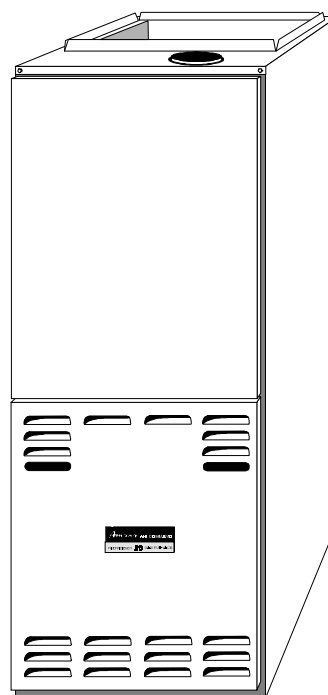
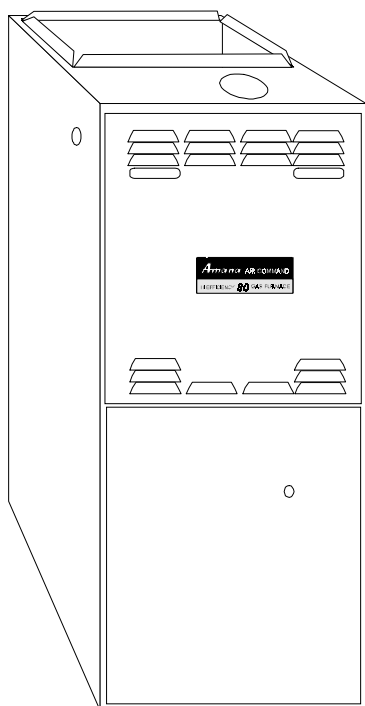


Service Instructions

40" 80% Gas Furnaces

GUIA, GCIA, GUIB, GCIB, GUIC, GCIC

GUID, GUIS, GCIS, GUIV & Accessories



This manual is to be used by qualified HVAC technicians only. Amana does not assume any responsibility for property damage or personal injury for improper service procedures done by an unqualified person.



Amana[®]
Heating ■ Air Conditioning

A higher standard of comfort

RS6620002
Revision 2
December 1998

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REV. 2 Added new models to manual

IMPORTANT INFORMATION

Pride and workmanship go into every product to provide our customers with quality products. It is possible, however, that during its lifetime a product may require service. Products should be serviced only by a qualified service technician who is familiar with the safety procedures required in the repair and who is equipped with the proper tools, parts, testing instruments and the appropriate service manual. REVIEW ALL SERVICE INFORMATION IN THE APPROPRIATE SERVICE MANUAL BEFORE BEGINNING REPAIRS.

IMPORTANT NOTICES



IF REPAIRS ARE ATTEMPTED BY UNQUALIFIED PERSONS, DANGEROUS CONDITIONS (SUCH AS EXPOSURE TO ELECTRICAL SHOCK) MAY RESULT. THIS MAY CAUSE SERIOUS INJURY OR DEATH.



AMANA WILL NOT BE RESPONSIBLE FOR ANY INJURY OR PROPERTY DAMAGE ARISING FROM IMPROPER SERVICE OR SERVICE PROCEDURES. IF YOU PERFORM SERVICE ON YOUR OWN PRODUCT, YOU ASSUME RESPONSIBILITY FOR ANY PERSONAL INJURY OR PROPERTY DAMAGE WHICH MAY RESULT.

To locate an authorized servicer, please consult your telephone book or the dealer from whom you purchased this product. For further assistance, please contact:

CONSUMER AFFAIRS DEPT.
AMANA HEATING & AIR CONDITIONING
AMANA, IOWA 52204

**OR
CALL**

1-319-622-5511
and ask for
Consumer Affairs

If outside the United States contact:

AMANA HEATING & AIR CONDITIONING
ATTN: INTERNATIONAL DIVISION
AMANA, IOWA 52204, USA
Telephone: (319) 622-5511
Facsimile: (319) 622-2180

RECOGNIZE SAFETY SYMBOLS, WORDS AND LABELS



DANGER - Immediate hazards which WILL result in severe personal injury or death.



WARNING - Hazards or unsafe practices which COULD result in severe personal injury or death.



CAUTION - Hazards or unsafe practices which COULD result in minor personal injury or product or property damage.

PRODUCT IDENTIFICATION

The model and manufacturing number are used for positive identification of component parts used in manufacturing. At which time engineering and manufacturing changes take place where interchangeability of components are affected, the manufacturing number will change.

It is very important to use the model and manufacturing numbers at all times when requesting service or parts information.

MODEL	M/N	MODEL	M/N	MODEL	M/N
GUIA045A30	P1177301F	GUIB045A30	P1186401F	GUIC045DA30	P1222501F
GUIA070A30	P1177302F	GUIB070A30	P1186402F	GUIC070DA30	P1222502F
GUIA070A40	P1177303F	GUIB070A40	P1186403F	GUIC070DA40	P1222503F
GUIA090A30	P1177304F	GUIB090A30	P1186404F	GUIC070DA40	P1222509F
GUIA090A50	P1177305F	GUIB090A50	P1186405F	GUIC090DA30	P1222504F
GUIA115A40	P1177306F	GUIB115A40	P1186406F	GUIC090DA50	P1222505F
GUIA115A50	P1177307F	GUIB115A50	P1186407F	GUIC115DA40	P1222506F
GUIA140A50	P1177308F	GUIB140A50	P1186408F	GUIC115DA50	P1222507F
				GUIC140DA50	P1222508F
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GUIA090B30	P1206604F	GUIB090B30	P1206804F	GUIC070DX40	P1222603F
GUIA090B50	P1206605F	GUIB090B50	P1206805F	GUIC070DX40	P1222609F
GUIA115B40	P1206606F	GUIB115B50	P1206807F	GUIC090DX30	P1222604F
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MODEL	M/N	MODEL	M/N	MODEL	M/N
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FURNACE ACCESSORY KITS

FTK__	Furnace Twinning Kit (Not for use with GUIS/GCIS/GUIV Furnace)
HANG__	High Altitude Nat Gas Kit
HALP__	High Altitude LP Kit
LPTK__	LP Conversion Kit
HAC1PS__	High Altitude Press Switch Kit

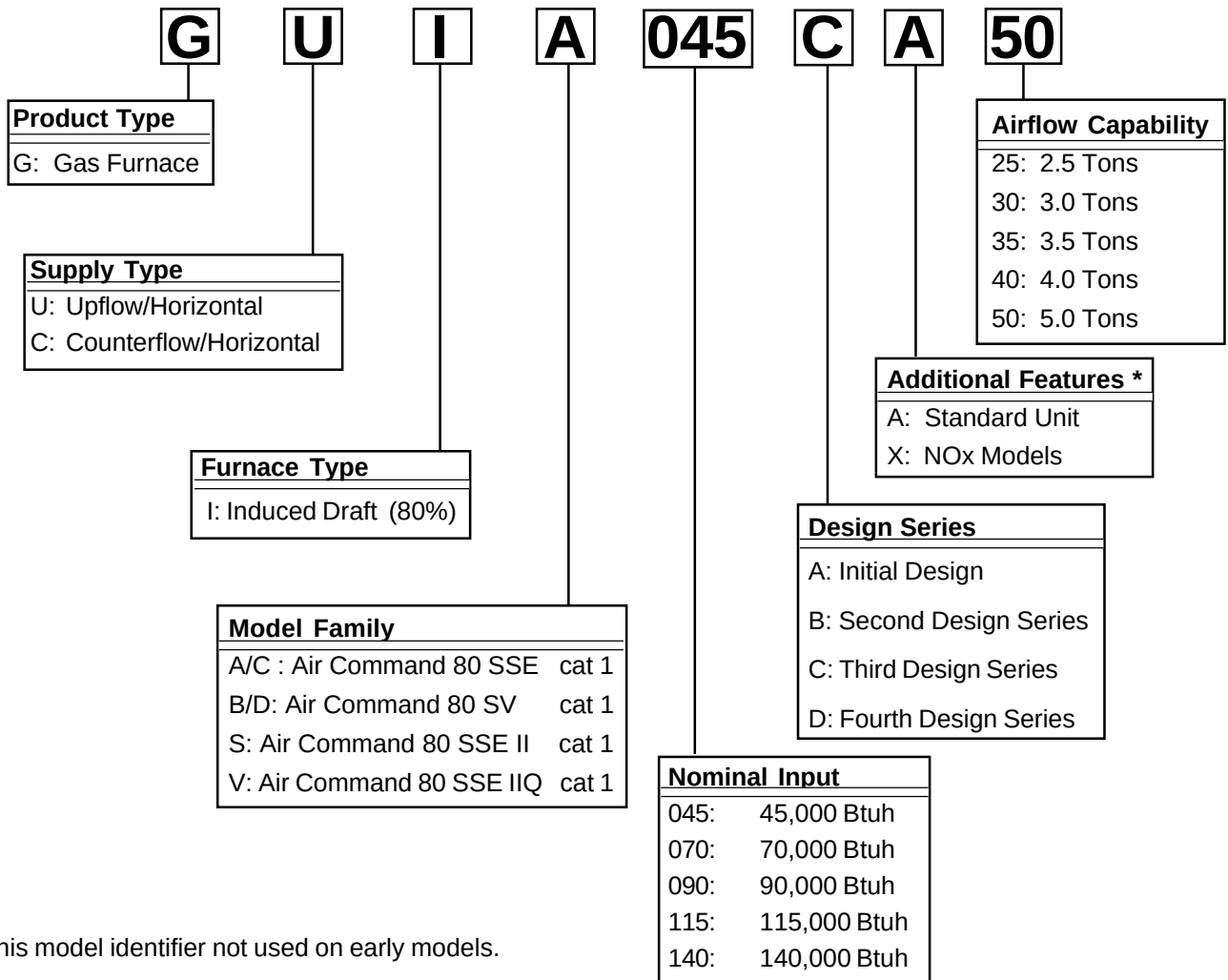
Note: See servicing section for available kits and usage.

ADDITIONAL FURNACE ACCESSORIES

ACG__	Accommodator (Filter Cabinet)
CVK__	Common Vent Kit
DEHUM__	Dehumidistat
EAC__	Electronic Air Cleaner
EFR__	External Filter Rack Kit
HR__	Horizontal Filter Housing
MAC__	Media Air Cleaner
MAF__	Media Air Filter (Replacement Filter for MAC__)

Note: For additional accessory kits listed above, see product identification section pages 12, 13, 14 and 15 for available accessories and usage.

PRODUCT IDENTIFICATION



PRODUCT IDENTIFICATION

FOR YOUR SAFETY READ BEFORE OPERATING

WARNING: If you do not follow these instructions explosion may result causing property damage, personal injury or loss of life.

- A. This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.
- B. **BEFORE OPERATING** smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.
- WHAT TO DO IF YOU SMELL GAS**
- Do not try to light any appliance.
 - Do not touch any electric switch; do not use any phone in your building.
 - Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
 - If you cannot reach your gas supplier, call the fire department.
- C. Use only your hand to push in or turn the gas control lever. Never use tools. If the lever will not push in or turn by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.
- D. Do not use this appliance if any part has been underwater. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been underwater.

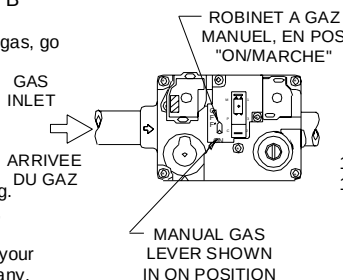
LIRE AVANT DE METTRE EN MARCHELIRE

AVERTISSEMENT: Quiconque ne respecte pas à la lettre les instructions dans le présent manuel risque de déclencher un incendie ou une explosion entraînant des dommages matériels, des lésions corporelles ou la perte de vies humaines.

- A. Cet appareil ne comporte pas de veilleuse. Il est muni d'un dispositif d'allumage qui allume automatiquement le brûleur. Ne pas tenter d'allumer le brûleur manuellement.
- B. **AVANT DE LE FAIRE FONCTIONNER**, reniffler tout autour de l'appareil pour déceler une odeur de gaz. Reniffler près du plancher, car certains gaz sont plus lourds que l'air et peuvent s'accumuler au niveau du sol.
- QUE FAIRE S'IL Y A UNE ODEUR DE GAZ**
- Ne pas tenter d'allumer l'appareil
 - Ne toucher aucun interrupteur électrique; n'utiliser aucun téléphone dans le bâtiment.
 - Appeler immédiatement le fournisseur de gaz en employant le téléphone d'un voisin. Respecter à la lettre les instructions du fournisseur de gaz.
 - Si personne ne répond, appeler le service des incendies.
- C. Ne pousser ou tourner le levier d'admission du gaz qu'à la main; ne jamais employer d'outil à cet effet. Si la manette reste coincée, ne pas tenter de la réparer; appeler un technicien qualifié. Quiconque tente de forcer la manette ou de la réparer peut déclencher une explosion ou un incendie.
- D. Ne pas se servir de cet appareil s'il a été plongé dans l'eau, complètement ou en partie. Appeler un technicien qualifié pour inspecter l'appareil et remplacer tout partie du système de contrôle et toute commande qui ont été plongés dans l'eau.

OPERATING INSTRUCTIONS

1. STOP! Read the safety information above on this label.
2. Set the thermostat to lowest setting.
3. Turn off all power to the appliance.
4. This appliance is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.
5. Push the gas control lever to "OFF" Position. Do not force.
6. Wait five (5) minutes to clear out any gas. Then smell for gas, including near the floor. If you then smell gas, STOP! Follow "B" in the safety information above on this Label. If you don't smell gas, go to next step.
7. Push gas control lever to "ON".
8. Replace access panel.
9. Turn on all electric power to the appliance.
10. Set thermostat to desired setting.
11. If the appliance will not operate, follow the instructions "To Turn Off Gas To Appliance" and call your service technician or gas company.



MISE EN MARCHÉ

1. **ARRETÊR!** Lisez les instructions de sécurité sur la portion supérieure de cette étiquette.
2. Régler le thermostat à la température la plus basse
3. Couper l'alimentation électrique de l'appareil.
4. Cet appareil ménager étant doté d'un système d'allumage automatique, ne pas essayer à allumer le brûleur manuellement.
5. Pousse le levier du contrôle du gaz à "OFF/ ARRET" position.
6. Attendre cinq (5) minutes pour laisser échapper tout le gaz. Reniffler tout autour de l'appareil, y compris près du plancher, pour déceler une odeur de gaz. Si c'est le cas, **ARRÊTER!** Passer à l'étape B des instructions de sécurité sur la portion supérieure de cette étiquette. S'il n'y a pas d'odeur de gaz, passer à l'étape suivante.
7. Pousse le levier du contrôle du gaz à "ON/MARCHE" position.
8. Remettre en place le panneau d'accès.
9. Mettre l'appareil sous tension.
10. Régler le thermostat à la température désirée.
11. Si l'appareil ne se met pas en marche, suivre les instructions intitulées. Comment coupler l'admission de gaz de l'appareil et appeler un technicien qualifié ou le fournisseur de gaz.

TO TURN OFF GAS TO APPLIANCE

1. Set the thermostat to lowest setting.
2. Turn off all electric power to the appliance if service is to be performed.
3. Push the gas control lever to "OFF" Position. Do not force.
4. Replace control access panel.

POUR COUPER L'ADMISSION DE GAZ DE L'APPAREIL

1. Régler le thermostat à la température la plus basse.
2. Couper l'alimentation électrique de l'appareil s'il faut procéder à des opérations d'entretien.
3. Pousse le levier du contrôle du gaz à "OFF / ARRET" position. Ne pas forcer.
4. Remettre en place le panneau d'accès.

PRODUCT IDENTIFICATION

FOR YOUR SAFETY READ BEFORE OPERATING

WARNING: If you do not follow these instructions explosion may result causing property damage, personal injury or loss of life.

- A. This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.
- B. **BEFORE OPERATING** smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.
- WHAT TO DO IF YOU SMELL GAS**
- Do not try to light any appliance.
 - Do not touch any electric switch; do not use any phone in your building.
 - Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
 - If you cannot reach your gas supplier, call the fire department.
- C. Use only your hand to turn the gas control knob. Never use tools. If the knob will not turn by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.
- D. Do not use this appliance if any part has been underwater. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been underwater.

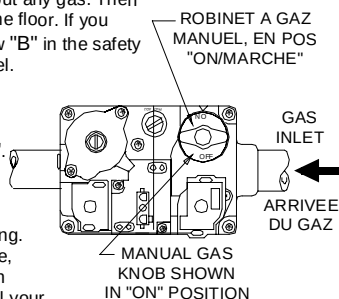
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AVERTISSEMENT: Quiconque ne respecte pas à la lettre les instructions dans le présent manuel risque de déclencher un incendie ou une explosion entraînant des dommages matériels, des lésions corporelles ou la perte de vies humaines.

- A. Cet appareil ne comporte pas de veilleuse. Il est muni d'un dispositif d'allumage qui allume automatiquement le brûleur. Ne pas tenter d'allumer le brûleur manuellement.
- B. **AVANT DE LE FAIRE FONCTIONNER**, renifler tout autour de l'appareil pour détecter une odeur de gaz. Renifler près du plancher, car certains gaz sont plus lourds que l'air et peuvent s'accumuler au niveau du sol.
- QUE FAIRE S'IL Y A UNE ODEUR DE GAZ**
- Ne pas tenter d'allumer l'appareil
 - Ne toucher aucun interrupteur électrique; n'utiliser aucun téléphone dans le bâtiment.
 - Appeler immédiatement le fournisseur de gaz en employant le téléphone d'un voisin. Respecter à la lettre les instructions du fournisseur de gaz.
 - Si personne ne répond, appeler le service des incendies.
- C. Ne pousser ou tourner le robinet d'admission du gaz qu'à la main; ne jamais employer d'outil à cet effet. Si la manette reste coincée, ne pas tenter de la réparer; appeler un technicien qualifié. Quiconque tente de forcer la manette ou de la réparer peut déclencher une explosion ou un incendie.
- D. Ne pas se servir de cet appareil s'il a été plongé dans l'eau, complètement ou en partie. Appeler un technicien qualifié pour inspecter l'appareil et remplacer toute partie du système de contrôle et toute commande qui ont été plongés dans l'eau.

OPERATING INSTRUCTIONS

1. **STOP!** Read the safety information above on this label.
2. Set the thermostat to lowest setting.
3. Turn off all power to the appliance.
4. This appliance is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.
5. Turn the gas control knob clockwise ↻ to "OFF" Position. Do not force.
6. Wait five (5) minutes to clear out any gas. Then smell for gas, including near the floor. If you then smell gas, **STOP!** Follow "B" in the safety information above on this Label. If you don't smell gas, go to next step.
7. Turn gas control knob counterclockwise ↺ to "ON".
8. Replace access panel.
9. Turn on all electric power to the appliance.
10. Set thermostat to desired setting.
11. If the appliance will not operate, follow the instructions "To Turn Off Gas To Appliance" and call your service technician or gas company.



MISE EN MARCHÉ

1. **ARRÊTÉR!** Lisez les instructions de sécurité sur la portion supérieure de cette étiquette.
2. Régler le thermostat à la température la plus basse.
3. Couper l'alimentation électrique de l'appareil.
4. Cet appareil ménager étant doté d'un système d'allumage automatique, ne pas essayer à allumer le brûleur manuellement.
5. Tourner le robinet à gaz dans le sens des aiguilles d'une montre ↻ en position "OFF/ARRÊT".
6. Attendre cinq (5) minutes pour laisser échapper tout le gaz. Renifler tout autour de l'appareil, y compris près du plancher, pour détecter une odeur de gaz. Si c'est le cas, **ARRÊTER!** Passer à l'étape B des instructions de sécurité sur la portion supérieure de cette étiquette. S'il n'y a pas d'odeur de gaz, passer à l'étape suivante.
7. Tourner le robinet à gaz dans le sens inverse des aiguilles d'une montre ↺ en pos "ON/MARCHE".
8. Remettre en place le panneau d'accès.
9. Mettre l'appareil sous tension.
10. Régler le thermostat à la température désirée.
11. Si l'appareil ne se met pas en marche, suivre les instructions intitulées. Comment coupler l'admission de gaz de l'appareil et appeler un technicien qualifié ou le fournisseur de gaz.

TO TURN OFF GAS TO APPLIANCE

1. Set the thermostat to lowest setting.
2. Turn off all electric power to the appliance if service is to be performed.
3. Turn the gas control knob clockwise ↻ to "OFF" Position. Do not force.
4. Replace control access panel.

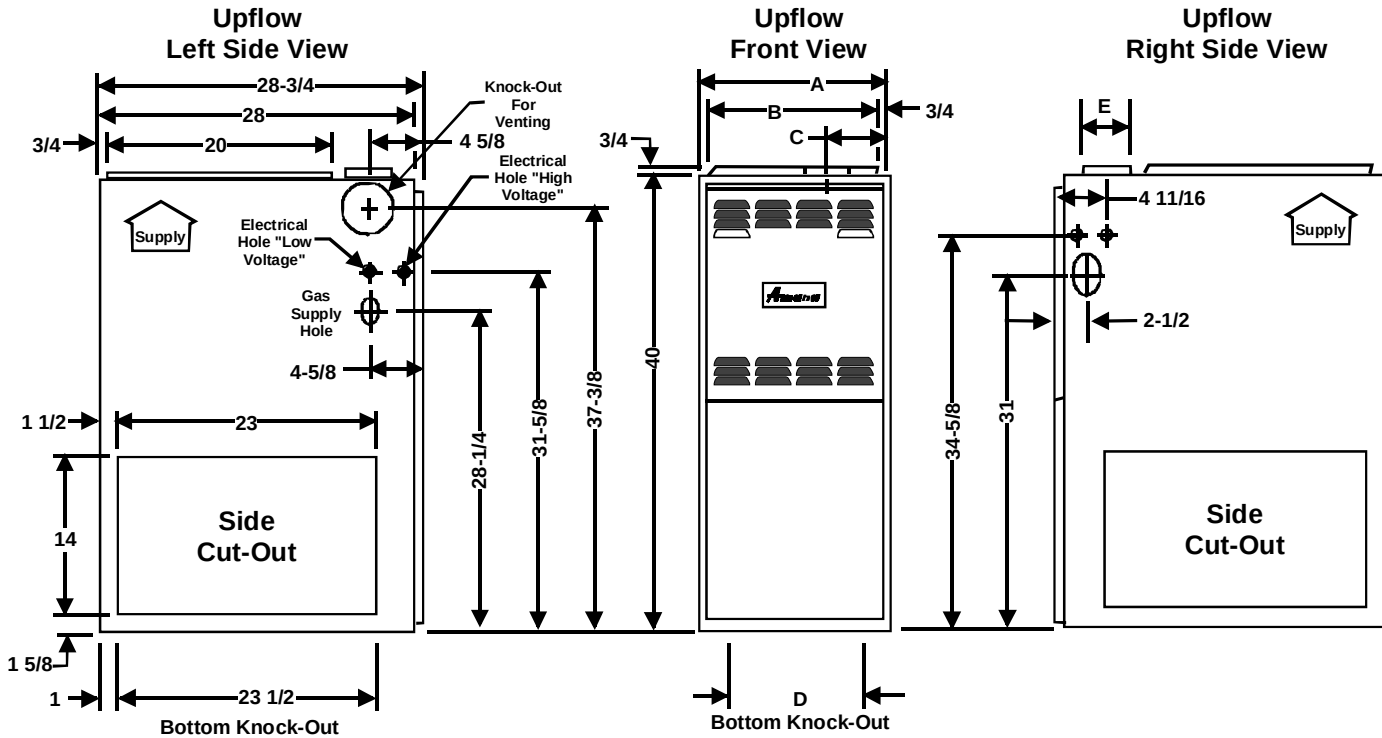
POUR COUPER L'ADMISSION DE GAZ DE L'APPAREIL

1. Régler le thermostat à la température la plus basse.
2. Couper l'alimentation électrique de l'appareil s'il faut procéder à des opérations d'entretien.
3. Tourner le robinet à gaz dans le sens des aiguilles d'une montre ↻ en position "OFF/ARRÊT". Ne pas forcer.
4. Remettre en place le panneau d'accès.

11072707

PRODUCT IDENTIFICATION

GUI_ 80% Upflow/Horizontal



GUI_ DIMENSIONS						
FURNACE MODEL	A	B	C	D	E	Minimum Vent Diameter
GUI_045 GUI_070	16-1/2	15	5-1/4	12-5/8	4	4
GUI_090	20-1/2	19	7-1/4	14-5/8	4	4
GUI_115 GUI_140	24-1/2	23	9-1/4	18-5/8	4	5

CLEARANCES TO COMBUSTIBLE SURFACES GUI_ MODEL FURNACES			
	UPFLOW	HORIZONTAL LEFT	HORIZONTAL RIGHT
FRONT	6 ¹	Alcove	Alcove
RIGHT	0	6	12
LEFT	0	12	6
REAR	0	0	0
TOP	1	6	6
FLUE	6 ²	6 ²	6 ²
FLOOR	C	C	C

¹ = 3 inch when using Type B-1 vent is used.

² = 1 inch when Type B-1 vent is used.

C = If placed on combustible floor, floor MUST be wood ONLY.

ACCESSIBILITY CLEARANCES (MINIMUM)

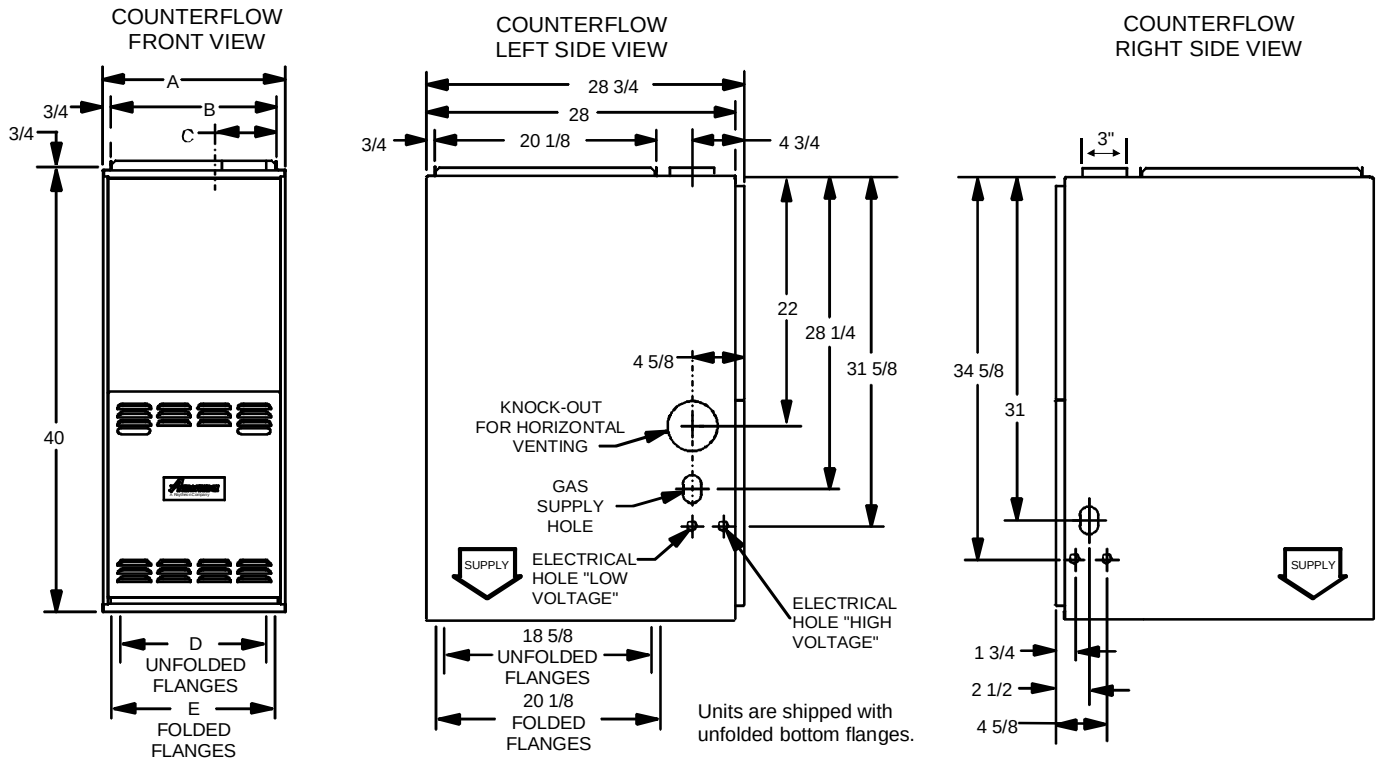
36" at front is required for servicing or cleaning.

NOTE: In all cases accessibility clearance shall take precedence over clearances from the enclosure where accessibility clearances are greater.

All dimensions given in inches.

PRODUCT IDENTIFICATION

GCI_ 80% Counterflow/Horizontal



GCI_ DIMENSIONS						
FURNACE MODEL	A	B	C	D Unfolded	E Folded	Minimum Vent Diameter
GCI_045 GCI_070	16-1/2	15	5/3/8	13-1/2	15	4
GCI_090	20-1/2	19	7-3/8	17-1/2	19	4
GCI_115 GCI_140	24-1/2	23	9-3/8	21-1/2	23	5

CLEARANCES TO COMBUSTIBLE SURFACES GCI_ MODEL FURNACES			
	UPFLOW	HORIZONTAL LEFT	HORIZONTAL RIGHT
FRONT	6 ¹	Alcove	Alcove
RIGHT	0	6	12
LEFT	0	12	6
REAR	0	0	0
TOP	1	6	6
FLUE	6 ²	6 ²	6 ²
FLOOR	C	C	C

¹ = 3 inch when using Type B-1 vent is used.

² = 1 inch when Type B-1 vent is used.

C = If placed on combustible floor, floor MUST be wood ONLY.

ACCESSIBILITY CLEARANCES (MINIMUM)

36" at front is required for servicing or cleaning.

NOTE: In all cases accessibility clearance shall take precedence over clearances from the enclosure where accessibility clearances are greater.

All dimensions given in inches.

