UNIT INFORMATION

ZGD SERIES
3 to 6 ton
10.6 to 21 kW

100186

Service Literature

ZGD036 through 074 with R454B

The ZGD packaged gas units are available in standard cooling efficiency (036S, 048S, 060S, 074S). Cooling capacities are 3, 4, 5 and 6 tons (10.6 to 20.3kW).

All units are available in single-stage 65,000 BTUH (19 kW), single-stage 108,000 BTUH (32 kW) and two-stage 81/108,000 BTUH (24/32 kW) heat capacities. ZGD048, 060 and 074 units are available in singe-stage 150,000 BTUH (44 kW) and two-stage 113/150,000 BTUH (33/44 KW) heat capacities. Gas heat sections are designed with aluminized steel tube heat exchangers.

Information contained in this manual is intended for use by qualified service technicians only. All specifications are subject to change. Procedures outlined in this manual are presented as a recommendation only and do not supesede or replace local or state codes.

If the unit must be lifted for service, rig unit by attaching four cables to the holes located in the unit base rail (two holes at each corner). Refer to the installation instructions for the proper rigging technique. Stacking brackets can be removed or left on the unit permanently. If brackets are removed, any screws removed during installation must be replaced.

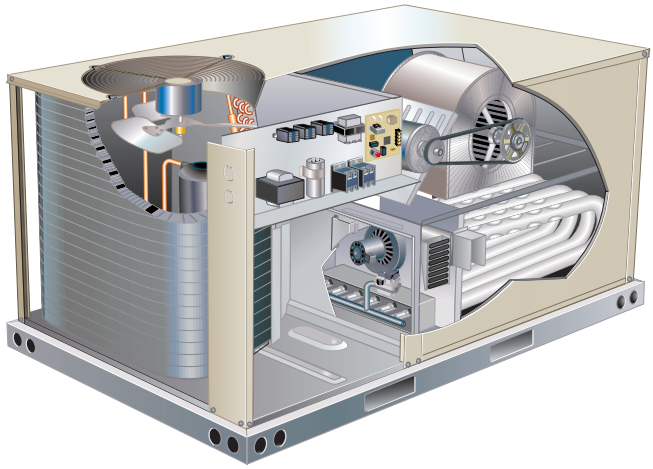
False ceilings or drop ceiling may be used as a return air plenum only if the unit being installed has a Refrigerant Detection System installed.

All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out with work in confined spaces being avoided.

Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

⚠ WARNING

Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or loss of life. Installation and service must be performed by a licensed professional HVAC installer or equivalent service agency.



⚠ WARNING

Electric shock hazard. Can cause injury or death. Before attempting to perform any service or maintenance, turn the electrical power to unit OFF at disconnect switch(es). Unit may have multiple power supplies.

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⚠ CAUTION

As with any mechanical equipment, contact with sharp sheet metal edges can result in personal in jury. Take care while handling this equipment and wear gloves and protective clothing.

⚠ WARNING

Only manufacturer approved auxiliary devices are permitted to be installed in this unit.

⚠ CAUTION

The appliance is not to be used by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction

⚠ CAUTION

Children should be supervised not to play with the appliance.

⚠ CAUTION

Any personnel installing, decommissioning, or performaing maintenance on the unit must be properly trained with A2L refrigerants.

⚠ CAUTION

Servicing shall be performed only as recommended by the manufacturer.

⚠ WARNING

•This appliance must be installed in accordance with local and national wiring regulations.

•If the appliance is not fitted with an option for full disconnection from power, a means of disconnection must be incorporated in the fixed wiring in accordance with national and local wiring regulations.

⚠ CAUTION

Leak Detection System installed. Unit must be powered except for service.

⚠ WARNING

Ducts connected to an appliance shall not contain a potential ignition source.

⚠ IMPORTANT

Pipe work, including piping material, pipe routing, and installation shall include protection from physical damage in operation and service, and be in compliance with national and local codes and standards, such as ASHRAE 15, ASHRAE 15.2, IAPMO Uniform Mechanical Code, ICC International Mechanical Code, or CSA B52. All field joints shall be accessible for inspection prior to being covered or enclosed.

⚠ IMPORTANT

Refrigerant sensors for refrigerant detection systems shall only be replaced with sensors specified by the appliance manufacture.

⚠ CAUTION

This unit is equipped with electrically powered safety measures. To be effective, the unit must be electrically powered at all times after installation, other than when servicing.

⚠ WARNING

To prevent serious injury or death:

1- Lock-out/tag-out before performing maintenance.

2- If system power is required (e.g., smoke detector maintenance), disable power to blower, remove fan belt where applicable, and ensure all controllers and thermostats are set to the "OFF" position before performing maintenance.

3- Always keep hands, hair, clothing, jewelry, tools, etc., away from moving parts.

OPTIONS / ACCESSORIES

Item		Order Number	Size 036	048	060	074
COOLING SYSTEM						
Condensate Drain Trap	PVC	**38R23**	X	X	X	X
	Copper	**38V21**	X	X	X	X
Drain Pan Overflow Switch		**38A64**	X	X	X	X
Low Ambient Kit		**99W67**	X	X	X	X
HEATING SYSTEM						
Conventional Gas Heat	Medium One-Stage - 108 kBtuh input (3 phase)	Factory	O	O	O	O
	High Two-Stage - 113/150 kBtuh input (3 phase)	Factory		O	O	O
[1] Low NOx Gas Heat	Standard One-Stage - 65 kBtuh input (1 and 3 phase)	Factory	O	O	O	O
	Medium One-Stage - 108 kBtuh input (1 and 3 phase)	Factory	O	O	O	
	High Two-Stage -113/150 kBtuh input (1 and 3 phase)	Factory		O	O	O
LPG/Propane Conversion Kits	One-Stage Heat	**21Z22**	X	X	X	X
	Two-Stage heat	**21Z23**	X	X	X	X
Stainless Steel Heat Exchanger		Factory	O	O	O	O
Vertical Vent Extension Kit		**31W62**	X	X	X	X
BLOWER - SUPPLY AIR						
Motors	Direct Drive (ECM) - 0.50 HP (208/230V-1ph, 208/230V-3ph)	Factory	O			
	Direct Drive (ECM) - 0.75 HP (208/230V-1ph, 208/230V-3ph)	Factory		O		
	Direct Drive (ECM) - 1.0 HP (208/230V-1ph, 208/230V-3ph)	Factory			O	
	Belt Drive - 1 HP (208/230V, 460V, 575V-3ph) Standard Efficiency	Factory	O	O		
	Belt Drive - 1.5 HP (208/230V, 460V, 575V-3ph) Standard Efficiency	Factory			O	
	Belt Drive - 2 HP (208/230V, 460V, 575V-3ph) (2 Speed)	Factory				O
Drive Kits See Blower Data Tables for selection	Kit #ZA01 - 678-1035 rpm	Factory	O			
	Kit #ZA02 - 803-1226 rpm	Factory		O		
	Kit #ZA03 - 906-1383 rpm	Factory			O	
	Kit #ZA04 - 964-1471 rpm	Factory	O			
	Kit #ZA05 - 1098-1490 rpm	Factory		O	O	
	Kit #ZAA02 - 632-875 rpm	Factory				O
	Kit #ZAA03 - 798-1105 rpm	Factory				O
	Kit #ZAA04 - 921-1226 rpm	Factory				O
CABINET						
Coil/Hail Guards		**12X19**	X	X		
		12X20			X	X
Corrosion Protection		Factory	O	O	O	O
ELECTRICAL						
Voltage 60 Hz	208/230V - 1 phase	Factory	O	O	O	
	208/230V - 3 phase	Factory	O	O	O	O
	460V - 3 phase	Factory	O	O	O	O
	575V - 3 phase	Factory	O	O	O	O
Bottom Power Entry Kit		**98W08**	X	X	X	X

[1] Low NOx is furnished with all single phase models, optional for three phase models with Medium or High Gas Heat.

NOTE - Order numbers shown are for ordering field installed accessories.

OX - Configure To Order (Factory Installed) or Field Installed

O = Configure To Order (Factory Installed)

X = Field Installed

OPTIONS / ACCESSORIES

Item		Order Number	Size			
			036	048	060	074
ECONOMIZERS						
Standard Economizer With Outdoor Air Hood (Not for Title 24)						
Standard Economizer (Downflow) Includes Barometric Relief Dampers and Exhaust Hood		**14D94**	X	X	X	X
Standard Economizer (Horizontal) Includes Barometric Relief Dampers and Exhaust Hood		**14D92**	X	X	X	X
Standard Economizer Controls (Not for Title 24)						
Single Enthalpy Control		**21Z09**	X	X	X	X
High Performance Economizer With Outdoor Air Hood (Approved for California Title 24 Building Standards / AMCA Class 1A Certified)						
High Performance Economizer (Downflow) Includes Barometric Exhaust Dampers and Exhaust Hood		**24J59**	X	X	X	X
High Performance Economizer (Horizontal) Includes Barometric Exhaust Dampers and Exhaust Hood		**24J60**	X	X	X	X
Economizer Controls						
Single Enthalpy Control		**24G11**	X	X	X	X
Economizer Accessories						
WLAN Stick (For High Performance Economizer only)		**23K58**	X	X	X	X
OUTDOOR AIR						
Outdoor Air Dampers With Outdoor Air Hood						
Motorized		**15D19**	X	X	X	X
Manual		**15D20**	X	X	X	X
POWER EXHAUST FAN						
Standard Static (Downflow)	208/230V-1 or 3ph	**21E01**	X	X	X	X
Standard Static (Horizontal)	208/230V-1 or 3ph	**24E01**	X	X	X	X
575V Transformer Kit	575V-3ph	**59E02**	X	X	X	X
NOTE - Order 575V Transformer Kit with 208/230V Power Exhaust Fan for 575V applications.						
INDOOR AIR QUALITY						
Indoor Air Quality (CO_2) Sensors						
Sensor - Wall-mount, off-white plastic cover with LCD display		**24C58**	X	X	X	X
Sensor - Wall-mount, black plastic case, no display, rated for plenum mounting		**23V87**	X	X	X	X
CO_2 Sensor Duct Mounting Kit - for downflow applications		**23Y47**	X	X	X	X
Aspiration Box - for duct mounting non-plenum rated CO_2 sensor (**24C58**)		**90N43**	X	X	X	X
ROOF CURBS						
Hybrid Roof Curbs, Downflow						
8 in. height		**11F76**	X	X	X	X
14 in. height		**11F77**	X	X	X	X
18 in. height		**11F78**	X	X	X	X
24 in. height		**11F79**	X	X	X	X
CEILING DIFFUSERS						
Step-Down - Order one	RTD9-65S	**13K60**	X	X	X	
	RTD11-95S	**13K61**				X
Flush - Order one	FD9-65S	**13K55**	X	X	X	
	FD11-95S	**13K56**				X
NOTE - Ceiling Diffuser Transitions are not furnished and must be field fabricated.						

NOTE - Order numbers shown are for ordering field installed accessories.

OX - Configure To Order (Factory Installed) or Field Installed

O = Configure To Order (Factory Installed)

X = Field Installed

SPECIFICATIONS — DIRECT DRIVE MODELS

Model		ZGD036S5E	ZGD048S5E	ZGD060S5E
Nominal Tonnage		3	4	5
Efficiency Type		Standard	Standard	Standard
Blower Type		ECM Direct Drive	ECM Direct Drive	ECM Direct Drive
Cooling Performance	Gross Cooling Capacity (Btuh)	36,200	46,700	57,000
	[1] Net Cooling Capacity (Btuh)	35,000	45,500	57,000
	[1] AHRI Rated Air Flow (cfm)	1190	1380	1725
	[1] SEER2 (Btuh/Watt)	13.4	13.4	13.4
	[1] EER2 (Btuh/Watt)	11.5	11.5	11.5
	Total Unit Power (kW)	3.0	4.1	5.0
Sound Rating Number	dBA	78	80	78
Refrigerant	Type	R-454B	R-454B	R-454B
	Charge Furnished	4 lbs. 1 oz.	4 lbs. 4 oz.	4 lbs. 10 oz.
Gas Heating Options		See page 15		
Compressor Type (number)		Scroll (1)	Scroll (1)	Scroll (1)
Outdoor Coil	Net face area - ft.^{2}	15.2	15.2	19.9
	Rows	1	1	1
	Fins - in.	23	23	23
Outdoor Coil Fan	Motor HP (number and type)	1/4 (1 ECM)	1/4 (1 ECM)	1/4 (1 ECM)
	Rpm	825	825	825
	Watts	315	315	315
	Diameter (Number) - in.	(1) 22	(1) 22	(1) 22
	Blades	4	4	4
	Total air volume - cfm	3700	3700	3700
Indoor Coil	Net face area - ft.^{2}	7.2	7.2	7.2
	Rows	1	1	1
	Fins - in.	18	18	18
	Condensate drain size (NPT) - in.	(1) 3/4	(1) 3/4	(1) 3/4
	Expansion device type	Balanced Port Thermostatic Expansion Valve		
Indoor Blower	Nominal Motor HP	0.50 (ECM)	0.75 (ECM)	1 (ECM)
	Wheel (Number) diameter x width - in.	(1) 10 x 10	(1) 10 x 10	(1) 11 x 10
Filters	Type	Disposable		
	Number and size - in.	(4) 14 x 20 x 2		(2) 16 x 20 x 2 (2) 20 x 20 x 2
Line voltage data (Volts-Phase-Hz)		208/230-1-60 208/230-3-60	208/230-1-60 208/230-3-60	208/230-1-60 208/230-3-60

NOTE - Net capacity includes evaporator blower motor heat deduction. Gross capacity does not include evaporator blower motor heat deduction.

[1] AHRI Certified to AHRI Standard 210/240: 95°F outdoor air temperature and 80°F db/67°F wb entering evaporator air; minimum external duct static pressure.

SPECIFICATIONS — BELT DRIVE MODELS

Model		ZGD036S5B	ZGD048S5B	ZGD060S5B	ZGD074S5T
Nominal Tonnage		3	4	5	6
Efficiency Type		Standard	Standard	Standard	Standard
Blower Type		Single Speed Belt Drive	Single Speed Belt Drive	Single Speed Belt Drive	Two Speed Belt Drive
Cooling Performance	Gross Cooling Capacity (Btuh)	36,200	46,700	58,300	68,500
	[1] Net Cooling Capacity (Btuh)	35,000	45,500	57,000	67,000
	[1] AHRI Rated Air Flow (cfm)	1190	1380	1725	2200
	[1] SEER2 (Btuh/Watt)	13.4	13.4	13.4	- - -
	[1] EER2 (Btuh/Watt)	11.5	11.5	11.5	- - -
	[1] IEER (Btuh/Watt)	- - -	- - -	- - -	15.0
	[1] EER (Btuh/Watt)	- - -	- - -	- - -	11.0
	Total Unit Power (kW)	3.0	4.1	5.0	5.8
Sound Rating Number	dBA	78	80	78	84
Refrigerant	Type	R-454B	R-454B	R-454B	R-454B
	Charge Furnished	4 lbs. 1 oz.	4 lbs. 4 oz.	4 lbs. 10 oz.	5 lbs. 0 oz.
Gas Heating Options		See page 15			
Compressor Type (number)		Single-Stage Scroll (1)	Single-Stage Scroll (1)	Single-Stage Scroll (1)	Two-Stage Scroll (1)
Outdoor Coil	Net face area - ft.[2]	15.2	15.2	19.9	19.9
	Rows	1	1	1	1
	Fins - in.	23	23	23	23
Outdoor Coil Fan	Motor HP	(1) 1/4	(1) 1/4	(1) 1/4	(1) 1/3
	Rpm	825	825	825	1075
	Watts	315	315	315	365
	Diameter (Number) - in.	(1) 22	(1) 22	(1) 22	(1) 22
	Blades	4	4	4	3
	Total air volume - cfm	3700	3700	3700	4270
Indoor Coil	Net face area - ft.[2]	7.2	7.2	7.2	9.5
	Rows	1	1	1	1
	Fins - in.	18	18	18	18
	Condensate drain size (NPT) - in.	(1) 3/4	(1) 3/4	(1) 3/4	(1) 3/4
	Expansion device type	Balanced Port Thermostatic Expansion Valve			
[2] **Indoor Blower & Drive Selection**	Nominal Motor HP	1	1	1.5	2
	Maximum Usable Motor HP	1.15	1.15	1.7	2.3
	Drive Kits	Kit #ZA01 678-1035 rpm Kit #ZAA04 921-1228 rpm	Kit #ZA02 803-1226 rpm Kit #ZA05 1098-1490 rpm	Kit #ZA03 906-1383 rpm Kit #ZA05 1098-1490 rpm	Kit #ZAA02 632-875 rpm Kit #ZAA03 798-1105 rpm Kit #ZAA04 921-1228 rpm
	Wheel (Number) diameter x width - in.	(1) 10 x 10	(1) 10 x 10	(1) 10 x 10	(1) 15 x 9
Filters	Type	Disposable			
	Number and size - in.	(4) 14 x 20 x 2		(2) 16 x 20 x 2 (2) 20 x 20 x 2	
Line voltage data (Volts-Phase-Hz)		208/230-3-60 460-3-60 575-3-60	208/230-3-60 460-3-60 575-3-60	208/230-3-60 460-3-60 575-3-60	208/230-3-60 460-3-60 575-3-60

NOTE - Net capacity includes evaporator blower motor heat deduction. Gross capacity does not include evaporator blower motor heat deduction.

[1] AHRI Certified to AHRI Standard 210/240 or 340/360: 95°F outdoor air temperature and 80°F db/67°F wb entering evaporator air; minimum external duct static pressure.

[2] Using total air volume and system static pressure requirements determine from blower performance tables rpm and motor HP required. Maximum usable HP of motors furnished are shown. In Canada, nominal motor HP is also maximum usable motor HP output. If motors of comparable HP are used, be sure to keep within the service factor limitations outlined on the motor nameplate.

SPECIFICATIONS — CONVENTIONAL GAS HEAT (THREE PHASE)

		Size	036, 048, 060	074	048, 060	074
		Heat Input Type	Medium (1 Stage)		High (2 Stage)	
Input Btuh		1st Stage	108,000		113,000	
		2nd Stage	- - -		150,000	
Output Btuh		1st Stage	86,000		90,000	
		2nd Stage	- - -		120,000	
Temperature Rise Range - °F		1st stage	35 - 65	20 - 50	30 - 60	25 - 55
		2nd Stage	- - -	- - -	45 - 75	35 - 65
Minimum air volume - cfm		Direct Drive (ECM)		N/A		N/A
		Belt Drive (1 Speed)		N/A		N/A
		Belt Drive (2 Speed)	N/A		N/A	
[1] Thermal Efficiency		Standard	80%	80%	80%	80%
Gas Supply Connections			1/2 in. NPT			
Recommended Gas Supply Pressure - Nat. / LPG			7 in.w.g. / 11 in.w.g.			
Gas Supply Pressure Range		Min./Max. (Natural)	4.5 - 10.5 in. w.g.			
		Min./Max. (LPG)	10.8 - 13.5 in. w.g.			

[1] Thermal Efficiency at full input.

SPECIFICATIONS — LOW NOX GAS HEAT (SINGLE AND THREE PHASE)

		Size	036, 048, 060	074	036, 048, 060	048, 060	074
		Heat Input Type	Standard (1 Stage)		Medium (1 Stage)	High (2 Stage)	
Input Btuh		1st Stage	65,000		108,000	113,000	
		2nd Stage	- - -		- - -	150,000	
Output Btuh		1st Stage	52,000		87,000	92,000	
		2nd Stage	- - -		- - -	121,000	
Temperature Rise Range - °F		1st stage	15 - 45	5 - 35	35 - 65	30 - 60	25 - 55
		2nd Stage	- - -	- - -	- - -	45 - 75	35 - 65
Minimum air volume - cfm		Direct Drive (ECM)		N/A			N/A
		Belt Drive (1 Speed)		N/A			N/A
		Belt Drive (2 Speed)	N/A			N/A	
[1] AFUE (single phase)			81%	- - -	81%	81%	- - -
[2] Thermal Efficiency (three phase)			81%	81%	81%	81%	81%
Gas Supply Connections			1/2 in. NPT				
Recommended Gas Supply Pressure - Nat. / LPG			7 in.w.g. / 11 in.w.g.				
Gas Supply Pressure Range		Min./Max. (Natural)	4.5 - 10.5 in. w.g.				
		Min./Max. (LPG)	10.8 - 13.5 in. w.g.				

[1] Annual Fuel Utilization Efficiency based on U.S. DOE test procedures and FTC labeling regulations - 1 phase models only.
[2] Thermal Efficiency at full input.

HIGH ALTITUDE DERATE

NOTE - Units may be installed at altitudes up to 2000 feet above sea level without any modifications.
At altitudes above 2000 feet units must be derated to match gas manifold pressures shown in table below.
At altitudes above 4500 feet unit must be derated 2% for each 1000 feet above sea level.

NOTE - This is the only permissible derate for these units.

Refer to the Installation Instructions for more detailed information.

Heat Input Type	Altitude Feet	Gas Manifold Pressure in. w.g.		Input Rate (Btuh)
		Natural Gas	LPG/ Propane	
Standard (1 stage)	2001 - 4500	1.7 / 3.0	5.9 / 9.0	60,000
Medium (1 stage)	2001 - 4500	1.7 / 3.0	5.9 / 9.0	100,000
Medium (2 stage)	2001 - 4500	1.7 / 3.0	5.9 / 9.0	75,000 /100,000
High (2 stage)	2001 - 4500	1.7 / 3.0	5.9 / 9.0	104,000 / 139,000

BLOWER TABLE INCLUDES RESISTANCE FOR BASE UNIT ONLY WITH DRY INDOOR COIL AND AIR FILTERS IN PLACE.

FOR ALL UNITS ADD:

1 - Any factory installed options air resistance (heat section, economizer, etc.).

2 - Any field installed accessories air resistance (duct resistance, diffuser, etc.).

See page 29 for wet coil and options/accessory air resistance data.

DOWNFLOW

External Static Press. in. w.g.	Blower Only			Low Speed						High Speed						Free Cooling		
	Low and High Speed: G (Pin 1)			1st Stage Heating: W1 (Pin 2) Cooling: Y1 (Pin 2 and 5)			2nd Stage Heating: W2 (Pin 2 and 4)			1st Stage Heating: W1 (Pin 3) 2nd Stage Heating: W2 (Pin 3 and 4)			Cooling: Y1 (Pin 3 and 5)			Low and High Speed: Y1 (Pin 1 and 5)		
	CFM	Watts	RPM	CFM	Watts	RPM	CFM	Watts	RPM	CFM	Watts	RPM	CFM	Watts	RPM	CFM	Watts	RPM
0	752	47	407	1127	142	623	1474	294	803	1664	404	887	1474	294	803	1474	294	803
0.1	694	53	482	1089	150	668	1445	304	835	1636	419	922	1445	304	835	1445	304	835
0.2	627	60	535	1049	158	713	1414	314	871	1613	430	949	1414	314	871	1414	314	871
0.3	560	66	602	1007	167	760	1389	323	898	1579	445	987	1389	323	898	1389	323	898
0.4	502	70	694	965	175	805	1350	335	940	1556	454	1011	1350	335	940	1350	335	940
0.5	- - -	- - -	- - -	923	183	849	1314	347	978	1522	466	1045	1314	347	978	1314	347	978
0.6	- - -	- - -	- - -	881	191	891	1287	356	1008	1488	475	1076	1287	356	1008	1287	356	1008
0.7	- - -	- - -	- - -	826	201	945	1251	367	1045	1442	485	1114	1251	367	1045	1251	367	1045
0.8	- - -	- - -	- - -	785	208	983	1219	377	1078	1408	490	1140	1219	377	1078	1219	377	1078
0.9	- - -	- - -	- - -	646	190	836	1181	389	1117	1363	494	1170	1181	389	1117	1181	389	1117
1.0	- - -	- - -	- - -	618	195	863	1147	400	1152	1317	494	1196	1147	400	1152	1147	400	1152

HORIZONTAL

External Static Press. in. w.g.	Blower Only			Low Speed						High Speed						Free Cooling		
	Low and High Speed: G (Pin 1)			1st Stage Heating: W1 (Pin 2) Cooling: Y1 (Pin 2 and 5)			2nd Stage Heating: W2 (Pin 2 and 4)			1st Stage Heating: W1 (Pin 3) 2nd Stage Heating: W2 (Pin 3 and 4)			Cooling: Y1 (Pin 3 and 5)			Low and High Speed: Y1 (Pin 1 and 5)		
	CFM	Watts	RPM	CFM	Watts	RPM	CFM	Watts	RPM	CFM	Watts	RPM	CFM	Watts	RPM	CFM	Watts	RPM
0	737	50	416	1255	179	671	1539	311	794	1666	386	850	1588	340	818	1539	311	794
0.1	676	56	485	1221	188	701	1509	321	827	1637	402	886	1560	350	849	1509	321	827
0.2	606	62	560	1179	199	749	1475	334	866	1614	414	914	1527	363	885	1475	334	866
0.3	536	68	628	1138	209	795	1446	344	896	1580	430	954	1493	376	921	1446	344	896
0.4	475	73	683	1096	219	840	1411	357	935	1545	445	991	1460	388	958	1411	357	935
0.5	- - -	- - -	- - -	1053	229	883	1375	369	972	1510	457	1027	1426	401	993	1375	369	972
0.6	- - -	- - -	- - -	1012	239	925	1341	381	1010	1475	468	1060	1393	413	1029	1341	381	1010
0.7	- - -	- - -	- - -	960	250	975	1305	393	1047	1441	478	1090	1359	426	1064	1305	393	1047
0.8	- - -	- - -	- - -	918	259	1012	1263	408	1090	1394	487	1128	1326	438	1100	1263	408	1090
0.9	- - -	- - -	- - -	873	268	1060	1216	423	1138	1360	492	1153	1281	454	1146	1216	423	1138
1.0	- - -	- - -	- - -	826	277	1094	1180	435	1173	1314	496	1183	1247	466	1181	1180	435	1173

BLOWER TABLE INCLUDES RESISTANCE FOR BASE UNIT ONLY WITH DRY INDOOR COIL AND AIR FILTERS IN PLACE.

FOR ALL UNITS ADD:

1 - Any factory installed options air resistance (heat section, economizer, etc.).

2 - Any field installed accessories air resistance (duct resistance, diffuser, etc.).

See page 29 for wet coil and options/accessory air resistance data.

DOWNFLOW

External Static Press. in. w.g.	Blower Only			Low Speed						High Speed						Free Cooling		
	Low and High Speed: G (Pin 1)			1st Stage Heating: W1 (Pin 2) Cooling: Y1 (Pin 2 and 5)			2nd Stage Heating: W2 (Pin 2 and 4)			1st Stage Heating: W1 (Pin 3) 2nd Stage Heating: W2 (Pin 3 and 4)			Cooling: Y1 (Pin 3 and 5)			Low and High Speed: Y1 (Pin 1 and 5)		
	CFM	Watts	RPM	CFM	Watts	RPM	CFM	Watts	RPM	CFM	Watts	RPM	CFM	Watts	RPM	CFM	Watts	RPM
0	933	82	507	1724	438	911	1514	294	779	1832	529	970	2051	754	1084	1884	579	998
0.1	884	90	568	1699	450	940	1477	306	820	1810	540	994	2017	750	1100	1864	591	1021
0.2	829	99	634	1672	462	970	1441	318	859	1784	553	1022	1976	746	1119	1838	606	1050
0.3	787	105	681	1636	478	1010	1406	329	897	1748	570	1060	1935	743	1138	1806	622	1084
0.4	732	113	739	1609	491	1040	1359	345	948	1722	583	1089	1894	739	1156	1779	636	1113
0.5	676	120	794	1582	503	1070	1324	356	985	1696	597	1117	1853	736	1174	1755	647	1138
0.6	621	127	844	1555	515	1099	1289	367	1022	1670	610	1146	1812	732	1192	1723	660	1169
0.7	552	134	901	1528	527	1128	1254	378	1058	1644	623	1174	1757	728	1214	1694	670	1195
0.8	510	138	932	1492	542	1167	1219	389	1093	1617	636	1203	1716	726	1231	1666	679	1219
0.9	- - -	- - -	- - -	1465	554	1195	1190	399	1122	1591	649	1231	1675	723	1247	1634	686	1245
1.0	- - -	- - -	- - -	1442	564	1219	1158	409	1155	1560	665	1265	1627	720	1265	1592	691	1273

HORIZONTAL

External Static Press. in. w.g.	Blower Only			Low Speed						High Speed						Free Cooling		
	Low and High Speed: G (Pin 1)			1st Stage Heating: W1 (Pin 2) Cooling: Y1 (Pin 2 and 5)			2nd Stage Heating: W2 (Pin 2 and 4)			1st Stage Heating: W1 (Pin 3) 2nd Stage Heating: W2 (Pin 3 and 4)			Cooling: Y1 (Pin 3 and 5)			Low and High Speed: Y1 (Pin 1 and 5)		
	CFM	Watts	RPM	CFM	Watts	RPM	CFM	Watts	RPM	CFM	Watts	RPM	CFM	Watts	RPM	CFM	Watts	RPM
0	935	82	508	1746	434	900	1524	292	794	1858	518	1043	2089	756	1068	1914	569	1030
0.1	886	90	572	1724	445	927	1497	302	825	1834	532	988	2066	754	1081	1893	582	1007
0.2	845	97	624	1697	458	960	1465	314	863	1807	546	939	2021	750	1102	1865	600	996
0.3	803	104	673	1669	472	993	1433	326	901	1781	560	908	1976	746	1123	1841	614	989
0.4	748	112	733	1642	485	1025	1402	337	938	1754	574	897	1946	744	1144	1812	629	997
0.5	692	119	789	1606	502	1068	1370	349	974	1728	588	904	1887	739	1165	1784	643	1014
0.6	637	126	839	1579	515	1099	1338	360	1011	1701	602	930	1857	737	1194	1755	655	1041
0.7	554	135	905	1552	528	1130	1295	376	1059	1666	620	995	1797	733	1215	1722	668	1089
0.8	505	139	937	1515	545	1171	1263	387	1095	1640	633	1065	1752	730	1236	1694	678	1138
0.9	- - -	- - -	- - -	1488	558	1202	1232	398	1130	1613	646	1153	1692	726	1264	1652	684	1204
1.0	- - -	- - -	- - -	1466	568	1227	1200	410	1165	1582	661	1281	1632	723	1288	1619	689	1283

BLOWER DATA — ZGD060S5E DIRECT DRIVE (SINGLE PHASE)

BLOWER TABLE INCLUDES RESISTANCE FOR BASE UNIT ONLY WITH DRY INDOOR COIL AND AIR FILTERS IN PLACE.

FOR ALL UNITS ADD:

1 - Any factory installed options air resistance (heat section, economizer, etc.).

2 - Any field installed accessories air resistance (duct resistance, diffuser, etc.).

See page 29 for wet coil and options/accessory air resistance data.

