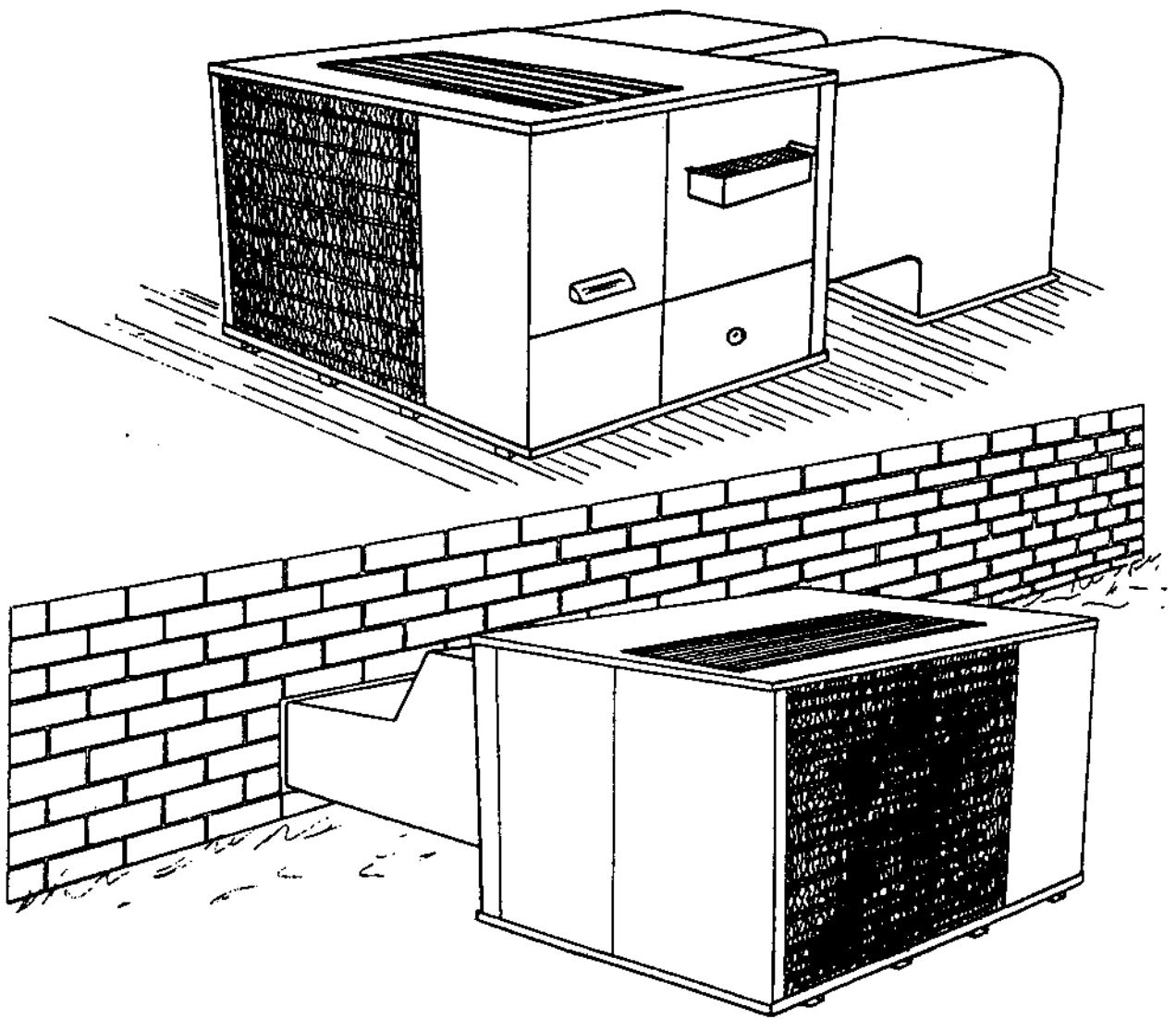


COMBINATION GAS/ELECTRIC SERVICE MANUAL



PGA SERIES

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WARNING

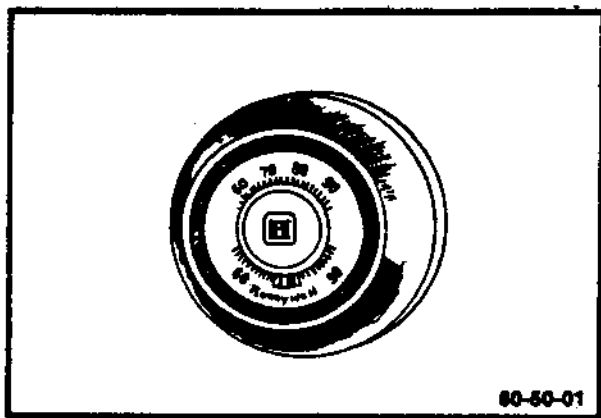
The information contained in this manual is intended for use by a qualified service technician who is familiar with the safety procedures required in the repair and who is equipped with the proper tools and testing instruments.

Repairs covered in this manual that are made by unqualified persons can result in hazards due to improper assembly or adjustments subjecting inexperienced person making such repairs to the risk of injury or electrical shock which can be serious or even fatal not only to them, but also to persons being serviced by the equipment.

If you perform service on your own equipment, you must assume responsibility for any bodily injury or property damage which may result to you or others. We will not be responsible for any injury or property damage arising from improper service and/or service procedures.

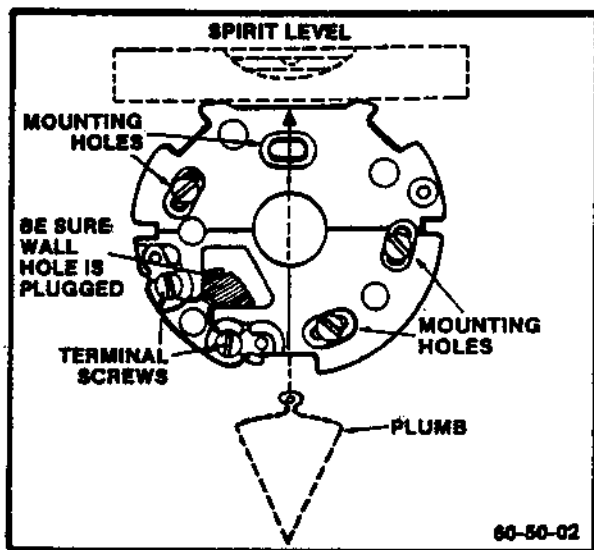
This manual to be used with Installation Instructions Technical Support Manual for units.

THERMOSTAT T87



INSTALLATION

Locate thermostat about 5 ft. above the floor on an inside wall where there is good natural air circulation and where thermostat will be exposed to average room temperatures.



NOTE

The T87 is mounted at true vertical when calibrated at the factory. If the wall plate or subbase is not properly leveled, the thermostat control point will deviate from the set point.

Mount the wall plate or subbase on the cover ring with the screws furnished. The "UP" line of the wall plate **MUST** be exactly vertical for the thermostat to be accurately calibrated. To level the wall plate, use a spirit level or a plumb line. After wiring, plug any free space to prevent drafts from affecting the thermostat.

MOUNT THERMOSTAT (See HEATER SCALE ADJUSTMENT before mounting)

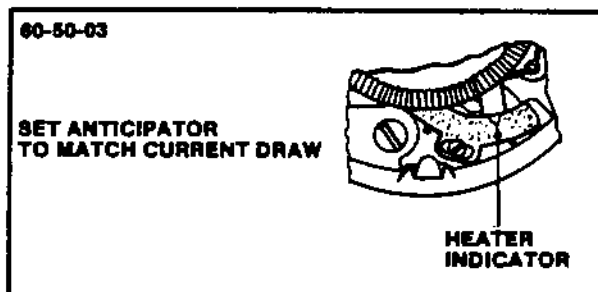
Mount the thermostat by placing it on the wall-plate or subbase and tightening the three captive mounting screws (these screws also complete the electrical connections between thermostat and backplate).

HEATER SCALE ADJUSTMENT

Adjust heater to match current rating of primary control; this rating is usually stamped on the control nameplate. Move the indicator on the scale to correspond with this rating and the heater will be properly adjusted. If the current rating is not given, proceed as follows before mounting the thermostat:

Connect an AC ammeter of appropriate range (0 to 2.0 amp, for example) between terminals on the wallplate or between R and W on subbase. Subbase system switch must be in HEAT position.

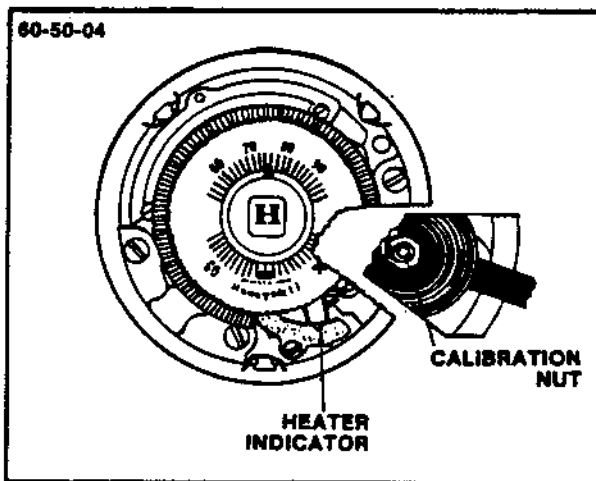
Use the current reading to select the proper heater setting on the heater indicator.



TEMPERATURE SELECTION

To select the temperature control point, turn the transparent dial until the desired point on the setting scale (top) is in line with the stationary pointer.

On locking cover models, the temperature range may be limited with stops at either extreme.



RECALIBRATION

The T87 is calibrated at the factory and no recalibration should be necessary. If it seems desirable to check the calibration, **FIRST** be sure thermostat is accurately leveled. If T87 is used on a subbase, move system switch to OFF position.

THERMOSTAT T87

Remove thermostat cover ring so you can observe mercury switch action. After a five or ten minute off period (with thermostat setting below room temperature), slowly raise the setting until the switch just makes contact. If thermometer pointer and setting indicator read the same the instant you see the switch make, no recalibration is necessary. If it does appear necessary, proceed as follows:

Turn the dial a few degrees above room temperature and remove cover.

Slip the calibration wrench onto the hex under the bimetal coil and, holding the dial firmly, turn the hex counterclockwise ← until the mercury breaks contact.

Turn the dial to a low setting so that the thermostat loses the heat it has gained from your hands and its own operation. Wait at least five minutes.

Slowly turn the dial up the scale until the pointers read the same.

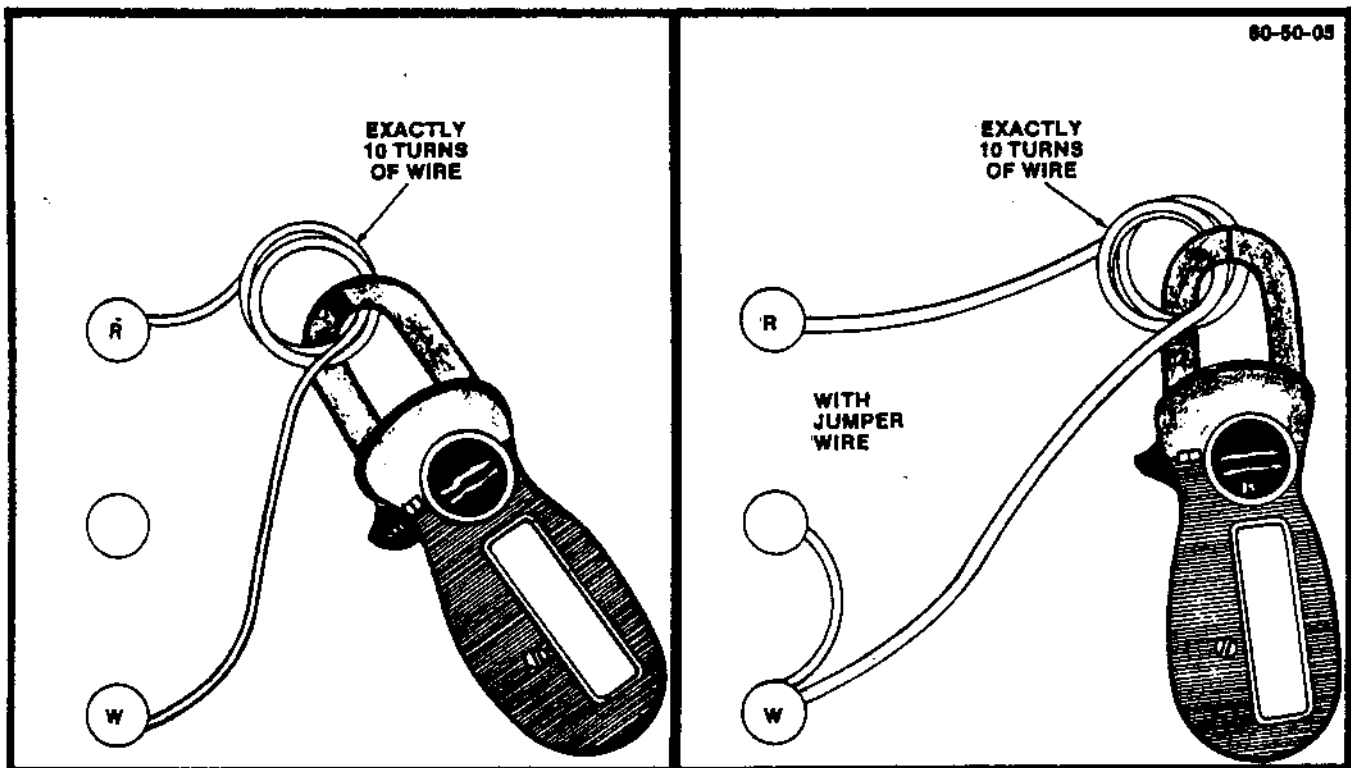
Firmly holding the dial from turning, carefully turn the hex clockwise → until the mercury slips to the heating contact end of the tube—NO FARTHER.

Recheck calibration, select the desired temperature and replace cover.

NOTE

When T87 provides cooling control, calibrating for heating automatically calibrates for cooling.

SETTING THERMOSTAT HEAT ANTICIPATOR



SETTING THERMOSTAT HEAT ANTICIPATOR

Visually check the heat anticipator for damage. Check continuity of heat anticipator. If continuity does not exist, anticipator circuit is open and thermostat must be replaced.

AMPING OUT ANTICIPATOR AND SETTING

Turn power off to system and remove the thermostat from the subbase or wallplate.

Wrap exactly 10 turns of wire around the jaws of a split jaw induction type current meter as illustrated.

Connect one end of wire to "R" terminal and the other to "W" terminal.

Turn on the power to system. Furnace should fire. Wait approximately 1 minute and read amp scale. Divide reading by 10 to obtain current draw.

EXAMPLE

$$2.0 \text{ amps} \div 10 = .2 \text{ amp draw}$$

Turn off power to system and remove amp meter wire coil. Set anticipator to match amp draw, and mount thermostat.

ELECTRICAL SYSTEM TROUBLESHOOTING "PGA" SERIES

WARNING

Danger of Electrical Shock, Electrocution, Explosion, or fire. Turn off gas supply at manual shut-off before troubleshooting the electrical system. Unit is connected to high voltage—use care to prevent electrical shock and/or electrocution.

NOTE

The typical wiring schematics used in this section are for illustrative use to help you troubleshoot the electrical system, always follow the wiring diagram supplied for the unit you are servicing.

THERMOSTAT AND SUBBASE

The thermostat and subbase must be checked before making any other low voltage test. If thermostat, subbase or connecting wiring is defective they must be repaired or replaced.

TRANSFORMER

Using a voltmeter, check the low volt output of the transformer by testing across the "C" and "R" terminals on the low volt terminal board. You should have a reading of 24 volts plus or minus 10%.

If you do not have required voltage, check for broken wires and corroded terminals. Check high volt side of transformer. You must have 197 volts or above for transformer to operate properly.

With above minimum high voltage, unbroken wires and clean terminals, low voltage output is less than required, transformer is defective and must be replaced.

HEATING—LO VOLT SIDE TROUBLESHOOTING

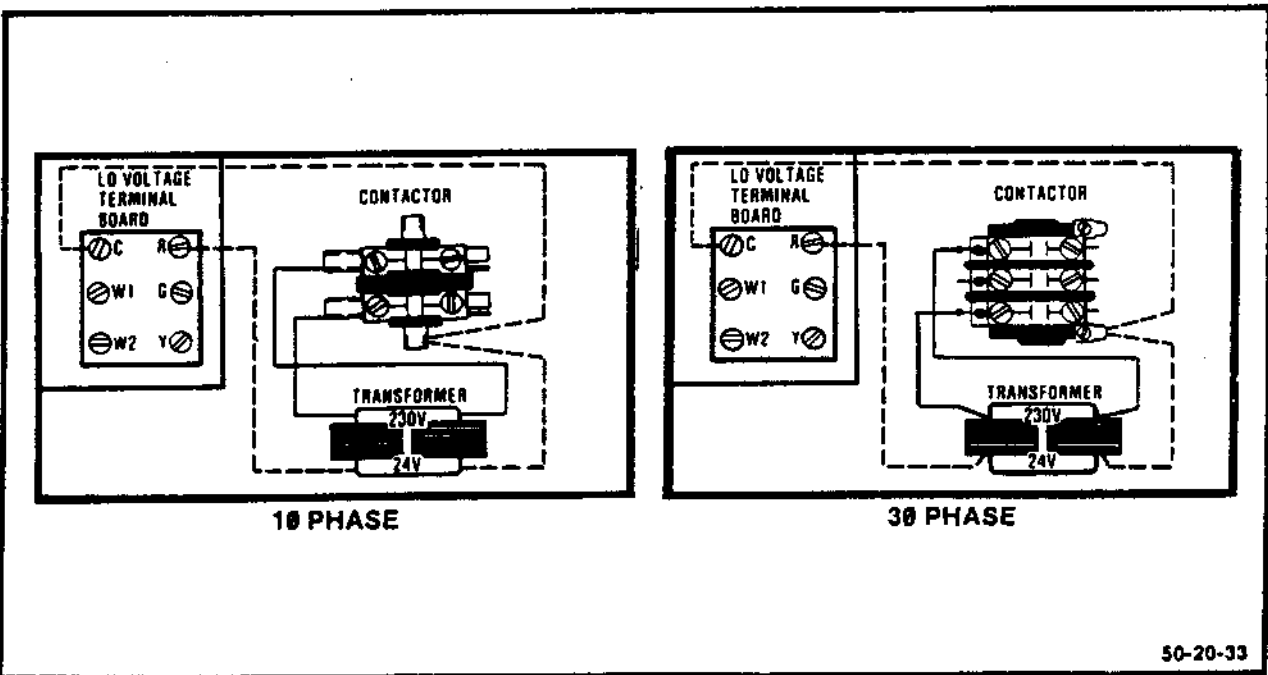
The following checks are made using an ohmmeter—Turn off all electrical power to unit.

"C" circuit—Hold one lead of ohmmeter to "C" terminal on low volt terminal board.

Consecutively touch second lead of ohmmeter to No. 3 terminal on fan relay, No. 1 terminal of heat relay, common terminal (limit side) of fan and limit control and 25v. common terminal of control module.

You must have continuity at all points checked. If you do not, check for broken wires, loose and corroded terminals. Clean terminals and repair or replace wiring as necessary.

"W1" circuit—Hold one lead of ohmmeter to "W1" terminal on lo volt terminal board. Consecutively touch second lead of ohmmeter to No. 3 terminal on heat relay, check both sides of limit section on fan and limit control. (The limit switch is a normally closed switch and will open when excessive temperatures are reached in the heat exchangers). Check rollout sensor by checking continuity through sensor. (The rollout sensor is a normally closed switch and will open if you have flame rollout).

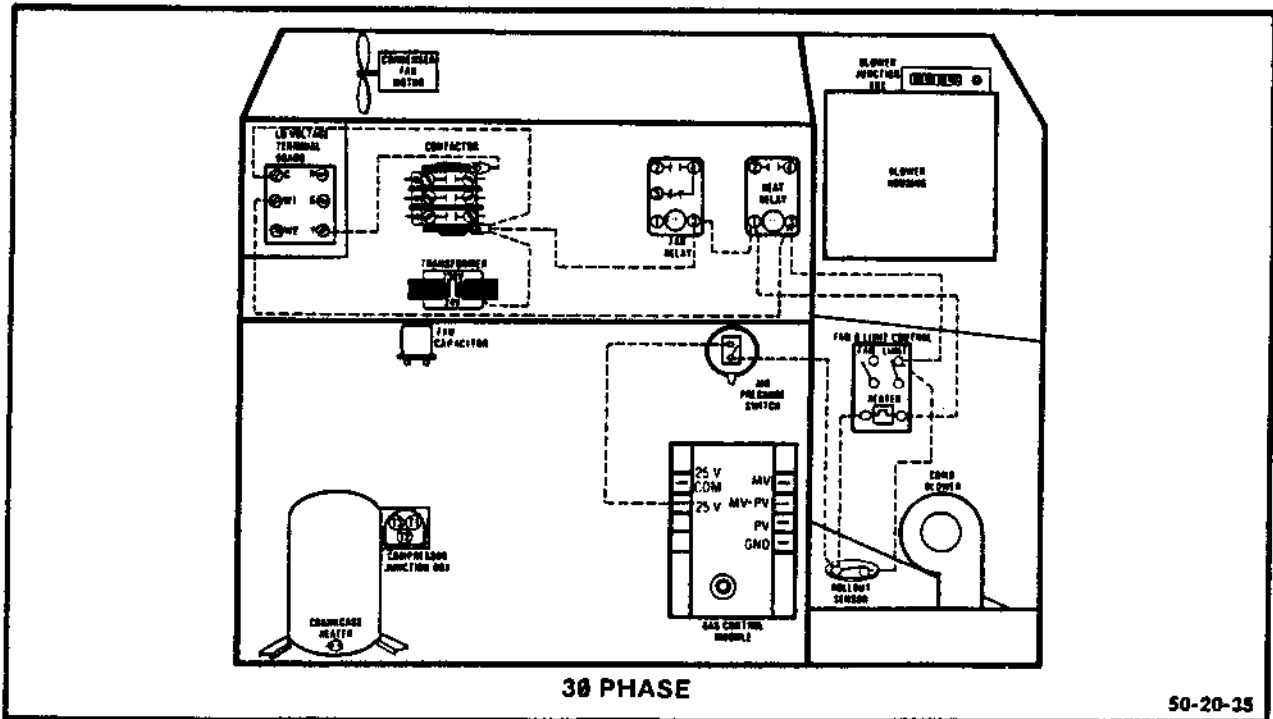
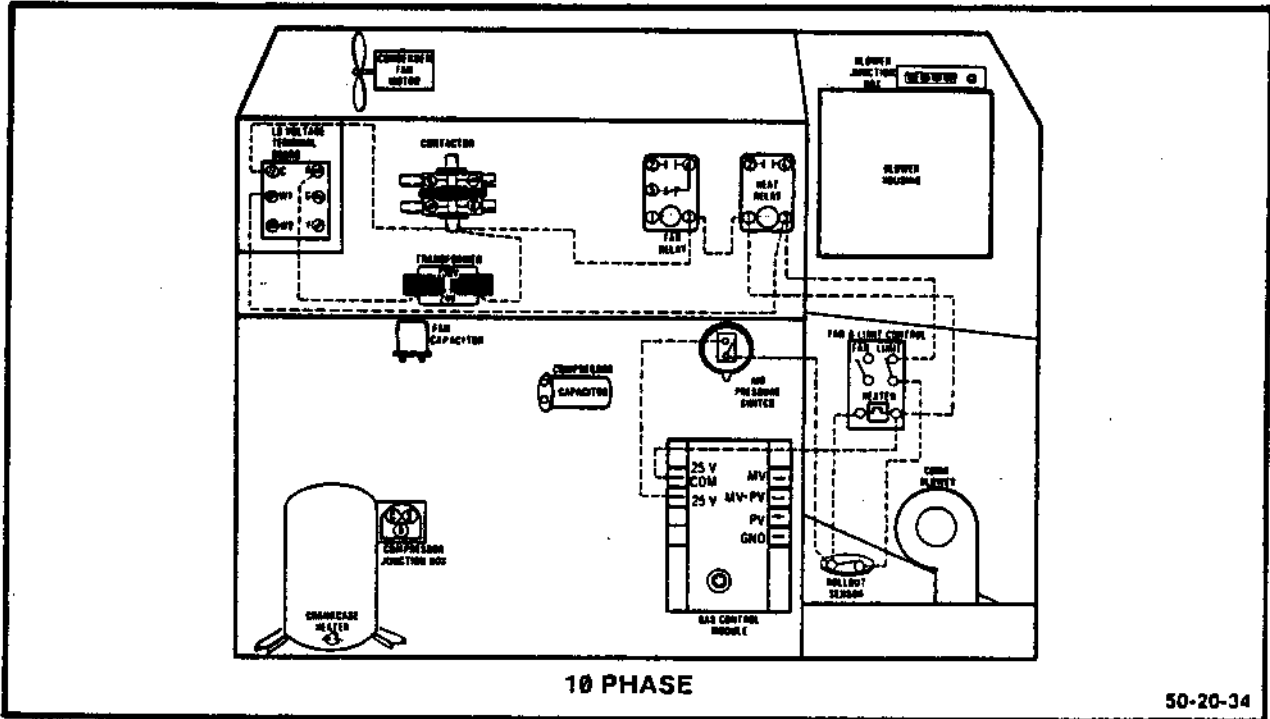


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ELECTRICAL SYSTEM TROUBLESHOOTING "PGA" SERIES

Air proving switch—Check for continuity from roll-out sensor to air proving switch. Now check across the switch—you must not have continuity through the switch with the combustion blower not operating. (For further troubleshooting of the air proving switch refer to "Combustion Blower" section.)

You must have continuity through all points checked from "W1" terminal to air proving switch. If you do not, check for broken wires, loose and corroded terminals, faulty rollout sensor and fan and limit control. Clean terminals, repair and or replace wiring and parts as necessary.



ELECTRICAL SYSTEM TROUBLESHOOTING "PCA" SERIES

HEATING—HIGH VOLT SYSTEM TROUBLESHOOTING

The following tests are made using a voltmeter. Use care when troubleshooting the electrical system to prevent electrical shock and/or electrocution.

Turn off Gas supply at manual shut-off valve.

Turn on electrical power to unit and set thermostat calling for heat.

Check electrical power to unit by checking for voltage across the lines.

COMBUSTION BLOWER

Place one lead of voltmeter on "L1" terminal (10 phase) ("L2" terminal 30 phase) of contactor. Consecutively check for voltage at number 4 terminal on fan relay, No. 2 terminal and No. 4 terminal on heat relay. (Heat relay should be pulled in with voltage through relay; if not, re-check low volt side of relay and coil operation—replace relay if defective.)

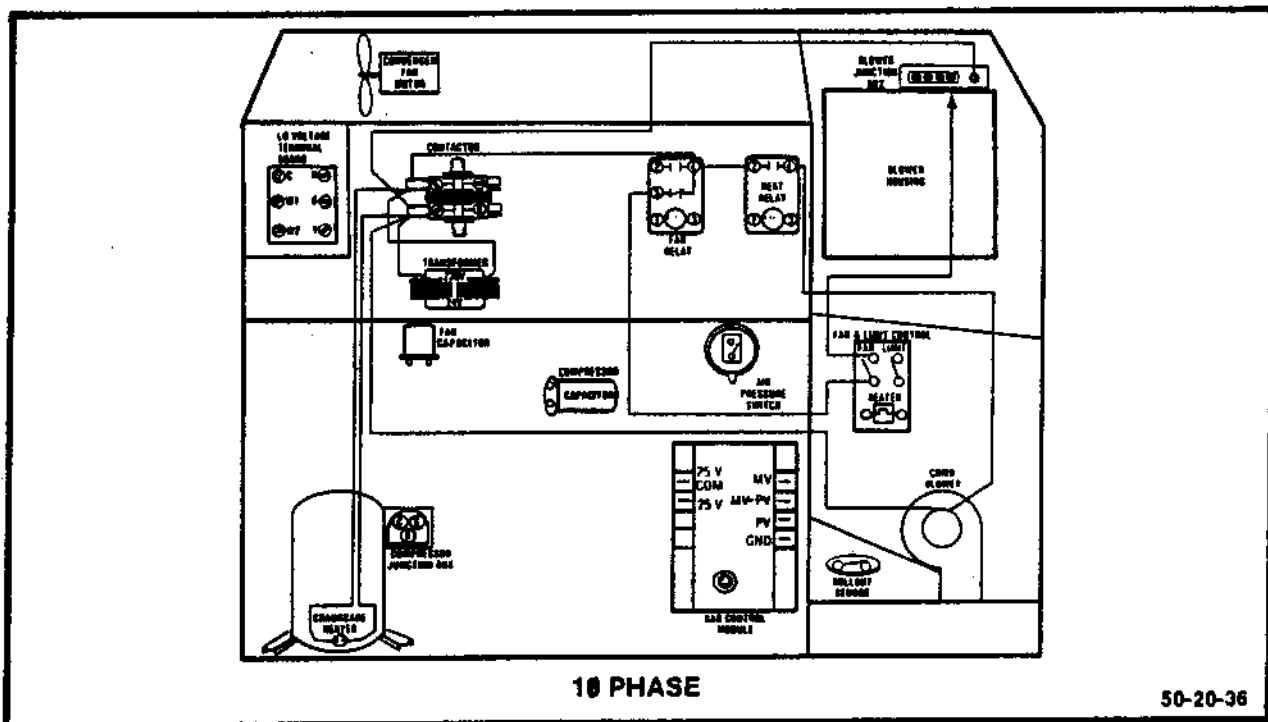
If you have voltage at all points checked and motor is not operating; check for blockage of the blower fan. If it is not blocked and all wiring and connectors have continuity, replace combustion blower assembly.