PRODUCT IDENTIFICATION

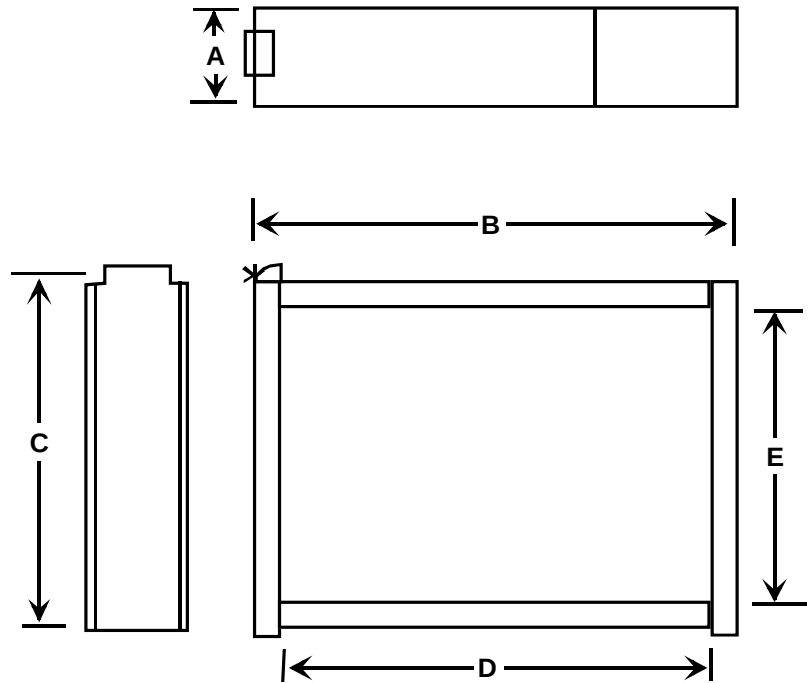
ACCESSORIES

MEDIA AIR CLEANER

MAC1 MEDIA AIR CLEANER SPECIFICATIONS	
CAPACITY	600-2000CFM
MEDIA SERVICE LIFE	12 MO.NOMINAL
MEDIA LISTING	UL CLASS 2
DIMENSIONS	
A	7-1/4
B	25
C	22-1/8
D	22-5/8
E	17-11/16
RESISTANCE	
CFM	INCHES W.C.
600	.04
800	.05
1000	.09
1200	.12
1400	.15
1600	.18
1800	.22
2000	.27

All dimensions given in inches.

MAC1 MEDIA AIR CLEANER	
Used On Models	
GUI_ / GCI_	

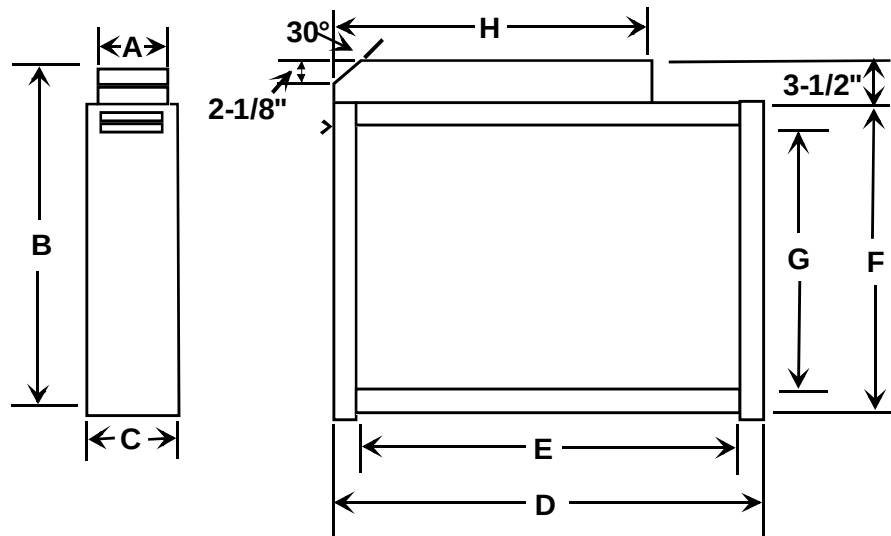


ELECTRONIC AIR CLEANER

EAC5 ELECTRONIC AIR CLEANER SPECIFICATIONS	
RATED CAPACITY	2000 CFM (3400 M ³ /HR)
MAX. PRESSURE DROP	.13 in. w.g. @ 2000 CFM
CELL WEIGHT	(2) 12 lbs. each
UNIT WEIGHT	46 lbs.
POWER CONSUMPTION	48 watts maximum
ELECTRICAL INPUT	120 V, 60 HZ, 1 PH
ELECTRICAL OUTPUT	3.2 MA @ 6200 VDC
DIMENSIONS	
A	4-1/2
B	24-7/16
C	7-3/16
D	25
E	20-5/16
F	20-3/4
G	22-1/2
H	17-3/4

All dimensions given in inches.

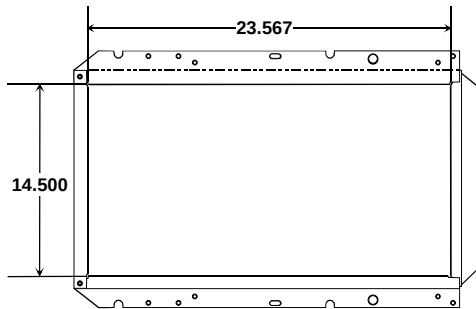
EAC5 ELECTRONIC AIR CLEANER	
Used On Models	
GUI_ / GCI_	



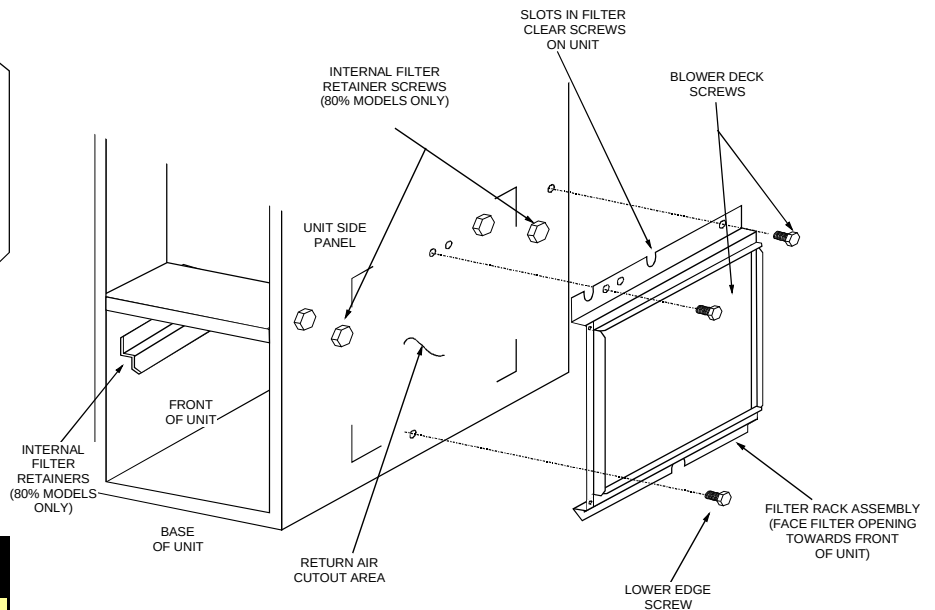
PRODUCT IDENTIFICATION

ACCESSORIES

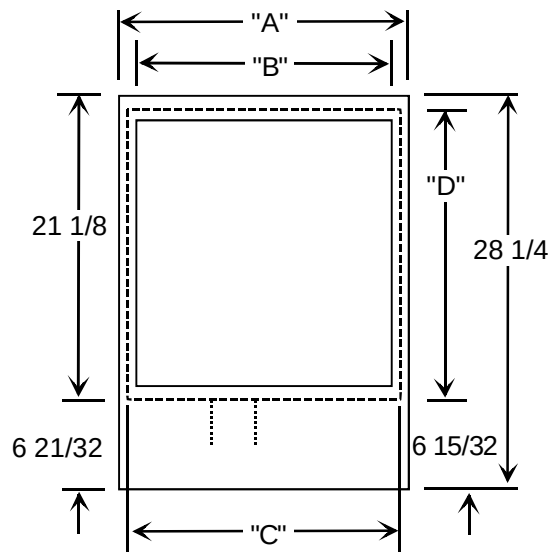
EXTERNAL FILTER RACK



EFR01	
EXTERNAL FILTER RACK	
Used On Models	
GUI_	



COUNTERFLOW SUBBASE



ASB01 SUBBASE DIMENSIONS				
Furnace Model	Dim. "A" Subbase Width	Dim. "B" Plenum Chamber	Dim. "C" Floor Opening	Dim. "D" Floor Opening
GCI_070	17	15	16-1/8	21-1/4
GCI_090	21	19	20-1/8	21-1/4
GCI_115 GCI_140	25	23	24-1/8	21-1/4

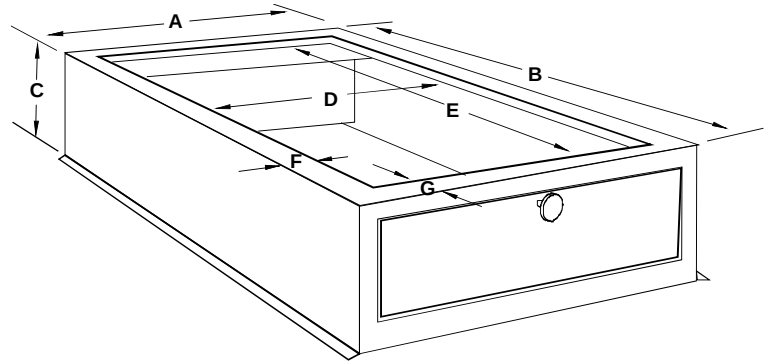
All dimensions given in inches.
Subbase adjustable to fit all 3 cabinet sizes.
Detailed installation instructions ship with the subbase.

PRODUCT IDENTIFICATION

ACCESSORIES

ACCOMODATOR

ACG1625 AND ACG2025 ACCOMODATOR	
Used on Models	Filter Base Required
GUI_045_30 GUI_070_30 GUI_070_40 GUI_090_30 GUI_090_50 GUI_115_40 GUI_115_50 GUI_140_50	ACG1625-3 or ACG1625-6
GUI_090_50 GUI_115_40 GUI_115_50 GUI_140_50	ACG2025-3 or ACG2025-6



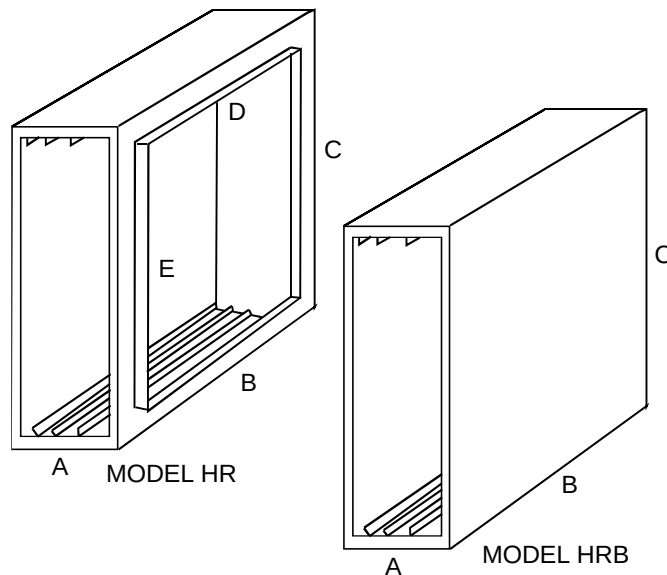
ACG1625 AND ACG2025 ACCOMODATOR DIMENSIONS								
Model Number	Overall			Opening		Top		Filter Size
	A	B	C	D	E	F	G	
ACG1625-3	17-3/8	28-3/8	3-3/4	14-7/8	26	1-1/2	1	1425
ACG1625-6	17-3/4	28-3/8	5-3/4	14-7/8	26	1-1/2	1	1625
ACG2025-3	21-3/8	28-3/8	3-3/4	18-7/8	26	1-1/2	1	2025
ACG2025-6	21-3/8	28-3/8	5-3/4	18-7/8	26	1-1/2	1	2025

All dimensions given in inches.

Short base handles 1" & 2" filters. Height 3-3/4".

Tall base handles 1", 2" & 4" filters. Height 5-3/4".

HORIZONTAL FILTER HOUSING



HR AND HRB HORIZONTAL FILTER HOUSING DIMENSIONS						
Model Number	Overall			Duct Opening		Filter Size
	A	B	C	D	E	
HR20	6-5/8	25-1/2	22	19-3/4	19	20x25
HR25	6-5/8	20-1/2	27	19-3/4	19	20x25
HRB20	6-5/8	25-1/2	22	-	-	20x25
HRB25	6-5/8	20-1/2	27	-	-	20x25

All dimensions given in inches.

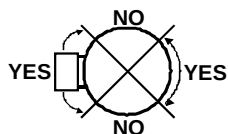
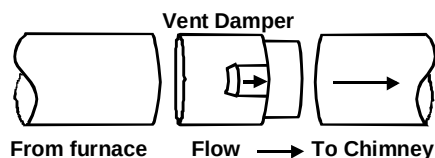
Uses Standard Filter Sizes: 1", 2" or 4".

HR AND HRB HORIZONTAL FILTER HOUSING
Used On Models
GUI_

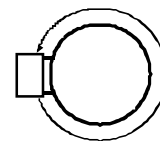
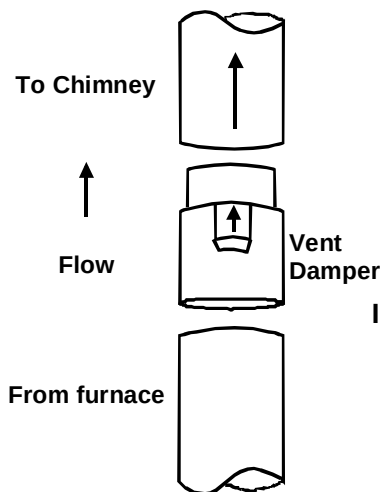
PRODUCT IDENTIFICATION

ACCESSORIES

COMMON VENT KIT



Install vent damper with actuator to sides of vent only. Do not mount vent damper with actuator above or below the vent.



Install vent damper with actuator in any position.

Horizontal Vent Installation

CVK4-7 COMMON VENT KITS	
Kit Model Numbers	Vent Diameter Inches
CVK 4	4
CVK 5	5
CVK 6	6
CVK 7	7

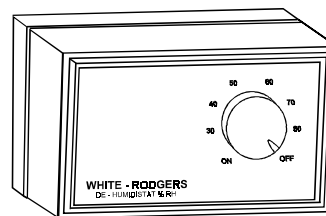
Vertical Vent Installation

CVK4-7 COMMON VENT KITS	
Used on Models	
GUIA	GCIA
GUIB	GCIB
GUIC	GCIC
GUID	

DEHUMIDISTAT

DEHUM1 DEHUMIDISTAT SPECIFICATIONS	
Model Number	2273W-21
Setpoint - Humidity Range	30% to 80% RH
Operating Ambient	10° to 40° C (50° to 104° F)
Differential	5%
Volts	120
Amps	1
HZ	60

DEHUM1 DEHUMIDISTAT	
Used on Models	
GUIV	



FURNACE SPECIFICATIONS

MODEL	GUIA045A30 GUIA045B30 GUIA045C30	GUIA070A30 GUIA070B30 GUIA070C30	GUIA070A40 GUIA070B40 GUIA070C40	GUIA090A30 GUIA090B90 GUIA090C30	GUIA090A50 GUIA090B50 GUIA090C50	GUIA115A40 GUIA115B40 GUIA115C40	GUIA115A50 GUIA115B50 GUIA115C50	GUIA140A50 GUIA140B50 GUIA140C50
Btuh Input (US)	46,000	69,000	69,000	92,000	92,000	115,000	115,000	140,000
Output (US)	36,800	55,200	55,200	73,600	73,600	92,000	92,000	110,400
A.F.U.E.	80%	80%	80%	80%	80%	80%	80%	80%
Rated External Static (WC)	.10 - .50	.12 - .50	.12 - .50	.15 - .50	.15 - .50	.20 - .50	.20 - .50	.20 - .50
Temperature Rise °F	35 - 65	35 - 65	35 - 65	40 - 70	40 - 70	40 - 70	35 - 65	45 - 75
Pressure Switch Trip Point	-1.80	-1.42	-1.42	-1.30	-1.30	-1.10	-1.10	-1.20
Blower Wheel (D x W)"	9 x 8	9 x 8	10 x 6	10 x 8	10 x 8	10 x 7	10 x 9	10 x 9
Blower Horsepower	1/3	1/3	1/2	1/2	1/2	1/2	3/4	3/4
Blower Speeds	4	4	4	4	4	4	4	4
Max CFM @ 0.5 E.S.P.	1200	1290	1450	1380	1975	1590	1985	2050
Power Supply	115-60-1	115-60-1	115-60-1	115-60-1	115-60-1	115-60-1	115-60-1	115-60-1
Min. Circuit Ampacity (MCA)	9.5	10.1	11.5	8.6	15.3	13.5	13.8	14.8
Max. Overcurrent Device	15	15	15	15	20	15	15	15
Transformer (VA)	40	40	40	40	40	40	40	40
Heat Anticipator	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Limit Setting °F	250	200	210	180	190	160	180	160
Aux. Limit °F.	160	160	160	160	160	160	160	160
Fan Delay On	30 secs.	30 secs.	30 secs.	30 secs.	30 secs.	30 secs.	30 secs.	30 secs.
Off Heating *	90 secs.	90 secs.	90 secs.	90 secs.	90 secs.	90 secs.	90 secs.	90 secs.
Off Cooling	45 secs.	45 secs.	45 secs.	45 secs.	45 secs.	45 secs.	45 secs.	45 secs.
Gas Supply Pressure (Nat/LP)	7" / 11"	7" / 11"	7" / 11"	7" / 11"	7" / 11"	7" / 11"	7" / 11"	7" / 11"
Manifold Pressure (Nat/LP)	3.5 " / 10"	3.5 " / 10"	3.5 " / 10"	3.5 " / 10"	3.5 " / 10"	3.5 " / 10"	3.5 " / 10"	3.5 " / 10"
Orifice Size (Nat/LP)	#43 / #55	#43 / #55	#43 / #55	#43 / #55	#43 / #55	#43 / #55	#43 / #55	#43 / #55
Number of Burners	2	3	3	4	4	5	5	6
Vent Connector Diameter	4"	4"	4"	4"	4"	4"	4"	4"
Shipping Weight (lbs.)	140	151	152	169	178	190	194	198

* Off Heating - This fan delay timing is adjustable (60, 90, 120, 180 seconds). 90 seconds as shipped.

1. These furnaces are manufactured for natural gas operation. Optional LP Conversion Kits are available to convert to propane gas.
2. For elevations above 2000 ft. the rating should be reduced by 4% for each 1000 ft. above sea level. The furnace must not be derated, orifice changes should only be made if necessary for altitude.
3. The total heat loss from the structure as expressed in TOTAL BTU/HR must be calculated by the manufactures method of in accordance with the "A.S.H.R.A.E. GUIDE" or "MANUAL J-LOAD CALCULATIONS" published by the AIR CONDITIONING CONTRACTORS OF AMERICA. The total heat loss calculated should be equal to or less than the heating capacity. Output based on D.O.E. test procedures, steady state efficiency times output.
4. Minimum Circuit Ampacity calculated as: (1.25 x Circulator Blower Amps) + I.D. Blower Amps.

FURNACE SPECIFICATIONS

MODEL	GUIA045CA30	GUIA070CA30	GUIA070CA40	GUIA090CA30	GUIA090CA50	GUIA115CA40	GUIA115CA50	GUIA140CA50
Btuh Input (US)	46,000	69,000	69,000	92,000	92,000	115,000	115,000	140,000
Output (US)	36,800	55,200	55,200	73,600	73,600	92,000	92,000	110,400
A.F.U.E.	80%	80%	80%	80%	80%	80%	80%	80%
Rated External Static (WC)	.10 - .50	.12 - .50	.12 - .50	.15 - .50	.15 - .50	.20 - .50	.20 - .50	.20 - .50
Temperature Rise °F	35 - 65	35 - 65	35 - 65	40 - 70	40 - 70	40 - 70	35 - 65	45 - 75
Pressure Switch Trip Point	-1.80	-1.42	-1.42	-1.30	-1.30	-1.10	-1.10	-1.20
Blower Wheel (D x W)"	9 x 8	9 x 8	10 x 6	10 x 8	10 x 8	10 x 7	10 x 9	10 x 9
Blower Horsepower	1/3	1/3	1/2	1/2	1/2	1/2	3/4	3/4
Blower Speeds	4	4	4	4	4	4	4	4
Max CFM @ 0.5 E.S.P.	1200	1290	1450	1380	1975	1590	1985	2050
Power Supply	115-60-1	115-60-1	115-60-1	115-60-1	115-60-1	115-60-1	115-60-1	115-60-1
Min. Circuit Ampacity (MCA)	9.5	10.1	11.5	8.6	15.3	13.5	13.8	14.8
Max. Overcurrent Device	15	15	15	15	20	15	15	15
Transformer (VA)	40	40	40	40	40	40	40	40
Heat Anticipator	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Limit Setting °F	250	200	210	180	190	160	180	160
Aux. Limit °F.	160	160	160	160	160	160	160	160
Fan Delay On	30 secs.	30 secs.	30 secs.	30 secs.	30 secs.	30 secs.	30 secs.	30 secs.
Off Heating *	90 secs.	90 secs.	90 secs.	90 secs.	90 secs.	90 secs.	90 secs.	90 secs.
Off Cooling	45 secs.	45 secs.	45 secs.	45 secs.	45 secs.	45 secs.	45 secs.	45 secs.
Gas Supply Pressure (Nat/LP)	7" / 11"	7" / 11"	7" / 11"	7" / 11"	7" / 11"	7" / 11"	7" / 11"	7" / 11"
Manifold Pressure (Nat/LP)	3.5 " / 10"	3.5 " / 10"	3.5 " / 10"	3.5 " / 10"	3.5 " / 10"	3.5 " / 10"	3.5 " / 10"	3.5 " / 10"
Orifice Size (Nat/LP)	#43 / #55	#43 / #55	#43 / #55	#43 / #55	#43 / #55	#43 / #55	#43 / #55	#43 / #55
Number of Burners	2	3	3	4	4	5	5	6
Vent Connector Diameter	4"	4"	4"	4"	4"	4"	4"	4"
Shipping Weight (lbs.)	140	151	152	169	178	190	194	198

* Off Heating - This fan delay timing is adjustable (60, 90, 120, 180 seconds). 90 seconds as shipped.

1. These furnaces are manufactured for natural gas operation. Optional LP Conversion Kits are available to convert to propane gas.
2. For elevations above 2000 ft. the rating should be reduced by 4% for each 1000 ft. above sea level. The furnace must not be derated, orifice changes should only be made if necessary for altitude.
3. The total heat loss from the structure as expressed in TOTAL BTU/HR must be calculated by the manufactures method of in accordance with the "A.S.H.R.A.E. GUIDE" or "MANUAL J-LOAD CALCULATIONS" published by the AIR CONDITIONING CONTRACTORS OF AMERICA. The total heat loss calculated should be equal to or less than the heating capacity. Output based on D.O.E. test procedures, steady state efficiency times output.
4. Minimum Circuit Ampacity calculated as: (1.25 x Circulator Blower Amps) + I.D. Blower Amps.

FURNACE SPECIFICATIONS

MODEL	GUIB045A30 GUIB045B30 GUIB045CX30	GUIB070A30 GUIB070B30 GUIB070CX30	GUIB070A40 GUIB070B40 GUIB070CX40	GUIB090A30 GUIB090B30 GUIB090CX30	GUIB090A50 GUIB090B50 GUIB090CX50	GUIB115A40 GUIB115B40 GUIB115CX40	GUIB115A50 GUIB115B50 GUIB115CX50	GUIB140A50 GUIB140B50 GUIB140CX50
Btuh Input (US)	46,000	69,000	69,000	92,000	92,000	115,000	115,000	140,000
Output (US)	36,800	55,200	55,200	73,600	73,600	92,000	92,000	110,400
A.F.U.E.	80%	80%	80%	80%	80%	80%	80%	80%
Rated External Static (WC)	.10 - .50	.12 - .50	.12 - .50	.15 - .50	.15 - .50	.20 - .50	.20 - .50	.20 - .50
Temperature Rise °F	35 - 65	35 - 65	35 - 65	40 - 70	40 - 70	40 - 70	35 - 65	45 - 75
Pressure Switch Trip Point	-1.80	-1.42	-1.42	-1.30	-1.30	-1.10	-1.10	-1.20
Blower Wheel (D x W)"	9 x 8	9 x 8	10 x 6	10 x 8	10 x 8	10 x 7	10 x 9	10 x 9
Blower Horsepower	1/3	1/3	1/2	1/2	1/2	1/2	3/4	3/4
Blower Speeds	4	4	4	4	4	4	4	4
Max CFM @ 0.5 E.S.P.	1200	1290	1450	1380	1975	1590	1985	2050
Power Supply	115-60-1	115-60-1	115-60-1	115-60-1	115-60-1	115-60-1	115-60-1	115-60-1
Min. Circuit Ampacity (MCA)	9.5	10.1	11.5	8.6	15.3	13.5	13.8	14.8
Max. Overcurrent Device	15	15	15	15	20	15	15	15
Transformer (VA)	40	40	40	40	40	40	40	40
Heat Anticipator	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Limit Setting °F	250	200	210	180	190	160	180	160
Aux. Limit °F.	160	160	160	160	160	160	160	160
Fan Delay On	30 secs.	30 secs.	30 secs.	30 secs.	30 secs.	30 secs.	30 secs.	30 secs.
Off Heating *	90 secs.	90 secs.	90 secs.	90 secs.	90 secs.	90 secs.	90 secs.	90 secs.
Off Cooling	45 secs.	45 secs.	45 secs.	45 secs.	45 secs.	45 secs.	45 secs.	45 secs.
Gas Supply Pressure (Nat/LP)	7" / 11"	7" / 11"	7" / 11"	7" / 11"	7" / 11"	7" / 11"	7" / 11"	7" / 11"
Manifold Pressure (Nat/LP)	3.5 " / 10"	3.5 " / 10"	3.5 " / 10"	3.5 " / 10"	3.5 " / 10"	3.5 " / 10"	3.5 " / 10"	3.5 " / 10"
Orifice Size (Nat/LP)	#43 / #55	#43 / #55	#43 / #55	#43 / #55	#43 / #55	#43 / #55	#43 / #55	#43 / #55
Number of Burners	2	3	3	4	4	5	5	6
Vent Connector Diameter	4"	4"	4"	4"	4"	4"	4"	4"
Shipping Weight (lbs.)	140	151	152	169	178	190	194	198

* Off Heating - This fan delay timing is adjustable (60, 90, 120, 180 seconds). 90 seconds as shipped.

1. These furnaces are manufactured for natural gas operation. Optional LP Conversion Kits are available to convert to propane gas.
2. For elevations above 2000 ft. the rating should be reduced by 4% for each 1000 ft. above sea level. The furnace must not be derated, orifice changes should only be made if necessary for altitude.
3. The total heat loss from the structure as expressed in TOTAL BTU/HR must be calculated by the manufactures method of in accordance with the "A.S.H.R.A.E. GUIDE" or "MANUAL J-LOAD CALCULATIONS" published by the AIR CONDITIONING CONTRACTORS OF AMERICA. The total heat loss calculated should be equal to or less than the heating capacity. Output based on D.O.E. test procedures, steady state efficiency times output.
4. Minimum Circuit Ampacity calculated as: (1.25 x Circulator Blower Amps) + I.D. Blower Amps.

FURNACE SPECIFICATIONS

MODEL	GUIC045CA30 GUIC045CX30 GUIC045DA30 GUIC045DX30	GUIC070CA30 GUIC070CX30 GUIC070DA30 GUIC070DX30	GUIC070CA40 GUIC070CX40 GUIC070DA40 GUIC070DX40	GUIC090CA30 GUIC090CX30 GUIC090DA30 GUIC090DX30	GUIC090CA50 GUIC090CX50 GUIC090DA50 GUIC090DX50	GUIC115CA40 GUIC115CX40 GUIC115DA40 GUIC115DX40	GUIC115CA50 GUIC115CX50 GUIC115DA50 GUIC115DX50	GUIC140CA50 GUIC140CX50 GUIC140DA50 GUIC140DX50
Btuh Input (US)	46,000	69,000	69,000	92,000	92,000	115,000	115,000	140,000
Output (US)	36,800	55,200	55,200	73,600	73,600	92,000	92,000	110,400
A.F.U.E.	80%	80%	80%	80%	80%	80%	80%	80%
Rated External Static (WC)	.10 - .50	.12 - .50	.12 - .50	.15 - .50	.15 - .50	.20 - .50	.20 - .50	.20 - .50
Temperature Rise °F	35 - 65	35 - 65	35 - 65	40 - 70	40 - 70	40 - 70	40 - 70	45 - 75
Pressure Switch Trip Point	-0.55	-0.55	-0.55	-0.55	-0.55	-0.55	-0.55	-0.55
Blower Wheel (D x W)"	9 x 8	9 x 8	10 x 6	10 x 8	10 x 8	10 x 7	10 x 9	10 x 9
Blower Horsepower	1/3	1/3	1/2	1/2	1/2	1/2	3/4	3/4
Blower Speeds	4	4	4	4	4	4	4	4
Max CFM @ 0.5 E.S.P.	1200	1290	1450	1380	1980	1590	1985	2050
Power Supply	115-60-1	115-60-1	115-60-1	115-60-1	115-60-1	115-60-1	115-60-1	115-60-1
Min. Circuit Ampacity (MCA)	8.7	9.3	10.7	7.8	14.5	12.7	13.0	14.0
Max. Overcurrent Device	15	15	15	15	15	15	15	15
Transformer (VA)	40	40	40	40	40	40	40	40
Heat Anticipator	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Limit Setting °F	230	220	170	170	170	170	190	135
Aux. Limit °F.	160	160	160	160	160	160	160	160
Fan Delay On	30 secs.	30 secs.	30 secs.	30 secs.	30 secs.	30 secs.	30 secs.	30 secs.
Off Heating *	90 secs.	90 secs.	90 secs.	90 secs.	90 secs.	90 secs.	90 secs.	90 secs.
Off Cooling	45 secs.	45 secs.	45 secs.	45 secs.	45 secs.	45 secs.	45 secs.	45 secs.
Gas Supply Pressure (Nat/LP)	7" / 11"	7" / 11"	7" / 11"	7" / 11"	7" / 11"	7" / 11"	7" / 11"	7" / 11"
Manifold Pressure (Nat/LP)	3.5 " / 10"	3.5 " / 10"	3.5 " / 10"	3.5 " / 10"	3.5 " / 10"	3.5 " / 10"	3.5 " / 10"	3.5 " / 10"
Orifice Size (Nat/LP)	#43 / #55	#43 / #55	#43 / #55	#43 / #55	#43 / #55	#43 / #55	#43 / #55	#43 / #55
Number of Burners	2	3	3	4	4	5	5	6
Vent Connector Diameter	4"	4"	4"	4"	4"	4"	4"	4"
Shipping Weight (lbs.)	140	151	152	169	178	190	194	198

* Off Heating - This fan delay timing is adjustable (60, 90, 120, 180 seconds). 90 seconds as shipped.

