
125	45002-001	ASSEMBLY-WIRE HARNESS LOWER		A	1	1	1	1	1	1	1	1	1	1
127	06131B046	FILTER 16.5" X 25" X .50"	+	A	1	1	1	1	1	1	1	1	1	1
130	45004-001	LABEL-WIRING DIAGRAM		A	1	1	1	1	1	1	1	1	1	1
250	38982B001	COIL-OUTDOOR		A	1	1								
250	38983B001	COIL-OUTDOOR		A						1	1	1		
250	40649-001	COIL-OUTDOOR		A									1	1
250	41114-001	COIL-OUTDOOR		A			1	1	1					
255	38979B001	COIL-INDOOR		A	1	1								
255	38980B001	COIL-INDOOR		A			1	1	1	1	1	1		
255	40648-001	COIL-INDOOR		A									1	1
256	S43271-001	ASSY-CAP. TUBE W/FILTER-DRIER		A	1	1								
256	S43271-002	ASSY-CAP. TUBE W/FILTER-DRIER		A			1	1	1					
256	S43271-003	ASSY-CAP. TUBE W/FILTER-DRIER		A						1	1	1		
256	S43375-001	ASSY-CAP. TUBE W/FILTER-DRIER		A									1	1

HWC3-H-1 (cont.)

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4-26-99

TO SELECT PART #

Last letter of the Model # is the Service Level.

64HWC303HA-1**A**

First find Model #. ---------- >

64HWC303HA-1**(*)**

Then match Service Level for desired part. ---------- >

REF	PART #	PART DESCRIPTION	REC STOCKING PART	SERVICE LEVEL = *	26HWC123HA-1(*)	38HWC123HA-1(*)	38HWC183HA-1(*)	51HWC183HA-1(*)	64HWC183HA-1(*)	38HWC243HA-1(*)	51HWC243HA-1(*)	64HWC243HA-1(*)	51HWC303HA-1(*)	64HWC303HA-1(*)
262	35125C009	COMPRESSOR-AW501ET-089-A4		A			1	1	1					
262	39008C001	COMPRESSOR-RK147ET-002-A4		A	1	1								
262	42811-005	COMPRESSOR-ZR24KC-PFV-130		A						1	1	1		
262	42811-006	COMPRESSOR-ZR28KC-PFV-130		A									1	1
267	41254-001	MOTOR 1/4 HP, 1 PHASE	+	A						1	1	1	1	1
267	41282-001	MOTOR 1/8 HP, 1 PHASE	+	A	1	1	1	1	1					
268	39062B001	BLADE-FAN		A						1	1	1	1	1
268	39085B001	BLADE-FAN		A	1	1	1	1	1					
269	03982D004	BRACKET-MOTOR SUPPORT		A	1	1	1	1	1	1	1	1	1	1
271	38514D002	CAPACITOR-25/5 MFD@370 VAC	+	A	1	1								
271	38514D004	CAPACITOR-35/5 MFD@370 VAC	+	A			1	1	1	1	1	1	1	1
276	42725-001	PLUG-COMPRESSOR	+	A						1	1	1	1	1
278	07535C001	CONTACTOR	+	A	1	1	1	1	1	1	1	1	1	1
301	39059B001	FILTER-DRIER	+	A	1	1								
301	39059B002	FILTER-DRIER	+	A			1	1	1	1	1	1		
301	39059B003	FILTER-DRIER	+	A									1	1

Section 9 - Troubleshooting/ Performance/ Charge Weights

Troubleshooting 9-2
- Compressor Checkout 9-2
- Capacitor Checkout 9-6

Performance 9-9
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Charge Weights 9-11

Troubleshooting

Compressor Checkout

The objective of this section is to help in diagnosing compressor problems. It presents a series of tests that should be conducting before a determination on the condition of the compressor is made. This section has been organized so that the simplest checks are done first, followed by the more detailed tests (if necessary).

⚠ WARNING

Use extreme caution when performing maintenance or troubleshooting operations. Electrical shock could cause personal injury or death.