BLOWER ASSEMBLY

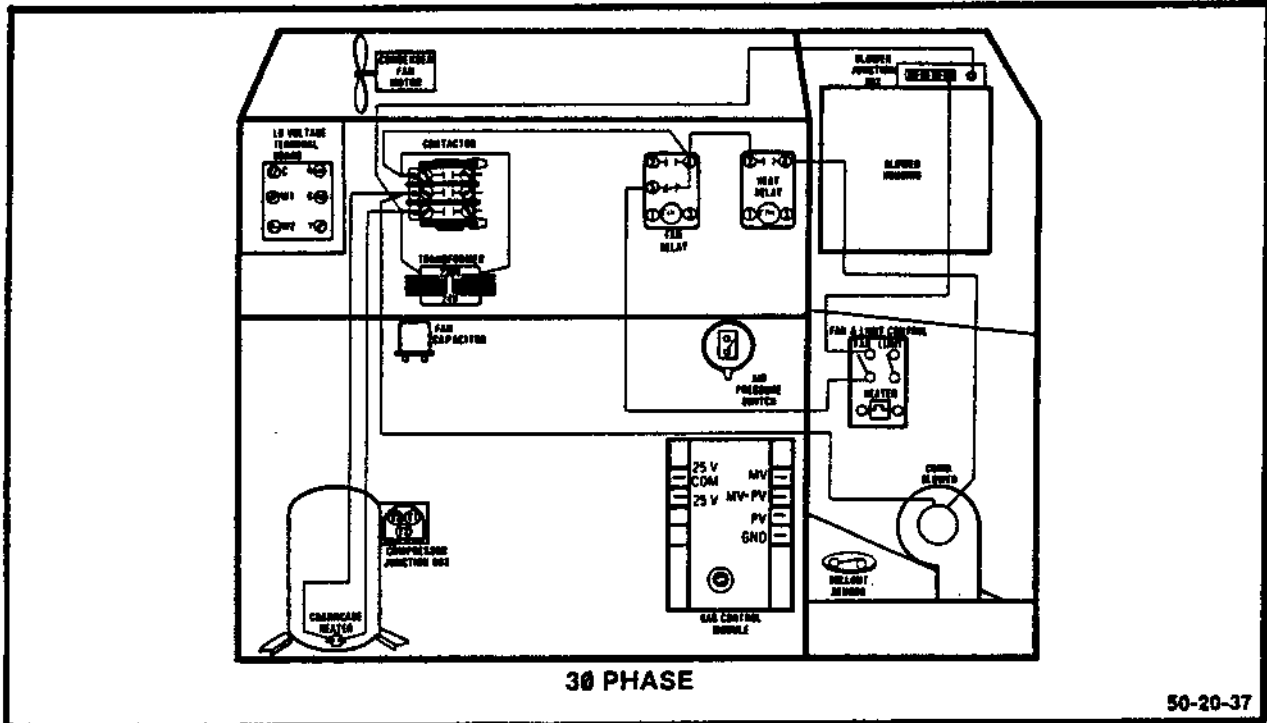
Place one lead of voltmeter on "L1" terminal of contactor (both 10 and 30 phase). Consecutively check for voltage at No. 4 terminal and No. 5 terminal of fan relay. (You must have voltage through relay, this is a normally closed switch.)

Check for voltage to fan and limit switch. (Without furnace fired the fan side of fan and limit is a normally open switch, and will close upon heat rise.) If you have voltage through the switch in a cold condition replace the fan and limit control.

Further testing of the blower will require that the unit is fired. With the unit fired the normally open fan switch should close in approximately 46 seconds. (A longer delay—a minute or longer—could indicate a defective fan switch heater.)



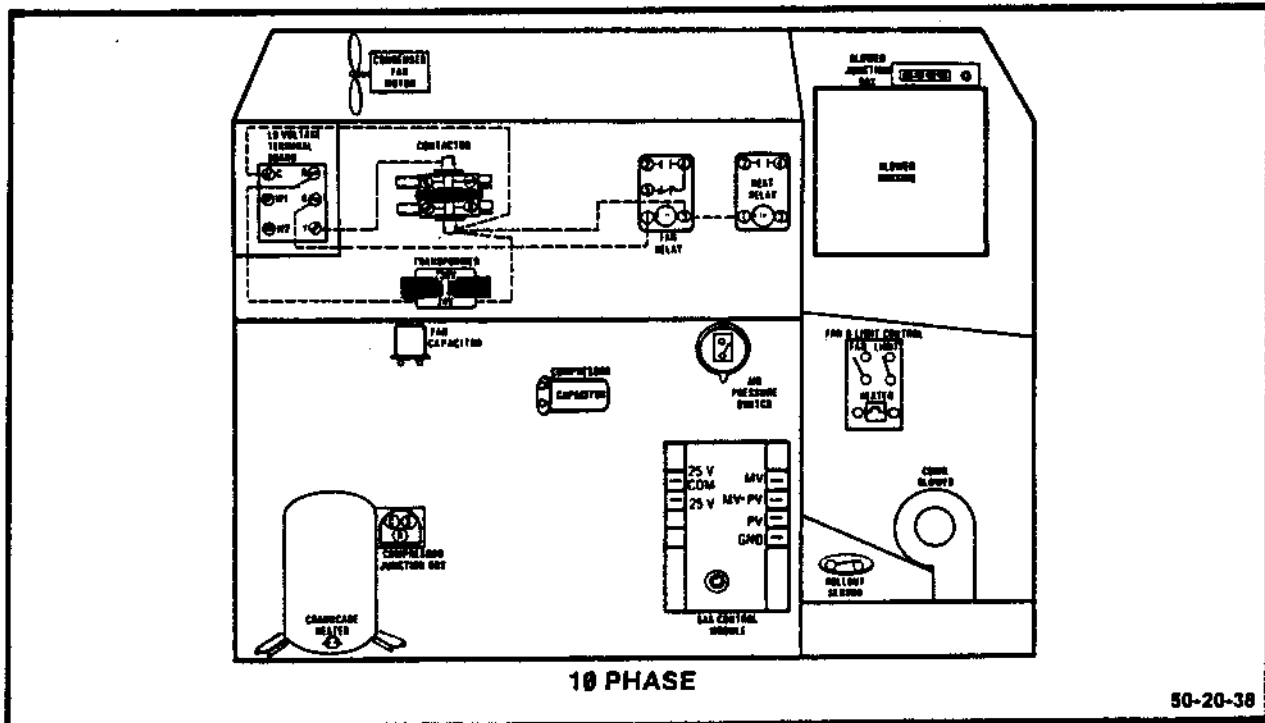
ELECTRICAL SYSTEM TROUBLESHOOTING "PGA" SERIES



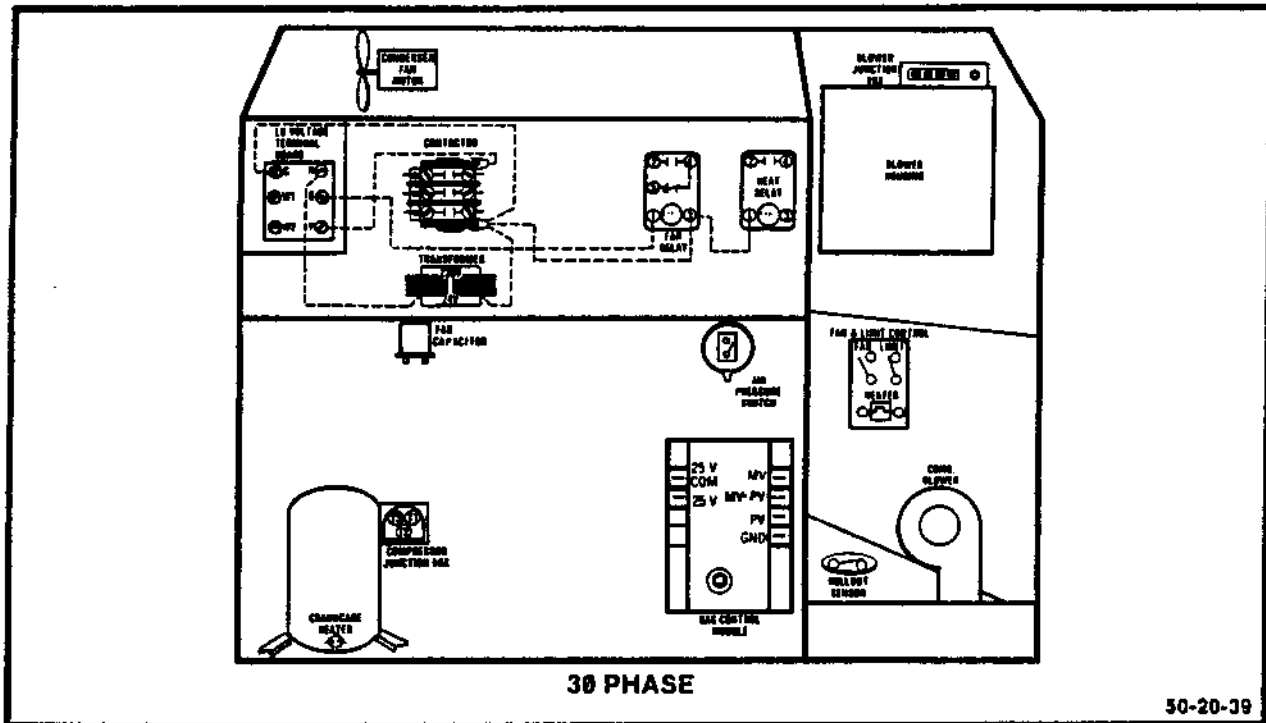
COOLING LO VOLT SYSTEM TROUBLESHOOTING

With electrical power "ON" to the unit and the thermostat set on "COOLING" position—contactor and fan relay coils should "pull-in" completing the circuits to the compressor, condenser fan motor and blower motor.

If unit fails to start check thermostat, circuit breakers, contactor coil, fan relay coil wiring and connectors for continuity.



ELECTRICAL SYSTEM TROUBLESHOOTING "PCA" SERIES



COOLING HIGH VOLT SYSTEM TROUBLESHOOTING

The following tests are made using a voltmeter. Use care when troubleshooting the electrical system to prevent electrical shock and/or electrocution.

Turn on electrical power to unit. Set thermostat calling for "COOLING".

CONTACTOR—With the unit in the cooling mode, the contactor must "pull-in", check voltage from (T1 to T2-10 phase) (T1 to T2 to T3-30 phase).

If contactor does not "pull-in" check thermostat low volt wiring and contactor coil.

Check contactor for high resistance across the contacts caused by burned and pitted contact points. (May be caused by low voltage to unit,—undersized wiring, corrosion, etc.)

Check for contactor points not releasing (stuck shut). (May be caused by broken springs, contact points welded together, etc.)

COMPRESSOR—10 PHASE

Electrical power is on, thermostat is set calling for cooling, contactor is pulled-in and compressor does not start.

Place one lead of voltmeter on "C" terminal of compressor. Consecutively touch the "R" terminal and "S" terminals with the other lead.

If you do not have voltage to terminals, check power to unit, contactor connectors and wiring.

If you have voltage to terminals and compressor does not start, check compressor internal overload protector for open condition, capacitor and optional start assist. (For further testing of the compressor refer to compressor section.)

COMPRESSOR 30 PHASE

Electrical power is on, thermostat is set calling for cooling, contactor is pulled-in and compressor does not start.

Alternately check for voltage across "T1", "T2" and "T3" terminals of compressor using voltmeter.

If you do not have voltage at all points checked, check for power to unit, contactor, wiring and connectors.

If you have voltage at terminals and compressor does not start, check compressor internal overload protector (For further testing of the compressor refer to compressor section.)

CONDENSER FAN MOTOR

The condenser fan motor should start as soon as the contactor closes.

If fan motor does not start; check contactor, electrical wiring, connectors and capacitor. Also,

ELECTRICAL SYSTEM TROUBLESHOOTING "PGA" SERIES

check for fan blockage and that fan is centered in orifice.

Check amperage draw of motor and compare to specifications. If amperage draw is excessive, check contactor tips and electrical connections for corrosion and loose connectors before replacing motor.

BLOWER MOTOR

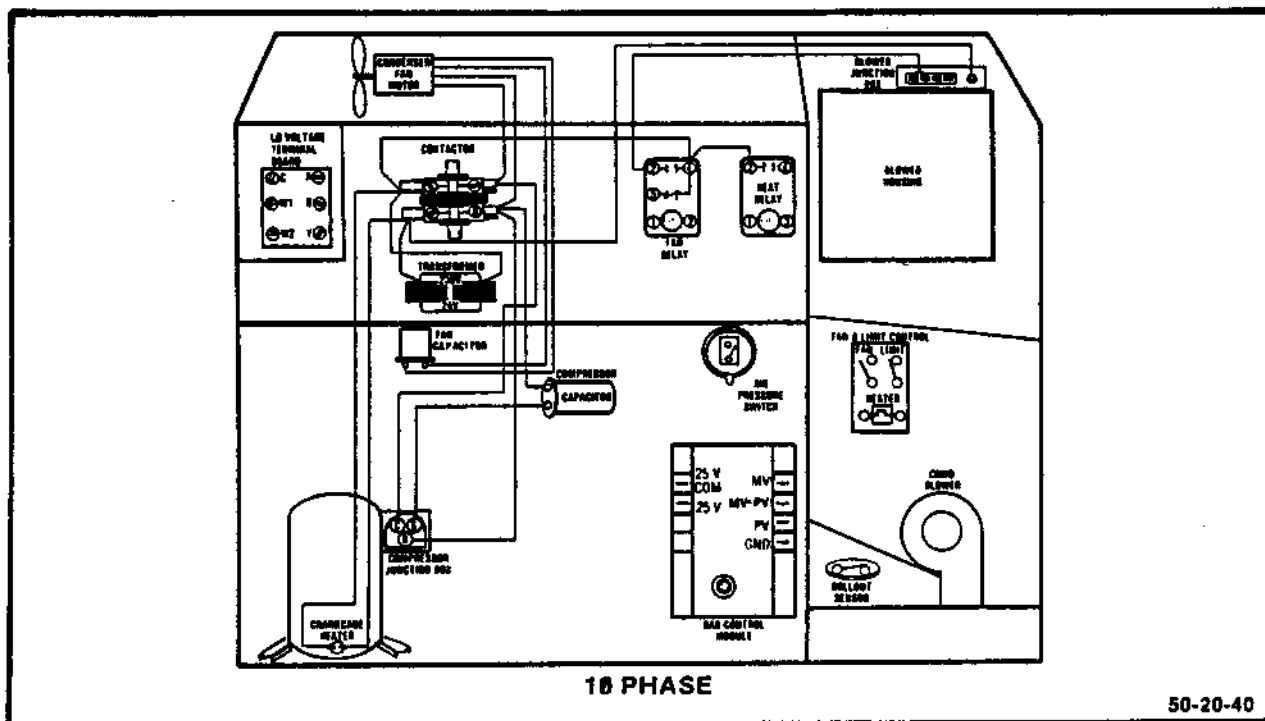
The electrical circuit to the blower motor is completed through the fan relay. Blower should start immediately whenever thermostat is calling for cooling.

If blower does not start check fan relay coil, it must "pull-in" completing the circuit through No. 2 and No. 4 terminals.

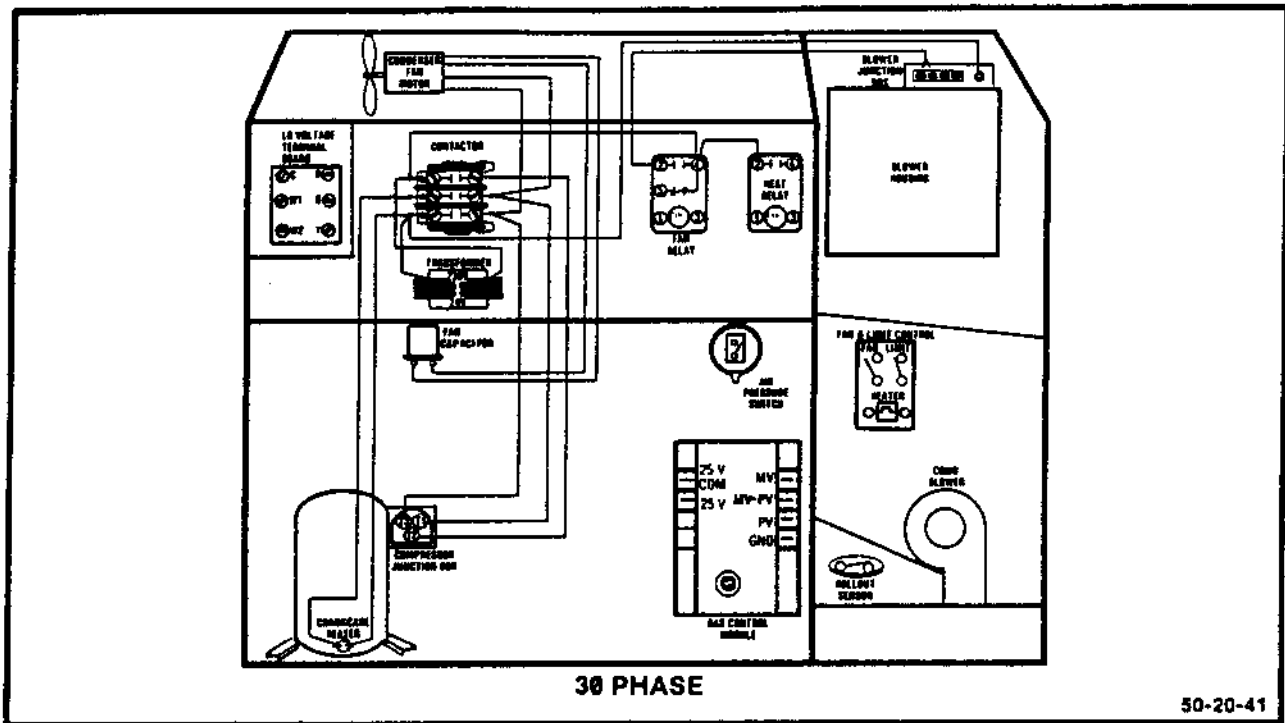
If coil does not "pull-in" check low voltage to coil. If you do not have voltage to coil, check thermostat and electrical wiring.

If fan relay pulls in and blower does not start check for voltage through fan relay. (No. 2 to No. 4 terminals is a normally open set of contacts and will close when fan relay coil is activated completing the circuit to the blower junction box.)

With power to blower junction box and blower does not run check for blockage of the blower wheel, bad capacitor, electrical wiring and connections before replacing blower motor.



ELECTRICAL SYSTEM TROUBLESHOOTING "PGA" SERIES



COMBUSTION BLOWER—AIR PROVING (PRESSURE) SWITCH—DIFFUSERS—AIR AND GAS ORIFICES

COMBUSTION AIR BLOWER AND AIR PROVING SWITCH

The purpose of the combustion air blower is to provide combustion air to the burners.

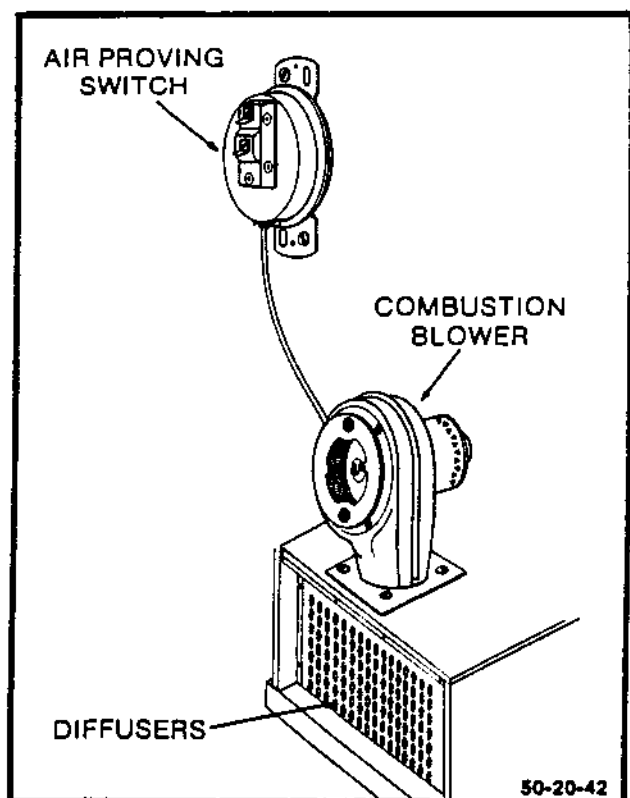
The combustion blower motor is activated through the heat relay. The heat relay is a normally open switch and will close completing the electrical circuit to blower motor whenever thermostat is calling for heat.

If combustion blower fails to start check heat relay, electrical wiring and blockage of the blower wheel before replacing the blower assembly.

AIR PROVING SWITCH

An air proving switch is provided with a connecting air tube to the combustion blower. The air proving switch is a normally open switch and when closed completes the electrical circuit to control module and fan and limit control heater. Air proving switch will close when blower is operating and sufficient combustion air is provided.

If air orifice becomes blocked, blower motor fails to run, heat exchanger or flue become blocked, switch will not close.



COMBUSTION BLOWER—AIR PROVING (PRESSURE) SWITCH—DIFFUSERS—AIR AND GAS ORIFICES

DIFFUSERS

The "F" series units are equipped with a front and back air diffuser.

The purpose of the diffusers is to equally distribute the combustion air to all of the burners. **DO NOT OPERATE THE unit without both diffusers in place.**

AIR ORIFICE—GAS ORIFICES

CAUTION

The air orifice size and gas orifice size must be matched for BTUH rating and safety.

The rating plate is stamped with the matching air and gas orifice for the BTUH rating required. Each air orifice is stamped with a letter such as F,

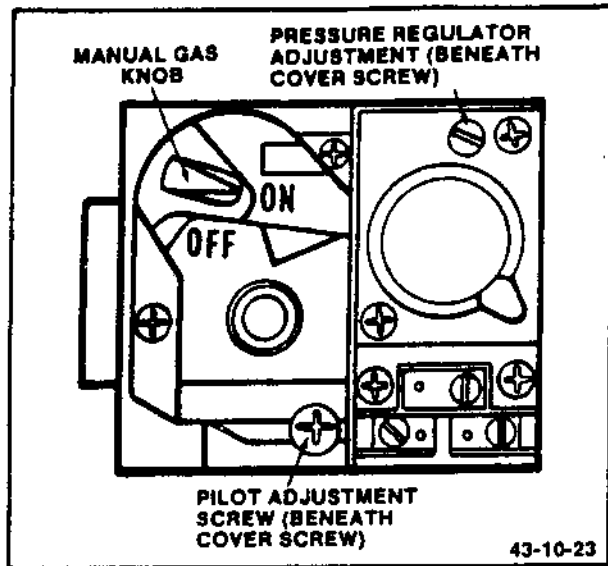
G, H. The gas orifices are stamped with the drill size such as 37, 41, etc.

As an example, if 80,000 BTUH is required, look on rating plate area stamped 80,000 BTUH. Now refer to area stamped; orifice-gas, air.

For 80,000 BTUH, the unit may require an air orifice stamped F and gas orifice stamped 37 (drill size).

The air orifice and gas orifice called for on rating plate must be installed as a matched set. **DO NOT** use any other combination of air and gas orifices other than those called for on rating plate.

HONEYWELL VR8440P GAS VALVE



CHECKING SUPPLY GAS PRESSURE TO GAS VALVE (NATURAL GAS)

Incoming gas pressure to the gas valve with all other gas appliances fired is a minimum of 4.5" w.c. and a maximum of 11.0" w.c. The ideal input pressure to gas valve should be 7.0" w.c. for these furnaces.

CHECKING SUPPLY GAS PRESSURE TO GAS VALVE (L.P. GAS)

Incoming gas pressure to the gas valve with all other gas appliances fired is a minimum of 11.0" w.c. and a maximum of 14.0" w.c. The ideal input pressure to gas valve should be 14.0" for these furnaces.

WARNING

DANGER OF EXPLOSION AND FIRE
Manually turn off gas supply at manual shut-off valve before working on or removing the gas valve.

ADJUST PILOT FLAME

Remove pilot adjustment cover screw. Turn inner adjustment screw clockwise → to decrease or counterclockwise ← to increase pilot flame. Be sure to replace cover screw after adjustment to prevent possible gas leakage.

STANDARD PRESSURE REGULATOR (A AND M MODELS)

Check input to main burner by clocking gas meter or by using a pressure gauge (manometer) connected to downstream tapping. The Nat. gas model is set at 3.5 in. wc outlet pressure, and the LP gas model is set at 10.0 in. If adjustment is required, proceed as follows.

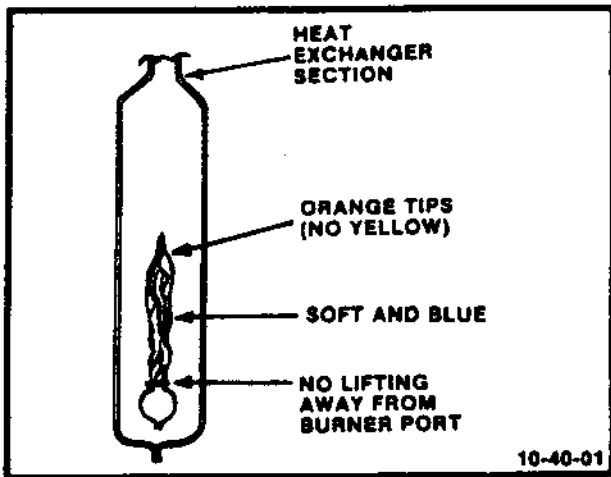
Remove pressure regulator cover screw. Using screwdriver, turn adjusting screw clockwise → to increase or counterclockwise ← to decrease gas pressure to burner. (NOTE: Adjustment fitting is plastic and may require slightly greater turning force than metal.) Replace cover screw.

WARNING

DANGER OF EXPLOSION AND FIRE
Carefully check each connection and joint of the piping and gas valve with a soap and water solution. Bubbles, indicate a gas leak which must be corrected immediately.

MODEL	TYPE GAS	REG. TYPE	MIN. PRES.
VR8440A	NAT.	STD.	3.5
VR8440A	L.P.	STD.	10.0

MAIN BURNER FLAME ADJUSTMENT



NATURAL GAS ONLY (Normal Combustion)

Turn the furnace on at the thermostat. Wait a few minutes, since any dislodge dust will alter the normal flame appearance. Flames should be stable, quiet, soft and blue with slightly orange tips. They should not be yellow. They should extend directly upward from the burner ports without curling downward, floating or lifting off the ports. They should not touch the side of the heat exchanger.

CAUSES OF ABNORMAL COMBUSTION

Gas pressure - Adjust to 3.5 in. w.c.

Clock meter - Flow must be within 5% of BTU rating (on rating plate).

Burners - Check burners for dirt, rust and other obstructions.

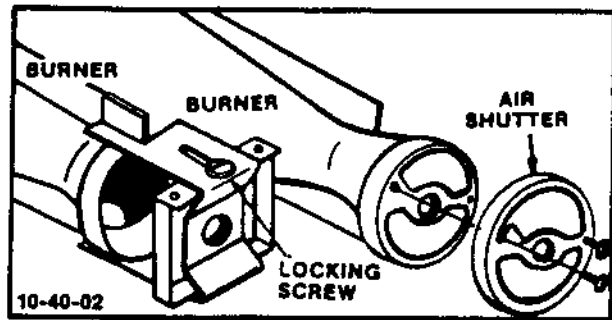
Heat Exchanger - Check heat exchanger for burn-out or cracks.

L.P. ONLY - (Same as natural gas except for the following.)

Gas pressure - Adjust to 10.0 in. w.c.

Air shutters - Adjust for proper primary air.

Orifice - Check for correct orifice size for L.P. Gas application.