DOWNFLOW

External Static Press. in. w.g.	Blower Only			Low Speed									High Speed									Free Cooling		
	Low and High Speed: G (Pin 1)			1st Stage Heating: W1 (Pin 2)			2nd Stage Heating: W2 (Pin 2 and 4)			Cooling: Y1 (Pin 2 and 5)			1st Stage Heating: W1 (Pin 3)			2nd Stage Heating: W2 (Pin 3 and 4)			Cooling: Y1 (Pin 3 and 5)			Low and High Speed: Y1 (Pin 1 and 5)		
	CFM	Watts	RPM	CFM	Watts	RPM	CFM	Watts	RPM	CFM	Watts	RPM	CFM	Watts	RPM	CFM	Watts	RPM	CFM	Watts	RPM	CFM	Watts	RPM
0	1076	108	495	1708	387	602	1938	553	860	1846	469	781	1708	387	602	2263	916	1027	2108	746	964	2108	746	964
0.1	1017	118	551	1677	398	680	1910	566	884	1818	481	816	1677	398	680	2230	928	1048	2082	760	987	2082	760	987
0.2	966	126	598	1642	411	758	1879	581	912	1785	495	855	1642	411	758	2190	942	1073	2054	776	1012	2054	776	1012
0.3	915	135	644	1602	425	831	1837	601	949	1742	513	900	1602	425	831	2150	952	1096	2018	797	1045	2018	797	1045
0.4	847	145	703	1573	436	885	1815	612	970	1719	523	926	1573	436	885	2110	960	1118	1990	812	1069	1990	812	1069
0.5	796	153	745	1532	451	939	1775	630	1004	1676	541	967	1532	451	939	2070	966	1139	1962	828	1093	1962	828	1093
0.6	745	160	786	1497	463	979	1743	644	1031	1643	555	998	1497	463	979	2030	969	1158	1934	843	1117	1934	843	1117
0.7	694	167	825	1456	478	1014	1712	658	1058	1609	569	1027	1456	478	1014	1990	969	1176	1906	858	1140	1906	858	1140
0.8	643	174	863	1415	492	1038	1670	677	1093	1565	587	1061	1415	492	1038	1950	968	1192	1870	877	1171	1870	877	1171
0.9	592	180	900	1381	505	1047	1639	691	1120	1533	601	1085	1381	505	1047	1897	961	1212	1842	892	1194	1842	892	1194
1.0	558	184	923	1345	517	1042	1612	703	1141	1503	612	1102	1345	517	1042	1857	953	1225	1819	904	1213	1819	904	1213

HORIZONTAL

External Static Press. in. w.g.	Blower Only			Low Speed									High Speed									Free Cooling		
	Low and High Speed: G (Pin 1)			1st Stage Heating: W1 (Pin 2)			2nd Stage Heating: W2 (Pin 2 and 4)			Cooling: Y1 (Pin 2 and 5)			1st Stage Heating: W1 (Pin 3)			2nd Stage Heating: W2 (Pin 3 and 4)			Cooling: Y1 (Pin 3 and 5)			Low and High Speed: Y1 (Pin 1 and 5)		
	CFM	Watts	RPM	CFM	Watts	RPM	CFM	Watts	RPM	CFM	Watts	RPM	CFM	Watts	RPM	CFM	Watts	RPM	CFM	Watts	RPM	CFM	Watts	RPM
0	1061	111	507	1693	386	764	1926	555	862	1825	472	820	1693	386	764	2244	870	992	2131	739	945	2131	739	945
0.1	1015	119	551	1662	398	792	1897	568	887	1796	484	846	1662	398	792	2224	885	1012	2097	753	970	2097	753	970
0.2	965	127	597	1627	410	822	1866	581	913	1764	498	874	1627	410	822	2189	909	1043	2068	765	992	2068	765	992
0.3	915	135	642	1581	427	863	1827	598	947	1722	516	912	1581	427	863	2166	922	1062	2038	778	1015	2038	778	1015
0.4	865	143	685	1552	437	888	1802	609	968	1699	525	931	1552	437	888	2131	940	1089	2000	797	1046	2000	797	1046
0.5	798	153	741	1512	452	923	1763	627	1001	1658	542	967	1512	452	923	2097	953	1114	1970	812	1070	1970	812	1070
0.6	765	157	767	1478	465	953	1733	641	1028	1626	556	995	1478	465	953	2062	963	1136	1941	827	1095	1941	827	1095
0.7	698	167	819	1443	477	983	1701	655	1055	1593	569	1023	1443	477	983	2027	968	1156	1912	844	1120	1912	844	1120
0.8	648	173	855	1397	494	1023	1663	673	1088	1551	587	1060	1397	494	1023	1981	970	1178	1882	860	1146	1882	860	1146
0.9	598	180	891	1369	504	1047	1632	687	1115	1520	600	1086	1369	504	1047	1923	963	1199	1853	878	1172	1853	878	1172
1.0	539	187	930	1334	516	1077	1606	700	1138	1492	611	1110	1334	516	1077	1883	951	1210	1829	893	1195	1829	893	1195

BLOWER DATA — ZGD036S5E DIRECT DRIVE (THREE PHASE)

BLOWER TABLE INCLUDES RESISTANCE FOR BASE UNIT ONLY WITH DRY INDOOR COIL AND AIR FILTERS IN PLACE.

FOR ALL UNITS ADD:

1 - Any factory installed options air resistance (heat section, economizer, etc.).

2 - Any field installed accessories air resistance (duct resistance, diffuser, etc.).

See page 29 for wet coil and options/accessory air resistance data.

DOWNFLOW

External Static Press. in. w.g.	Tap 1: Pin 1			Tap 2: Pin 2			Tap 3: Pin 3			Tap 4: Pin 4			Tap 5: Pin 5		
	CFM	Watts	RPM	CFM	Watts	RPM	CFM	Watts	RPM	CFM	Watts	RPM	CFM	Watts	RPM
0	1086	130	601	1127	142	623	1182	157	653	1474	294	803	1664	404	887
0.1	1046	138	649	1089	150	668	1146	165	694	1445	304	835	1636	419	922
0.2	1006	146	695	1049	158	713	1107	174	738	1414	314	871	1613	430	949
0.3	962	154	745	1007	167	760	1068	183	781	1389	323	898	1579	445	987
0.4	918	162	792	965	175	805	1029	192	823	1350	335	940	1556	454	1011
0.5	873	170	838	923	183	849	990	200	864	1314	347	978	1522	466	1045
0.6	829	178	882	881	191	891	951	208	905	1287	356	1008	1488	475	1076
0.7	771	187	935	826	201	945	899	219	957	1251	367	1045	1442	485	1114
0.8	729	194	973	785	208	983	860	227	995	1219	377	1078	1408	490	1140
0.9	525	154	679	646	190	836	808	237	1045	1181	389	1117	1363	494	1170
1.0	502	159	701	618	195	863	772	244	1078	1147	400	1152	1317	494	1196

HORIZONTAL

External Static Press. in. w.g.	Tap 1: Pin 1			Tap 2: Pin 2			Tap 3: Pin 3			Tap 4: Pin 4			Tap 5: Pin 5		
	CFM	Watts	RPM	CFM	Watts	RPM	CFM	Watts	RPM	CFM	Watts	RPM	CFM	Watts	RPM
0	1218	166	651	1255	179	671	1305	195	698	1539	311	794	1666	386	850
0.1	1183	175	684	1221	188	701	1272	205	723	1509	321	827	1637	402	886
0.2	1140	186	733	1179	199	749	1232	216	769	1475	334	866	1614	414	914
0.3	1097	196	781	1138	209	795	1192	227	814	1446	344	896	1580	430	954
0.4	1054	206	828	1096	219	840	1152	237	857	1411	357	935	1545	445	991
0.5	1010	215	872	1053	229	883	1111	247	898	1375	369	972	1510	457	1027
0.6	967	225	915	1012	239	925	1071	257	938	1341	381	1010	1475	468	1060
0.7	916	236	964	960	250	975	1018	270	989	1305	393	1047	1441	478	1090
0.8	873	244	1003	918	259	1012	978	279	1025	1263	408	1090	1394	487	1128
0.9	825	253	1052	873	268	1060	938	288	1070	1216	423	1138	1360	492	1153
1.0	777	262	1087	826	277	1094	891	298	1103	1180	435	1173	1314	496	1183

BLOWER DATA — ZGD048S5E DIRECT DRIVE (THREE PHASE)

BLOWER TABLE INCLUDES RESISTANCE FOR BASE UNIT ONLY WITH DRY INDOOR COIL AND AIR FILTERS IN PLACE.

FOR ALL UNITS ADD:

1 - Any factory installed options air resistance (heat section, economizer, etc.).

2 - Any field installed accessories air resistance (duct resistance, diffuser, etc.).

See page 29 for wet coil and options/accessory air resistance data.

DOWNFLOW

External Static Press. in. w.g.	Tap 1: Pin 1			Tap 2: Pin 2			Tap 3: Pin 3			Tap 4: Pin 4			Tap 5: Pin 5		
	CFM	Watts	RPM	CFM	Watts	RPM	CFM	Watts	RPM	CFM	Watts	RPM	CFM	Watts	RPM
0	1455	258	741	1514	294	779	1724	438	911	1884	579	998	2051	754	1084
0.1	1417	270	786	1477	306	820	1699	450	940	1864	591	1021	2017	750	1100
0.2	1379	282	828	1441	318	859	1672	462	970	1838	606	1050	1976	746	1119
0.3	1342	293	869	1406	329	897	1636	478	1010	1806	622	1084	1935	743	1138
0.4	1292	309	923	1359	345	948	1609	491	1040	1779	636	1113	1894	739	1156
0.5	1254	320	963	1324	356	985	1582	503	1070	1755	647	1138	1853	736	1174
0.6	1217	331	1001	1289	367	1022	1555	515	1099	1723	660	1169	1812	732	1192
0.7	1180	342	1040	1254	378	1058	1528	527	1128	1694	670	1195	1757	728	1214
0.8	1142	352	1077	1219	389	1093	1492	542	1167	1666	679	1219	1716	726	1231
0.9	1114	361	1104	1190	399	1122	1465	554	1195	1634	686	1245	1675	723	1247
1.0	1079	371	1139	1158	409	1155	1442	564	1219	1592	691	1273	1627	720	1265

HORIZONTAL

External Static Press. in. w.g.	Tap 1: Pin 1			Tap 2: Pin 2			Tap 3: Pin 3			Tap 4: Pin 4			Tap 5: Pin 5		
	CFM	Watts	RPM	CFM	Watts	RPM	CFM	Watts	RPM	CFM	Watts	RPM	CFM	Watts	RPM
0	1453	259	761	1524	292	794	1746	434	900	1914	569	1030	2089	756	1068
0.1	1425	269	795	1497	302	825	1724	445	927	1893	582	1007	2066	754	1081
0.2	1391	281	835	1465	314	863	1697	458	960	1865	600	996	2021	750	1102
0.3	1358	292	874	1433	326	901	1669	472	993	1841	614	989	1976	746	1123
0.4	1325	303	913	1402	337	938	1642	485	1025	1812	629	997	1946	744	1144
0.5	1292	314	951	1370	349	974	1606	502	1068	1784	643	1014	1887	739	1165
0.6	1258	325	989	1338	360	1011	1579	515	1099	1755	655	1041	1857	737	1194
0.7	1214	340	1038	1295	376	1059	1552	528	1130	1722	668	1089	1797	733	1215
0.8	1181	350	1075	1263	387	1095	1515	545	1171	1694	678	1138	1752	730	1236
0.9	1148	361	1110	1232	398	1130	1488	558	1202	1652	684	1204	1692	726	1264
1.0	1112	372	1148	1200	410	1165	1466	568	1227	1619	689	1283	1632	723	1288

BLOWER DATA — ZGD060S5E DIRECT DRIVE (THREE PHASE)

BLOWER TABLE INCLUDES RESISTANCE FOR BASE UNIT ONLY WITH DRY INDOOR COIL AND AIR FILTERS IN PLACE.

FOR ALL UNITS ADD:

1 - Any factory installed options air resistance (heat section, economizer, etc.).

2 - Any field installed accessories air resistance (duct resistance, diffuser, etc.).

See page 29 for wet coil and options/accessory air resistance data.

DOWNFLOW

External Static Press. in. w.g.	Tap 1: Pin 1			Tap 2: Pin 2			Tap 3: Pin 3			Tap 4: Pin 4			Tap 5: Pin 5		
	CFM	Watts	RPM	CFM	Watts	RPM	CFM	Watts	RPM	CFM	Watts	RPM	CFM	Watts	RPM
0	1795	438	714	1846	469	781	1938	553	860	2108	746	964	2263	916	1027
0.1	1765	450	765	1818	481	816	1910	566	884	2082	760	987	2230	928	1048
0.2	1732	463	818	1785	495	855	1879	581	912	2054	776	1012	2190	942	1073
0.3	1689	480	874	1742	513	900	1837	601	949	2018	797	1045	2150	952	1096
0.4	1664	490	911	1719	523	926	1815	612	970	1990	812	1069	2110	960	1118
0.5	1622	507	957	1676	541	967	1775	630	1004	1962	828	1093	2070	966	1139
0.6	1588	521	991	1643	555	998	1743	644	1031	1934	843	1117	2030	969	1158
0.7	1551	535	1022	1609	569	1027	1712	658	1058	1906	858	1140	1990	969	1176
0.8	1509	552	1052	1565	587	1061	1670	677	1093	1870	877	1171	1950	968	1192
0.9	1476	565	1071	1533	601	1085	1639	691	1120	1842	892	1194	1897	961	1212
1.0	1444	577	1080	1503	612	1102	1612	703	1141	1819	904	1213	1857	953	1225

HORIZONTAL

External Static Press. in. w.g.	Tap 1: Pin 1			Tap 2: Pin 2			Tap 3: Pin 3			Tap 4: Pin 4			Tap 5: Pin 5		
	CFM	Watts	RPM	CFM	Watts	RPM	CFM	Watts	RPM	CFM	Watts	RPM	CFM	Watts	RPM
0	1776	440	799	1825	472	820	1926	555	862	2131	739	945	2244	870	992
0.1	1746	452	826	1796	484	846	1897	568	887	2097	753	970	2224	885	1012
0.2	1713	465	855	1764	498	874	1866	581	913	2068	765	992	2189	909	1043
0.3	1669	482	893	1722	516	912	1827	598	947	2038	778	1015	2166	922	1062
0.4	1644	492	915	1699	525	931	1802	609	968	2000	797	1046	2131	940	1089
0.5	1603	509	951	1658	542	967	1763	627	1001	1970	812	1070	2097	953	1114
0.6	1570	522	979	1626	556	995	1733	641	1028	1941	827	1095	2062	963	1136
0.7	1537	535	1008	1593	569	1023	1701	655	1055	1912	844	1120	2027	968	1156
0.8	1494	552	1046	1551	587	1060	1663	673	1088	1882	860	1146	1981	970	1178
0.9	1463	564	1072	1520	600	1086	1632	687	1115	1853	878	1172	1923	963	1199
1.0	1433	576	1098	1492	611	1110	1606	700	1138	1829	893	1195	1883	951	1210

BLOWER TABLE INCLUDES RESISTANCE FOR BASE UNIT ONLY WITH DRY INDOOR COIL AND AIR FILTERS IN PLACE.

FOR ALL UNITS ADD:

1 - Any factory installed options air resistance (heat section, economizer, wet coil, etc.).

2 - Any field installed accessories air resistance (duct resistance, diffuser, etc.).

See page 29 for blower motors and drives and wet coil and options/accessory air resistance data.

DOWNFLOW

Air Volume cfm	External Static - in. w.g.															
	0.10		0.20		0.30		0.40		0.50		0.60		0.70		0.80	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
900	573	0.16	639	0.18	707	0.19	776	0.21	844	0.23	908	0.25	967	0.27	1022	0.30
1000	600	0.18	665	0.20	733	0.22	802	0.23	868	0.25	930	0.28	986	0.31	1038	0.33
1100	628	0.21	695	0.22	762	0.24	829	0.26	893	0.29	953	0.31	1007	0.35	1057	0.38
1200	660	0.23	727	0.25	794	0.27	859	0.29	921	0.32	977	0.36	1029	0.39	1077	0.42
1300	695	0.26	761	0.28	827	0.31	890	0.33	949	0.37	1003	0.40	1053	0.44	1099	0.47
1400	734	0.30	799	0.32	862	0.35	923	0.38	978	0.41	1030	0.45	1078	0.49	1122	0.53
1500	775	0.34	837	0.37	898	0.40	955	0.43	1009	0.46	1058	0.50	1104	0.54	1147	0.58

Air Volume cfm	External Static - in. w.g.															
	0.90		1.00		1.10		1.20		1.30		1.40		1.50		1.60	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
900	1072	0.32	1120	0.35	1166	0.38	1210	0.41	1252	0.44	1292	0.47	1331	0.5	1370	0.54
1000	1087	0.36	1134	0.39	1179	0.42	1222	0.45	1263	0.48	1303	0.51	1341	0.55	1379	0.58
1100	1104	0.40	1150	0.43	1194	0.46	1236	0.49	1277	0.53	1315	0.56	1353	0.60	1390	0.64
1200	1123	0.45	1167	0.48	1210	0.51	1251	0.55	1291	0.58	1330	0.62	1367	0.66	1403	0.70
1300	1143	0.50	1186	0.54	1228	0.57	1268	0.60	1308	0.64	1346	0.68	1382	0.72	1418	0.76
1400	1165	0.56	1206	0.59	1247	0.63	1287	0.67	1326	0.70	1363	0.75	1399	0.79	1435	0.83
1500	1188	0.62	1229	0.66	1269	0.69	1308	0.73	1346	0.77	1382	0.82	1418	0.86	1453	0.90

HORIZONTAL

Air Volume cfm	External Static - in. w.g.															
	0.10		0.20		0.30		0.40		0.50		0.60		0.70		0.80	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
900	573	0.14	642	0.16	712	0.18	780	0.21	846	0.23	909	0.26	967	0.28	1022	0.31
1000	599	0.16	668	0.18	737	0.21	804	0.23	868	0.26	928	0.29	984	0.32	1037	0.35
1100	626	0.18	695	0.21	764	0.24	830	0.26	892	0.29	950	0.32	1003	0.36	1053	0.39
1200	656	0.21	726	0.24	794	0.27	858	0.30	918	0.33	973	0.37	1024	0.40	1072	0.43
1300	691	0.25	761	0.28	827	0.31	889	0.34	945	0.38	998	0.41	1047	0.45	1093	0.48
1400	731	0.29	798	0.32	862	0.35	920	0.39	974	0.42	1024	0.46	1071	0.49	1115	0.53
1500	773	0.34	838	0.37	898	0.40	952	0.44	1004	0.47	1051	0.51	1096	0.55	1139	0.58

Air Volume cfm	External Static - in. w.g.															
	0.90		1.00		1.10		1.20		1.30		1.40		1.50		1.60	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
900	1074	0.33	1123	0.36	1171	0.39	1216	0.41	1260	0.44	1301	0.47	1340	0.49	1378	0.52
1000	1087	0.37	1135	0.40	1181	0.42	1226	0.45	1269	0.48	1310	0.51	1350	0.54	1388	0.57
1100	1101	0.41	1148	0.44	1193	0.47	1237	0.49	1279	0.52	1321	0.55	1360	0.59	1398	0.62
1200	1118	0.46	1163	0.48	1208	0.51	1251	0.54	1293	0.58	1334	0.61	1375	0.64	1414	0.68
1300	1137	0.51	1181	0.53	1224	0.57	1267	0.60	1309	0.63	1350	0.67	1391	0.71	1432	0.75
1400	1158	0.56	1200	0.59	1242	0.62	1284	0.66	1326	0.70	1367	0.74	1407	0.79	1448	0.83
1500	1180	0.61	1222	0.65	1263	0.69	1304	0.73	1345	0.77	1386	0.82	1427	0.87	1467	0.92

BLOWER TABLE INCLUDES RESISTANCE FOR BASE UNIT ONLY WITH DRY INDOOR COIL AND AIR FILTERS IN PLACE.

FOR ALL UNITS ADD:

1 - Any factory installed options air resistance (heat section, economizer, wet coil, etc.).

2 - Any field installed accessories air resistance (duct resistance, diffuser, etc.).

See page 29 for blower motors and drives and wet coil and options/accessory air resistance data.

DOWNFLOW

Air Volume cfm	External Static - in. w.g.															
	0.10		0.20		0.30		0.40		0.50		0.60		0.70		0.80	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
1200	660	0.23	727	0.25	794	0.27	859	0.29	921	0.32	977	0.36	1029	0.39	1077	0.42
1300	695	0.26	761	0.28	827	0.31	890	0.33	949	0.37	1003	0.40	1053	0.44	1099	0.47
1400	734	0.30	799	0.32	862	0.35	923	0.38	978	0.41	1030	0.45	1078	0.49	1122	0.53
1500	775	0.34	837	0.37	898	0.40	955	0.43	1009	0.46	1058	0.50	1104	0.54	1147	0.58
1600	817	0.39	877	0.42	935	0.45	989	0.48	1040	0.52	1087	0.56	1131	0.60	1173	0.65
1700	859	0.44	917	0.47	972	0.50	1023	0.54	1071	0.58	1117	0.62	1159	0.67	1199	0.71
1800	902	0.49	957	0.53	1008	0.56	1057	0.60	1103	0.64	1147	0.69	1188	0.74	1227	0.79
1900	944	0.56	996	0.59	1045	0.63	1092	0.68	1136	0.72	1178	0.77	1218	0.82	1257	0.87
2000	986	0.63	1035	0.67	1083	0.71	1127	0.76	1170	0.81	1210	0.86	1249	0.91	1287	0.97
Air Volume cfm	External Static - in. w.g.															
	0.90		1.00		1.10		1.20		1.30		1.40		1.50		1.60	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
1200	1123	0.45	1167	0.48	1210	0.51	1251	0.55	1291	0.58	1330	0.62	1367	0.66	1403	0.70
1300	1143	0.50	1186	0.54	1228	0.57	1268	0.60	1308	0.64	1346	0.68	1382	0.72	1418	0.76
1400	1165	0.56	1206	0.59	1247	0.63	1287	0.67	1326	0.70	1363	0.75	1399	0.79	1435	0.83
1500	1188	0.62	1229	0.66	1269	0.69	1308	0.73	1346	0.77	1382	0.82	1418	0.86	1453	0.90
1600	1213	0.69	1252	0.73	1292	0.77	1330	0.81	1367	0.85	1403	0.89	1438	0.94	1472	0.98
1700	1239	0.76	1278	0.80	1316	0.84	1354	0.89	1390	0.93	1425	0.98	1459	1.02	1492	1.07
1800	1266	0.83	1304	0.88	1342	0.93	1378	0.98	1414	1.02	1448	1.07	1481	1.12	1514	1.16
1900	1294	0.92	1332	0.97	1369	1.02	1404	1.07	1439	1.12	1472	1.17	1504	1.21	1536	1.26
2000	1324	1.02	1360	1.07	1396	1.13	1431	1.18	1465	1.23	1497	1.27	1529	1.32	1560	1.37

HORIZONTAL

Air Volume cfm	External Static - in. w.g.															
	0.10		0.20		0.30		0.40		0.50		0.60		0.70		0.80	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
1200	656	0.21	726	0.24	794	0.27	858	0.30	918	0.33	973	0.37	1024	0.40	1072	0.43
1300	691	0.25	761	0.28	827	0.31	889	0.34	945	0.38	998	0.41	1047	0.45	1093	0.48
1400	731	0.29	798	0.32	862	0.35	920	0.39	974	0.42	1024	0.46	1071	0.49	1115	0.53
1500	773	0.34	838	0.37	898	0.40	952	0.44	1004	0.47	1051	0.51	1096	0.55	1139	0.58
1600	817	0.39	878	0.42	934	0.46	985	0.49	1034	0.53	1080	0.56	1123	0.60	1164	0.64
1700	861	0.45	918	0.48	970	0.51	1018	0.55	1065	0.58	1108	0.62	1150	0.66	1190	0.70
1800	904	0.51	957	0.54	1006	0.57	1052	0.61	1096	0.65	1138	0.69	1178	0.73	1217	0.78
1900	946	0.57	996	0.61	1042	0.64	1086	0.68	1128	0.72	1168	0.76	1207	0.81	1245	0.86
2000	988	0.64	1035	0.68	1079	0.72	1120	0.76	1161	0.81	1199	0.85	1237	0.90	1275	0.96
Air Volume cfm	External Static - in. w.g.															
	0.90		1.00		1.10		1.20		1.30		1.40		1.50		1.60	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
1200	1118	0.46	1163	0.48	1208	0.51	1251	0.54	1293	0.58	1334	0.61	1375	0.64	1414	0.68
1300	1137	0.51	1181	0.53	1224	0.57	1267	0.60	1309	0.63	1350	0.67	1391	0.71	1432	0.75
1400	1158	0.56	1200	0.59	1242	0.62	1284	0.66	1326	0.70	1367	0.74	1407	0.79	1448	0.83
1500	1180	0.61	1222	0.65	1263	0.69	1304	0.73	1345	0.77	1386	0.82	1427	0.87	1467	0.92
1600	1204	0.68	1245	0.72	1285	0.76	1325	0.80	1366	0.85	1406	0.90	1447	0.96	1487	1.02
1700	1229	0.75	1269	0.79	1309	0.84	1348	0.89	1388	0.94	1428	1.00	1468	1.06	1508	1.12
1800	1256	0.83	1295	0.88	1334	0.93	1373	0.98	1412	1.04	1451	1.10	1490	1.16	1529	1.23
1900	1283	0.92	1322	0.97	1360	1.03	1398	1.09	1436	1.15	1474	1.21	1511	1.27	1549	1.34
2000	1312	1.02	1350	1.07	1387	1.13	1424	1.20	1461	1.26	1498	1.32	1535	1.38	1571	1.45

BLOWER TABLE INCLUDES RESISTANCE FOR BASE UNIT ONLY WITH DRY INDOOR COIL AND AIR FILTERS IN PLACE.

FOR ALL UNITS ADD:

1 - Any factory installed options air resistance (heat section, economizer, wet coil, etc.).

2 - Any field installed accessories air resistance (duct resistance, diffuser, etc.).

See page 29 for blower motors and drives and wet coil and options/accessory air resistance data.

DOWNFLOW

Air Volume cfm	External Static - in. w.g.															
	0.10		0.20		0.30		0.40		0.50		0.60		0.70		0.80	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
1600	848	0.48	905	0.53	961	0.57	1015	0.61	1064	0.66	1107	0.69	1148	0.73	1189	0.76
1700	898	0.56	952	0.60	1005	0.65	1054	0.69	1099	0.73	1140	0.77	1180	0.80	1221	0.83
1800	948	0.63	998	0.68	1047	0.73	1093	0.78	1136	0.82	1175	0.85	1214	0.88	1255	0.91
1900	996	0.72	1042	0.77	1088	0.82	1132	0.86	1173	0.90	1211	0.94	1250	0.97	1290	1.00
2000	1041	0.81	1084	0.86	1128	0.91	1170	0.95	1210	0.99	1249	1.03	1287	1.06	1326	1.10
2100	1084	0.91	1126	0.95	1168	1.00	1209	1.04	1249	1.08	1287	1.12	1324	1.17	1362	1.21
2200	1128	1.01	1169	1.05	1210	1.10	1250	1.14	1288	1.19	1326	1.23	1363	1.28	1399	1.34
2300	1173	1.11	1214	1.16	1253	1.20	1292	1.25	1329	1.30	1366	1.36	1402	1.42	1437	1.48
2400	1220	1.23	1259	1.28	1297	1.33	1335	1.38	1371	1.44	1406	1.50	1442	1.57	1476	1.63
Air Volume cfm	External Static - in. w.g.															
	0.90		1.00		1.10		1.20		1.30		1.40		1.50		1.60	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
1600	1232	0.79	1274	0.82	1316	0.86	1356	0.90	1395	0.94	1433	0.99	1470	1.04	1506	1.09
1700	1263	0.86	1304	0.90	1344	0.94	1383	0.99	1421	1.04	1458	1.09	1494	1.14	1530	1.19
1800	1295	0.95	1335	0.99	1374	1.04	1412	1.09	1448	1.14	1484	1.20	1520	1.25	1556	1.30
1900	1329	1.04	1368	1.09	1405	1.15	1441	1.20	1477	1.26	1513	1.31	1548	1.37	1583	1.42
2000	1364	1.15	1401	1.21	1437	1.27	1472	1.33	1507	1.38	1543	1.44	1578	1.49	1613	1.54
2100	1399	1.27	1435	1.33	1470	1.40	1505	1.46	1539	1.51	1574	1.56	1609	1.61	1645	1.66
2200	1435	1.40	1470	1.47	1504	1.53	1538	1.59	1573	1.65	1608	1.70	1642	1.74	1678	1.79
2300	1472	1.54	1506	1.61	1540	1.67	1574	1.73	1608	1.78	1642	1.83	1677	1.88	1712	1.93
2400	1510	1.7	1544	1.76	1577	1.82	1610	1.88	1644	1.93	1678	1.97	1713	2.02	1748	2.07

HORIZONTAL

Air Volume cfm	External Static - in. w.g.															
	0.10		0.20		0.30		0.40		0.50		0.60		0.70		0.80	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
1600	761	0.43	820	0.47	879	0.52	937	0.56	994	0.61	1045	0.65	1090	0.69	1132	0.72
1700	803	0.49	861	0.53	918	0.58	973	0.63	1025	0.67	1072	0.72	1114	0.75	1155	0.78
1800	846	0.56	901	0.60	955	0.65	1008	0.70	1056	0.75	1099	0.79	1140	0.82	1181	0.85
1900	889	0.63	941	0.68	993	0.73	1042	0.78	1087	0.83	1129	0.87	1168	0.90	1209	0.93
2000	933	0.71	981	0.76	1030	0.81	1076	0.86	1119	0.91	1159	0.95	1198	0.98	1238	1.01
2100	974	0.79	1020	0.85	1065	0.90	1109	0.96	1151	1.00	1190	1.04	1229	1.07	1268	1.11
2200	1013	0.89	1057	0.94	1100	0.99	1143	1.05	1183	1.09	1222	1.13	1261	1.17	1299	1.21
2300	1050	0.99	1093	1.04	1135	1.09	1177	1.14	1217	1.18	1255	1.23	1293	1.27	1331	1.32
2400	1088	1.09	1129	1.14	1170	1.19	1211	1.23	1250	1.28	1289	1.33	1326	1.38	1363	1.44
Air Volume cfm	External Static - in. w.g.															
	0.90		1.00		1.10		1.20		1.30		1.40		1.50		1.60	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
1600	1175	0.76	1218	0.79	1260	0.82	1302	0.85	1343	0.89	1383	0.93	1421	0.98	1458	1.03
1700	1198	0.82	1241	0.85	1283	0.89	1324	0.93	1364	0.97	1402	1.02	1439	1.07	1476	1.12
1800	1223	0.89	1265	0.92	1307	0.96	1347	1.01	1386	1.06	1423	1.11	1459	1.16	1495	1.21
1900	1250	0.96	1292	1.01	1332	1.05	1371	1.10	1408	1.15	1445	1.21	1481	1.27	1516	1.32
2000	1279	1.05	1319	1.10	1358	1.15	1396	1.20	1432	1.26	1468	1.32	1504	1.38	1539	1.44
2100	1308	1.15	1347	1.20	1385	1.26	1421	1.32	1457	1.38	1493	1.44	1528	1.50	1563	1.56
2200	1338	1.26	1376	1.31	1412	1.38	1448	1.45	1483	1.51	1518	1.57	1553	1.63	1588	1.68
2300	1368	1.37	1405	1.44	1441	1.51	1476	1.58	1510	1.64	1545	1.70	1580	1.76	1615	1.81
2400	1400	1.50	1435	1.57	1470	1.65	1505	1.72	1539	1.78	1573	1.84	1608	1.89	1643	1.94

BLOWER DATA — ZGD074S5T BELT DRIVE (THREE PHASE)

BLOWER TABLE INCLUDES RESISTANCE FOR BASE UNIT ONLY WITH DRY INDOOR COIL AND AIR FILTERS IN PLACE.

FOR ALL UNITS ADD:

1 - Any factory installed options air resistance (heat section, economizer, wet coil, etc.).

2 - Any field installed accessories air resistance (duct resistance, diffuser, etc.).

See page 29 for blower motors and drives and wet coil and options/accessory air resistance data.