1. These furnaces are manufactured for natural gas operation. Optional LP Conversion Kits are available to convert to propane gas.
2. For elevations above 2000 ft. the rating should be reduced by 4% for each 1000 ft. above sea level. The furnace must not be derated, orifice changes should only be made if necessary for altitude.
3. The total heat loss from the structure as expressed in TOTAL BTU/HR must be calculated by the manufactures method of in accordance with the "A.S.H.R.A.E. GUIDE" or "MANUAL J-LOAD CALCULATIONS" published by the AIR CONDITIONING CONTRACTORS OF AMERICA. The total heat loss calculated should be equal to or less than the heating capacity. Output based on D.O.E. test procedures, steady state efficiency times output.
4. Minimum Circuit Ampacity calculated as: (1.25 x Circulator Blower Amps) + I.D. Blower Amps.

FURNACE SPECIFICATIONS

MODEL	GUID045CA30 GUID045CX30 GUID045DA30 GUID045DX30	GUID070CA30 GUID070CX30 GUID070DA30 GUID070DX30	GUID070CA40 GUID070CX40 GUID070DA40 GUID070DX40	GUID090CA30 GUID090CX30 GUID090DA30 GUID090DX30	GUID090CA50 GUID090CX50 GUID090DA50 GUID090DX50	GUID115CA50 GUID115CX50 GUID115DA50 GUID115DX50
Btuh Input (US)	46,000	69,000	69,000	92,000	92,000	115,000
Output (US)	36,800	55,200	55,200	73,600	73,600	92,000
A.F.U.E.	80%	80%	80%	80%	80%	80%
Rated External Static (WC)	.10 - .50	.12 - .50	.12 - .50	.15 - .50	.15 - .50	.20 - .50
Temperature Rise °F	35 - 65	35 - 65	35 - 65	40 - 70	40 - 70	40 - 70
Pressure Switch Trip Point	-0.55	-0.55	-0.55	-0.55	-0.55	-0.55
Blower Wheel (D x W)"	9 x 8	9 x 8	10 x 6	10 x 8	10 x 8	10 x 9
Blower Horsepower	1/3	1/3	1/2	1/2	1/2	3/4
Blower Speeds	4	4	4	4	4	4
Max CFM @ 0.5 E.S.P.	1200	1290	1450	1380	1975	1985
Power Supply	115-60-1	115-60-1	115-60-1	115-60-1	115-60-1	115-60-1
Min. Circuit Ampacity (MCA)	8.7	9.3	10.7	7.8	14.5	13.0
Max. Overcurrent Device	15	15	15	15	15	15
Transformer (VA)	40	40	40	40	40	40
Heat Anticipator	0.7	0.7	0.7	0.7	0.7	0.7
Limit Setting °F	230	220	170	160	160	190
Aux. Limit °F.	160	160	160	160	160	160
Fan Delay On	30 secs.	30 secs.	30 secs.	30 secs.	30 secs.	30 secs.
Off Heating *	90 secs.	90 secs.	90 secs.	90 secs.	90 secs.	90 secs.
Off Cooling	45 secs.	45 secs.	45 secs.	45 secs.	45 secs.	45 secs.
Gas Supply Pressure (Nat/LP)	7" / 11"	7" / 11"	7" / 11"	7" / 11"	7" / 11"	7" / 11"
Manifold Pressure (Nat/LP)	3.5 " / 10"	3.5 " / 10"	3.5 " / 10"	3.5 " / 10"	3.5 " / 10"	3.5 " / 10"
Orifice Size (Nat/LP)	#43 / #55	#43 / #55	#43 / #55	#43 / #55	#43 / #55	#43 / #55
Number of Burners	2	3	3	4	4	5
Vent Connector Diameter	4"	4"	4"	4"	4"	4"
Shipping Weight (lbs.)	140	151	152	169	178	194

* Off Heating - This fan delay timing is adjustable (60, 90, 120, 180 seconds). 90 seconds as shipped.

1. These furnaces are manufactured for natural gas operation. Optional LP Conversion Kits are available to convert to propane gas.
2. For elevations above 2000 ft. the rating should be reduced by 4% for each 1000 ft. above sea level. The furnace must not be derated, orifice changes should only be made if necessary for altitude.
3. The total heat loss from the structure as expressed in TOTAL BTU/HR must be calculated by the manufactures method of in accordance with the "A.S.H.R.A.E. GUIDE" or "MANUAL J-LOAD CALCULATIONS" published by the AIR CONDITIONING CONTRACTORS OF AMERICA. The total heat loss calculated should be equal to or less than the heating capacity. Output based on D.O.E. test procedures, steady state efficiency times output.
4. Minimum Circuit Ampacity calculated as: (1.25 x Circulator Blower Amps) + I.D. Blower Amps.

FURNACE SPECIFICATIONS

MODEL	GUIC070DA40	GUIC070DX40	GUID070DA40	GUID070DX40	GCIC070DX40
Btuh Input (US)	69,000	69,000	69,000	69,000	69,000
Output (US)	55,200	55,200	55,200	55,200	55,200
A.F.U.E.	80%	80%	80%	80%	80%
Rated External Static (WC)	.12 - .50	.12 - .50	.12 - .50	.12 - .50	.12 - .50
Temperature Rise °F	35 - 65	35 - 65	35 - 65	35 - 65	45 - 75
Pressure Switch Trip Point	-0.55	-0.55	-0.55	-0.55	-0.55
Blower Wheel (D x W)" **	10 x 8	10 x 8	10 x 8	10 x 8	10 x 8
Blower Horsepower	1/2	1/2	1/2	1/2	1/2
Blower Speeds	4	4	4	4	4
Max CFM @ 0.5 E.S.P.	1529	1529	1529	1529	1571
Power Supply	115-60-1	115-60-1	115-60-1	115-60-1	115-60-1
Min. Circuit Ampacity (MCA)	9.9	9.9	9.9	9.9	9.9
Max. Overcurrent Device	15	15	15	15	15
Transformer (VA)	40	40	40	40	40
Heat Anticipator	0.7	0.7	0.7	0.7	0.7
Limit Setting °F	215	215	215	215	215
Aux. Limit °F.	160	160	160	160	160
Fan Delay On	30 secs.	30 secs.	30 secs.	30 secs.	30 secs.
Off Heating *	90 secs.	90 secs.	90 secs.	90 secs.	90 secs.
Off Cooling	45 secs.	45 secs.	45 secs.	45 secs.	45 secs.
Gas Supply Pressure (Nat/LP)	7" / 11"	7" / 11"	7" / 11"	7" / 11"	7" / 11"
Manifold Pressure (Nat/LP)	3.5 " / 10"	3.5 " / 10"	3.5 " / 10"	3.5 " / 10"	3.5 " / 10"
Orifice Size (Nat/LP)	#43 / #55	#43 / #55	#43 / #55	#43 / #55	#43 / #55
Number of Burners	3	3	3	3	3
Vent Connector Diameter	4"	4"	4"	4"	4"
Shipping Weight (lbs.)	152	152	152	152	152

* Off Heating - This fan delay timing is adjustable (60, 90, 120, 180 seconds). 90 seconds as shipped.

** Note: The five models above use 10x8 blower assembly instead of 10x6 to achieve a full 4 tons of airflow.

1. These furnaces are manufactured for natural gas operation. Optional LP Conversion Kits are available to convert to propane gas.
2. For elevations above 2000 ft. the rating should be reduced by 4% for each 1000 ft. above sea level. The furnace must not be derated, orifice changes should only be made if necessary for altitude.
3. The total heat loss from the structure as expressed in TOTAL BTU/HR must be calculated by the manufactures method of in accordance with the "A.S.H.R.A.E. GUIDE" or "MANUAL J-LOAD CALCULATIONS" published by the AIR CONDITIONING CONTRACTORS OF AMERICA. The total heat loss calculated should be equal to or less than the heating capacity. Output based on D.O.E. test procedures, steady state efficiency times output.
4. Minimum Circuit Ampacity calculated as: (1.25 x Circulator Blower Amps) + I.D. Blower Amps.

FURNACE SPECIFICATIONS

MODEL	GUI070CA35 GUI070CX35 GUI070DA35 GUI070DX35	GUI090CA30 GUI090DA30 GUI090DX30	GUI090CA50 GUI090CX50 GUI090DA50 GUI090DX50	GUI115CA50 GUI115DA50 GUI115DX50	GUI140CA50 GUI140DA50	GCIS070CX35 GCIS070DX35	GCIS090CX50 GCIS090DX50
Btuh Input (US) High Fire	69,000	92,000	92,000	115,000	138,000	69,000	92,000
Output (US) High Fire	55,200	73,600	73,600	92,000	110,400	55,200	73,600
Btuh Input (US) Low Fire	48,000	64,000	64,000	80,000	96,000	48,000	64,000
Output (US) Low Fire	38,400	51,200	51,200	64,000	76,800	38,400	51,200
A.F.U.E.	80%	80%	80%	80%	80%	80%	80%
Rated External Static (WC)	.12 - .50	.15 - .50	.15 - .50	.20 - .50	.20 - .50	.12 - .50	.15 - .50
Temperature Rise °F	30 - 60	35 - 65	35 - 65	35 - 65	45 - 75	35 - 65	45 - 75
High Pressure Switch Trip Point	-0.80	-0.74	-0.74	-0.66	-0.66	-0.55	-0.55
Low Pressure Switch Trip Point	-0.45	-0.37	-0.37	-0.37	-0.32	-0.27	-0.27
Blower Wheel (D x W)"	10 X 6	10 X 8	10 X 8	10 X 9	10 X 9	10 X 6	10 X 8
Blower Horsepower	1/2	1/2	1/2	3/4	3/4	1/2	3/4
Blower Speeds	4	4	4	4	4	4	4
Max CFM @ 0.5 E.S.P.	1450	1380	1975	1985	2050	1366	1780
Power Supply	115-60-1	115-60-1	115-60-1	115-60-1	115-60-1	115-60-1	115-60-1
Min. Circuit Ampacity (MCA)	10.9	8.0	14.8	13.3	14.3	10.2	14.2
Max. Overcurrent Device	15	15	15	15	15	15	15
Transformer (VA)	40	40	40	40	40	40	40
Heat Anticipator	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Limit Setting °F	230	220	170	190	160	190	160
Aux. Limit °F.	160	160	160	160	160	160	160
Fan Delay On	30 secs.	30 secs.	30 secs.	30 secs.	30 secs.	30 secs.	30 secs.
Off Heating *	90 secs.	90 secs.	90 secs.	90 secs.	90 secs.	90 secs.	90 secs.
Off Cooling	45 secs.	45 secs.	45 secs.	45 secs.	45 secs.	45 secs.	45 secs.
Gas Supply Pressure (Nat/LP)	7" / 11"	7" / 11"	7" / 11"	7" / 11"	7" / 11"	7" / 11"	7" / 11"
Manifold Pressure (Nat/LP) High Stage	3.5 " / 10"	3.5 " / 10"	3.5 " / 10"	3.5 " / 10"	3.5 " / 10"	3.5 " / 10"	3.5 " / 10"
Manifold Pressure (Nat/LP) Low Stage	1.9" / 6.0"	1.9" / 6.0"	1.9" / 6.0"	1.9" / 6.0"	1.9" / 6.0"	1.9" / 6.0"	1.9" / 6.0"
Orifice Size (Nat/LP)	#43 / #55	#43 / #55	#43 / #55	#43 / #55	#43 / #55	#43 / #55	#43 / #55
Number of Burners	3	4	4	5	6	3	4
Vent Connector Diameter	4"	4"	4"	4"	4"	3"	3"
Shipping Weight (lbs.)	152	169	178	194	198	152	178

* Off Heating - This fan delay timing is adjustable (60, 90, 120, 180 seconds). 90 seconds as shipped.

1. These furnaces are manufactured for natural gas operation. Optional LP Conversion Kits are available to convert to propane gas.
2. For elevations above 2000 ft. the rating should be reduced by 4% for each 1000 ft. above sea level. The furnace must not be derated, orifice changes should only be made if necessary for altitude.
3. The total heat loss from the structure as expressed in TOTAL BTU/HR must be calculated by the manufactures method of in accordance with the "A.S.H.R.A.E. GUIDE" or "MANUAL J-LOAD CALCULATIONS" published by the AIR CONDITIONING CONTRACTORS OF AMERICA. The total heat loss calculated should be equal to or less than the heating capacity. Output based on D.O.E. test procedures, steady state efficiency times output.
4. Minimum Circuit Ampacity calculated as: (1.25 x Circulator Blower Amps) + I.D. Blower Amps.

FURNACE SPECIFICATIONS

MODEL	GUIV070DX40	GUIV090DX50	GUIV115DX50	GUIV140DX50
Btuh Input (US) High Fire	69,000	92,000	115,000	138,000
Output (US) High Fire	55,200	73,600	92,000	110,400
Btuh Input (US) Low Fire	48,000	64,000	80,000	96,000
Output (US) Low Fire	38,400	51,200	64,000	76,800
A.F.U.E.	80%	80%	80%	80%
Rated External Static (WC)	.10 - .50	.10 - .50	.10 - .50	.10 - .50
Temperature Rise °F	30 - 60	35 - 65	35 - 65	45 - 75
High Pressure Switch Trip Point	-0.80	-0.74	-0.66	-0.66
Low Pressure Switch Trip Point	-0.45	-0.37	-0.37	-0.32
Blower Wheel (D x W)"	10 X 8	10 X 8	10 X 9	10 X 9
Blower Horsepower	1/2	3/4	3/4	3/4
Blower Speeds	Refer to notes below airflow tables on pages 31-33.			
Max CFM @ 0.5 E.S.P.	1426	1845	2059	2059
Power Supply	115-60-1	115-60-1	115-60-1	115-60-1
Min. Circuit Ampacity (MCA)	11.0	11.7	11.7	11.7
Max. Overcurrent Device	15	15	15	15
Transformer (VA)	40	40	40	40
Heat Anticipator	0.7	0.7	0.7	0.7
Limit Setting °F	230	220	190	160
Aux. Limit °F.	160	160	160	160
Fan Delay On Cooling **	0 or 5 secs.	0 or 5 secs.	0 or 5 secs.	0 or 5 secs.
Fan Delay On Heating	30 secs.	30 secs.	30 secs.	30 secs.
Off Heating *	90 secs.	90 secs.	90 secs.	90 secs.
Off Cooling ***	0 or 45 secs.	0 or 45 secs.	0 or 45 secs.	0 or 45 secs.
Gas Supply Pressure (Nat/LP)	7" / 11"	7" / 11"	7" / 11"	7" / 11"
Manifold Pressure (Nat/LP) High Stage	3.5 " / 10"	3.5 " / 10"	3.5 " / 10"	3.5 " / 10"
Manifold Pressure (Nat/LP) Low Stage	1.9" / 6.0"	1.9" / 6.0"	1.9" / 6.0"	1.9" / 6.0"
Orifice Size (Nat/LP)	#43 / #55	#43 / #55	#43 / #55	#43 / #55
Number of Burners	3	4	5	6
Vent Connector Diameter	4"	4"	4"	4"
Shipping Weight (lbs.)	152	178	194	198

* Off Heating - This fan delay timing is adjustable (60, 90, 120, 180 seconds). 90 seconds as shipped.

** On Cooling - This fan delay timing can be set at either 0 or 5 seconds. Refer to pages 31-33 for further details.

*** Off Cooling - This fan delay timing can be set at either 0 or 45 seconds. Refer to pages 31-33 for further details.

1. These furnaces are manufactured for natural gas operation. Optional LP Conversion Kits are available to convert to propane gas.
2. For elevations above 2000 ft. the rating should be reduced by 4% for each 1000 ft. above sea level. The furnace must not be derated, orifice changes should only be made if necessary for altitude.
3. The total heat loss from the structure as expressed in TOTAL BTU/HR must be calculated by the manufactures method of in accordance with the "A.S.H.R.A.E. GUIDE" or "MANUAL J-LOAD CALCULATIONS" published by the AIR CONDITIONING CONTRACTORS OF AMERICA. The total heat loss calculated should be equal to or less than the heating capacity. Output based on D.O.E. test procedures, steady state efficiency times output.
4. Minimum Circuit Ampacity calculated as: (1.25 x Circulator Blower Amps) + I.D. Blower Amps.

FURNACE SPECIFICATIONS

MODEL	GCIA045A30 GCIA045CA30 GCIA045CX30	GCIA070A30 GCIA070CA30 GCIA070CX30	GCIA070A40 GCIA070CA30 GCIA070CX30	GCIA090A30 GCIA090CA30 GCIA090CX30	GCIA090A50 GCIA090CA50 GCIA090CX50	GCIA115A40 GCIA115CA40 GCIA115CX40	GCIA115A50 GCIA115CA50 GCIA115CX50	GCIA140A50 GCIA115CA50 GCIA115CX50
Btuh Input (US)	46,000	69,000	69,000	92,000	92,000	115,000	115,000	140,000
Output (US)	36,800	55,200	55,200	73,600	73,600	92,000	92,000	110,400
A.F.U.E.	80%	80%	80%	80%	80%	80%	80%	80%
Rated External Static (WC)	.10 - .50	.12 - .50	.12 - .50	.15 - .50	.15 - .50	.20 - .50	.20 - .50	.20 - .50
Temperature Rise °F	35 - 65	45 - 75	45 - 75	45 - 75	45 - 75	45 - 75	45 - 75	45 - 75
Pressure Switch Trip Point	-1.70	-1.42	-1.42	-1.20	-1.20	-1.15	-1.15	-1.05
Blower Wheel (D x W)"	9 x 8	9 x 8	10 x 6	10 x 8	10 x 8	10 x 7	10 x 9	10 x 9
Blower Horsepower	1/3	1/3	1/2	1/2	1/2	1/2	3/4	3/4
Blower Speeds	4	4	4	4	4	4	4	4
Max CFM @ 0.5 E.S.P.	1160	1145	1366	1265	1780	1660	1840	1845
Power Supply	115-60-1	115-60-1	115-60-1	115-60-1	115-60-1	115-60-1	115-60-1	115-60-1
Min. Circuit Ampacity (MCA)	9.5	9.3	10.7	8.6	14.7	13.1	14.5	14.5
Max. Overcurrent Device	15	15	15	15	15	15	15	15
Transformer (VA)	40	40	40	40	40	40	40	40
Heat Anticipator	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Limit Setting °F	240	200	170	170	160	130	130	140
Aux. Limit °F.	160	160	160	160	160	160	160	160
Fan Delay On	30 secs.	30 secs.	30 secs.	30 secs.	30 secs.	30 secs.	30 secs.	30 secs.
Off Heating *	90 secs.	90 secs.	90 secs.	90 secs.	90 secs.	90 secs.	90 secs.	90 secs.
Off Cooling	45 secs.	45 secs.	45 secs.	45 secs.	45 secs.	45 secs.	45 secs.	45 secs.
Gas Supply Pressure (Nat/LP)	7" / 11"	7" / 11"	7" / 11"	7" / 11"	7" / 11"	7" / 11"	7" / 11"	7" / 11"
Manifold Pressure (Nat/LP)	3.5 " / 10"	3.5 " / 10"	3.5 " / 10"	3.5 " / 10"	3.5 " / 10"	3.5 " / 10"	3.5 " / 10"	3.5 " / 10"
Orifice Size (Nat/LP)	#43 / #55	#43 / #55	#43 / #55	#43 / #55	#43 / #55	#43 / #55	#43 / #55	#43 / #55
Number of Burners	2	3	3	4	4	5	5	6
Vent Connector Diameter	3"	3"	3"	3"	3"	3"	3"	3"
Shipping Weight (lbs.)	140	151	152	169	178	190	194	198

* Off Heating - This fan delay timing is adjustable (60, 90, 120, 180 seconds). 90 seconds as shipped.

1. These furnaces are manufactured for natural gas operation. Optional LP Conversion Kits are available to convert to propane gas.
2. For elevations above 2000 ft. the rating should be reduced by 4% for each 1000 ft. above sea level. The furnace must not be derated, orifice changes should only be made if necessary for altitude.
3. The total heat loss from the structure as expressed in TOTAL BTU/HR must be calculated by the manufactures method of in accordance with the "A.S.H.R.A.E. GUIDE" or "MANUAL J-LOAD CALCULATIONS" published by the AIR CONDITIONING CONTRACTORS OF AMERICA. The total heat loss calculated should be equal to or less than the heating capacity. Output based on D.O.E. test procedures, steady state efficiency times output.
4. Minimum Circuit Ampacity calculated as: $(1.25 \times \text{Circulator Blower Amps}) + \text{I.D. Blower Amps}$.

FURNACE SPECIFICATIONS

MODEL	GCIB045A30	GCIB070A30	GCIB070A40	GCIB090A30	GCIB090A50	GCIB115A40	GCIB115A50	GCIB140A50
Btuh Input (US)	46,000	69,000	69,000	92,000	92,000	115,000	115,000	138,000
Output (US)	37,000	55,000	55,000	74,000	74,000	92,000	92,000	110,000
A.F.U.E.	80%	80%	80%	80%	80%	80%	80%	80%
Rated External Static (WC)	.10 - .50	.12 - .50	.12 - .50	.15 - .50	.15 - .50	.20 - .50	.20 - .50	.20 - .50
Temperature Rise °F	35 - 65	45 - 75	45 - 75	45 - 75	45 - 75	45 - 75	45 - 75	45 - 75
Pressure Switch Trip Point	-1.30	-1.10	-1.10	-1.05	-1.05	-0.95	-0.95	-1.10
Blower Wheel (D x W)"	9 x 8	9 x 8	10 x 6	10 X 8	10 x 8	10 x 7	10 x 9	10 x 9
Blower Horsepower	1/3	1/3	1/2	1/3	1/2	1/2	3/4	3/4
Blower Speeds	4	4	4	4	4	4	4	4
Max CFM @ 0.5 E.S.P.	1160	1145	1366	1265	1780	1660	1840	1845
Power Supply	115-60-1	115-60-1	115-60-1	115-60-1	115-60-1	115-60-1	115-60-1	115-60-1
Min. Circuit Ampacity (MCA)	10.1	9.3	10.7	8.3	14.7	13.1	14.5	14.5
Max. Overcurrent Device	15	15	15	15	20	15	20	20
Transformer (VA)	40	40	40	40	40	40	40	40
Heat Anticipator	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Limit Setting °F	240	200	170	170	160	130	130	140
Aux. Limit °F.	160	160	160	160	160	160	160	160
Fan Delay On	30 secs.	30 secs.	30 secs.	30 secs.	30 secs.	30 secs.	30 secs.	30 secs.
Off Heating *	90 secs.	90 secs.	90 secs.	90 secs.	90 secs.	90 secs.	90 secs.	90 secs.
Off Cooling	45 secs.	45 secs.	45 secs.	45 secs.	45 secs.	45 secs.	45 secs.	45 secs.
Gas Supply Pressure (Nat/LP)	7" / 11"	7" / 11"	7" / 11"	7" / 11"	7" / 11"	7" / 11"	7" / 11"	7" / 11"
Manifold Pressure (Nat/LP)	3.5 " / 10"	3.5 " / 10"	3.5 " / 10"	3.5 " / 10"	3.5 " / 10"	3.5 " / 10"	3.5 " / 10"	3.5 " / 10"
Orifice Size (Nat/LP)	#43 / #55	#43 / #55	#43 / #55	#43 / #55	#43 / #55	#43 / #55	#43 / #55	#43 / #55
Number of Burners	2	3	3	4	4	5	5	6
Vent Connector Diameter	3"	3"	3"	3"	3"	3"	3"	3"
Shipping Weight	135	145	145	160	160	175	175	185

* Off Heating - This fan delay timing is adjustable (60, 90, 120, 180 seconds). 90 seconds as shipped.

1. These furnaces are manufactured for natural gas operation. Optional LP Conversion Kits are available to convert to propane gas.
2. For elevations above 2000 ft. the rating should be reduced by 4% for each 1000 ft. above sea level. The furnace must not be derated, orifice changes should only be made if necessary for altitude.
3. The total heat loss from the structure as expressed in TOTAL BTU/HR must be calculated by the manufactures method of in accordance with the "A.S.H.R.A.E. GUIDE" or "MANUAL J-LOAD CALCULATIONS" published by the AIR CONDITIONING CONTRACTORS OF AMERICA. The total heat loss calculated should be equal to or less than the heating capacity. Output based on D.O.E. test procedures, steady state efficiency times output.
4. Minimum Circuit Ampacity calculated as: $(1.25 \times \text{Circulator Blower Amps}) + \text{I.D. Blower Amps}$.

FURNACE SPECIFICATIONS

MODEL	GCIC045CX30	GCIC070CX30	GCIC070CX40	GCIC090CX30	GCIC090CX50	GCIC115CX40	GCIC115CX50	GCIC140CX50
Btuh Input (US)	46,000	69,000	69,000	92,000	92,000	115,000	115,000	140,000
Output (US)	36,800	55,200	55,200	73,600	73,600	92,000	92,000	110,400
A.F.U.E.	80%	80%	80%	80%	80%	80%	80%	80%
Rated External Static (WC)	.10 - .50	.12 - .50	.12 - .50	.15 - .50	.15 - .50	.20 - .50	.20 - .50	.20 - .50
Temperature Rise °F	35 - 65	45 - 75	45 - 75	45 - 75	45 - 75	45 - 75	45 - 75	45 - 75
Pressure Switch Trip Point	-0.55	-0.55	-0.55	-0.55	-0.55	-0.55	-0.55	-0.55
Blower Wheel (D x W)"	9 x 8	9 x 8	10 x 6	10 X 8	10 x 8	10 x 7	10 x 9	10 x 9
Blower Horsepower	1/3	1/3	1/2	1/3	1/2	1/2	3/4	3/4
Blower Speeds	4	4	4	4	4	4	4	4
Max CFM @ 0.5 E.S.P.	1160	1150	1370	1270	1780	1660	1840	1850
Power Supply	115-60-1	115-60-1	115-60-1	115-60-1	115-60-1	115-60-1	115-60-1	115-60-1
Min. Circuit Ampacity (MCA)	8.7	8.5	9.9	7.8	13.9	12.3	13.7	13.7
Max. Overcurrent Device	15	15	15	15	15	15	15	15
Transformer (VA)	40	40	40	40	40	40	40	40
Heat Anticipator	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Limit Setting °F	240	200	170	170	160	130	130	140
Aux. Limit °F.	160	160	160	160	160	160	160	160
Fan Delay On	30 secs.	30 secs.	30 secs.	30 secs.	30 secs.	30 secs.	30 secs.	30 secs.
Off Heating *	90 secs.	90 secs.	90 secs.	90 secs.	90 secs.	90 secs.	90 secs.	90 secs.
Off Cooling	45 secs.	45 secs.	45 secs.	45 secs.	45 secs.	45 secs.	45 secs.	45 secs.
Gas Supply Pressure (Nat/LP)	7" / 11"	7" / 11"	7" / 11"	7" / 11"	7" / 11"	7" / 11"	7" / 11"	7" / 11"
Manifold Pressure (Nat/LP)	3.5 " / 10"	3.5 " / 10"	3.5 " / 10"	3.5 " / 10"	3.5 " / 10"	3.5 " / 10"	3.5 " / 10"	3.5 " / 10"
Orifice Size (Nat/LP)	#43 / #55	#43 / #55	#43 / #55	#43 / #55	#43 / #55	#43 / #55	#43 / #55	#43 / #55
Number of Burners	2	3	3	4	4	5	5	6
Vent Connector Diameter	3"	3"	3"	3"	3"	3"	3"	3"
Shipping Weight (lbs.)	140	151	152	169	178	190	194	198

* Off Heating - This fan delay timing is adjustable (60, 90, 120, 180 seconds). 90 seconds as shipped.

1. These furnaces are manufactured for natural gas operation. Optional LP Conversion Kits are available to convert to propane gas.
2. For elevations above 2000 ft. the rating should be reduced by 4% for each 1000 ft. above sea level. The furnace must not be derated, orifice changes should only be made if necessary for altitude.
3. The total heat loss from the structure as expressed in TOTAL BTU/HR must be calculated by the manufactures method of in accordance with the "A.S.H.R.A.E. GUIDE" or "MANUAL J-LOAD CALCULATIONS" published by the AIR CONDITIONING CONTRACTORS OF AMERICA. The total heat loss calculated should be equal to or less than the heating capacity. Output based on D.O.E. test procedures, steady state efficiency times output.
4. Minimum Circuit Ampacity calculated as: $(1.25 \times \text{Circulator Blower Amps}) + \text{I.D. Blower Amps}$.

BLOWER PERFORMANCE SPECIFICATIONS

SINGLE STAGE

CFM & Temperature Rise vs. External Static Pressue														
MODEL (Htg. Speed As Shipped)	MOTOR SPEED	TONS AC @ 0.5" ESP	External Static Pressure, Inches Water Column											
			0.1		0.2		0.3		0.4		0.5		0.6	
			CFM	Rise	CFM	Rise	CFM	Rise	CFM	Rise	CFM	Rise	CFM	Rise
GUI_045_30 (Low)	HIGH	3.0	1460	-	1400	-	1345	-	1280	-	1200	-	1110	-
	MED-HI	2.5	1200	-	1150	-	1100	-	1050	-	980	35	900	38
	MED-LO	2.0	935	36	910	37	885	39	845	40	790	43	710	48
	LOW	1.5	700	49	685	50	665	51	635	54	575	59	425	-
GUI_070_30 (Med-Lo)	HIGH	3.0	1555	-	1505	-	1440	35	1365	37	1290	39	1180	43
	MED-HI	3.0	1325	38	1305	39	1250	41	1200	42	1140	44	1060	48
	MED-LO	2.5	1090	47	1080	47	1055	48	1020	50	970	52	905	56
	LOW	2.0	760	-	750	-	750	-	735	-	700	-	645	-
GUI_070_40 (Low)	HIGH	3.5	1695	-	1625	-	1580	-	1520	-	1450	35	1365	37
	MED-HI	3.0	1485	-	1450	35	1400	36	1350	38	1295	39	1235	41
	MED-LO	3.0	1235	41	1200	42	1180	43	1140	44	1115	45	1050	48
	LOW	2.5	1095	46	1070	47	1050	48	1025	49	975	52	950	53
GUI_090_30 (High)	HIGH	3.5	1630	42	1560	44	1550	44	1465	47	1380	49	1275	53
	MED-HI	3.0	1360	50	1325	51	1290	53	1215	56	1155	59	1070	64
	MED-LO	2.0	920	-	920	-	900	-	890	-	850	-	800	-
	LOW	1.5	770	-	750	-	740	-	730	-	690	-	660	-
GUI_090_50 (Med-Lo)	HIGH	5.0	2250	-	2185	-	2120	-	2030	-	1975	-	1885	-
	MED-HI	4.0	1775	-	1750	-	1735	-	1690	40	1650	41	1600	43
	MED-LO	3.5	1320	52	1315	52	1315	52	1315	52	1280	53	1240	55
	LOW	3.0	1180	58	1180	58	1175	58	1170	58	1140	60	1120	61
GUI_115_40 (High)	HIGH	4.0	1835	46	1780	48	1730	49	1660	51	1590	53	1530	55
	MED-HI	3.5	1630	52	1595	53	1540	55	1490	57	1440	59	1375	62
	MED-LO	3.0	1320	64	1305	65	1290	66	1260	67	1200	-	1180	-
	LOW	2.5	1140	-	1145	-	1120	-	1100	-	1065	-	1030	-
GUI_115_50 (Med-Hi)	HIGH	5.0	2330	36	2245	38	2165	39	2065	41	1985	43	1885	45
	MED-HI	5.0	2120	40	2070	41	2020	42	1940	44	1850	46	1775	48
	MED-LO	4.0	1875	45	1840	46	1800	47	1735	49	1685	50	1600	53
	LOW	3.0	1290	-	1275	-	1250	-	1235	-	1210	-	1170	-
GUI_140_50 (High)	HIGH	5.0	2455	-	2390	-	2290	-	2200	46	2050	49	1935	52
	MED-HI	5.0	2050	49	2025	50	1965	52	1890	54	1810	56	1715	59
	MED-LO	4.0	1715	59	1700	60	1660	61	1615	63	1555	65	1470	69
	LOW	3.5	1450	70	1435	71	1415	72	1380	73	1340	-	1280	-

- Units are shipped without filter(s). CFM in chart is without filter(s).
- All furnaces shipped as high speed for cooling. Installer should adjust blower speeds as needed.
- INSTALLATION IS TO BE ADJUSTED TO OBTAIN TEMPERATURE RISE WITHIN THE RANGE SPECIFIED ON THE RATING PLATE.
- The chart is for information only. For satisfactory operation, external static pressure not to exceed value shown on rating plate. The shaded area indicates ranges in excess of maximum external static pressure allowed when heating.
- The above chart is for U.S. furnaces installed at 0-2000 feet. At higher altitudes, a properly derated unit will have approximately the same temperature rise at a particular CFM, while the ESP at that CFM will be lower.