SPUD ORIFICES

Contact the furnace manufacturer before changing orifice sizes on any furnace.

Check orifice sizes for natural gas or L.P. Gas application (see I & O manual or Tech-Service-Data sheets for proper sizes).

Before changing orifices (except for obvious damage):

Check and adjust manifold pressure.

Check gas input.

Check shutter adjustment (L.P. Gas only) or other causes listed in main burner flame adjustment section.

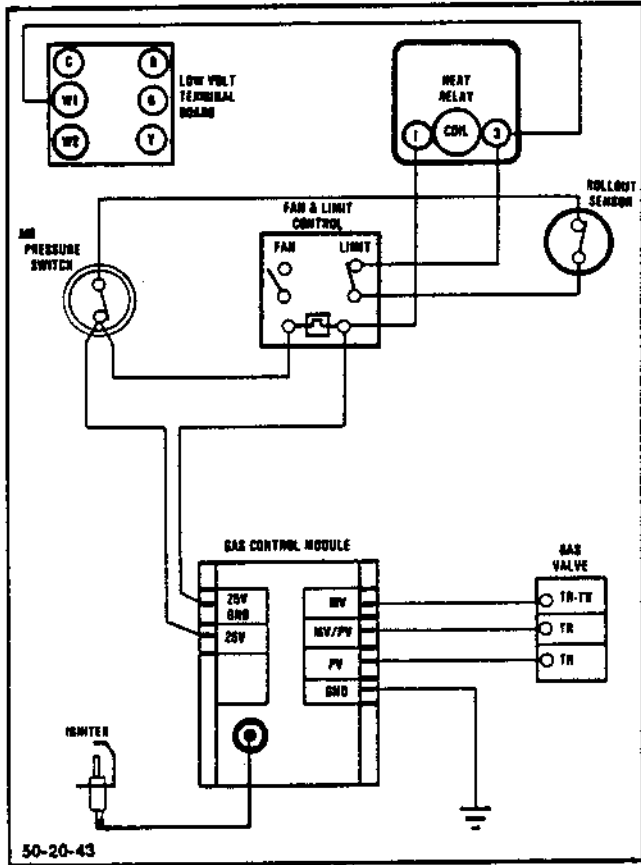
HONEYWELL SPARK TO PILOT (I.I.D.) TROUBLE SHOOTING CHART

SYMPTOMS	POSSIBLE CAUSE	CHECKS & REMEDIES
No spark	Open in ignition cable. Ignitor improperly grounded. No voltage to ignition module. Ignitor improperly adjusted. Defective control module.	Check continuity of ignition cable if open, replace. Check ground connections, insure good chassis ground. Verify 25 volts AC input to ignition module. Verify correct ignitor adjustment. Check for spark from module
Spark, But No Ignition	No gas to pilot assembly. Pilot orifice plugged. Gas supply tubing to pilot kinked. No voltage to gas control.	Verify supply pressure. Inspect orifice clean or replace if dirty. Inspection tubing to pilot assembly correct or replace. Verify voltage across terminals PV-MV/PV of module. If no voltage, replace module, if present replace gas control.
Spark Continues After Ignition	Ignition cable has no continuity. Poor flame impingement on sensor rod.	Check ignition cable for continuity. Check that flame covers both electrodes
Main Burner Fails To Light	No voltage to gas valve. Defective gas valve.	Verify voltage at terminals MV-MV/PV of modules. If no voltage, replace module. Check connections between module and gas valve, if O.K., replace gas valve.
Main Burner Shuts Down	Unit improperly grounded.	Verify ignitor assembly and module is grounded properly.
Main Burner Fails To Shut Down At End Of Cycle	Defective thermostat. Defective ignition module.	Check thermostat. Remove MV lead from module, if gas valve closes, replace module, if not replace gas valve.

HONEYWELL SPARK TO PILOT (S86F) NATURAL GAS IGNITION SYSTEM

The Honeywell S86F control module is for use with NATURAL GAS only. Do not use on L.P. Gas applications. With this control, gas will continue to flow to the pilot and sparking will continue until call for heat from the thermostat ends.

The "Typical Ignition System Wiring" is for illustrative purposes. Follow the wiring diagram supplied with your furnace.



SUPPLY GAS PRESSURE TO VALVE

Check gas inlet pressure to gas valve. Inlet pressure to valve must be a minimum 4.5 in. w.c. with all other gas appliances fired.

WARNING

DANGER OF EXPLOSION, FIRE, PERSONAL INJURY OR DEATH
Before testing or working on the furnace, turn off the gas supply at the manual shut-off valve leading to the furnace.

ELECTRICAL POWER TO FURNACE

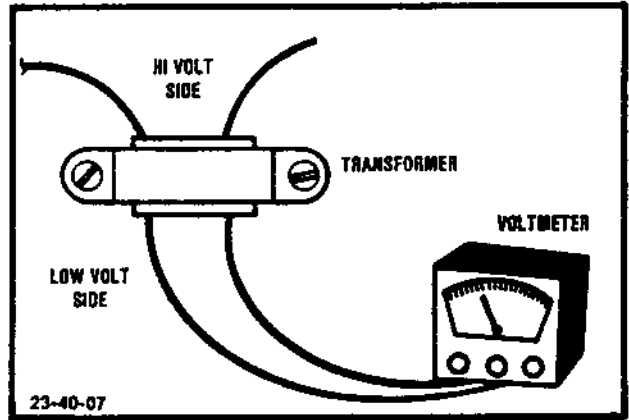
Check fuse or circuit breakers to make sure they are not blown or tripped.

FURNACE ELECTRICAL GROUND

Furnace may not operate at all or operate intermittently if furnace is not properly grounded.

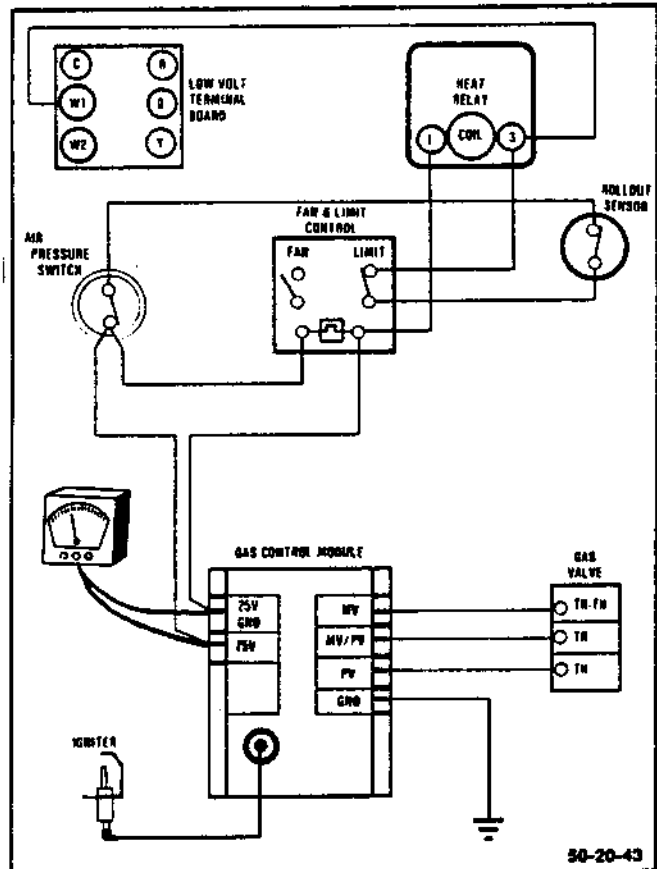
THERMOSTAT

A careful check of the thermostat and wiring must be made to insure that the thermostat is operating properly, no wires are broken and that the heat anticipator is not burned out and set to specifications.



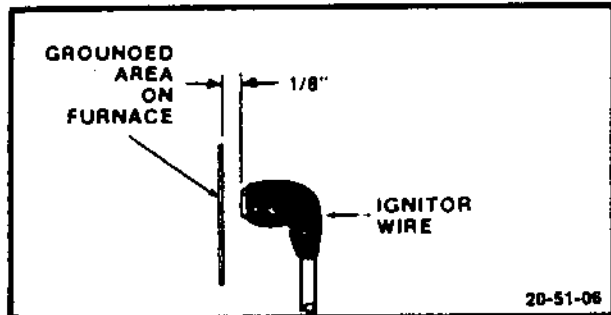
TRANSFORMER

With power on to furnace and thermostat calling for heat, check transformer low volt side for minimum voltage of 25 volts a.c. Replace transformer if below minimum output voltage is obtained.



HONEYWELL SPARK TO PILOT (S86F) NATURAL GAS IGNITION SYSTEM

**VOLTAGE TO CONTROL MODULE
(WITH COMBUSTION BLOWER OPERATING)**
Using a volt meter check for minimum voltage (25 volts) across the 25V (COM) and 25V, terminals of control module. If you do not have voltage to module, check voltage output from transformer. Check continuity through heat relay, fan and limit control, rollout sensor and air proving switch. Check for continuity of wiring and corroded leads. If any parts prove to be defective they must be replaced. Electrical leads must be clean, tight and defective wiring replaced.



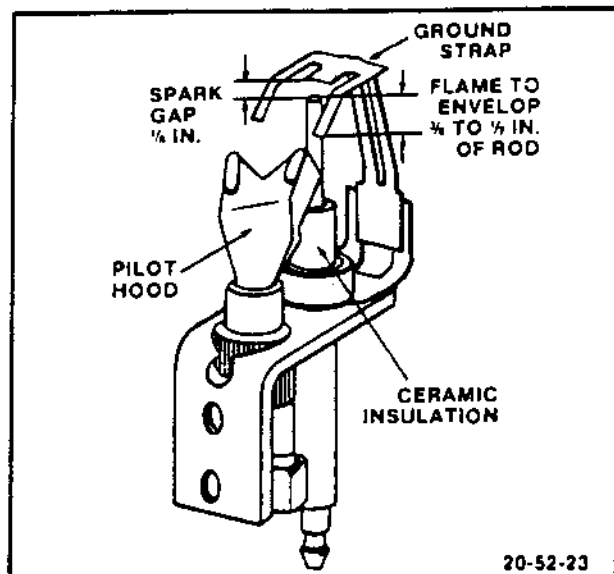
**NO SPARKING ACROSS IGNITOR/
SENSOR GAP**
MANUALLY TURN OFF GAS SUPPLY AT MANUAL SHUT OFF VALVE.

WARNING
**DANGER OF SHOCK
OR ELECTROCUTION**
If you touch the high voltage terminals or the ignition cable end with electrical system on.

Remove ignition cable end from pilot ignitor/sensor. Hold tip of cable $\frac{1}{8}$ in. from a grounded area of the furnace using an insulated tool such as a fuse puller. Turn furnace on call for heat and observe spark.

If you do not have sparking across gap, check continuity of fuse. Replace fuse if blown, with same type of fuse as removed (STANDARD FAST ACTING 3A FUSE). Shorting across gas valve terminals will blow fuse. Do not use a fuse of a higher value, or control module can be destroyed. If you still do not have sparking, check continuity of ignition cable. Replace lead if you measure 5 ohms or more resistance using the R \times 1 scale of an ohm meter.

Control module ground must be clean and free of corrosion. Replace control module if you do not have sparking across the $\frac{1}{8}$ in. gap or if sparking appears weak.



**NO SPARKING ACROSS IGNITOR/
SENSOR GAP**

(CONTROL MODULE CHECKS OUT OKAY)
Control module and pilot assembly must be grounded. Carefully check ground wiring and contact areas. If grounding is poor or erratic, shutdown may occur even though operation is normal at time of the checkout.

IGNITION CABLE

Carefully inspect ignition cable. Faulty ignition cable can cause shutdown, erratic firing, intermittent shutdown and continual sparking after pilot has fired.

CERAMIC INSULATOR

Insulator must not be cracked, if it is, replace pilot assembly. Keep ceramic clean. A cracked or dirty insulator can cause the high voltage spark to leak to ground and intermittent firing or possibly no firing across the gap can occur.

SPARK GAP

Spark gap must be adjusted to $\frac{1}{8}$ in. between ignitor/sensor electrode and ground strap.

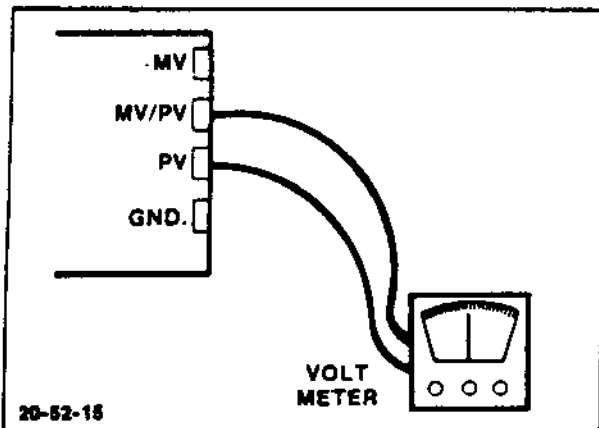
PILOT FLAME

Pilot flame must envelop $\frac{1}{8}$ in. to $\frac{1}{4}$ in. of ignitor/sensor electrode.

TURN GAS SUPPLY ON

WARNING
**DANGER OF EXPLOSION, FIRE,
PERSONAL INJURY AND/OR DEATH**
After turning gas supply on; check each joint with a soapy solution. If any leaks are detected, they must be repaired immediately.
Wait five minutes between each trial for ignition with combustion blower operating. This time will allow the gas to be vented out of the furnace.

HONEYWELL SPARK TO PILOT (S86F) NATURAL GAS IGNITION SYSTEM



MAIN BURNER DOES NOT LIGHT (PILOT BURNING)

Using a volt meter check across MV-MV/PV terminals for 25 volts a.c. If you do not have correct voltage, check for shorts to ground, if problem still exists replace control module.

If you have voltage, check electrical connections and wiring to the gas valve. If wiring is okay, check gas valve and replace if necessary.

SYSTEM DOES NOT RUN DURING CALL FOR HEAT

Check continuity of ignitor cable and ground wire.

GAS SUPPLY ON, PILOT BURNER DOES NOT LIGHT (IGNITOR SPARKING)

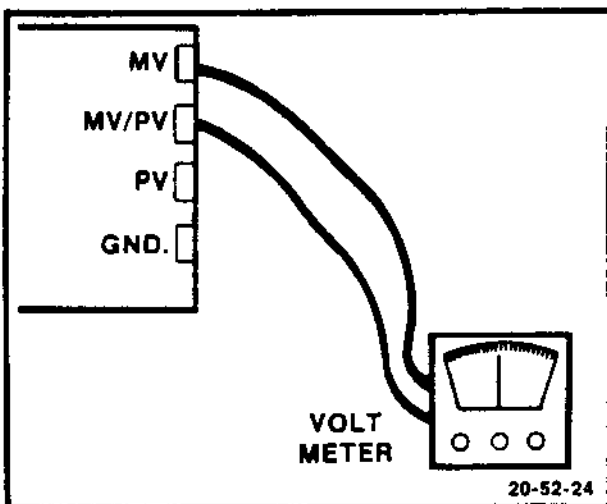
Check all manual gas cocks to make sure they are open. Check supply lines, tubing and pressures. Check pilot burner orifice to make sure it is not blocked.

Check electrical connections and wiring between control module and pilot operator on gas valve. Using volt meter check for 25 volts a.c. across PV-MV/PV terminals on control module. If you do not have voltage across these two terminals with power on to control module, module is defective and must be replaced. If you have voltage and wiring is okay, check gas valve operation. If found to be defective, replace gas valve.

SPARKING DOES NOT STOP WHEN PILOT IS LIT

Check continuity of ignition cable and ground wire. Replace cable if 5 ohms or more resistance exists or is deteriorated. Check condition of ground wire and replace if necessary and clean contact areas of ground.

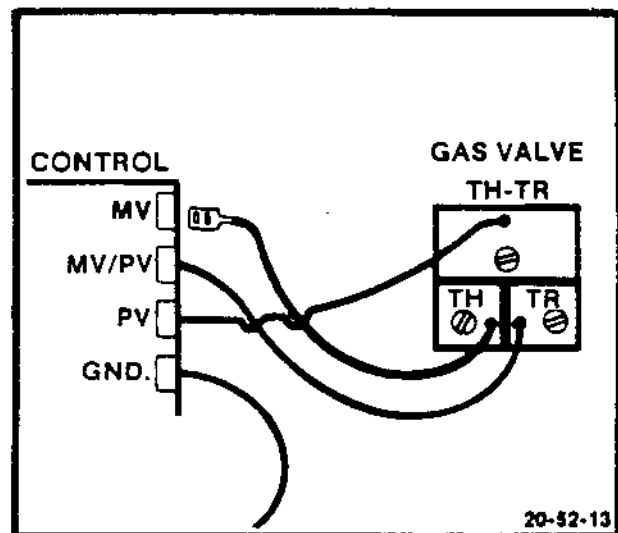
Check pilot flame. Flame must envelope $\frac{3}{8}$ to $\frac{1}{2}$ in. of electrode. If these checks are okay and sparking continues, replace ground wire and ignition cable. If problem still exists, replace control module.



NOTE

If ground is poor or erratic, shutdowns may occur occasionally even though operation is normal at time of checkout.

If checks are okay, replace control module.



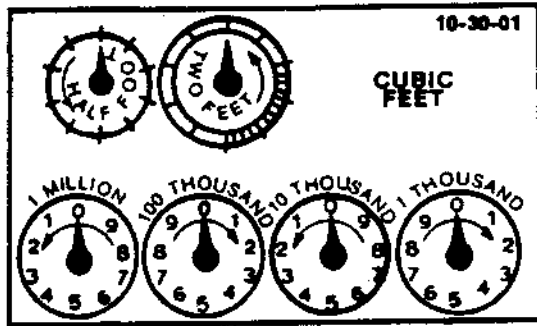
CALL FOR HEAT ENDS SYSTEM DOES NOT SHUT OFF

Carefully check thermostat and thermostat wires for shorts.

Check for proper thermostat operation. Remove MV lead from control, if gas valve closed, replace control. If gas valve does not close, replace gas valve.

CHECK GAS INPUT

METER FLOW TABLE



TO MEASURE THE INPUT USING THE GAS METER

Turn off gas supply to all other appliances except the furnace.

With the furnace operating, time the smallest dial on the meter for one complete revolution. If this is a 2 cu. ft. dial, divide the seconds by 2; if it is a 1 cu. ft. dial, use the time in seconds as is. This gives the seconds per cu. ft. of gas being delivered to the furnace.

Assuming natural gas with a heating value of 1000 BTU per cu. ft. and 34 seconds per cu. ft. as determined by step then:

$$\text{Input} = 1000 \times 3600 \div 34$$

$$= 10600 \text{ BTU Per Hour}$$

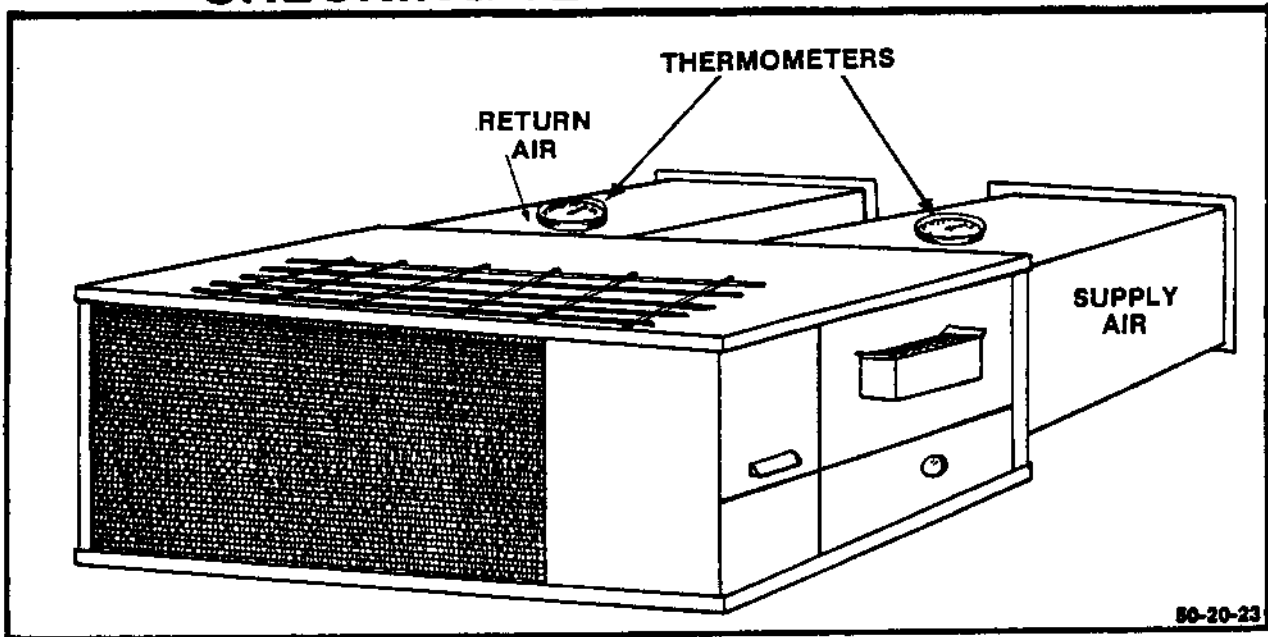
This measured input must not be greater than the input indicated on the rating plate of the furnace. Relight all other appliances turned off in step above.

Be sure all pilot burners are operating.

SECONDS FOR ONE REVOLUTION	SIZE OF TEST DIAL		
	1 CU. FT.	2 CU. FT.	3 CU. FT.
10	360	720	1800
11	327	655	1636
12	300	600	1500
13	277	555	1385
14	257	515	1286
15	240	480	1200
16	225	450	1125
17	212	424	1059
18	200	400	1000
19	189	379	974
20	180	360	947
21	171	343	857
22	164	327	818
23	157	313	788
24	150	300	750
25	144	288	720
26	138	277	692
27	133	267	667
28	129	257	643
29	124	248	621
30	120	240	600
31	116	232	581
32	113	225	563
33	109	218	545

SECONDS FOR ONE REVOLUTION	SIZE OF TEST DIAL			SECONDS FOR ONE REVOLUTION	SIZE OF TEST DIAL		SECONDS FOR ONE REVOLUTION	SIZE OF TEST DIAL	
	1 CU. FT.	2 CU. FT.	3 CU. FT.		2 CU. FT.	5 CU. FT.		2 CU. FT.	5 CU. FT.
34	106	212	529	62	116	290	110	—	164
35	103	206	514	84	112	281	112	84	161
36	100	200	500	66	109	273	116	62	155
37	97	195	486	68	106	285	120	60	150
38	95	189	479	70	103	257	125	—	144
39	92	185	462	72	100	250	130	—	138
40	90	180	450	74	97	243	135	—	132
41	—	176	439	76	95	237	140	—	129
42	88	172	429	78	92	231	145	—	124
43	—	167	419	80	90	225	150	—	120
44	82	164	409	82	88	220	155	—	116
45	80	160	400	84	86	214	160	—	113
46	78	157	391	86	84	209	165	—	109
47	—	153	383	88	82	205	170	—	106
48	75	150	375	90	80	200	175	—	103
49	—	147	367	92	78	196	180	—	100
50	72	144	360	94	—	192	—	—	—
—	—	—	—	96	75	188	—	—	—
52	69	138	348	98	—	184	—	—	—
54	67	133	333	100	72	180	—	—	—
56	64	129	321	102	—	176	—	—	—
58	62	124	310	104	69	173	—	—	—
60	60	120	300	106	—	170	—	—	—
—	—	—	—	108	67	167	—	—	—

CHECKING TEMPERATURE RISE



CHECK TEMPERATURE RISE

Check temperature rise through the unit by placing thermometer in supply and return air ducts, as close to the unit as possible.

All registers and duct dampers must be open and the unit should be operated for 15 minutes before taking readings.

It must be within the range specified on the rating plate.

With a properly designed system, the proper amount of temperature rise will normally be obtained when the unit is operating at rated input with the recommended blower speed.

If the correct amount of temperature rise is not obtained, when operating on the recommended blower speed, it may be necessary to change the blower speed. A higher blower speed will lower the temperature rise. A slower blower speed will increase the temperature rise.

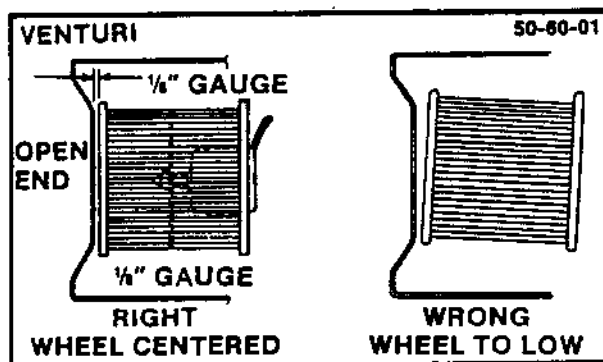
NOTE

Air temperature rise is the temperature difference between supply and return air.

EXAMPLE

If rating plate calls for 45°-70° temperature rise
 Supply Temp. 170°
 Return Temp. -70°
 Air Temp. Rise 100° = Increase blower speed.

BLOWER ASSEMBLY

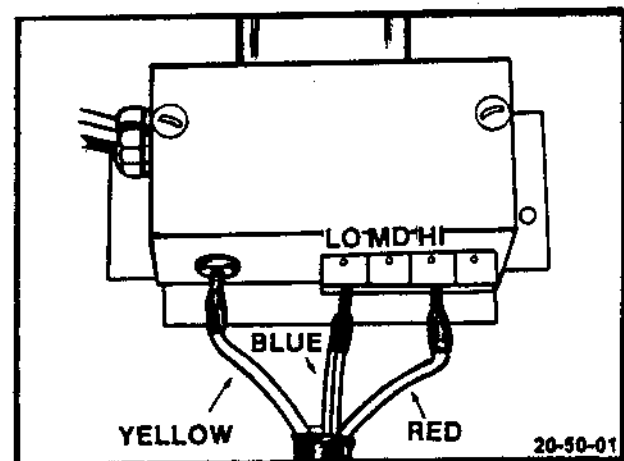


The blower wheel must be centered in the venturi on both the open end and motor end of the housing.

Place a piece of 1/8" gauge stock between venturi and wheel.

Pull wheel against gauge and lock into position.

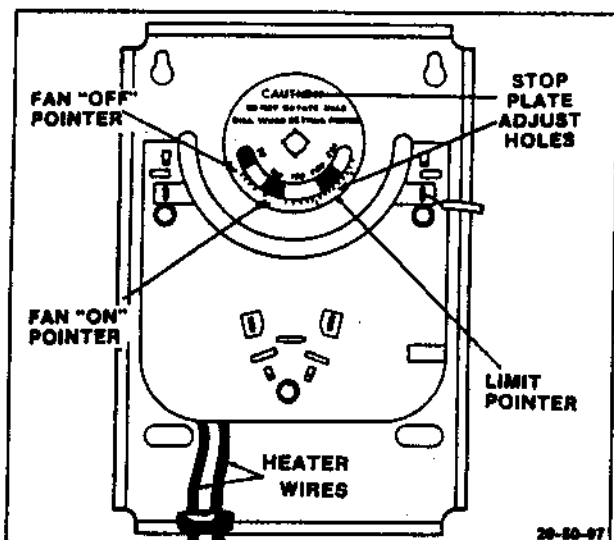
Oil motor by dropping 2 or 3 drops of 30 W. oil into each tube.



Air Flow can be increased (this will decrease the outlet air temperature) by changing the blower speed tap to a higher setting. The terminal block in the blower junction box makes this a simple operation. The red wire is plugged into the desired speed tap for heating. The blue wire is plugged into the desired speed tap for cooling.

FAN AND LIMIT CONTROL

(Honeywell-Timed On-Temperature Terminated)



Control is a timed on temperature terminated switch.

A 24 volt heater causes a "warp switch" in the fan and limit control to turn on the fan after furnace has fired.

HOW CONTROL WORKS

Start cycle.

Thermostat calls for heat.

Gas valve comes on; furnace fires.

Power goes to fan limit control.

24 volt heater starts to heat and approximately 46 seconds later blower starts.

CYCLE TERMINATES

Thermostat shuts off power to gas valve.

Furnace no longer fired, no power to heater.

Blower continues to run until "helix" of fan and limit control cools to preset temperature for fan cycle to end thermally for lack of heat.

BURNED OUT HEATER ELEMENT

Ohm out heater element using 0 x 10,000 scale. No reading - bad heater element, replace fan and limit control.

LIMIT CONTROL

Check limit control function after 15 minutes of operation by blocking the return grille(s).

After several minutes the main burners should go - OFF. Blower will continue to run.

Remove air restrictions and main burner will relight after a cool down period of a few minutes. Fan and limit controls are preset at the factory. Adjust the thermostat setting below room temperature.

Main burners should go off.