DOWNFLOW

Air Volume	External Static - in. w.g.															
	0.10		0.20		0.30		0.40		0.50		0.60		0.70		0.80	
cfm	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
1900	578	0.44	610	0.49	643	0.54	678	0.60	714	0.65	749	0.70	785	0.76	819	0.82
2000	600	0.50	632	0.56	665	0.61	699	0.66	734	0.71	769	0.77	803	0.83	837	0.90
2100	623	0.57	655	0.62	688	0.68	721	0.73	755	0.79	789	0.84	822	0.91	854	0.98
2200	647	0.65	678	0.70	711	0.75	743	0.81	776	0.86	809	0.93	841	1.00	872	1.06
2300	671	0.73	702	0.78	734	0.83	766	0.89	798	0.95	829	1.02	860	1.09	890	1.16
2400	696	0.81	726	0.87	757	0.92	788	0.98	819	1.04	850	1.11	880	1.19	909	1.26
2500	720	0.90	750	0.95	780	1.01	811	1.07	841	1.14	871	1.22	900	1.30	929	1.37
2600	745	0.99	774	1.05	804	1.11	834	1.17	864	1.25	893	1.33	921	1.41	949	1.49
2700	770	1.09	799	1.15	828	1.21	858	1.28	887	1.36	916	1.44	943	1.53	969	1.61
2800	795	1.19	824	1.25	853	1.33	882	1.40	911	1.48	939	1.56	965	1.65	990	1.73
2900	820	1.30	849	1.37	878	1.45	907	1.53	935	1.61	962	1.70	988	1.78	1012	1.86

Air Volume	External Static - in. w.g.															
	0.90		1.00		1.10		1.20		1.30		1.40		1.50		1.60	
cfm	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
1900	853	0.88	885	0.94	915	0.99	944	1.05	971	1.11	996	1.17	1021	1.23	1045	1.29
2000	869	0.96	899	1.01	929	1.07	957	1.13	984	1.19	1009	1.25	1033	1.31	1058	1.38
2100	885	1.04	915	1.10	944	1.15	971	1.22	997	1.28	1022	1.34	1046	1.40	1070	1.46
2200	902	1.13	931	1.19	959	1.24	986	1.31	1012	1.37	1036	1.43	1060	1.50	1084	1.56
2300	920	1.23	948	1.29	975	1.35	1001	1.41	1027	1.47	1051	1.53	1075	1.60	1098	1.66
2400	938	1.33	965	1.39	992	1.45	1017	1.52	1042	1.58	1066	1.64	1090	1.70	1113	1.77
2500	956	1.44	983	1.51	1009	1.57	1034	1.63	1059	1.69	1082	1.75	1105	1.82	1128	1.88
2600	975	1.56	1001	1.63	1026	1.69	1051	1.75	1075	1.81	1098	1.87	1121	1.93	1143	2.00
2700	995	1.68	1020	1.75	1044	1.81	1069	1.87	1092	1.93	1114	1.99	1136	2.06	1158	2.13
2800	1015	1.81	1039	1.87	1063	1.94	1086	2.00	1109	2.06	1131	2.12	1152	2.19	1174	2.26
2900	1035	1.94	1058	2.00	1081	2.07	1104	2.13	1126	2.19	1147	2.26	1168	2.33	1189	2.40

HORIZONTAL

Air Volume	External Static - in. w.g.															
	0.10		0.20		0.30		0.40		0.50		0.60		0.70		0.80	
cfm	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
1900	581	0.44	618	0.49	655	0.54	692	0.59	729	0.64	765	0.69	800	0.75	833	0.80
2000	602	0.50	639	0.55	676	0.61	713	0.66	749	0.71	784	0.76	818	0.82	850	0.88
2100	625	0.57	661	0.62	698	0.67	735	0.73	770	0.78	804	0.84	837	0.90	868	0.96
2200	648	0.64	685	0.69	721	0.75	757	0.80	791	0.86	824	0.92	856	0.98	886	1.05
2300	673	0.71	709	0.77	745	0.83	780	0.88	813	0.94	845	1.01	876	1.08	905	1.15
2400	699	0.79	734	0.85	769	0.91	803	0.97	835	1.04	866	1.11	896	1.18	924	1.25
2500	725	0.88	759	0.94	793	1.00	826	1.07	857	1.14	887	1.21	916	1.28	944	1.36
2600	752	0.97	785	1.04	818	1.10	850	1.17	880	1.25	909	1.32	937	1.40	964	1.48
2700	779	1.07	811	1.14	843	1.21	873	1.29	902	1.37	931	1.44	958	1.52	984	1.60
2800	805	1.18	837	1.26	868	1.33	897	1.41	925	1.49	952	1.57	979	1.66	1004	1.74
2900	832	1.30	863	1.38	892	1.46	921	1.54	948	1.63	974	1.71	1000	1.80	1024	1.88

Air Volume	External Static - in. w.g.															
	0.90		1.00		1.10		1.20		1.30		1.40		1.50		1.60	
cfm	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
1900	864	0.87	895	0.93	924	0.99	953	1.06	980	1.12	1007	1.18	1032	1.25	1056	1.31
2000	881	0.95	911	1.01	940	1.08	967	1.14	994	1.21	1020	1.27	1044	1.34	1068	1.40
2100	898	1.03	927	1.10	955	1.17	982	1.23	1008	1.30	1033	1.37	1057	1.43	1080	1.50
2200	916	1.12	944	1.19	971	1.26	998	1.33	1023	1.40	1047	1.47	1071	1.54	1093	1.60
2300	934	1.22	961	1.29	988	1.36	1014	1.43	1038	1.50	1062	1.58	1085	1.65	1107	1.71
2400	952	1.32	979	1.40	1005	1.47	1030	1.54	1054	1.62	1077	1.69	1099	1.76	1121	1.83
2500	971	1.43	997	1.51	1022	1.59	1046	1.66	1069	1.74	1092	1.81	1114	1.88	1135	1.95
2600	990	1.55	1015	1.63	1039	1.71	1063	1.79	1086	1.86	1108	1.94	1129	2.01	1150	2.07
2700	1009	1.68	1034	1.76	1057	1.84	1080	1.92	1102	1.99	1124	2.07	1145	2.14	1166	2.21
2800	1028	1.82	1052	1.9	1075	1.98	1097	2.06	1119	2.13	1140	2.21	1161	2.28	1182	2.34
2900	1048	1.96	1071	2.04	1093	2.12	1115	2.20	1136	2.28	1157	2.35	1177	2.42	1198	2.48

BLOWER DATA

BELT DRIVE KIT SPECIFICATIONS - ZGD036-060

Model	Motor HP		Speeds	Drive Kits and RPM Range				
	Nominal	Maximum		ZA01	ZA02	ZA03	ZA04	[1] ZA06
ZGD036	1	1.15	1	678 - 1035	- - -	- - -	964 - 1471	- - -
ZGD048	1	1.15	1	- - -	803 - 1226	- - -	- - -	- - -
ZGD060	1.5	1.7	1	- - -	- - -	906 - 1383	- - -	1262 - 1634

BELT DRIVE KIT SPECIFICATIONS - ZGD074

Model	Motor HP		Speeds	Drive Kits and RPM Range		
	Nominal	Maximum		ZAA02	ZAA03	ZAA04
ZGD074	2	2.3	2	632 - 875	798 - 1105	921 - 1228

NOTE - Using total air volume and system static pressure requirements determine from blower performance tables rpm and motor HP required. Maximum usable HP of motors furnished are shown. In Canada, nominal motor HP is also maximum usable motor HP. If motors of comparable HP are used, be sure to keep within the service factor limitations outlined on the motor nameplate.

POWER EXHAUST FAN PERFORMANCE

Return Air System Static Pressure - in. w.g.	Air Volume Exhausted cfm
0.00	1865
0.05	1785
0.10	1710
0.15	1630
0.20	1545
0.25	1450
0.30	1350
0.35	1240

BLOWER DATA

OPTIONS / ACCESSORIES AIR RESISTANCE - in. w.g.

Air Volume cfm	Wet Indoor Coil		Gas Heat Exchanger		Economizer	
	ZGD036, ZGD048	ZGD060, ZGD074	Medium	High	Downflow	Horizontal
900	0.01	- - -	0.05	0.06	0.03	0.04
1000	0.02	- - -	0.06	0.06	0.03	0.05
1100	0.02	- - -	0.06	0.07	0.04	0.05
1200	0.02	- - -	0.06	0.07	0.05	0.06
1300	0.03	- - -	0.07	0.07	0.05	0.07
1400	0.03	- - -	0.07	0.08	0.06	0.08
1500	0.04	- - -	0.07	0.08	0.07	0.08
1600	0.04	0.03	0.07	0.08	0.08	0.09
1700	0.05	0.03	0.07	0.08	0.09	0.10
1800	0.05	0.03	0.06	0.08	0.10	0.11
1900	0.06	0.04	0.06	0.08	0.11	0.12
2000	0.06	0.04	0.07	0.09	0.12	0.13
2100	- - -	0.05	0.08	0.10	0.13	0.14
2200	- - -	0.05	0.10	0.12	0.14	0.15
2300	- - -	0.05	0.11	0.14	0.15	0.16
2400	- - -	0.06	0.11	0.13	0.16	0.18
2500	- - -	0.06	0.11	0.15	0.18	0.19
2600	- - -	0.07	0.13	0.16	0.19	0.20
2700	- - -	0.07	0.15	0.18	0.20	0.21
2800	- - -	0.07	0.13	0.16	0.22	0.23
2900	- - -	0.08	0.13	0.18	0.23	0.24

OUTDOOR SOUND DATA

Size	Octave Band Sound Power Levels dBA, re 10^{-12} Watts - Center Frequency - Hz							[1] Sound Rating Number (dBA)
	125	250	500	1000	2000	4000	8000	
036	66	70	73	72	70	67	60	78
048	68	71	75	74	71	68	63	80
060	64	68	72	73	69	67	63	78
074	73	76	80	78	73	68	66	84

NOTE - The octave sound power data does not include tonal corrections.

[1] Sound Rating Number according to AHRI Standard 270-2008. SRN is the overall A-Weighted Sound Power Level, (LWA), dBA (100 Hz to 10,000 Hz).

BLOWER DATA

CEILING DIFFUSERS AIR RESISTANCE (in. w.g.)

Air Volume cfm	RTD9-65S Step–Down Diffuser			FD9-65S Flush Diffuser	RTD11-95S Step–Down Diffuser			FD11-95S Flush Diffuser
	2 Ends Open	1 Side & 2 Ends Open	All Ends & Sides Open		2 Ends Open	1 Side & 2 Ends Open	All Ends & Sides Open	
800	0.15	0.13	0.11	0.11	- - -	- - -	- - -	- - -
1000	0.19	0.16	0.14	0.14	- - -	- - -	- - -	- - -
1200	0.25	0.20	0.17	0.17	- - -	- - -	- - -	- - -
1400	0.33	0.26	0.20	0.20	- - -	- - -	- - -	- - -
1600	0.43	0.32	0.20	0.24	- - -	- - -	- - -	- - -
1800	0.56	0.40	0.30	0.30	0.13	0.11	0.09	0.09
2000	0.73	0.50	0.36	0.36	0.15	0.13	0.11	0.10
2200	0.95	0.63	0.44	0.44	0.18	0.15	0.12	0.12
2400	- - -	- - - -	- - -	- - -	0.21	0.18	0.15	0.14
2600	- - -	- - - -	- - -	- - -	0.24	0.21	0.18	0.17
2800	- - -	- - - -	- - -	- - -	0.27	0.24	0.21	0.20
3000	- - -	- - - -	- - -	- - -	0.32	0.29	0.25	0.25
3200	- - -	- - - -	- - -	- - -	0.41	0.37	0.32	0.31
3400	- - -	- - - -	- - -	- - -	0.50	0.45	0.39	0.37
3600	- - -	- - - -	- - -	- - -	0.61	0.54	0.48	0.44

CEILING DIFFUSER AIR THROW DATA

Air Volume - cfm	[1] Effective Throw - ft.		Air Volume - cfm	[1] Effective Throw - ft.	
Model	RTD9-65S	FD9-65S	Model	RTD11-95S	FD11-95S
800	10 - 17	14 - 18	2600	24 - 29	19 - 24
1000	10 - 17	15 - 20	2800	25 - 30	20 - 28
1200	11 - 18	16 - 22	3000	27 - 33	21 - 29
1400	12 - 19	17 - 24	3200	28 - 35	22 - 29
1600	12 - 20	18 - 25	3400	30 - 37	22 - 30
1800	13 - 21	20 - 28	3600	25 - 33	22 - 24
2000	14 - 23	21 - 29			
2200	16 - 25	22 - 30			

[1] Effective throw based on terminal velocities of 75 ft. per minute.

ELECTRICAL DATA — DIRECT DRIVE | 3 TON

Model		ZGD036S5E	
[1] Voltage - 60Hz		208/230V-1 Ph	208/230V-3 Ph
Compressor (Non-Inverter)	Rated Load Amps	14.4	9
	Locked Rotor Amps	86	70
Outdoor Fan Motor	Full Load Amps (1 Non-ECM)	1.7	1.7
Power Exhaust (1) 0.33 HP	Full Load Amps	2.4	2.4
Indoor Blower Motor	HP	0.5	0.5
	Type	ECM Direct	ECM Direct
	Full Load Amps	4.3	4.3
[2] Maximum Overcurrent Protection (MOCP)	Unit Only	35	25
	With (1) 0.33 HP Power Exhaust	40	25
[3] Minimum Circuit Ampacity (MCA)	Unit Only	24	18
	With (1) 0.33 HP Power Exhaust	27	20

ELECTRICAL DATA — DIRECT DRIVE | 4 TON

Model		ZGD048S5E	
[1] Voltage - 60Hz		208/230V-1 Ph	208/230V-3 Ph
Compressor (Non-Inverter)	Rated Load Amps	19.4	12
	Locked Rotor Amps	102	123
Outdoor Fan Motor	Full Load Amps (1 Non-ECM)	1.7	1.7
Power Exhaust (1) 0.33 HP	Full Load Amps	2.4	2.4
Indoor Blower Motor	HP	0.75	0.75
	Type	ECM Direct	ECM Direct
	Full Load Amps	6.1	6.1
[2] Maximum Overcurrent Protection (MOCP)	Unit Only	50	30
	With (1) 0.33 HP Power Exhaust	50	35
[3] Minimum Circuit Ampacity (MCA)	Unit Only	33	23
	With (1) 0.33 HP Power Exhaust	35	26

ELECTRICAL DATA — DIRECT DRIVE | 5 TON

Model		ZGD060S5E	
[1] Voltage - 60Hz		208/230V-1 Ph	208/230V-3 Ph
Compressor (Non-Inverter)	Rated Load Amps	23.7	16
	Locked Rotor Amps	157	156.4
Outdoor Fan Motor	Full Load Amps (1 Non-ECM)	1.7	1.7
Power Exhaust (1) 0.33 HP	Full Load Amps	2.4	2.4
Indoor Blower Motor	HP	1	1
	Type	ECM Direct	ECM Direct
	Full Load Amps	7.4	7.4
[2] Maximum Overcurrent Protection (MOCP)	Unit Only	60	45
	With (1) 0.33 HP Power Exhaust	60	45
[3] Minimum Circuit Ampacity (MCA)	Unit Only	39	30
	With (1) 0.33 HP Power Exhaust	42	32

NOTE - All units have a minimum Short Circuit Current Rating (SCCR) of 5000 amps.

[1] Extremes of operating range are plus and minus 10% of line voltage.

[2] HACR type breaker or fuse.

[3] Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

ELECTRICAL DATA — BELT DRIVE | 3 TON

Model		ZGD036S5B		
[1] Voltage - 60Hz		208/230V - 3 Ph	460V - 3 Ph	575V - 3 Ph
Compressor (Non-Inverter)	Rated Load Amps	9	4.1	3.3
	Locked Rotor Amps	70	39	29
Outdoor Fan Motor	Full Load Amps (1 Non-ECM)	1.7	0.9	0.7
Power Exhaust (1) 0.33 HP	Full Load Amps	2.4	1.3	1
Indoor Blower Motor	HP	1	1	1
	Type	Belt	Belt	Belt
	Full Load Amps	4.6	2.1	1.7
[2] Maximum Overcurrent Protection (MOCP)	Unit Only	25	15	15
	With (1) 0.33 HP Power Exhaust	25	15	15
[3] Minimum Circuit Ampacity (MCA)	Unit Only	18	9	7
	With (1) 0.33 HP Power Exhaust	20	10	8

ELECTRICAL DATA — BELT DRIVE | 4 TON

Model		ZGD048S5B		
[1] Voltage - 60Hz		208/230V - 3 Ph	460V - 3 Ph	575V - 3 Ph
Compressor (Non-Inverter)	Rated Load Amps	12	6.3	4.4
	Locked Rotor Amps	123	60	41
Outdoor Fan Motor	Full Load Amps (1 Non-ECM)	1.7	0.9	0.7
Power Exhaust (1) 0.33 HP	Full Load Amps	2.4	1.3	1
Indoor Blower Motor	HP	1	1	1
	Type	Belt	Belt	Belt
	Full Load Amps	4.6	2.1	1.7
[2] Maximum Overcurrent Protection (MOCP)	Unit Only	30	15	15
	With (1) 0.33 HP Power Exhaust	35	15	15
[3] Minimum Circuit Ampacity (MCA)	Unit Only	22	11	8
	With (1) 0.33 HP Power Exhaust	24	13	9

ELECTRICAL DATA — BELT DRIVE | 5 TON

Model		ZGD060S5B		
[1] Voltage - 60Hz		208/230V - 3 Ph	460V - 3 Ph	575V - 3 Ph
Compressor (Non-Inverter)	Rated Load Amps	13.5	7.1	6.4
	Locked Rotor Amps	109	69	47.8
Outdoor Fan Motor	Full Load Amps (1 Non-ECM)	1.7	0.9	0.7
Power Exhaust (1) 0.33 HP	Full Load Amps	2.4	1.3	1
Indoor Blower Motor	HP	1.5	1.5	1.5
	Type	Belt	Belt	Belt
	Full Load Amps	4.4	2.3	2.3
[2] Maximum Overcurrent Protection (MOCP)	Unit Only	40	15	15
	With (1) 0.33 HP Power Exhaust	40	20	15
[3] Minimum Circuit Ampacity (MCA)	Unit Only	27	13	11
	With (1) 0.33 HP Power Exhaust	29	14	12

NOTE - All units have a minimum Short Circuit Current Rating (SCCR) of 5000 amps.

[1] Extremes of operating range are plus and minus 10% of line voltage.

[2] HACR type breaker or fuse.

[3] Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

Model		ZGD074S5T		
[1] Voltage - 60Hz		208/230V - 3 Ph	460V - 3 Ph	575V - 3 Ph
Compressor (Non-Inverter)	Rated Load Amps	19.2	9.1	6.2
	Locked Rotor Amps	162.3	70.8	58.2
Outdoor Fan Motor	Full Load Amps (1 Non-ECM)	1.7	1	0.9
Power Exhaust (1) 0.33 HP	Full Load Amps	2.4	1.3	1
Indoor Blower Motor	HP	2	2	2
	Type	Belt	Belt	Belt
	Full Load Amps	7.5	3.4	2.7
[2] Maximum Overcurrent Protection (MOCP)	Unit Only	50	20	15
	With (1) 0.33 HP Power Exhaust	50	25	15
[3] Minimum Circuit Ampacity (MCA)	Unit Only	34	16	12
	With (1) 0.33 HP Power Exhaust	36	18	13

NOTE - All units have a minimum Short Circuit Current Rating (SCCR) of 5000 amps.

[1] Extremes of operating range are plus and minus 10% of line voltage.

[2] HACR type breaker or fuse.

[3] Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

FIELD WIRING NOTES

- For use with copper wiring only
- Field wiring not furnished
- All wiring must conform to NEC or CEC and local electrical codes
- For specific wiring information, please refer to the installation instructions

Minimum R454B Space and CFM Requirements

Minimum Airflow[1]		
Unit	Q_{min}(CFM)	Q_{min}(m^3h)
ZGD 036	108	184
ZGD 048	112	191
ZGD 060	122	208
ZGD 074	182	309

Refrigerant Charge R-454B		
Unit	M_c(lbs)	M_c(kg)
ZGD 036	4.10	1.86
ZGD 048	4.25	1.93
ZGD 060	4.63	2.10
ZGD 074	5.00	2.27

*[1] **NOTE -** The minimum airflow is the lowest CFM allowed during venting operation (leak mitigation).*

Minimum Room Area of Conditioned Space[2]		
Unit	TA_{min}(ft^2)	TA_{min}(m^2)
ZGD 036	61	5.6
ZGD 048	63	5.8
ZGD 060	68	6.3
ZGD 074	101	9.4

*[2] **NOTE -** The minimum room area of conditioned space is the smallest area the unit can service.*

Altitude Adjustment Factor[3]									
Halt	0	200	400	600	800	1000	1200	1400	1600
AF	1	1	1	1	1.02	1.05	1.07	1.1	1.12
Halt	1600	1800	2000	2200	2400	2600	2800	3000	3200
AF	1.12	1.15	1.18	1.21	1.25	1.28	1.32	1.36	1.4

*[3] **NOTE -** Use the Altitude Adjustment Factor to adjust the values in the tables above to different altitudes. Find the relevant altitude above sea level in the two "Halt" rows and then multiply the value needed from the tables above by the altitude factor number. Example: For the minimum airflow in CFM for an ZGD036 at 1000 ft. above see lev*el, multiply 108 by 1.05 to get 113.4 CFM a*s the new Q_{min}.*

Parts Arrangement

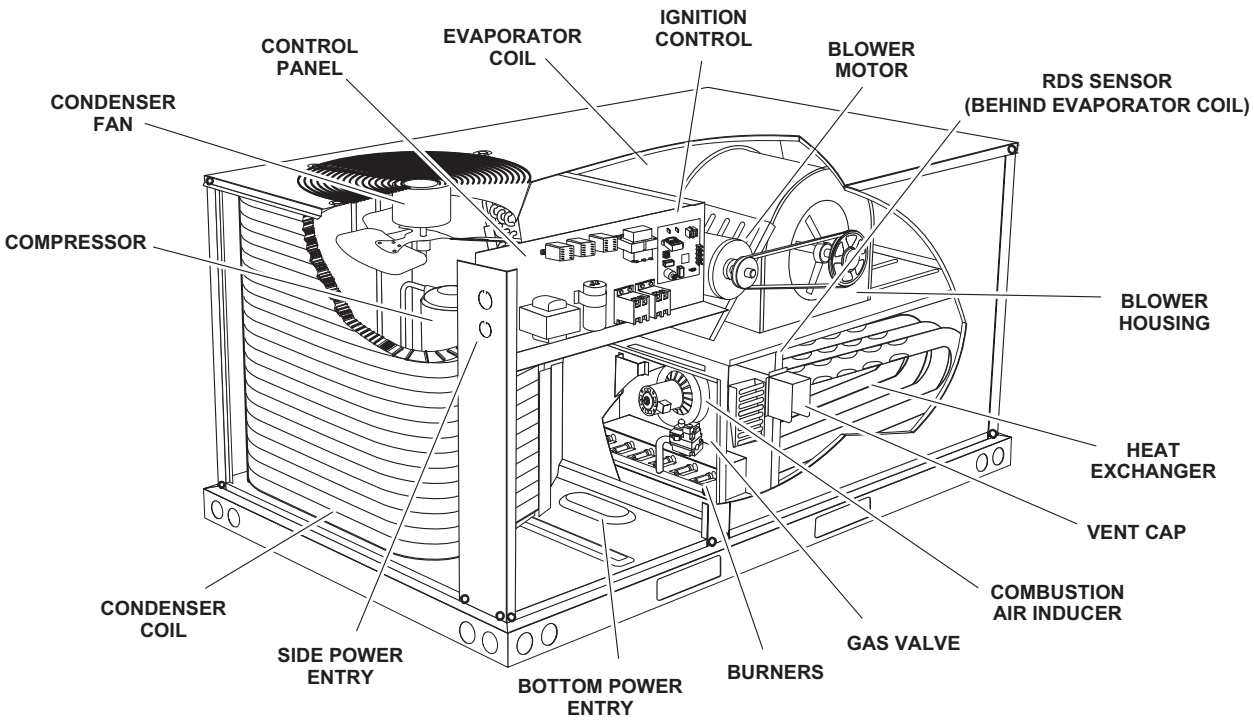


FIGURE 1

ZGD 036-060 CONTROL BOX

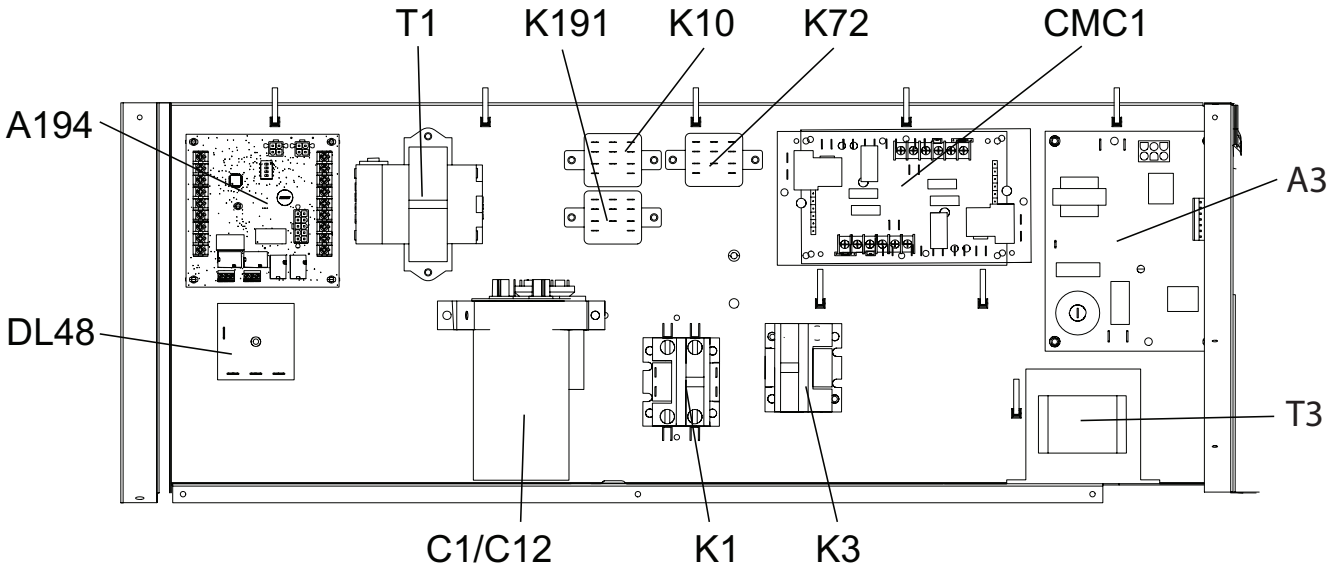


FIGURE 2

ZGD 074 CONTROL BOX

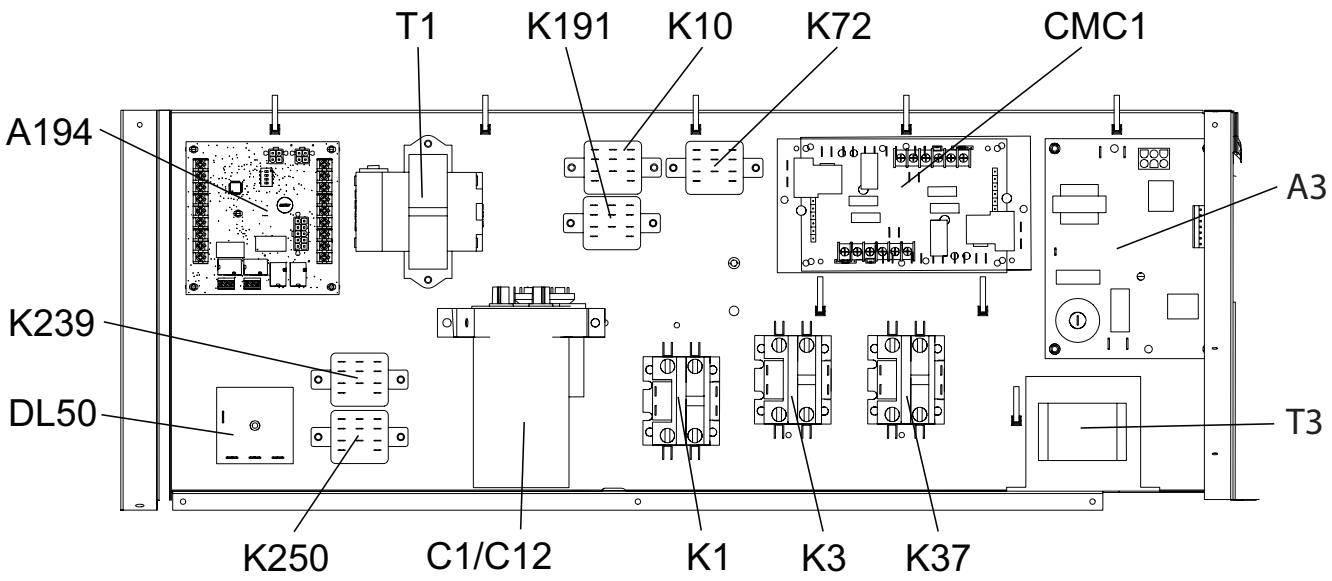


FIGURE 3

I-UNIT COMPONENTS

ELECTROSTATIC DISCHARGE (ESD)
Precautions and Procedures

⚠ CAUTION

Electrostatic discharge can affect electronic components. Take precautions to neutralize electrostatic charge by touching your hand and tools to metal prior to handling the control.

The ZGD unit components are shown in FIGURE 1. All units come standard with removable unit panels. All L1, L2, and L3 wiring is color coded; L1 is red, L2 is yellow, and L3 is blue.

A-CONTROL BOX COMPONENTS

ZGD control box components are shown in FIGURE 2 and FIGURE 3. The control box is in the outdoor section to the left of the blower and heat section.

1-Control Transformer T1

All units use a single line voltage to 24VAC transformer-mounted in the control box. The transformer supplies power to control circuits in the unit. The transformer is rated at 70VA and is protected by a 3 amp (auto) fuse F1. The 208/230 (Y) voltage transformers use two primary voltage taps as shown in FIGURE 4, while 460 (G) and 575 (J) voltage transformers use a single primary voltage tap.

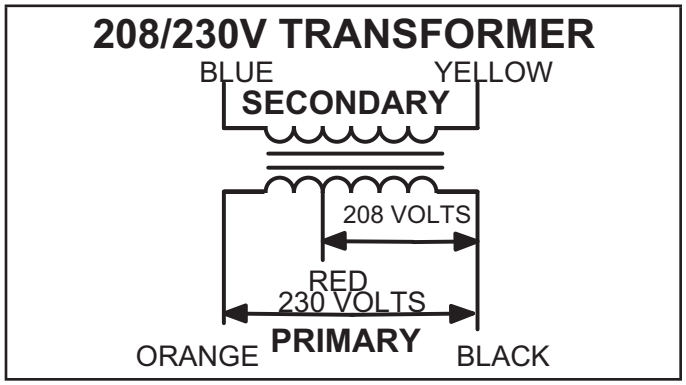


FIGURE 4

2-C. A. I. Transformers T3 (G, J Voltage)

All (G) 460 and 575 (J) voltage units use transformer T3 mounted in the control box. The transformers have an output rating of 0.75A. T3 transformer supplies 230 VAC power to the combustion air inducer motor (B6).

3-Fan Capacitor C1 (three phase)

Fan capacitor C1 is used to assist in the start up of condenser fan B4. Ratings will be on side of capacitor or outdoor fan motor nameplate.

4-Dual Capacitor C12 (single phase)

A single dual capacitor is used for both the outdoor fan and compressor (see unit diagram). The fan side and the compressor side have different MFD ratings. See side of capacitor for ratings.

5-Compressor Contactor K1

In all ZGD units, K1 energizes compressors B1 in response to thermostat demand. Three phase units use two pole double break contactors with a 24 volt coil. Single phase units use single pole double break contactors with a 24 volt coil.

6-Blower Contactor K3

On three phase units, K3 is a two pole double-break contactor with a 24VAC coil and on single phase units is a single pole double break contactor with a 24 volt coil. K3 energizes the indoor blower motor B3 in response to blower demand.

7-Condenser Fan Relay K10 (G, J voltage)

Outdoor fan relay K10 is an optional, field-installed DPDT relay with a 24VAC coil. K10 relay coil is in series with S11 low ambient pressure switch and cycles B4 outdoor fan via K10-1 N.O. contacts.

8-Crankcase Heater Delay DL48 & Crankcase Heater Relay K191

Delay DL48 and relay K191 keep crankcase heater de-energized during and immediately following compressor shut down. They ensure the crankcase heater is off while compressor is energized.

9-Relay K239 (-074 Units)

Relay K239 sends the Y1 demand “G” signal to K3 (through K250) to energize the blower on low speed and also sends the “W1” demand “G” signal to K37 (through K250) to energize the blower on high speed.

10- Relay K250 (-074 Units)

Relay K250 passes the “G” signal to contactor K3 energizing the blower on low speed. On a Y2 call K250 passes the signal to K37 (energizing the blower on high speed) and internal solenoid L34 (energizing the compressor on high speed).

11-Blower Contactor K37 (-074 Units)

On two-speed operation K37 acts as the high speed blower contactor and K3 acts as the low speed contactor in response to blower demand.

12-Blower Delay DL50 (-074 Units)

DL50 causes a 1.5 second delay switching from high speed to low speed.