Initial Testing

If a compressor failure is suspected, several simple checks should be done initially to make sure that the right course of action is being taken. The following is a list of items and points that should be looked at before a determination is made of the condition of the compressor.

- Is the correct voltage available at the unit? Using a volt/ohm meter, check the voltage and compare with the voltage specified by the manufacturer (found on the data plate on the unit). Many compressors are replaced only to find later that there was either no power or incorrect power available to the unit.

- Is the contactor closing? Check to make sure that there is 24 volts at the coil side of the contactor. Check to make sure the points in the contactor are in good condition. Are they pitted or corroded to the point where they no longer conduct electricity?

- Is the capacitor in good condition? Does it have the correct rating for the application? Using a meter, determine if it still has the correct capacitance.

- The last of these initial tests to do is a touch test. This should be done very carefully as the compressor can become very hot in certain situations. This information may be helpful if further tests are needed to determine the condition of the compressor.

Further Testing

Use extreme caution when conducting the following tests. **The power must be turned off before continuing with the testing.**

Checking Continuity

1. Remove wires from the fusite plug in the compressor, recording the location of each wire as it is removed. If a wire is misplaced when the test is complete, serious damage could be done to the compressor.

2. Set an ohm meter to the lowest possible setting. On a note pad, write the following: “C to ground”, “S to ground” and “R to ground.”

3. Using the ohm meter, check for continuity between C terminal on the fusite plug and the case of the compressor (a spot may have to be cleaned on the compressor to get a good reading.) Record what was observed on the note pad next to the heading “C to ground”. Do the same to the other two terminals and record the findings in the proper places.

4. If any sign of continuity between any of the terminals and ground was observed, recheck the terminal to confirm that the readings were correct. Any indication of continuity between any of the terminals and ground would point to an internal winding being shorted to the compressor case. This suggests that the compressor has an internal failure and it would need to be replaced.

5. If no continuity is noted between any of the terminals and ground, the compressor must be checked out further.

Checking Windings

The following test is used to check the condition of the internal start and run windings.

1. Write the following down: “C to S”, “C to R” and “S to R.”

2. Using the volt/ohmmeter, measure the resistance between terminals C and S. Record the findings on the note pad in the correct place. Measure and record the resistance between the remaining terminals in the same manner.

The following examples show how this information can be used to determine if there is an internal failure.

Example #1

C to S (Common through Start Windings)	3.5 ohms
C to R (Common through Run Windings)	1.5 ohms
S to R (Start Windings through Common and Run Windings)	5.0 ohms

A resistance measurement between C to S shows that there is continuity between the common and start terminals. The reading between terminals C and R proves that there is continuity between the terminals through the windings. The resistance recorded between S and R is actually a reading of the entire circuit within the motor (S through C to R).

A determination of the condition of the motor windings can be made with the information just collected. The following steps show how this is done.

1. Add the readings from “C to S” and “C to R.”

   C to S (3.5 ohms) + C to R (1.5 ohms) = 5 ohms

When the resistance of "C to S" is added to the resistance of "C to R", the combination is the total resistance of the entire motor windings circuit.

2. Compare the total to the reading taken between "S to R." If the windings are in good condition, the sum of "C to S" and "C to R" should be the same as the reading between "S to R" (S through C to R). (In this example, they are equal.)

If the numbers are the same, this suggests that the windings are intact and that there are no internal shorts between the start and run windings.

Example #2

In the following example, the measurements taken provide different results from the earlier example. These results would indicate that there is a problem with the compressor.

C to S (Common through Start Windings)	3.5 ohms
C to R (Common through Run Windings)	1.5 ohms
S to R (Start Windings through Common and Run Windings)	4.3 ohms

Using the procedure followed in Example #1:

C to S (3.5 ohms) + C to R (1.5 ohms) = 5 ohms

In this example, the actual reading of "S to R" is 4.3 ohms. In comparing the readings taken, the resistance measured between "S to R" (the resistance of the entire motor windings circuit) is not equal to the sum of "C to S" and "C to R."