NOTE

Adjustment - DO NOT rotate dial when setting pointers.

If necessary adjust fan ON-OFF settings to obtain a satisfactory comfort level.

If fan runs too long after furnace shutdown and blows cold air, turn fan "OFF" pointer up a few degrees.

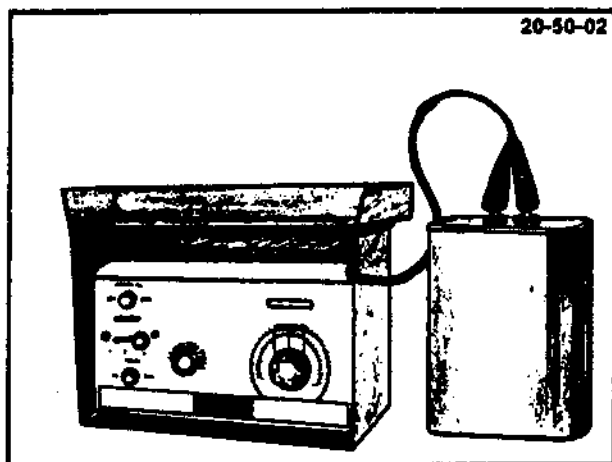
If fan goes off and then bumps on and off adjust fan "OFF" pointer a few degrees lower.

NOTE

The limit control is factory preset and must not be adjusted.

Stop plate adjustment (replacement). Use a piece of small wire, press down lightly on top hole located in the word "CAUTION". Turn plate by using another piece of wire turning plate to stop at specified setting. Then adjust limit pointer against "STOP".

CAPACITORS



WARNING

Hazard of shock and electrocution. A capacitor can hold a charge for long periods of time. A service technician who touches these terminals can be injured. Never discharge the capacitor by shorting across the terminals with a screwdriver.

Many motor capacitors are internally fused. Shorting the terminals will blow the fuse, ruining the capacitor. A 20,000-ohm, 2-watt resistor can be used to discharge capacitors safely.

CAPACITOR CHECK WITH CAPACITOR ANALYZER

The capacitor analyzer will show whether the capacitor is "open" or "shorted". It will tell whether the capacitor is within its microfarad rating and it will show whether the capacitor is operating at the proper power-factor percentage. The instrument will automatically discharge the capacitor when the test switch is released.

To use the analyzer, set the line-voltage switch to the proper setting. Set the range switch to the correct range in microfarads to match the capacitor value. Attach the leads to the capacitor and push the test switch to "TEST", and hold "ON". Now turn the microfarad dial until the "eye" is as sharp as you can obtain. (You may find it necessary to use the power-factor dial to make the eye very sharp.) This test will tell you two things, whether the capacitor is within its microfarad rating and whether it has an acceptable power rating. If the "eye" will not sharpen, the capacitor is either "open" or "shorted." By observing the eye, you can determine which by turning the microfarad dial all the way left for "open" or all the way right for "shorted".

OHMMETER CAPACITOR CHECK

Since capacitors used are generally quite large, always discharge them (with a resistor) before attempting any checks. The ohmmeter test is not recommended and, at the very best, gives only an indication that the capacitor could be good. Set the ohmmeter scale to Rx100 and connect the test probes to the terminals of the capacitor. A shorted capacitor registers instantly at zero ohms or extremely low resistance. A good capacitor will cause the pointer to move toward zero at the instant the leads are connected; then the pointer will slowly return toward the high resistance end of the scale. A capacitor with a broken wire will register infinity on the meter scale.

COMPRESSOR

CRANKCASE HEATER

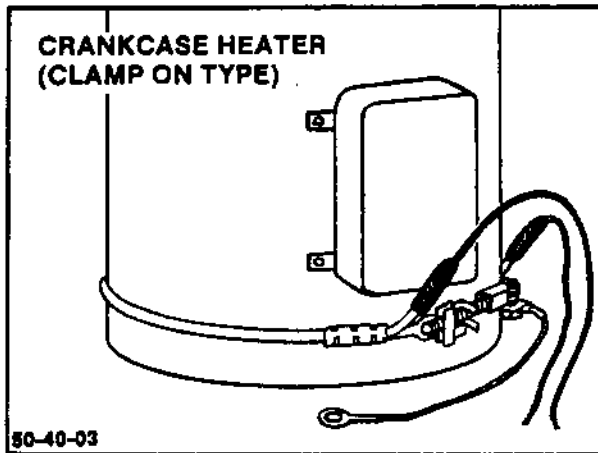
The crankcase heater will provide a small amount of heat at the bottom of the compressor to keep refrigerant from migrating to and storing in the compressor shell. This helps to prevent liquid slugging of the compressor when it starts.

WARNING

Danger of shock or electrocution. High voltage electricity. Use caution when working on equipment.

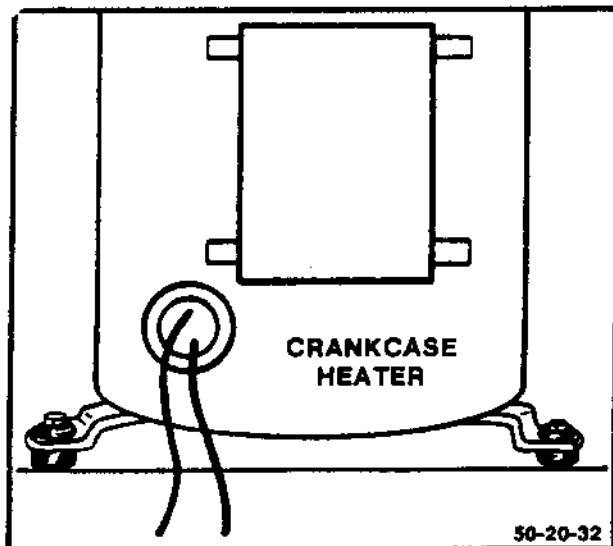
NOTE

Whenever the electric power is on, the compressor crankcase heater will be energized. If outdoor temperature is below 75°F, allow the unit to stay in this mode for 12 hours before attempting to start the compressor. This will allow the crankcase heater time to vaporize refrigerant in the compressor oil and prevent possible compressor damage.



CLAMP ON HEATERS

This type heater is nothing more than a resistance, it can be simply checked. Remove the wires to it, and using an ohmmeter, check from terminal to terminal for continuity, and from each terminal to ground. There should be no reading when checking for continuity.

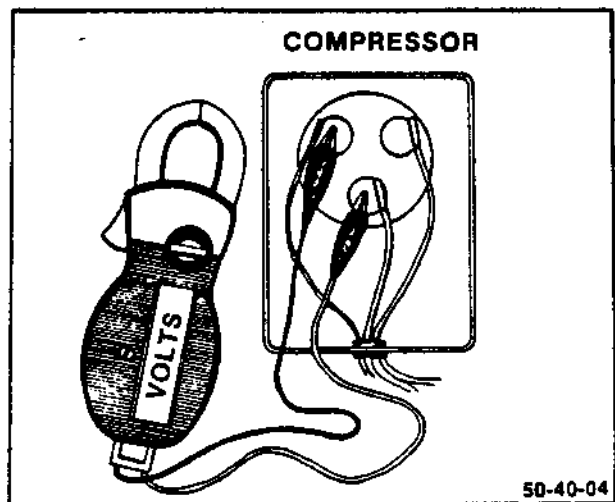


SOLID STATE HEATERS

It is not practical to check for resistance through this type of heater using an ohmmeter, but it can be checked to ground and for continuity. If the heater is grounded or shows an open circuit, it is defective. If it checks with continuity, it must still be checked with power on to insure that it functions by touching the heater when the compressor is off and the oil sump has cooled down to ambient temperature. The assembly should feel warm to the touch.

LOCKED ROTOR VOLTAGE (L.R.V.) TEST

Locked rotor voltage (L.R.V.) is the actual voltage available at the compressor under a stalled condition.



CAUTION

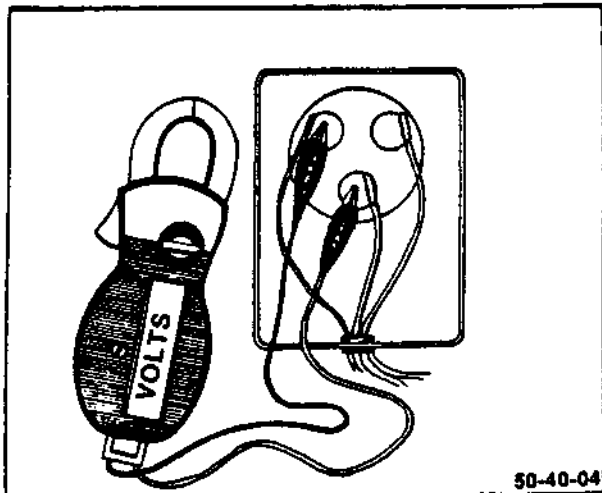
Make sure that the ends of the lead do not touch the compressor shell since this will cause a short circuit.

Start the unit with the voltmeter attached; then stop the unit. Attempt to restart the unit within a couple of seconds and immediately read the voltage on the meter. The unit under these conditions will not start and will usually kick out on overload within just a few seconds since the pressures in the system will not have had time to equalize.

SINGLE PHASE COMPRESSORS

Using a voltmeter, attach one lead of the meter to the run "R" terminal on the compressor and the other lead to the common "C" terminal of the compressor. Voltage should be minimum voltage and above as specified on the rating plate.

COMPRESSOR



THREE PHASE COMPRESSORS

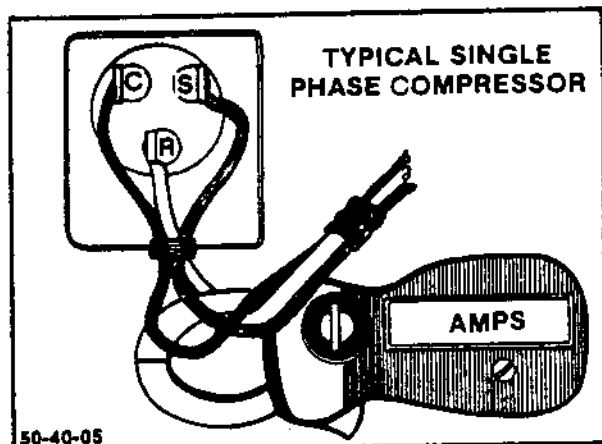
With a voltmeter, check L.R.V. at the compressor between terminals "T1" to "T2" and "T3". Voltage should be minimum voltage and above as specified on the rating plate.

LINE VOLTAGE UNBALANCE

Checking the voltage to the compressor is very important to determine if the line voltage balance is equal. Check each line to the compressor for voltage balance. The voltage on each line must be equal to the other lines. If they are not, excessive internal temperatures will result. If you have a motor that is "tripped out" on overload for no apparent reason, check the line voltage for an unbalanced condition. If the line voltages are not equal, contact the local power company or utility.

RUNNING AND LOCKED ROTOR AMPERAGE (L.R.A.) TEST

The running amperage of the compressor is the most important of these readings. A running amperage higher than that indicated in the performance data indicates that the compressor is overloaded.

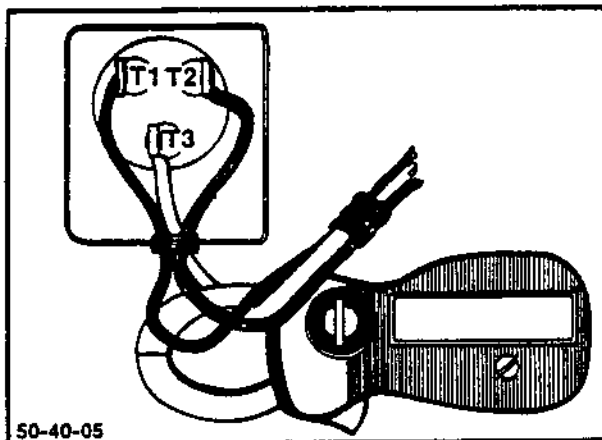


SINGLE PHASE RUNNING AND L.R.A. TEST

Consult the specification and performance section for running amperage. The L.R.A. can also be found on the rating plate.

Select the proper amperage scale and clamp the meter probe around the wire to the "C" terminal of the compressor.

Turn on the unit and read the running amperage on the meter. If the compressor does not start, the reading will indicate the locked rotor amperage (L.R.A.).



THREE PHASE RUNNING AND L.R.A. TEST

Consult the specification and performance section for running amperage. The L.R.A. can also be found on the rating plate.

Select the proper amperage scale and clamp the meter probe around "any" of the leads going to the compressor terminals.

Turn on the unit and read the running amperage on the meter. If the compressor does not start, the reading will indicate the locked rotor amperage (L.R.A.).

INTERNAL OVERLOAD

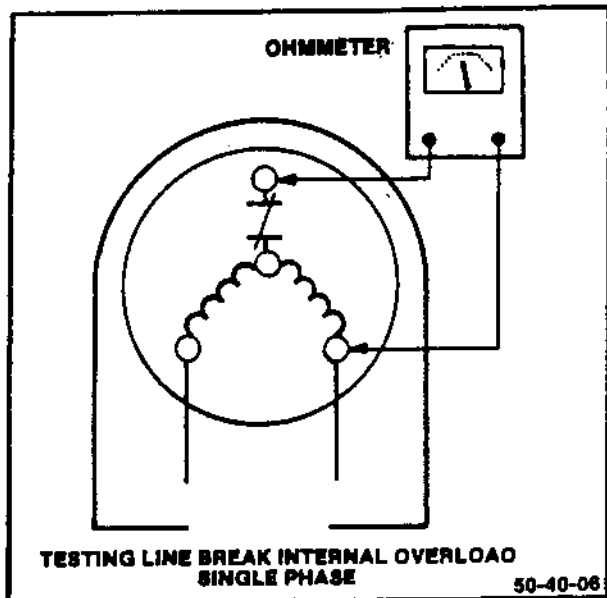
The compressor is equipped with an internal overload which senses both motor amperage and winding temperature. High motor temperature or amperage heats the overload causing it to open, breaking the common circuit within the compressor.

Heat generated within the compressor shell, usually due to recycling of the motor, high amperage or insufficient gas to cool the motor, is slow to dissipate. It may take anywhere from a few minutes to several hours for the overload to reset.

NOTE

If a check indicates an open overload and there is any doubt about the compressor's internal temperature, wait 12 to 24 hours and recheck before condemning the compressor.

COMPRESSOR

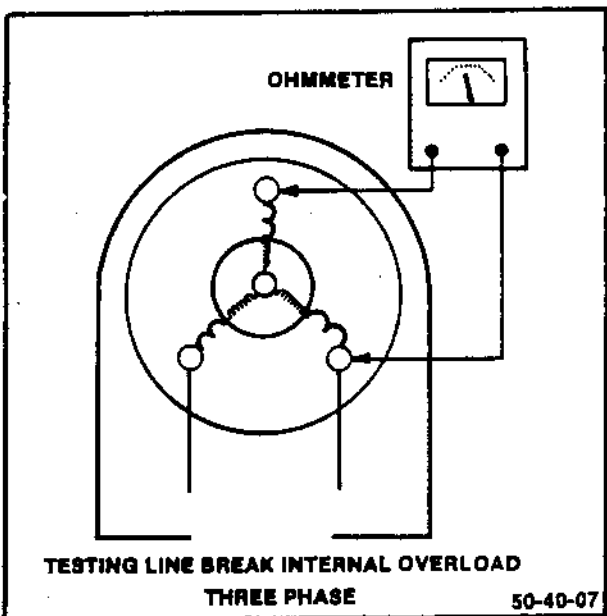


CHECKING INTERNAL OVERLOAD SINGLE PHASE

With power off, remove the leads from the compressor terminals.

Using an ohmmeter, test continuity between terminals "C" to "S" and "C" to "R".

If test is not continuous, the overload is open and the compressor must be replaced.



CHECKING INTERNAL OVERLOAD THREE PHASE

With power off, remove the leads from the compressor terminals.

Using an ohmmeter, test continuity between terminals "T1" to "T2" and "T3".

If test is not continuous between any two terminals, the overload is open and the compressor must be replaced.

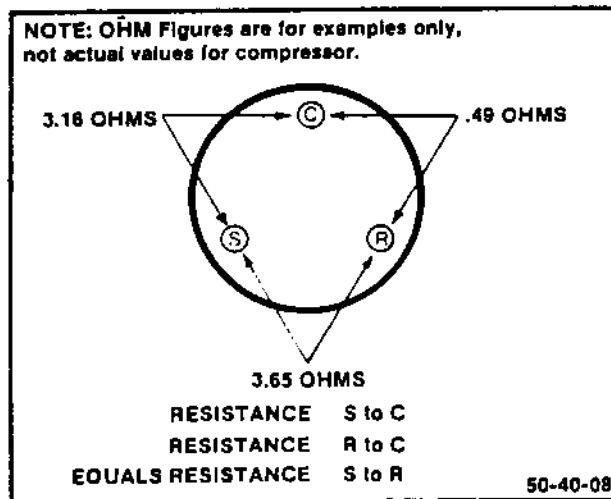
CHECKING FOR INTERNAL GROUNDING

Using an ohmmeter set on its highest scale, touch one lead to the compressor suction line and the other lead to each compressor terminal. If any reading (or continuity exists) compressor is grounded and must be replaced.

RESISTANCE TEST AND TERMINAL IDENTIFICATION

NOTE

Before testing the windings, make sure the compressor is cool so the internal overload is closed.



TERMINAL IDENTIFICATION SINGLE PHASE

In a single phase PSC compressor motor, the highest value will be from the start to the run connections ("S" to "R"). The next highest resistance is from the start to the common connections ("S" to "C"). The lowest resistance is from run to common connections ("R" to "C"). By using this method, the terminal can be identified.

SINGLE PHASE RESISTANCE TEST

Remove the lead from the compressor terminals.

Set ohmmeter on lowest scale (R x 1).

Touch the leads of the ohmmeter from terminals common to start ("C" to "S") and common to run terminals ("C" to "R").

Add values "C" to "S" and "C" to "R" together and check resistance from start to run terminals ("S" to "R"). Resistance "S" to "R" should equal the total of "C" to "S" and "C" to "R".

THREE PHASE RESISTANCE TEST

Remove the leads from the compressor terminals.

Set ohmmeter on lowest scale (R x 1).

Touch the leads of the ohmmeter to terminals "T1" to "T2" and "T3". The resistance values should be equal between all terminals.

SYSTEM REFRIGERANT CHARGE AND TROUBLE SHOOTING

The refrigerant charge for this unit is very critical. Refrigerant charge must be within ± 2 ozs. of the correct charge specified for the unit. **DO NOT ADD REFRIGERANT.** This is a sealed system. If unit is low on refrigerant, the system has a refrigerant leak and it must be repaired.

If there is any question of the system being overcharged or undercharged, purge the charge, evacuate the system and recharge with the correct weigh-in-charge. This is the only recommended procedure for charging the system.

SUCTION LINE COOL (Below 75°F)

Do not install gauges.

- A. Indicates a light load condition on the evaporator coil
 - 1. Low air flow caused by
 - a. Dirty evaporator coil
 - b. Dirty evaporator blower
 - c. Evaporator motor running slow (wrong speed tap, etc.) or backwards (wrong motor, bad capacitor, wrong phase, etc.)
 - d. Supply air closed or blocked
 - e. Return air restricted (dirty filters, grill restricted, etc.)
 - f. Undersized duct system
- B. Overcharge of refrigerant

SUCTION LINE WARM (Above 75°F)

- A. Refrigerant undercharge (check for refrigerant leak)
- B. Heavy load condition on evaporator
 - 1. Undersized unit for the structure
 - 2. Break in return duct (outside air across evaporator)
 - 3. Unit heating and cooling at the same time
 - 4. Excessive humidity inside the structure from dryer vents, showers, etc.
- C. Restriction of refrigerant flow in the system
 - 1. Capillary tube strainer
 - 2. Kink in tubing, etc.
- D. Compressor valves leaking or broken

SUCTION LINE WARM SYSTEM NOT COOLING

Install test gauges.

Compare gauge reading to specifications.

HEAD PRESSURE	SUCTION PRESSURE	POSSIBLE CAUSE
LO	LO	Undercharge
LO	LO	Restriction
HI	HI	Heavy Load
HI	HI	Air in refrigeration system
LO	HI	Compressor valve defective

SPECIFICATIONS

Model No.	SINGLE PHASE				THREE PHASE			
	PGA24A090	PGA30A090	PGA36A090	PGA48A120	PGA60A145	PGA48B120	PGA60B145	
Electrical Data								
General Information	230-1-60	230-1-60	230-1-60	230-1-60	230-1-60	208-230-3-60	208-230-3-60	
Wire Size/Max. Length	#12/52'	#10/66'	#10/55'	#6/90'	#6/85'	#10/50'	#8/70'	
Time Delay Fuse/HACR Breaker	25/30 amps	30/35 amps.	35/40 amps.	50/60 amps.	60/70 amps	35/40 amps.	40/45 amps.	
Max. Fuse Size	30 amps.	35 amps.	40 amps.	60 amps.	70 amps.	40 amps.	45 amps.	
Ampacity	18.0	22.3	24.3	41.2	43.9	25.9	30.4	
Condenser Data								
Coil: Total Face Area (Sq. Ft.)	7.5	7.5	7.5	11.25	11.25	11.25	11.25	
Fins: Per In./Rows	18/1	18/1	18/2	18/2	18/2	18/2	18/2	
Tube Dia.	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"	
Fan: H.P. Type	1/2/PSC	1/2/PSC	1/2/PSC	1/2/PSC	1/2/PSC	1/2/PSC	1/2/PSC	
Motor: Full Load Amps	1.3	1.3	1.8	3.0	3.5	3.0	3.5	
Locked Rotor Amps	2.2	2.2	5.4	6.9	7.7	6.9	7.7	
Fan: Size Dia.	20"	20"	22"	22"	24"	22"	24"	
RPM (Max.)	1100	1100	1100	1100	1100	1100	1100	
CFM (Max.)	2600	2600	3200	3200	3400	3200	3400	
Evaporator Data								
Coil: Total Face Area (Sq. Ft.)	4.0	3.25	4.0	5.4	5.4	5.4	5.4	
Fins Per In./Rows	14/2	14/3	14/3	14/3	14/3	14/3	14/3	
Tube Dia.	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"	
Blower Motor: H.P./Type Speeds	1/2/PSC/2	1/2/PSC/2	1/2/PSC/2	1/2/PSC/2	1/2/PSC/2	1/2/PSC/2	1/2/PSC/2	
Full Load Amps	1.7	1.7	3.2	4.4	4.4	4.4	4.4	
Locked Rotor Amps	4.5	4.5	7.8	11.0	11.0	11.0	11.0	
Blower: Type & Size	DD9-6	DD9-6	DD10-7	DD10-10	DD10-10	DD10-10	DD10-10	
RPM (Max.)	1100	1100	1100	1100	1100	1090	1100	
CFM (Rated)	800	1000	1200	1600	1800	1600	1800	
Compressor Data								
Full Load Amps.	12.0	15.4	15.4	27.0	28.8	14.8	18.0	
Locked Rotor Amps.	53	75	81	121	139	90	104	
Factory Refrigerant Charge (R-22)	49 oz.	47 oz.	90 oz.	113 oz.	127 oz.	113 oz.	127 oz.	
Weights: Shipping (Lbs.) (Approx.)	470	482	511	670	679	700	679	

APPLICATION DATA

Model No.	OUTDOOR AMBIENT TEMPERATURE -- DEGREES F. DRY BULB																							
	65°				75°				85°				95°				105°				115°			
	*ENTERING INDOOR TEMPERATURE -- DEGREES F. WET BULB																							
	63	65	67	69	63	65	67	69	63	65	67	69	63	65	67	69	63	65	67	69	63	65	67	69
SINGLE PHASE																								
	STANDARD RATING																							
PGA24A	22.8	23.5	24.2	25.0	23.0	23.7	24.4	25.2	22.9	23.6	24.3	25.1	22.3	23.0	24.0	24.4	21.2	21.8	22.5	23.2	19.5	20.1	20.7	21.4
PGA30A	27.9	28.7	29.6	30.5	28.2	29.0	29.9	30.8	28.0	28.8	29.7	30.7	27.3	28.1	29.0	29.9	26.0	26.7	27.5	28.4	23.9	24.6	25.3	26.1
PGA36A	33.3	34.2	35.3	31.4	33.6	34.6	35.7	36.8	33.2	34.4	35.4	36.6	32.6	33.5	34.6	35.7	31.0	31.9	32.8	33.9	28.5	29.3	30.2	31.2
PGA48A	46.2	47.5	49.0	50.5	46.7	48.0	49.5	51.1	46.4	47.7	49.2	50.6	45.2	46.5	48.0	49.5	43.0	44.2	45.6	47.0	39.5	40.7	41.9	43.3
PGA60A	56.8	58.4	60.2	62.1	57.3	59.0	60.8	62.8	57.0	58.6	60.4	62.4	55.8	57.1	59.0	60.8	52.8	54.3	56.0	57.8	48.6	50.0	51.5	53.2
THREE PHASE																								
PGA48B	48.1	49.5	51.0	52.6	48.6	50.0	51.5	53.2	48.3	49.7	51.2	52.9	47.1	48.5	50.0	51.5	44.8	46.0	47.5	49.0	41.2	42.3	43.7	45.1
PGA60B	55.3	56.9	58.7	60.5	55.9	57.5	59.3	61.2	55.6	57.1	58.9	60.8	54.1	55.7	57.5	59.3	51.5	52.9	54.6	56.3	47.3	48.7	50.2	51.8

BTUH = 1000 x Value shown.

* All entering air based on 80° Dry Bulb.

For applications at 208 Volts, deduct 1000 BTU.

PERFORMANCE DATA: HEATING

Model Number	PGA24A090			PGA30A090			PGA36A090			PGA48A120 PGA48B120			PGA60A145 PGA60B145							
Capacity																				
Input (M/BTUH)	60	80	90†	60	80	90†	60	80	90†	80	100	120†	80	130	145†					
*Heating Capacity (M/BTUH)	48.0	65.0	70.0	48.0	65.0	70.0	50.0	65.0	71.0	65.0	81.0	93.0	68.0	106.0	118.0					
A.F.U.E. %	76.9	77.3	73.5	76.9	77.3	73.5	79.7	78.1	73.7	79.7	77.4	72.2	81.2	78.3	77.8					
Temp. Rise (°)	35	50	50	35	50	50	35	50	50	55	55	55	50	60	60					
Gas Piping Size	1/2"			1/2"			1/2"			1/2"			1/2"							
Burners (Number)	3			3			3			4			5							
Transformer Size (VA)	40			40			40			40			40							
Filter Data (Field Supplied)																				
Area (Sq. In.)	528		320		528		320		600		400		828		500		960		575	
Type	Disp.		Wash		Disp.		Wash		Disp.		Wash		Disp.		Wash		Disp.		Wash	

*As determined by D.O.E. Steady State Efficiency Rating Test. Heating capacity valid for elevations up to 2,000 feet above sea level. For elevations above 2,000 feet, rated capacity should be reduced by 4% for each 1,000 feet above sea level.

†Units stocked at this input. Derate orifices furnished with each unit at no charge.

BLOWER PERFORMANCE							
Model Number	Motor Speed	Air Delivery in CFM Ext. Static Pressure (In. W.C.)					
		.10	.20	.30	.40	.50	
PGA24A090 PGA30A090 (Cooling) 1 Phase	230V	Lo. Md. Hi.	900 — 1240	890 — 1185	865 — 1125	825 — 1050	780 — 975
PGA24A090 PGA30A090 (Heating) 1 Phase	230V	Lo. Md. Hi.	890 — 1185	865 — 1125	825 — 1050	780 — 975	705 — 870
PGA36A090 (Cooling) 1 Phase	230V	Lo. Md. Hi.	1090 1370 1615	1090 1335 1575	1070 1300 1525	1040 1255 1460	1010 1200 1390
PGA36A090 (Heating) 1 Phase	230V	Lo. Md. Hi.	1110 1420 1710	1105 1400 1660	1085 1395 1610	1080 1340 1555	1055 1295 1490
PGA48A120 PGA48B120 (Cooling) 1 & 3 Phase	230V	Lo. Md. Hi.	— — —	1600 — 2075	1630 — 2035	1635 — 1985	1615 — 1885
PGA48B120 (Cooling) 3 Phase	208V	Lo. Md. Hi.	— — —	1515 — 1895	1480 — 1875	1425 — 1830	1380 — 1775
PGA48A120 PGA48B120 (Heating) 1 & 3 Phase	230V	Lo. Md. Hi.	1855 — 2220	1675 — 2185	1685 — 2135	1685 — 2070	1675 — 2000
PGA48B120 (Heating) 3 Phase	208V	Lo. Md. Hi.	1600 — 1955	1575 — 1945	1560 — 1930	1540 — 1905	1495 — 1870

BLOWER PERFORMANCE							
Model Number	Motor Speed	Air Delivery in CFM Ext. Static Pressure (In. W.C.)					
		.10	.20	.30	.40	.50	
PGA60A145 PGA60B145 (Cooling) 1 & 3 Phase	230V	Lo. Md. Hi.	1555 — 1995	1520 — 1950	1480 — 1900	1445 — 1855	1385 — 1780
PGA60B145 (Cooling) 3 Phase	208V	Lo. Md. Hi.	1540 — 1940	1500 — 1875	1460 — 1850	1425 — 1805	1370 — 1725
PGA60A145 PGA60B145 (Heating) 1 & 3 Phase	230V	Lo. Md. Hi.	1705 — 2120	1680 — 2035	1660 — 1955	1600 — 1875	1550 — 1775
PGA60B145 (Heating) 3 Phase	208V	Lo. Md. Hi.	1610 — 2065	1580 — 1965	1530 — 1890	1480 — 1810	1435 — 1730

Note:
Heating air delivery shown as dry coil operation.
Cooling air delivery shown as wet coil operation.