13-Refrigerant Detection Board (A194) and Sensor (RT58)

This air handler is equipped with a Refrigerant Leak Detection System. The system consists of the RDS Non-Communicating Blower Control Board (A194) in the control compartment and a R454B Refrigerant Sensor (RT58) near the coil.

14-Burner Control A3

⚠ WARNING

Electric shock hazard. Can cause injury or death. Before attempting to perform any service or maintenance, turn the electrical power to unit OFF at disconnect switch(es). Unit may have multiple power supplies.

IGNITION CONTROL A3

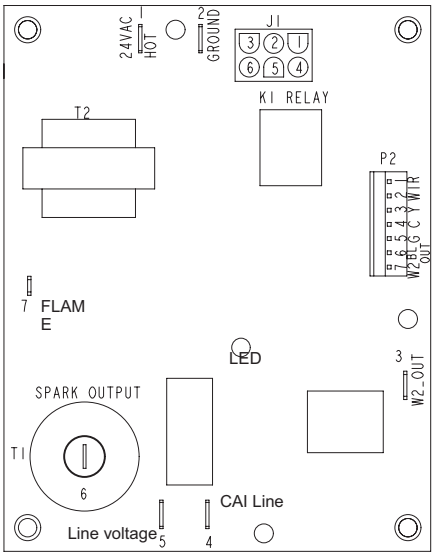


FIGURE 5

The main control box (FIGURE 2 and FIGURE 3) houses the burner control A3.

The ignition control provides four main functions: gas valve control, blower control, ignition, and flame sensing. The control has a green LED to show control status (TABLE 1).

The unit will usually ignite on the first trial and A3 allows three trials for ignition before locking out. The lockout time is 1 hour. After lockout, the ignition control automatically resets and provides three more attempts at ignition. Manual reset after lockout requires removing power from the control for more than 1 second or removing the thermostat call for heat for more than 1 second but no more than 20 seconds. 24 volt thermostat connections (P2) and heating component connections (J1) are made through separate jackplugs. See TABLE 2 for thermostat terminations and TABLE 3 for heating component terminations.

TABLE 1

LED	STATUS
Slow Flash	Normal operation. No call for heat.
Fast Flash	Normal operation. Call for heat.
Steady Off	Internal control fault, no power to board or gas valve relay fault.
Steady On	Control internal failure.
2 Flashes	Lockout. Failed to detect or sustain flame.
3 Flashes	Rollout switch open / prove switch open or closed.
4 Flashes	Primary high limit switch open.
5 Flashes	Flame sensed but gas valve not open.

Flame rectification sensing is used on all ZGD units. Loss of flame during a heating cycle is indicated by an absence of flame signal (0 microamps). If this happens, the control will immediately restart the ignition sequence and then lock out if ignition is not gained after the third trial. See System Service Checks section for flame current measurement. The control shuts off gas flow immediately in the event of a power failure. Upon restoration of gas and power, the control will restart the ignition sequence and continue until flame is established or system locks out for one hour.

TABLE 2

P2 TERMINAL DESIGNATIONS	
Pin #	**Function**
1	**R** 24 Volts To Thermostat.
2	**W1** Heat Demand
3	**Y** Cool Demand
4	**C** Common
5	**G** Indoor Blower
6	**BL OUT** Indoor Blower Relay
7	**W2** Second Stage Heat

TABLE 3

J1 TERMINAL DESIGNATIONS	
Pin #	**Function**
1	Limit Switch On
2	Rollout Switch / Prove Switch Out
3	Gas Valve Common
4	Gas Valve Out
5	Rollout Switch / Prove Switch In
6	Limit Switch In

Operation

On a heating demand, the ignition control checks for a closed limit switch and open (to prove switch is not failed closed prior to start-up) combustion air prove switch. Once this check is complete and conditions are correct, the ignition control then allows 30 seconds for the combustion air inducer to vent exhaust gases from the burners. When the combustion air inducer is purging the exhaust gases, the combustion air prove switch closes proving that the combustion air inducer is operating before allowing the ignition control to energize. When the combustion air prove switch is closed and the delay is over, the ignition control activates the gas valve, the spark electrode and the flame sensing electrode. Once the gas valve is energized the non-adjustable 40 second indoor blower delay period begins. Sparking stops immediately after flame is sensed or at the end of the 8 second trial for ignition

The control then proceeds to “steady state” mode where all inputs are monitored to ensure the limit switch, rollout switch and prove switch are closed as well as flame is present. When the heat call is satisfied and the gas valve is deenergized, a combustion air inducer post purge period of 5 seconds begins along with a 120 second blower off delay.

15-Power Exhaust Transformer T10 (J volt)

Transformer T10 is a field-installed 600/230V transformer which provides power to the 208/230V power exhaust fan in 575V applications

16-Compressor Monitoring Control Board CMC1

The unit is equipped with a CMC1 control board which has the combined function of anti-short cycle timed off control and high- and low-pressure switch system control. Inputs will include cooling commands and pressure controls.

Integral features include:

- Led diagnostic indicators.
- High- and low-pressure switch monitoring, with 5-strike lockout

COMPRESSOR MONITORING CONTROL BOARD CMC1

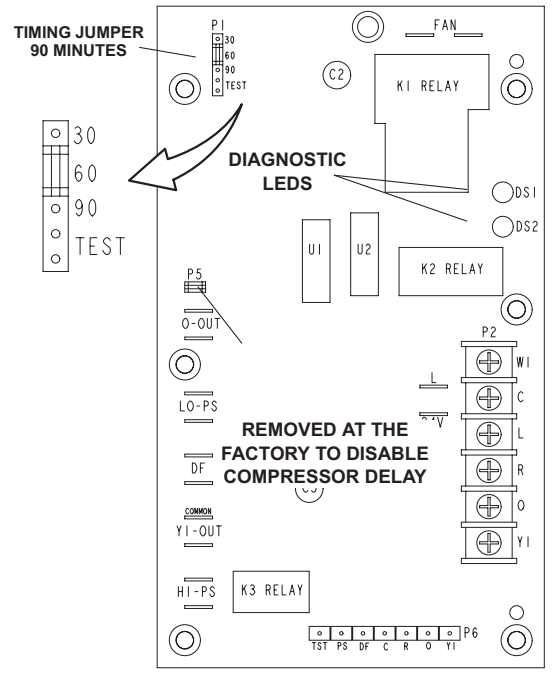


FIGURE 6

Diagnostic LEDs

The defrost board uses two LEDs for diagnostics. The LEDs flash a sequence according to the condition.

TABLE 4

Defrost Control Board Diagnostic LED

Mode	Green LED (DS2)	Red LED (DS1)
No power to control	OFF	OFF
Normal operation / power to control	Simultaneous Slow FLASH	
Anti-shot cycle lockout	Alternating Slow FLASH	
High pressure switch fault	Slow FLASH	OFF
High pressure switch lockout	ON	OFF

ZGD PLUMBING AND COMPRESSOR CIRCUIT DETAIL

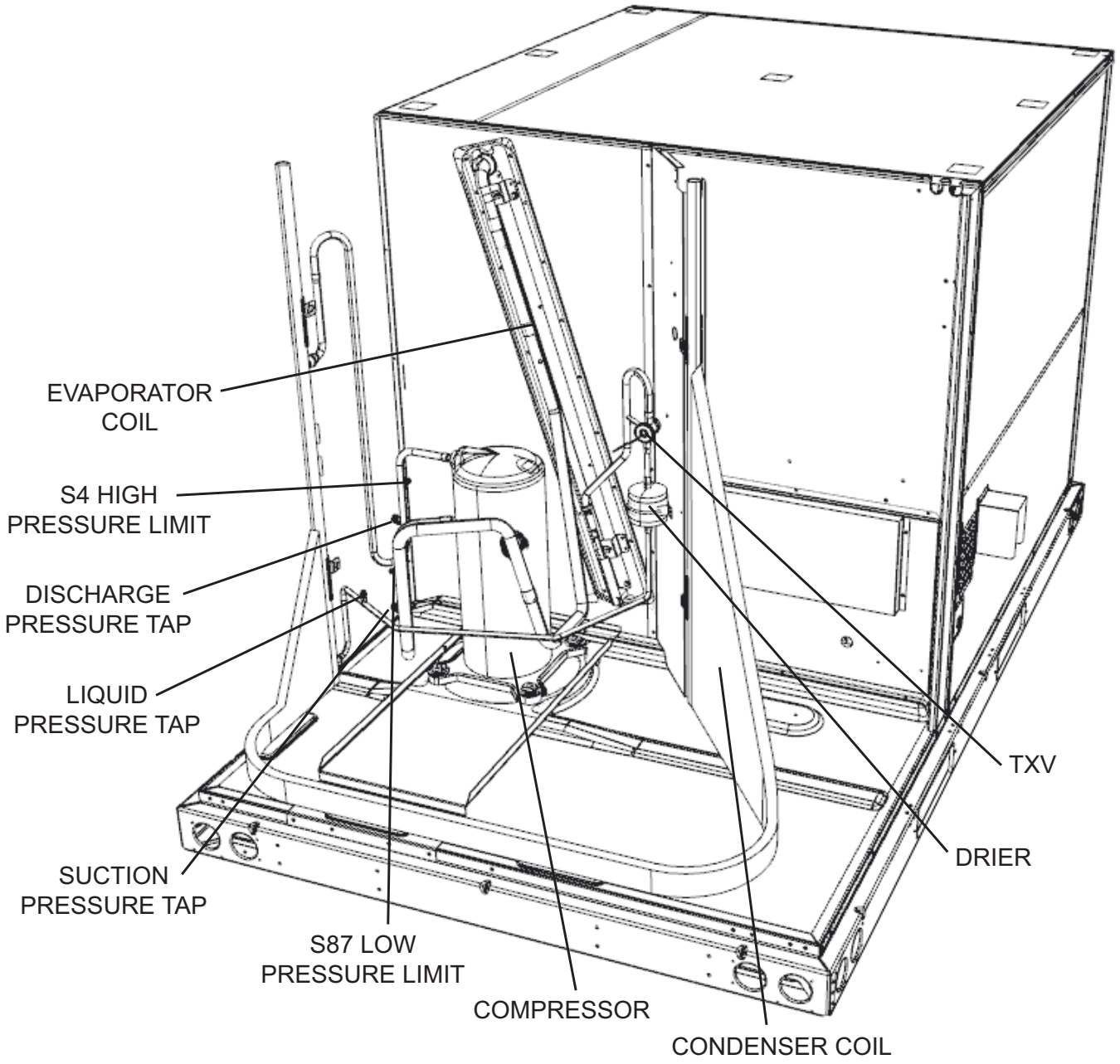


FIGURE 7

B-COOLING COMPONENTS

All units use independent cooling circuits consisting of separate compressors, condenser coils and evaporator coils. See FIGURE 7. One draw-through type condenser fan is used in ZGD036-074 units. All units are equipped with belt-drive blowers which draw air across the evaporator during unit operation.

Cooling may be supplemented by a factory- or field installed economizer. The evaporator is always equipped with a TXV. Each evaporator is also equipped with enhanced fins and rifled tubing.

In all units each compressor is protected by the S4 high pressure switch (on each evaporator). A low ambient switch (S11) is available as an option for additional compressor protection. The compressor is protected by a crankcase heater.

1-Compressor B1

All ZGD036-074 units use one scroll compressor. Compressor capacity may vary from stage to stage. In all cases, the capacity of the compressor is added to reach the total capacity of the unit. See “SPECIFICATIONS” and “ELECTRICAL DATA” (table of contents) or compressor nameplate for compressor specifications.

⚠ WARNING

Electrical shock hazard. Compressor must be grounded. Do not operate without protective cover over terminals. Disconnect power before removing protective cover. Discharge capacitors before servicing unit. Failure to follow these precautions could cause electrical shock resulting in injury or death.

The compressor is energized by a corresponding compressor contactor.

NOTE-Refer to the wiring diagram section for specific unit operation.

If Interlink compressor replacement is necessary, call 1-800-453-6669.

⚠ IMPORTANT

Some scroll compressors have an internal vacuum protector that will unload scrolls when suction pressure goes below 20 psig. A hissing sound will be heard when the compressor is running unloaded. Protector will reset when low pressure in system rises above 40 psig. DO NOT REPLACE COMPRESSOR.

2-High Pressure Switch S4

The high pressure switch is an auto-reset SPST N.C. switch which opens on a pressure rise. S4 is located in the compressor discharge line and wired in series with the respective compressor contactor coils.

When discharge pressure rises to 640 ± 10 psig (4413 ± 69 kPa) (indicating a problem in the system) the switch opens and the respective compressor is de-energized (the economizer can continue to operate).

3-Low Pressure Switch S87

The compressor circuit is protected by a loss of charge switch located on the suction line. Switch opens at 40 psig + 5 psig (276 + 34 kPa) and automatically resets at 90 psig + 5 psig (621 kPa + kPa).

4-Low Ambient Switch S11 (optional)

The low ambient switch is an auto-reset SPST N.O. pressure switch which allows for mechanical cooling operation at low outdoor temperatures. In all models a switch is located in each liquid line prior to the indoor coil section.

When liquid pressure rises to 450 ± 10 psig (3102 ± 69 kPa), the switch closes and the condenser fans are energized. When liquid pressure in both refrigerant circuits drops to 240 ± 10 psig (1655 ± 69 kPa), the switches open and the condenser fans are de-energized. This intermittent fan operation results in higher evaporating temperature allowing the system to operate without icing the evaporator coil and losing capacity.

5-Crankcase Heaters HR1

All units use a belly band heater. Heater HR1 is installed around compressor B1. Crankcase heater wattage varies by compressor manufacturer. The power to the crankcase heater is routed through the N.C. contacts on K10 Outdoor Fan Motor Relay.

6-Filter Drier (all units)

Units have a filter drier located in the liquid line of each refrigerant circuit at the exit of each outdoor coil. The drier removes contaminants and moisture from the system.

7-Condenser Fan Motor B4

See specifications section of this manual for specifications of condenser fan B4. All motors are ball bearing type single-phase motors. The fan may be removed for servicing and cleaning by removing the fan grilles.

8-Refrigerant Leak Detection System

This unit is equipped with a Refrigerant Leak Detection System. The system consists of the A194 Control Board (A194) in the control compartment and a R454B Refrigerant Sensor near the coil. The Modes of Operation for the A194 Control Board are Initializing, Normal, Leak Detected, and Fault.

MODES OF OPERATION

Initializing

The A194 Control Board is establishing connection with the refrigerant detection sensor and sensor is “warming up”.

Normal

The HVAC system is functioning normally, i.e., responding to thermostat demand signals. The A194 Control Board has not detected a refrigerant leak.

Leak Detected (Mitigation)

When the A194 Control Board detects a refrigerant leak:

1 - The A194 Control Board shuts off the (R) output (24VAC power) to the thermostat, which de-energizes the outdoor unit compressor and heat sources, such as gas and/or electric strip heat. No heating or cooling demands will be met.

2 - The A194 Control Board activates the blower ventilation speed (G). The blower purges refrigerant from the cabinet, plenum, and ductwork.

3 - After the A194 Control Board determines the refrigerant levels are below the safety threshold, the blower will continue to function for an additional seven (7) minutes.

4 - After the blower sequence is complete, the HVAC system resumes normal operation.

NOTE - *The HVAC system may not maintain a cooling or heating setpoint if a significant leak exists. Any refrigerant leaks that remain unaddressed for an extended time may cause the HVAC system to shut down on a low refrigerant pressure limit condition.*

Fault/Service

When a fault is detected within the A194 Control Board, the indoor blower engages and remains engaged at a constant output until the fault is cleared.

DIAGNOSTIC CODES / TROUBLESHOOTING

The A194 Control Board is equipped with a multicolor LED. The LED signals the operational state of the A194 Control Board. To review the operational states, refer to TABLE 5, LED Operational Modes / Troubleshooting, for details.

Red diagnostic codes indicate a specific A194 Control Board issue. To determine the issue and possible troubleshooting actions, refer to TABLE 6, Red LED Diagnostic Codes / Troubleshooting.

The A194 Control Board is equipped with a Test/Reset button. The Test button can be used to complete several functions, depending on the mode of operation of the A194 Control Board. TABLE 7 lists the functions of the Test button during each mode of operation.

TABLE 5

LED Operational Modes / Troubleshooting

Operating Mode	LED Status	Action
Initializing	Flashing green	None
Monitoring	Solid green*	None
Mitigation (Leak Detected)	Flashing blue	Check coil tubes for leak. Repair the issue and restart the equipment.
Fault / Service	Solid blue, interrupted by red flash code	Refer to table for troubleshooting guidance.

*Solid green interrupted by a blue flash indicates the mitigation process has previously occurred.

TABLE 6

Red LED Diagnostic Codes / Troubleshooting

Red Wink	Applies to Individual Sensor(s)	Issue	Action
1	Yes	RDS Sensor Fault	Replace sensor
2	No	Drain pan overflow	Check board for alarms, remedy alarms present. If float switch is installed, verify proper switch mounting location, depth in pan, unobstructed condensate drain line; correct as needed.
3	Yes	Incompatible sensor installed	Replace sensor
4	Yes	Sensor communication issue	Check sensor connection. Ensure connection is clean and tight
5	No	R-input not available	Check for 24VAC power connected to thermostat R terminal on the RDSC. 24VAC power should only be provided at A194-R quick connection for the RDSC to function.
6	No	Invalid configuration of sensor count	Not applicable

TABLE 7

Test Button Functions

Operation Mode	Press the Test button to...	Press	Action
Monitoring	Trigger a leak detection response. Verify all equipment is wired correctly into the RDSC (after installation).	Short	Clear purge-counter if prior mitigation has occured; test mitigation.
		Long	Reset control.
Mitigating (Leak Detected)	Reset the RDSC to a normal mode of operation after a previous leak has been detected and purged from the HVAC system.	Short	If testing mitigation, end test.
Fault/Service	Reset the RDSC after troubleshooting and resolving a fault condition. If the fault is not resolved, the RDSC will enter the Fault mode again.	Short	Reevaluate fault condition - if cleared, return to monitoring, otherwise update indicator.
		Long	Reset control.

RDS SENSORS

Units are equipped with factory-installed RDS Sensors located on different points on the unit. The RDS sensors provide the Unit Controller with continuous readings for leaked refrigerant concentration levels and sensor health status (Good or Fault). These readings are used to modify unit operation to disperse the leaked refrigerant and to remove possible ignition sources. In addition, the Unit Controller uses these readings to initiate alarms to alert the operator of a refrigerant leak or faulty sensor(s).

Each sensor must be specifically placed for proper unit operation and to initiate valid alarms. To identify sensor locations see TABLE 8.

TABLE 8

RDS Sensor Figures

Model	Qty.	Type	Figure
ZCD036-074	1 sensor	INDOOR SENSOR	FIGURE 8

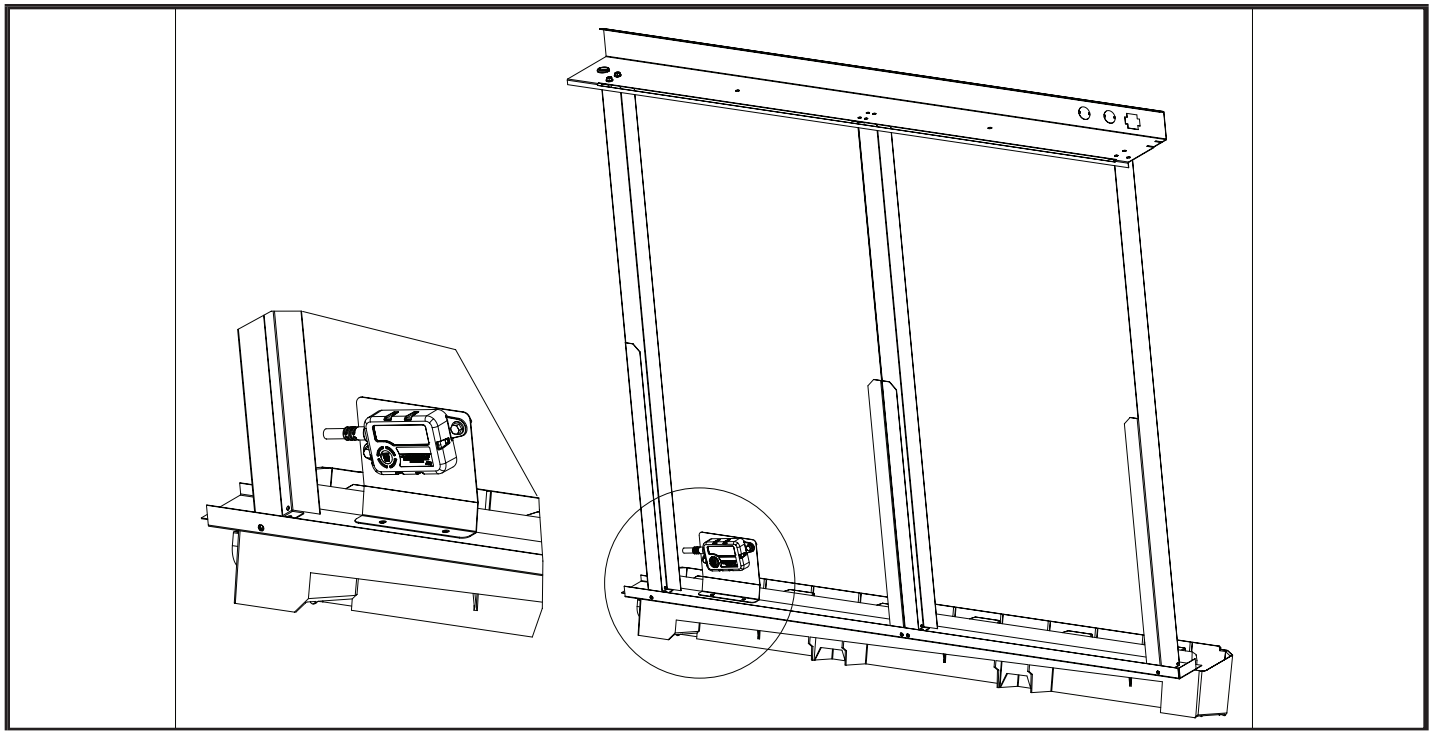


FIGURE 8

SENSOR MAINTENANCE

It is recommended to check the state of the sensor every 6 months, at the beginning of each cooling and heating season.

- Check that the sensor cable is in good condition.
- Ensure that the sensor opening is clear and free of debris.
  - DO NOT use abrasive cleaning solutions or detergents to clean sensor opening.
  - DO NOT use flammable compressed air solutions to clean the sensor opening.
  - DO NOT vacuum sensor inlet opening, as this could cause damage to the sensor internal components.
- Replace sensor if the opening is not clean or free of debris.

NOTE - *When cleaning the evaporator coil, remove the sensor from the coil. Recommended method is removal of bracket with sensor attached.*

See FIGURE 9 for an example of a clear, unobstructed sensor inlet.

FIGURE 9

C-BLOWER COMPARTMENT

Units are equipped with one of three factory-installed blower options. The ninth character in the model number identifies the blower as follows:

E= Three-, four-, and five-ton units are equipped with a variable speed (ECM) direct drive blower.

B= Units are equipped with a single-stage belt drive blower.

T= ZGD074S5T units are equipped with two-stage blowers. The blower will operate at high speed with a Y2 thermostat demand and low speed with a Y1 thermostat demand. Low speed operation delivers approximately ⅔ of the air volume of high speed. Two-speed blower operation results in lower energy consumption.

⚠ IMPORTANT

Three phase scroll compressors must be phased sequentially for correct compressor and blower rotation. Follow “COOLING START-UP” section of installation instructions to ensure proper compressor and blower operation.

A-Blower Operation

Initiate blower demand at thermostat according to instructions provided with thermostat. Unit will cycle on thermostat demand. The following steps apply to applications using a typical electro-mechanical thermostat.

1 - Blower operation is manually set at the thermostat subbase fan switch. With fan switch in **ON** position, blowers will operate continuously.

2 - With fan switch in **AUTO** position, the blowers will cycle with demand. Blowers and entire unit will be off when system switch is in **OFF** position.

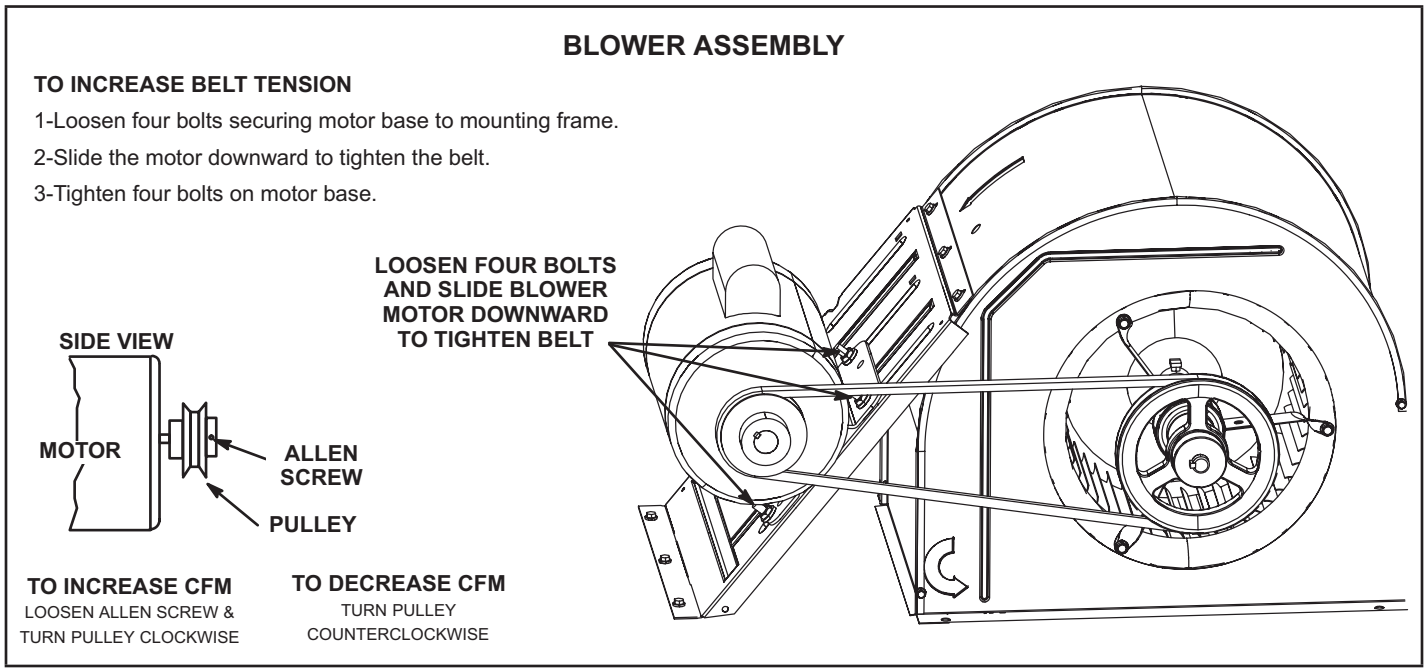


FIGURE 10

B-Determining Unit CFM - Belt Drive Blowers

IMPORTANT - ZGD074S5T blower (G thermostat) ***CFM MUST BE ADJUSTED IN HIGH SPEED***. See TABLE 9.

TABLE 9
TWO-SPEED BLOWER OPERATION
ZGD074ST UNITS

Thermostat	Blower Speed
G	Low
W1	High
W2	High
Y1	Low
Y2	High

**Factory-installed jack/plug connection.*

1 - The following measurements must be made with air filters in place.

2 - With all access panels in place, measure static pressure external to unit (from supply to return). Blower performance data is based on static pressure readings taken in locations shown in FIGURE 11.

NOTE - *Static pressure readings can vary if not taken where shown.*

Referring to the blower tables starting on page 8 use static pressure and RPM readings to determine unit CFM. Use air resistance table when installing units with any of the options or accessories listed.

3 - The blower RPM can be adjusted at the motor pulley. Loosen Allen screw and turn adjustable pulley clockwise to increase CFM. Turn counterclockwise to decrease CFM. See FIGURE 10. Do not exceed minimum and maximum number of pulley turns as shown in TABLE 10.

TABLE 10
MINIMUM AND MAXIMUM PULLEY ADJUSTMENT

Belt	Min. Turns Open	Max. Turn Open
A Section	No minimum	5

C-Determining Unit CFM - Direct Drive Blowers

1 - Referring to direct drive blower tables, use static pressure and RPM readings to determine unit CFM. Use page 19 when installing units with any of the options or accessories listed.

2 - If the design CFM is too low, use FIGURE 14 or FIGURE 15 to move the control lead to a higher setting.

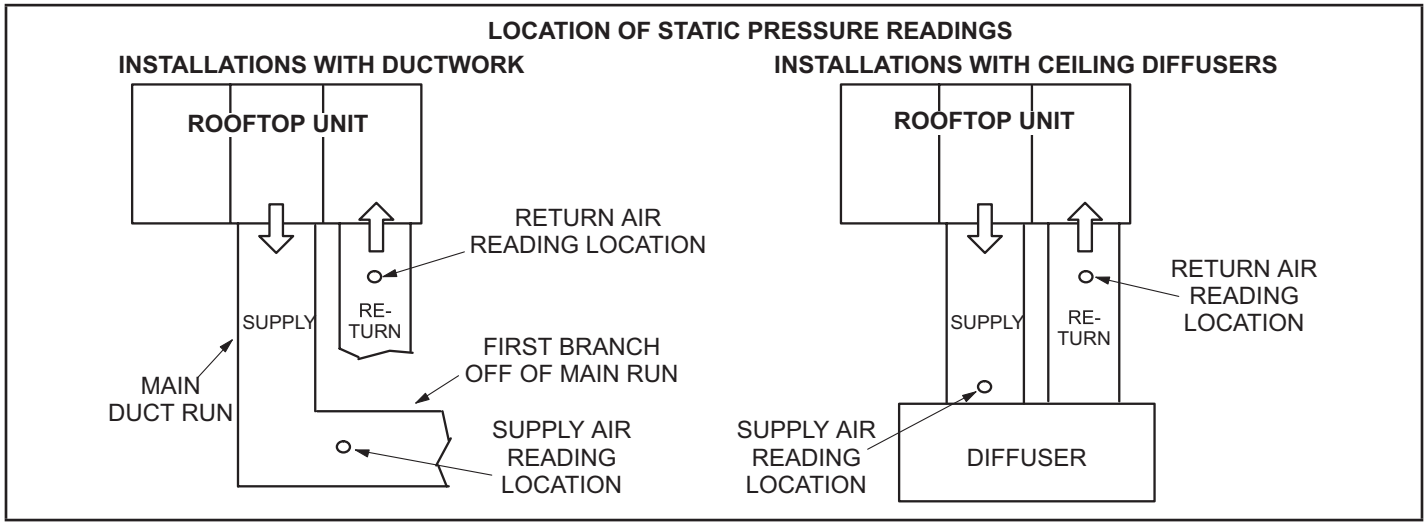


FIGURE 11

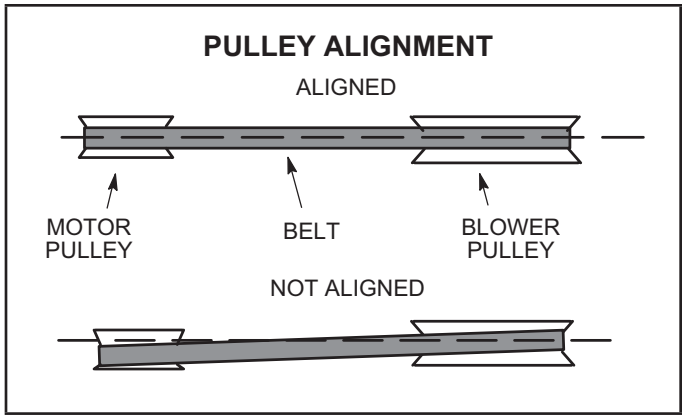


FIGURE 12

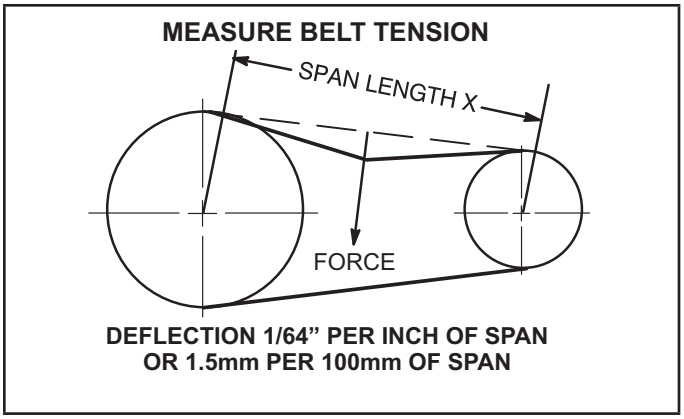


FIGURE 13

D-Blower Belt Adjustment

Maximum life and wear can be obtained from belts only if proper pulley alignment and belt tension are maintained. Tension new belts after a 24-48 hour period of operation. This will allow belt to stretch and seat into grooves. Make sure blower and motor pulley are aligned as shown in FIGURE 12.