BLOWER PERFORMANCE SPECIFICATIONS

SINGLE STAGE

CFM & Temperature Rise vs. External Static Pressue														
MODEL (Htg. Speed As Shipped)	MOTOR SPEED	TONS AC @ 0.5" ESP	External Static Pressure, Inches Water Column											
			0.1		0.2		0.3		0.4		0.5		0.6	
			CFM	Rise	CFM	Rise	CFM	Rise	CFM	Rise	CFM	Rise	CFM	Rise
GCI_045_30 (Low)	HIGH	3.0	1455	-	1430	-	1360	-	1255	-	1160	-	1040	-
	MED-HI	2.5	1255	-	1200	-	1150	-	1075	-	990	-	890	38
	MED-LO	2.0	1010	-	980	35	940	36	880	39	810	42	700	49
	LOW	1.5	775	44	745	46	710	48	655	52	560	61	435	-
GCI_070_30 (Med-Lo)	HIGH	3.0	1455	-	1420	-	1365	-	1275	-	1145	-	1015	50
	MED-HI	3.0	1110	46	1090	47	1050	48	1015	50	935	54	845	60
	MED-LO	2.5	910	56	905	56	895	57	860	59	810	63	745	68
	LOW	2.0	730	69	715	71	710	71	680	75	645	-	490	-
GCI_070_40 (Low)	HIGH	3.5	1655	-	1580	-	1500	-	1445	-	1366	-	1280	-
	MED-HI	3.0	1530	-	1470	-	1400	-	1345	-	1280	-	1210	-
	MED-LO	3.0	1090	47	1075	47	1055	48	1015	50	975	52	915	55
	LOW	2.5	945	54	935	54	915	55	890	57	850	60	810	63
GCI_090_30 (High)	HIGH	3.5	1620	-	1550	-	1470	46	1385	49	1265	54	1165	59
	MED-HI	3.0	1415	48	1355	50	1285	53	1215	56	1120	61	1015	67
	MED-LO	2.0	1025	67	1010	68	990	69	945	72	890	-	815	-
	LOW	1.5	850	-	840	-	810	-	790	-	750	-	675	-
GCI_090_50 (Med-Lo)	HIGH	5.0	2110	-	2030	-	1960	-	1870	-	1780	-	1680	-
	MED-HI	4.0	1830	-	1765	-	1710	-	1640	-	1550	-	1470	46
	MED-LO	3.5	1260	54	1255	54	1230	55	1200	57	1170	58	1115	61
	LOW	3.0	1015	67	1000	68	980	70	964	71	930	73	875	-
GCI_115_40 (High)	HIGH	4.0	1960	-	1890	45	1825	46	1745	49	1660	51	1580	54
	MED-HI	3.5	1725	49	1685	50	1640	52	1585	53	1515	56	1440	59
	MED-LO	3.0	1440	59	1425	60	1405	60	1380	61	1335	64	1275	67
	LOW	2.5	1035	-	1025	-	1015	-	1005	-	975	-	955	-
GCI_115_50 (Med-Hi)	HIGH	5.0	2100	-	2060	-	2000	-	1915	-	1840	46	1750	48
	MED-HI	5.0	1915	-	1890	45	1840	46	1775	48	1710	50	1635	52
	MED-LO	4.0	1535	55	1516	56	1485	57	1455	58	1410	60	1355	63
	LOW	3.0	1175	72	115	73	1140	74	1120	-	1090	-	1060	-
GCI_140_50 (High)	HIGH	5.0	2255	45	2170	47	2065	49	1970	51	1845	55	1735	58
	MED-HI	5.0	2170	47	2045	50	1945	52	1855	55	1750	58	1650	61
	MED-LO	4.0	1845	55	1790	57	1720	59	1620	63	1525	66	1445	70
	LOW	3.5	1425	71	1390	73	1370	74	1320	-	1265	-	1185	-

1. Units are shipped without filter(s). CFM in chart is without filter(s).
2. All furnaces shipped as high speed for cooling. Installer should adjust blower speeds as needed.
3. INSTALLATION IS TO BE ADJUSTED TO OBTAIN TEMPERATURE RISE WITHIN THE RANGE SPECIFIED ON THE RATING PLATE.
4. The chart is for information only. For satisfactory operation, external static pressure not to exceed value shown on rating plate. The shaded area indicates ranges in excess of maximum external static pressure allowed when heating.
5. The above chart is for U.S. furnaces installed at 0-2000 feet. At higher altitudes, a properly derated unit will have approximately the same temperature rise at a particular CFM, while the ESP at that CFM will be lower.

BLOWER PERFORMANCE SPECIFICATIONS

SINGLE STAGE

CFM & Temperature Rise vs. External Static Pressure													
MODEL (Htg. Speed As Shipped)	MOTOR SPEED	TONS AC @ 0.5" ESP	External Static Pressure, Inches Water Column										
			0.1		0.2		0.3		0.4		0.5		0.6
			CFM	Rise	CFM	Rise	CFM	Rise	CFM	Rise	CFM	Rise	CFM
GUI_070_40 (Med-Lo)	HIGH	4.0	1799	-	1742	-	1694	-	1622	-	1529	-	1444
	MED-HI	3.5	1720	-	1590	-	1542	-	1483	-	1404	36	1330
	MED-LO	2.5	1113	46	1096	47	1078	47	1067	48	1018	50	967
	LOW	2	967	53	954	54	941	54	913	56	885	58	826
GCI_070_40 (Low)	HIGH	4.0	1882	-	1814	-	1743	-	1676	-	1571	-	1492
	MED-HI	3.5	1746	-	1668	-	1603	-	1530	-	1432	-	1368
	MED-LO	2.5	1169	44	1141	45	1136	45	1102	46	1043	49	1006
	LOW	2.0	1006	51	993	51	980	52	954	54	921	55	871

Note: The models listed in the above airflow table use 10x8 blower assembly instead of 10x6 to achieve a full 4 tons of airflow. Listed below are the model numbers along with the manufacturing numbers of the five units using the 10x8 blower assembly.

GUIC070DA40	P1226609F
GUIC070DX40	P1226709F
GCIC070DX40	P1226809F
GUID070DA40	P1226909F
GUID070DX40	P1227009F

1. Units are shipped without filter(s). CFM in chart is without filter(s).
2. All furnaces shipped as high speed for cooling. Installer should adjust blower speeds as needed.
3. INSTALLATION IS TO BE ADJUSTED TO OBTAIN TEMPERATURE RISE WITHIN THE RANGE SPECIFIED ON THE RATING PLATE.
4. The chart is for information only. For satisfactory operation, external static pressure not to exceed value shown on rating plate. The shaded area indicates ranges in excess of maximum external static pressure allowed when heating.
5. The above chart is for U.S. furnaces installed at 0-2000 feet. At higher altitudes, a properly derated unit will have approximately the same temperature rise at a particular CFM, while the ESP at that CFM will be lower.

BLOWER PERFORMANCE SPECIFICATIONS

TWO STAGE

CFM & Temperature Rise vs. External Static Pressue																		
MODEL (Htg. Speed as Shipped)	MOTOR SPEED	TONS AC @ 0.5" ESP	External Static Pressure, Inches Water Column															
			0.1			0.2			0.3			0.4			0.5			0.6
			CFM	RISE, HIGH FIRE	RISE, LOW FIRE	CFM	RISE, HIGH FIRE	RISE, LOW FIRE	CFM	RISE, HIGH FIRE	RISE, LOW FIRE	CFM	RISE, HIGH FIRE	RISE, LOW FIRE	CFM	RISE, HIGH FIRE	RISE, LOW FIRE	CFM
GUISO70_35 (30-60)	HIGH	3.5	1695	30	-	1625	31	-	1580	32	-	1520	34	-	1450	35	-	1365
	MED-HI	3.0	1485	34	-	1450	35	-	1400	37	-	1350	38	-	1295	39	-	1235
High Fire: Med-Lo	MED-LO	3.0	1235	41	-	1200	43	30	1180	43	30	1140	45	31	1115	46	32	1050
Low Fire: Low	LOW	2.5	1095	47	33	1070	48	33	1050	49	34	1025	50	35	975	52	37	950
GUISO90_30 (35-65)	HIGH	3.5	1630	42	-	1560	44	-	1550	44	-	1465	47	-	1380	49	35	1275
	MED-HI	3.0	1360	50	35	1325	51	36	1290	53	37	1215	56	39	1155	59	41	1070
High Fire: High	MED-LO	2.0	920	-	52	920	-	52	900	-	53	890	-	54	850	-	56	800
Low Fire: Med-Lo	LOW	1.5	770	-	62	750	-	64	740	-	64	730	-	65	690	-	-	660
GUISO90_50 (35-65)	HIGH	5.0	2250	-	-	2185	-	-	2120	-	-	2030	-	-	1975	35	-	1885
	MED-HI	4.0	1775	38	-	1750	39	-	1735	39	-	1690	40	-	1650	41	-	1600
High Fire: Med-Lo	MED-LO	3.5	1320	52	36	1315	52	36	1315	52	36	1315	52	36	1280	53	37	1240
Low Fire: Low	LOW	3.0	1180	58	40	1180	58	40	1175	58	41	1170	58	41	1140	60	42	1120
GUIS115_50 (35-65)	HIGH	5.0	2330	37	-	2245	38	-	2165	39	-	2065	41	-	1985	43	-	1885
	MED-HI	5.0	2120	40	-	2070	41	-	2020	42	-	1940	44	-	1850	46	-	1775
High Fire: Med-Lo	MED-LO	4.0	1875	45	-	1840	46	-	1800	47	-	1735	49	-	1685	51	35	1600
Low Fire: Low	LOW	3.0	1290	-	46	1275	-	47	1250	-	48	1235	-	48	1210	-	49	1170
GUIS140_50 (45-75)	HIGH	5.0	2455	-	-	2390	-	-	2290	45	-	2200	46	-	2050	50	-	1935
	MED-HI	5.0	2050	50	-	2025	50	-	1965	52	-	1890	54	-	1810	56	-	1715
High Fire: Med-Hi	MED-LO	4.0	1715	60	-	1700	60	-	1660	62	-	1615	63	-	1555	66	46	1472
Low Fire: Low	LOW	3.5	1450	70	49	1436	71	50	1413	72	51	1380	74	52	1338	-	53	1280
GCISO70_35 (35-65)	HIGH	3.5	1655	-	-	1580	-	-	1500	-	-	1445	35	-	1366	37	-	1280
	MED-HI	3.0	1530	-	-	1470	35	-	1400	37	-	1345	38	-	1280	40	-	1210
High Fire: Med-Lo	MED-LO	3.0	1090	47	-	1075	48	-	1055	48	-	1015	50	35	975	52	37	915
Low Fire: Low	LOW	2.5	945	54	38	935	55	38	915	56	39	890	57	40	850	60	42	810
GCISO90_50 (45-75)	HIGH	5.0	2110	-	-	2030	-	-	1960	-	-	1870	-	-	1780	-	-	1680
	MED-HI	4.0	1830	-	-	1765	-	-	1710	-	-	1640	-	-	1550	-	-	1470
High Fire: Med-Lo	MED-LO	3.5	1260	54	-	1255	54	-	1230	55	-	1200	57	-	1170	58	-	1115
Low Fire: Low	LOW	3.0	1015	67	47	1000	68	48	980	70	49	964	71	49	930	73	51	875

Blower Speeds for each firing rate are set independant of each other.

- Units are shipped without filter(s). CFM in chart is without filter(s).
- All furnaces shipped as high speed for cooling. Installer should adjust blower speeds as needed.
- INSTALLATION IS TO BE ADJUSTED TO OBTAIN TEMPERATURE RISE WITHIN THE RANGE SPECIFIED ON THE RATING PLATE.
- The chart is for information only. For satisfactory operation, external static pressure not to exceed value shown on rating plate. The shaded area indicates ranges in excess of maximum external static pressure allowed when heating.
- The above chart is for U.S. furnaces installed at 0-2000 feet. At higher altitudes, a properly derated unit will have approximately the same temperature rise at a particular CFM, while the ESP at that CFM will be lower.

BLOWER PERFORMANCE SPECIFICATIONS

TWO STAGE - VARIABLE SPEED

Cooling Speed Chart

("Y" on Two-Stage Integrated Furnace Control or "Y/Y2 on Interface Board)

GUIV70DX40			GUIV90DX50			GUIV115X50			GUIV140DX50		
Cooling Speed	Adjust	CFM @ .1 to .8 "WC ESP	Cooling Speed	Adjust	CFM @ .1 to .8 "WC ESP	Cooling Speed	Adjust	CFM @ .1 to .8 "WC ESP	Cooling Speed	Adjust	CFM @ .1 to .8 "WC ESP
A	Minus	540	A	Minus	720	A	Minus	900	A	Minus	900
A	Normal	600	A	Normal	800	A	Normal	1000	A	Normal	1000
A	Plus	660	A	Plus	880	A	Plus	1100	A	Plus	1100
B	Minus	720	B	Minus	990	B	Minus	1080	B	Minus	1080
B	Normal	800	B	Normal	1100	B	Normal	1200	B	Normal	1200
B	Plus	880	B	Plus	1210	B	Plus	1320	B	Plus	1320
C	Minus	990	C	Minus	1260	C	Minus	1440	C	Minus	1440
C	Normal	1100	C	Normal	1400	C	Normal	1600	C	Normal	1600
C	Plus	1210	C	Plus	1540	C	Plus	1760	C	Plus	1760
D	Minus	1260	D	Minus	1620	D	Minus	1800	D	Minus	1800
D	Normal	1400	D	Normal	1800	D	Normal	2000	D	Normal	2000
D	Plus	1540	D	Plus	1980	D	Plus	2000	D	Plus	2000

Low Stage Cooling Speed Chart

("Y1" on Interface Board)

GUIV70DX40			GUIV90DX50			GUIV115X50			GUIV140DX50		
Cooling Speed	Adjust	CFM @ .1 to .8 "WC ESP	Cooling Speed	Adjust	CFM @ .1 to .8 "WC ESP	Cooling Speed	Adjust	CFM @ .1 to .8 "WC ESP	Cooling Speed	Adjust	CFM @ .1 to .8 "WC ESP
A	Minus	351	A	Minus	468	A	Minus	585	A	Minus	585
A	Normal	390	A	Normal	520	A	Normal	650	A	Normal	650
A	Plus	429	A	Plus	572	A	Plus	715	A	Plus	715
B	Minus	468	B	Minus	644	B	Minus	702	B	Minus	702
B	Normal	520	B	Normal	715	B	Normal	780	B	Normal	780
B	Plus	572	B	Plus	787	B	Plus	858	B	Plus	858
C	Minus	644	C	Minus	819	C	Minus	936	C	Minus	936
C	Normal	715	C	Normal	910	C	Normal	1040	C	Normal	1040
C	Plus	787	C	Plus	1001	C	Plus	1144	C	Plus	1144
D	Minus	819	D	Minus	1053	D	Minus	1170	D	Minus	1170
D	Normal	910	D	Normal	1170	D	Normal	1300	D	Normal	1300
D	Plus	1001	D	Plus	1287	D	Plus	1300	D	Plus	1300

- Units are shipped without filter(s). CFM in chart is without filter(s).
- All furnaces shipped with heating speed set at "B" and cooling speed set at "A". Installer should adjust blower speeds as needed.
- INSTALLATION IS TO BE ADJUSTED TO OBTAIN TEMPERATURE RISE WITHIN THE RANGE SPECIFIED ON THE RATING PLATE.
- The chart is for information only. For satisfactory operation, external static pressure not to exceed value shown on rating plate.
- The above chart is for U.S. furnaces installed at 0-2000 feet. At higher altitudes, a properly derated unit will have approximately the same temperature rise at a particular CFM, while the ESP at that CFM will be lower.

BLOWER PERFORMANCE SPECIFICATIONS

TWO STAGE - VARIABLE SPEED

Continuous Fan Speed Charts

Cooling - Based Continuous Fan Speeds ("G" connected to "G" on Interface Board)

GUIV070DX40			GUIV90DX50			GUIV115DX50			GUIV140DX50		
Cooling Speed	Adjust	CFM @ .1 to .8 "WC ESP	Cooling Speed	Adjust	CFM @ .1 to .8 "WC ESP	Cooling Speed	Adjust	CFM @ .1 to .8 "WC ESP	Cooling Speed	Adjust	CFM @ .1 to .8 "WC ESP
A	Minus	405	A	Minus	540	A	Minus	675	A	Minus	675
A	Normal	450	A	Normal	600	A	Normal	750	A	Normal	750
A	Plus	495	A	Plus	660	A	Plus	825	A	Plus	825
B	Minus	540	B	Minus	742.5	B	Minus	810	B	Minus	810
B	Normal	600	B	Normal	825	B	Normal	900	B	Normal	900
B	Plus	660	B	Plus	907.5	B	Plus	990	B	Plus	990
C	Minus	743	C	Minus	945	C	Minus	1080	C	Minus	1080
C	Normal	825	C	Normal	1050	C	Normal	1200	C	Normal	1200
C	Plus	908	C	Plus	1155	C	Plus	1320	C	Plus	1320
D	Minus	945	D	Minus	1215	D	Minus	1350	D	Minus	1350
D	Normal	1050	D	Normal	1350	D	Normal	1500	D	Normal	1500
D	Plus	1155	D	Plus	1485	D	Plus	1650	D	Plus	1650

Heating - Based Continuous Fan Speeds ("G" connected to "G" on Two-Stage Integrated Furnace Control)

GUIV070DX40			GUIV90DX50			GUIV115DX50			GUIV140DX50		
Heating Speed	Adjust	CFM @ .1 to .8 "WC ESP	Heating Speed	Adjust	CFM @ .1 to .8 "WC ESP	Heating Speed	Adjust	CFM @ .1 to .8 "WC ESP	Heating Speed	Adjust	CFM @ .1 to .8 "WC ESP
A	Minus	585	A	Minus	801	A	Minus	945	A	Minus	945
A	Normal	650	A	Normal	890	A	Normal	1050	A	Normal	1050
A	Plus	715	A	Plus	979	A	Plus	1155	A	Plus	1155
B	Minus	630	B	Minus	855	B	Minus	990	B	Minus	990
B	Normal	700	B	Normal	950	B	Normal	1100	B	Normal	1100
B	Plus	770	B	Plus	1045	B	Plus	1210	B	Plus	1210
C	Minus	720	C	Minus	945	C	Minus	1080	C	Minus	1080
C	Normal	800	C	Normal	1050	C	Normal	1200	C	Normal	1200
C	Plus	880	C	Plus	1155	C	Plus	1320	C	Plus	1320
D	Minus	810	D	Minus	1049	D	Minus	1170	D	Minus	1170
D	Normal	900	D	Normal	1165	D	Normal	1300	D	Normal	1300
D	Plus	990	D	Plus	1282	D	Plus	1430	D	Plus	1430

- Units are shipped without filter(s). CFM in chart is without filter(s).
- All furnaces shipped with heating speed set at "B" and cooling speed set at "A". Installer should adjust blower speeds as needed.
- INSTALLATION IS TO BE ADJUSTED TO OBTAIN TEMPERATURE RISE WITHIN THE RANGE SPECIFIED ON THE RATING PLATE.
- The chart is for information only. For satisfactory operation, external static pressure not to exceed value shown on rating plate.
- The above chart is for U.S. furnaces installed at 0-2000 feet. At higher altitudes, a properly derated unit will have approximately the same temperature rise at a particular CFM, while the ESP at that CFM will be lower.

BLOWER PERFORMANCE SPECIFICATIONS

TWO STAGE - VARIABLE SPEED

Heating Speed Charts

("W1" must be connected to "W1" on Two-Stage Integrated Furnace Control)

("W2" must be connected to "W2" on Two-Stage Integrated Furnace Control)

GUIV070DX40						
Heating Speed	Adjust	CFM @ .1 to .5 "WC Low Stage ESP	Rise Low Stage (°F)	CFM @ .1 to .5 "WC High Stage ESP	Rise High Stage Natural (°F)	Rise High Stage Propane (°F)
A	Minus	585	---	---	61	55
A	Normal	650	55	936	55	49
A	Plus	715	50	1030	50	45
B	Minus	630	56	907	56	51
B	Normal	700	51	1008	51	46
B	Plus	770	46	1109	46	41
C	Minus	720	49	1037	49	44
C	Normal	800	44	1152	44	40
C	Plus	880	40	1267	40	36
D	Minus	810	44	1166	44	39
D	Normal	900	40	1296	39	35
D	Plus	990	36	1426	36	32

GUIV090DX50						
Heating Speed	Adjust	CFM @ .1 to .5 "WC Low Stage ESP	Rise Low Stage (°F)	CFM @ .1 to .5 "WC High Stage ESP	Rise High Stage Natural (°F)	Rise High Stage Propane (°F)
A	Minus	801	59	1153	59	53
A	Normal	890	53	1282	53	48
A	Plus	979	48	1410	48	44
B	Minus	588	55	1231	55	50
B	Normal	950	50	1368	50	45
B	Plus	1045	45	1505	45	41
C	Minus	945	50	1361	50	45
C	Normal	1050	45	1512	45	41
C	Plus	1155	41	1663	41	37
D	Minus	1049	45	1510	45	41
D	Normal	1165	41	1678	41	37
D	Plus	1282	37	1845	37	33

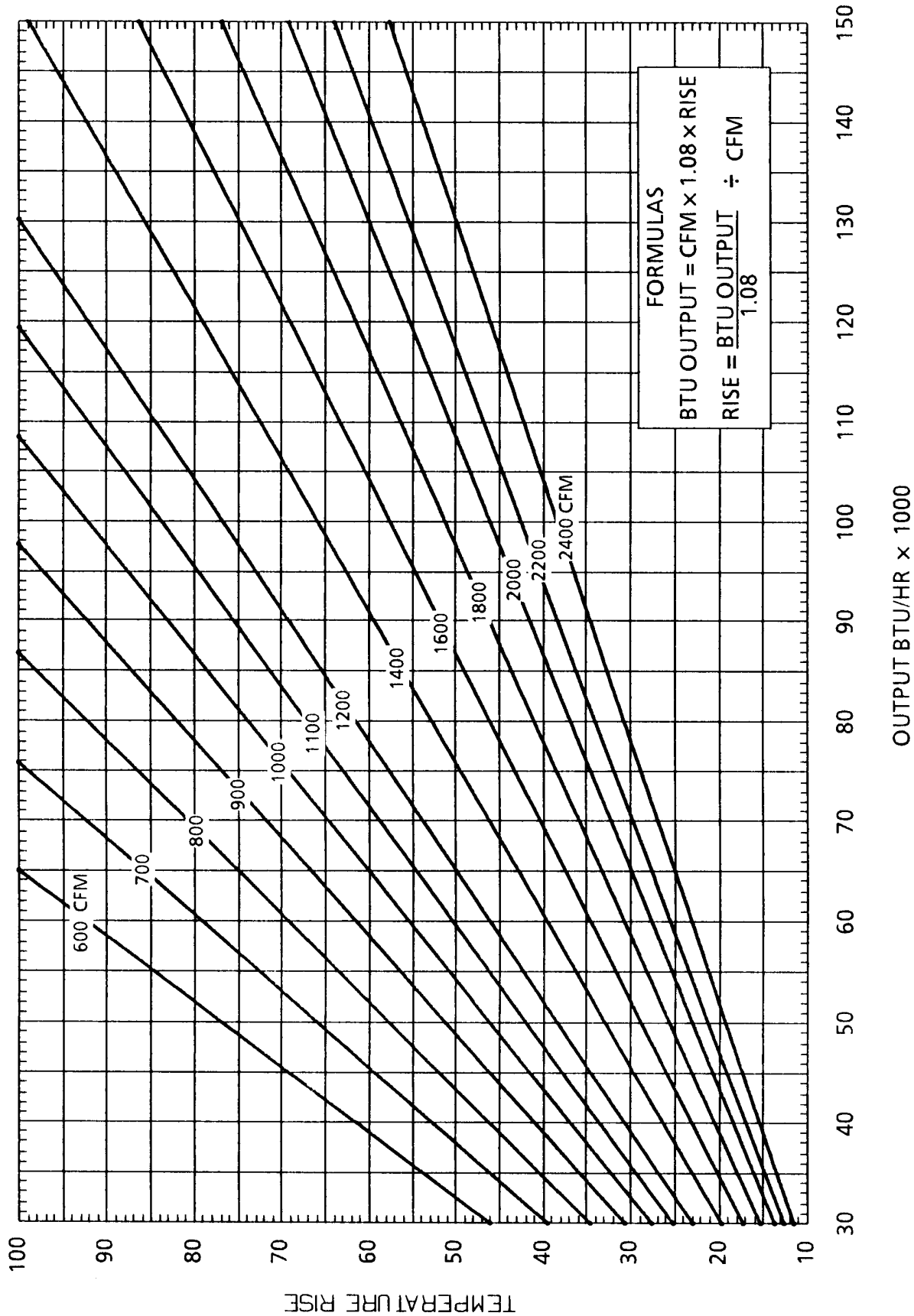
GUIV115DX50						
Heating Speed	Adjust	CFM @ .1 to .5 "WC Low Stage ESP	Rise Low Stage (°F)	CFM @ .1 to .5 "WC High Stage ESP	Rise High Stage Natural (°F)	Rise High Stage Propane (°F)
A	Minus	945	63	1361	63	56
A	Normal	1050	56	1512	56	51
A	Plus	1155	51	1663	51	46
B	Minus	990	60	1426	60	54
B	Normal	1100	54	1584	54	48
B	Plus	1210	39	1742	49	44
C	Minus	1080	55	1555	55	49
C	Normal	1200	49	1728	49	44
C	Plus	1320	45	1901	45	40
D	Minus	1170	51	1685	51	46
D	Normal	1300	46	1872	46	41
D	Plus	1430	41	2059	41	37

GUIV140DX50						
Heating Speed	Adjust	CFM @ .1 to .5 "WC Low Stage ESP	Rise Low Stage (°F)	CFM @ .1 to .5 "WC High Stage ESP	Rise High Stage Natural (°F)	Rise High Stage Propane (°F)
A	Minus	945	75	1361	75	68
A	Normal	1050	68	1512	68	61
A	Plus	1155	62	1663	61	55
B	Minus	990	72	1426	72	65
B	Normal	1100	65	1584	65	58
B	Plus	1210	59	1742	59	53
C	Minus	1080	66	1555	66	59
C	Normal	1200	59	1728	59	53
C	Plus	1320	54	1901	54	48
D	Minus	1170	61	1685	61	55
D	Normal	1300	55	1872	55	49
D	Plus	1430	50	2059	50	45

- Units are shipped without filter(s). CFM in chart is without filter(s).
- All furnaces shipped with heating speed set at "B" and cooling speed set at "A". Installer should adjust blower speeds as needed.
- INSTALLATION IS TO BE ADJUSTED TO OBTAIN TEMPERATURE RISE WITHIN THE RANGE SPECIFIED ON THE RATING PLATE.
- The chart is for information only. For satisfactory operation, external static pressure not to exceed value shown on rating plate.
- The above chart is for U.S. furnaces installed at 0-2000 feet. At higher altitudes, a properly derated unit will have approximately the same temperature rise at a particular CFM, while the ESP at that CFM will be lower.

BLOWER PERFORMANCE SPECIFICATIONS

BTU OUTPUT vs TEMPERATURE RISE CHART



COMBUSTION AND VENTILATION AIR



Property damage, bodily injury, or death may occur if the furnace and any other fuel-burning appliances are not provided with enough fresh air for proper combustion and ventilation of flue gases. Most homes require outside air to be supplied into the furnace area.

Improved construction and additional insulation in homes has reduced the heat loss and made these homes much tighter around doors and windows so that air infiltration is minimal. This creates a problem to supply combustion and ventilation air for gas fired or other fuel burning appliances. Any use of appliances that pull air out of the house (clothes dryers, exhaust fans, fireplaces, etc.) increases this problem and appliances could be starving for air.

In addition, these energy saving measures mean that your home will retain more water vapor and have a higher relative humidity. High humidity, especially during cold weather, may be damaging to buildings because condensation forms on windows and inside walls.

This furnace cannot be installed as a direct vent (i.e., sealed combustion) furnace. The burner box is present only to help reduce sound transmission from the burners to the occupied space.

AIR REQUIREMENTS

Most homes will require that outside air be supplied to the furnace area by means of ventilation grilles or ducts connecting directly to the outdoors or spaces open to the outdoors such as attics or crawl spaces. The following information on air for combustion and ventilation is reproduced from the National Fuel Gas Code NFPA54/ANSIZ223.1 Section 5.3.

5.3.1 General

(a) The provisions of 5.3 apply to gas utilization equipment installed in buildings and which require air for combustion, ventilation and dilution of flue gases from within the building. They do not apply to (1) direct vent equipment which is constructed and installed so that air for combustion is obtained from the outside atmosphere and all flue gases are discharged to the outside atmosphere, or (2) enclosed furnaces which incorporate an integral total enclosure and use only outside air for combustion and dilution of flue gases.