IMPORTANT

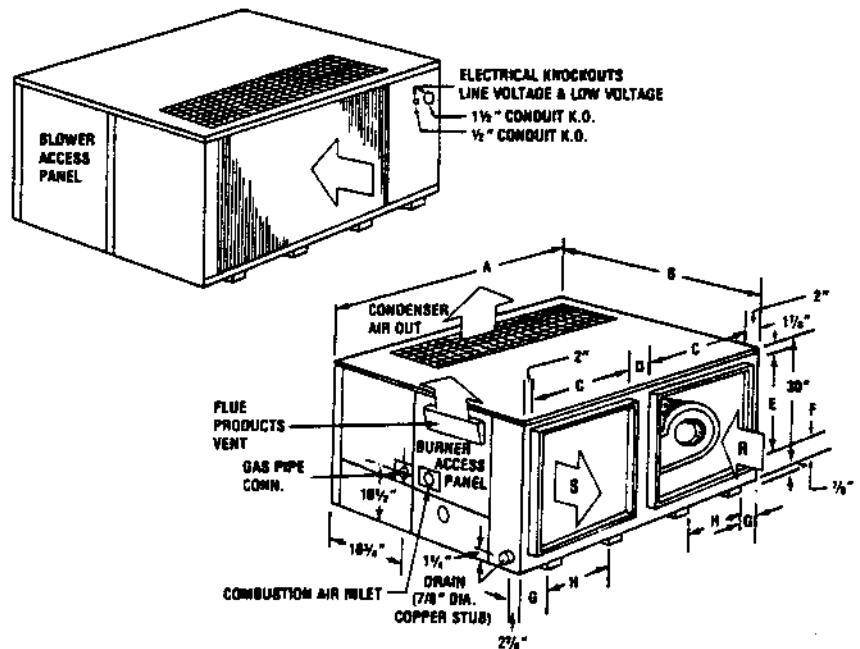
While this electrical data is presented as a guide, it is important to electrically connect properly-sized fuses and conductor wires in accordance with the National Electrical code and all existing local codes.

Specifications subject to change without notice.

Dimensions

Model No.	A	B	C	D	E	F	G	H	Gas Pipe Size
PGA24A090 PGA30A090 PGA36A090	52	40 ^{3/32}	22	3 ^{1/16}	26 ^{1/16}	2	6	12 ^{3/4}	1/2
PGA48A120 PGA48B120	70	43 ^{2/32}	30	5 ^{5/32}	27 ^{1/2}	1 ^{1/4}	6	18 ^{1/8}	1/2
PGA60A145 PGA60B145	70	47 ^{3/32}	30	5 ^{5/32}	27 ^{1/2}	1 ^{1/4}	6	18 ^{1/8}	1/2

All dimensions in inches.



INSTALLATION INSTRUCTIONS TECHNICAL SUPPORT MANUAL

AND

PARTS LIST

FOR

COMBINATION ELECTRIC COOLING & GAS HEATING UNITS SINGLE PHASE MODELS

PGA24A060

PGA24A090

PGA30A060

PGA30A090

PGA36A060

PGA36A090

PGA36A120

PGA42A060

PGA42A090

PGA42A120

PGA48A080

PGA48A120

PGA48A145

PGA60A080

PGA60A120

PGA60A145

THREE PHASE MODELS

PGA36B090

PGA48B080

PGA48B120

PGA60B080

PGA60B145

Unpacking the Unit

After removing the shipping carton, check the unit's rating plate for correct model number and whether the unit requires single or three phase electrical service.

Dispose of packing material.

ACCESSORIES

Any supplemental accessory to be installed with the unit is packaged separately. Installation and operating instructions are packed with each accessory.

General Requirements and Information

This unit must be installed in compliance with local codes and ordinances or, in their absence, with the National Fuel Gas Code (ANSI Z223.1-1984) and the National Electrical Code (ANSI/NFPA No. 70-1984).

Unit sizing, system design, layout and construction should conform to accepted principles of good practice.

The rated heating capacity for the furnace is based on operation at sea level. This rating may be used, when determining unit requirements in relation to heating load, for elevations up to 2000 feet. For operations

above 2000 ft. elevation, reduce the rated capacities by 4 percent for each 1000 ft. above sea level.

The unit utilizes electric spark ignition in place of a continuous operating pilot. The ignition circuit operates on 24 VAC 60 HZ current with a consumption of approximately 1 watt during the ignition cycle and while the pilot is on.

Figures 1 and 2 show the access panels and general description of the unit.

FIG. 1 BLOWER END—SUPPLY AND RETURN CONDENSER DISCHARGE

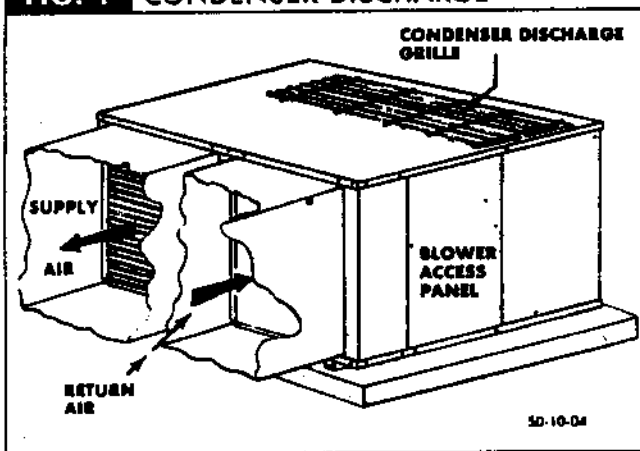
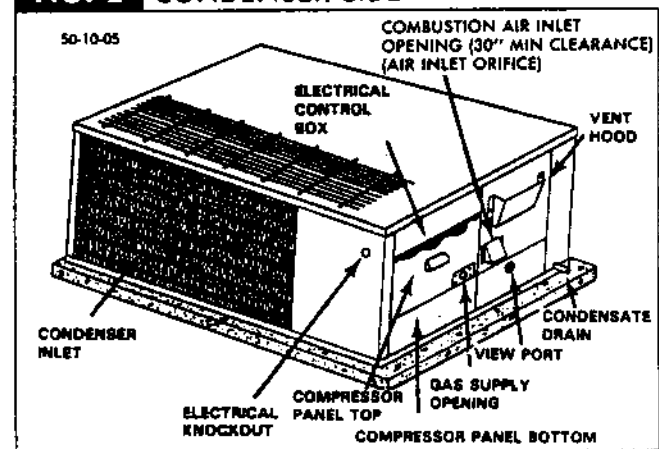


FIG. 2 COMPRESSOR END—CONDENSER SIDE



Locating the Unit

The unit is designed for outdoor installations only. The unit may be installed on a concrete mounting base at ground level, or on a rooftop with an adequate platform. Typical installations are shown in Fig. 3 and Fig. 4.

Do Not Install the unit inside a building, attic or crawl space.

The location must allow for minimum clearances and should not be adjacent to a patio or other area where the unit's operating sound level might be objectionable. The combination air inlet openings must not be obstructed (See Fig. 2). In addition, local codes should be observed.

CLEARANCES

Minimum clearances, as specified, must be maintained from adjacent structures to provide adequate fire protection, adequate combustion air, and room for service personnel.

While minimum clearances are acceptable for safety reasons, they may not allow adequate air circulation around the unit for proper operation in the cooling mode. Whenever possible, it is desirable to allow additional clearance, especially around the condenser inlet and discharge openings.

Do Not Install the unit in a location that will permit discharged air from the condenser to recirculate to the condenser inlet.

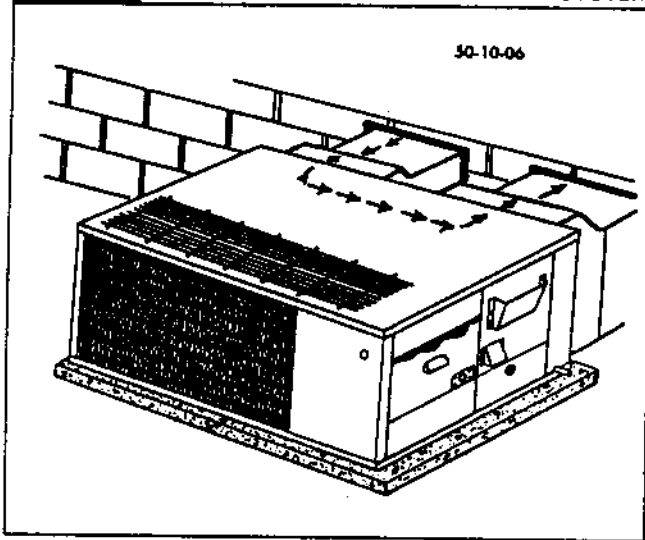
Minimum Clearances to Combustible Construction

Furnace Plenum	2"
Duct Side	6"
Condenser Inlet Side	30"
Blower Service (Rear)	30"
Control Service Side (Front Combustion Air Inlet)	30"
Clearance between 3 Ft. Overhand and Top of Unit	30"
Combustible Base (Wood or Class A, B or C roof covering material)	0"

GROUND LEVEL INSTALLATION

Provide a level wood platform (pressure treated) or a concrete mounting base at least 4" thick and separate from the building foundation. The base surface should be 4" above grade level in an area that is well drained.

FIG. 3 TYPICAL INSTALLATION, BASEMENT OR CRAWL SPACE DISTRIBUTION SYSTEM

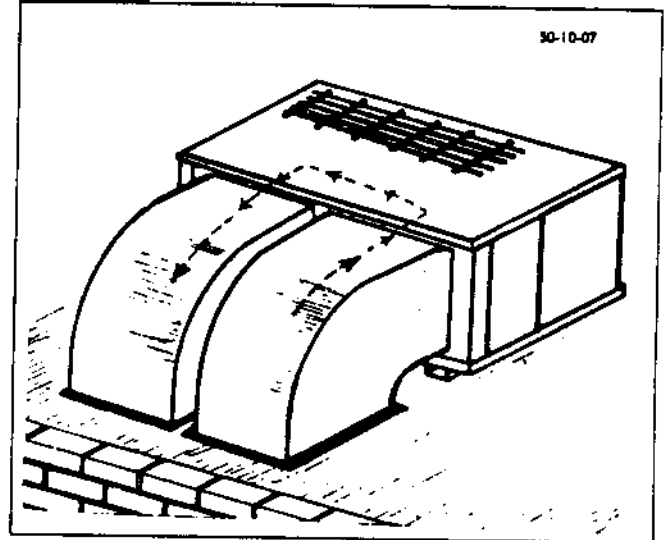


ROOFTOP INSTALLATION

The existing roof structure must be adequate to support the weight of the unit or the roof must be reinforced. Check the weight of the unit (Reference Figure 7) in relation to the roof structure and local building codes or ordinances.

The unit must be situated to provide safe access for servicing. Support for the unit must be level and may consist of a platform or a combination of platform and roof beams or curb. The platform may be constructed of combustible material (wood only, or covered with Class A, B, or C roof covering).

FIG. 4 TYPICAL ROOFTOP INSTALLATION ATTIC OR DROP CEILING DISTRIBUTION SYSTEM



Gas Supply and Piping

The A.G.A. Rating Plate located on the side panel on the unit, contains the model number, type of gas and gas input rating, and other important information.

WARNING

**DANGER OF PROPERTY DAMAGE,
BODILY INJURY OR DEATH**

MAKE CERTAIN THE UNIT IS EQUIPPED TO OPERATE ON THE TYPE OF GAS AVAILABLE. MODELS DESIGNATED AS NATURAL GAS ARE TO BE USED WITH NATURAL GAS ONLY.

MODELS DESIGNATED FOR USE WITH LIQUEFIED PETROLEUM (L.P.) GAS ARE SHIPPED WITH ORIFICES SIZED FOR COMMERCIALLY PURE PROPANE GAS. THEY MUST NOT BE USED WITH BUTANE OR A MIXTURE OF BUTANE AND PROPANE UNLESS PROPERLY SIZED ORIFICES ARE INSTALLED BY A LICENSED L.P. INSTALLER.

When installing a unit for operation on Propane Gas the connections from the Bulk Storage Tank to the furnace can only be made by a licensed L.P. dealer.

GAS SUPPLY

Recommended gas supply pressures for the unit are 7" water column pressure for Natural Gas and 11" water column pressure for L.P. Gas with all other gas appliances fired. A maximum gas supply pressure of 13" water column should not be exceeded on either gas. The minimum gas supply pressure of 4½" water column for Natural Gas and 11" water column for L.P. should not be allowed to vary downward because this will decrease the input to the unit.

Gas input to the burners must not exceed the rated input shown on the rating plate. On Natural Gas the manifold pressure should be 3.5" water column. The manifold pressure should be 10" water column for L.P. Gas. See note, Fig. 7, for operation above 2000 feet altitude. Orifice change or manifold pressure adjustment may be required to suit gas supplied. Check with the gas supplier.

Orifice Sizes

The orifice in the pilot burner varies with the type of gas. Orifice sizes for Natural and Propane Gas are listed below.

TYPE OF GAS	PILOT ORIFICE SIZE
	NATURAL
PROPANE	.010

GAS PIPING

The gas supply line must be of adequate size to handle the BTU/HR requirements and length of the run for the unit being installed.

Determine the minimum pipe size from the table, basing the length of the run from the gas meter or source to the unit.

BTU rating of all other gas appliances must be considered for sizing of main gas line.

Check gas line to installation for compliance with local codes.

FIG. 5 GAS PIPE SIZE

NATURAL GAS				
LENGTH OF PIPE-FT.	PIPE CAPACITY - BTU PER HOUR (INCLUDES FITTINGS) PIPE SIZE.			
	1/2"	3/4"	1"	
20	92,000	190,000	350,000	
40	63,000	130,000	245,000	
60	50,000	105,000	195,000	
L.P. GAS				
LENGTH OF PIPE-FT.	PIPE CAPACITY-BTU PER HOUR (INCLUDES FITTINGS)			
	1/2"	3/4"	1"	
20	189,000	393,000	732,000	
40	129,000	267,000	504,000	
60	103,000	217,000	409,000	

Connecting the Gas Piping

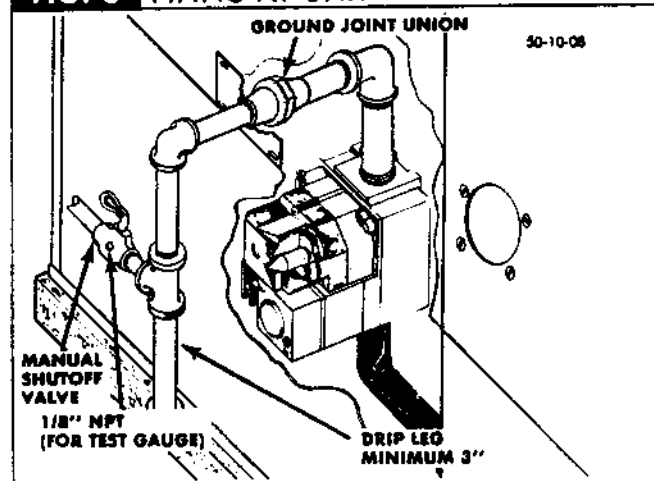
Refer to Fig. 6 for the general layout at the unit. It shows the basic fittings needed.

The following rules apply:

1. Use steel or wrought iron pipe and fittings.
2. Use pipe joint compound on male threads only. Pipe joint compound must be resistant to the action of LP gases.
3. Use ground joint unions.

4. Install a drip leg to trap dirt and moisture before it can enter the gas valve. Drip leg must be a minimum of 3 inches long.
5. Install a manual shut-off valve.
6. Provide a 1/8 NPT test gauge connection immediately upstream of the gas supply connection to the furnace.
7. If installation is for Propane Gas, have L.P. installer use two-stage regulation and make all connections from storage tank to unit.
8. Use two pipe wrenches when making the connection to the valve to prevent turning, or damage to gas valve.
9. Tighten all joints securely.

FIG. 6 PIPING AT UNIT



Checking The Gas Piping

When checking gas piping going to the furnace, shut off the manual gas valve for the furnace. Gas pressure must not exceed 1/2 PSIG.

If gas piping is to be checked with pressures above 1/2 PSIG, the furnace and manual shutoff valve must be disconnected from the line during testing.

WARNING

**DANGER OF PROPERTY DAMAGE,
BODILY INJURY OR DEATH**

NEVER USE A MATCH OR OPEN FLAME TO TEST FOR LEAKS. NEVER EXCEED SPECIFIED PRESSURES FOR TESTING. HIGHER PRESSURES MAY DAMAGE THE GAS VALVE AND CAUSE OVERFIRING WHICH MAY RESULT IN HEAT EXCHANGER FAILURE. LIQUEFIED PETROLEUM (L.P.) GAS IS HEAVIER THAN AIR AND IT WILL SETTLE IN ANY LOW AREA, INCLUDING OPEN DEPRESSIONS AND IT WILL REMAIN THERE UNLESS AREA IS PROPERLY VENTILATED.

IF YOU SUSPECT THE PRESENCE OF GAS IMMEDIATELY CALL YOUR GAS SUPPLIER.

Air Distribution System

Ductwork, supply registers, return air grilles and filters must be designed and sized to handle the greater of the units heating or cooling air volume requirements.

If the unit is connected to an existing system, the ductwork must be checked to make sure it is adequate. Extra runs or larger duct sizes may have to be installed.

FIG. 7 CAPACITIES AIR DELIVERY

Model Number	Type Gas	Capacity—Btuh			Air Flow**				Unit Wt/lbs
		***Heating		Static Press.	Heating—Dry Coil		Cooling—Wet Coil		
		Input	Output		Speed Tap	CFM	Speed Tap	CFM	
PGA24A090 *PGA24A060	NAT.	*60,000	47,000	.25	LOW	870	LOW	800	500
		*80,000	63,000	.28	HIGH	1150	LOW	800	500
		90,000	68,000	.28	HIGH	1150	LOW	800	500
PGA30A090 *PGA30A060	NAT.	*60,000	47,000	.25	LOW	875	HIGH	1000	500
		*80,000	63,000	.28	HIGH	1150	HIGH	1000	500
		90,000	68,000	.28	HIGH	1150	HIGH	1000	500
PGA36A090 *PGA36A060	NAT.	*60,000	48,000	.25	LOW	1090	MED	1200	505
		*80,000	63,000	.28	LOW	1090	MED	1200	505
		90,000	68,000	.28	MED	1370	MED	1200	505
PGA36A120	NAT.	80,000	63,000	.28	LOW	1015	MED	1200	585
		100,000	78,000	.28	MED	1300	MED	1200	585
		120,000	87,000	.33	HIGH	1530	MED	1200	585
PGA42A120	NAT.	80,000	63,000	.28	LOW	1015	HIGH	1430	590
		100,000	78,000	.28	HIGH	1560	HIGH	1430	590
		120,000	87,000	.33	HIGH	1530	HIGH	1430	590
PGA42A090 *PGA42A060	NAT.	*60,000	48,000	.25	LOW	1015	HIGH	1475	520
		*80,000	63,000	.28	LOW	1015	HIGH	1475	520
		90,000	68,000	.28	MED	1335	HIGH	1475	520
PGA48A120 *PGA48A080	NAT.	*80,000	64,000	.28	LOW	1695	LOW	1625	660
		*100,000	79,000	.28	LOW	1695	LOW	1625	660
		120,000	90,000	.33	LOW	1680	LOW	1625	660
PGA60A120 *PGA60A080	NAT.	*80,000	64,000	.28	LOW	1695	HIGH	1860	665
		*100,000	79,000	.28	LOW	1695	HIGH	1860	665
		120,000	90,000	.33	LOW	1680	HIGH	1860	665
PGA48A145	NAT.	80,000	66,000	.28	LOW	1675	LOW	1600	700
		130,000	103,000	.33	HIGH	2000	LOW	1600	700
		145,000	115,000	.33	HIGH	2000	LOW	1600	700
PGA60A145	NAT.	80,000	66,000	.28	LOW	1650	HIGH	1800	705
		130,000	103,000	.33	HIGH	1950	HIGH	1800	705
		145,000	115,000	.33	HIGH	1950	HIGH	1800	705
THREE PHASE PGA36B090	NAT.	60,000	48,000	.25	LOW	1090	MED	1200	505
		80,000	63,000	.28	LOW	1090	MED	1200	505
		90,000	68,000	.28	MED	1370	MED	1200	505
PGA48B120 *PGA48B080	NAT.	*80,000	64,000	.28	LOW	1695	LOW	1625	660
		*100,000	79,000	.28	LOW	1695	LOW	1625	660
		120,000	90,000	.33	LOW	1680	LOW	1625	660
*PGA60B080	NAT.	*80,000	64,000	.28	LOW	1695	HIGH	1860	665
		*100,000	79,000	.28	LOW	1695	HIGH	1860	665
		120,000	90,000	.33	LOW	1680	HIGH	1860	665
PGA60B145	NAT.	80,000	66,000	.28	LOW	1650	HIGH	1800	705
		130,000	103,000	.33	HIGH	1950	HIGH	1800	705
		145,000	115,000	.33	HIGH	1950	HIGH	1800	705

*NOTE: Only 2 heating capacities on Low Nox. Models.

**DO NOT set thermostat fan switch for constant operation on heating if selected cooling speed is lower than the recommended heating speed.

***For elevations above 2000 feet, reduce rating by 4% for each 1000 feet above sea level.

DUCTWORK

Maximum recommended velocity in trunk ducts is 1000 feet per minute. Velocity in branches should not exceed 800 feet per minute. Refer to Fig. 7 and 8 for unit air volume requirements and system sizing recommendations.

Ductwork installed outdoors should have a minimum of 2" insulation and a weatherproof vapor barrier. It should be protected against damage. Caulking and flashings, or other means adequate to provide a permanent weather seal, should be used.

Ductwork installed in attics or other areas exposed to outside temperatures should be installed with a minimum of 2" insulation and have an indoor type vapor barrier.

Ductwork Connections

The use of flexible, non-combustible connectors, between main trunk ducts and supply and return air plenums, is recommended to minimize vibration transmission.

NOTE

Connect supply and return air plenums to unit in a manner that will allow the top of the unit to be removed without removing plenums. Plenums must be individually sealed to unit casing with ducts terminating inside structure.

Condensate Drain

A 3/4 O.D. condensate drain connection is located at the front end of the unit. A 3/4" drain line should be installed, if required by local codes or location of unit, and run to an open drain or other suitable disposal point.

FILTERS

Provisions for air filtering must be made. No filters or filter rack are provided in the unit. A remote filter grille or grilles, electronic air cleaner, or other accessible filter arrangement must be installed in the return air ductwork. All return air must pass through a filter before entering the unit. Minimum recommended filter areas are listed in Fig. 8, and are based on a velocity of 300 F.P.M. for disposable filters and 500 F.P.M. for high velocity filters.

CAUTION

DO NOT OPERATE THE UNIT WITHOUT A FILTER.

FIG. 8 DISTRIBUTION SYSTEM—REFRIGERANT CHARGE

MODEL NUMBER	FILTER-AREA SQUARE INCH		REFRIGERANT CHARGE REQUIRED R-22/lb.
	DISPOSABLE	HIGH VELOCITY	
PGA24A060	528	320	49
PGA24A090	528	320	49
PGA30A060	528	320	47
PGA30A090	528	320	47
PGA36A060	600	400	90
PGA36A090	600	400	90
PGA36A120	672	400	90
PGA42A090	672	400	89
PGA42A060	672	400	89
PGA42A120	828	500	89
PGA48A080	828	500	118
PGA48A120	828	500	118
PGA48A145	980	575	118
PGA60A080	828	500	127
PGA60A120	828	500	127
PGA60A145	960	575	127
PGA36B090	672	400	102
PGA48B080	828	500	118
PGA48B120	828	500	118
PGA60B080	960	575	127
PGA60B145	960	575	127

Heating Vent and Rain Shield Assembly

The flue cover, flue collector, flue rain shield and inlet air rain shield with gasket are packed with screws in the blower compartment.

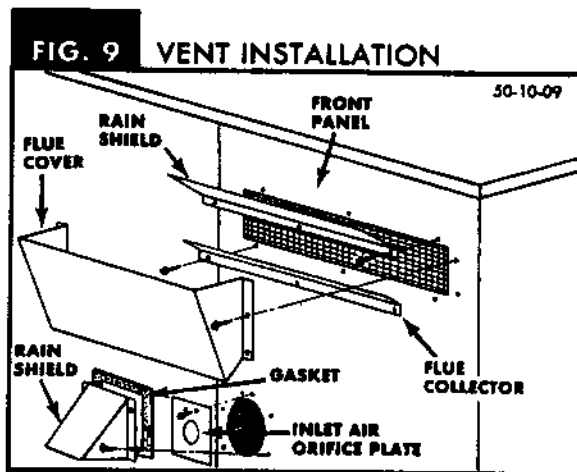
Assemble as shown in Fig. 9 in the following order.

1. Flue Rain Shield
2. Flue Collector
3. Flue Cover
4. Inlet Air Rain Shield with Gasket

NOTE

If the BTU input is being changed see following section before installing the Inlet Air Rain Shield.

DO NOT OPERATE THE UNIT WITHOUT THE VENT ASSEMBLY INSTALLED.



How To Change The Unit's BTU Input

The Btu input on this unit can be changed. However, if you decide to change the BTU input, then you must change both the air orifice and the gas orifices to the appropriate orifices for the BTU input you desire. Correct orifice sizes for both the air orifice and the gas orifices are on the units rating plate.

WARNING

**DANGER OF PROPERTY DAMAGE:
BODILY INJURY OR DEATH**
THE CORRECT COMBINATION OF ORIFICE SIZES FOR THE DESIRED BTU INPUT MUST BE USED. YOU MUST NOT HAVE AN AIR ORIFICE SIZE WHICH DOES NOT MATCH THE GAS ORIFICE SIZE FOR THE BTU INPUT SELECTED.

Air Orifices

The air orifice may be changed by removing the sheet metal screws holding orifice in place. Select the proper size orifice required. Install orifice, making sure all sheet metal screws are secure. See fig. 2 and 9 for location of orifice.

Gas Orifices

Change the gas orifices to the proper size to match the air orifice listed on the rating plate as follows:
Remove the burner access panel and the Compressor Access Panels, See Figure 16 and parts catalog.
Remove the four (4) screws holding the manifold to the manifold bracket.
Remove the screw(s) holding the pilot burner to the pilot bracket.
Carefully disengage the manifold assembly from the burners and the pilot from the pilot bracket.
Remove the Gas Orifice from the manifold and replace them with the properly sized orifices as required.
Install all parts and assemblies in reverse order as removed.

Thermostat

The location of the thermostat has an important effect on the operation of the unit. FOLLOW THE INSTRUCTIONS INCLUDED WITH THE THERMOSTAT FOR CORRECT MOUNTING AND WIRING.

Heat Anticipator

Set the thermostat heat anticipator to .88 in accordance with thermostat instructions.

ELECTRICAL WIRING

WARNING

**DANGER OF PROPERTY DAMAGE,
BODILY INJURY OR DEATH**
TURN OFF ELECTRIC POWER AT FUSE BOX OR SERVICE PANEL BEFORE MAKING ANY ELECTRICAL CONNECTIONS.
GROUND CONNECTION MUST BE COMPLETED BEFORE MAKING LINE VOLTAGE CONNECTIONS.

All electrical work must conform with the requirements of local codes and ordinances and the National Electrical Code ANSI/NFPA-No. 70-1984 or current edition.