1 - Loosen four bolts securing motor base to mounting frame. See FIGURE 10.

2 - To increase belt tension

Slide blower motor downward to tighten the belt. This increases the distance between the blower motor and the blower housing.

3 - To loosen belt tension

Slide blower motor upward to loosen the belt. This decreases the distance between the blower motor and the blower housing.

4 - Tighten four bolts securing motor base to the mounting frame.

E-Check Belt Tension

Overtensioning belts shortens belt and bearing life. Check belt tension as follows:

1 - Measure span length X. See FIGURE 13.

2 - Apply perpendicular force to center of span (X) with enough pressure to deflect belt 1/64" for every inch of span length or 1.5mm per 100mm of span length. Example: Deflection distance of a 40" span would be 40/64" or 5/8".

Example: Deflection distance of a 400mm span would be 6mm.

3 - Measure belt deflection force. For a used belt, the deflection force should be 5 lbs. (35kPa). A new belt deflection force should be 7 lbs. (48kPa).

A force below these values indicates an undertensioned belt. A force above these values indicates an overtensioned belt.

F-Field-Furnished Blower Drives

For field-furnished blower drives, use belt drive blower tables to determine BHP and RPM required. Reference page 19 for additional air resistance and page 18 to determine the drive kit number. See TABLE 11 for drive component manufacturers numbers.

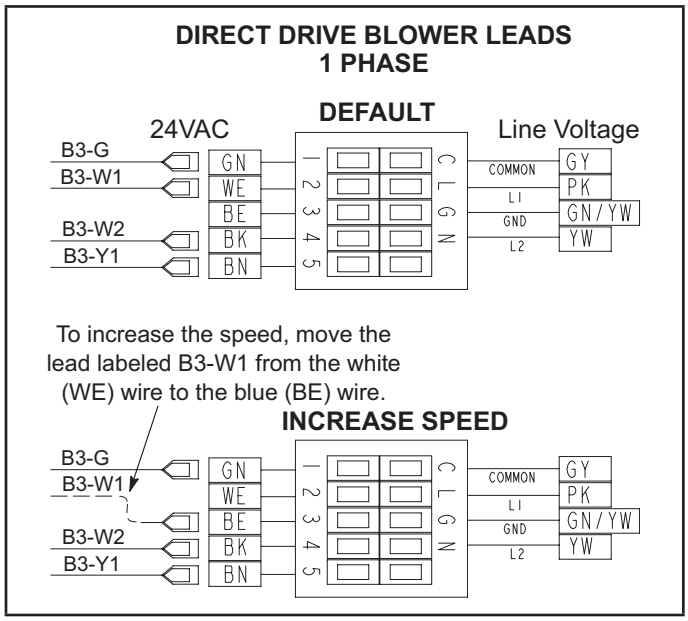


FIGURE 14

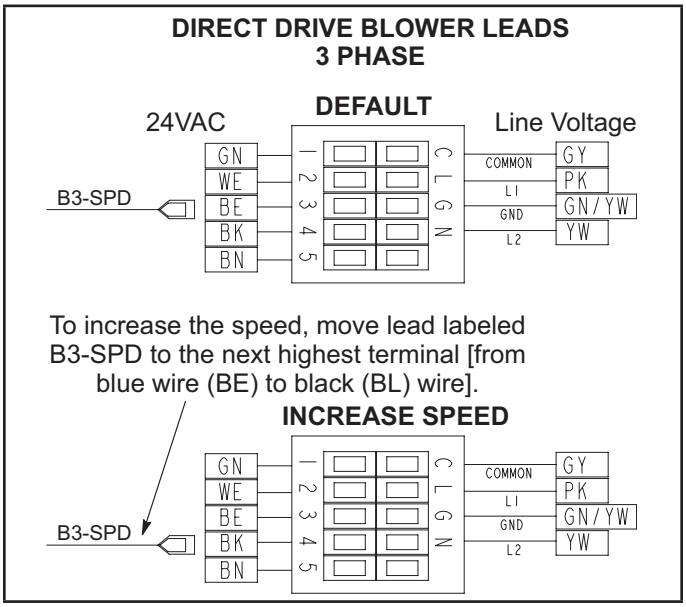


FIGURE 15

TABLE 11
DRIVE COMPONENT MANUFACTURER'S NUMBERS

Drive No.	DRIVE COMPONENT PART NUMBERS					
	Motor Pulley		Blower Pulley		Belts	
	Browning	OEM	Browning	OEM	Browning	OEM
Z01	1VP34 X 7/8	31K6901	AK54 X 5/8	10024430	A40	10024517
Z02	1VP34 X 7/8	31K6901	AK46 X 5/8	10024431	A39	10024516
Z03	1VP34 X 7/8	31K6901	AK41 X 5/8	10024428	A39	10024516
Z04	1VP34 X 7/8	31K6901	AK39 X 5/8	10024432	A38	10024515
Z05	1VP44 X 7/8	P81488	AK49 X 5/8	10024426	A41	10024518
ZAA01	1VP34 X 7/8	31K69	AK69 X 1	37L47	AX51	13H01
ZAA02	1VP40 X 7/8	79J03	BK80H	100788-03	A53	100245-40
ZAA03	1VP40 X 7/8	79J03	AK59 X 1	31K68	A50	100245-29
ZAA04	1VP44 X 7/8	P81488	AK59 X 1	31K68	AX51	13H01

F-GAS HEAT COMPONENTS

ZGD036-074 units are available in 65,000 BTUH, 108,000 BTUH, 113,000 BTUH or 150,000 BTUH heat sizes.

1-Heat Exchanger FIGURE 16

Units are equipped with tubular aluminized steel heat exchangers and two-stage redundant gas valves. Units use one eleven tube/burner for high heat, one nine tube/burner for medium heat and one six tube/burner for standard heat. Burners in all units use a burner venturi to mix gas and air for proper combustion. Combustion takes place at each tube entrance. As hot combustion gases are drawn upward through each tube by the combustion air inducer, exhaust gases are drawn out the top and fresh air/gas mixture is drawn in at the bottom. Heat is transferred to the air stream from all surfaces of the heat exchanger tubes. The supply air blower forces air across the tubes to extract the heat of combustion. The shape of the tubes ensures maximum heat exchange.

The gas valves accomplish staging by allowing more or less gas to the burners as called for by heating demand.

2-Burner Box Assembly FIGURE 17

The burner assembly consists of a spark electrode, flame sensing electrode and gas valve. Ignition board A3 controls all functions of the assembly.

Burners

Units are equipped with either aluminized steel inshot burners or a one piece aluminized burner cluster. Burners are factory set and do not require adjustment. A peep hole with cover is furnished in the heating access panel for flame viewing. Always operate the unit with the access panel in place. Burners can be removed individually for service. Burner maintenance and service is detailed in the SERVICE CHECKS section of this manual.

Orifice

Each burner uses an orifice which is matched to the burner input. The orifice is threaded into the burner manifold. The burner is supported by the orifice and will easily slide off for service once the mounting screws are removed from the burners.

NOTE-*Do not use thread sealing compound on the orifices. Using thread sealing compound may plug the orifices.*

Each orifice and burner are sized specifically to the unit. Refer to Product Zone@www.davenet.com for correct sizing information.

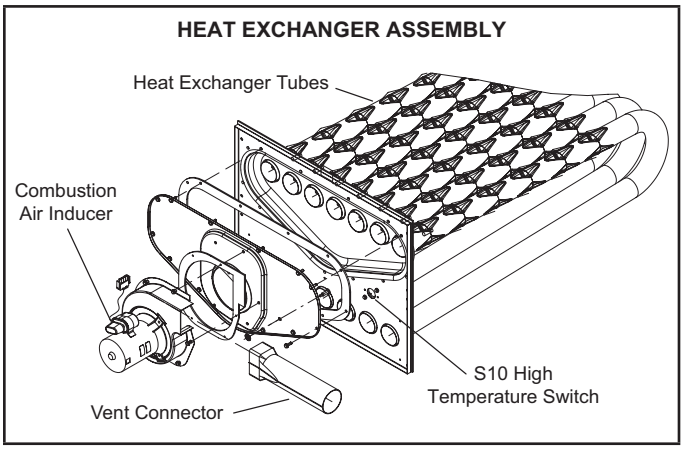


FIGURE 16

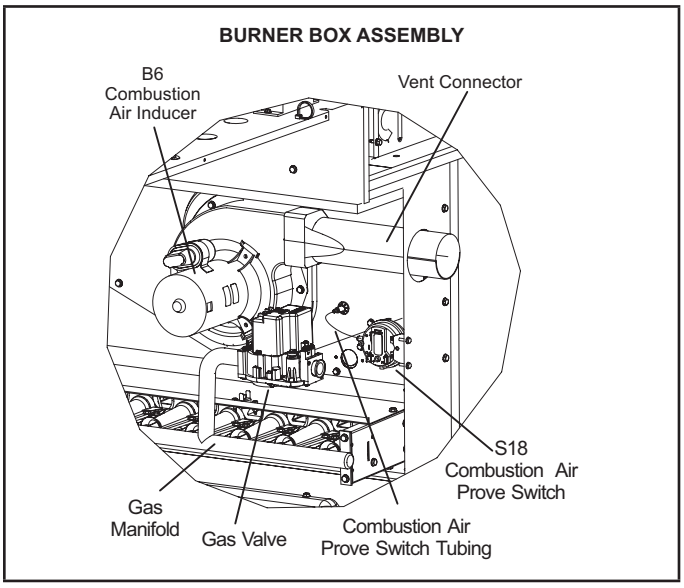


FIGURE 17

3-Primary High Temperature Limit S10

S10 is a SPST N.C. high temperature primary limit for gas heat in ZGD092/150 units. S10 is located to the right of the combustion air inducer on the heat exchanger assembly. See FIGURE 16.

Primary limit S10 is wired to the ignition control A3. Its N.C. contacts open to de-energize the ignition control when excessive temperature is reached in the blower compartment. If the limit trips the blower relay coil K3 will be energized by ignition control A3. Three limits with different actuating temperatures are used. See Product Zone@ www.davenet.com for replacement.

4-Flame Rollout Limit Switch S47

Flame rollout limit switch S47 is a SPST N.C. high temperature limit located just above the burner air intake opening in the burner enclosures (see figure 10). S47 is wired to the ignition control A3. When S47 senses flame rollout (indicating a blockage in the combustion air passages), the flame rollout limit trips and the ignition control immediately closes the gas valve.

Limit S47 is factory preset to open at 290F ± 12ºF (143C ± 6.7ºC) on a temperature rise on all units. All flame rollout limits are manual reset.

5-Combustion Air Prove Switch S18

Prove switch S18 is a SPST N.O. switch located to the right of the induced draft assembly. S18 monitors combustion air inducer operation. Switch S18 is wired to the ignition control A3. The switch closes on a negative pressure fall. This negative pressure fall and switch actuation allows the ignition sequence to continue (proves, by closing, that the combustion air inducer is operating before allowing the gas valve to open.) The combustion air prove switch is factory set and not adjustable. The switch will automatically open on a pressure rise (less negative pressure). TABLE 12 shows prove switch settings.

TABLE 12

S18 Prove Switch Settings

Close“ w.c. (Pa)	Open “ w.c. (Pa)
0.25 ± 5 (62.3 ± 12.4)	0.10 ± 5 (24.8 ± 12.4)

6-Combustion Air Inducer B6

Combustion air inducers on ZGD092/150 units provide air to the corresponding burners while clearing the combustion chamber of exhaust gases. The inducer begins operating immediately upon receiving a thermostat demand and is de-energized when thermostat demand is satisfied.

The inducer uses a 208/230V single-phase PSC motor and a 4.81in. x 1.25in. (122mm x 32mm) blower wheel. All motors operate at 3200RPM and are equipped with auto-reset overload protection. Inducers are supplied by various manufacturers.

Ratings may vary by manufacturer. Specific inducer electrical ratings can be found on the unit rating plate. On a heating demand (W1), the ignition control A3 initiates the heating cycle. A3 then allows 30 to seconds for the combustion air inducer to vent exhaust gases from the burners.

When the combustion air inducer is purging the exhaust gases, the combustion air prove switch closes, proving that the combustion air inducer is operating before allowing the ignition sequence to continue. When the combustion air prove switch is closed and the delay is over, the ignition control activates the first stage operator of the gas valve (low fire), the spark and the flame sensing electrode. Sparking stops immediately after flame is sensed or at the end of the eight second trial for ignition.

All combustion air inducer motors are sealed and cannot be oiled. The inducer cannot be adjusted but can be disassembled for cleaning.

7-Combustion Air Motor Capacitor C3

The combustion air inducer motors in all ZGD units require run capacitors. Capacitor C3 is connected to combustion air inducer B6. Ratings will be on side of capacitor or combustion air motor nameplate.

8-Gas Valves GV1

Gas valve GV1 is a two-stage redundant valve. Units are equipped with valves manufactured by White-Rodgers or Resideo. On a call for first stage heat (low fire), the valve is energized by the ignition control simultaneously with the spark electrode. On a call for second stage heat (high fire), the second stage operator is energized directly from A3. A manual shut-off knob is provided on the valve for shut-off. Manual shut-off knob immediately closes both stages without delay. On both valves first stage (low fire) is quick opening (on and off in less than 3 seconds).

On the White-Rodgers valve second stage is slow opening (on to high fire pressure in 40 seconds and off to low fire pressure in 30 seconds). The White-Rodgers valve is adjustable for high fire only. Low fire is not adjustable. On the Resideo valve second stage is quick opening. The Resideo valve is adjustable for both low fire and high fire. FIGURE 21 and FIGURE 22 show gas valve components. TABLE 13 shows factory gas valve regulation for ZGD series units.

TABLE 13

GAS VALVE REGULATION

Max. Inlet Pressure	Operating Manifold Pressure			
13.0" W.C.	Natural		L.P.	
	Low	High	Low	High
	1.6 ± 0.2" W.C.	3.7 ± 0.3" W.C.	5.5" + 0.3" W.C	10.5" ± 0.5" W.C.

9-Spark Electrode FIGURE 19

An electrode assembly is used for ignition spark. The electrode is mounted through holes under the left most burner location. The electrode tip protrudes into the flame envelope of the adjacent burner. The electrode assembly is fastened to burner supports and can be removed for service without removing any part of the burners. See FIGURE 18 for location of ignitor and sensor.

During ignition, spark travels through the spark electrode (FIGURE 19) and ignites the left burner. Flame travels from burner to burner until all are lit.

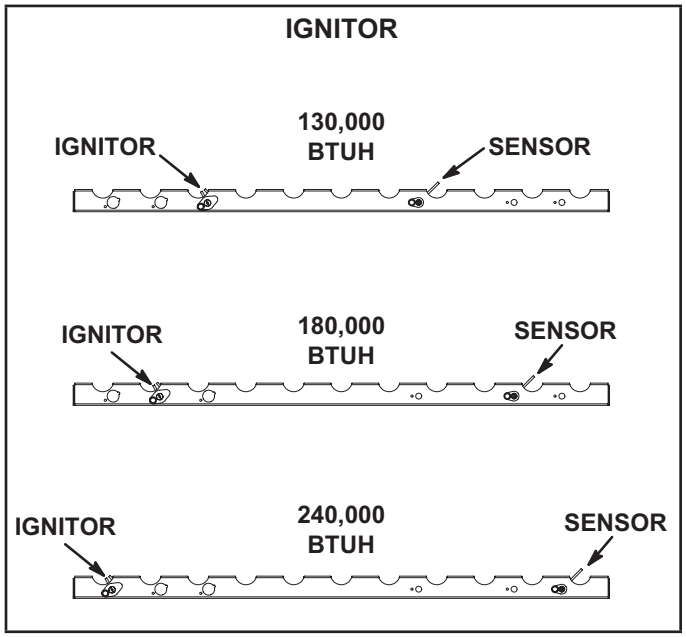


FIGURE 18

The spark electrode is connected to the ignition control by a 8 mm silicone-insulated stranded high voltage wire. The wire uses 1/4" (6.35 mm)female quick connect on both ends of the wire.

NOTE - *If electrode wire is replace, wire and suppression must be same type cable. See Product Zone@www.davenet.com for replacement.*

The spark electrode assembly can be removed for inspection by removing the screw securing the electrode assembly and sliding it out of unit.

For proper unit operation, electrodes must be positioned and gapped correctly.

Spark gap may be checked with appropriately sized twist drills or feeler gauges. Disconnect power to the unit and remove electrode assembly. The gap should be between 0.125" + 0.015" (3.2 mm + .4 mm). See FIGURE 19.

NOTE-*IN ORDER TO MAXIMIZE SPARK ENERGY TO ELECTRODE, HIGH VOLTAGE WIRE SHOULD TOUCH UNIT CABINET AS LITTLE AS POSSIBLE.*

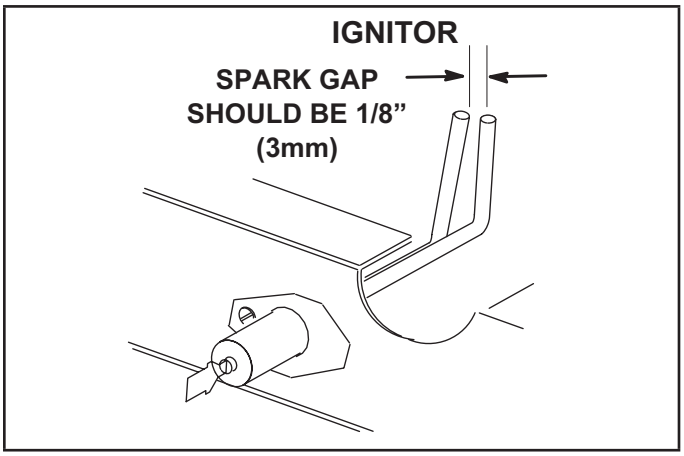


FIGURE 19

10-Flame Sensor FIGURE 20

A flame sensor is located under the right most side burner. The sensor is mounted through a hole in the burner support and the tip protrudes into the flame envelope of the right most burner. The sensor assembly is fastened to burner supports and can be removed for service without removing any part of the burners.

When flame is sensed by the flame sensor (indicated by microamp signal through the flame) sparking stops immediately or after the eight second trial for ignition. During operation, flame is sensed by current passed along the ground electrode (located on the spark electrode), through the flame and into the sensing electrode. The ignition control allows the gas valve to stay open as long as a flame signal (current passed through the flame) is sensed.

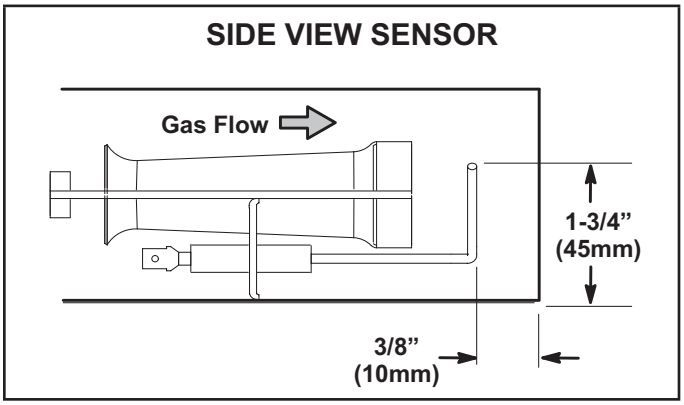


FIGURE 20

II-PLACEMENT AND INSTALLATION

Make sure the unit is installed in accordance with the installation instructions and all applicable codes. See accessories section for conditions requiring use of the optional roof mounting frame (Z1CURB40B-1, Z1CURB41B-1, Z1CURB42B-1, or Z1CURB43B-1).

III-STARTUP - OPERATION

A-PRELIMINARY AND SEASONAL CHECKS

1 - Make sure the unit is installed in accordance with the installation instructions and applicable codes.

2 - Inspect all electrical wiring, both field and factory installed for loose connections. Tighten as required. Refer to unit diagram located on inside of unit compressor access panel.

3 - Check to ensure that refrigerant lines are in good condition and do not rub against the cabinet or other refrigerant lines.

4 - Check voltage at the disconnect switch. Voltage must be within the range listed on the nameplate. If not, consult the power company and have the voltage corrected before starting the unit.

5 - Recheck voltage and amp draw with unit running. If voltage is not within range listed on unit nameplate, stop unit and consult power company. Refer to unit nameplate for maximum rated load amps.

6 - Inspect and adjust blower belt (see section on Blower Compartment - Blower Belt Adjustment).

B-HEATING STARTUP

FOR YOUR SAFETY READ BEFORE LIGHTING

⚠ WARNING

Electric shock hazard. Can cause injury or death. Do not use this unit if any part has been under water. Immediately call a qualified service technician to inspect the unit and to replace any part of the control system and any gas control which has been under water.

⚠ WARNING

Danger of explosion. Can cause injury or product or property damage. If overheating occurs or if gas supply fails to shut off, shut off the manual gas valve to the appliance before shutting off electrical supply.

⚠ WARNING

Electric shock hazard. Can cause injury or death. Before attempting to perform any service or maintenance, turn the electrical power to unit OFF at disconnect switch(es). Unit may have multiple power supplies.

⚠ CAUTION

SMOKE POTENTIAL

The heat exchanger in this unit could be a source of smoke on initial firing. Take precautions with respect to building occupants and property. Vent initial supply air outside when possible.

BEFORE LIGHTING smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.

Use only your hand to push in or turn the gas control knob. Never use tools. If the knob will not push in or turn by hand, do not try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.

⚠ WARNING

Danger of explosion. Can cause injury or death. Do not attempt to light manually. Unit has a direct spark ignition system.

This unit is equipped with an automatic spark ignition system. There is no pilot. In case of a safety shutdown, move thermostat switch to OFF and return the thermostat switch to HEAT to reset ignition control.

1-Placing Unit In Operation

⚠ WARNING

Danger of explosion and fire. Can cause injury or product or property damage.

You must follow these instructions exactly.

Gas Valve Operation for Resideo VR8305Q or White Rodgers 36H54 FIGURE 21 or FIGURE 22

1 - Set thermostat to lowest setting.

2 - Turn off all electrical power to appliance.

3 - This appliance is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.

4 - Open or remove the heat section access panel.

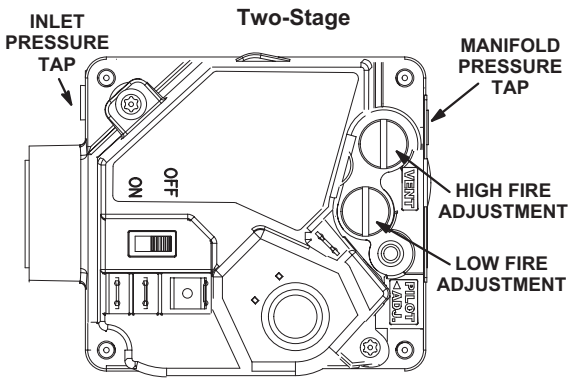


FIGURE 21

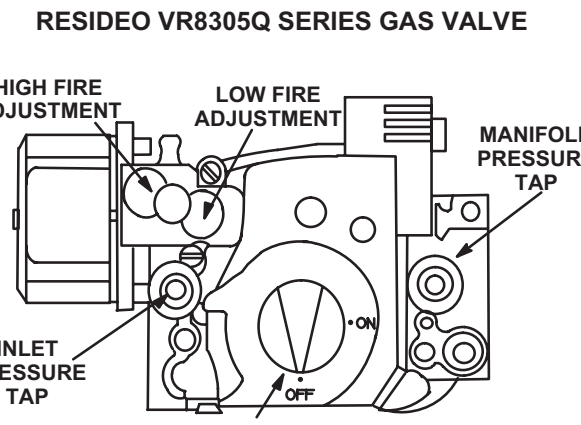


FIGURE 22

5 - Turn gas valve switch to OFF. See FIGURE 21. On Resideo VR8305Q gas valves, turn the knob on the gas valve clockwise to “OFF”. Do not force. See FIGURE 22.

6 - Wait five (5) minutes to clear out any gas. If you then smell gas, STOP! Immediately call your gas supplier from a neighbor’s phone. Follow the gas supplier’s instructions. If you do not smell gas, go to the next step.

7 - Turn gas valve switch to ON. See FIGURE 21. On Resideo VR8305Q gas valves, turn the knob on the gas valve counterclockwise to “ON”. Do not force. See FIGURE 22.

8 - Close or replace the heat section access panel.

9 - Turn on all electrical power to appliance.

10 - Set thermostat to desired setting.

11 - The ignition sequence will start.

12 - If the appliance does not light the first time (gas line not fully purged), it will attempt up to two more ignitions before locking out.

13 - If lockout occurs, repeat steps 1 through 10.

14 - If the appliance will not operate, follow the instructions

“Turning Off Gas to Appliance” and call your service technician or gas supplier.

Turning Off Gas to Unit

1 - If using an electromechanical thermostat, set to the lowest setting.

2 - Before performing any service, turn off all electrical power to the appliance.

3 - Open or remove the heat section access panel.

4 - Turn gas valve switch to OFF. On Resideo VR8305Q gas valves, turn the knob on the gas valve clockwise to “OFF”. Do not force.

5 - Close or replace the heat section access panel.

⚠ WARNING

Danger of explosion. Can cause injury or death. Do not attempt to light manually. Unit has a direct spark ignition system.

C-COOLING STARTUP

1-Operation

1 - Initiate first and second stage cooling demands according to instructions provided with thermostat.

2 - *No Economizer Installed in Unit* -

A first-stage cooling demand (Y1) will energize the compressor and condenser fan. An increased cooling demand (Y2) will not change operation.

Units Equipped With Economizer -

When outdoor air is acceptable, a first-stage cooling demand (Y1) will energize the economizer. An increased cooling demand (Y2) will energize compressor 1 and the condenser fan. When outdoor air is not acceptable unit will operate as though no economizer is installed.

3 - Units contain one refrigerant circuit or stage.

4 - Each refrigerant circuit is separately charged with R-454B refrigerant. See unit rating plate for correct amount of charge.

5 - Refer to section IV CHARGING for proper method to check refrigerant charge.

2-Safety or Emergency Shutdown

Turn off power to unit. Close manual and main gas valves.

IV-CHARGING

⚠ WARNING

Refrigerant can be harmful if it is inhaled. Refrigerant must be used and recovered responsibly.

Failure to follow this warning may result in personal injury or death.

A-REFRIGERANT CHARGE AND CHECK

WARNING-Do not exceed nameplate charge under any condition.

This unit is factory charged and should require no further adjustment. If the system requires additional refrigerant, reclaim the charge, evacuate the system, and add required nameplate charge.

Refrigerant Charge R-454B		
Unit	M_c(lbs)	M_c(kg)
ZGD 036	4.10	1.86
ZGD 048	4.25	1.93
ZGD 060	4.63	2.10
ZGD 074	5.00	2.27

When breaking into the refrigerant circuit to make repairs – or for any other purpose – conventional procedures shall be used. However, for flammable refrigerants it is important that best practice be followed and, since flammability is a consideration, the following procedure shall be adhered to:

- Safely remove refrigerant following local and national regulations,
- Evacuate the circuit,
- Purge the circuit with inert gas,
- Evacuate,
- Purge with inert gas,
- Open the circuit

The refrigerant charge shall be recovered into the correct recovery cylinders if venting is not allowed by local and national codes. For appliances containing flammable refrigerants, the system shall be purged with oxygen-free nitrogen to render the appliance safe for flammable refrigerants. This process might need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems. Refrigerant purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum. This process shall be repeated until no refrigerant is within the system. When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to enable work to take place. Ensure that the outlet for the vacuum pump is not close to any potential ignition sources and that ventilation is available.

In addition to conventional charging procedures, the following requirements shall be followed.

- Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimize the amount of refrigerant contained in them.
- Cylinders shall be kept in an appropriate position according to the instructions.
- Ensure that the refrigerating unit is earthed prior to charging the system with refrigerant.
    - Label the system when charging is complete (if not already).
    - Extreme care shall be taken not to overfill the refrigerating unit.

Prior to recharging the system, it shall be pressure-tested with the appropriate purging gas. The system shall be leak-tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

- When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely. When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge is available. All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i. e. special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure- relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.
- The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of all appropriate refrigerants includ-ing, when applicable, flammable refrigerants. In ad-dition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition. Before using the recovery machine, check that it is in satisfactory working order, has been properly maintained and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant release. Consult manu-facturer if in doubt.
- The recovered refrigerant shall be returned to the refrigerant supplier in the correct recovery cylinder, and the relevant waste transfer note arranged. Do not mix refrigerants in recovery units and especially not in cylinders.

- If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant. The evacuation process shall be carried out prior to returning the compressor to the suppliers. Only electric heating to the compressor body shall be employed to accelerate this process. When oil is drained from a system, it shall be carried out safely.

NOTE - *System charging is not recommended below 60F (15C). In temperatures below 60F (15C), the charge must be weighed into the system.*

If weighing facilities are not available, or to check the charge, use the following procedure:

IMPORTANT - Charge unit in standard cooling mode.

1 - Make sure outdoor coil is clean. Attach gauge manifolds and operate unit at full CFM in cooling mode with economizer disabled until system stabilizes (approximately five minutes). Make sure all outdoor air dampers are closed. operate the unit in cooling mode at high speed using the following mobile service app menu path:

RTU MENU > COMPONENT TEST > COOLING > COOLING STAGE 3

2 - Compare the normal operating pressures to the pressures obtained from the gauges. Check unit components if there are significant differences.

3 - Measure the outdoor ambient temperature and the suction pressure. Refer to the charging curve to determine a target liquid temperature.

Note - *Pressures are listed for sea level applications.*

4 - Use the same thermometer to accurately measure the liquid temperature (in the outdoor section).

- If measured liquid temperature is higher than the target liquid temperature, add refrigerant to the system.
- If measured liquid temperature is lower than the target liquid temperature, recover some refrigerant from the system.

5 - Add or remove charge in increments. Allow the system to stabilize each time refrigerant is added or removed.

6 - Continue the process until measured liquid temperature agrees with the target liquid temperature. Do not go below the target liquid temperature when adjusting charge. Note that suction pressure can change as charge is adjusted.

7 - Example: For the ZGD036, at 95°F outdoor ambient and a measured suction pressure of 130psig, the target liquid temperature is 100°F. For a measured liquid temperature of 106°F, add charge in increments until measured liquidtemperature agrees with the target liquid temperature.