(b) Equipment shall be installed in a location in which the facilities for ventilation permit satisfactory combustion of gas, proper venting, and the maintenance of ambient temperature at safe limits under normal conditions of use. Equipment shall be located so as not to interfere with proper circulation of air. When normal infiltration does not provide the necessary air, outside air shall be introduced.

(c) In addition to air needed for combustion, process air shall be provided as required for: cooling of equipment or material, controlling dew point, heating, drying, oxidation or dilution, safety exhaust, odor control, and air for compressors.

(d) In addition to air needed for combustion, air shall be applied for ventilation, including all air required for comfort and proper working conditions for personnel.

(e) While all forms of building construction cannot be covered in detail, air for combustion, ventilation, and dilution of flue gases for gas utilization equipment vented by natural draft normally may be obtained by appliance of one of the methods covered in 5.3.3 and 5.3.4.

(f) Air requirements for the operation of exhaust fans, kitchen ventilation systems, clothes dryers, and fireplaces shall be considered in determining the adequacy of a space to provide combustion air requirements.

5.3.2 Equipment Located in Unconfined Spaces:

In unconfined spaces (see definition below) in buildings, infiltration may be adequate to provide air for combustion, ventilation and dilution of flue gases. However, in buildings of tight construction (for example, weather stripping, heavily insulated, caulked, vapor barrier, etc.), additional air may need to be provided using the methods described in 5.3.3-b or 5.3.4.

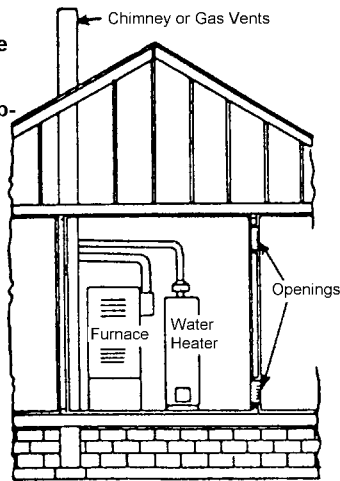
Unconfined Space. For purposes of this Code, a space whose volume is not less than 50 cubic feet per 1,000 Btu per hour of the aggregate input rating of all appliances installed in that space. Rooms communicating directly with the space in which the appliances are installed, through openings not furnished with doors, are considered a part of the unconfined space.

5.3.3 Equipment Located in Confined Spaces:

(a) *All Air from Inside the Building:* The confined space shall be provided with two permanent openings communicating directly with an additional room(s) of sufficient volume so that the combined volume of all spaces meets the criteria for an unconfined space. The total input of all gas utilization equipment installed in the combined space shall be considered in making this determination. Each opening shall have a minimum free area of 1 square inch per 1,000 Btu per hour of the total input rating of all gas utilization equipment in the confined space, but not less than 100 square inches. One opening shall be within 12 inches of the top and one within 12 inches of the bottom of the enclosure. The following drawing illustrates the air opening specifications for equipment located in confined spaces; all air from inside building.

COMBUSTION AND VENTILATION AIR

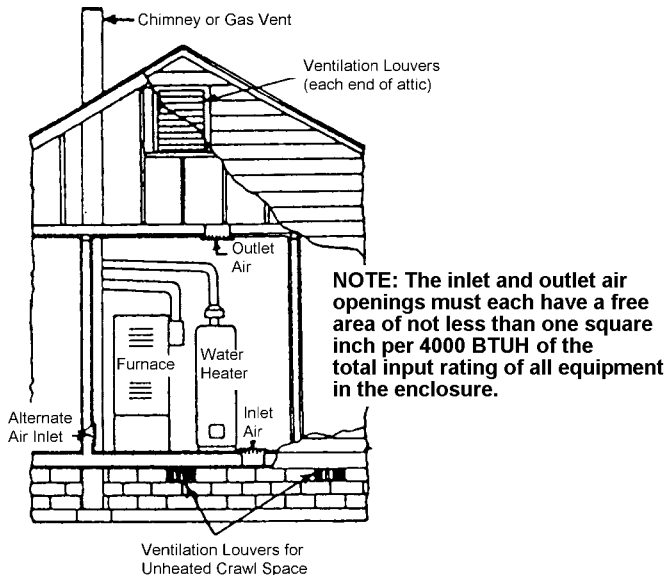
NOTE: Each opening must have a free area of not less than one square inch per 1000 BTU of the total input rating of all equipment in the enclosure, but not less than 100 square inches.



Equipment Located in Confined Spaces; All Air from Inside Building. See 5.3.3-a

(b) *All Air from Outdoors:* The confined space shall be provided with two permanent openings, one commencing within 12 inches of the top and one commencing within 12 inches of the bottom of the enclosure. The openings shall communicate directly, or by ducts, with the outdoors or spaces (crawl or attic) that freely communicate with the outdoors.

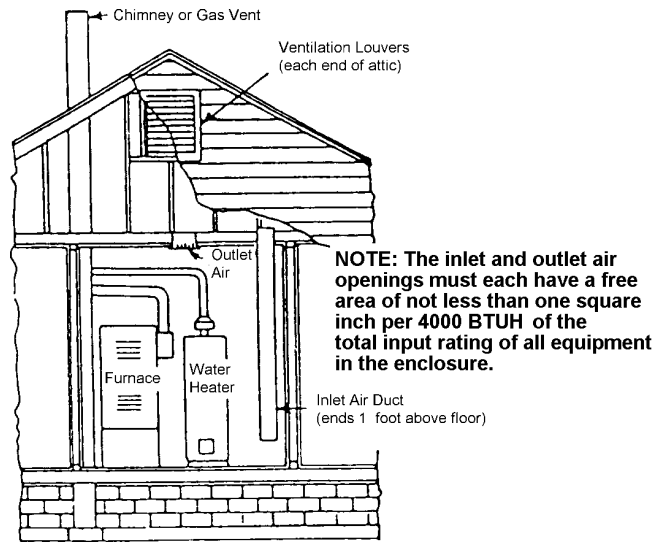
1. When directly communicating with the outdoors, each opening shall have a minimum free area of 1 square inch per 4,000 BTU per hour of total input rating of all equipment in the enclosure. The following drawing illustrates the air opening specifications for equipment located in confined spaces; all air from outdoors-inlet air from ventilated crawl space and outlet air to ventilated attic.



Equipment Located in Confined Spaces; All Air from Outdoors—Inlet Air from Ventilable Crawl Space and Outlet Air to Ventilable Attic. See 5.3.3-b

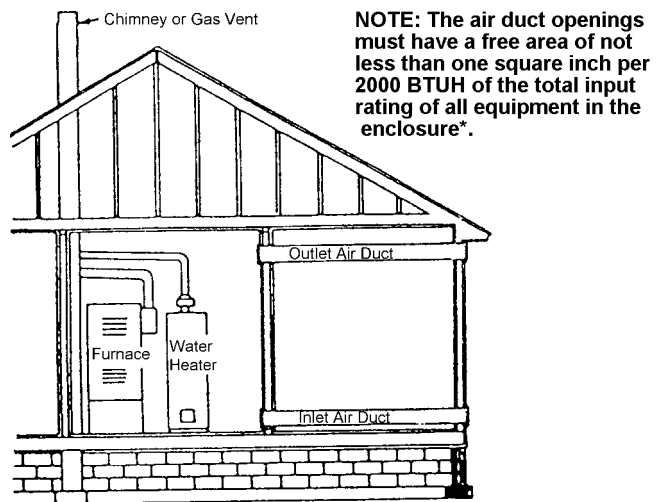
2. When communicating with the outdoors through vertical ducts, each opening shall have a minimum free area of 1 square inch per 4,000 BTU per hour of total input rating of

all equipment in the enclosure. The following drawing illustrates the air opening specifications for equipment located in confined spaces; all air from outdoors through ventilated attic.



Equipment Located in Confined Spaces; All Air from Outdoors Through Ventilable Attic. See 5.3.3-b.

3. When communicating with the outdoors through horizontal ducts, each opening shall have a minimum free area of 1 square inch per 2,000 BTU per hour of total input rating of all equipment in the enclosure. The following drawing illustrates the air opening specifications for equipment located in confined spaces; all air from outdoors.



*If the appliance room is located against an outside wall and the air openings communicate directly with the outdoors, each opening shall have a free area of not less than one square inch per 4,000 BTU per hour of the total input rating of all appliances in the enclosure.

Equipment Located in Confined Spaces; All Air from Outdoors. See 5.3.3-b.

4. When ducts are used, they shall be of the same cross-sectional area as the free area of the openings to which they connect. The minimum dimension of rectangular air ducts shall not be less than 3 inches.

COMBUSTION AND VENTILATION AIR

5.3.4 Specially Engineered Installations:

The requirements of 5.3.3 shall not necessarily govern when special engineering, approved by the authority having jurisdiction, provides an adequate supply of air for combustion, ventilation, and dilution of flue gases.

5.3.5 Louvers and Grilles:

In calculating free area in 5.3.3, consideration shall be given to the blocking effect of louvers, grilles or screens protecting openings. Screens used shall not be smaller than 1/4 inch mesh. If the area through a design of louver or grille is known, it should be used in calculating the size of opening required to provide the free area specified. If the design and free area is not known, it may be assumed that wood louvers will have 20-25 percent free area and metal louvers and grilles will have 60-75 percent free area. Louvers and grilles shall be fixed in the open position or interlocked with the equipment so that they are opened automatically during equipment operation.

5.3.6 Special Conditions Created by Mechanical Exhausting or Fireplaces:

Operation of exhaust fans, ventilation systems, clothes dryers, or fireplaces may create conditions requiring special attention to avoid unsatisfactory operation of installed gas utilization equipment.

PRODUCT DESIGN

GAS SUPPLY AND PIPING

The rating plate is stamped with the model number, type of gas, and gas input rating. Make sure the furnace is equipped to operate on the type of gas available.

Inlet Gas Supply Pressure	
Natural Gas	Minimum: 5.0" W.C. Maximum :10.0" W.C.
Propane Gas	Minimum:11.0" W.C. Maximum :13.0" W.C.

Note: Inlet Gas Pressure Must Not Exceed the Maximum Value Shown in Table Above.

The minimum supply pressure must not be varied downward because this could lead to unreliable ignition. In addition, gas input to the burners must not exceed the rated input shown on the rating plate. Overfiring of the furnace could result in premature heat exchanger failure. Finally, note that inlet gas pressures in excess of 13 inches water column could result in permanent damage to the gas valve.

HIGH ALTITUDE DERATE

If you are installing this furnace on natural gas and at an altitude of 0 to 6000 feet for "C" and "D" model furnaces, or 0 to 7500 feet for "A" and "B" model furnaces, or 0 to 3000 feet for "S" and "V" model furnaces, no additional kits are required. Please refer to the chart below for the proper natural gas manifold pressure required.

If you are installing this furnace on propane gas and at an altitude of 0 to 6000 feet for "C" model furnace, 0 to 7000 feet for "S" and "V" model furnaces, or 0 to 7500 feet for "A" and "B" model furnaces, the propane conversion kit, LPTK07, LPTK07A or LPTK09, will be required. The "D" model furnace at an altitude of 0 to 6000 feet, will require the propane conversion kit, LPTK08 or LPTK09. Please refer to the charts below for the proper propane gas manifold pressure required.

Model	Gas	Altitude	Kit	Orifice	Manifold Pressure
GUA/B GUA/B	Natural	0 - 7500 ft	None	#43	3.5" W.C.
	Propane	0 - 7500 ft	LPTK07, 7A or 09	#55	10.0" W.C.
GUIC GUIC	Natural	0 - 6000 ft	None	#43	3.5" W.C.
	Propane	0 - 6000 ft	LPTK07, 7A or 09	#55	10.0" W.C.
GUID	Natural	0 - 6000 ft	None	#43	3.5" W.C.
	Propane	0 - 6000 ft	LPTK08 or 09	#55	10.0" W.C.

Model	Gas	Altitude	Kit	Orifice	Manifold Pressure	
					High Stage	Low Stage
GUIS GCIS	Natural	0 - 3000 ft	None	#43	3.5" W.C.	1.9" W.C.
	Propane	0 - 7000 ft	LPTK07, 7A or 09	#55	10.0" W.C.	6.0" W.C.
	Propane	7001 - 8500 ft	HALP09	#56	10.0" W.C.	6.0" W.C.
GUIV	Natural	0 - 3000 ft	None	#43	3.5" W.C.	1.9" W.C.
	Propane	0 - 7000 ft	LPTK07, 7A or 09	#55	10.0" W.C.	6.0" W.C.
	Propane	7001 - 8500 ft	HALP09	#56	10.0" W.C.	6.0" W.C.

At altitudes above 6000 feet for "C" and "D" model furnaces, or 7500 feet for "A" and "B" model furnaces, or 7000 feet for "S" and "V" model furnaces, a High Altitude Conversion Kit is required. This is required regardless of the heat content of the fuel used. For proper kit selection refer to the *S-17 HIGH ALTITUDE APPLICATION* section in the *SERVICING* section of this manual.

High altitude kits can be purchased depending upon the altitude.



CAUTION

The furnace will naturally derate itself with altitude. Do not attempt to increase the firing rate by changing orifices or increasing the manifold pressure. This can cause poor combustion and equipment failure.

Adjustment of the manifold pressure to a lower pressure reading than what is specified on the furnace nameplate is not a proper derate procedure. With a lower density of air and a lower manifold pressure at the burner orifice, the orifice will not aspirate the proper amount of air into the burner. This can cause incomplete combustion of the gas, flash back, and possible yellow tipping.



CAUTION

To avoid possible unsatisfactory operation or equipment damage due to underfiring of equipment, do not undersize the natural gas piping from the meter to the furnace. When sizing a trunk line per the tables, include all appliances on that line that could be operated simultaneously.

The gas pipe supplying the furnace must be properly sized based on the cubic feet per hour of gas flow required, specific gravity of the gas and length of the run. The gas line installation must comply with local codes, or in the absence of local codes, with the latest edition of the National Fuel Gas Code ANSI Z223.1.

NATURAL GAS CAPACITY OF PIPE IN CUBIC FEET OF GAS PER HOUR (CFH)

Length of Pipe in Feet	Nominal Black Pipe Size				
	1/2"	3/4"	1"	1-1/4"	1-1/2"
10	132	278	520	1050	1600
20	92	190	350	730	1100
30	73	152	285	590	980
40	63	130	245	500	760
50	56	115	215	440	670
60	50	105	195	400	610
70	46	96	180	370	560
80	43	90	170	350	530
90	40	84	160	320	490
100	38	79	150	305	460

(Pressure 0.5PSIG or less and Pressure Drop of 0.3" W.C. based on 0.60 Specific Gravity Gas)

$$CFH = \frac{BTUH \text{ FURNACE INPUT}}{CALORIFIC \text{ VALUE OF GAS}}$$

PRODUCT DESIGN

CONNECTING THE GAS PIPING - NATURAL GAS

Refer to Installation Instructions for the general layout of the furnace. The following rules apply:

1. Use black iron or steel pipe and fittings for the building piping.
2. Use pipe joint compound on male threads only. Pipe joint compound must be resistant to the action of the fuel used.
3. Use ground joint unions. (Inside or outside of furnace.)
4. Install a drip leg to trap dirt and moisture before it can enter the gas valve. The drip leg must be a minimum of three inches long.
5. Use two pipe wrenches when making connection to the gas valve to keep it from turning. **The orientation of the gas valve on the manifold must be the same as shipped from the factory.**
6. Install a manual shutoff valve. This shutoff valve should be conveniently located within six (6) feet of the unit, and between the meter and unit. The shutoff valve should be upstream of the dripleg and union.
7. Tighten all joints securely.
8. The furnace shall be connected to the building piping by one of the following.
 - a. Rigid metallic pipe and fittings.
 - b. Semirigid metallic tubing and metallic fittings. Aluminum alloy tubing shall not be used in exterior locations.
 - c. Listed gas appliance connectors used in accordance with the terms of their listing that are completely in the same room as the equipment.
 - d. In "b" and "c" above, the connector or tubing shall be installed so as to be protected against physical and thermal damage. Aluminum-alloy tubing and connectors shall be coated to protect against external corrosion where they are in contact with masonry, plaster, or insulation or are subject to repeated wettings by such liquids as water (except rain water), detergents, or sewage.

CHECKING THE GAS PIPING



To avoid the possibility of property damage, personal injury or fire, the following instructions must be performed regarding gas connections, pressure testing, location of shutoff valve and installation of gas piping.

The unit and its gas connections must be leak tested before placing in operation. Because of the danger of explosion or fire, never use a match or open flame to test for leaks. Never exceed specified pressure for testing. Higher pressure may damage the gas valve and cause overfiring which may result in heat exchanger failure.

This unit must be isolated from the gas supply system by closing its individual manual shutoff valve during any pressure testing of the gas supply piping system at test pressures equal to or less than 1/2 psig (3.48 kPa).

TANKS AND PIPING - PROPANE UNITS



PERSONAL INJURY HAZARD

Iron oxide (rust) can reduce the level of odorant in propane gas. A gas detecting device is the only reliable method to detect a propane gas leak. Contact your local propane supplier about installing a gas detecting warning device to alert you in the event that a gas leak should develop.

Failure to detect a propane gas leak could result in an explosion or fire which could cause serious personal injury or death.

All propane gas equipment must conform to the safety standards of the National Board of Fire Underwriters (See NBFU Manual 58).

For satisfactory operation, propane gas pressure must be 10 inch W.C. at the furnace manifold with all gas appliances in operation. Maintaining proper gas pressure depends on three main factors.

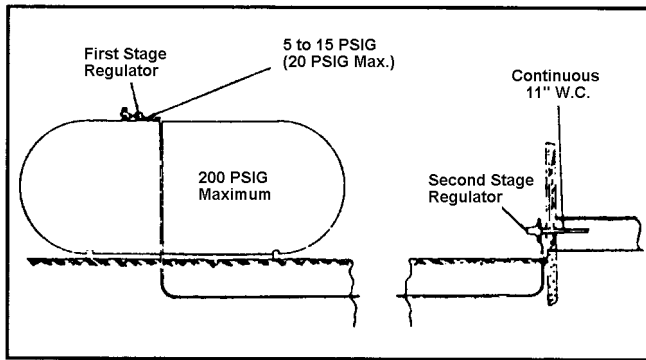
1. Vaporization rate, which depends on (a) temperature of the liquid, and (b) "wetted surface" area of the container or containers.
2. Proper pressure regulation. (Two stage regulation is recommended from the standpoint of both cost and efficiency.)
3. Pressure drop in lines between regulators, and between second stage regulator and the appliance. Pipe size required will depend on length of pipe run and total load of all appliances.

Complete information regarding tank sizing for vaporization, recommended regulator settings, and pipe sizing is available from most regulator manufacturers and propane gas suppliers.

Propane is an excellent solvent, and special pipe dope must be used when assembling piping for this gas as it will quickly dissolve white lead or most standard commercial compounds. Shellac base compounds resistant to the actions of liquefied petroleum gases such as Gasolac, Stalactic, Clyde's or John Crane are satisfactory.

PRODUCT DESIGN

The following drawing illustrates a typical propane gas installation.



Typical Propane Gas Installation

WARNING

If your propane gas furnace is installed in a basement, an excavated area or a confined space, we strongly recommend that you contact your propane supplier about installing a warning device that would alert you to a gas leak.

- . . . Propane gas is heavier than air and any leaking gas can settle in any low areas or confined spaces.
- . . . Propane gas odorant may fade, making the gas undetectable except with a warning device.

An undetected gas leak would create a danger of explosion or fire. If you suspect the presence of gas, follow the instructions below. Failure to do so could result in **SERIOUS PERSONAL INJURY OR DEATH**.

WARNING

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

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

—WHAT TO DO IF YOU SMELL GAS

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

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

PROPANE PIPING CHART

Sizing Between First and Second Stage Regulator*

Maximum Propane Capacities listed are based on 2 psig pressure drop at 10 psig setting. Capacities in 1,000 BTU/hour.

Pipe or Tubing Length, Feet	Tubing Size, O.D. Type L					Nominal Pipe Size Schedule 40	
	3/8"	1/2"	5/8"	3/4"	7/8"	1/2"	3/4"
10	730	1,700	3,200	5,300	8,300	3,200	7,500
20	500	1,100	2,200	3,700	5,800	2,200	4,200
30	400	920	2,000	2,900	4,700	1,800	4,000
40	370	850	1,700	2,700	4,100	1,600	3,700
50	330	770	1,500	2,400	3,700	1,500	3,400
60	300	700	1,300	2,200	3,300	1,300	3,100
80	260	610	1,200	1,900	2,900	1,200	2,600
100	220	540	1,000	1,700	2,600	1,000	2,300
125	200	490	900	1,400	2,300	900	2,100
150	190	430	830	1,300	2,100	830	1,900
175	170	400	780	1,200	1,900	770	1,700
200	160	380	730	1,100	1,800	720	1,500

To convert to capacities at 15 psig settings - multiply by 1.130

To convert to capacities at 5 psig settings - multiply by 0.879

Sizing Between Single or Second Stage Regulator and Appliance*

Maximum Propane Capacities Listed are Based on 1/2" W.C. pressure drop at 11" W.C. setting. Capacities in 1,000 BTU/hour.

Pipe or Tubing Length, Feet	Tubing Size, O.D. Type L							Nominal Pipe Size Schedule 40			
	3/8"	1/2"	5/8"	3/4"	7/8"	1-1/8"	1-1/2"	3/4"	1"	1-1/4"	1-1/2"
10	39	92	199	329	501	935	275	567	1,071	2,205	3,307
20	26	62	131	216	346	630	189	393	732	1,496	2,299
30	21	50	107	181	277	500	152	315	590	1,212	1,858
40	19	41	90	145	233	427	129	267	504	1,039	1,559
50	18	37	79	131	198	376	114	237	448	913	1,417
60	16	35	72	121	187	340	103	217	409	834	1,275
80	13	29	62	104	155	289	89	185	346	724	1,066
100	11	26	55	90	138	255	78	162	307	630	976
125	10	24	48	81	122	224	69	146	275	567	866
150	9	21	43	72	109	202	63	132	252	511	787
200	8	19	39	66	100	187	54	112	209	439	665
250	8	17	36	60	93	172	48	100	185	390	590

*Data in accordance with NFPA pamphlet NO. 54

PROPANE TANK SIZING (MINIMUM)

Maximum Gas Needed to Vaporize*	Tank Size required if lowest outdoor temperature (Avg. for 24 Hours) reaches:						
	32°F	20°F	10°F	0°F	-10°F	-20°F	-30°F
125K BTU/HR (50CFH)	115 Gallon	115 Gallon	115 Gallon	250 Gallon	250 Gallon	400 Gallon	600 Gallon
250K BTU/HR (100CFH)	250 Gallon	250 Gallon	250 Gallon	400 Gallon	500 Gallon	1000 Gallon	1500 Gallon
375K BTU/HR (150CFH)	300 Gallon	400 Gallon	500 Gallon	500 Gallon	1000 Gallon	1500 Gallon	2500 Gallon
500K BTU/HR (200CFH)	400 Gallon	500 Gallon	750 Gallon	1000 Gallon	1500 Gallon	2000 Gallon	3500 Gallon
750K BTU/HR (300CFH)	750 Gallon	1000 Gallon	1500 Gallon	2000 Gallon	2500 Gallon	4000 Gallon	5000 Gallon

*Average rate/hour withdrawal in 8 hour period.

PRODUCT DESIGN

ELECTRICAL WIRING



To avoid the risk of electrical shock, wiring to the unit must be properly polarized and grounded.



To avoid electrical shock, injury or death, disconnect electrical power before changing any electrical wiring.

The wiring harness on this unit is furnished as an integral part of the furnace. Field alteration to comply with electrical codes should not be required.

LINE VOLTAGE WIRING

Power supply to the furnace must be N.E.C. Class 1, and must comply with all applicable codes. The furnace must be electrically grounded in accordance with the local codes or, in their absence, with the latest edition of the National Electrical Code, ANSI/NFPA No. 70, and/or the CSA C22.1 Electrical Code. A fused disconnect should be provided and sized in accordance with the unit maximum overcurrent protection.

The **ground wire** must run all the way back to the electrical panel. This will provide more reliable sensing of flame.

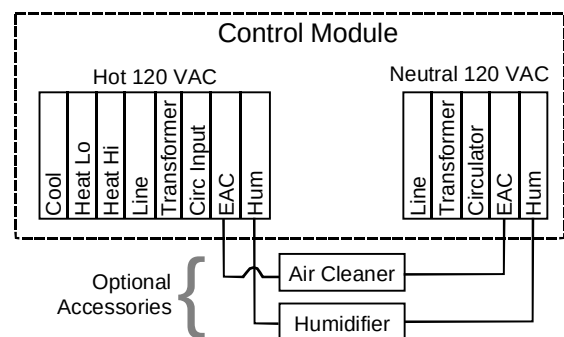
LINE VOLTAGE CONNECTION OF OPTIONAL HUMIDIFIER AND ELECTRONIC AIR CLEANER

The Integrated ignition control used on the "A & C" model (SSE) furnaces, "D" model (SV) furnace, "S" model (SEE II) furnace, and "V" model (SEE IIQ) model furnace is equipped with line voltage accessory terminals for connection of field supplied humidifiers, and/or electronic air cleaners.

Accessory Load Specifications	
Humidifier	1.0 Amp maximum at 120 VAC
Electronic Air Cleaner	1.0 Amp maximum at 120 VAC

Accessory Installation. Follow the electronic air cleaner and humidifier manufacturer's instructions for mounting and electrically grounding these accessories. Check that the power supply to the furnace has been disconnected. Wire the accessories to the furnace control module as shown in the following diagram. All connections to the control module are to be made through 1/4 (.250") receptacle (female) terminals.

If it is necessary for the installer to supply additional line voltage wiring to the inside of the furnace, the wiring must comply with all local codes. This wiring must have a minimum temperature rating of 105°C. and must be routed away from the burner compartment. All line voltage splices must be made inside the furnace junction box. The following drawing illustrates the wiring of optional accessories to the control module.



Optional Accessory Wiring

Accessory Operation. The furnace control module energizes the humidifier whenever the combustion blower is energized (if there is an optional air cleaner on the system, the humidifier is **not** energized until the air cleaner is energized). The control module energizes the air cleaner whenever the air circulation blower is energized.

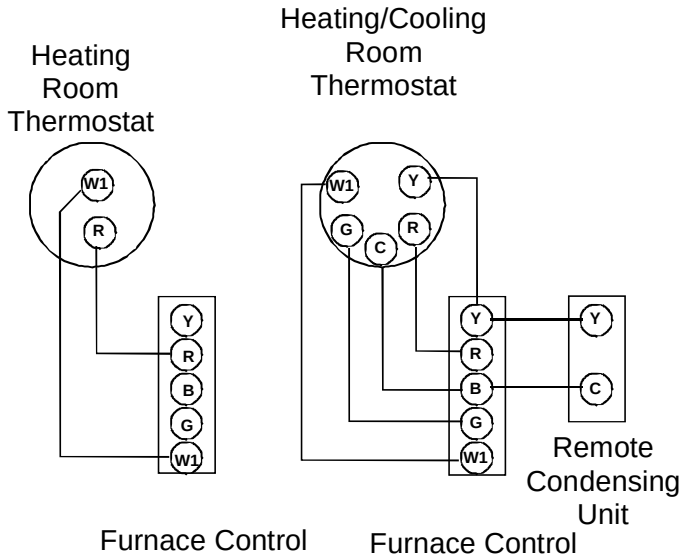
The Integrated ignition control used on "B" model (SV) furnaces do not feature accessory terminals for a humidifier or electronic air cleaner. If adding an optional accessory humidifier, or electronic air cleaner to "B" model (SV) furnaces, refer to the installation instructions shipped with the furnace.

PRODUCT DESIGN

THERMOSTAT WIRING

Thermostat Wiring - Single Stage Furnace

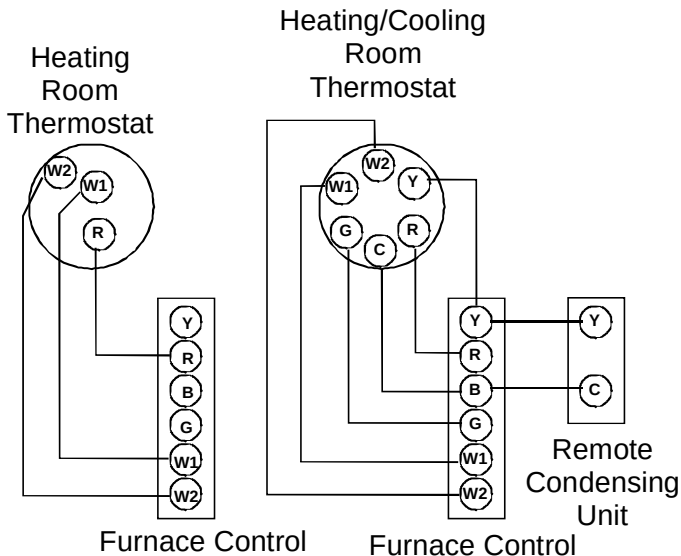
The single stage furnace will have a "W1" terminal and will use a single stage thermostat. The following drawing illustrates the typical field wiring for a heat only single stage system and a single stage heating/single stage cooling system.



**Typical Field Wiring for Single Stage Gas Furnace
(24 VAC Control Circuit)**

Thermostat Wiring - GUIS/GCIS Two Stage Furnace

A two stage furnace will have both "W1" and "W2" terminals and must use a two stage thermostat. The following drawing illustrates the typical field wiring for a heat only two stage system and a two stage heating/one stage cooling system. If the thermostat has "Y1" and "Y2" connections and a one stage cooling system is used, connect "Y" on the furnace control to "Y1" on the thermostat.



**Typical Field Wiring for Two Stage Furnace
(24 VAC Control Circuit)**

Thermostat Wiring - GUIV Variable Speed, Two Stage Furnace

A variable speed, two stage furnace will have both "W1" and "W2" terminals. Figures A, B, and C show connections for a "heat only" two-stage system and a two-stage "heating"/one stage "cooling" system. If the thermostat has "Y1" and "Y2" connections and a one stage cooling system is used, connect "Y" on the furnace control to "Y1" on the thermostat.