A short between the windings of the start and run coils would reduce the length of the wire being measured and would result in less resistance between the two points. Instead of measuring the resistance from "S to C to R", the resistance is actually being measured through an internal short in the windings to the R terminal, bypassing the C terminal. This results in a lower resistance reading and indicates that the compressor has failed and the windings are shorted.

Checking the Thermal Overload Device

If during the time that resistance was being checked in the previous test infinity was ever registered (meter indicated no continuity), the assumption could be made that there is an open winding (or a break in the wires of the winding). This may indicate that the windings had burned out and that the compressor had failed.

In the motor windings there is a thermal overload device. This device is designed to open if the internal temperature of the windings exceed a preset limit. Since the resistance reading of a winding where the thermal overload device has opened would show no resistance, the assumption would most likely be made that the winding was burned out. This is where the temperature of the compressor as noted in the touch test becomes very important. If at the time of the touch test the compressor was found to be very hot, then there is a good chance that the thermal

overload protector has opened. Before the compressor can be condemned as having a burned out start or run winding, it must be determined that the overload switch is in fact closed. It may take several hours for the compressor to cool down enough to guarantee that the switch has closed. After enough time has elapsed for the switch to close, the resistance between each of the terminals should be measured. It may be found that with the overload switch closed, the compressor checks out electrically sound. If this is the case, then other possibilities have to be looked at as to what caused the compressor to overheat.*

There are several reasons why a compressor would overheat.

- If the capacitor was incorrect or failing, the amp draw (current flow) would be increased. This could cause the motor to heat up very rapidly, activating the thermal overload protection device. This would interrupt power and protect the motor windings from damage.

- A loss of charge could also cause the operating temperature of the compressor to rise and open the thermal overload switch.

- Restricted airflow through the coil could also cause the operating temperature of the unit to rise.

It is important to perform these checks before making a decision as to the condition of the compressor.

* An open thermal overload device in a motor does not mean that the motor was damaged or harmed in any way.

Capacitor Checkout

Before starting the checkout of the capacitor, it is important to understand what a capacitor is, how it works and what its function is in relation to a motor.

A **capacitor** is a storage device similar to a battery, only unlike a battery a capacitor wants to give up its energy all at once. This ability to store and release energy is used to make motors run more efficiently, with more power in a smaller size and to start easier. There are many types of capacitors but they all serve one common purpose, to store electrons.

Capacitance refers to the capacitor's ability to store electrons. Different size capacitors hold different amounts of charge.

Capacitance is measured in **farads**. A 1-farad capacitor connected to a 1-volt power supply will store 6,280,000,000,000,000,000, or (6.28 x 10 to the 18th power) electrons. Most capacitors store a much smaller quantity of electrons. Smaller capacitors have different terms to indicate the quantity of electrons that they can store. A **picofarad** is one *trillionth* of a farad; a **microfarad** is one *millionth* of a farad. The microfarad is the term most often used in the HVAC business, this is marked on a capacitor as "**MFD**".

The capacitor that is most often used in the HVAC business is known as an **electrolytic** capacitor. The electrolytic capacitor is unique in that a thin layer of oxide is formed on the aluminum sheets used to make up its internal parts. The electrons that are supplied to the capacitor are stored in this layer of oxide. But by doing this, nature is being forced to do something that it doesn't want to do. Nature likes to be in equilibrium. The fact that nature prefers to return to a steady state is the idea behind the use of capacitors. By storing a fixed amount of energy in the capacitor, it provides the reserve of extra power needed to start and run a motor. Without this energy source, motors would have to be much bigger and more complex.

⚠ WARNING

A capacitor can store a charge for a considerable length of time after the power has been turned off. This charge can be very dangerous. An electrolytic capacitor charged with only 10 or 15 volts can melt the tip of the end of a screwdriver when placed across the terminals. A high voltage capacitor can store a charge that could be lethal. Never touch the terminals of a capacitor without first discharging it.