TABLE 14
ZGD036 NORMAL OPERATING PRESSURES - ALL-ALUMINUM COIL

Outdoor Coil Entering Air Temperature											
65°F		75°F		85°F		95°F		105°F		115°F	
Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)
102	213	103	249	106	289	110	334	115	382	122	435
114	216	115	252	118	293	121	337	127	386	134	439
134	221	135	258	137	299	141	345	146	394	153	448
150	227	151	265	153	306	156	353	162	403	168	457

TABLE 15
ZGD048 NORMAL OPERATING PRESSURES - ALL-ALUMINUM COIL

Outdoor Coil Entering Air Temperature											
65°F		75°F		85°F		95°F		105°F		115°F	
Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)
104	228	107	266	110	307	113	353	117	402	120	455
110	230	114	268	118	310	122	357	126	407	131	461
121	234	127	274	132	318	138	365	144	417	150	472
130	239	137	280	144	325	151	375	159	428	166	485

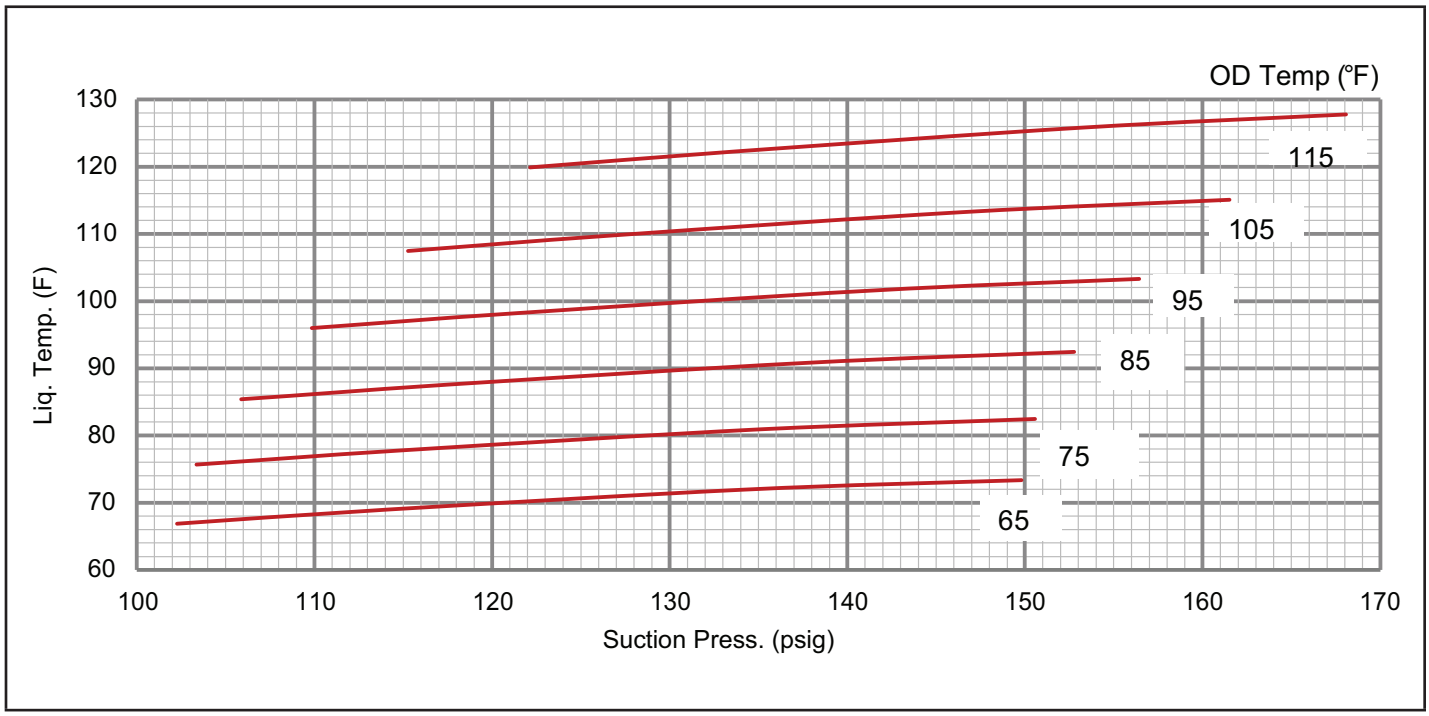
TABLE 16
ZGD060 NORMAL OPERATING PRESSURES - ALL-ALUMINUM COIL

Outdoor Coil Entering Air Temperature											
65°F		75°F		85°F		95°F		105°F		115°F	
Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)
101	235	102	272	104	314	105	360	106	411	107	466
108	241	111	279	113	321	115	368	116	419	118	475
123	250	127	289	130	332	133	380	136	433	138	490
138	255	142	295	146	340	151	389	154	443	158	501

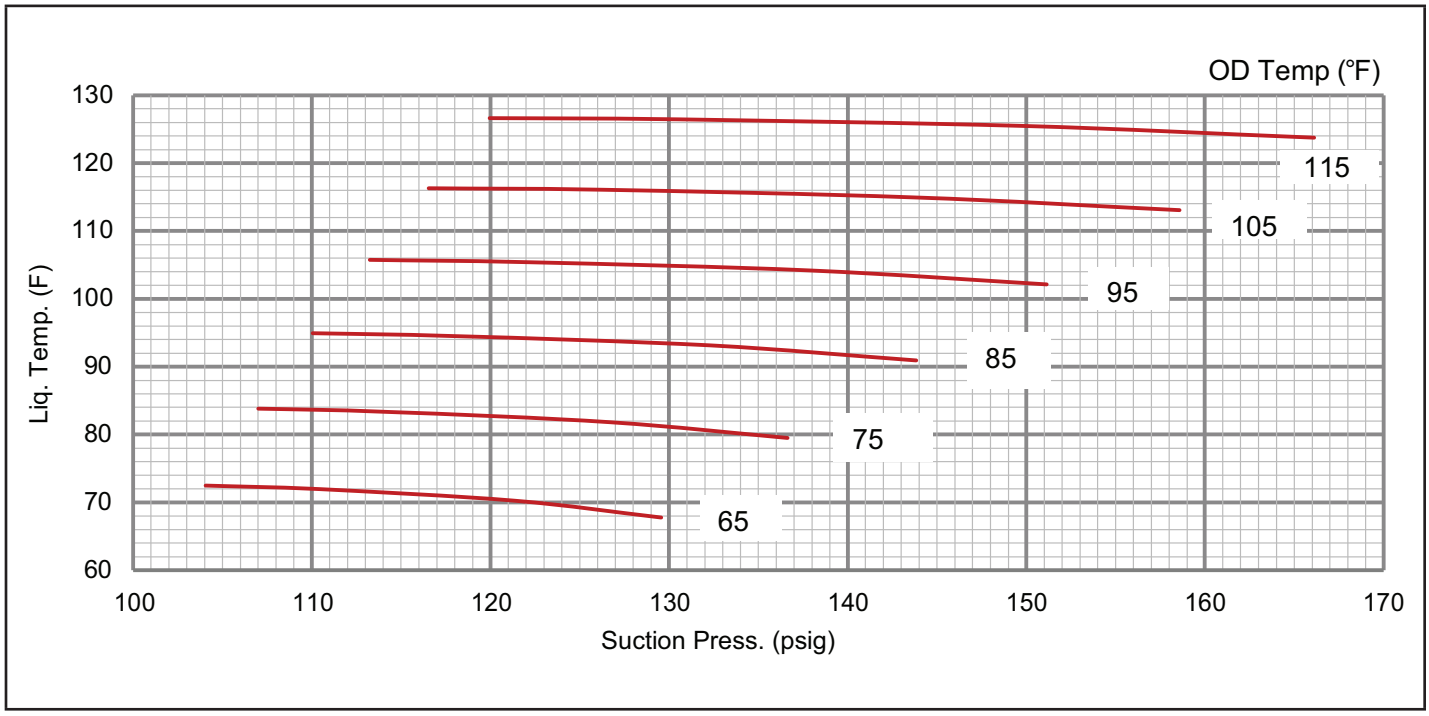
TABLE 17
ZGD074 NORMAL OPERATING PRESSURES - ALL-ALUMINUM COIL

Outdoor Coil Entering Air Temperature											
65°F		75°F		85°F		95°F		105°F		115°F	
Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)
102	241	104	279	106	323	108	373	109	428	110	489
109	244	111	283	114	327	116	377	118	433	120	495
123	251	127	291	131	336	134	388	137	445	140	508
138	261	143	302	148	348	153	401	157	459	160	523

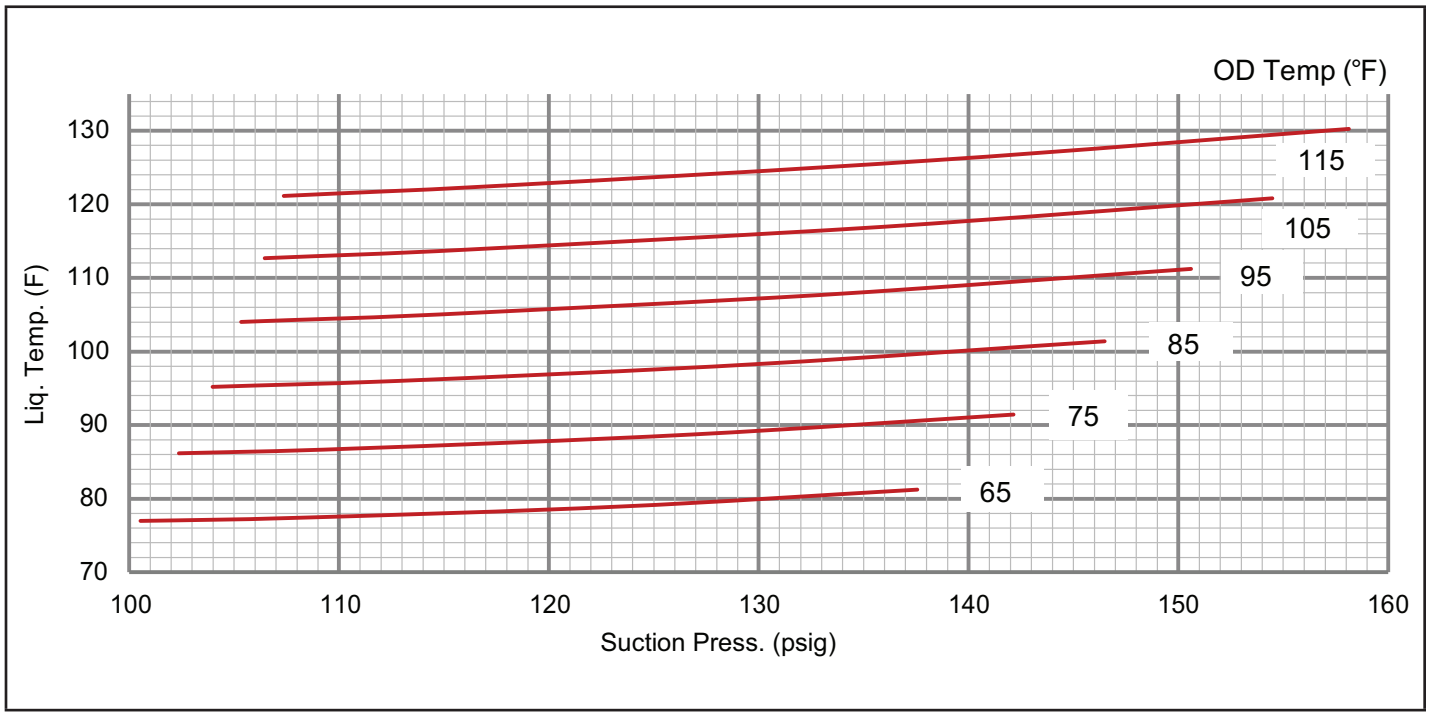
ZGD036 CHARGING CURVE - ALL-ALUMINUM COIL



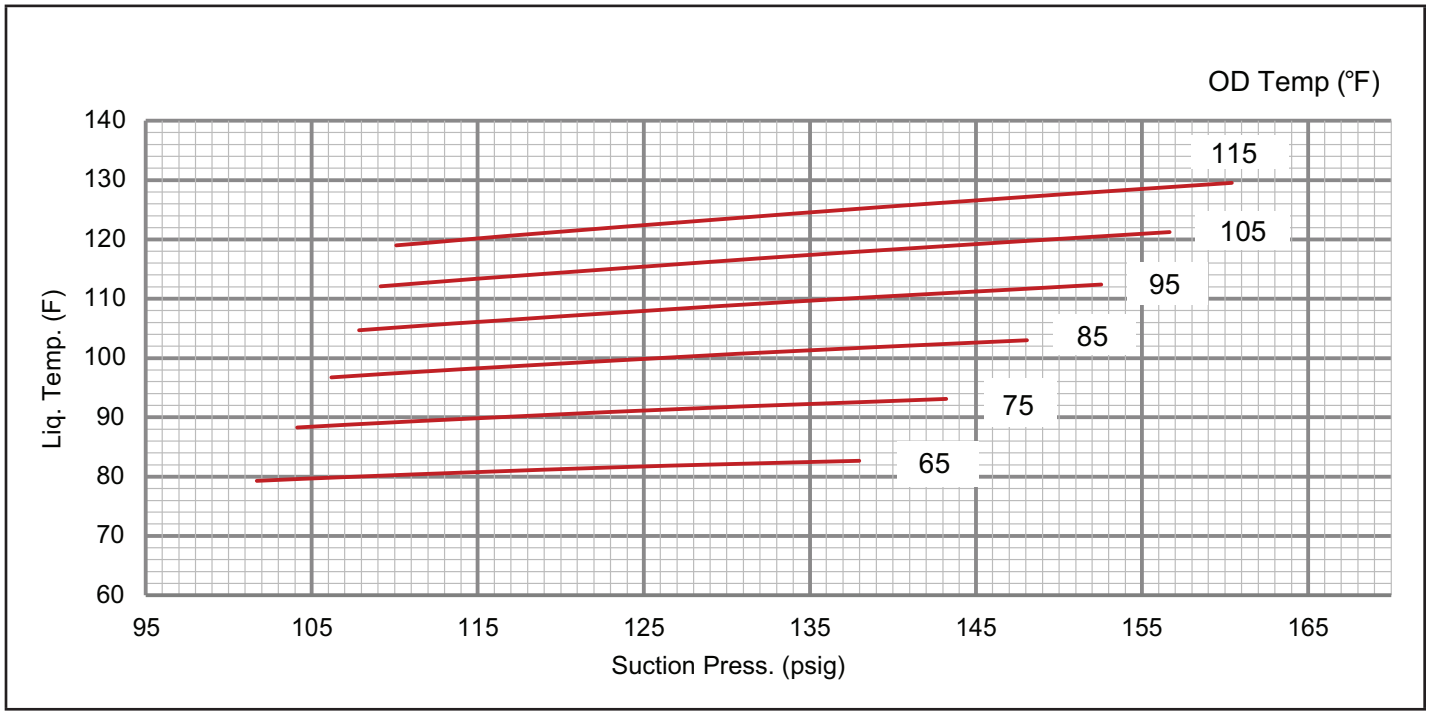
ZGD048 CHARGING CURVE - ALL-ALUMINUM COIL



ZGD060 CHARGING CURVE - ALL-ALUMINUM COIL



ZGD074 CHARGING CURVE - ALL-ALUMINUM COIL



V- SYSTEMS SERVICE CHECKS

A-HEATING SYSTEM SERVICE CHECKS

All ZGD units are ETL/CSA design certified without modification.

Before checking piping, check with gas company or authorities having jurisdiction for local code requirements. Refer to the ZGD Installation instruction for more information.

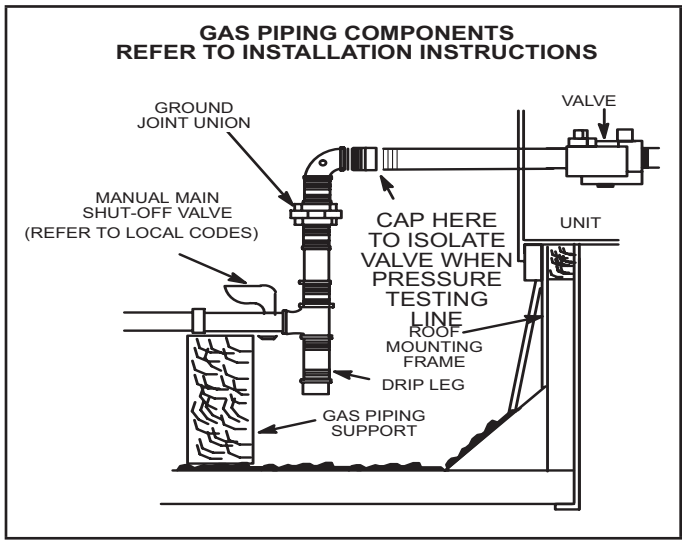


FIGURE 23

1-Gas Piping

Gas supply piping must not allow more than 0.5”W.C. (124.3 Pa) drop in pressure between the gas meter and the unit. Supply gas pipe must not be smaller than the unit gas connection. Refer to installation instructions for details.

2-Testing Gas Piping

NOTE-*In case emergency shutdown is required, turn off the main manual shut-off valve and disconnect the main power to the unit. These controls should be properly labeled by the installer.*

When pressure testing gas lines, the gas valve must be disconnected and isolated. Gas valves can be damaged if subjected to more than 0.5 psig [14”W.C. (3481 Pa)]. See FIGURE 23.

When checking piping connection for gas leaks, use the preferred means. Common kitchen detergents can cause harmful corrosion on various metals used in gas piping. The use of specialty Gas Leak Detector is strongly recommended. It is available as part number 31B2001. See CORP 8411-L10, for further details.

Do not use matches, candles, flame or any other source of ignition to check for gas leaks.

3-Testing Gas Supply Pressure

When testing gas supply pressure, connect test gauge to the inlet pressure tap located on unit gas valve GV1. Test supply gas pressure with unit firing at maximum rate (both stages energized). Make sure the reading falls within the range of the following values.

Low pressure may result in erratic operation or “underfire.” High pressure can result in permanent damage to the gas valve or “overfire.” For natural gas units, operating pressure at the unit gas connection must be between 4.7”W.C. and 10.5”W.C. (1168 Pa and 2610 Pa). For L.P. gas units, operating pressure at the unit gas connection must be between 10.8”W.C. and 13.5”W.C. (2685.3 Pa and 3356.7 Pa).

On multiple unit installations, each unit should be checked separately while operating at maximum rate, beginning with the one closest to the supply gas main and progressing to the one furthest from the main. Multiple units should also be tested with and without the other units operating. Supply pressure must fall within the range listed in the previous paragraph.

4-Check and Adjust Manifold Pressure

After line pressure has been checked and adjusted, check manifold pressure. Move test gauge to the manifold pressure tap located on unit gas valve GV1. See FIGURE 21 and FIGURE 22 for location of manifold tap on the gas valve.

The manifold pressure is factory set and should not require adjustment. If manifold pressure is incorrect and no other source of improper manifold pressure can be found, the valve must be replaced. See FIGURE 21 and FIGURE 22 for location of gas valve (manifold pressure) adjustment screw.

All gas valves are factory regulated. The gas valve should completely and immediately cycle off in the event of gas or power failure. The manual shut-off knob can be used to immediately shut off gas supply.

⚠ CAUTION

For safety, connect a shut-off valve between the manometer and the gas tap to permit shut off of gas pressure to the manometer.

Manifold Adjustment Procedure

1 - Connect test gauge to the outlet pressure tap on the gas valve. Start the unit (call for second stage heat) and allow five minutes for the unit to reach steady state.

2 - While waiting for the unit to stabilize, notice the flame. The flame should be stable without flashback and should not lift from the burner heads. Natural gas should burn basically blue with some clear streaks. L.P. gas should burn mostly blue with some clear yellow streaks.

3 - After allowing the unit to stabilize for five minutes, record the manifold pressure and compare to the values given in TABLE 13. On two-stage units, check low fire, make adjustments, and recheck high fire before recording values.

⚠ IMPORTANT

Disconnect heating demand as soon as an accurate reading has been obtained.

5-High Altitude

See page 6 HIGH ALTITUDE DERATE.

6-Proper Gas Flow

Furnace should operate at least 5 minutes before checking gas flow. Determine time in seconds for two revolutions of gas through the meter. (Two revolutions assures a more accurate time.) Divide by two and compare to time in TABLE 18. Seconds in TABLE 18 are based on a 1 cu.ft. dial and gas value of 1000 btu's for natural and 2500 btu's for LP. Adjust manifold pressure on gas valve to match time needed.

NOTE - *To obtain accurate reading, shut off all other gas appliances connected to meter.*

TABLE 18

GAS METER CLOCKING CHART

Unit Input Rate	Seconds for Natural	Seconds for Propane
65,000	55	138
108,000	33	83
113,000	31	79
150,000	24	60

7-Heat Exchanger

To Access or Remove Heat Exchanger From Unit:

1 - Turn off gas and electric power.
2 - Remove access panel(s) and unit center mullion.
3 - Remove gas valve, manifold assembly and burners.
4 - Remove combustion air inducer and flue box cover. Pay careful attention to the order in which gaskets and orifice are removed.
5 - Support heat exchanger (to prevent it from falling when final screws are removed.)
6 - Remove screws supporting heat exchanger.
7 - To install heat exchanger, reverse procedure. Be sure to secure all wires and check plumbing and burner plate for airtight seal. Screws must be torqued to 35 in.-lbs. to ensure proper operation.

8-Flame Sensing

Flame current is an electrical current which passes from the ignition control through the sensor electrode during unit operation.

The current passes from the sensor through the flame to the ground electrode (located on the flame electrode) to complete a safety circuit. The electrodes should be located so the tips are at least 1/2" (12.7 mm) inside the flame envelope. Do not bend electrodes. To measure flame current, follow the procedure below:

NOTE-*Electrodes are not field adjustable. Any alterations to the electrode may create a hazardous condition that can cause property or personal injury.*

1 - Disconnect power to unit.
2 - Remove lead from sensing electrode and install a 0-50DC microamp meter in series between the sensing electrode and the sensing lead.
3 - Reconnect power and adjust thermostat for heating demand.
4 - When flame is established, microamp reading should be 0.5 to 1.0. Do not bend electrodes. Drop out signal is .09 or less.
5 - Disconnect power to unit before disconnecting meter. Make sure sensor wire is securely reconnected before reconnecting power to unit.

NOTE-*If the meter scale reads 0, the leads are reversed. Disconnect power and reconnect leads for proper polarity.*

B-COOLING SYSTEM SERVICE CHECKS

ZGD units are factory charged and require no further adjustment; however, charge should be checked periodically using the approach method. The approach method compares actual liquid temperature with the outdoor ambient temperature. See section IV- CHARGING.

NOTE-*When unit is properly charged discharge line pressures should approximate those in TABLE 14 - TABLE 17.*

VI-MAINTENANCE

The unit should be inspected once a year by a qualified service technician.

⚠ WARNING

Electric shock hazard. Can cause injury or death. Before attempting to perform any service or maintenance, turn the electrical power to unit OFF at disconnect switch(es). Unit may have multiple power supplies.

⚠ IMPORTANT

Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation. Verify proper operation after servicing.

⚠ WARNING

Any service personnel installing, decommissioning, or performing maintenance on the unit must be properly trained with A2L refrigerants

Prior to beginning work on systems containing refigerant to ensure the risk of ignition is minimized:

- All work shall be undertaken under a controlled procedure so as to minimize the risk of a flammable gas or vapor being present while the work is being performed.
- The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially toxic or flammable atmospheres. Ensure that the leak detection equipment being used is suitable for use with all applicable refrigerants, i. e. non-sparking, adequately sealed or intrinsically safe.
- If any hot work is to be conducted on the refrigerating equipment or any associated parts, the appropriate fire extinguishing equipment shall be available to hand. Have a dry powder or CO2 fire extinguisher adjacent to the charging area.
- No person carrying out work in relation to a refrigerating system which involves exposing any pipe work shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which refrigerant can possibly be released to the surrounding space. Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks. “No Smoking” signs shall be displayed.
- Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work.

A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

- Where electrical components are being changed, service technicians shall be fit for the purpose and to the correct specification. At all times the manufacturer’s maintenance and service guidelines shall be followed. If in doubt, consult the manufacturer’s technical department for assistance. The following checks shall be applied to installations using flameable refrigerants as applicable:

1 - The actual refrigerant charge is in accordance with the room size within which the refrigerant containing parts are installed.

2 - The ventilation machinery and outlets are operating adequately and are not obstructed.

3 - If an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant.

4 - Markings on the equipment should be visible and legible. Markings and signs that are illegible shall be corrected.

5 - Refrigerating pipes or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.For systems containing refigerant all repair and maintenance to electrical components shall include initial safety checks and component inspection procedures such as that capacitors are discharged in a safe manner to avoid possibility of sparking, that no live electrical components and wiring are exposed while charging, recovering, or purging the system, and that there is continuity of earth bonding. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used that is reported to the owner of the equipment, so all parties are advised.

NOTE - *Sealed electrical components shall be replaced, not repaired.*

NOTE - *Intrinsically safe components must be replaced, not repaired.*

- Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used. Electronic leak detectors may be used to detect

refrigerant leaks but, in the case of flammable refrigerants, the sensitivity may not be adequate, or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed, and the appropriate percentage of gas (25 % maximum) is confirmed. Leak detection fluids are also suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work. If a leak is suspected, all naked flames shall be removed/extinguished. If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak.

- When breaking into the refrigerant circuit to make repairs – or for any other purpose – conventional procedures shall be used. However, for flammable refrigerants it is important that best practice be followed, since flammability is a consideration. The following procedure shall be adhered to:

  a. Safely remove refrigerant following local and national regulations,

  b. Evacuate the circuit,

  c. Purge the circuit with inert gas,

  d. Evacuate,

  e. Purge with inert gas,

  f. Open the circuit.

- The refrigerant charge shall be recovered into the correct recovery cylinders if venting is not allowed by local and national codes. For appliances containing flammable refrigerants, the system shall be purged with oxygen-free nitrogen to render the appliance safe for flammable refrigerants. This process might need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems. Refrigerant purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum. This process shall be repeated until no refrigerant is within the system. When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to enable work to take place. Ensure that the outlet for the vacuum pump is not close to any potential ignition sources and that ventilation is available.

A-FILTERS

Units are equipped with temporary filters which must be replaced prior to building occupation. Refer to local codes or appropriate jurisdiction for approved filters. See TABLE 19 for filter sizes and quantities.

TABLE 19

Models	Filter (Qty.) Size
036-048	(4) 14 x 20 x 2
060-074	(2) 16 x 20 x 2
	(2) 20 x 20 x 2

To change filters, open filter access panel on back side of unit. See FIGURE 24. Lift filter stop to remove filters. See FIGURE 25.

⚠ WARNING

Units are shipped from the factory with temporary filters. Replace filters before building is occupied. Damage to unit could result if filters are not replaced with approved filters. Refer to appropriate codes.

Approved filters should be checked monthly and replaced when necessary. Take note of air flow direction marking on filter frame when reinstalling filters. See FIGURE 25.

NOTE-*Filters must be U.L.C. certified or equivalent for use in Canada.*

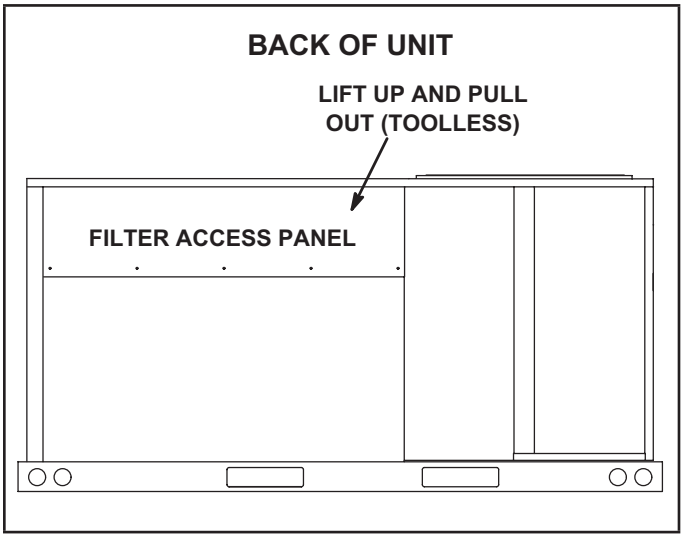


FIGURE 24

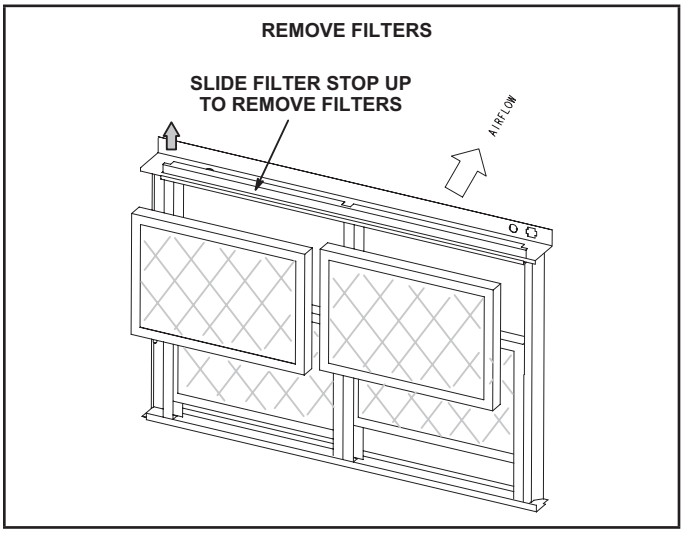


FIGURE 25

B-LUBRICATION

All motors are lubricated at the factory. No further lubrication is required.

C-EVAPORATOR COIL

Inspect and clean coil at beginning of each cooling season. Clean using mild detergent or commercial coil cleanser.

Flush coil and condensate drain with water taking care not to get insulation, filters and return air ducts wet.D-Burners

Periodically examine burner flames for proper appearance during the heating season. Before each heating season examine the burners for any deposits or blockage which may have occurred.

Clean burners as follows:

1 - Turn off both electrical power and gas supply to unit.

2 - Remove burner compartment access panel.

3 - Remove two screws securing burners to burner support and lift the burners from the orifices. See FIGURE 17. Clean as necessary.

Note - *Some units have inshot burners and can be removed individually. Some units have a one piece burner cluster and can removed as an assembly.*

4 - Locate the ignitor under the left burners. Check ignitor spark gap with appropriately sized twist drills or feeler gauges. See FIGURE 19.

5 - Replace burners and screws securing gas manifold.

⚠ WARNING

Danger of explosion. Can cause injury or death. Do not overtighten main burner mounting screws. Snug tighten only.

6 - Replace access panel.

7 - Restore electrical power and gas supply. Follow lighting instructions attached to unit and use inspection port in access panel to check flame.

D-COMBUSTION AIR INDUCER

A combustion air proving switch checks combustion air inducer operation before allowing heating sequence to continue. The sequence will not be allowed to continue if inducer is obstructed.

The combustion air inducer wheel should be checked and cleaned prior to the heating season. It should be examined periodically during the heating season to establish an ideal cleaning schedule. With power supply disconnected, the condition of the inducer wheel can be determined by removing the vent pipe and inspecting the wheel through the outlet opening.

Clean combustion air inducer as follows:

1 - Shut off power supply and gas to unit.

2 - Disconnect pressure switch air tubing from combustion air inducer port.

3 - Remove and retain screws securing combustion air inducer to flue box. Remove and retain two screws from bracket supporting vent connector. See FIGURE 16.

4 - Clean inducer wheel blades with a small brush and wipe off any dust from housing. Clean accumulated dust from front of flue box cover.

5 - Return combustion air inducer motor and vent connector to original location and secure with retained screws. It is recommended that the combustion air inducer gasket be replaced during reassembly.

6 - Clean combustion air inlet louvers on heat access panel using a small brush.

E-FLUE PASSAGEWAY AND FLUE BOX

1 - Remove combustion air inducer assembly as described in section D.

2 - Remove flue box cover. Clean with a wire brush as required.

3 - Clean tubes with a wire brush.

4 - Reassemble the unit. The flue box cover gasket and combustion air inducer gasket should also be replaced during reassembly.

F-CONDENSER COIL

Clean condenser coil annually with water and inspect monthly during the cooling season.

Note - Do not use commercial coil cleaner on the all aluminum coil. Using anything other than water could result in corrosion and/or leaks.

Clean the all-aluminum coil by spraying the coil steadily and uniformly from top to bottom. Do not exceed 900 psi or a 45 angle; nozzle must be at least 12 inches from the coil face. Take care not to fracture the braze between the fins and refrigerant tubes. Reduce pressure and work cautiously to prevent damage.

G-SUPPLY BLOWER WHEEL

Annually inspect supply air blower wheel for accumulated dirt or dust. Turn off power before attempting to remove access panel or to clean blower wheel.

VII-ACCESSORIES

The accessories section describes the application of most of the optional accessories which can be factory or field installed to the ZGD units. OPTIONAL ACCESSORIES section (see table of contents) show specific size per unit.

A-MOUNTING FRAMES

When installing units on a combustible surface for downflow discharge applications, the Z1CURB roof mounting frame is used. The roof mounting frames are recommended in all other applications but not required. If the ZGD units are not mounted on a flat (roof) surface, they MUST be supported under all edges and under the middle of the unit to prevent sagging. The units MUST be mounted level within 1/16” per linear foot or 5mm per meter in any direction.

The assembled Z1CURB mounting frame is shown in FIGURE 26. Refer to the roof mounting frame installation instructions for details of proper assembly and mounting. The roof mounting frame MUST be squared to the roof and level before mounting. Plenum system MUST be installed before the unit is set on the mounting frame. Typical roof curbing and flashing is shown in FIGURE 27. Refer to the roof mounting frame installation instructions for proper plenum construction and attachment.