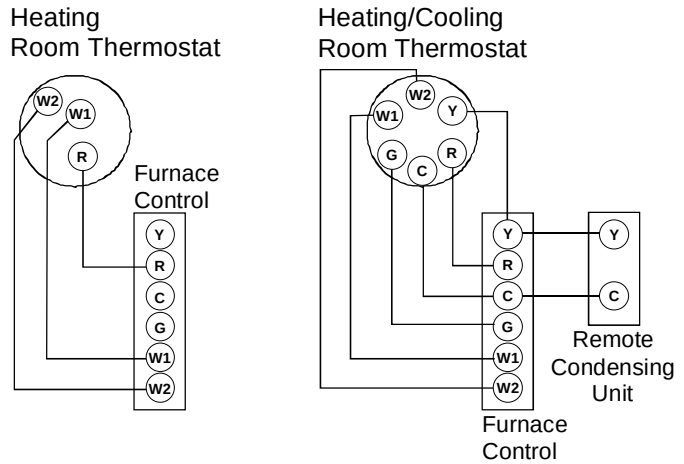


Figure A

Figure B

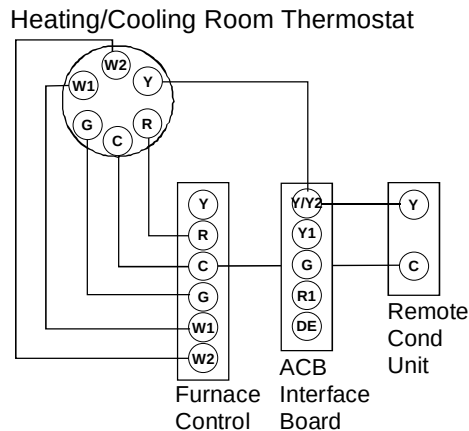


Figure C

**Typical Field Wiring for Variable Speed,
Two Stage Furnace
(24VAC Control Circuit)**

A 40 V.A. transformer and an integrated electronic control are built into the furnace to allow use with most cooling equipment.

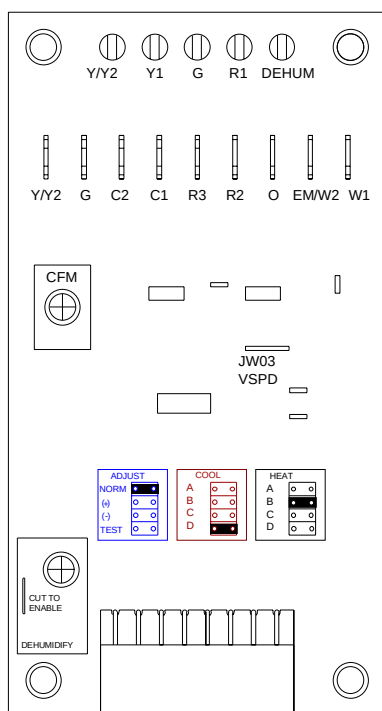
Dehumidistat Wiring

The dehumidistat is an optional device that energizes a lower blower speed whenever the cooling system is activated and there is a call for dehumidification. The dehumidistat used must operate on 24 VAC and contains a switch that opens on a humidity rise.

PRODUCT DESIGN

To install the dehumidistat, wire the hot side of the dehumidistat (typically, the black lead) to the screw terminal marked "DEHUM" on the air circulating motor interface board (see Air Circulating Motor Interface figure below). Wire the neutral side of the dehumidistat (typically, the white lead) to the screw terminal marked "R1" on the air circulating motor interface board. If there is a ground wire on the dehumidistat (typically, a green wire), ground the wire to the junction box on the wall.

To activate the dehumidify function on the air circulating motor interface board, cut the jumper wire labeled "CUT TO ENABLE", located inside the box labeled "DEHUMIDIFY" on the interface board (see Air Circulating Motor Interface figure below). Once the wire is cut, the dehumidify function is enabled on a combination call for cooling and dehumidification.



Air Circulating Motor Interface Board

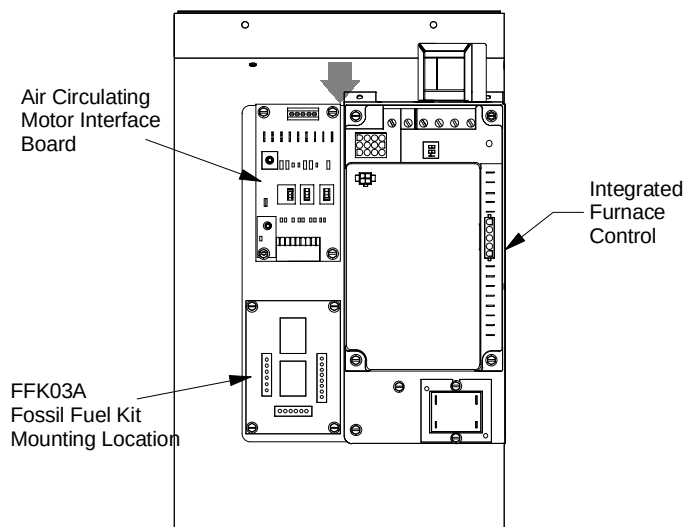
Fossil Fuel Applications

The GUIV furnace can be used in conjunction with a heat pump in a fossil fuel application. A fossil fuel application is where an outdoor temperature sensor determines the most cost efficient means of heating (heat pump, gas furnace, or both).

A heat pump thermostat with three stages of heat is required to properly use the two-stage furnace with a heat pump. Refer to the fossil fuel kit installation manual for additional thermostat requirements.

To install, strictly follow the wiring guidelines in the fossil fuel kit installation. Do **not** connect the "O" and "EM" lines from the heat pump or thermostat directly to the "O" and "EM/W2" terminals on the air circulating motor interface board. All connections to the furnace must be to the two-stage integrated furnace control board and must wire to the "FURNACE" terminal strip on the fossil fuel control board.

Space provisions on the control panel have been made to fasten to the Amana FFK03A Fossil Fuel Control Board to the furnace control panel (see FFK03A Fossil Fuel Mounting Kit Location figure below) using two #8, 3/4" long, sheet metal screws.



Amana FFK03A Fossil Fuel Kit Mounting Location

CONTINUOUS FAN OPERATION

Single Stage Furnace

The single stage furnace control will energize the cooling circulator fan speed when the fan switch on the thermostat is turned to the "ON" position.

GUIV/GCIS Two Stage Furnace

The two stage furnace control will energize the low heat circulator fan speed when the fan switch on the thermostat is turned to the "ON" position. This fan speed will provide circulation with less electricity than conventional single stage equipment.

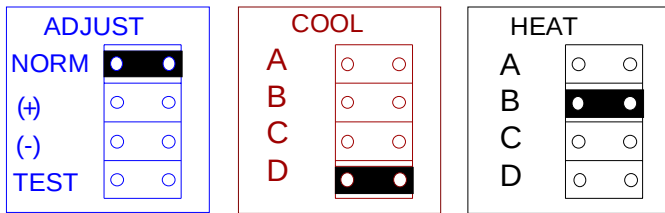
Note: For two stage heat only (no cooling) applications, the continuous fan speed may be increased by jumpering "Y" to "G". Thermostat must have a "G" terminal to make use of this feature.

GUIV Variable Speed, Two Stage Furnace

There are two speeds for continuous fan. The speeds are dependant on how "G" from the thermostat is connected.

1. If "G" from the thermostat is connected to "G" on the two-stage integrated furnace control (Thermostat Wiring Figure B), the continuous fan speed will be the same as the low stage heating speed selected. The low stage heating speed can be selected from four speeds on the air circulating motor interface board (Heat A, Heat B, Heat C, or Heat D). Refer to the following Speed Tap Adjustments figure.

PRODUCT DESIGN



Speed Tap Adjustments

Note: The heating speeds must be within the specified rise range. Refer to the *BLOWER PERFORMANCE* section of this manual or *SPECIFICATION SHEET* for this unit for temperature rise settings.

- If "G" from the thermostat is connected to "G" on the air circulating motor interface board (Thermostat Wiring Figure C), the continuous fan speed will be 75% of the cooling fan speed selected. The cooling fan speed can be selected using the COOL and ADJUST taps on the air circulating motor interface board. Refer to previous Speed Tap Adjustments figure). Refer to *BLOWER PERFORMANCE* section of this manual or the *SPECIFICATION SHEET* for speeds.

Depending on the heating input of the furnace and the capacity of the cooling system, one continuous fan speed may be preferable to the other. The lower the continuous fan speed, the lower the electrical consumption. When using an electronic air cleaner, make sure the continuous fan speed's CFM is within the CFM range listed for the electronic air cleaner.

Note: For two-stage heat only (no cooling) applications, the continuous fan speed may be increased by jumpering "Y" to "G". Thermostat must have a "G" terminal to make use of this feature.

AIR CIRCULATION FAN TIMING

Single Stage GUI_ /GCI_ and Two Stage GUIS/GCIS Furnaces

All items in this section refer to the air circulation blower, not to the induced draft blower. The timing sequence for the induced draft blower is not adjustable.

When a call for cooling occurs, the circulation fan will come on. It will remain on for 45 seconds after the call for cooling ends. This fan timing is not adjustable.

During normal heating operation, the air circulation blower will come on 37 seconds after the gas valve opens. This timing is not adjustable.

As shipped, the circulation blower will remain on for 90 seconds after the gas valve closes. If desired, this timing may be adjusted. The following figure illustrates the adjustment pins or switches, which are located near the low voltage terminal strip.

	Style A	Style B
60 Second Delay		
90 Second Delay		
120 Second Delay		
180 Second Delay		

Heating Fan Off Adjustments

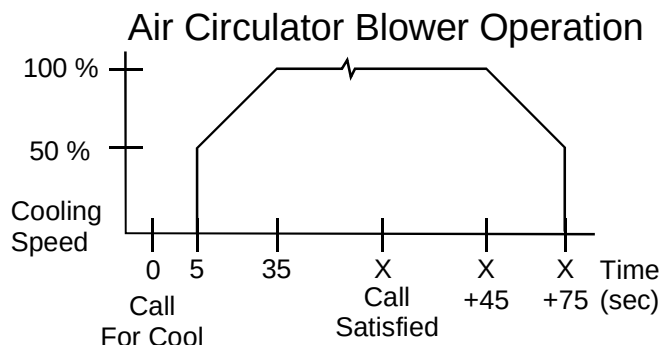
GUIV Variable Speed, Two Stage Furnace

All items in this section refer to the air circulation blower not to the induced draft blower. The timing sequence for the induced draft blower is not adjustable.

Cooling Fan Timing

The cooling system may be attached in one of two ways. The following will explain the two possible operations:

If "Y" from the thermostat is connected to "Y" on the Two-stage Integrated Furnace Control (Thermostat Wiring Figure B), then the following on and off sequences will occur.

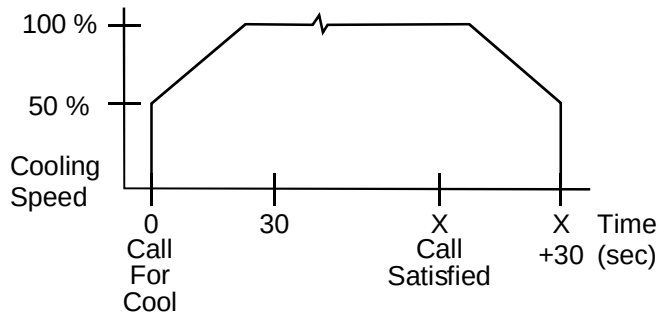


Cooling On Delay:	5 seconds
Cooling On Ramp Up:	30 seconds
Cooling Off Delay:	45 seconds
Cooling Off Ramp Down:	30 seconds

PRODUCT DESIGN

If "Y" from the thermostat is connected to "Y/Y2" on the air circulation motor interface board (Thermostat Wiring Figure C), then the following on and off sequences will occur.

Air Circulator Blower Operation

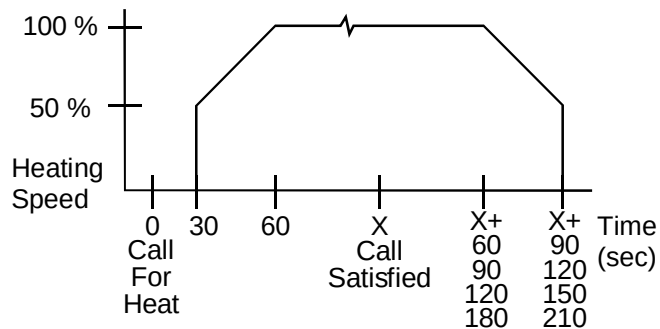


Cooling On Delay: 0 seconds
Cooling On Ramp Up: 30 seconds
Cooling Off Delay: 0 seconds
Cooling Off Ramp Down: 30 seconds

HEATING FAN TIMING

The heating fan timing has a fixed on sequence with an adjustable delay off timing. The delay timing may be adjusted using the switches near the low voltage terminal strip (see the following switch position figure). For heating operation "W1" from the thermostat **must** be connected to "W1" on the two-stage integrated furnace control. "W2" from the thermostat **must** be connected to "W2" on the two-stage integrated furnace control. The following on and off sequences of the air circulating blower fan will occur:

Air Circulator Blower Operation



Heating On Delay: 30 seconds
Heating On Ramp Up: 30 seconds
Heating Off Delay: 60, 90, 120, or 180 seconds (Adjustable)
Heating Off Ramp Down: 30 seconds

CIRCULATING AIR AND FILTERS

DUCTWORK - AIR FLOW

Duct systems and register sizes must be properly designed for the C.F.M. and external static pressure rating of the furnace. Ductwork should be designed in accordance with the recommended methods of "Air Conditioning Contractors of America" manual D.

A duct system should be installed in accordance with Standards of the National Board of Fire Underwriters for the Installation of Air Conditioning, Warm Air Heating and Ventilating Systems, Pamphlets No. 90A and 90B.

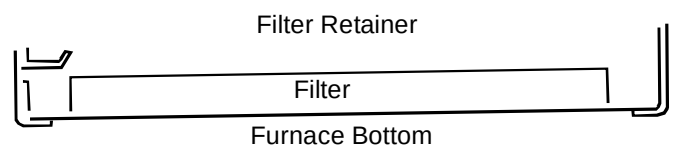
A return air filter is not supplied with the furnace. The installer must supply a means of filtering all of the return air. Filter(s) shall comply with UL900 or CAN/ULC-S111 Standards. If the furnace is installed with out filters, the warranty will be voided.

The following two charts show the **recommended minimum filter sizes** for each furnace model. Larger sizes are also acceptable.

UPFLOW/HORIZONTAL FILTER SIZE CHART		
Minimum Recommended Filter Sizes		
Qty. - Nominal Size Inches (Square Inch Surface Area)		
Furnace Model	Disposable	Permanent
GUI_045_30	1 - 20 x 25 (500)	1 - 15 x 20 (300)
GUI_070_30	1 - 20 x 25 (500)	1 - 15 x 20 (300)
GUI_070_35/40	2 - 14 x 25 (350)	1 - 16 x 25 (400)
GUI_090_30	1 - 24 x 24 (576)	1 - 16 x 25 (400)
GUI_090_50	2 - 18 x 25 (450)	1 - 20 x 25 (500)
GUI_115_40	2 - 14 x 25 (350)	1 - 18 x 25 (450)
GUI_115_50	2 - 18 x 25 (450)	1 - 20 x 25 (500)
GUI_140_50	2 - 18 x 25 (450)	1 - 20 x 25 (500)

BOTTOM RETURN FILTER SIZE CHART		
Furnace Model	Filter Size	Type
GUI_045, 070	14 x 25 x 1	Permanent
GUI_090	16 x 25 x 1	Permanent
GUI_115, 140	20 x 25 x 1	Permanent

The sketch below shows how the filter is retained over the bottom return air opening.



Bottom Return Filter Retention

One inch throwaway filters should be sized for a face velocity of 300 feet per minute or less (14x25x1 throwaway = 730 CFM max. 16x25x1 throwaway = 830 CFM max. 18x25x1 throwaway = 940 CFM max. 20x25x1 throwaway = 1040 CFM max.) All other filters should be sized according to their manufacturer's instructions.

For air delivery of less than 1800 CFM; use one side return or bottom return.

For air delivery of 1800 CFM or higher; use two side returns or one side return plus bottom return.

Guide dimples locate the side and bottom return cutout locations. Use a straight edge to scribe lines connecting the dimples. Cut out the opening on these lines. An undersized opening will cause reduced airflow. For bottom return connection, remove the bottom of the cabinet before setting the furnace on the raised platform or return air duct.

PRODUCT DESIGN

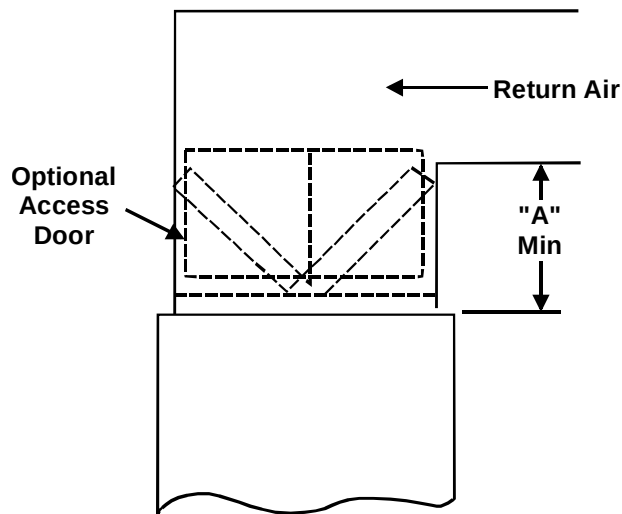
A closed return duct system must be used, with the return duct connected to the furnace. Supply and return connections to the furnace may be made with flexible joints to reduce noise transmission, if desired. If a central return is used, a connecting duct must be installed between the unit and the utility room wall so the blower will not interfere with combustion air or draft. The room, closet, or alcove must not be used as a return air chamber.

When the furnace is used in connection with a cooling unit, the furnace should be installed in parallel with or on the upstream side of the cooling unit to avoid condensation in the heating element. With a parallel flow arrangement, the dampers or other means used to control the flow of air must be adequate to prevent chilled air from entering the furnace and, if manually operated, must be equipped with means to prevent operation of either unit unless the damper is in the full heat or cool position.

When the furnace is heating, the temperature of the return air entering the furnace must be between 55°F and 100°F.

COUNTERFLOW INSTALLATIONS

A filter rack is shipped with the furnace for counterflow installation. If this filter rack is used, the side of the plenum must be at least as tall as dimension "A" shown below.



Counterflow Filter Rack

COUNTERFLOW FILTER SIZE CHART				
Minimum Recommended Filter Sizes				
Furnace Model	Dimension "A"		Qty. - Nominal Size Inches (Square Inch Surface Area)	
	Disposable	Permanent	Disposable	Permanent
GCI_045_30	15 1/2	8	2 - 16 x 20 x 1	2 - 10 x 20 x 1
GCI_070_30	15 1/2	8	2 - 16 x 20 x 1	2 - 10 x 20 x 1
GCI_070_35/40	19 3/4	8	2 - 20 x 20 x 1	2 - 10 x 20 x 1
GCI_090_30	14 1/4	13	2 - 16 x 20 x 1	2 - 15 x 20 x 1
GCI_090_50	24 1/4	13	2 - 25 x 20 x 1	2 - 15 x 20 x 1
GCI_115_40	17 3/4	11	2 - 20 x 20 x 1	2 - 15 x 20 x 1
GCI_115_50	23 1/2	11	2 - 25 x 20 x 1	2 - 15 x 20 x 1
GCI_140_50	23 1/2	11	2 - 25 x 20 x 1	2 - 15 x 20 x 1

All filter sizes are based on high speed operation.

HORIZONTAL INSTALLATIONS

Filter(s) must be installed external to the furnace casing for horizontal installations. For most installations it is preferable to use a central return with filters installed in the duct behind the return air grill. In this way filter replacement is relatively simple by merely removing the grille, rather than going into the attic or crawl space.

Refer to the Upflow/Horizontal Filter Size chart on Recommended Minimum Filter Sizes.

NOTE: The HFC Filter cabinets (used with Amana GSI furnaces) will not match the bottom opening of a GUIA furnace.

ADDITIONAL FILTERING ACCESSORIES

External Filter Rack Kit (EFR)

The external filter rack kit is intended to provide a location external to the furnace casing, for installation of a permanent filter on upflow model furnaces. The rack is designed to mount over the indoor blower compartment area of either side panel, and provide filter retention as well as a location for attaching return air ductwork.

Electronic Air Cleaner (EAC) or Media Air Cleaner (MAC)

The electronic air cleaner and media air cleaner are multi-positional high efficiency air filtration devices that can be installed in any position, except with the access door facing down. The best location for the air cleaner is in the return air duct next to the blower compartment. Before installing the air cleaner, consider the application. The electronic air cleaner must be readily accessible for periodic inspection and cleaning of the pre-filters and electronic cells while the media air cleaner must be readily accessible for periodic inspection and replacement of the media cartridge (MAF), to maintain maximum efficiency and trouble-free operation.

Accommodator (ACG1625 or ACG2025) (Filter Cabinet)

The Accommodator is a filter cabinet that provides a location external to the furnace casing for installation of a filter on upflow model furnaces using bottom return. The Accommodator gives the homeowner the option of using many choices of filter types and sizes. The filter sizes that may be used are 1", 2" and 4".

Horizontal Filter Housing (HR20or 25 & HRB20 or25)

The Horizontal Filter Housing provides a location external to the furnace casing for installation of a filter(s) on upflow model furnaces using side air return(s). The Horizontal Filter Housing gives the homeowner the option of using many choices of filter types and sizes. The filter sizes that may be used are 1", 2" or 4".

Note: For complete details on each of the additional filtering accessories, refer to the instructions provided with each accessory.

SYSTEM OPERATION

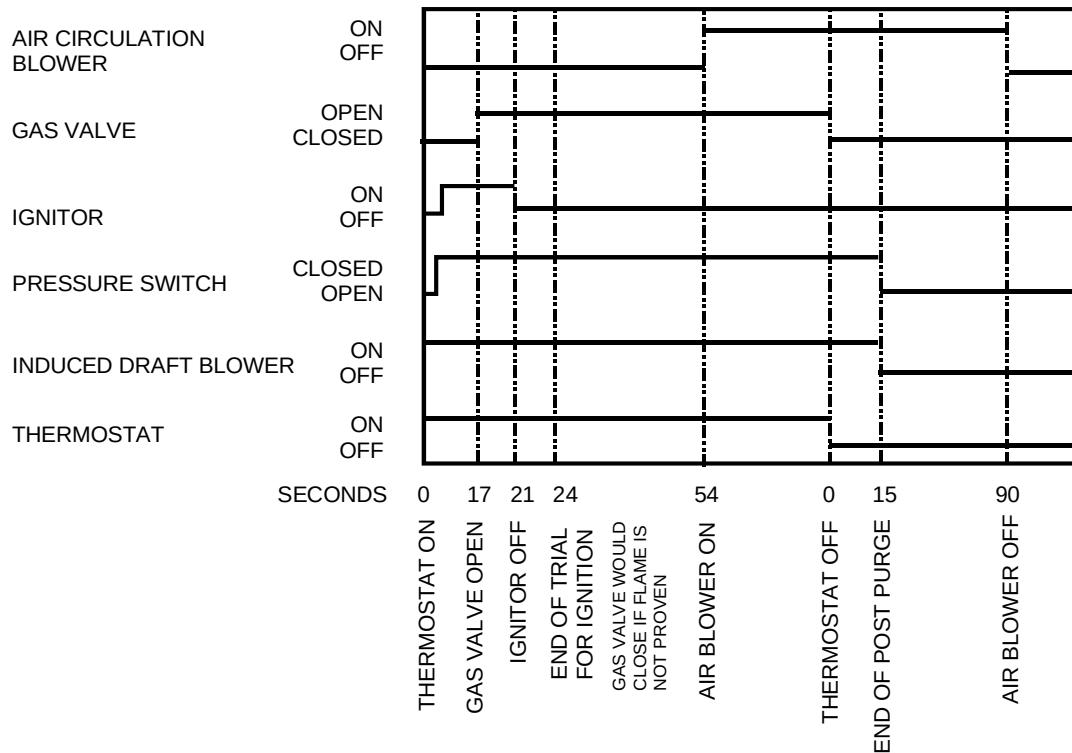
SEQUENCE OF OPERATION

(Models with White-Rodgers 50A50 or Heatcraft HSI 1-1A, HSI-2 Integrated Ignition Control)

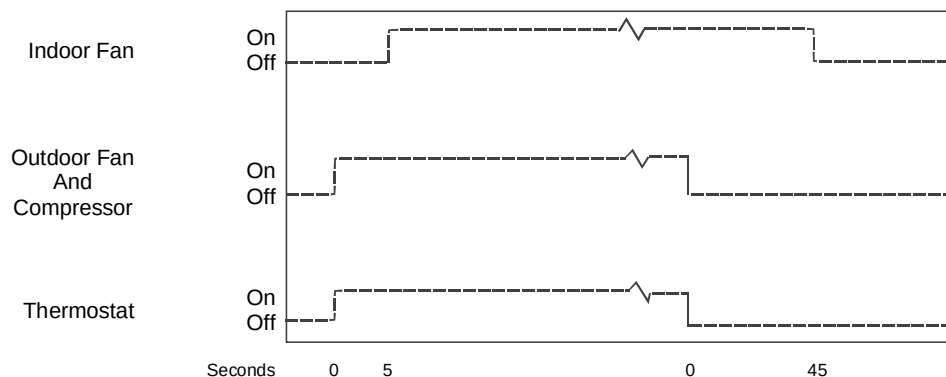
NORMAL SEQUENCE OF OPERATION

1. Thermostat calls for heat.
2. The induced draft blower is energized, and the pressure switch contacts close.
3. The ignitor is energized and is allowed to preheat for 17 seconds.
4. The gas valve is energized, delivering gas to the burners and starting combustion.
5. The control checks for a signal from the flame sensor within seven seconds after the gas valve is energized. Gas will continue to flow only if a signal is present.
6. The control waits 30 seconds and turns on the air circulation blower to the speed that was selected for heating operation. At this time the optional humidifier and electronic air cleaner are also energized.
7. The thermostat is satisfied and opens.
8. The control de-energizes the gas valve.
9. After a 15 second delay, the induced draft blower and optional humidifier are de-energized.
10. The air circulation blower has an adjustable delay-off timing of 60, 90, 120 or 180 seconds (starting from the time the gas valve closes). This allows more heat from the furnace to be transferred to the conditioned space. After this time has elapsed, the blower will be de-energized.

HEATING TIMING CHART FOR WHITE-RODGERS 50A50 AND HEATCRAFT HSI 1-1A OR HSI-2 INTEGRATED IGNITION CONTROL OPERATION



COOLING TIMING CHART FOR WHITE-RODGERS 50A50 AND HEATCRAFT HSI 1-1A OR HSI-2 INTEGRATED IGNITION CONTROL OPERATION



SYSTEM OPERATION

ABNORMAL OPERATION

(Models with White-Rodgers 50A50 or Heatcraft HSI 1-1A Integrated Ignition Control)

The following presents the probable causes of questionable furnace operation and how to fix them. Look through the observation window in the blower access door and make a note of the number of flashes in sequence between pauses. Next, refer to the *DIAGNOSTIC SIGNAL CHART* for an interpretation of the signals and to this section for a description.

1. **Internal Control Failure with Integrated Ignition Control.** If the control determines it has an internal fault, it enters a locked-out state, and the diagnostic light will **light continuously with no flashes**. The control should be replaced.
2. **System Lockout.** If a flame is not sensed during the first seven (7) seconds after the gas valve is energized, the control turns off the gas. There will then be a 60 second delay while the induced draft blower is energized to purge the heat exchanger. The ignitor will next be energized and preheated for 27 seconds. The gas valve will then be energized. If flame is not sensed in seven (7) seconds the gas valve will be de-energized and another purge will occur. The control will cycle the gas valve a total of three (3) times before it determines it cannot establish measurable combustion and enters a locked out state. If flame is sensed but lost after ten (10) seconds, the control will recycle this series of three tries four (4) more times before locking out. The diagnostic light code for this problem is **one short flash** followed by a longer pause. The control can be reset and brought out of lockout mode by turning the thermostat off and then back on. It can also be reset by turning off the electrical disconnect switch to the furnace for 30 seconds.

Note: The control board will automatically reset one hour after lockout occurs. If the furnace frequently has to be reset, it means that a problem exists that should be corrected.

3. **Pressure Switch Stuck Closed.** If the control senses the pressure switch is closed when the induced draft blower is off, it waits until the fault is corrected. The diagnostic light code for this problem is **two short flashes** followed by a longer pause. The probable cause is either a faulty pressure switch or wiring.
4. **Pressure Switch Stuck Open.** If, after the induced draft blower is energized, the pressure switch does not close, the control will keep the blower and wait for the switch to close. The diagnostic light code for this problem is **three short flashes** followed by a pause. The probable cause is either disconnected hose to the pressure switch, faulty pressure switch or wiring, or restricted air intake or flue piping.
5. **Open Limit Control.** If the limit control opens, the air circulation and induced draft blower will be turned on until the limit closes. The diagnostic light code for this problem is **four short flashes** followed by a pause. The probable cause is either low conditioned air flow due to dirty filter or resistance in duct work, faulty limit, faulty blower, or blower speed set to low.
6. **Open Rollout Control.** If the rollout control opens, the air circulation blower and vent blower will be energized all the time. The diagnostic light code for this problem is **five flashes** followed by a pause. The probable cause is either restricted flue piping or improper air requirements.
7. **Flame Sensed with No Call for Heat.** If the control senses a flame when the gas valve is de-energized, it will run the air circulation blower and the induced draft blower continuously. The diagnostic light code for this problem is **continuous light flashing**. The probable cause is either a short to ground in flame sense circuit or miswiring.

50A50 or HSI 1-1A INTEGRATED IGNITION CONTROL DIAGNOSTIC SIGNAL CHART	
LIGHT SIGNAL	FOR CORRECTIVE ACTION REFER TO ABNORMAL OPERATION NUMBER
Continuous Light	1. Internal Control Failure
1 Flash	2. System Lockout
2 Flashes	3. Pressure Switch Stuck Closed
3 Flashes	4. Pressure Switch Stuck Open
4 Flashes	5. Open Limit Control
5 Flashes	6. Open Rollout Control
Continuous Flashing	7. Flame Sensed No Call For Heat

HSI-2 INTEGRATED IGNITION CONTROL DIAGNOSTIC SIGNAL CHART	
LIGHT SIGNAL	FOR CORRECTIVE ACTION REFER TO ABNORMAL OPERATION NUMBER
Continuous Light	1. Internal Control Failure
1 Flash	2. System Lockout (Retries/Recycles Exceeded)
2 Flashes	3. Pressure Switch Stuck Closed
3 Flashes	4. Pressure Switch Stuck Open
4 Flashes	5. Open Primary or Auxiliary Limit
5 Flashes	6. Open Rollout Limit
6 Flashes	7. 115V AC Power Reversed or Poor Unit Ground
8 Flashes	8. Pressure Switch Open 5 Times During Heat Cycle
9 Flashes	9. Primary Limit Open 5 Times During Heat Cycle
Continuous Flashing	10. Unanticipated Flame Present

SYSTEM OPERATION

ABNORMAL OPERATION

(Models with Heatcraft HSI-2 Integrated Ignition Control)

The following presents the probable causes of questionable furnace operation and how to fix them. Look through the observation window in the blower access door and make a note of the number of flashes in sequence between pauses. Next, refer to the *DIAGNOSTIC SIGNAL CHART* for an interpretation of the signals and to this section for a description.