Capacitor Testing

Capacitors are an integral part of the system and must be checked along with the motor when a problem occurs.

Check to make sure that the capacitor is correctly rated for the application. Confirm that the right capacitor is being used for the application.

The following information is found on a capacitor: the **MFD** (microfarad rating) and the **working voltage**. Compare this to the rating plate on the motor or the information provided with the unit.

The following are some of the problems that could be caused by a defective or incorrect capacitor:

- Motor overheating (internal thermal overload tripped)
- Motor refuses to start
- Intermittent problems with blown fuses or breaker tripped
- High electrical consumption
- Motor rotates in the wrong direction
- Contactor overheating or melted contacts
- Motor vibration

Any one of the above faults could be attributed to the capacitor. Therefore, the capacitor must be checked out before a determination is made of the problem.

In the past, the old method of swinging the meter needle to tell if the capacitor was good or not could be used. When the terminal of the capacitor was touched with the meter probes, the meter needle would swing over than back to zero. If it didn't, it could be assumed that the capacitor had failed. There are many problems with this technique. Swinging the meter needle only proves that the capacitor will take a charge, but not how much of a charge. In some cases, when a capacitor starts to break down it still will take a charge (but the number of electrons that it can hold is greatly reduced). The capacitor must take the correct charge as originally designed so that the motor will work as it should. A much more accurate method must be used to determine the condition of the capacitor before the decision on its condition can be made.

The best method is to use a meter that is capable of reading capacitance. This gives a very accurate indication of the condition of the capacitor. If a meter that is able to do this is not available, then another way to determine the condition of the capacitor must be found.

In order to do this, several things will be needed: a volt ohm meter, an amp meter and a calculator. A set of test leads will also need to prepared to do this test. Make the test leads with a loop (10 loops) in one of the leads. The ten loops in the lead will cause the amp meter reading to be multiplied by "ten". This will make it much easier to read very low amp meter readings and will be helpful when doing the following test.

Connect the alligator clips of the test leads to the terminals on the capacitor. Hook the amp meter through the 10 loops of wire on the test lead (see Figure 9-1 on page 9-8).

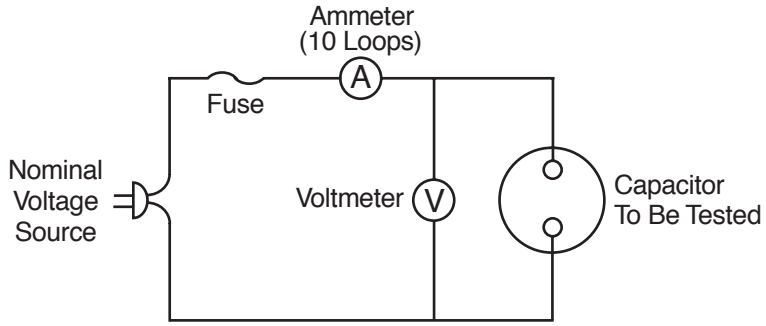

FIGURE 9-1 Determining Capacitance (MFD) Rating with a Test Cord

Before starting the test, take a reading of the line voltage at the outlet that will be used.

Double check the connections, making sure that the amp meter is on. Plug the test leads into the wall outlet. Wait a few seconds and read the amp meter (**CAUTION:** there is only approximately ten seconds to do this or the capacitor could be damaged). Unplug the jumper and record the readings.

Using the calculator, divide the amp meter reading by ten (the number of loops in one of the test leads). This is the correct amp reading which is needed to finish the calculations. This information and the voltage at the outlet is all that is needed to calculate the capacitance of the capacitor.

$$\frac{2650 \times \text{Amps}}{\text{Volts}} = \text{Capacitance (MFD)}$$

In the following calculation, a constant multiplier (2650) is used for 60 Hz electrical systems.*

$$\frac{2650 \times 1 \text{ Amp}}{115 \text{ Volts}} = 23 \text{ MFD}$$

Example

This calculation provides the actual capacitance of the capacitor. Compare this reading to the listed rating on the capacitor. It should be within +/– 10% of the actual capacitor rating. If it does not fall within this range, the capacitor is defective and should be replaced.