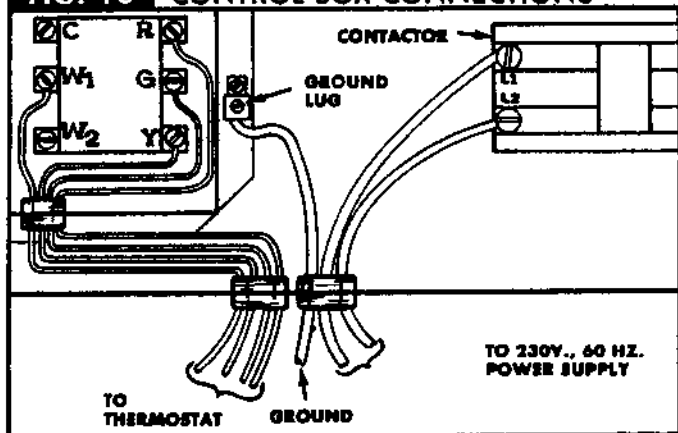
Provide line voltage power supply from a separate fused circuit with a disconnect switch located within sight of the unit. Supply voltage, amperage, wire, fuse and disconnect switch sizes must conform with specifications in Fig. 11, or with unit rating plate.

All exposed wiring or connections must be made with weatherproof cable or wire unless installed in conduit.

Wiring must be installed so it is protected from possible mechanical damage.

Connections for low voltage and line voltage are made in the unit control box. For access, remove the top Compressor Access Panel and the control box cover. Ref. Fig. 2 and 10.

FIG. 10 CONTROL BOX CONNECTIONS



LOW VOLTAGE WIRING

Low voltage wiring connections for the Thermostat are made at the 24V terminal board inside the control box. Refer to the Wiring Diagram for the applicable model, Figure 10 and the instructions with the thermostat.

LINE VOLTAGE WIRING

Do not complete line voltage connections until unit is permanently grounded. All line voltage connections and the ground connection must be made with copper wire.

Ground Connection

A ground lug is installed in the control box for the ground connection. Use a copper conductor of the appropriate size from the unit to a grounded connection in the electrical service panel or a properly driven and electrically grounded ground rod.

Line Connections

Complete the line service connections to the contactor "L" terminals inside the control box. Refer to applicable wiring diagram. Check all screw terminals to make sure they are tight.

FIELD INSTALLED EQUIPMENT

Wiring to be done in the field between the furnace and devices not attached to the furnace, or between separate devices which are field installed and located, shall conform with the temperature limitation for Type T wire and be installed in accordance with the manufacturer's instructions.

FIG. 11 ELECTRIC POWER REQUIREMENTS

ALL UNITS 230 NOMINAL VOLTS, 60 Hz MINIMUM OPERATING VOLTS 197, MAXIMUM VOLTAGE 253—USE COPPER WIRE ONLY								
MODEL NUMBER	TOTAL AMPS COOLING FLA	BRANCH CIRCUIT AMPACITY REQUIRED	POWER WIRING		MINIMUM GROUND WIRE SIZE	MAXIMUM FUSE SIZE (AMP)	TIME DELAY FUSE SIZE (AMP)	DISCONNECT SWITCH SIZE (AMP)
			MAX LENGTH FEET	MIN SIZE AWG				
SINGLE PHASE								
PGA24A060	15	18.0	52	12	12	30	25	30
PGA24A090	15	18.0	52	12	12	30	25	30
PGA30A060	18.4	22.3	66	10	12	35	30	60
PGA30A090	18.4	22.3	66	10	12	35	30	60
PGA36A060	20.4	24.3	55	10	12	35	30	60
PGA36A090	20.4	24.3	55	10	12	35	30	60
PGA36A120	20.4	24.3	55	10	12	35	30	60
PGA42A090	25.0	30	50	10	12	50	40	60
PGA42A060	25.0	30	50	10	12	50	40	60
PGA42A120	25.0	30	50	10	12	50	40	60
PGA48A080	34.7	41.2	90	6	8	60	45	60
PGA48A120	34.7	41.2	90	6	8	60	45	60
PGA48A145	34.7	41.2	90	6	8	60	45	60
PGA60A080	36.7	43.9	85	6	8	70	60	100
PGA60A120	36.7	43.9	85	6	8	70	60	100
PGA60A145	36.7	43.9	85	6	8	70	60	100
THREE PHASE								
PGA368090	14.5	18.4	50	12	12	30	25	30
PGA48B080	22.2	25.9	60	10	12	40	35	60
PGA48B120	22.2	25.9	60	10	12	40	35	60
PGA60B080	25.9	30.4	77	8	10	50	40	60
PGA60B145	25.9	30.4	77	8	10	50	40	60

Check Before Starting

MAKE SURE ELECTRICAL POWER IS OFF.

Make a final wiring check to be sure system is correctly wired. Inspect field installed wiring and the routing to ensure that rubbing or chafing due to vibration will not occur.

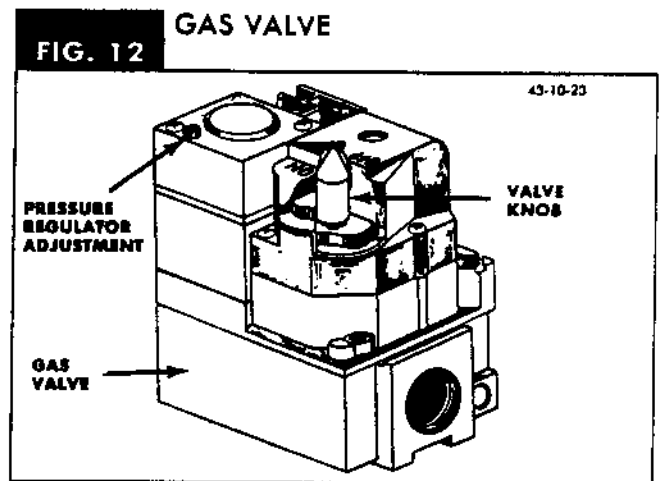
Check the fan control off setting. It should be 90°-100°. The limit control is factory set and is not adjustable.

Check blower motor speed terminal block to see that motor is connected for the correct heating and cooling speeds. Refer to the unit wiring diagram and Fig. 7 Capacities and Air Delivery.

Check to see that clean, properly sized air filters are installed.

Turn unit gas control knob ON.

Replace all service access panels.



Start-Up Procedure

Check the unit's operation as outlined in the following instructions. If any sparking, odors or unusual noises are encountered, shut off electric power immediately. Re-check for wiring errors, or obstructions in or near blower motors.

1. Set thermostat Heat-Cool selector to OFF.
2. Set thermostat fan switch to AUTO.
3. Turn electric power ON.
4. Turn manual gas valve ON.
5. Set thermostat fan switch to ON.
 - A. Circulating Air Blower should come ON and run at cooling speed.
6. Reset thermostat fan switch to AUTO.
 - A. Circulating Air Blower should go - OFF.
7. Adjust thermostat setting above room temperature and set thermostat selector to HEAT.
 - A. Combustion air blower - ON
 - B. Ignition spark should ignite pilot burner.
 - C. Pilot flame will ignite the gas to main burners.

NOTE

It may take several minutes to purge the air out of the gas lines on initial start up.

8. Check the pilot flame through view port in access panel, Fig. 2. The flame should envelop the upper 3/4 inch of the Flame Sensor, Fig. 15.

9. Natural Gas Only

Inspect main burner flame through view port in access panel (Fig. 2). Flames should be stable and blue with orange tips. Check manifold gas pressure if the flames are not normal.

L.P. Gas Only

Inspect the main burner flames through view port in access panel. (Fig. 2). Flames should be stable and blue with orange tips.

- A. If flames have yellow tips or appear to be lifting away from burner ports, adjustment is necessary. Remove burner access panel and loosen locking screws on primary air shutters. Close shutters until yellow tips appear in flames then open just enough to eliminate the yellow tips. Tighten locking screws, replace access panel and re-check flame appearance.

10. Check temperature rise through the unit by placing thermometers in supply and return air ducts as close to the unit as possible.
 - A. All registers and duct dampers must be open and the unit should be operated for 15 minutes before taking readings.
 - B. It must be within the temperature rise as marked on the rating plate.

NOTE

Air temperature rise is the temperature difference between supply and return air.

With a properly designed distribution system, the proper amount of temperature rise will normally be obtained when the unit is operating at rated input with the recommended blower speed.

If the correct amount of temperature rise is not obtained, when operating on the recommended blower speed, it may be necessary to change the blower speed. A higher blower speed will lower the temperature rise. A slower blower speed will increase the temperature rise.

11. Check Limit Control function after 15 minutes of operation by blocking the return air grille(s).
 - A. After several minutes the main burners and pilot should go - OFF. Blower will continue to run.
 - B. Remove air restrictions and pilot and main burner will relight after a cool down period of a few minutes.

NOTE

The limit setting for all models is 200°F.

12. Adjust thermostat setting below room temperature.
 - A. Main and pilot burners and combustion air blower should go off.
 - B. Circulating Air Blower should continue to run briefly until supply air temperature drops to 90°-100°.
13. Set thermostat Heat-Cool selector to OFF.

COOLING

NOTE

Whenever the electric power is on, the compressor crankcase heater will be energized. If outdoor temperature is below 75°F, allow the unit to stay in this mode for 12 hours. This will allow the crankcase heater time to vaporize refrigerant in the compressor oil and prevent possible compressor damage upon start up. After 12 hours, or if outdoor temperature is above 75°F, proceed with cooling check.

1. Turn electric power - OFF
2. Set thermostat Heat-Cool select to COOL.
3. Adjust thermostat setting to below room temperature.
4. Turn power ON, for approximately 5 seconds, then OFF. During power application check the following:
 - a. Contactor - Contacts Closing
 - b. Compressor - ON
 - c. Condenser fan motor - ON
 - d. Circulating Air Blower - ON

Operation and Maintenance Instructions

WARNING

DANGER OF PROPERTY DAMAGE, BODILY INJURY OR DEATH
TURN OFF ELECTRIC POWER SUPPLY AT DISCONNECT SWITCH OR SERVICE PANEL BEFORE REMOVING ANY ACCESS OR SERVICE PANEL FROM UNIT.

STARTING THE UNIT AFTER IT HAS BEEN SHUT DOWN For Heating:

WARNING

DANGER OF PROPERTY DAMAGE, BODILY INJURY OR DEATH
DO NOT ATTEMPT TO LIGHT THE BURNER WITH A MATCH OR FLAME OF ANY KIND.

1. Set thermostat to OFF.
2. Remove compressor access panels - Top & Bottom. Locate gas valve knob (Fig. 12), depress and turn to OFF. Wait 5 minutes.
3. Turn knob to ON. Replace compressor access panels - Top & Bottom. Turn manual gas valve in supply pipe on.
4. Turn electric power on.
5. Set thermostat to HEAT and to desired temperature. Unit will come on and operate automatically under control of the thermostat. Never attempt to light the pilot manually.

CAUTION

Do not operate the unit on heating unless all access panels are securely fastened in place. Abnormal and possibly hazardous burner operation could result.

For Cooling:

1. Make sure electric power to unit has been on at least 12 hours.
2. Set thermostat to desired temperature and set system switch to COOL. The unit will come on and operate automatically under control of the thermostat. Close all doors and windows. The unit may run continuously for several hours or longer on the initial run to reduce residual heat and moisture in the house. This is normal for any air conditioning system.

CAUTION

Do not operate on cooling when outdoor temperature is below 60°F or if the electric power has not been on for at least 12 hours. These procedures are necessary to prevent possible damage to the compressor.

When setting the thermostat for cooling temperature, be careful not to turn the unit off and then right back on. Refrigerant pressures in the system must have time to equalize before the compressor can start normally. Always wait four minutes after shutting the unit off before turning it back on. If the unit will not start, check for a blown main fuse or tripped circuit breaker.

TURNING THE UNIT OFF

1. Set system selector on the thermostat to OFF, fan switch to AUTO. To re-start, set to HEAT or COOL and temperature desired.
2. To shut the unit down completely, turn electric power off. Turn manual gas valve off. Replace burner access panel.

NOTE

During the normal cooling season, do not turn electric power off.

WARNING

DANGER OF PROPERTY DAMAGE, BODILY INJURY OR DEATH
IF THE FURNACE OVER HEATS OR FAILS TO SHUT OFF, CLOSE MANUAL GAS SHUT OFF VALVE FOR THE FURNACE BEFORE TURNING OFF ELECTRIC POWER.

THERMOSTAT FAN SWITCH OPERATION

With the selector switch in the ON position the circulating air blower will run continuously at the speed used for cooling. In the AUTO position the blower will only be on during each heating or cooling cycle.

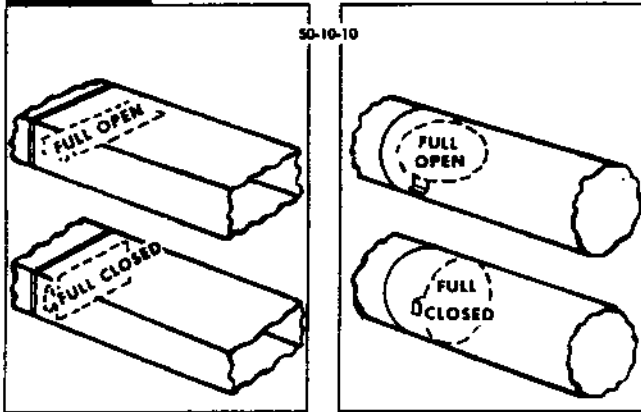
CAUTION

Some units use a lower blower speed for cooling than for heating. DO NOT POSITION selector switch to ON, for continuous operation, during heating cycle, if the cooling blower speed is lower than the heating speed. Blower speeds for each model are listed in Fig. 7.

ADJUSTING ROOM TEMPERATURES

If the temperature in individual rooms is not as desired, balance the system by adjusting the dampers in the branch ducts. Adjust a little at a time and wait a day after each change to judge the effect. Once the dampers are adjusted for normal weather conditions, it is best to leave them that way. Compensate for temporary weather changes by adjusting the thermostat setting.

FIG. 13 TYPICAL BRANCH DUCT DAMPERS



MONTHLY MAINTENANCE AND INSPECTION CHECKS

Air Filter

DO NOT OPERATE WITHOUT FILTERS

Inspect filters at least monthly and replace or clean as required. Disposable type filters should be replaced. Washable filters may be cleaned by soaking in mild detergent and rinsing with cold water. Replace filters with the arrows on the side pointing in the direction of air flow. Dirty filters are the most common cause of inadequate heating or cooling performance, and of compressor failures.

HEATING SEASON CHECKS/ MONTHLY

Main Burner Flame

During the heating season make a visual check of the burner flames. Turn the furnace on at the thermostat. Wait a few minutes, since any dislodged dust will alter the normal flame appearance. Flames should be stable, quiet, soft and blue with slightly orange tips. They should not be yellow. They should extend directly upward from the burner ports without curling downward, floating or lifting off the ports. They should not touch the sides of the heat exchanger.

WARNING

DANGER OF PROPERTY DAMAGE,
BODILY INJURY OR DEATH
FLAME ROLLOUT MAY OCCUR WITH PANEL
REMOVED.

Pilot Flame

While the main burner is on, the flame should envelop the upper part of the Flame Sensor, as shown in Fig. 15.

Main Burner Air Shutter Adjustment

Some natural gas models are equipped with main burner air shutters.

To adjust the air shutters, remove panel and air difuser. Fire the furnace and adjust air shutters by loosening retaining screw and turning air shutter clockwise or counter clockwise until normal flame (Fig. 14) is obtained.

Tighten retainer screw. Install air difuser and visually check for normal flame appearance. Repeat procedure until you have normal flame (Fig. 14).

FIG. 14 NORMAL FLAME—MAIN BURNER WITH INSERT SHOWN

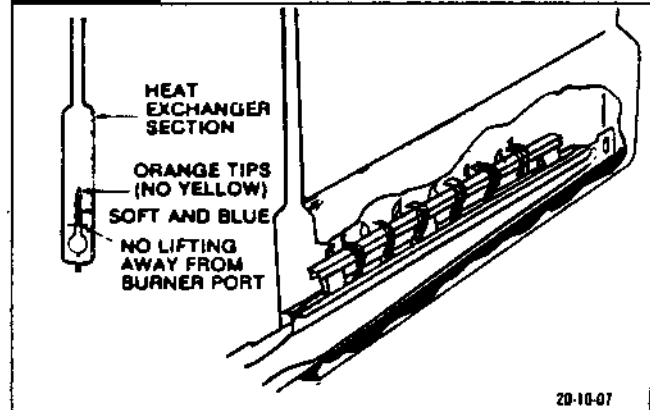
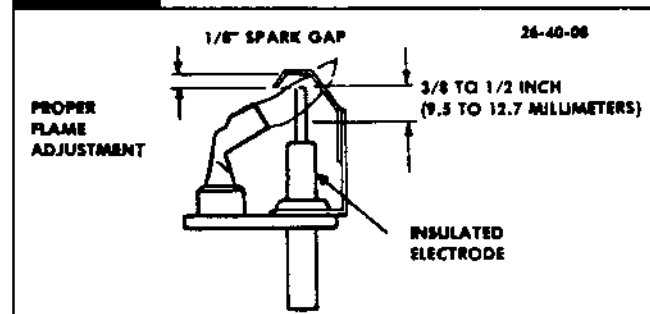


FIG. 15 PILOT ASSEMBLY



Vent Assembly

Check the vent system for evidence of deterioration or obstruction due to leaves, spider webs, etc.

WARNING

DANGER OF PROPERTY DAMAGE,
BODILY INJURY OR DEATH
FLUE COVER (VENT) MAY BE HOT.

COOLING SEASON CHECKS/MONTHLY

Condenser Coil

Keep the condenser inlet and outlet area clean and free of leaves, grass clippings or other debris. Grass should be kept short in front of the condenser inlet. Shrubby must be trimmed back so it is no closer than 30 inches to unit.

Condensate Drain

Check for condensate drainage. Clean as required.

ANNUAL MAINTENANCE AND INSPECTION

The annual inspection should include lubrication and cleaning as required to ensure efficient operation of the unit. To simplify access, remove the top from the unit and all access panels.

WARNING

DANGER OF PROPERTY DAMAGE,
BODILY INJURY OR DEATH

TURN OFF ELECTRIC POWER SUPPLY AT
DISCONNECT SWITCH, FUSE BOX OR SER-
VICE PANEL BEFORE REMOVING ANY
DOORS OR ACCESS OR SERVICE PANELS
FROM UNIT.

Condenser Fan Motor

Oil the condenser fan motor after five years of operation and every five years thereafter.

Use SAE 10W30 motor oil. To oil, remove the hole plugs from the motor end bells and add several drops (approximately 1/2 teaspoonful) of oil with a squeeze type, flexible tube oiler. Replace hole plugs after oiling. Do not over oil.

Clean the surrounding area and the condenser and evaporator coils. Use caution to avoid damage to coil fins.

Circulating Air Blower

Visually inspect the blower wheel for accumulations of dirt or lint. Clean the compartment and the blower wheel. If accumulation is excessive on blower wheel, or does not easily remove, it will be necessary to remove the blower assembly.

Oil the blower motor by adding 1/2 teaspoonful (2cc) of SAE 10W20 to each motor bearing. The blower motor should be oiled after five years of operation and every five years thereafter.

CAUTION

Do not use 3 in 1 oil, penetrating oil, WD40 or similar oils to oil motor bearings.

Burners/Heat Exchangers/Flue Gas Passages

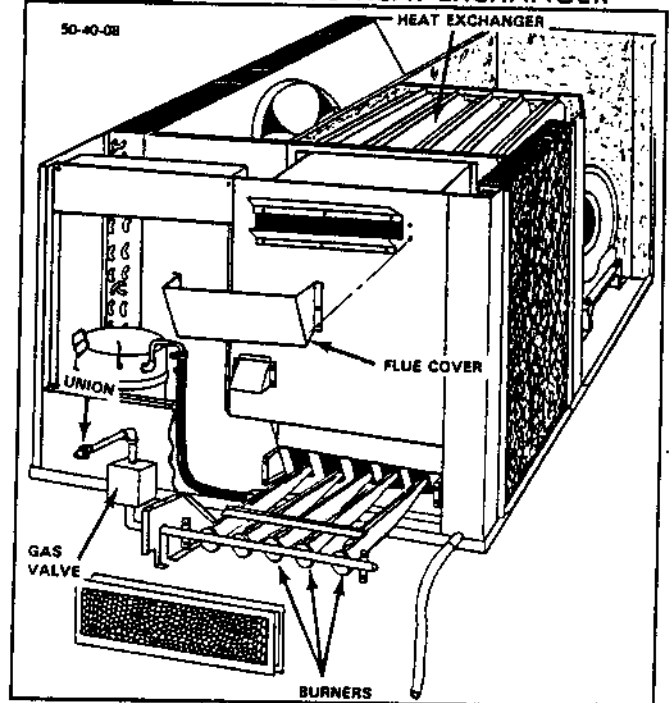
The burners, heat exchanger and interior flue gas passages may be inspected using a light and small mirror on an extension handle. Remove the flue cover and collector portions of the vent to inspect the upper chambers of the heat exchanger.

Check the exterior of the heat exchanger and the interior flue gas passages for any evidence of deterioration due to corrosion, cracking or other causes. If signs of scaling or sooting exist, remove the burners and clean the heat exchanger, as required.

INSPECTION AND CLEANING OF BURNERS AND HEAT EXCHANGERS QUALIFIED SERVICE TECHNICIAN ONLY

1. Remove the Vent Assembly Flue Cover.
2. Disconnect gas pipe at union.
3. Disconnect wires from gas valve, note connections.
4. Remove screws that secure the gas manifold and remove gas valve, manifold and burners as on assembly.
5. Clean the burners with a brush and by holding the burner vertically and tapping it against a wood block. Severe cases of lint clogging may require washing the burners in hot water.
6. Clean flue gas passages by using small brushes and a vacuum cleaner. It may be necessary to fabricate handle extensions for the brushes, to reach the areas that require cleaning. Reinspect after cleaning and replace the heat exchanger if defective.
7. Reinstall parts in reverse order. Check the spark gap, 1/8 inch, between the igniter and pilot hood.
8. Turn gas on and check for leaks.
9. Install all access panels, turn power on and check for normal operation.

FIG. 16 ACCESS TO HEAT EXCHANGER



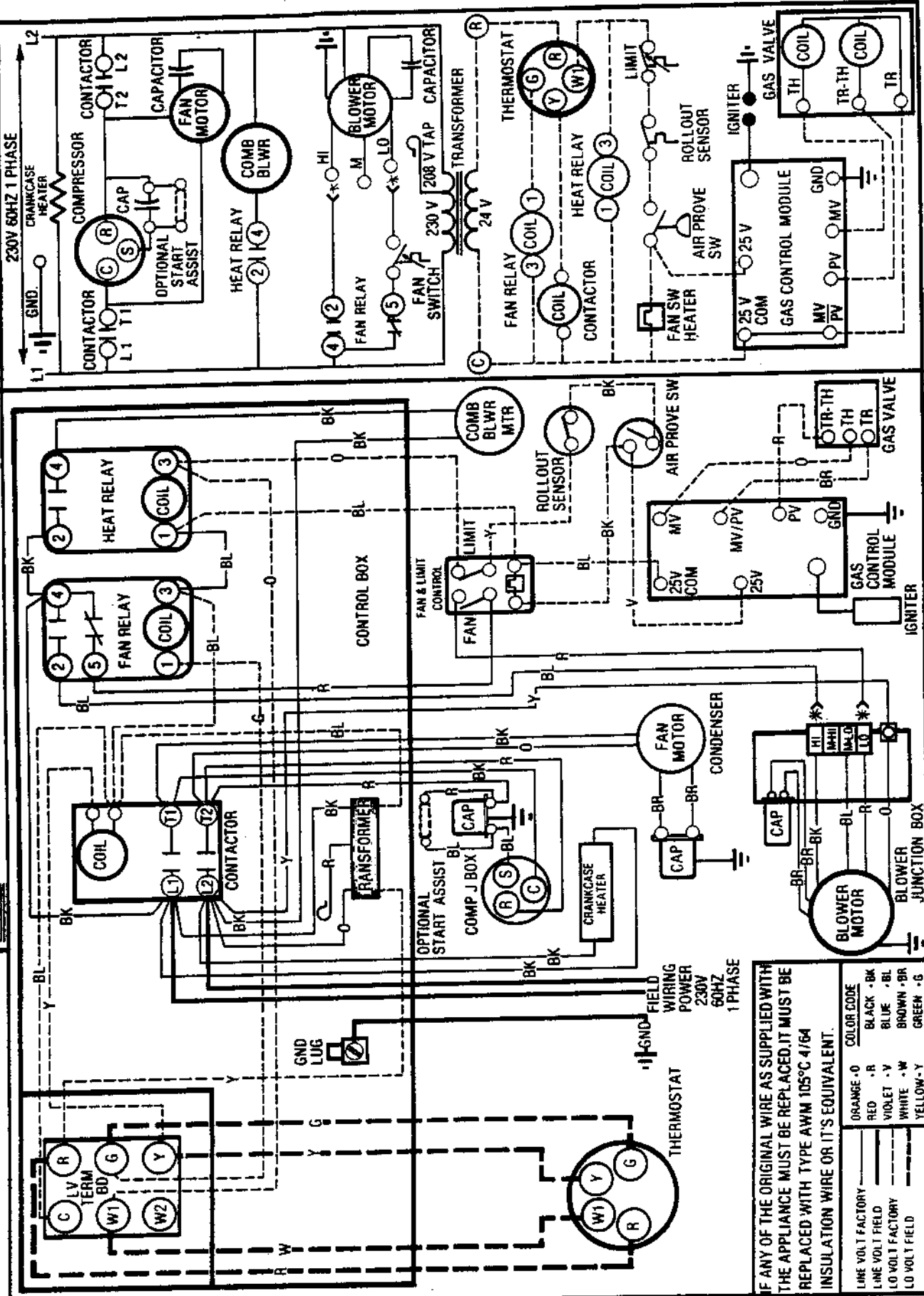
WIRING DIAGRAM — SINGLE PHASE MODELS

CONNECTION DIAGRAM

⚠ DANGER: ELECTRICAL SHOCK HAZARD. DISCONNECT POWER BEFORE SERVICING

LADDER DIAGRAM

230V 60HZ 1 PHASE



IF ANY OF THE ORIGINAL WIRE AS SUPPLIED WITH THE APPLIANCE MUST BE REPLACED IT MUST BE REPLACED WITH TYPE AWM 105°C 4/64 INSULATION WIRE OR IT'S EQUIVALENT.