1. **Internal Control Failure with Integrated Ignition Control.** If the control determines it has an internal fault, it enters a locked-out state, and the diagnostic light will **light continuously with no flashes**. The control should be replaced.
2. **System Lockout.** If a flame is not sensed during the first seven (7) seconds after the gas valve is energized, the control turns off the gas. There will then be a 60 second delay while the induced draft blower is energized to purge the heat exchanger. The ignitor will next be energized and preheated for 27 seconds. The gas valve will then be energized. If flame is not sensed in seven (7) seconds the gas valve will be de-energized and another purge will occur. The control will cycle the gas valve a total of three (3) times before it determines it cannot establish measurable combustion and enters a locked out state. If flame is sensed but lost after ten (10) seconds, the control will recycle this series of three tries four (4) more times before locking out. The diagnostic light code for this problem is **one short flash** followed by a longer pause. The control can be reset and brought out of lockout mode by turning the thermostat off and then back on. It can also be reset by turning off the electrical disconnect switch to the furnace for 30 seconds.

Note: The control board will automatically reset one hour after lockout occurs. If the furnace frequently has to be reset, it means that a problem exists that should be corrected. Refer to *TROUBLESHOOTING - DIAGNOSTIC CHART* on the following pages for aid in determining the cause.

3. **Pressure Switch Stuck Closed.** If the control senses the pressure switch is closed when the induced draft blower is off, it waits until the fault is corrected. The diagnostic light code for this problem is **two short flashes** followed by a longer pause. The probable cause is either a faulty pressure switch or wiring.
4. **Pressure Switch Stuck Open.** If, after the induced draft blower is energized, the pressure switch does not close, the control will keep the induced draft blower on and wait for the switch to close. The diagnostic light code for this problem is **three short flashes** followed by a pause. The probable causes are either disconnected hose to the pressure switch, faulty pressure switch or wiring, or restricted air intake or flue piping.

5. **Open Primary or Auxiliary Limit.** If the limit control opens, the air circulation and induced draft blower will be turned on until the limit closes. The diagnostic light code for this problem is **four short flashes** followed by a pause. The probable cause is either low conditioned air flow due to dirty filter or resistance in duct work, faulty limit, faulty blower, or blower speed set to low.
6. **Open Rollout Limit.** If the rollout control opens, the air circulation blower and induced draft blower will be energized all the time. The diagnostic light code for this problem is **five flashes** followed by a pause. The probable cause is either restricted flue piping or improper air requirements.
7. **Reversed Polarity.** If the 115V or 24V AC power leads are reversed, the furnace will fail to operate. The diagnostic light code for this problem is **six flashes** followed by a pause. The probable cause is either the 115V AC power to furnace or integrated control module is reversed, the 24V AC orange and gray wires to transformer are reversed, or poor unit ground.
8. **Pressure Switch Opened Five Times During A Single Call for Heat.** If the furnace fails to operate due to pressure switch opening five times during a single call for heat. The diagnostic light code for this problem is **eight flashes** followed by a pause. The probable cause is either the pressure switch hose is blocked, pinched, or misconnected, blocked flue or drain system, weak induced draft blower, incorrect pressure switch set point or faulty pressure switch, or loose or misconnected wiring.

Note: There is a twenty minute lockout if the pressure switch has tripped five times during a single call for heat.

9. **Primary or Auxiliary Limit Opened Five Times During a Single Call for Heat.** If the furnace fails to operate due to primary or auxiliary limit opening five times during a single call for heat, the control will run the air circulation blower continuously with no further furnace operation. The diagnostic light code for this problem is **nine flashes** followed by a pause. The probable cause is either low conditioned air flow due to dirty filter(s) or resistance in duct work, faulty limit, faulty blower, or blower speed set to low.

Note: There is a one hour lockout if either the primary or auxiliary limit has tripped five times during a single call for heat.

10. **Flame Sensed with No Call for Heat.** If the control senses a flame when the gas valve is de-energized, it will run the air circulation blower and the induced draft blower continuously with no further furnace operation. The diagnostic flash code for this is a **continuous flash**. The probable cause is either a short to ground in flame sense circuit or miswiring.

TROUBLESHOOTING CHART FOR MODELS USING HEATCRAFT HSI-2 IGNITION CONTROL

Symptoms of Abnormal Operation	Associated LED Code (See Note 2)	Fault Description(s)	Possible Causes	Corrective Action	Cautions and Notes
- Furnace fails to operate. and - Integrated control module diagnostic LED provides no signal.	None	- No 115 V power to furnace, or no 24 V power to integrated control module. - Blown fuse, or circuit breaker. - No signal from thermostat.	- Manual disconnect switch OFF, door switch open, or 24 V wires miswired, loose or misconnected wires. - Blown fuse, or circuit breaker. - Improper thermostat connection or setting.	- Assure 115 V and 24 V power to furnace and integrated control module. - Check integrated control module fuse (3 A). Replace if necessary. - Check for possible shorts in 115 V and 24 V circuits. Repair as necessary.	- Turn power OFF prior to repair. - Replace integrated control module fuse with 3 A automotive style fuse.
- Furnace fails to operate. and - Integrated control module diagnostic LED is lit continuously.	 Continuous On	- Integrated control module has an internal fault.	- Integrated control module has an internal fault.	- Replace bad integrated control module with known good control module.	- Turn power OFF prior to repair. - Read precautions in "Electrostatic Discharge" section of manual.
- Furnace is not operating and - Integrated control module diagnostic LED is flashing one flash.	 1 Flash	- Furnace lockout due to an excessive number of ignition "retries" (3 total attempts), or "recycles" (5 total recycles). See note 1.	- Failure to establish flame. Cause may be no gas to burners, front cover pressure switch stuck open, bad igniter or igniter alignment, improper orifices, or coated/oxidized or misconnected flame sensor. - Loss of flame after establishment. Cause may be interrupted gas supply, lazy burner flames (improper gas pressure or restriction in flue and/or combustion air piping), front cover pressure switch opening, or improper induced draft blower performance.	- Locate and correct gas interruption. - Check front cover pressure switch operation (hose, wiring, contact operation). Correct if necessary. - Replace or realign igniter. - Check flame sense signal. Sand sensor if coated/oxidized. - Check flue piping for blockage, proper length, elbows, and termination. - Verify proper induced draft blower performance.	- Turn power OFF prior to repair. - Ignitor is fragile, handle with care. - Sand flame sensor with emery cloth - See "Flue and Combustion Air Pipe" section for piping details.
- Furnace fails to operate. and - Integrated control module diagnostic LED is flashing two flashes.	 2 Flashes	- Pressure switch circuit is closed even though induced draft blower is not operating.	- Induced draft blower pressure switch contacts sticking. - Shorts in pressure switch circuit.	- Replace induced draft blower pressure switch if bad. - Check for and correct shorted wiring.	- Turn power OFF prior to repair. - Replace pressure switch with proper replacement part.
- Induced draft blower runs continuously with no further furnace operation. and - Integrated control module diagnostic LED is flashing three flashes.	 3 Flashes	- Pressure switch circuit does not close in response to induced draft blower operation.	- Pressure switch hose blocked, pinched, or misconnected. - Blocked flue and/or inlet air pipe, blocked drain system, or weak induced draft blower. - Incorrect pressure switch set point or malfunctioning switch contacts. - Loose or misconnected wiring.	- Check and correct pressure switch hose. - Check flue and/or inlet air piping for blockage, proper length, elbows and termination. Check drain system. - Verify proper pressure switch set point and contact motion. - Check and correct wiring.	- Turn power OFF prior to repair. - See "Flue and Combustion Air Pipe" section for piping details. - Replace pressure switch with proper replacement part.
- Circulator blower runs continuously with no further furnace operation. and - Integrated control module diagnostic LED is flashing four flashes.	 4 Flashes	- Primary limit circuit is open. (Primary or auxiliary limit).	- Insufficient conditioned air over the heat exchanger. Cause may be blocked filters, restrictive ductwork, improper circulator blower speed, or failed circulator blower. - Loose or misconnected wiring.	- Check filters and ductwork for blockage. Clean filters or remove obstruction. - Check for proper circulator blower speed and performance. Correct speed or replace blower if necessary. - Check and correct wiring.	- Turn power OFF prior to repair. - See Specification Sheet for allowable rise range and proper circulator blower speed.
- Circulator blower runs continuously with no further furnace operation. and - Integrated control module diagnostic LED is flashing five flashes.	 5 Flashes	- Rollout limit circuit is open.	- Rollout limit(s) is(are) open due to flame rollout. Cause may be misaligned burners, blocked flue and/or air inlet pipe, or failed induced draft blower. - Loose or misconnected wiring.	- Check burners for proper alignment. - Check flue and/or air inlet piping for blockage, proper length, elbows, and termination. - Check induced draft blower for proper performance. Replace if necessary. - Check and correct wiring.	- Turn power OFF prior to repair. - See "Flue and Combustion Air Pipe" section for piping details. - Replace induced draft blower with proper replacement part.
- Furnace fails to operate. and - Integrated control module diagnostic LED is flashing six flashes.	 6 Flashes	- Polarity of 115 V or 24 V AC power is reversed.	- Polarity of 115 V AC power to furnace or integrated control module is reversed. - Orange and gray wires to transformer are reversed. - Poor unit ground.	- Review wiring diagram. - Verify proper grounding. - Check and correct wiring.	- Turn power OFF prior to repair.

Notes:

- 1) Integrated control module will automatically attempt to reset from lock out after one hour.
- 2) LED flash code will cease if power to the control module is interrupted through the disconnect or door switch.
- 3) Integrated control module will automatically attempt to reset from lock out after 20 minutes.

TROUBLESHOOTING CHART FOR MODELS USING HEATCRAFT HSI-2 IGNITION CONTROL

Symptoms of Abnormal Operation	Associated LED Code (See Note 2)	Fault Description(s)	Possible Causes	Corrective Action	Cautions and Notes
- Normal furnace operation. but - Integrated control module diagnostic LED is flashing seven flashes.	 7 Flashes <i>White Rodgers Control Only</i>	- Flame sense micro-amp signal is low.	- Flame sensor is coated/oxidized. - Flame sensor incorrectly positioned in burner flame. - Lazy burner flame due to improper gas pressure, or combustion air.	- Sand flame sensor if coated/oxidized. Inspect for proper sensor alignment. - Check inlet air piping for blockage, proper length, elbows, and termination. - Check for proper gas pressures.	- Turn power OFF prior to repair. - Sand flame sensor with emery cloth. - See "Flue and Combustion Air Pipe" section for piping details. - See rating plate for proper gas pressures.
- Furnace is not operating and - Integrated control module diagnostic LED is flashing eight flashes.	 8 Flashes <i>Heatcraft Control Only</i>	- Pressure switch circuit has opened five times during a single call for heat. See note 3.	- Pressure switch hose blocked, pinched, or misconnected. - Blocked flue and/or inlet air pipe, blocked drain system, or weak induced draft blower. - Incorrect pressure switch set point or malfunctioning switch contacts. - Loose or misconnected wiring.	- Check and correct pressure switch hose. - Check flue and/or inlet air piping for blockage, proper length, elbows and termination. Check drain system. - Verify proper pressure switch set point and contact motion. - Check and correct wiring.	- Turn power OFF prior to repair. - See "Flue and Combustion Air Pipe" section for piping details. - Replace pressure switch with proper replacement part.
- Circulator blower running continuously with no further furnace operation and - Integrated control module diagnostic LED is flashing nine flashes.	 9 Flashes <i>Heatcraft Control Only</i>	- Limit circuit (primary or auxiliary) has opened five times during a single call for heat. See note 1.	- Insufficient conditioned air over the heat exchanger. Cause may be blocked filters, restrictive ductwork, improper circulator blower speed, or failed circulator blower. - Loose or misconnected wiring.	- Check filters and ductwork. For blockage. Clean filters or remove obstruction. - Check for proper circulation blower speed and performance. Correct speed or replace blower if necessary. - Check and correct wiring.	- Turn power OFF prior to repair. - See Specification Sheet for allowable rise range and proper circulator blower speed.
- Induced draft and circulator blower run continuously with no further furnace operation. and - Integrated control module diagnostic LED is flashing continuously.	 Continuous Flashing	- Flame has been sensed with no call for heat.	- Short to ground in flame sense circuit.	- Correct short at flame sensor or in flame sensor wiring.	- Turn power OFF prior to repair.

Notes:

- 1) Integrated control module will automatically attempt to reset from lock out after one hour.
- 2) LED flash code will cease if power to the control module is interrupted through the disconnect or door switch.
- 3) Integrated control module will automatically attempt to reset from lock out after 20 minutes.

SYSTEM OPERATION

SEQUENCE OF OPERATION

(Models with White-Rodgers 50A52 Radiant Sense Ignition Control)

NORMAL SEQUENCE OF OPERATION

1. The thermostat calls for heat, and the induced draft blower is energized.

2. The pressure switch closes.

3. The ignitor is energized. It will heat for at least 17 seconds, and will continue to heat until the radiant sensor determines the ignitor is hot enough (i.e., until a heat signal is produced.)

4. The gas valve is opened. Combustion begins.
5. One second after the gas valve opens, the ignitor is de-energized.

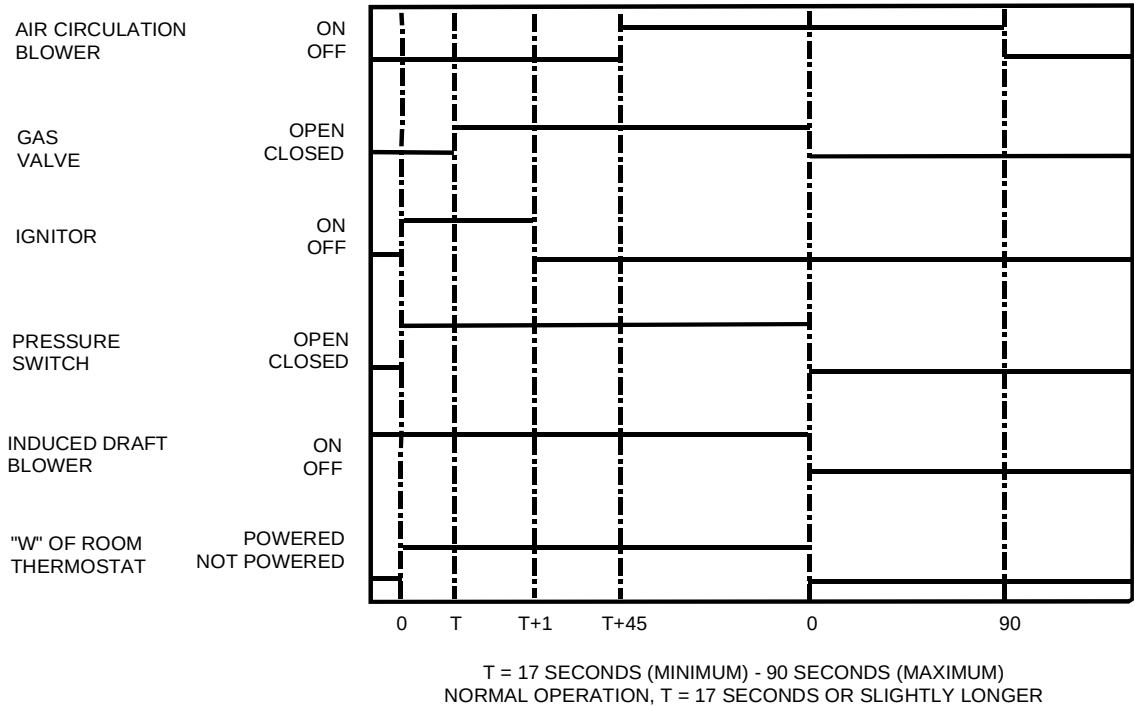
6. The radiant sensor monitors the flame. As long as flame is present and the call for heat continues, the gas valve will remain open. Either a hot ignitor or a flame can produce a heat signal.

7. 45 seconds after the gas valve opens, the control turns on the air circulation blower.

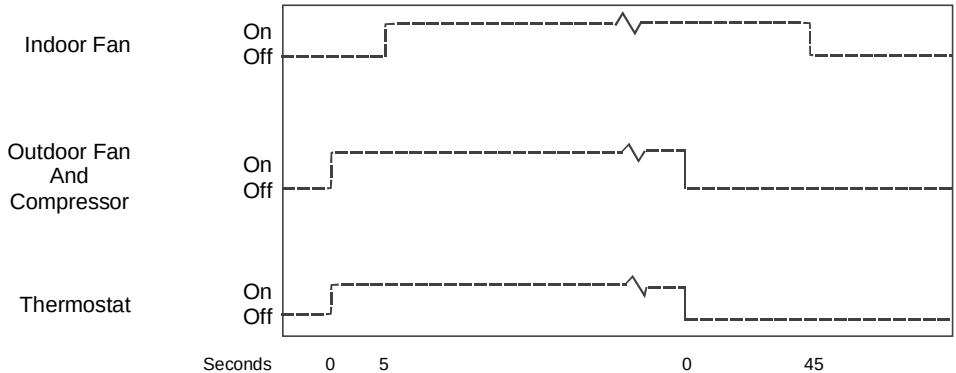
8. Sometime later, the thermostat is satisfied. The call for heat ends. The gas valve closes, and the induced draft blower is de-energized.

9. 90 seconds after the gas valve closes, the control turns off the air circulation blower.

HEATING TIMING CHART FOR WHITE-RODGERS 50A52 (RADIANT SENSE) OPERATION



COOLING TIMING CHART FOR WHITE-RODGERS 50A52 (RADIANT SENSE) OPERATION



SYSTEM OPERATION

ABNORMAL OPERATION

(Models with White-Rodgers 50A52 Radiant Sense Ignition Control)

1. **Internal Control Failure.** The system will lockout
2. **Pressure Switch Stuck Closed.** If the control senses that the pressure switch is closed while the induced draft blower is off, it waits until the switch opens—until then, no heating components are energized. The probable cause is either bad pressure switch or miswiring.
3. **Pressure Switch Stuck Open.** If the induced draft blower is energized and the pressure switch does not close, the control will keep the induced draft blower running until the switch closes—until then, no other heating components will be energized. The probable cause is either disconnected hose to pressure switch, restricted vent system, bad pressure switch or miswiring.
4. **Ignitor failure.** If the ignitor will not produce a heat signal within 90 seconds, the control will hold the gas valve closed and the system will lockout. The probable cause is either cracked ignitor, miswiring, or faulty radiant sensor.
5. **Flame lost within 90 seconds.** If the heat signal is lost (while the call for heat continues) from 0 to 90 seconds after the gas valve opens, the system will retry once. The probable cause is either the gas valve manually closed, air in gas line, incorrect gas pressures, incorrect burner alignment, incorrect burner gap, faulty gas valve, or faulty radiant sensor.

During a retry, the gas valve closes, and the induced draft blower runs for 60 seconds. After the 60 seconds are up, a new ignition sequence begins. The system will only retry once. If the retry does not produce a flame that lasts for at least 90 seconds, the furnace will lockout.
6. **Flame lost later than 90 seconds.** If the heat signal is lost (while the call for heat continues) more than 90 seconds after the gas valve opens, the system will recycle.

During a recycle, the gas valve closes, and a new ignition sequence begins. No matter how many recycles may occur, this alone will not cause the furnace to lockout.
7. **Trip on High Limit or Auxiliary Limit.** If the high limit or auxiliary limit control opens during a heating cycle, the gas valve closes. The induced draft blower runs, and the air circulation blower runs at "Heating" speed. This continues until the limit closes. (Note: Auxiliary limit is manual reset, so it will never close on its own.) When the limit closes, the induced draft blower shuts off immediately, but the air circulation blower continues to run for 90 seconds. After this 90 second cooldown is completed, a normal heating sequence can begin. The probable cause is either low airflow due to dirty filter, dirty coil, or restricted ductwork or blower speed set too low, gas input set too high, faulty limit or faulty blower.

8. **Interruption of Power Supply.** If the line voltage power is interrupted, the gas valve closes. It will remain closed until line voltage power is restored and a low voltage call for heat occurs at the room thermostat. At that time, a new ignition sequence will begin.

9. **Open Rollout Thermostat.** If the rollout thermostat opens during a heating cycle, the gas valve closes. The induced draft blower runs, and the air circulation blower runs at "Heating" speed (same symptoms as trip on high limit). This will continue until the rollout thermostat is manually reset. The probable cause is either incorrect gas pressures, improper burner alignment, faulty orifice(s), or restricted crossover gap(s).

OTHER ITEMS

A. **Lockout** (see previous Numbers 1, 4, 5). The gas valve, ignitor, and induced draft blower are de-energized immediately. (Exception: If a trip on high/auxiliary/rollout limit is combined with a lockout, the induced blower will remain energized until the limit closes.) The air circulation blower runs for 90 seconds, and then shuts off.

To manually end a lockout, interrupt the call for heat for at least 1 second, but not more than 20 seconds.

To automatically end a lockout, wait three hours. The control will automatically reset itself and try again.

B. **Constant Fan.** During normal operation, the air circulation blower will continually run at "Cooling" speed as long as power is present at terminal G. If a call for heat occurs, the blower will continue to run at cooling speed throughout the heating cycle.

If a trip on high/auxiliary/rollout limit occurs, the air circulation blower will run at "Heating" speed. Even if power is present at the G terminal the blower will run at heating speed until the limit closes.

C. **Cooling Operation.** With the thermostat in the COOL; FAN-AUTO position, the air circulation blower will start and stop at the same time as the compressor. No fan time delay will occur.

D. **Fan On/Off Timings** are as described above. They are not adjustable.

IMPORTANT: If the furnace frequently has to be reset, it means that a problem exists that should be corrected.

SYSTEM OPERATION

SEQUENCE OF OPERATION

(GUIS & GCIS Two Stage Models with White-Rodgers 50A51-215 Integrated Ignition Control)

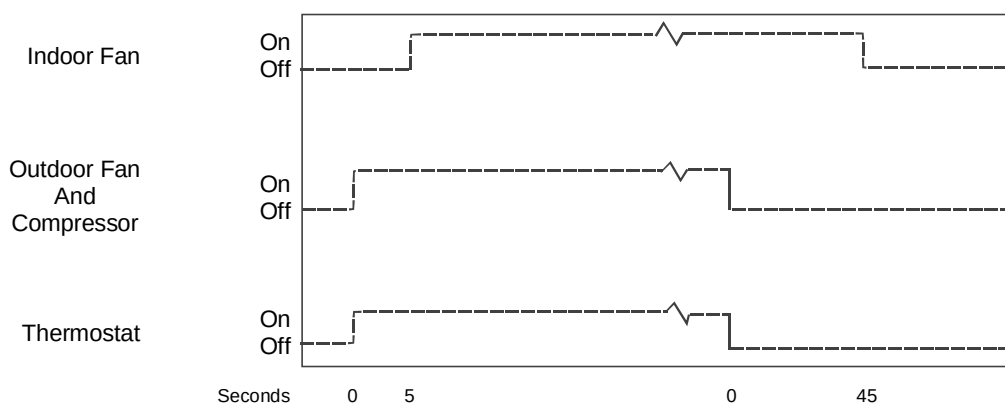
NORMAL SEQUENCE OF OPERATION

1. Thermostat calls for heat (high heat or low heat).
2. The induced draft blower is energized on high speed for a 10 second prepurge.
3. The induced draft blower is energized on low speed.
4. The igniter is energized and is allowed to preheat for 17 seconds.
5. The gas valve is energized delivering gas to the burners at the low stage heat flow rate.
6. The control checks for a signal from the flame sensor within seven seconds after the gas valve is energized (opens). Gas will only continue to flow if a signal is present.
7. The control checks the thermostat to see whether the call for heat is for low stage heat or high stage heat. If the call is for high stage heat, the induced draft blower is switched to high speed and the gas valve is energized on high flow rate.
8. The control waits 30 seconds and turns on the air circulating blower to the appropriate speed (high heat speed for high heat or low heat speed for low heat). On some Amana models, the high heat air circulator speed may be the same as the low heat circulator speed. These models are factory shipped to be within the rise range on both stages with the same air circulator speed.
9. The furnace is now operating on the specified stage called out by the two stage thermostat.
10. If the two stage thermostat changes the call from low heat to high heat, the control will immediately switch the vent blower motor, gas valve, and air circulating speed to their high stage setting.
11. If the two stage thermostat changes the call from high heat to low heat, the control will immediately switch the induced draft blower motor to low speed and switch the flow rate on the gas valve to low. The air circulator motor will remain on high heating speed for thirty seconds before switching to the low heat circulating speed. The 30 second delay feature on the circulator speed eliminates the possibility of tripping the high (primary) limit when the high stage flue products are traveling through the heat exchanger upon a call for low stage heat.
12. The two stage thermostat is satisfied and opens.
13. The control turns the gas valve off.
14. After a five second delay while flue products are purged from the heat exchanger, the induced draft blower motor is turned off (the induced draft blower is on low speed during the first five seconds post purge.)
15. The air circulator blower has an adjustable delay-off timing of 60, 90, 120, or 180 seconds (starting from the time the gas valve closes). The speed(s) run during this period depend on the last heat call seen by the thermostat.

If the last call for heat was a call for low heat, the air circulator motor will run on the low heat speed for the duration of the adjusted delay-off timing (60, 90, 120, or 180 seconds).

If the last call for heat was a call for high heat, the air circulating motor run on the high heating speed for thirty seconds and then switch to the low heating speed for the **balance** of the adjusted delay-off timing (30, 60, 90, or 150 seconds).

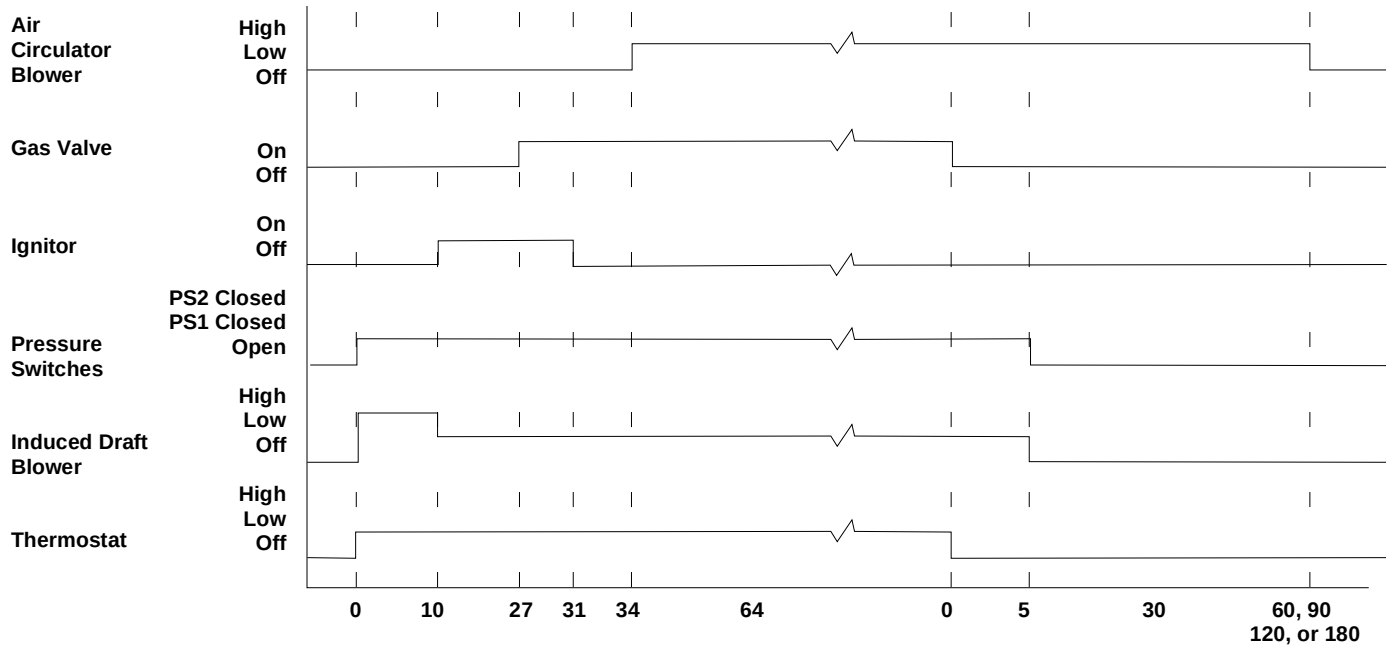
COOLING TIMING CHART FOR WHITE-RODGERS 50A51-215 INTEGRATED IGNITION CONTROL OPERATION