The capacitor should always be checked before replacing an electric motor. Eliminate the capacitor as a possible cause of the problems before the decision is made to replace the motor. A good practice is also to replace the capacitor whenever a motor is replaced, as the capacitor does have a service life cycle. The capacitor is a very important part of the motor electrical system. Always check the capacitor along with the motor when a fault is noted.

*For 50 Hz electrical systems, use 3180 as the constant multiplier.

Performance

Performance Checkout

HW/HWC chassis come with a pre-charged chassis assembly. The chassis assembly is designed in a way that the unit may be run independently of the HWC unit. When the chassis is run on a floor or bench, the performance measurements will be affected due to the change in static pressures, recirculated air, excessive temperatures and equal ambient temperatures from indoor to outdoor.

Two sets of tables are provided in this section to address these issues. Tables 9-1 to 9-4 are to be used when the chassis is still installed in the complete unit. Tables 9-5 and 9-6 are to be used when the chassis is run independently outside of the unit.

Note: Pressures may vary +/– 10 psi. Temperatures may vary =/– 2-3°F.

Performance Tests (Chassis Installed in Unit)

TABLE 9-1 HWC122 Performance Test (Chassis Installed)

		Outdoor Air Temperature Entering Outdoor Coil											
		85°			95°			105°			115°		
Enter. DB/WB	Total Air Vol. (CFM)	Suction Pressure	Suction Temp.	Liquid Temp.	Suction Pressure	Suction Temp.	Liquid Temp.	Suction Pressure	Suction Temp.	Liquid Temp.	Suction Pressure	Suction Temp.	Liquid Temp.
75°/63°	400	81	49	87	82	49	97	84	50	107	85	51	117
	450	83	54	87	84	50	97	86	51	107	87	52	117
	500	85	60	87	86	52	97	88	52	107	89	53	117
80°/67°	400	87	63	87	88	53	97	89	53	107	91	54	117
	450	88	68	88	90	58	97	91	54	107	93	55	117
	500	90	73	88	92	63	97	93	57	107	95	56	117
85°/71°	400	92	74	88	93	64	97	94	56	108	96	57	117
	450	94	79	88	95	71	97	96	62	108	98	58	117
	500	96	84	88	97	74	97	98	65	108	100	59	117

Based on a normally installed cooling chassis

TABLE 9-2 HWC182 Performance Test (Chassis Installed)

		Outdoor Air Temperature Entering Outdoor Coil											
		85°			95°			105°			115°		
Enter. DB/WB	Total Air Vol. (CFM)	Suction Pressure	Suction Temp.	Liquid Temp.	Suction Pressure	Suction Temp.	Liquid Temp.	Suction Pressure	Suction Temp.	Liquid Temp.	Suction Pressure	Suction Temp.	Liquid Temp.
75°/63°	550	80	49	96	81	48	106	84	50	114	86	51	123
	600	82	54	96	83	50	106	86	51	114	88	52	123
	650	84	59	96	85	52	106	88	52	114	90	54	124
80°/67°	550	86	62	98	88	53	106	90	54	115	92	55	124
	600	87	67	98	89	58	107	91	54	116	94	56	125
	650	99	72	98	91	62	107	93	57	116	95	56	125
85°/71°	550	91	73	99	93	64	107	95	56	116	97	58	125
	600	93	78	99	95	70	108	97	63	117	99	59	126
	650	95	83	99	97	74	108	99	66	117	101	60	126

Based on a normally installed cooling chassis

Performance Tests (Chassis Installed in Unit) - cont.