LINE VOLT FACTORY	COLOR CODE
LINE VOLT FIELD	ORANGE - O
LO VOLT FACTORY	RED - R
LO VOLT FIELD	VIOLET - V
	WHITE - W
	YELLOW - Y
	BLACK - BK
	BLUE - BL
	BROWN - BR
	GREEN - G

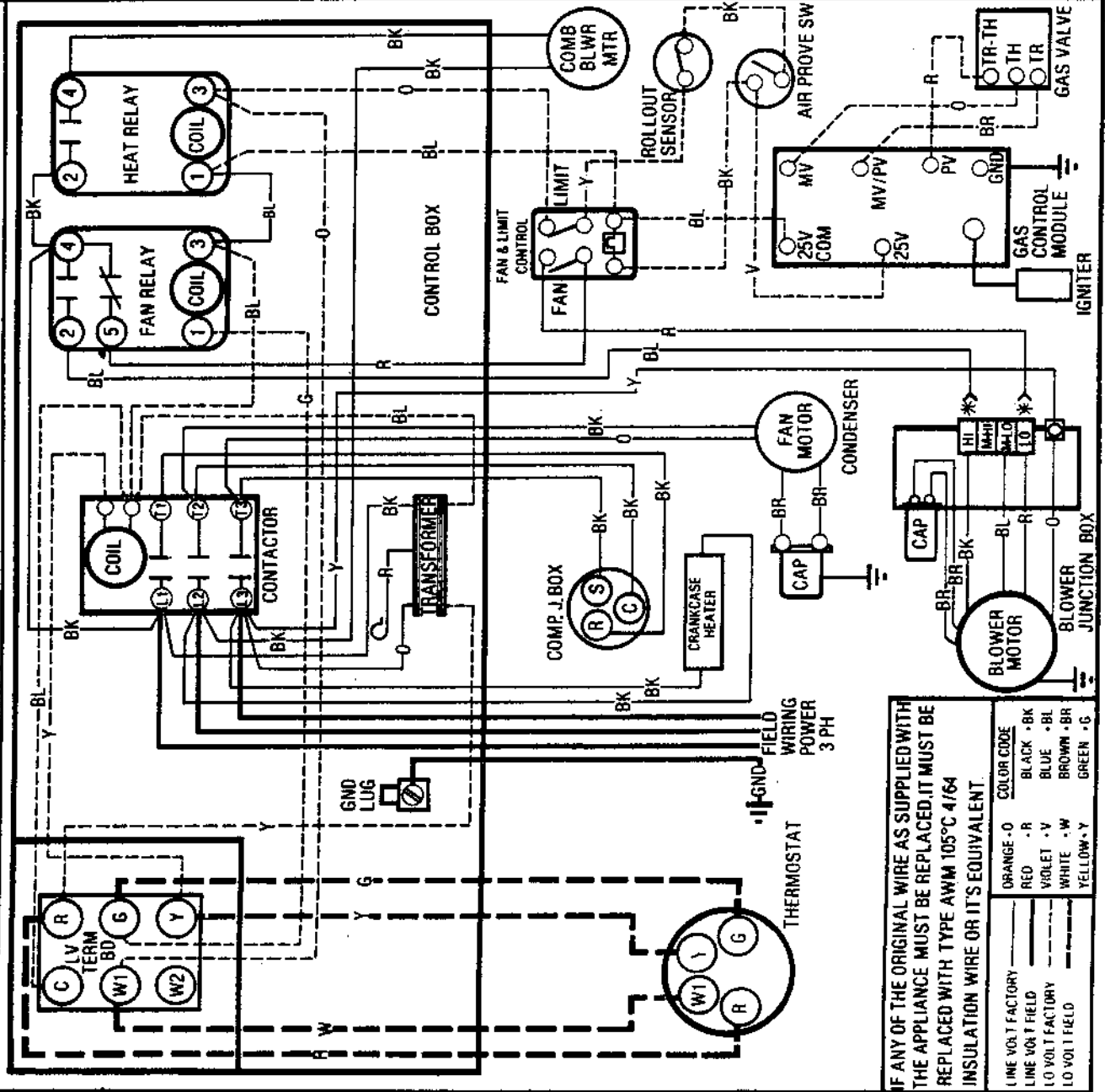
* SEE INSTALLATION MANUAL FOR PROPER HEATING AND COOLING SPEED CONNECTIONS FOR YOUR UNIT

1000249 REV. 1

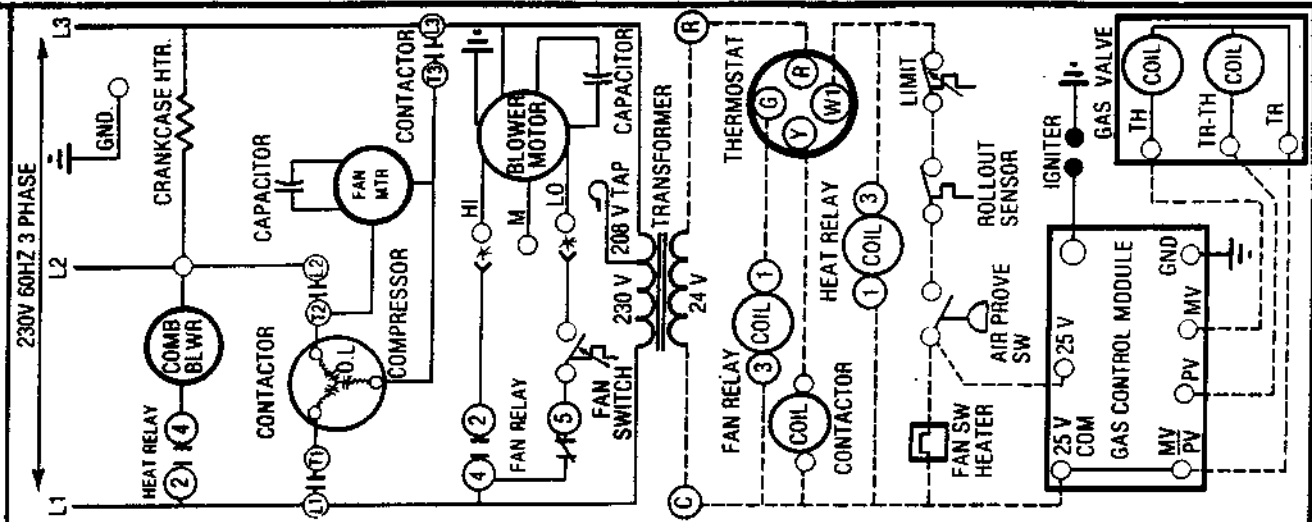
WIRING DIAGRAM — THREE PHASE MODELS

CONNECTION DIAGRAM

⚠ DANGER: ELECTRICAL SHOCK HAZARD. DISCONNECT POWER BEFORE SERVICING



LADDER DIAGRAM

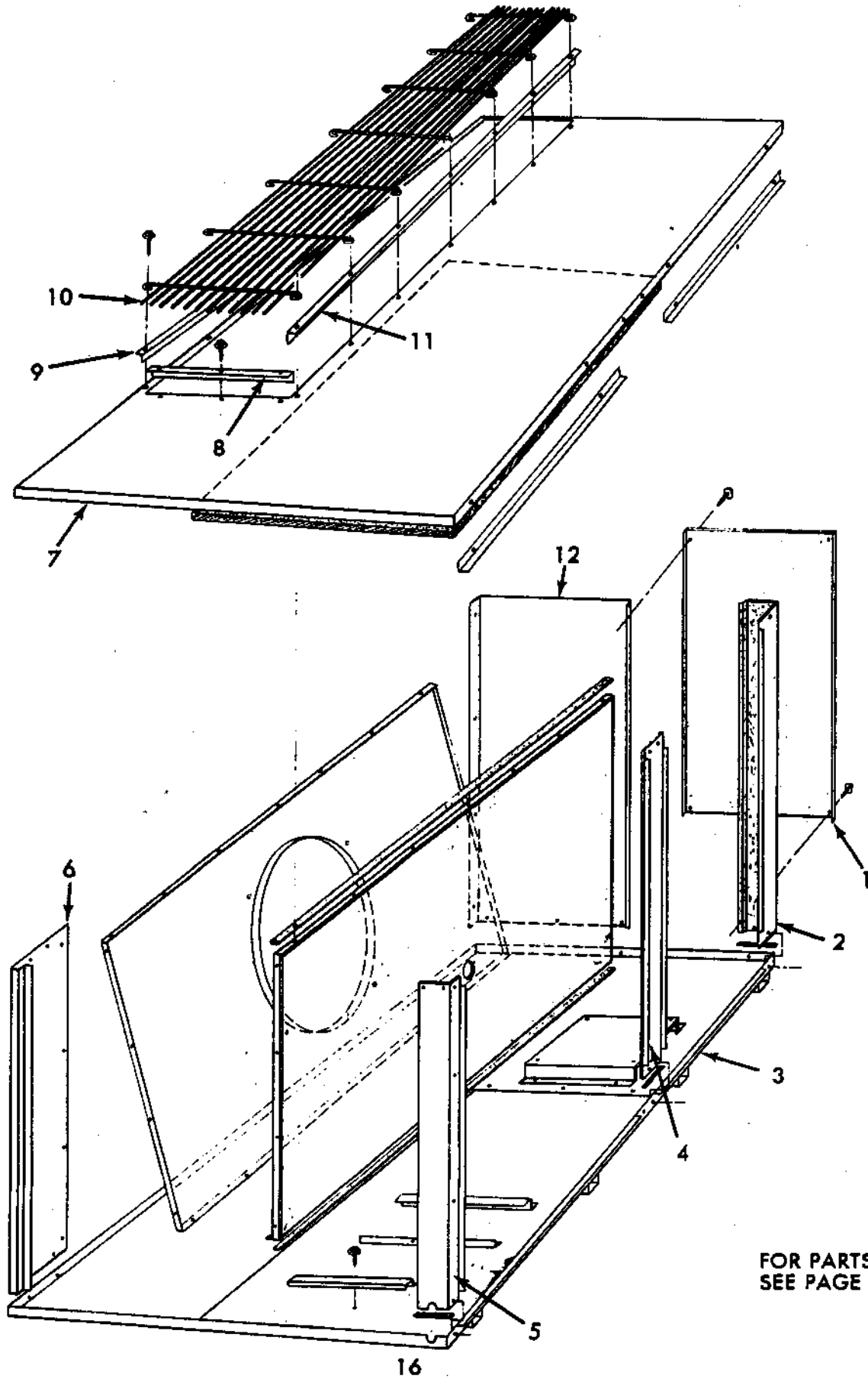


IF ANY OF THE ORIGINAL WIRE AS SUPPLIED WITH THE APPLIANCE MUST BE REPLACED, IT MUST BE REPLACED WITH TYPE AWM 105°C 4/64 INSULATION WIRE OR IT'S EQUIVALENT

LINE VOLT FACTORY	COLOR CODE
LINE VOLT FIELD	ORANGE - O
LO VOLT FACTORY	RED - R
LO VOLT FIELD	VIOLET - V
	WHITE - W
	YELLOW - Y
	BLACK - BK
	BLUE - BL
	BROWN - BR
	GREEN - G

* SEE INSTALLATION MANUAL FOR PROPER HEATING AND COOLING SPEED CONNECTIONS FOR YOUR UNIT

COMBINATION UNIT — MODELS "PGA SERIES"



FOR PARTS LIST
SEE PAGE 17

COMBINATION UNIT — MODELS "PGA SERIES"

KEY NO.	PART NUMBERS FOR MODELS			DESCRIPTION
	PGA24A060 PGA24A090 PGA30A060 PGA30A090	PGA36A060 PGA36A090 PGA36B090 PGA42A090 PGA42A060	PGA36A120 PGA42A120	
1	9044-001	9044-001	9044-002	Door, Blower
2	9044-004	9044-004	9044-004	Post, Rear Corner
3	9044-006	9044-006	9044-007	Base
4	9044-010	9044-010	9044-010	Panel, Center
5	9044-012	9044-012	9044-012	Post, Front Corner
6	9044-014	9044-014	9044-014	Panel, Side
7	9044-015	9044-015	9044-016	Panel, Top
8	9044-019	9044-019	9044-019	Angle, Grille (End)
9	9044-020	9044-020	9044-020	Angle, Grille (Left)
10	9044-022	9044-022	9044-022	Grille, Outlet
11	9044-024	9044-024	9044-024	Angle, Grille (Right)
12	9044-026	9044-026	9044-026	Panel, Rear
	- - -	- - -	- - -	*Diagram, Wiring
	- - -	- - -	- - -	Sheet, Tech (SEE PAGE 28.)

↓ Part Not Illustrated

* Use Wiring Diagram No. 1000249 on Single Phase Units

* Use Wiring Diagram No. 1000248 on Three Phase Units

FOR PARTS ILLUSTRATION
SEE PAGE 16

KEY NO.	PART NUMBERS FOR MODELS			DESCRIPTION
	PGA48A080 PGA48A120 PGA48B080 PGA48B120	PGA60A080 PGA60A120 PGA60B080 PGA60B120	PGA48A145 PGA60A145 PGA60B145	
1	9044-002	9044-002	9044-003	Door, Blower
2	9044-005	9044-005	9044-005	Post, Rear Corner
3	9044-008	9044-008	9044-009	Base
4	9044-011	9044-011	9044-011	Panel, Center
5	9044-013	9044-013	9044-013	Post, Front Corner
6	9044-014	9044-014	9044-014	Panel, Side
7	9044-017	9044-017	9044-018	Panel, Top
8	9044-019	9044-019	9044-019	Angle, Grille (End)
9	9044-021	9044-021	9044-021	Angle, Grille (Left)
10	9044-023	9044-023	9044-023	Grille, Outlet
11	9044-025	9044-025	9044-025	Angle, Grille (Right)
12	9044-026	9044-026	9044-026	Panel, Rear
	- - -	- - -	- - -	*Diagram, Wiring
	- - -	- - -	- - -	Sheet, Tech (SEE PAGE 28.)

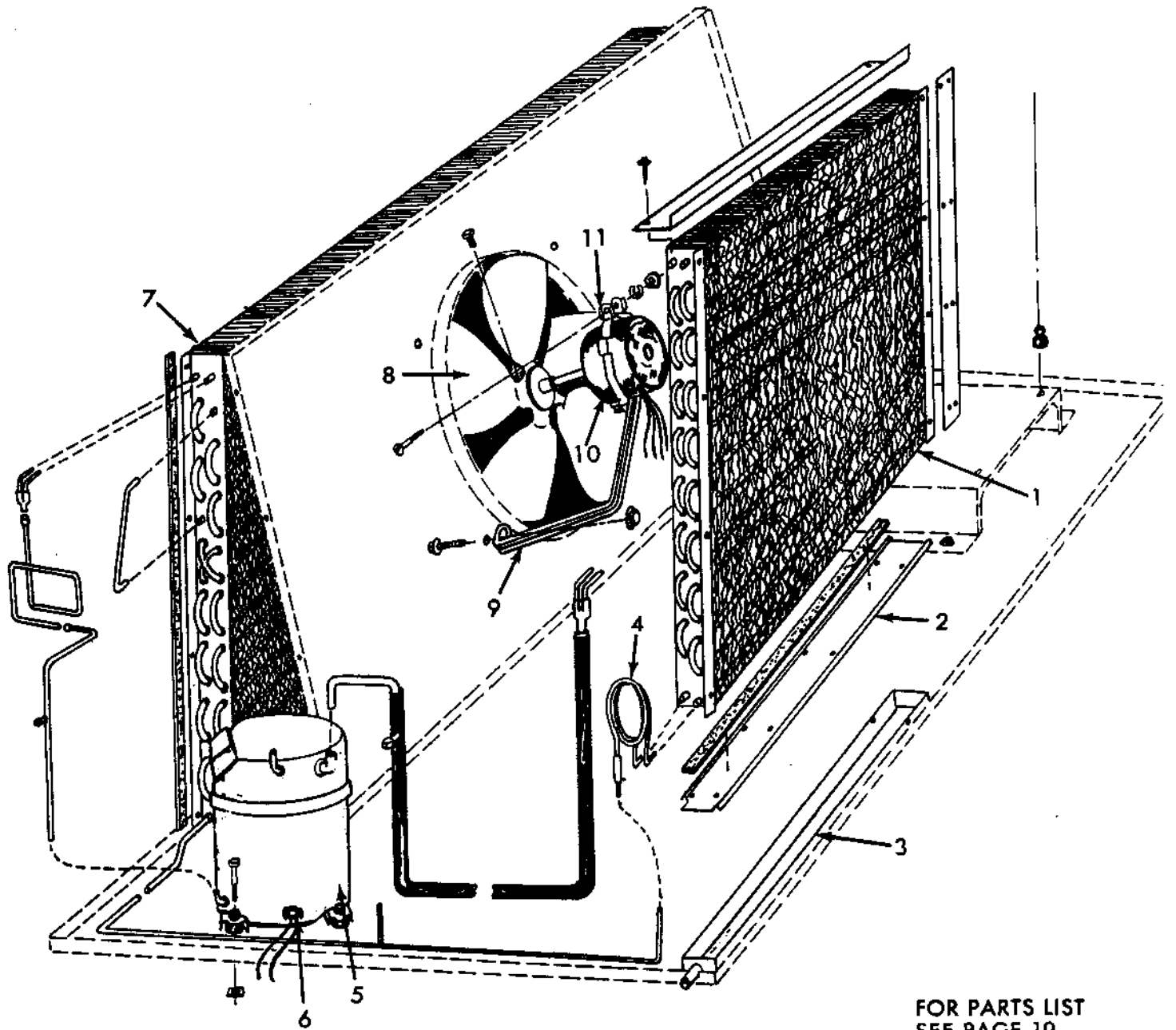
↓ Part Not Illustrated

* Use Wiring Diagram No. 1000249 on Single Phase Units

* Use Wiring Diagram No. 1000248 on Three Phase Units

FOR PARTS ILLUSTRATION
SEE PAGE 16

COMBINATION UNIT — MODELS "PGA SERIES"



FOR PARTS LIST
SEE PAGE 19

COMBINATION UNIT — MODELS "PGA SERIES"

KEY NO.	PART NUMBERS FOR MODELS				DESCRIPTION
	PGA24A060 PGA24A090	PGA30A060 PGA30A090	PGA36A060 PGA36A090 PGA36A120	PGA36B090	
1	9044-027	9044-028	9044-029	9044-030	Evaporator
2	9044-034	9044-034	9044-034	9044-035	Cover, Drain Pan
3	9044-037	9044-037	9044-037	9044-037	Pan, Drain
4	9044-039	9044-040	9044-041	9044-041	Tube, Capillary
5✓	9044-045	- - -	- - -	- - -	Compressor, 230/208V., 60Hz., 1Ph., Bristol #H21B223ABCA
5✓	- - -	8000-086	- - -	- - -	Compressor, 230/208V., 60Hz., 1Ph., Bristol #H21A293ABCA
5✓	- - -	- - -	9044-046	- - -	Compressor, 230/208V., 60Hz., 1Ph., Bristol #H21A313ABCA
5✓	- - -	- - -	- - -	9044-07	Compressor, 230/208V., 60Hz., 3Ph., Bristol #H21A313DBDA
6✓	9044-052	9044-052	9044-052	9044-052	Heater, Crankcase
7	9044-053	9044-054	9044-055	9044-055	Condenser
8	9044-058	9044-058	9044-059	9044-059	Blade, Fan
9	9044-062	9044-062	9044-062	9044-062	Leg, Motor Mount (4 Req.)
10✓	9044-063	9044-063	- - -	- - -	Motor, Condenser Fan, 1/5H.P., 230/208V., 60Hz., 1Ph.
10✓	- - -	- - -	9044-064	9044-064	Motor, Condenser Fan, 1/3H.P., 230/208V., 60Hz., 1Ph.
11	9044-067	9044-067	9044-067	9044-067	Band, Motor Mount

✓Suggested Distributor Stocking Parts List
(2% of Units Installed - Minimum 1 Each)

FOR PARTS ILLUSTRATION SEE PAGE 18

KEY NO.	PART NUMBERS FOR MODELS			DESCRIPTION
	PGA42A060 PGA42A090 PGA42A120	PGA48A080 PGA48A120 PGA48A145	PGA48B080 PGA48B120	
1	9044-031	9044-032	9044-032	Evaporator
2	9044-034	9044-036	9044-036	Cover, Drain Pan
3	9044-037	9044-038	9044-038	Pan, Drain
4	9044-042	9044-043	9044-043	Tube, Capillary
5✓	9044-048	- - -	- - -	Compressor, 230/208V., 60Hz., 1Ph., Bristol #H21A413ABCA
5✓	- - -	8000-073	- - -	Compressor, 230/208V., 60Hz., 1Ph., Copeland #CRL1-0350-PFV-270
5✓	- - -	- - -	9044-049	Compressor, 230/208V., 60Hz., 3Ph., Copeland #CRL1-0350-TF5-270
6	9044-052	8605-005	8605-005	Heater, Crankcase
7	9044-055	9044-056	9044-056	Condenser
8	9044-059	9044-059	9044-060	Blade, Fan
9	9044-062	9044-062	9044-062	Leg, Motor Mount (4 Req.)
10✓	9044-064	- - -	- - -	Motor, Condenser Fan, 1/3H.P., 230/208V., 60Hz., 1Ph.
10✓	- - -	9044-065	9044-065	Motor, Condenser Fan, 1/3 H.P., 230/208V., 60Hz., 1Ph.
11	9044-067	9044-067	9044-067	Band, Motor Mount

✓Suggested Distributor Stocking Parts Lists.
(2% of Units Installed - Minimum 1 Each)

FOR PARTS ILLUSTRATION
SEE PAGE

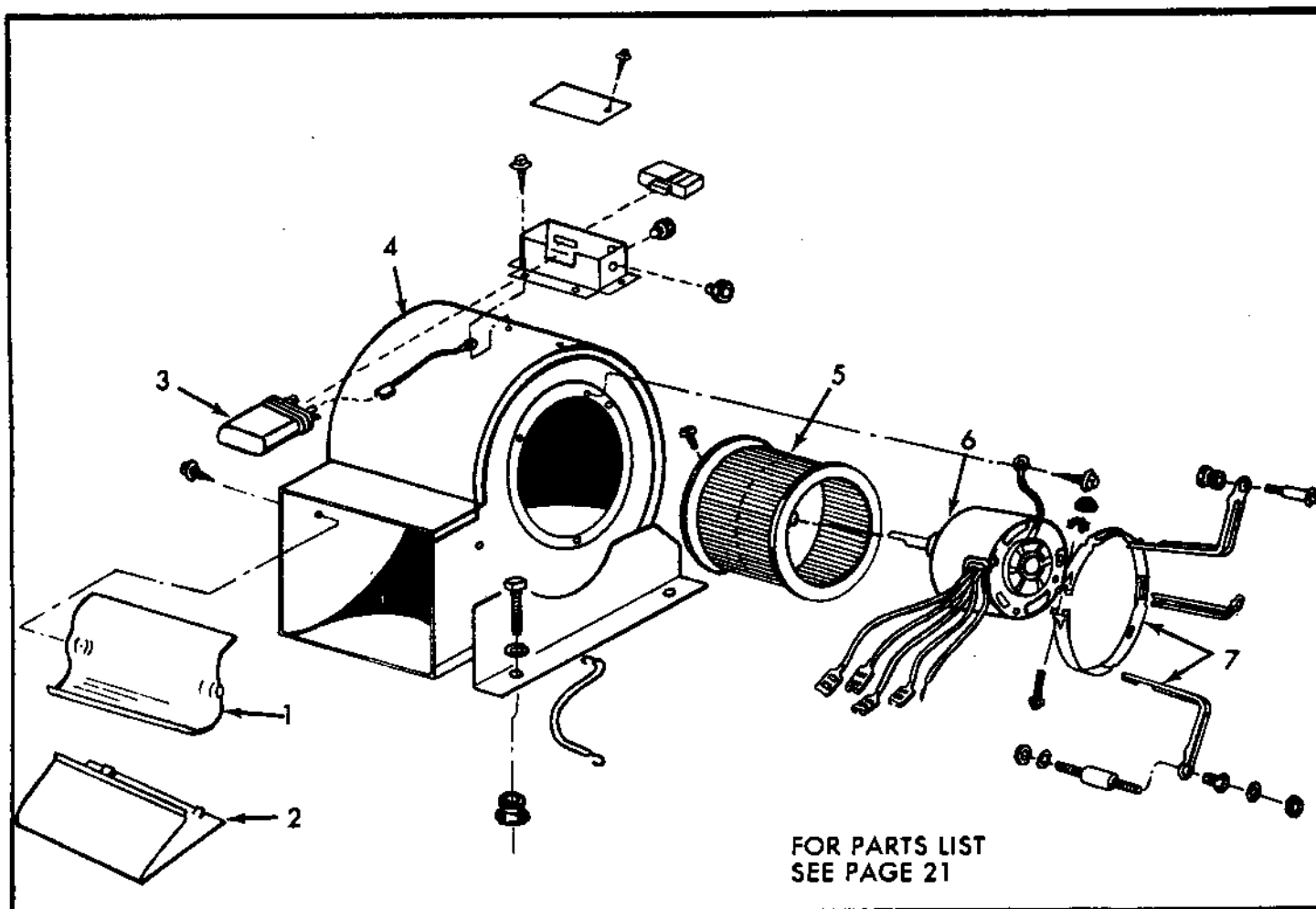
COMBINATION UNIT — MODELS "PGA SERIES"

KEY NO.	PART NUMBERS FOR MODELS		DESCRIPTION
	PGA60A080 PGA60A120 PGA60A145	PGA60B080 PGA60B145	
1	9044-033	9044-033	Evaporator
2	9044-036	9044-036	Cover, Drain Pan
3	9044-038	9044-038	Pan, Drain
4	9044-044	9044-044	Tube, Capillary
5✓	9044-050	- - -	Compressor, 230/208V., 60Hz., 1Ph., Copeland #CRNI-0500-PFV-270
5✓	- - -	9044-051	Compressor, 230/208V., 60Hz., 3Ph., Copeland #CRNI-0500-TF5-270
6	8605-005	8605-005	Heater, Crankcase
7	9044-057	9044-057	Condenser
8	9044-061	9044-061	Blade, Fan
9	9044-062	9044-062	Leg, Motor Mount (4 Req.)
10	9044-066	9044-066	Motor, Condenser Fan, 1/2H.P., 230/208V., 60Hz., 1Ph.
11	9044-067	9044-067	Band, Motor Mount

✓Suggested Distributor Stocking Parts List.
(2% of Units Installed - Minimum 1 Each)

FOR PARTS ILLUSTRATION
SEE PAGE 18

COMBINATION UNIT — MODELS "PGA SERIES"



COMBINATION UNIT — MODELS "PGA SERIES"

KEY NO.	PART NUMBERS FOR MODELS			DESCRIPTION
	PGA24A060 PGA24A090	PGA30A060 PGA30A090	PGA36A060 PGA36A090 PGA36B090 PGA36A120	
1	9044-152	9044-152	9044-153	Panel, Cut-off
2	9044-155	9044-155	9044-156	Diffuser, Air
3✓	8552-004	8552-004	8552-004	Capacitor, 7.5MFD., 370V., 60Hz., 1Ph.
4	9044-158	9044-158	9044-159	Housing, Blower
5	9044-161	9044-161	9044-162	Wheel, Blower
6✓	9044-164	9044-164	- - -	Motor, 1/3H.P., 208/230V., 60Hz., 1100RPM., 2-Speed
6✓	- - -	- - -	9044-165	Motor, 1/2H.P., 208/230V., 60Hz., 1Ph., (3.0AMP) 1100RPM., 3-Speed
7	9044-167	9044-167	- - -	Assembly, Motor Mount
7	- - -	- - -	9044-168	Assembly, Motor Mount

✓Suggested Distributor Stocking Parts List.
(2% of Units Installed - Minimum 1 Each)

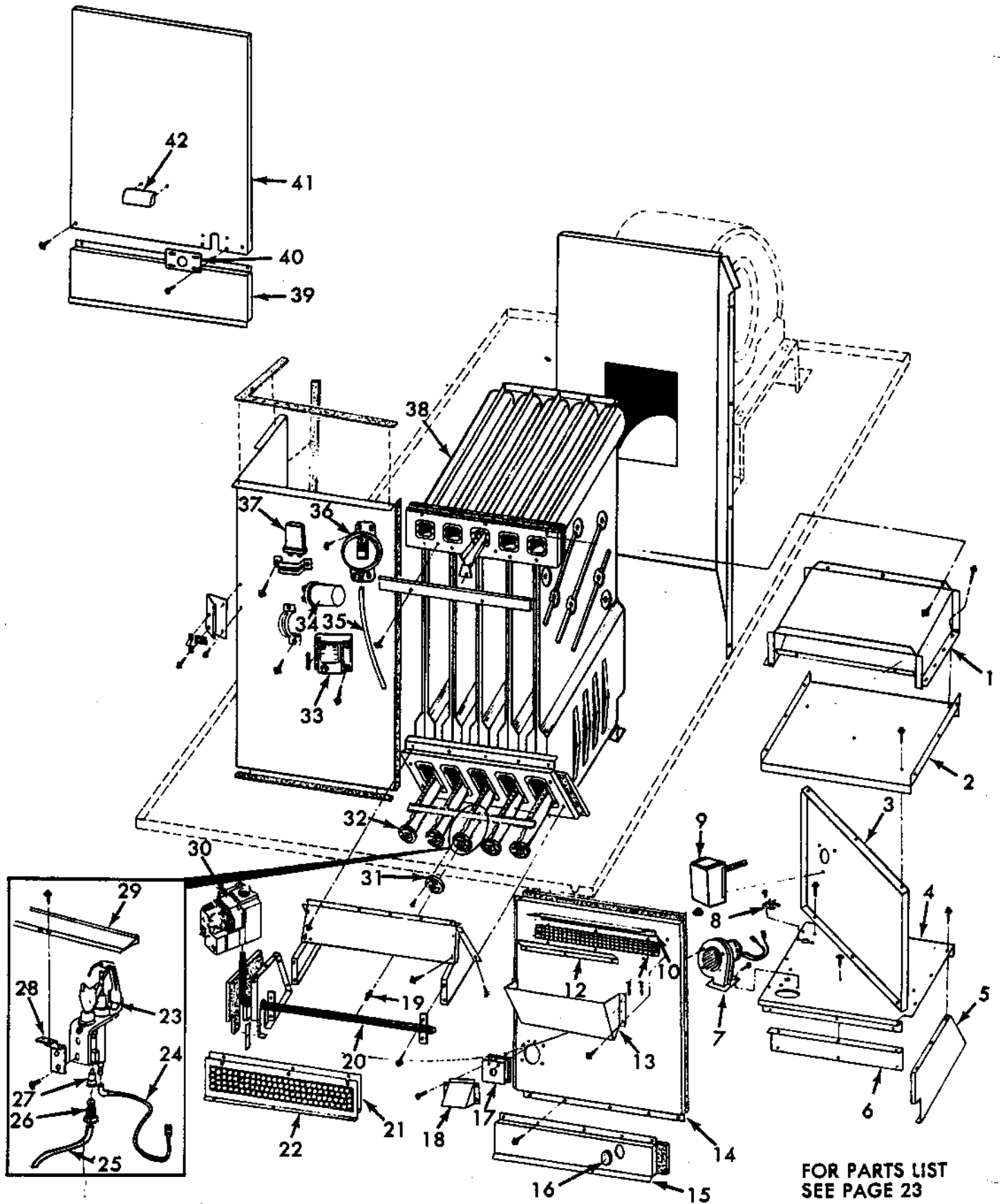
FOR PARTS ILLUSTRATION
SEE PAGE 20

KEY NO.	PART NUMBERS FOR MODELS			DESCRIPTION
	PGA42A060 PGA42A090 PGA42A120	PGA48A080 PGA48A120 PGA48B120 PGA48B080 PGA48A145	PGA60A080 PGA60A120 PGA60B080 PGA60A145 PGA60B145	
1	9044-153	9044-154	9044-154	Panel, Cut-off
2	9044-156	9044-157	9044-157	Diffuser, Air
3✓	8552-004	8552-004	8552-004	Capacitor, 7.5MFD., 370V., 60Hz., 1Ph.
4	9044-160	9044-160	9044-160	Housing, Blower
5	9044-162	9044-163	9044-163	Wheel, Blower
6✓	9044-165	- - -	- - -	Motor, 1/2H.P., 208/230V., 60Hz., 1Ph., (3.0AMP) 1100RPM., 3-Speed
6✓	- - -	9044-166	9044-166	Motor, 1/2H.P., 208/230V., 60Hz., 1Ph., 1120RPM., 2-Speed
7	9044-168	9044-168	9044-168	Assembly, Motor Mount