B-TRANSITIONS

Transitions are field-provided.

C-SUPPLY AND RETURN DIFFUSERS

Optional flush mount diffuser/return FD11 and extended mount diffuser/return RTD11 are available for use with all ZGD units. Refer to manufacturer’s instructions included with transition for detailed installation procedures.

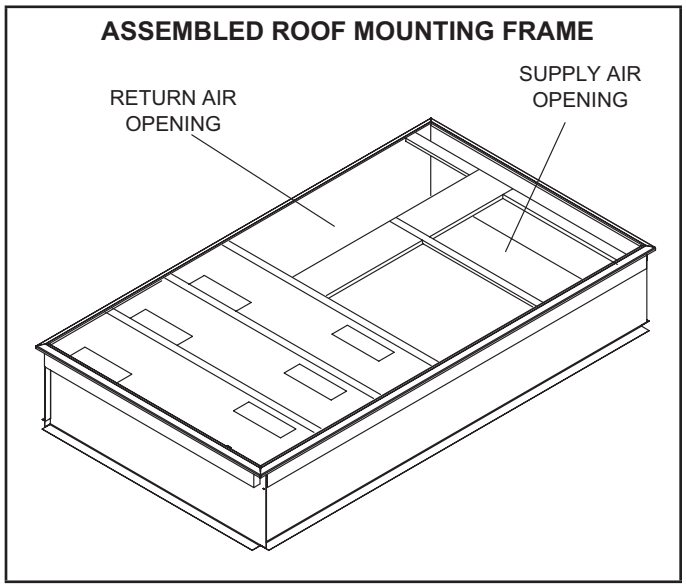


FIGURE 26

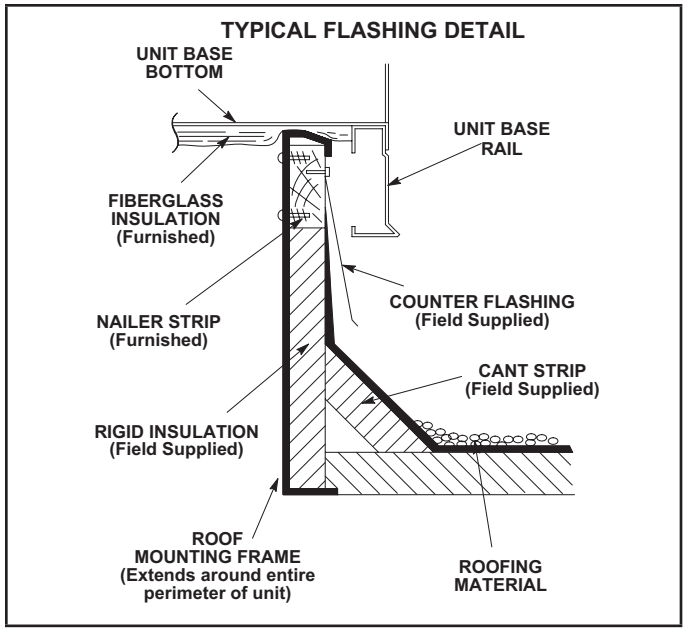


FIGURE 27

D-HORIZONTAL AIR DISCHARGE

Units are shipped ready for downflow air discharge. An additional kit is not required to change the unit to horizontal air discharge. Remove the horizontal duct covers and place over the downflow air openings. See FIGURE 28 and FIGURE 29.

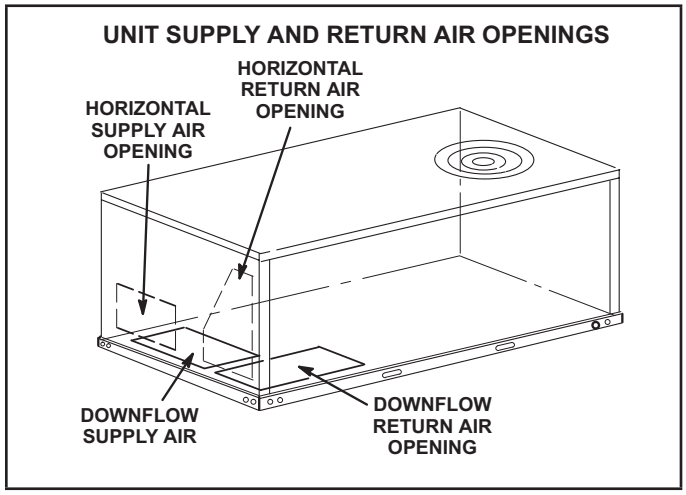


FIGURE 28

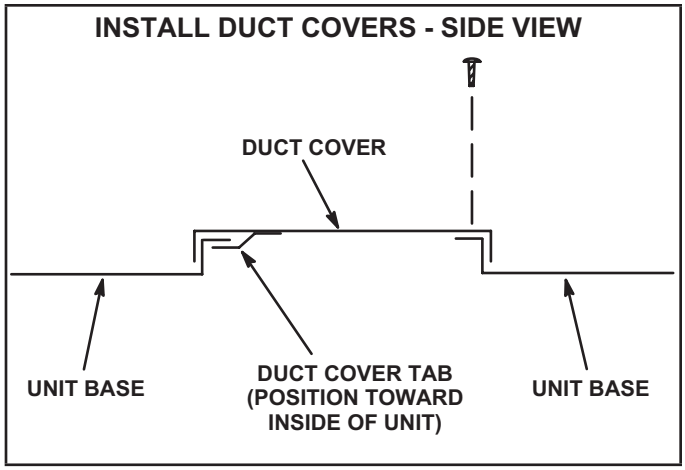


FIGURE 29

E- ECONOMIZER

(Factory Installed)

Downflow economizers are a factory-installed option. Downflow and horizontal air flow economizers are a factory- or field-installed option. Economizers are equipped with an A6 enthalpy control, an R1 mixed air sensor and an S175 outdoor sensible sensor. The modulating economizer opens fully to use outdoor air for free cooling when temperature is suitable and opens to minimum position during the occupied time period.

When A6 determines outdoor air is suitable (via input from S175 outdoor air sensor), dampers will modulate open (via B7 damper motor) to maintain 55°F (13°C) supply air (determined by input from R1 mixed/supply air sensor).

The A6 enthalpy control and B7 damper motor are shown in FIGURE 30 for downflow air discharge and FIGURE 31 for horizontal air discharge. The R1 mixed air sensor is shown in FIGURE 32. An A7 outdoor enthalpy sensor is optional and replaces the S175 sensible sensor. See FIGURE 33.

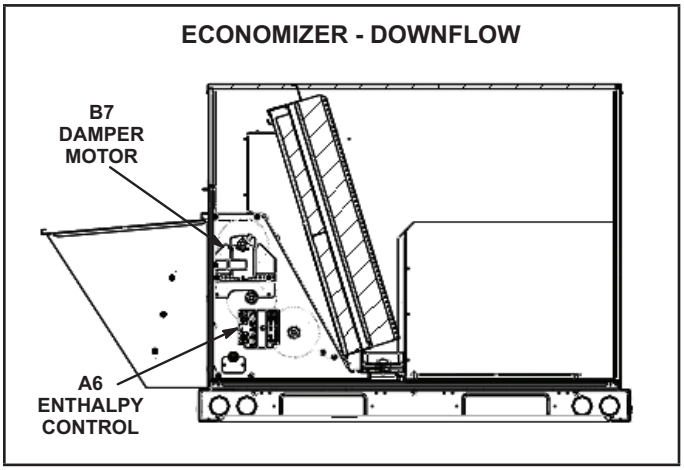


FIGURE 30

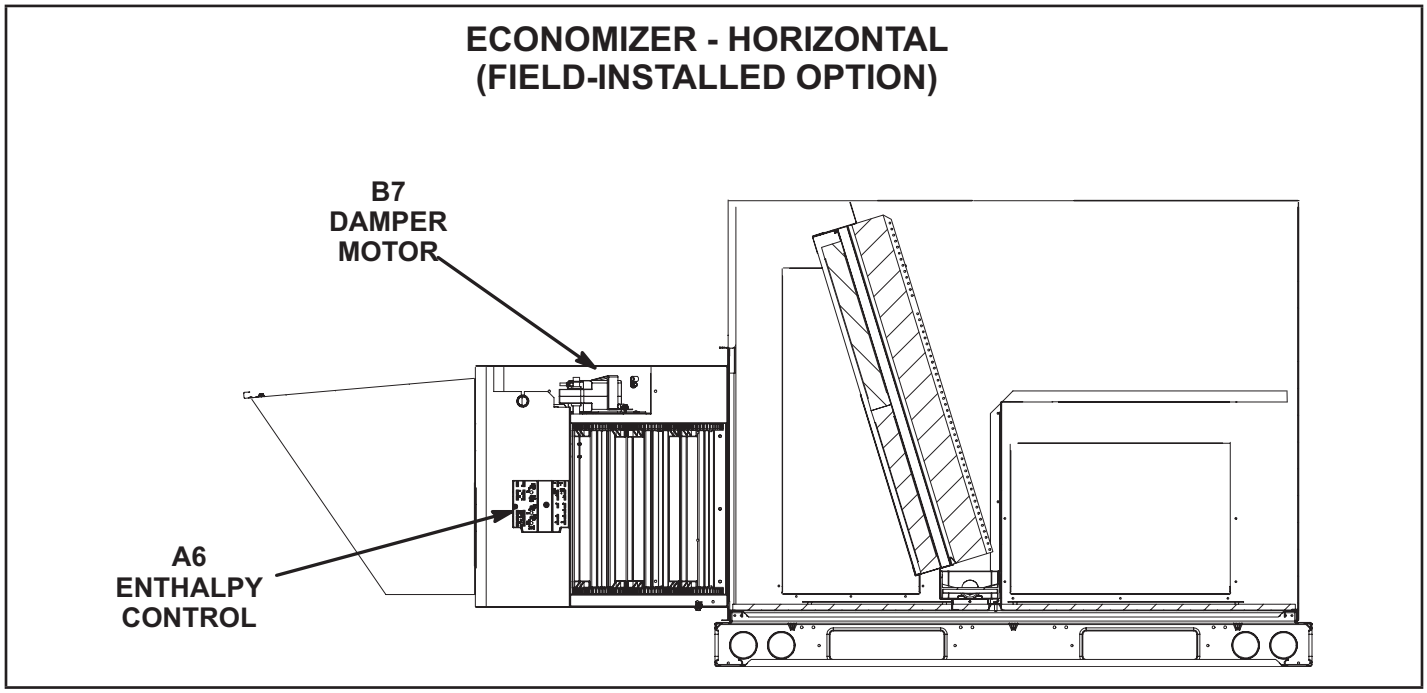


FIGURE 31

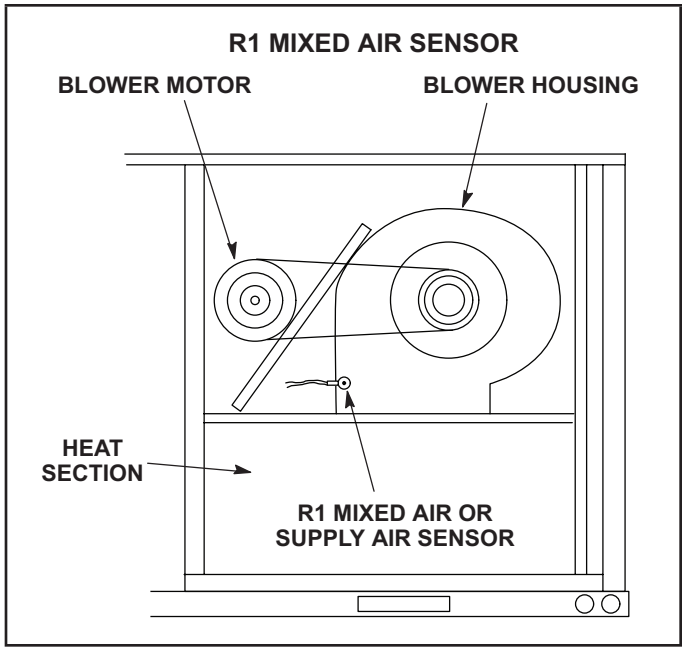


FIGURE 32

An optional IAQ sensor (A63) may be used to lower operating costs by controlling outdoor air based on CO2 level or room occupancy (also called demand control ventilation or DCV). Damper minimum position can be set lower than traditional minimum air requirements; dampers open to traditional ventilation requirements when CO2 level reaches DCV (IAQ) setpoint.

Refer to instructions provided with sensors for installation.

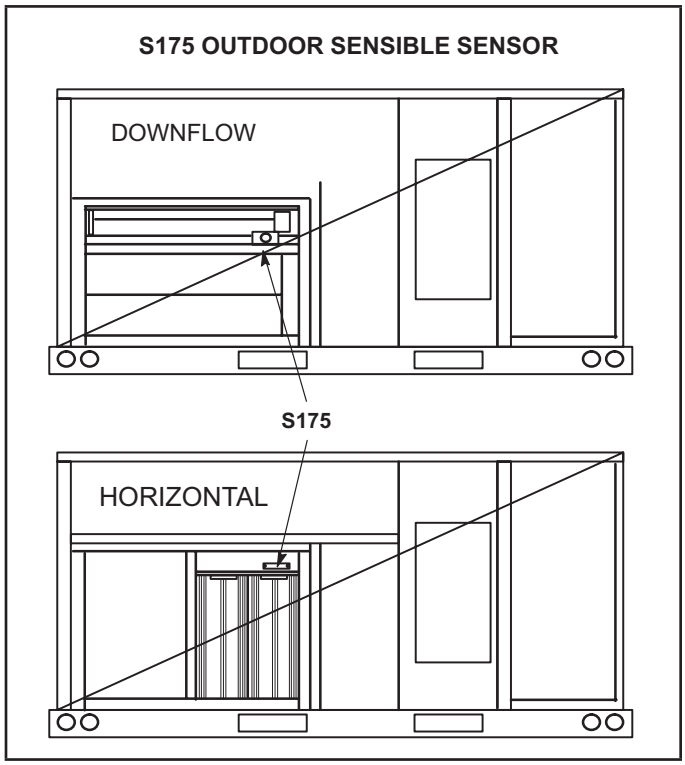


FIGURE 33

A6 Enthalpy Control LEDs

A steady green Free Cool LED indicates that outdoor air is suitable for free cooling.

When an optional IAQ sensor is installed, a steady green DCV LED indicates that the IAQ reading is higher than setpoint requiring more fresh air. See FIGURE 34.

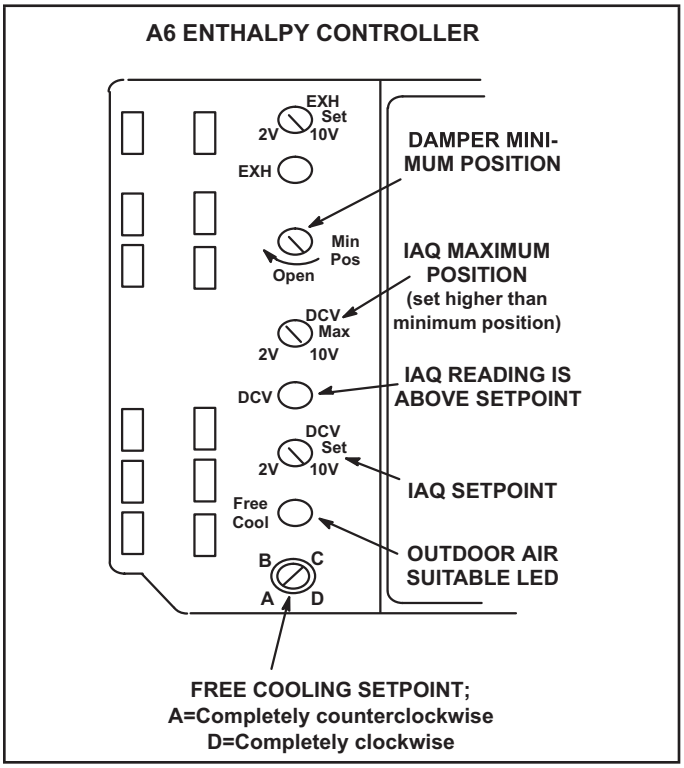


FIGURE 34

Free Cooling Setpoint

Outdoor air is considered suitable when temperature and humidity are less than the free cooling setpoints shown in TABLE 20. Setting A is recommended. See FIGURE 34. At setting A, free cooling will be energized when outdoor air is approximately 73°F (23°C) and 50% relative humidity. If indoor air is too warm or humid, lower the setpoint to B. At setting B, free cooling will be energized at 70°F (21°C) and 50% relative humidity.

When an optional A62 differential sensor is installed, turn A6 enthalpy control free cooling setpoint potentiometer completely clockwise to position “D”.

TABLE 20

ENTHALPY CONTROL SETPOINTS

Control Setting	Free Cooling Setpoint At 50% RH
A	73° F (23°C)
B	70° F (21°C)
C	67° F (19°C)
D	63° F (17°C)

Damper Minimum Position

1 - Set thermostat to occupied mode if the feature is available. Make sure unit 24V control leads R and OC are connected if using a thermostat which does not have the feature.

2 - Rotate MIN POS SET potentiometer to approximate desired fresh air percentage.

NOTE - *Damper minimum position can be set lower than traditional minimum air requirements when an IAQ sensor is specified. Dampers will open to DCV MAX setting (if CO2 is above setpoint) to meet traditional ventilation requirements.*

3 - Measure outdoor air temperature. Mark the point on the bottom line of Chart 1 and label the point “A” (40°F, 4°C shown).

4 - Measure return air temperature. Mark that point on the top line of Chart 1 and label the point “B” (74°F, 23°C shown).

5 - Measure mixed air (outdoor and return air) temperature. Mark that point on the top line of Chart 1 and label point “C” (70°F, 21°C shown).

6 - Draw a straight line between points A and B.

7 - Draw a vertical line through point C.

8 - Draw a horizontal line where the two lines meet. Read the percent of fresh air intake on the side.

9 - If fresh air percentage is less than desired, adjust MIN POS SET potentiometer higher. If fresh air percentage is more than desired, adjust MIN POS SET potentiometer lower. Repeat steps 3 through 8 until calculation reads desired fresh air percentage.

DCV Set and Max Settings

Adjust settings when an optional IAQ sensor is installed. The DCV SET potentiometer is factory-set at approximately 50% of the potentiometer range. Using a standard 1-2000ppm CO2 sensor, dampers will start to open when the IAQ sensor reads approximately 1000ppm. Adjust the DCV SET potentiometer to the approximate setting specified by the controls contractor. Refer to FIGURE 34.

The DCV MAX potentiometer is factory-set at approximately 50% of the potentiometer range or 6VDC. Dampers will open approximately half way when CO2 rises above setpoint. Adjust the DCV MAX potentiometer to the approximate setting specified by the controls contractor. Refer to FIGURE 34.

NOTE - *DCV Max must be set higher than economizer minimum position setting for proper demand control ventilation.*

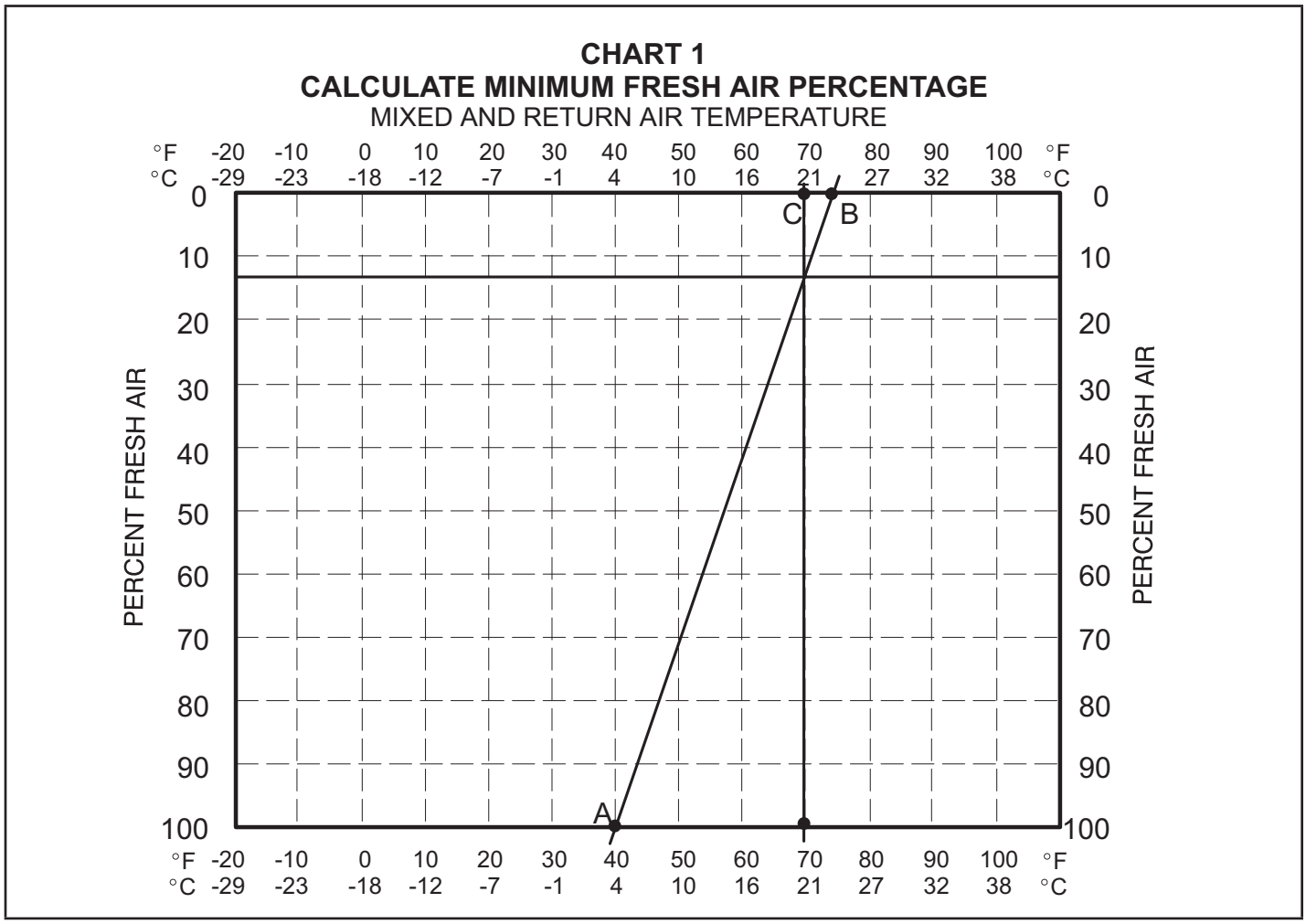


FIGURE 35

TABLE 21

ECONOMIZER OPERATION

OUTDOOR AIR IS SUITABLE FOR FREE COOLING -- FREE COOL LED "ON"

THERMOSTAT DEMAND	DAMPER POSITION		MECHANICAL COOLING
	UNOCCUPIED	OCCUPIED	
OFF	CLOSED	CLOSED	NO
G	CLOSED	MINIMUM	NO
Y1	OPEN*	OPEN*	NO
Y2	OPEN*	OPEN*	STAGE 1
*Dampers will modulate to maintain 55°F (13°C) supply air when an R1 mixed air sensor is installed			

Economizer Operation

The occupied time period is determined by the thermostat or energy management system.

Outdoor Air Not Suitable:

During the unoccupied time period dampers are closed.

During the occupied time period a cooling demand will open dampers to minimum position and mechanical cooling functions normally.

During the occupied time period dampers will open to DCV MAX when IAQ reading is above setpoint (regardless of thermostat demand or outdoor air suitability)

Outdoor Air Suitable:

See TABLE 21 for economizer operation with a standard twostage thermostat.

During the occupied period, dampers will open to DCV MAX when IAQ reading is above setpoint (regardless of thermostat demand or outdoor air suitability). DCV MAX will NOT override damper full-open position. When an R1 mixed air sensor for modulating dampers is installed, DCV MAX may override damper free cooling position when occupancy is high and outdoor air temperatures are low. If R1 senses discharge air temperature below 45°F (7°C), dampers will move to minimum position until discharge air temperature rises to 48°F (9°C).

High Performance Economizer

USER INTERFACE

See FIGURE 36.

1 - One-line LCD. After a period of inactivity, the controller displays the default HMI screen (free cooling status: "1FREECOOL YES" or "1FREECOOL NO").

2 - Operation button (Up button) - Move to the previous value, step or category.

3 - Operation button (Down button)- Move to the next value, step or category.

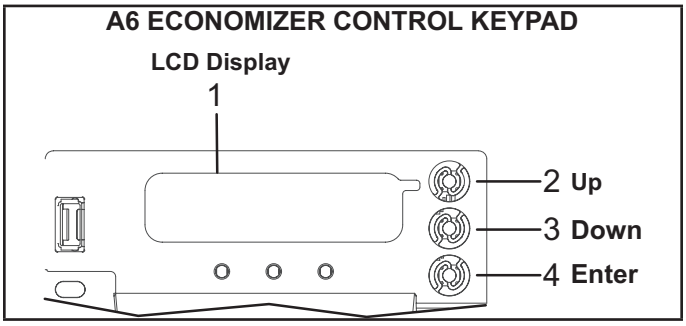


FIGURE 36

4 - Operation button (Enter button):

- Press to edit the current value or option.
- Press to confirm a newly selected value or option.
- Press Enter + Up to jump up one entire category.
- Press Enter + Down to jump down one entire category.

MENU STRUCTURE

See FIGURE 37.

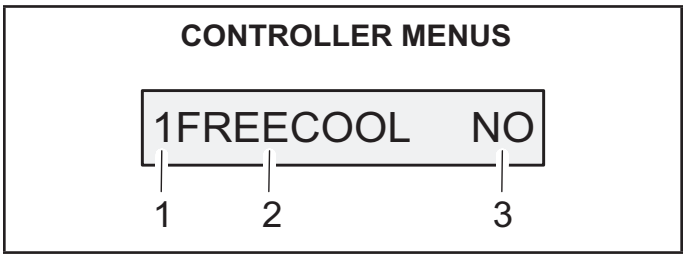


FIGURE 37

1 - Menus are displayed in the Economizer Controller as per categories. There are eight first-level menus. Each menu is represented by a number at the beginning of the line on the LCD. Press Enter + Up or Down to toggle between different first-level menus.

- 1: Status Display
- 2: Basic Settings
- 3: Advanced Settings
- 4: Alarms
- 5: Enter Configuration State and Reset
- 6: I/O Config.
- 7: Testing
- 8: Enter Running State

2 - Sub-menus follow the numbered first-level menus closely. Pressing Up or Down can toggle between different sub-menus.

3 - At the end of the line, the LCD displays the value of the current sub-menu (if any). Enter the Edit mode by pressing Enter (if the value is editable). Press Up or Down to change the highlighted value. Press Enter to confirm the change and exit the Edit mode.

For a complete list of parameters refer to the Siemens installation manual provided in this kit.

FREE COOLING SETPOINT

Single OA Sensible Sensing (Default)

The default free cooling setpoint or high limit setpoint is 63°F. This means that the outdoor air is suitable for free cooling at 62°F and below and not suitable at 64°F and above. This setpoint is adjustable.

For California Title 24 compliance, adjust the free cooling setpoint based on:

- The climate zone where the unit is installed. See TABLE 22.
- The setpoint requirement published by the California Energy Commission. See Section 140.4 - Prescriptive Requirements for Space Conditioning Systems of the 2013 Building Energy Efficiency Standards.

NOTE - *Values in the referenced standard will supersede values listed in* TABLE 22*.*

TABLE 22

FREE COOLING SETPOINT - SINGLE SENSIBLE

Climate Zone	Setpoint
1, 3, 5, 11-16	75°F
2, 4, 10	73°F
6, 8, 9	71°F
7	69°F

To adjust the setpoint, navigate to the “BASIC SETTINGS” menu and change the “2TEMP OFF” parameter accordingly.

Single OA Enthalpy Sensing (Optional)

To adjust the enthalpy setpoint, navigate to the “*BASIC SETTINGS*” menu and change the “*2ENTH OFF*” parameter accordingly.

Differential Sensing (Optional)

Two sensors can be used to compare outdoor air to return air. When outdoor air is cooler than return air, outdoor air is suitable for free cooling. When return air is cooler than outdoor air, the damper will modulate to the minimum position.

SETUP AND CONFIGURATION - FACTORY-INSTALLED ECONOMIZER

Program the following parameters into the controller. Navigate to the specific menus to make the changes required.

1INS	(MM/DD/YY) enter installation date
2FAN L ACT*	( ) adjust VDC value until desired fresh air setpoint is reached when fan runs at low speed. **Appears only if unit is configured as 2SPEED*.
2FAN H ACT	( ) adjust VDC value until desired fresh air setpoint is reached

SETUP AND CONFIGURATION - FIELD-INSTALLED ECONOMIZER

Program the following parameters into the controller. Navigate to the specific menus to make the changes required.

IMPORTANT - Before setup and configuration, it is recommended to obtain some location-based values such as shutoff points or utilize the location services in the Climatix mobile application.

Menus are displayed in the Economizer Controller as per categories. There are eight first-level menus. Each of them is represented by a number at the beginning of the line on the LCD. Press Enter + Up or Down to toggle between different first-level menus.

Navigate to the applicable menus and set the following parameters based on the unit configuration:

1INS	(MM/DD/YY) enter installation date
2FAN L ACT	( ) adjust VDC value until desired fresh air set point is reached when fan runs at low speed (**Appears only if unit is configured as 2SPEED*)
2FAN H ACT	( ) adjust VCD value until desired fresh air set point is reached
3STG3 DLY	(120)
6Y2O	(NONE) For single-stage units (COOL 2) For 2-stage units
6FAN	(1 SPEED) For CAV units (2 SPEED) For MSAV units

F-POWER EXHAUST FAN

The power exhaust fan (PEF) requires an optional gravity exhaust damper and economizer and is used in downflow applications only. The PEF provides exhaust air pressure relief and also runs when return air dampers are closed and the supply air blower is operating. See installation instructions for more detail.

Power Exhaust Setpoint Adjustment

Locate the A6 enthalpy control in the control area. The EXH SET potentiometer is factory-set at approximately 50% of the dial range. See FIGURE 38. Power exhaust fans will be energized 30 seconds after dampers are 50% open. Adjust the EXH SET potentiometer higher (clockwise toward 10V) to energize fans when dampers are further open. Adjust the EXH SET potentiometer lower (counterclockwise toward 2V) to energize fans when dampers are further closed. (Thirty-second delay allows dampers to partially open before exhaust fan starts.)

G-LP / PROPANE KIT

ZGD092/150 units require a natural to LP /propane kit. The kit includes one LP spring conversion kit, up to eleven burner orifices and three stickers. For more detail refer to the natural to LP gas changeover kit installation instructions.

H-DRAIN PAN OVERFLOW SWITCH S149 (OPTION)

The overflow switch is used to interrupt cooling operation when excessive condensate collects in the drain pan. The N.O. overflow switch is controlled by K220 and DL46 relays, located in the unit control panel.

When the overflow switch closes, 24VAC power is interrupted and after a five second delay unit compressors are de-energized. Once the condensate level drops below the set level, the switch will open. After a five-minute delay the compressor will be energized.