TABLE 9-3 HWC242 Performance Test (Chassis Installed)

		Outdoor Air Temperature Entering Outdoor Coil											
		85°			95°			105°			115°		
Enter. DB/WB	Total Air Vol. (CFM)	Suction Pressure	Suction Temp.	Liquid Temp.	Suction Pressure	Suction Temp.	Liquid Temp.	Suction Pressure	Suction Temp.	Liquid Temp.	Suction Pressure	Suction Temp.	Liquid Temp.
75°/63°	700	77	47	98	78	46	108	79	47	117	80	48	128
	800	79	52	98	80	47	108	81	48	117	82	49	128
	900	81	57	99	82	50	109	83	49	118	84	50	128
80°/67°	700	82	60	99	83	51	109	85	50	118	86	51	128
	800	84	65	100	85	56	109	87	52	119	88	52	129
	900	86	70	100	87	60	110	89	55	119	90	53	129
85°/71°	700	87	71	100	88	61	110	89	53	119	90	54	129
	800	89	76	101	90	68	110	91	59	120	92	55	130
	900	91	81	101	92	71	110	93	62	120	94	56	130

Based on a normally installed cooling chassis

TABLE 9-4 HWC302 Performance Test (Chassis Installed)

		Outdoor Air Temperature Entering Outdoor Coil											
		85°			95°			105°			115°		
Enter. DB/WB	Total Air Vol. (CFM)	Suction Pressure	Suction Temp.	Liquid Temp.	Suction Pressure	Suction Temp.	Liquid Temp.	Suction Pressure	Suction Temp.	Liquid Temp.	Suction Pressure	Suction Temp.	Liquid Temp.
75°/63°	775	76	46	100	77	46	110	78	46	120	79	47	129
	850	78	51	100	79	47	110	80	48	120	81	48	129
	925	80	57	100	81	49	111	82	49	120	83	50	130
80°/67°	775	82	60	102	84	51	111	85	51	121	87	52	131
	850	84	65	102	85	56	112	87	52	121	88	53	131
	925	85	70	102	87	60	112	88	54	121	89	53	131
85°/71°	775	89	72	103	90	63	112	92	55	122	93	55	132
	850	91	77	104	92	69	113	94	61	123	95	57	133
	925	93	82	104	94	72	113	96	64	123	97	58	133

Based on a normally installed cooling chassis

Performance Tests (Chassis Bench Tested)

TABLE 9-5 70 - 80° Ambient Temperature Chassis Bench Test

Chassis Model	Ambient Temp. DB/WB	Disch. Pressure	Disch. Temp.	Liquid Pressure	Liquid Temp.	Suction Pressure	Suction Temp.	Total Amps	Comp. SH	Subcooling
122, 123	75°/63°	175 psi	120°	170 psi	78°	78 psi	53°	5.0	7	13
182, 183	75°/63°	200 psi	107°	190 psi	80°	82 psi	54°	8.3	5	18
242, 243	75°/63°	205 psi	99°	200 psi	81°	71 psi	50°	10.7	8	21
302, 303	75°/63°	205 psi	153°	200 psi	84°	70 psi	62°	13.5	21	18

TABLE 9-6 95° Ambient Temperature Chassis Bench Test

Chassis Model	Ambient Temp. DB/WB	Disch. Pressure	Disch. Temp.	Liquid Pressure	Liquid Temp.	Suction Pressure	Suction Temp.	Total Amps	Comp. SH	Subcooling
122, 123	95°/79°	270 psi	154°	270 psi	99°	110 psi	83°	6.0	18	25
182, 183	95°/79°	310 psi	141°	305 psi	106°	110 psi	68°	10.2	3	25
242, 243	95°/79°	325 psi	153°	310 psi	114°	101 psi	69°	14.2	9	19
302, 303	95°/79°	305 psi	177°	300 psi	105°	88 psi	86°	16.4	32	25

Charge Weights

TABLE 9-7 HWC Refrigerant Charge Weights

Model	Refrigerant Charge
HWC122/123	42 oz.
HWC182/183	56 oz.
HWC242/243	58 oz.
HWC302/303	59 oz.