✓Suggested Distributor Stocking Parts List.
(2% of Units Installed - Minimum 1 Each)

FOR PARTS ILLUSTRATED
SEE PAGE 20

COMBINATION UNIT — MODELS "PGA SERIES"



FOR PARTS LIST
SEE PAGE 23

COMBINATION UNIT — MODELS "PGA SERIES"

KEY NO.	PART NUMBERS FOR MODELS			DESCRIPTION
	PGA24A060 PGA24A090 PGA30A060 PGA30A090	PGA36A060 PGA36A090 PGA36B090 PGA42A060 PGA42A090	PGA36A120 PGA42A120	
1	9044-068	9044-068	9044-069	Diverter, Draft
2	9044-070	9044-070	9044-071	Bottom Draft Diverter
3	9044-072	9044-072	9044-072	Side, Air Box
4	9044-073	9044-073	9044-074	Bottom, Air Box
5	9044-075	9044-075	9044-075	Panel, Diverter Compartment
6	9044-076	9044-076	9044-077	Bracket, Diffuser
7✓	9044-078	9044-078	9044-078	Blower, Combustion
8✓	9044-079	9044-079	9044-079	Limit, Auxiliary, SPST., 250° - 300°F
9✓	8402-045	8402-045	8402-045	Control, Fan and Limit
10	9044-080	9044-080	9044-081	Shield, Rain
11	9044-083	9044-083	9044-083	Screen, Flue
12	9044-086	9044-086	9044-087	Bottom, Flue Collector
13	9044-088	9044-088	9044-089	Cover, Flue
14	9044-090	9044-090	9044-091	Panel, Front
15	9044-093	9044-093	9044-094	Panel, Burner
16	9044-096	9044-096	9044-096	Glass, Sight
17	SEE TABLE - PAGE 25 AND 26			Plate, Orifice
18	9044-097	9044-097	9044-097	Shield, Rain
19	SEE TABLE - PAGE 25 AND 26			Orifice, Main Burner
20	9044-098	9044-098	9044-099	Manifold
21	9044-101	9044-101	9044-102	Diffuser, Back
22	9044-104	9044-104	9044-105	Diffuser, Front
23✓	9044-107	9044-107	9044-107	Burner, Pilot/Ignitor/Sensor (Nat. Gas)
23✓	9044-108	9044-108	9044-108	Honeywell #Q345A100BJ (Includes Key No. 26 & 27)
24	9044-109	9044-109	9044-109	Burner, Pilot/Ignitor/Sensor (L.P. Gas)
25	9044-110	9044-110	9044-110	Honeywell #Q345A1016J (Includes Key No. 26 & 27)
26	9044-111	9044-111	9044-111	Wire, Spark
27✓	9044-112	9044-112	9044-112	Tube, Pilot
27✓	9044-113	9044-113	9044-113	Compression Nut and Sleeve
28	9044-114	9044-114	9044-114	Orifice, Pilot Burner (Nat. Gas) (Plain) BCR18(.018)
29	9044-115	9044-115	9044-116	Orifice, Pilot Burner (L.P. Gas) (Red) BBR12(.012)
30✓	9044-118	9044-118	9044-118	Bracket, Pilot
30✓	9044-119	9044-119	9044-119	Crosslighter
31	9044-120	9044-120	9044-120	Valve, Gas (Nat. Gas) (1/2" X 1/2") Honeywell #VR8440A2001
32	SEE TABLE - PAGE 27			Valve, Gas (L.P. Gas) (1/2" X 1/2") Honeywell #VR8440A2050
33	9044-121	9044-121	9044-121*	Shutter, Air (L.P. Gas)
34	SEE TABLE - PAGE 27			Burner
35	9044-122	9044-122	9044-122	Module, Ignition Control, Honeywell #S86F
36	9044-123	9044-123	9044-123	Capacitor, Compressor Run
37✓	8552-002	- - -	- - -	Tube, Silicone Rubber
37✓	- - -	8552-004	8552-004	Switch, Air Pressure
38	9044-124	9044-124	9044-125	Capacitor, Fan, 5MFD., 370V., 60Hz., 1Ph.
39	9044-126	9044-126	9044-126	Capacitor, Fan, 7.5MFD., 370V., 60Hz., 1Ph.
40	9044-127	9044-127	9044-127	Exchanger, Heat
41	9044-128	9044-128	9044-128	Panel, Bottom Compressor Access
42	9044-129	9044-129	9044-129	Plate, Inlet
				Panel, Top Compressor Access
				Handle, Door

*Suggested Distributor Stocking Parts List.
(2% of Units Installed - Minimum 1 Each)

FOR PARTS ILLUSTRATION
SEE PAGE 22

COMBINATION UNIT — MODELS "PGA SERIES"

KEY NO.	PART NUMBERS FOR MODELS			DESCRIPTION
	PGA48A080 PGA48A120 PGA48B080 PGA48B120	PGA48A145 PGA60A145 PGA60B145	PGA60A080 PGA60A120 PGA60B080	
1	9044-069	9044-069	9044-069	Diverter, Draft
2	9044-071	9044-071	9044-071	Bottom, Draft Diverter
3	9044-072	9044-072	9044-072	Side, Air Box
4	9044-074	9044-074	9044-074	Bottom, Air Box
5	9044-075	9044-075	9044-075	Panel, Diverter Compartment
6	9044-077	9044-077	9044-077	Bracket, Diffuser
7✓	9044-078	9044-078	9044-078	Blower, Combustion
8✓	9044-079	9044-079	9044-079	Limit, Auxiliary, SPST., 250° - 300°F.
9✓	8402-045	8402-045	8402-045	Control, Fan and Limit
10	9044-081	9044-082	9044-081	Shield, Rain
11	9044-084	9044-085	9044-084	Screen, Flue
12	9044-087	9044-087	9044-087	Bottom, Flue Collector
13	9044-089	9044-089	9044-089	Cover, Flue
14	9044-091	9044-092	9044-091	Panel, Front
15	9044-094	9044-095	9044-094	Panel, Burner
16	9044-096	9044-096	9044-096	Glass, Sight
17	SEE TABLE - PAGE 25	AND 26		Plate, Orifice
18	9044-097	9044-097	9044-097	Shield, Rain
19	SEE TABLE - PAGE 25	AND 26		Orifice, Main Burner
20	9044-099	9044-100	9044-099	Manifold
21	9044-102	9044-103	9044-102	Diffuser, Back
22	9044-105	9044-106	9044-105	Diffuser, Front
23✓	9044-107	9044-107	9044-107	Burner, Pilot/Ignitor/Sensor (Nat. Gas) Honeywell #Q345A1008J (Includes Key No. (26 and 27))
23✓	9044-108	9044-108	9044-108	Burner, Pilot/Ignitor/Sensor (L.P. Gas) Honeywell #Q345A1016J (Includes Key No. (26 and 27))
24	9044-109	9044-109	9044-109	Wire, Spark
25	9044-110	9044-110	9044-110	Tube, Pilot
26	9044-111	9044-111	9044-111	Compression Nut & Sleeve
27✓	9044-112	9044-112	9044-112	Orifice, Pilot Burner (Nat. Gas) (Plain) BCR18 (.018)
27✓	9044-113	9044-113	9044-113	Orifice, Pilot Burner (L.P. Gas) (Red) BBR12 (.012)
28	9044-114	9044-114	9044-114	Bracket, Pilot
29	9044-116	9044-117	9044-116	Crosslighter
30✓	9044-118	9044-118	9044-118	Valve, Gas (Nat.) (1/2 X 1/2) Honeywell #YRB440A2001
30✓	9044-119	9044-119	9044-119	Valve, Gas (L.P.) (1/2 X 1/2) Honeywell #YRB440A2050
31	9044-120	- - -	9044-120	Shutter, Air (L.P. Gas)
32	SEE TABLE - PAGE 27			Burner
33	9044-121	9044-121	9044-121	Module, Ignition Control, Honeywell #S86F-1067
34	SEE TABLE - PAGE 27			Capacitor, Compressor Run
35	9044-122	9044-122	9044-122	Tube, Silicone Rubber
36	9044-123	9044-123	9044-123	Switch, Air Pressure
37✓	8552-002	**8552-002	- - -	Capacitor, Fan, 5MFD., 370V., 60Hz., 1Ph.
37✓	- - -	***8552-004	8552-004	Capacitor, 7.5MFD., 370V., 60Hz., 1Ph.
38	9044-125	9044-125	9044-125	Exchanger, Heat
39	9044-126	9044-126	9044-126	Panel, Bottom Compressor Access
40	9044-127	9044-127	9044-127	Plate, Inlet
41	9044-128	9044-128	9044-128	Panel, Top Compressor Access
42	9044-129	9044-129	9044-129	Handle, Door

✓Suggested Distributor Stocking Parts Lists.
(2% of Units Installed - Minimum 1 Each)

FOR PARTS ILLUSTRATION
SEE PAGE 22

**Use Fan Capacitor Part No. 8552-002 Model PGA48A145.
***Use Fan Capacitor Part No. 8552-004 Models PGA60A145 and PGA60B145.

COMBINATION UNIT — MODELS "PGA SERIES"

NOTE: SEE UNIT RATING PLATE FOR THE
FURNACE INPUT OF THE UNIT

FURNACE INPUT	PART NUMBERS FOR MODELS			DESCRIPTION
	PGA24A090 PGA30A090	PGA36A090 PGA36B090 PGA42A090	PGA36A120 PGA42A120 PGA48A120	
60,000	9044-130	9044-130	- - -	#Orifice, Main Burner (Nat. Gas) Drill Size No. 44 (3 Req.)
	9044-131	9044-131	- - -	#Orifice, Main Burner (L.P. Gas) Drill Size No. 55 (3 Req.)
	9044-141	9044-141	- - -	Plate, Air Orifice
	9044-132	9044-132	- - -	#Orifice, Main Burner (Nat. Gas) Drill Size No. 40 (3 Req.)
80,000	- - -	- - -	9044-130	#Orifice, Main Burner (Nat. Gas) Drill Size No. 44 (4 Req.)
	9044-133	9044-133	- - -	#Orifice, Main Burner (L.P. Gas) Drill Size No. 53 (3 Req.)
	- - -	- - -	9044-131	#Orifice, Main Burner (L.P. Gas) Drill Size No. 55 (3 Req.)
	9044-142	9044-142	9044-142	Plate, Air Orifice
	9044-134	9044-134	- - -	#Orifice, Main Burner (Nat. Gas) Drill Size No. 37 (3 Req.)
90,000	9044-135	9044-135	- - -	#Orifice, Main Burner (L.P. Gas) Drill Size No. 52 (3 Req.)
	9044-143	9044-143	- - -	Plate, Orifice
	- - -	- - -	9044-136	#Orifice, Main Burner (Nat. Gas) Drill Size No. 41 (4 Req.)
100,000	- - -	- - -	9044-133	#Orifice, Main Burner (L.P. Gas) Drill Size No. 53 (4 Req.)
	- - -	- - -	9044-144	Plate, Air Orifice
	- - -	- - -	9044-137	#Orifice, Main Burner (Nat. Gas) Drill Size No. 38 (4 Req.)
120,000	- - -	- - -	9044-135	#Orifice, Main Burner (L.P. Gas) Drill Size No. 52 (4 Req.)
	- - -	- - -	9044-145	Plate, Air Orifice

#Be sure Parts Being Ordered are For
Type of Gas Being Used.

FOR PARTS ILLUSTRATION
SEE PAGE 22

COMBINATION UNIT — MODELS "PGA SERIES"

NOTE: SEE UNIT RATING PLATE FOR THE
FURNACE INPUT OF THE UNIT

FURNACE INPUT	PART NUMBERS FOR MODELS		DESCRIPTION
	PGA48B120 PGA60A120	PGA48A145 PGA60A145 PGA60B145	
80,000	9044-130	- - -	#Orifice, Main Burner (Nat. Gas) Drill Size No. 44 (4 Req.)
	- - -	9044-138	#Orifice, Main Burner (Nat. Gas) Drill Size No. 47 (5 Req.)
	9044-131	- - -	#Orifice, Main Burner (L.P. Gas) Drill Size No. 55 (4 Req.)
	- - -	9044-139	#Orifice, Main Burner (L.P. Gas) Drill Size No. 56 (5 Req.)
	9044-142	9044-142	Plate, Air Orifice
100,000	9044-136	- - -	#Orifice, Main Burner (Nat. Gas) Drill Size No. 41 (4 Req.)
	9044-133	- - -	#Orifice, Main Burner (L.P. Gas) Drill Size No. 53 (4 Req.)
	9044-144	- - -	Plate, Air Orifice
120,000	9044-137	- - -	#Orifice, Main Burner (Nat. Gas) Drill Size No. 38 (4 Req.)
	9044-135	- - -	#Orifice, Main Burner (L.P. Gas) Drill Size No. 52 (4 Req.)
	9044-145	- - -	Plate, Air Orifice
130,000	- - -	9044-136	#Orifice, Main Burner (Nat. Gas) Drill Size No. 41 (5 Req.)
	- - -	9044-133	#Orifice, Main Burner (L.P. Gas) Drill Size No. 53 (5 Req.)
	- - -	9044-143	Plate, Air Orifice
145,000	- - -	9044-137	#Orifice, Main Burner (Nat. Gas) Drill Size No. 38 (5 Req.)
	- - -	9044-140	#Orifice, Main Burner (L.P. Gas) Drill Size No. 1/16 (5 Req.)
	- - -	9044-146	Plate, Air Orifice

FURNACE INPUT	PART NUMBERS FOR MODELS			DESCRIPTION
	PGA24A060 PGA30A060	PGA36A060 PGA42A060	PGA48A080 PGA48B080 PGA60A080 PGA60B080	
60,000	9044-130	9044-130	- - -	#Orifice, Main Burner (Nat. Gas) Drill Size No. 44 (3 Req.)
	9044-131	9044-131	- - -	#Orifice, Main Burner (L.P. Gas) Drill Size No. 55 (3 Req.)
	9044-141	9044-141	- - -	Plate, Air Orifice
	9044-132	9044-132	- - -	#Orifice, Main Burner (Nat. Gas) Drill Size No. 40 (3 Req.)
80,000	- - -	- - -	9044-130	#Orifice, Main Burner (Nat. Gas) Drill Size No. 44 (4 Req.)
	9044-133	9044-133	- - -	#Orifice, Main Burner (L.P. Gas) Drill Size No. 53 (3 Req.)
	- - -	- - -	9044-131	#Orifice, Main Burner (L.P. Gas) Drill Size No. 55 (3 Req.)
	9044-142	9044-142	9044-142	Plate, Air Orifice
100,000	- - -	- - -	9044-136	#Orifice, Main Burner (Nat. Gas) Drill Size No. 41 (4 Req.)
	- - -	- - -	9044-133	#Orifice, Main Burner (L.P. Gas) Drill Size No. 53 (4 Req.)
	- - -	- - -	9044-144	Plate, Air Orifice

#Be Sure Parts Being Ordered are
For Type of Gas Being Used.

FOR PARTS ILLUSTRATION
SEE PAGE 22

COMBINATION UNIT — MODELS "PGA SERIES" CAPACITOR — COMPRESSOR RUN

KEY NO.	PART NUMBERS FOR MODELS				DESCRIPTION
	PGA24A060 PGA24A090	PGA30A060 PGA30A090	PGA36A060 PGA36A090 PGA36A120	PGA42A060 PGA42A090 PGA42A120	
34/	9044-148	- - -	- - -	- - -	Capcaitor, Compressor Run, 30MFD., 370V., 60Hz., 1Ph.
34/	- - -	8552-032	- - -	- - -	Capacitor, Compressor Run, 35MFD., 370V., 60Hz., 1Ph.
34/	- - -	- - -	8552-035	- - -	Capacitor, Compressor Run, 40MFD., 370V., 60Hz., 1Ph.
34/	- - -	- - -	- - -	8552-030	Capacitor, Compressor Run, 40MFD., 440V., 60Hz., 1Ph.

KEY NO.	PART NUMBERS FOR MODELS		DESCRIPTION
	PGA48A080 PGA48A120 PGA48A145	PGA60A080 PGA60A120 PGA60A145	
34/	8552-040	- - -	Capacitor, Compressor Run, 40MFD., 440V., 60Hz., 1Ph.
34/	- - -	9044-149	Capacitor, Compressor Run, 55MFD., 440V., 60Hz., 1Ph.

✓Suggested Distributor Stocking Parts List.
(2% of Units Installed - Minimum 1 Each)

FOR PARTS ILLUSTRATION
SEE PAGE 22

BURNERS

KEY NO.	PART NUMBERS FOR MODELS					DESCRIPTION
	PGA24A090 PGA30A090	PGA36090 PGA36B090 PGA42A090	PGA36A120 PGA42A120 PGA48A120	PGA48B120 PGA60A120 PGA60B120	PGA48A145 PGA60A145 PGA60B145	
50	9044-150	9044-150	- - -	- - -	- - -	Burner (3 Req.)
50	- - -	- - -	9044-150	9044-150	- - -	Burner (4 Req.)
50	- - -	- - -	- - -	- - -	9044-150	Burner (5 Req.)

FOR PARTS ILLUSTRATION
SEE PAGE

KEY NO.	PART NUMBERS FOR MODELS				DESCRIPTION
	PGA24A060 PGA30A060	PGA36A060 PGA42A060	PGA48A080 PGA48B080	PGA60A080 PGA60B080	
50	9044-151	9044-151	- - -	- - -	Burner (3 Req.)
50	- - -	- - -	9044-151	9044-151	Burner (4 Req.)

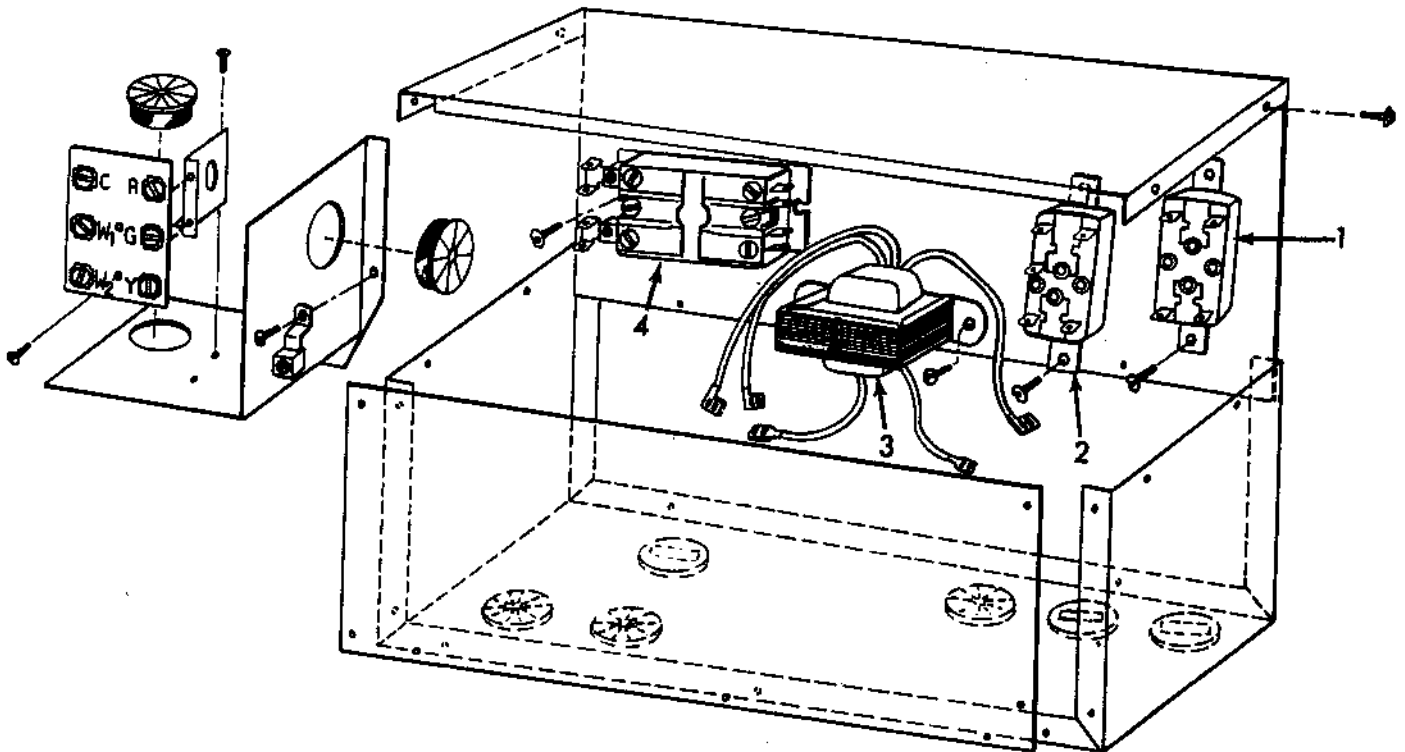
FOR PARTS ILLUSTRATION
SEE PAGE 22

COMBINATION UNIT — MODELS "PGA SERIES" TECH SHEET

KEY NO.	PART NUMBERS FOR MODELS				DESCRIPTION
	PGA24A060 PGA24A090	PGA30A060 PGA30A090	PGA36A060 PGA36A090	PGA36B090	
X	1000368	1000369	1000370	1000371	Sheet, Tech
	PART NUMBERS FOR MODELS				
KEY NO.	PGA36A120	PGA42A060 PGA42A090	PGA42A120	PGA48A120 PGA48A080	DESCRIPTION
X	1000372	1000373	1000374	1000375	Sheet, Tech
	PART NUMBERS FOR MODELS				
KEY NO.	PGA48B120 PGA48B080	PGA48A145	PGA60A120 PGA60A080	PGA60B080	DESCRIPTION
X	1000376	1000377	1000378	1000379	Sheet, Tech
	PART NUMBERS FOR MODELS				
KEY NO.	PGA60A145	PGA60B145	DESCRIPTION		
X	1000380	1000381	Sheet, Tech		

XPart Not Illustrated.

COMBINATION UNIT — MODELS "PGA SERIES"



KEY NO.	PART NUMBERS FOR MODELS				DESCRIPTION
	PGA24A060 PGA24A090 PGA30A060 PGA30A090 PGA36A060 PGA36A090 PGA36A120	PGA42A060 PGA42A090 PGA42A120 PGA48A080 PGA48A120 PGA48A145	PGA60A080 PGA60A120 PGA60A145	PGA36B090 PGA48B120 PGA48B080 PGA60B080 PGA60B145	
1/	8201-006	8201-006	8201-006	8201-006	Relay, SPST., 24V. Coil Heat
2/	8201-009	8201-009	8201-009	8201-009	Relay, SPST., 24V. Coil Fan, Essex #184-10103-306A
3/	8407-034	8407-034	8407-034	8407-034	Transformer, 208/240V., 60Hz., Basler #BE-8733-KJJ106 or Jard #TB402424-B21A
4/	8401-006	- - -	- - -	- - -	Contactor, 20AMP., 1Ph., Elmwood #30-B0-20
4/	- - -	8401-010	- - -	- - -	Contactor, 30AMP., 1Ph., Elmwood #30-C00-20
4/	- - -	- - -	8401-001	- - -	Contactor, 40AMP., 1Ph., Elmwood #30-F0-20 or RBM #154-4388081-52100ZA
4/	- - -	- - -	- - -	8401-011	Contactor, 30AMP., 3Ph., Elmwood #30-E0-303 or RBM #154-312221-52000ZB

✓Suggested Distributor Stocking Parts List.
(2% of Units Installed - Minimum 1 Each)

Limited Warranty



WHAT THIS WARRANTY COVERS

We warrant to the original purchaser only that all Bard products will be free from defects in materials and workmanship in normal use for the periods shown below. We will either repair or replace a defective part at our Bryan, Ohio factory and return it to your dealer. We make no express warranties, other than this one.

DURATION OF WARRANTY

Our warranty and all implied warranties are limited to defects arising during the periods shown in the following table. The start of the periods is the date of installation shown on your warranty registration card. You must return this card to get the full term of the warranty. If you do not return the card, the periods will start when your Bard product was shipped from our factory.

ITEMS COVERED	LENGTH OF WARRANTY
1. All Bard products	One Year
2. Hermetic Compressors	Five years
3. Steel heat exchangers for Hi-Boy, Lo-Boy and Counterflow furnaces	Twenty years You pay 1/10 of latest list price for each year after ten years
4. Steel heat exchangers for all horizontal oil furnaces	Ten years
5. Steel heat exchangers for all horizontal gas furnaces and combination gas/electric units	You pay 1/10 of latest list price for each year Ten years

Warranty repairs and replacement will not extend the periods. The warranty for the repaired or replacement part will last only for the remainder of the warranty period for the original part or product.

All implied warranties are limited to the periods in the table. We make no other implied warranties, including implied warranties of merchantability and fitness for a particular purpose. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.

WHAT THIS WARRANTY DOES NOT COVER

This warranty does not cover defects caused by

1. Alterations not approved by us, improper or negligent installation, applications, repairs or servicing, or parts not supplied by us.
2. Failure to follow the limitations on the product's rating plate or in our instructions or failure to do required preventative maintenance.
3. Unusual, negligent, or improper use.
4. Improper fuel or electrical supply (Examples of improper, electrical supply are low voltage, voltage transients, power interruption, improper frequency, blown fuses, and open circuit breakers).
5. Accidents or other events beyond Bard's control (Examples of these include damage in transportation, storm damage, damage caused by workmen, fire, flooding, lightning, etc.).

6. Defects that happen after

- (a) Anyone has tampered with the product.
- (b) The product has been improperly serviced by anyone not authorized by us (See also No. 1 above).
- (c) The product has been moved from its original place of installation, or,
- (d) The product has been damaged by an event beyond Bard's control (See also No. 5 above)

Our warranty does not cover normal preventive maintenance or repair or replacement of consumable parts, such as cleaning or replacement of filters. Please see your manual for normal maintenance requirements.

This warranty applies only to our products that are installed in the United States except Alaska and Hawaii. Products installed in Canada also are not covered.

WHAT WE WILL DO ABOUT A DEFECT

We will repair or replace defective parts only. We will repair or replace the heat exchangers indicated in the tables showing the length of warranty if you pay the applicable portion of the latest list price. Replacement parts may be reconditioned parts. We will not pay or be responsible for the following.

1. Labor or transportation costs.
2. Delays in repairing or failures to complete repairs caused by events beyond our control (Common examples of such events are strikes, floods, unavailability of materials, and governmental restrictions).
3. Any incidental, consequential, or other damages or other costs arising out of the defect (An example would be living expenses or increased utilities expenses while the product needs repair or is out of operation).

Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation may not apply to you.

WHAT YOU MUST DO

1. Tell your dealer as soon as you discover a problem and ask your dealer to fix the problem. You should do this in writing for serious problems.
2. Pay all costs for transporting the defective part and the repaired or replacement part.
3. Pay all removal, installation, and service charges.
4. For defective heat exchangers, pay the prorated portion of the list price applicable to the heat exchangers.

This warranty gives you specific legal rights, and you may have other rights which vary from state to state.

FOR SERVICE OR DEALER, FOLLOW THESE STEPS IN ORDER:

FIRST:Contact the installer. You may find his name on the product in your Owner's Packet. If his name is not known, call your builder if yours is a new residence.

SECOND:Contact the nearest distributor. (See telephone pages).

THIRD:Contact:

**BARD MANUFACTURING COMPANY
P.O. Box 607
Bryan, Ohio 43506**

Phone: (419) 636-1194

FOR OWNERS INFORMATION

Product Model No. _____

Unit Serial No. _____

Installation Date _____

Installed by (dealer) _____