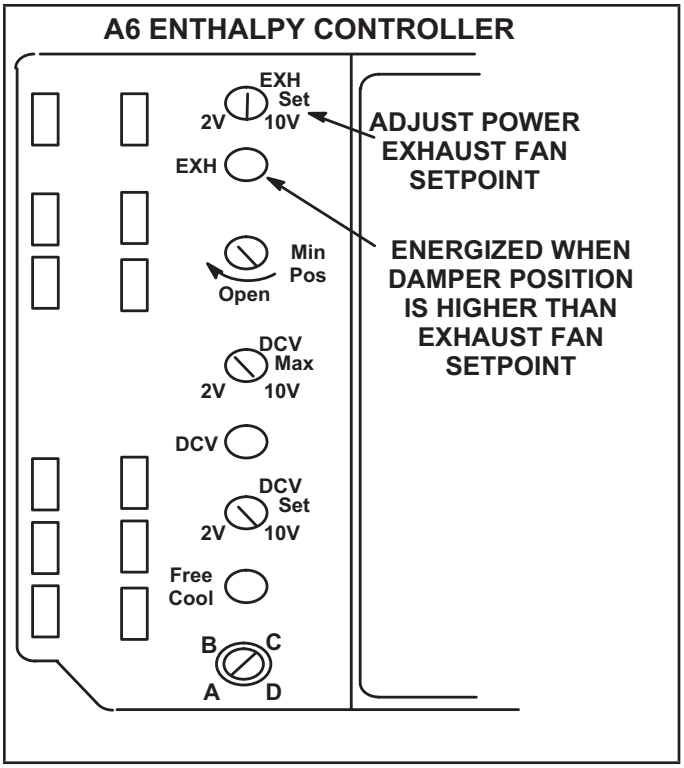
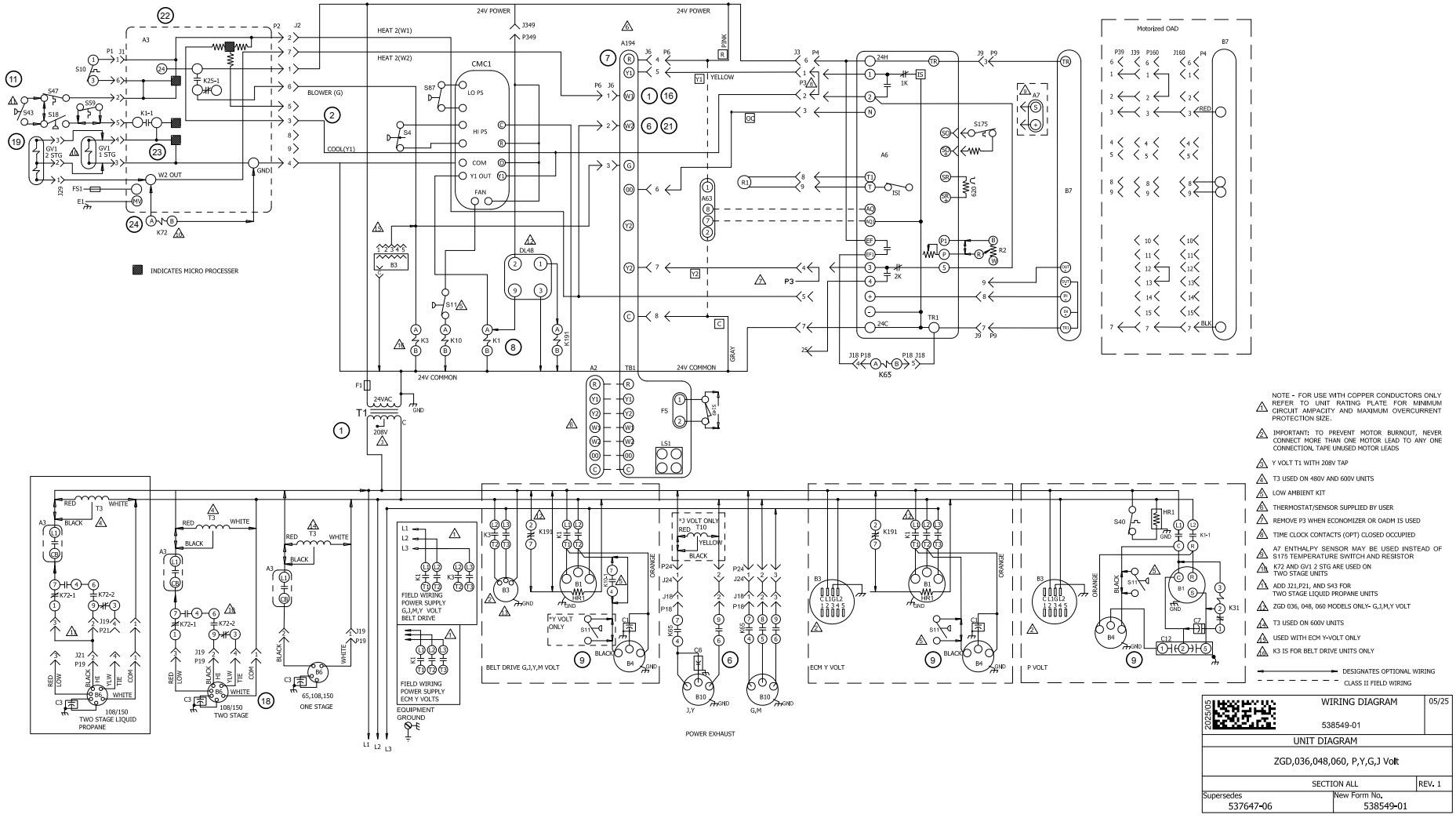


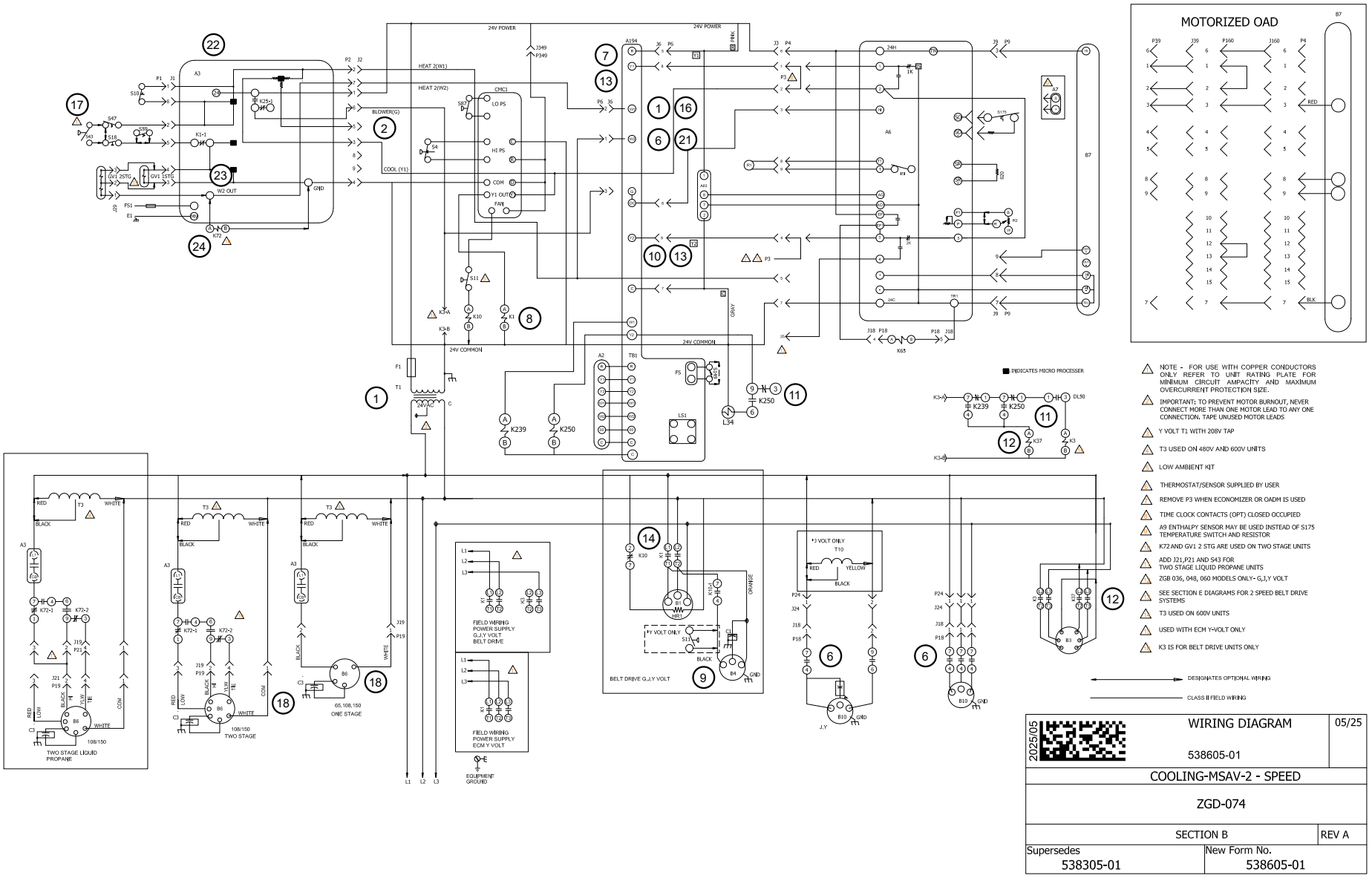
FIGURE 38

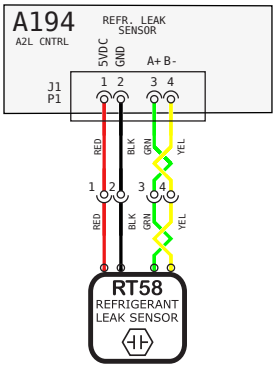
VIII-WIRING DIAGRAMS AND SEQUENCE OF OPERATION

ZGD 036-060 UNIT DIAGRAM



ZGD 074 UNIT DIAGRAM





KEY LIST	
COMPONENT	**DESCRIPTION**
A194	CONTROL, REFR. LEAK DETECTION
RT58	SENSOR, REFR. LEAK DETECTION

WARNING

DISCONNECT ALL POWER BEFORE SERVICING.

ELECTRIC SHOCK HAZARD, CAN CAUSE INJURY OR DEATH. UNIT MUST BE GROUNDED IN ACCORDANCE WITH NATIONAL AND LOCAL CODES.

FOR USE WITH COPPER CONDUCTORS ONLY. REFER TO UNIT RATING PLATE FOR MINIMUM CIRCUIT AMPACITY AND MAXIMUM OVERCURRENT PROTECTION SIZE.

IF ANY WIRE IN THIS APPLIANCE IS REPLACED, IT MUST BE REPLACED WITH WIRE OF LIKE SIZE, RATING AND INSULATION THICKNESS.

MODEL: ZC/ZG/ZH
A2L SENSOR DIAGRAM
VOLT: All
SUPSDS: N/A NO: 538618-01

Rev 0

3 x 7
CUT SIZE

REV	EC NO.	DATE	BY	APVD	REVISION NOTE
---	CN-012849P	04-23-2025	ZN	STT	ORIGINATED AT PD&R CARROLLTON, TX

ZGD036, 048, 060, 074 P, Y, G, & J Voltage Sequence of Operation

Power:

1 - Line voltage from unit disconnect energizes transformer T1. T1 provides 24VAC power to theunit cooling, heating and blower controls.

Blower Operation:

2 - Indoor thermostat terminal G, via A3 ignition control, energizes blower contactor K3 with 24VAC.

3 - N.O. K3 closes, energizing blower B3.

Economizer Operation:

4 - Economizer modulates open (see TABLE 21 in VII-ACCESSORIES section).

Power Exhaust Fan Operation:

5 - The A6 economizer control module receives a Y1 thermostat demand and energizes exhaust fanrelay K65 with 24VAC at 50% outside air damper open (adjustable).

6 - N.O. K65-1 closes, energizing exhaust fan motor B10.

Cooling Demand.

First Stage

7 - First stage cooling demand Y1 and G is energized by the thermostat. G energizes blower.

8 - 24VAC is routed through low voltage Y1 lead to optional N.C. compressor low discharge temperaturelimit S3, N.C. high pressure switch S4 and N.C. compressor high temperature limit S5. Compressorcontactor K1 is energized.

9 - N.O. K1-1 close energizing compressor B1 and outdoor fan B4.

Second Stage:

10 - Second stage cooling demand Y2 and G is energized by indoor thermostat.

11 - 24VAC is routed through low voltage Y2 lead to K250 energizing high speed blower contactor K37.

12 - K37 closes energizing blower B3 on high speed.

End of Cooling Demand

13 - Cooling demand is satisfied. Thermostat terminals Y1 and Y2 de-energize.

14 - Compressor K1 is de-energized. N.O. K1 contactor opens de-energizing compressor B1 and outdoor fan B4.

15 - De-energizing compressor contactor K1 energizes K191. K191 energizes the crankcase heater

First Stage Heat:

16 - The thermostat initiates W1 heating demand.

17 - 24VAC is routed to ignition control A3. A3 proves N.C. primary limit S10 and N.C. roll-out switch S47.

18 - Combustion air inducer blower B6 is energized.

19 - After the combustion air inducer B6 has reached full speed, the combustion air proving switch S18 contacts close.

20 - After a 30 second delay A3 energizes the ignitor and gas valve GV1 on first stage.

Second Stage Heat:

21 - Additional heating demand from the thermostat initiates W2.

22 - A second stage heating demand is received by ignition control A3.

23 - A3 energizes gas valve GV1 on second stage.

24 - Relay K72-1 terminals 1 and 7 open, 7 and 4 close. K72-2 terminals 6 and 9 close and 9 and 3 open, energizing combustion air inducer B6 on high speed.

End of Second Stage Heat:

25 - Heating demand is satisfied. W2 (second stage) is de-energized.

26 - Second stage heat is de-energized on GV1 by ignition control A3.

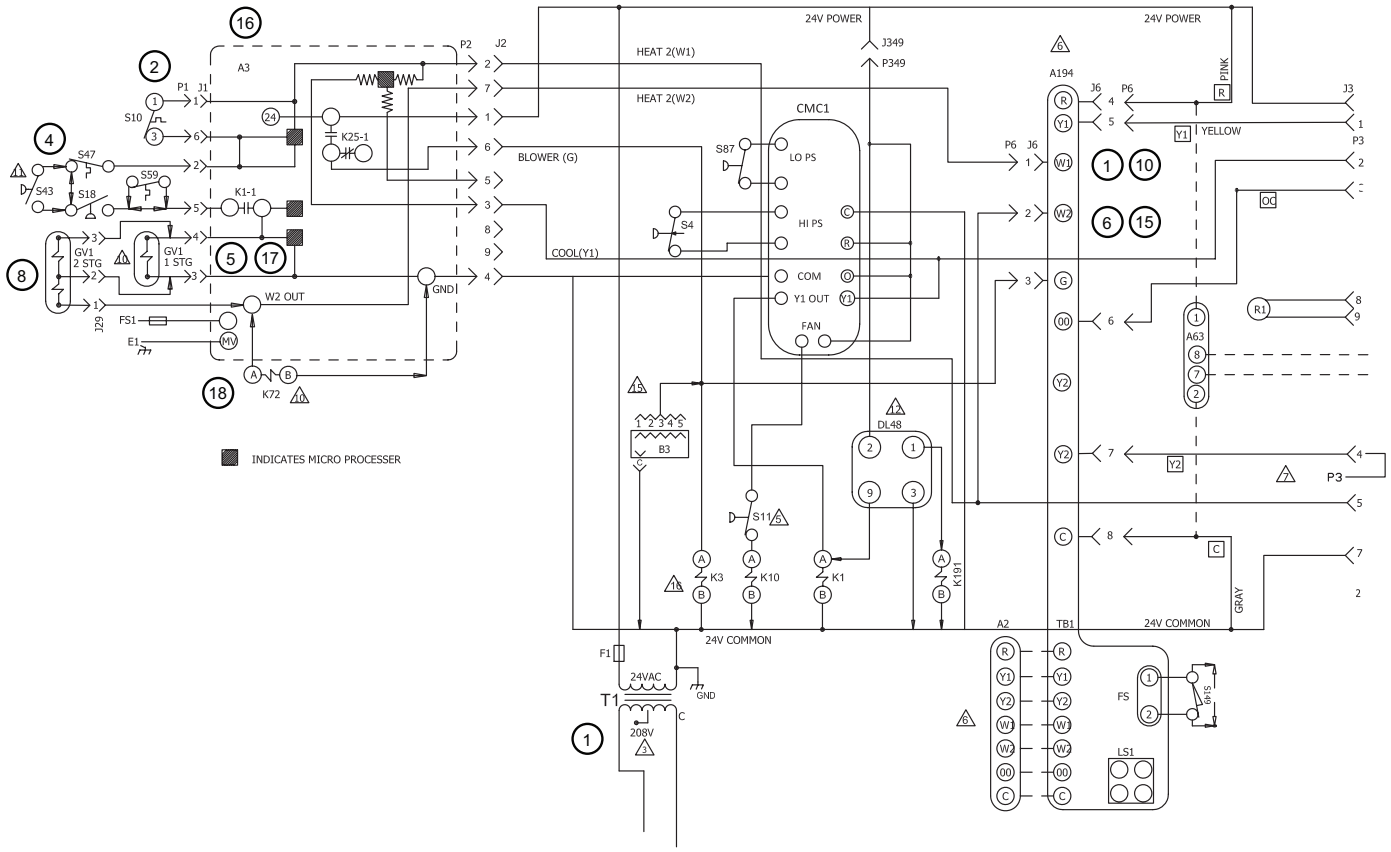
27 - Combustion air inducer B6 is now on low speed.

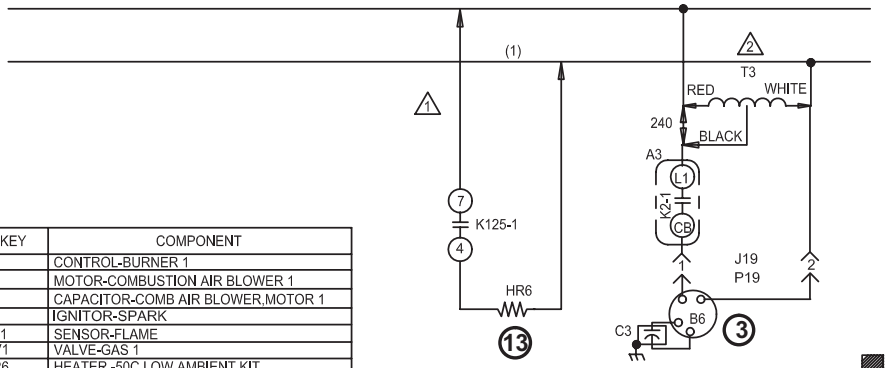
End of First Stage Heat:

28 - Heating demand is satisfied. W1 (first stage) is de-energized.

29 - Ignition A3 is de-energized in turn de-energizing gas valve GV1 and combustion air inducer B6.

GAS HEAT FOR ZGD036-074 UNITS





1 CSA(-50C)LOW AMBIENT KIT (OPTIONAL)

2 T3 USED ON 480V AND 600V UNITS

KEY	COMPONENT
A3	CONTROL-BURNER 1
B6	MOTOR-COMBUSTION AIR BLOWER 1
C3	CAPACITOR-COMB AIR BLOWER,MOTOR 1
E1	IGNITOR-SPARK
FS1	SENSOR-FLAME
GV1	VALVE-GAS 1
HR6	HEATER,-50C LOW AMBIENT KIT
J29	JACK-GAS 1
K125,-1	RELAY-HEAT SHUTOFF
P2	PLUG-HEAT
S10	SWITCH-LIMIT, PRIMARY GAS
S18	SWITCH-COMB AIR BLOWER, PROVE
S47	SWITCH-FLAME ROLLOUT, BURNER 1
S59	THERMOSTAT-OPEN -20F, CLOSE 10F
S60	THERMOSTAT-OPEN 20F, CLOSE -10F
S61	THERMOSTAT-OPEN 50F, CLOSE 20F
T3	TRANSFORMER-COMB AIR BLOWER 1

J/P	JACK/PLUG DESCRIPTION
1	GAS LIMIT
19	COMBUSTION AIR BLOWER
229	VESTIBULE HEATER,CONTROL 1

0625	WIRING DIAGRAM 538549-01	04-14
HEATING - GAS		
ZGD UNITS - 65K THRU 150		
SECTION A		REV 1
	New Form No. 538549-01	

GAS HEAT SEQUENCE OF OPERATION

First Stage Heat:

1 - The thermostat initiates W1 heating demand.

2 - 24VAC is routed from A194 to ignition control A3 through P2. A3 proves N.C. primary limit S10 and N.C. rollout switch S47.

3 - Combustion air inducer blower B6 is energized.

4 - After the combustion air inducer B6 has reached full speed, the combustion air proving switch S18 contacts close.

5 - After a 30 second delay, A3 energizes the ignitor and LO terminal (low fire) of gas valve GV1.

Second Stage Heat:

6 - With first stage heat operating, an additional heating demand from the thermostat initiates W2.

7 - A second stage heating demand is received by A194. The second stage heat signal passes from A194 to A3.

8 - A3 energizes HI terminal (high fire) of gas valve GV1.

End of Second Stage Heat:

9 - Heating demand is satisfied. Terminal W2 (high fire) is de-energized.

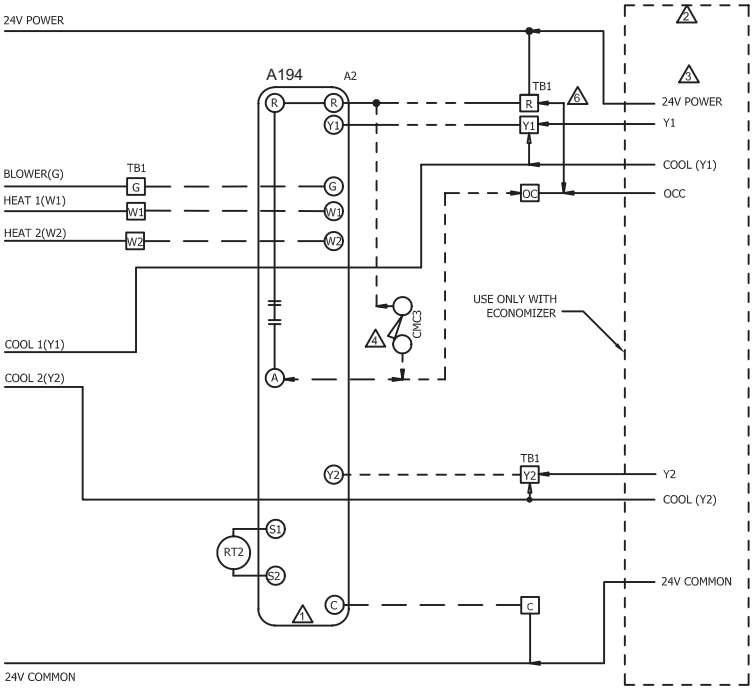
10 - Terminal HI of GV1 is de-energized by A3 control module.

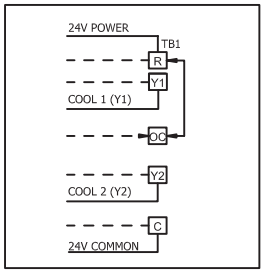
End of First Stage Heat:

11 - Heating demand is satisfied. Terminal W1 (low fire) is de-energized.

12 - Ignition A3 is de-energized in turn de-energizing terminal LO of GV1.

ELECTRONIC OR ELECTROMECHANICAL THERMOSTAT





CONNECTION SCHEME FOR ZCD, ZGD AND ZHD 092 THROUGH 150 UNITS WITHOUT ECONOMIZER ONLY

KEY	COMPONENT
A2	SENSOR, ELECTRONIC THERMOSTAT
A63	SENSOR, CO2
CMC3	CLOCK, TIME
K65	RELAY, EXHAUST FAN
R1	SENSOR, MIXED AIR OR SUPPLY AIR
RT2	SENSOR, REMOTE THERMOSTAT
A194	REFRIGERANT DETECTION BOARD

1. THERMOSTAT SUPPLIED BY USER
2. OPTIONAL WIRING FOR UNITS WITH ECONOMIZER
3. J3 MAXIMUM LOAD 20VA 24VAC CLASS II
4. TIME CLOCK CONTACTS (OPT) CLOSED OCCUPIED
5. TOUCHSCREEN THERMOSTAT
6. REMOVE JUMPER BETWEEN TB1-R AND TB1-OCP WHEN USING A NITE SETBACK THERMOSTAT

DENOTES OPTIONAL COMPONENTS
CLASS II FIELD WIRING

2022/09	WIRING DIAGRAM 538308-01	09/22
CONTROL		
ELECTRONIC/ELECTROMECHANICAL THERMOSTAT		
SECTION C		REV 0
Supersedes 537673-01	New Form No. 538308-01	

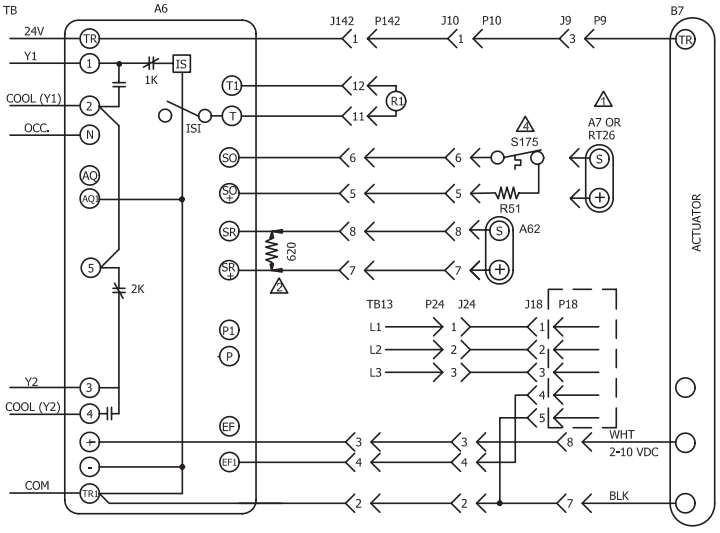
POWER:

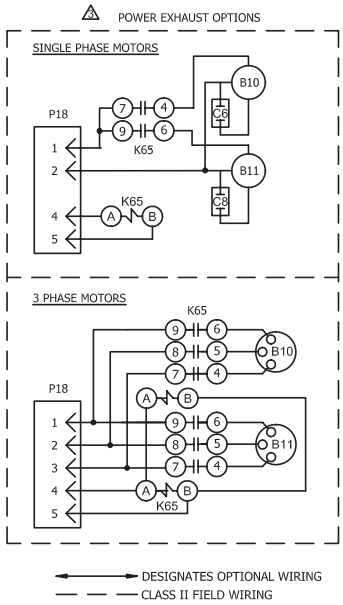
1- The A194 board energizes thermostat components with 24VAC.

OPERATION:

2- A194 receives data from the electronic thermostat A2 (Y1, Y2, W1, W2, G, OCP). The 24VAC signal from A194 energizes the appropriate components for heat or cool demand.

ECONOMIZER STANDARD EFFICIENCY





DESIGNATES OPTIONAL WIRING
CLASS II FIELD WIRING

KEY	COMPONENT
A6	CONTROL-SOLID STATE ENTHALPY
A7	SENSOR-SOLID STATE ENTHALPY
A62	SENSOR-ENTHALPY, INDOOR
B7	MOTOR-DAMPER, ECONOMIZER
B10	POWER EXHAUST FAN 1
B11	POWER EXHAUST FAN 2
B43	MOTOR-EXHAUST DAMPER
C6	CAPACITOR, EXHAUST FAN 1
C8	CAPACITOR, EXHAUST FAN 2
K65	RELAY, EXHAUST FAN
R1	MIXED AIR SENSOR
R51	RESISTOR-SENSIBLE 820 OHM
RT26	SENSOR-OUTDOOR AIR TEMP
S175	THERMOSTAT-SENSIBLE TEMP 55-70F
TB13	TERMINAL STRIP, POWER DISTRIBUTION

J/P	DESCRIPTION
9	ECONOMIZER, MOTOR
10	ECONOMIZER
18	EXHAUST FAN COMPT.
24	EXHAUST FAN
142	ECONOMIZER HARNESS

1 RT26 OR A7 CAN BE USED IN PLACE OF S175 SENSOR. REMOVE R51 RESISTOR IF REPLACING S175 WITH RT26 OR A7

2 IF USING A DIFFERENTIAL ENTHALPY SENSOR, REMOVE 620 OHM RESISTOR

3 OPTION: POWER EXHAUST

4 REPLACE S175 WITH A7 OR RT26 AS OPTIONAL.

04/14	WIRING DIAGRAM 537674-01	04/14
ACCESSORIES		
ECONOMIZER		
SECTION D		REV. 0
Supersedes	New Form No. 537674-01	

SEQUENCE OF OPERATION

POWER:

1- A194 board energizes the economizer components with 24VAC.

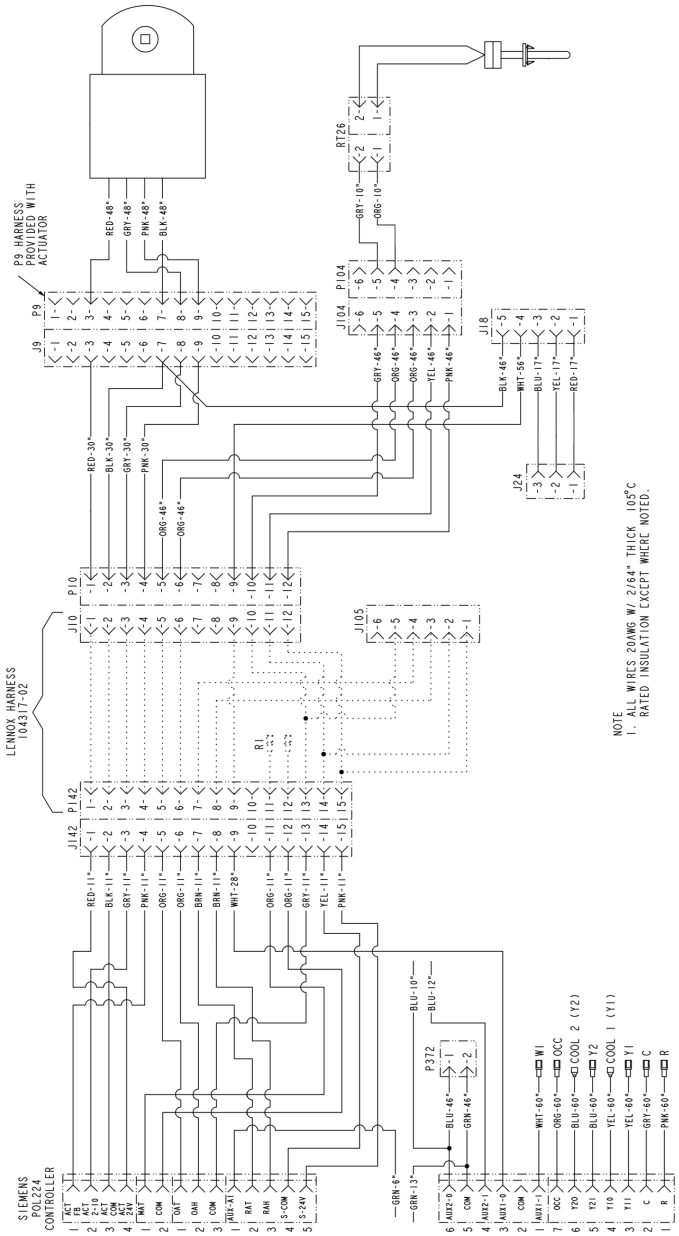
OPERATION:

2- Enthalpy sensor A7 and A62 (if differential enthalpy is used) communicates to the economizer control module A6 when to power the damper motor B7.

3- Economizer control module A6 supplies B7 with 0 - 10 VDC to control the positioning of economizer.

4- The damper actuator provides 2 to 10 VDC position feedback.

ECONOMIZER HIGH PERFORMANCE / LOW LEAK



SEQUENCE OF OPERATION

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3- Economizer control module A6 supplies B7 with 0 - 10 VDC to control the positioning of economizer.

4- The damper actuator provides 2 to 10 VDC position feedback.

IX-DECOMMISSIONING

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is recommended good practice that all refrigerants are recovered safely.

Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to re-use of recovered refrigerant. It is essential that electrical power is available before starting decommissioning.

a) Become familiar with the equipment and its operation.

b) Isolate system electrically.

c) Before attempting the procedure, ensure that:

- mechanical handling equipment is available, if required, for handling refrigerant cylinders;
- all personal protective equipment is available and being used correctly;
- the recovery process is supervised at all times by a competent person;
- recovery equipment and cylinders conform to the appropriate standards.

d) Pump down refrigerant system, if possible.

e) If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.

f) Make sure that cylinder is situated on the scales before recovery takes place.

g) Start the recovery machine and operate in accordance with instructions.

h) Do not overfill cylinders (no more than 80% volume liquid charge).

i) Do not exceed the maximum working pressure of the cylinder, even temporarily.

j) When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.

k) Recovered refrigerant shall not be charged into another REFRIGERATING SYSTEM unless it has been cleaned and checked.

⚠ IMPORTANT

Equipment shall be labelled stating that it has been decommissioned and emptied of refrigerant. The label shall be signed and dated. Ensure that there are labels on the equipment that state the flammability of the refrigerant used.