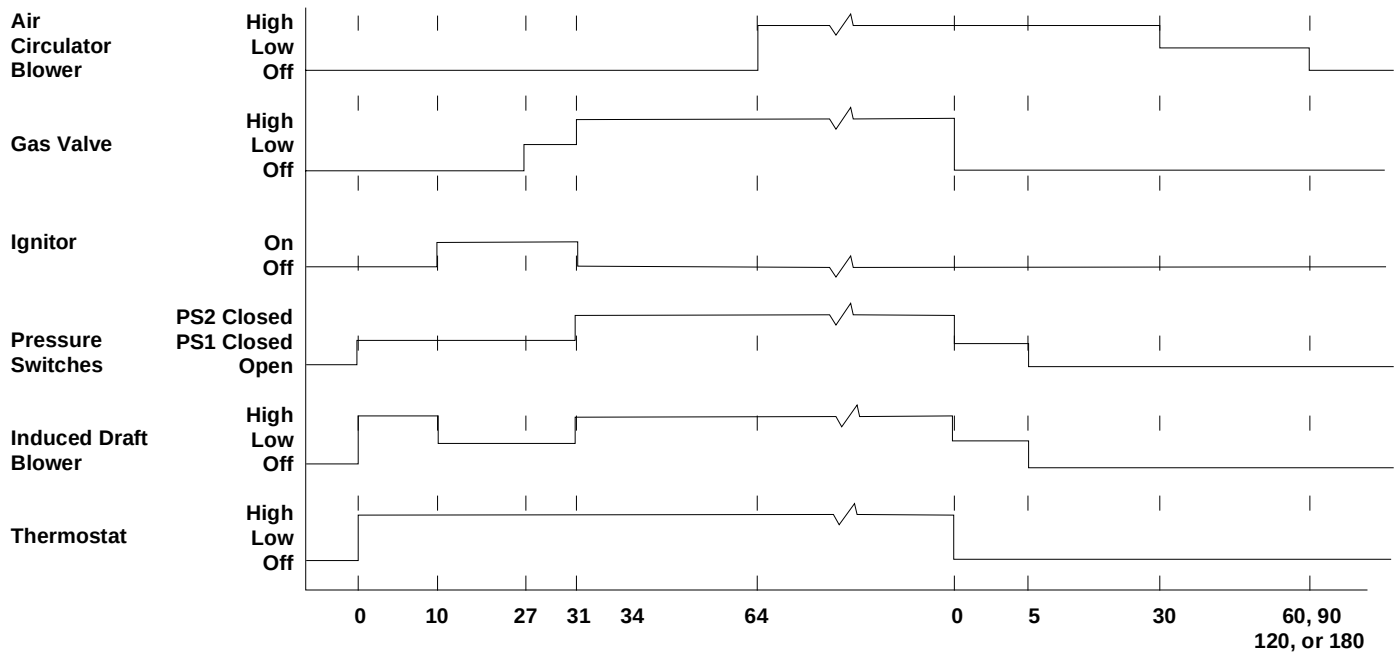
SYSTEM OPERATION

Timing Charts For GUIS/GCIS Two Stage Integrated Ignition Control Operation

GUIS/GCIS Example 1: Continuous Call For Low Stage Heat Only



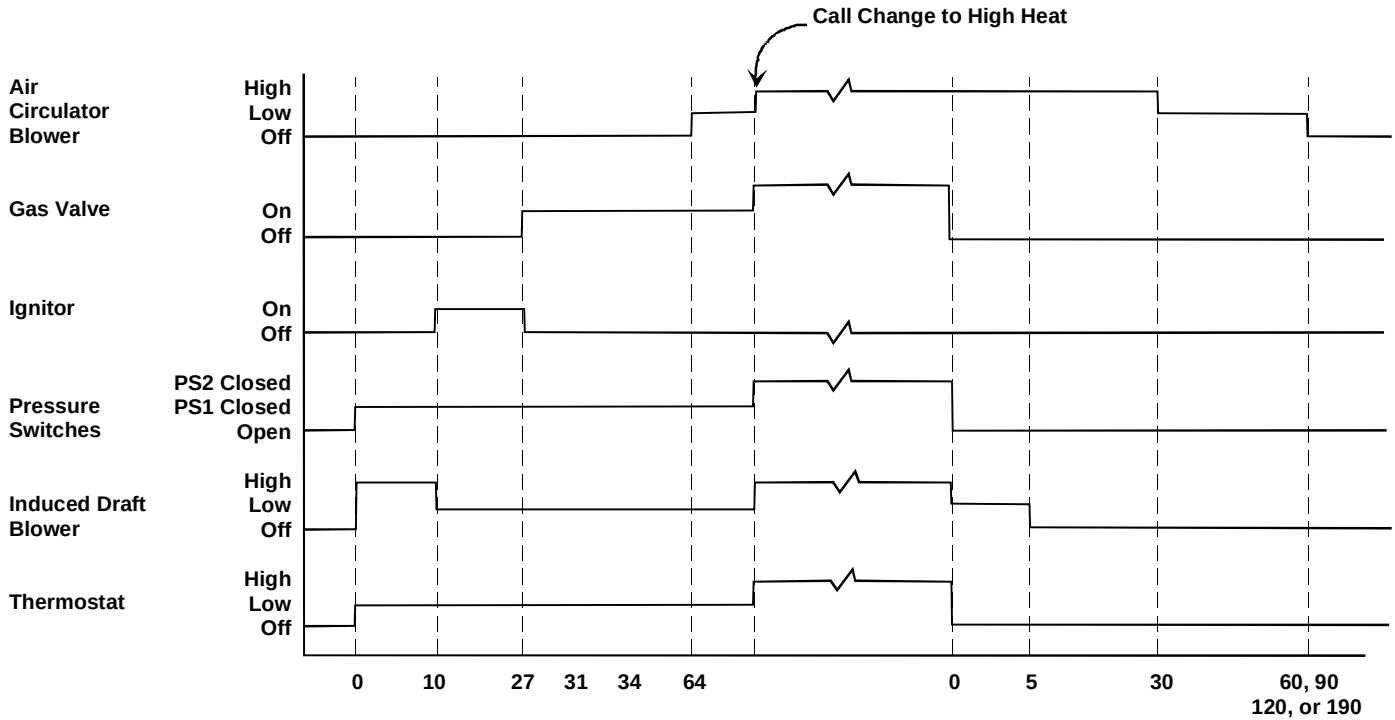
GUIS/GCIS Example 2: Continuous Call For High Stage Heat Only



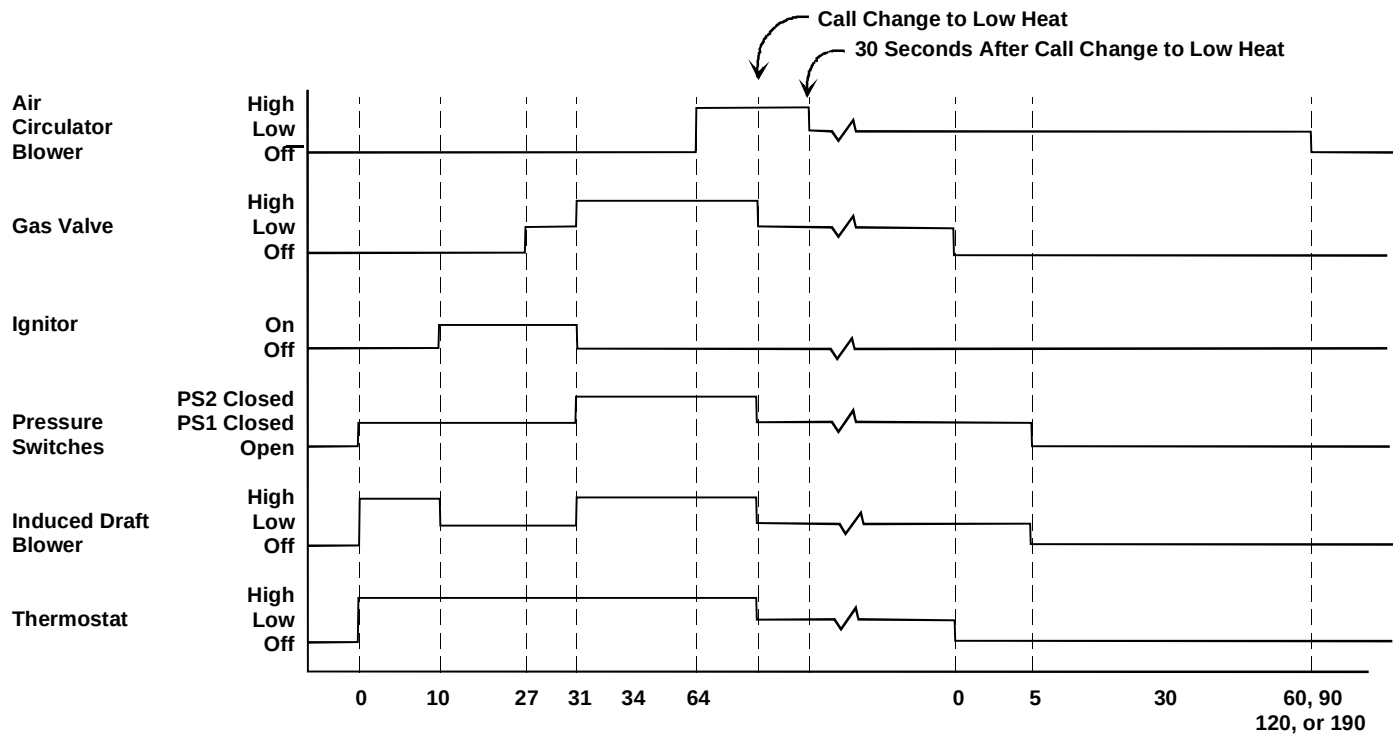
SYSTEM OPERATION

Timing Charts For GUIS/GCIS Two Stage Integrated Ignition Control Operation

GUIS/GCIS Example 3: Initial Call For Low Heat, Change In Call To High Heat



GUIS/GCIS Example 4: Initial Call For High Heat, Subsequent Call To Low Heat



SYSTEM OPERATION

ABNORMAL OPERATION

(GUIS & GCIS Two Stage Models with White-Rodgers 50A51-215 Integrated Ignition Control)

The following presents the probable causes of questionable furnace operation and how to fix them. Look through the observation window in the blower access door and make a note of the number of flashes in sequence between pauses. Next, refer to the *DIAGNOSTIC SIGNAL CHART* for an interpretation of the signals and to this section for a description.

1. **Internal Lockout.** If, during a self test cycle, the control determines an internal fault, the control stops and the diagnostic light will **light continuously**. The control should be replaced.
2. **External Lockout.** If flame was not sensed during the first 7 seconds after the gas valve was energized, the control turns off the gas. There will be a 120 second delay with the induced draft blower motor energized to purge the heat exchanger. The ignitor will then be energized for 27 seconds. The gas valve will be energized on low stage flow rate. If flame is not sensed in 7 seconds the gas valve will be de-energized and another purge will occur. The control will cycle the gas valve a total of *three tries* before it determines it cannot establish measurable combustion and enters a locked out state. If flame is sensed but lost after 10 seconds, the control will recycle this series of *three tries four more times* before locking out. The diagnostic light code for this problem is **one short flash** followed by a longer pause. The control can be reset and brought out of lockout mode by turning the thermostat off and then back on. It can also be reset by turning off the electrical disconnect switch to the furnace for 30 seconds.

Note: The control board will automatically reset two hours after the lockout occurs. If the furnace frequently has to be reset, it means that a problem exists that should be corrected.

3. **Pressure Switch Stuck Closed.** If the control senses that either pressure switch is closed when the induced draft blower is off, it waits until the fault is corrected. The diagnostic light code for this problem is **two short flashes** followed by a longer pause. The probable cause is either a faulty pressure switch or miswiring.

4. **Pressure Switch Stuck Open.** If, after the induced draft blower is energized, the appropriate pressure switch checked does not close, the control will keep the blower on and wait for the switch to close. The diagnostic light code for this problem is **three short flashes** followed by a longer pause. The probable cause is either: restricted air intake, restricted flue piping, disconnected hose to pressure switches, miswiring, or faulty pressure switch.

5. **Open Thermal Protection Device.** If the primary (high) limit, auxiliary limit, or rollout limit control opens, the gas valve is de-energized. Both the induced draft blower motor and air circulating motor are energized on low heat speed. The diagnostic light code for this problem is **four short flashes** followed by a longer pause.

If the primary or auxiliary limit is open, the probable cause is either: low conditioned air flow due to dirty filter or high resistance in duct work, faulty limit, faulty blower, or blower speed set too low. The primary limit will automatically reset, while the auxiliary limit control must be manually reset.

If the rollout limit control is open, the probable cause is insufficient combustion air, restricted flue passage, or restricted heat exchanger. The rollout limit control must be manually reset.

6. **Flame Sensed with No Call for Heat.** If the control senses a flame when the gas valve is de-energized it will run the induced draft blower and air circulator blower continuously on the low heat speed for each. The diagnostic light code for this problem is **continuous flashing**. The probable cause is either a short to ground in flame sense circuit or miswiring.

50A51 INTEGRATED IGNITION CONTROL DIAGNOSTIC SIGNAL CHART	
LIGHT SIGNAL	FOR CORRECTIVE ACTION REFER TO ABNORMAL OPERATION NUMBER
Continuous Light	1. Internal Control Failure
1 Flash	2. System Lockout
2 Flashes	3. Pressure Switch Stuck Closed
3 Flashes	4. Pressure Switch Stuck Open
4 Flashes	5. Thermal Protection Device Open
Continuous Flashing	6. Flame Sensed No Call For Heat Stat Recovery (1/4 Second on, 1/4 Second Off)

SYSTEM OPERATION

SEQUENCE OF OPERATION

(GUIV Variable Speed Two Stage Models with White-Rodgers 50A51-255 Integrated Ignition Control)

NORMAL SEQUENCE OF OPERATION

Normal Heating Sequence

1. Thermostat calls for heat (high heat or low heat).
2. The induced draft blower is energized on high speed for a 10 second prepurge.
3. The induce draft blower is energized on low speed.
4. The ignitor is energized and is allowed to preheat for 17 seconds.
5. The gas valve is energized delivering gas to the burners at the low stage heat flow rate.
6. The control checks for a signal from the flame sensor within seven seconds after the gas valve is energized (opens). Gas will only continue to flow if a signal is present.
7. The control checks the thermostat to see whether the call for heat is for low stage heat or high stage heat. If the call is for high stage heat, the induced blower is switched to high speed and the gas valve is energized on high flow rate.
8. The control waits 30 seconds and turns on the air circulation blower fan to the appropriate speed (high heat speed for high heat or low heat speed for low heat). The circulation blower fan will take 30 seconds to ramp up to full speed.
9. The furnace is now operating on the specified stage called out by the two-stage thermostat.
10. If the two-stage thermostat changes the call from low heat to high heat, the control will immediately switch the induced draft blower motor, gas valve, and air circulating speed to their high stage setting.
11. If the two-stage thermostat changes the call from high heat to low heat, the control will immediately switch the induced draft blower motor to low speed and switch the flow rate on the gas valve to low. The air circulator motor will remain on high heating speed for thirty seconds before switching to the low heat circulating speed. The 30 second delay feature on the circulator speed eliminates the possibility of tripping the high (primary) limit when the high stage flue products are traveling through the heat exchanger upon a call for low stage heat.
12. The two-stage thermostat is satisfied and opens.
13. The control turns the gas valve off.
14. After a five second delay while flue products are purged from the heat exchanger, the induced draft blower motor is turned off (the induced draft blower is on low speed during the first five seconds post purge).
15. The air circulation blower fan has an adjustable delay-off timing of 60, 90, 120, or 180 seconds (starting from the time the gas valve closes). The speeds run during this period depend on the last heat call seen by the thermostat.

If the last call for heat was a call for low heat, the air circulator motor will run on the low heat speed for the duration of the adjusted delay-off timing (60, 90, 120, or 180 seconds).

If the last call for heat was a call for high heat, the air circulating motor run on the high heating speed for thirty seconds and then switch to the low heating speed for the **balance** of the adjusted delay-off timing (30, 60, 90, or 150 seconds).

Example: A GUIV090DX50 has the heating blower off delay set to 120 seconds by the installer. When the thermostat is satisfied after a call for high heat, the air circulation blower fan will run on high speed for 30 seconds and then switch to low circulator speed for $120 - 30 = 90$ seconds.

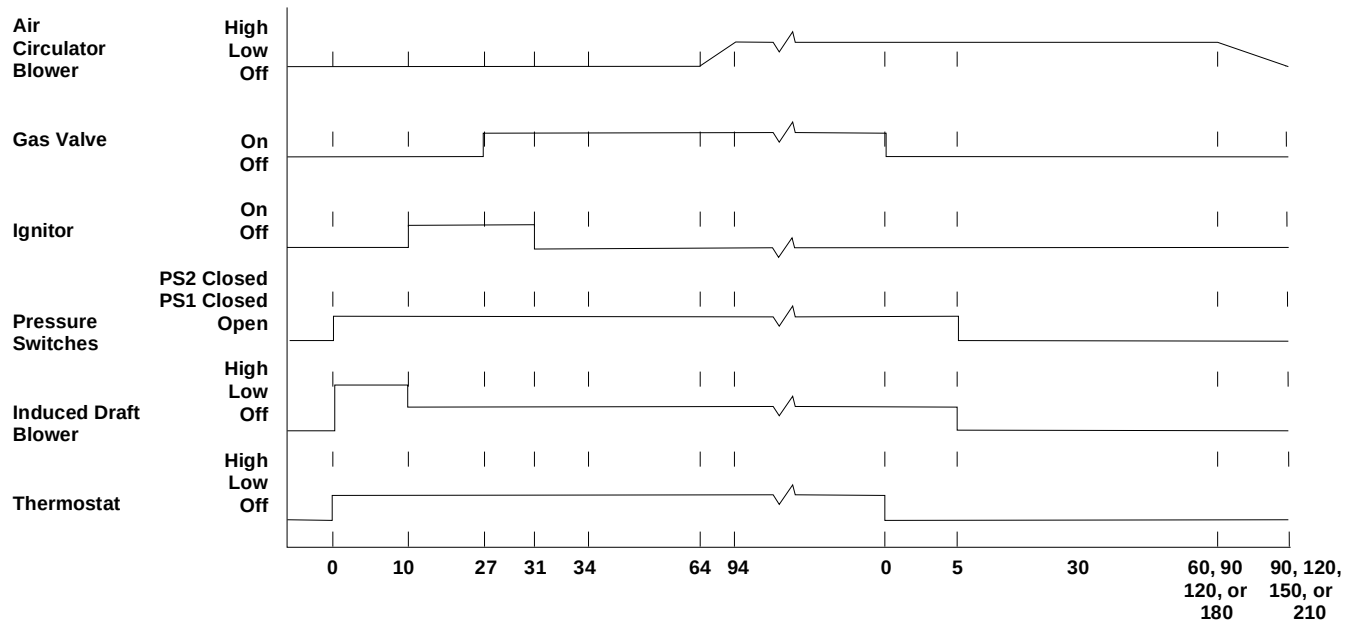
The adjustable delay-off timing allows for more heat transferred to the conditioned space from the furnace. After the delay time has elapsed, the air circulating motor is de-energized. The adjustable delay-off timing feature allows the installer to customize the comfort level based on the pre-dominant staging requirements of the living space.

16. The air circulating blower fan will ramp down for another 30 seconds and shut down.

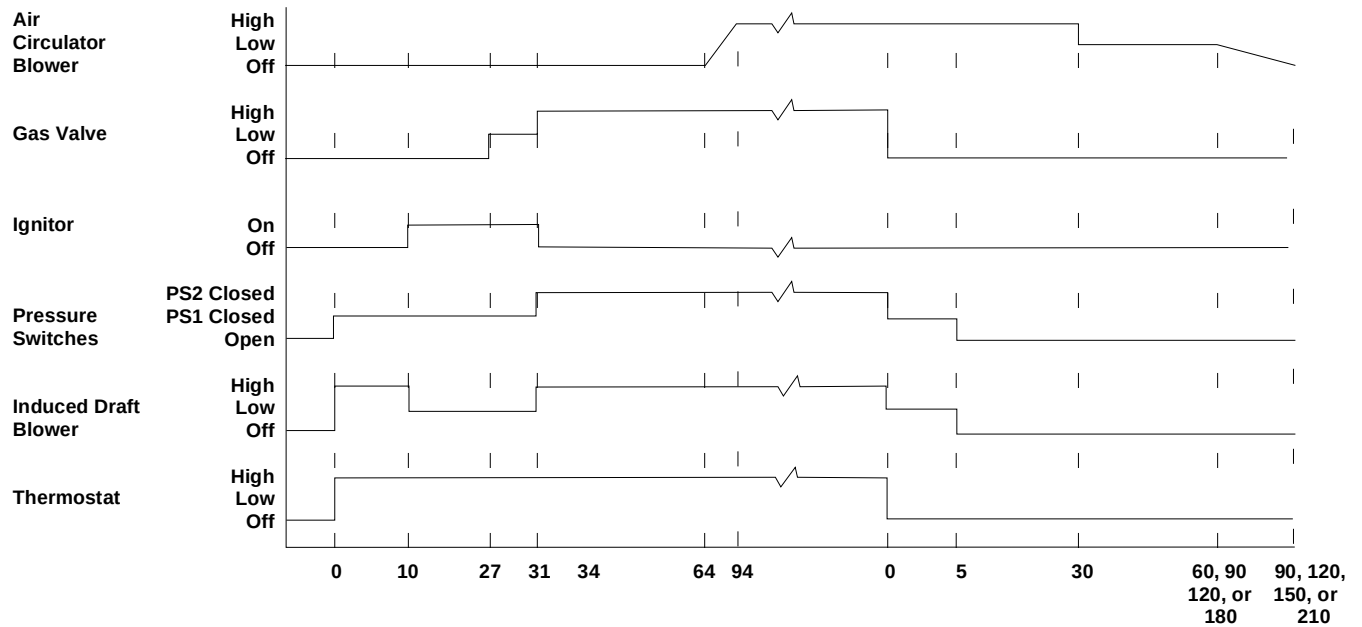
SYSTEM OPERATION

Timing Charts For GUV Variable Speed Two Stage Integrated Ignition Control Operation

GUV Example 1: Continuous Call For Low Stage Heat Only



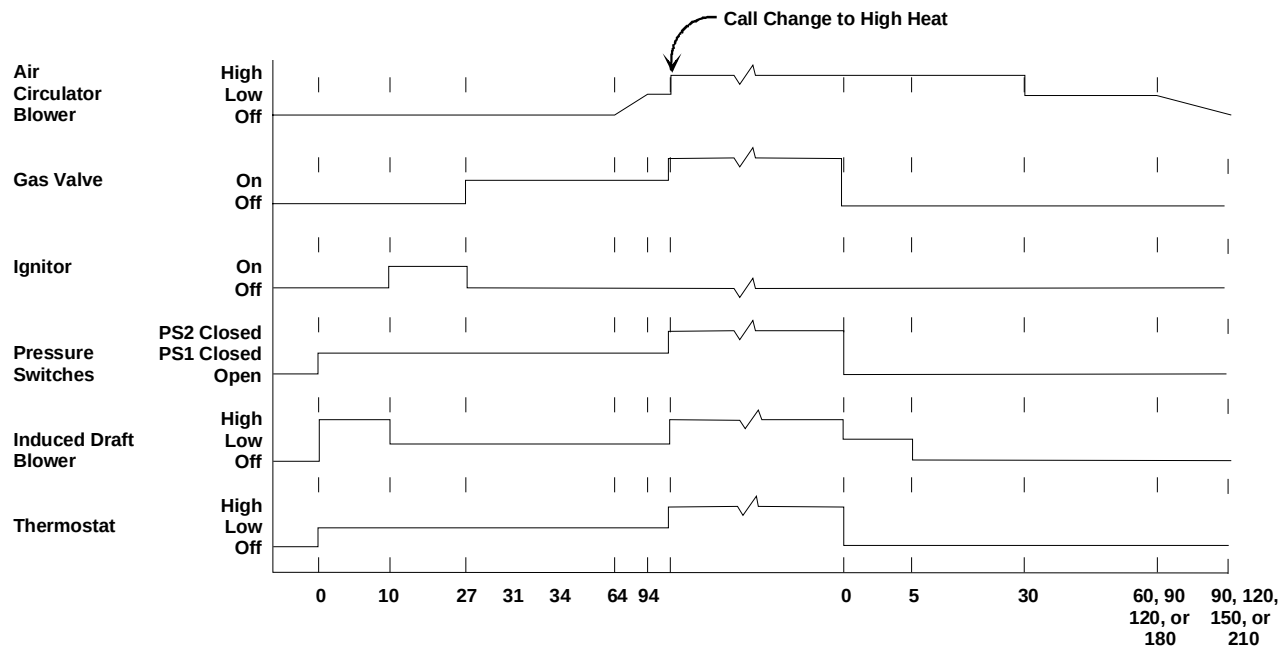
GUV Example 2: Continuous Call For High Stage Heat Only



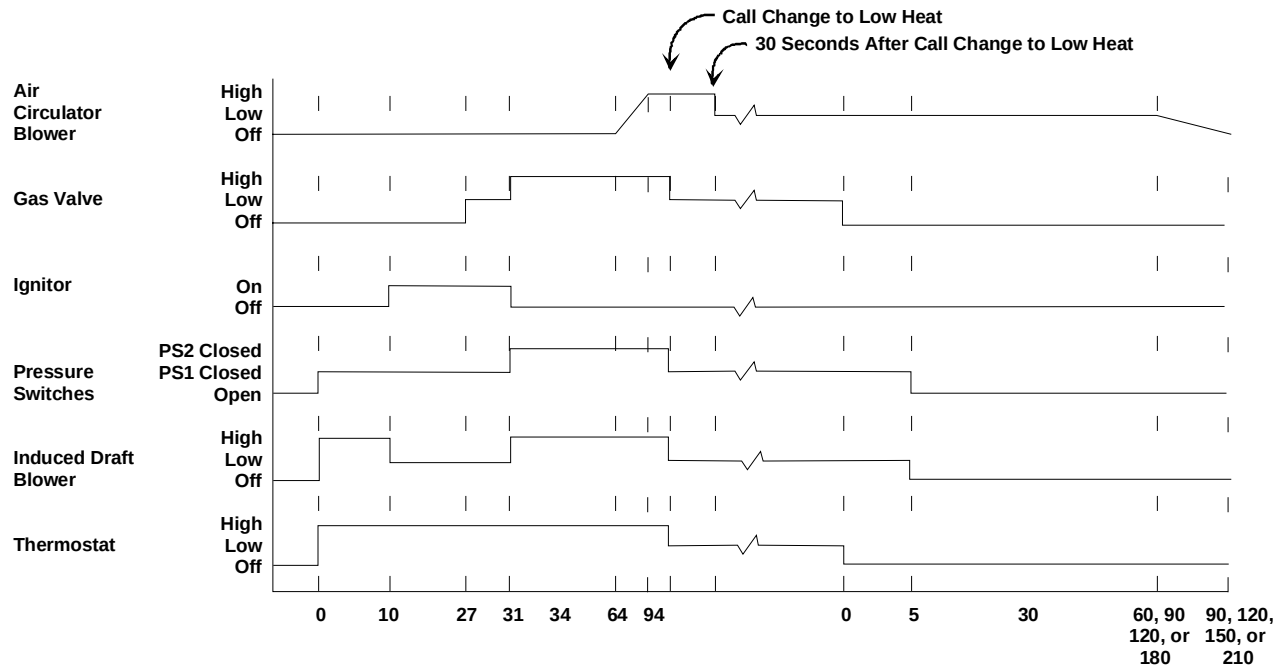
SYSTEM OPERATION

Timing Charts For GUIV Variable Speed Two Stage Integrated Ignition Control Operation

GUIV Example 3: Initial Call For Low Heat, Change In Call To High Heat



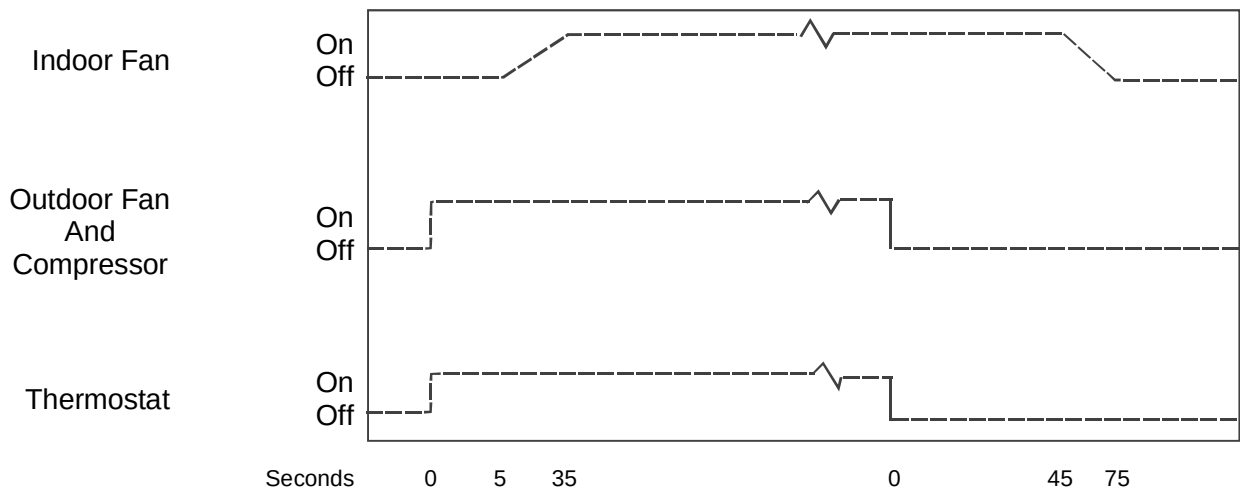
GUIV Example 4: Initial Call For High Heat, Subsequent Call To Low Heat



SYSTEM OPERATION

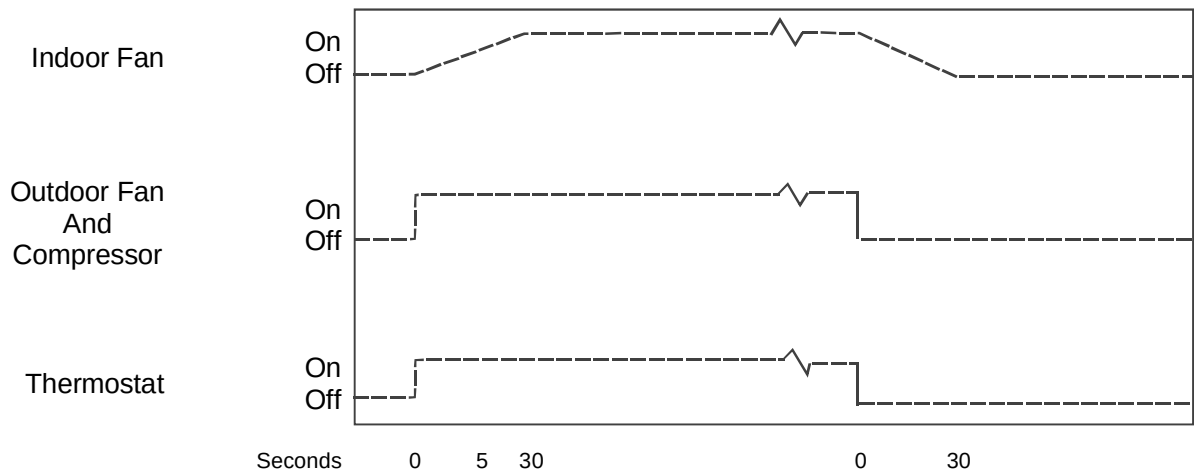
Timing Chart for Normal Cooling Operation

(With “Y” From Thermostat Connected to “Y” On Integrated Furnace Control)



Timing Chart for Normal Cooling Operation

(With “Y” From Thermostat Connected to “Y/Y2” On
Air Circulating Motor Interface Board)



SYSTEM OPERATION

Abnormal Operation

(GUIV Variable Speed Two Stage Models with White-Rodgers 50A51-255 Integrated Ignition Control)

The following presents the probable causes of questionable furnace operation and how to fix them. Look through the observation window in the blower access door and make a note of the number of flashes in sequence between pauses. Next, refer to the *DIAGNOSTIC SIGNAL CHART* for an interpretation of the signals and to this section for a description.

1. Internal Lockout. An internal lockout occurs when the integrated ignition control senses an internal problem and stops the unit.

To solve this problem, replace the ignition control.

2. External Lockout. A external lockout occurs when the integrated ignition control determines that a measurable combustion cannot be established or maintained after three consecutive tries (four, if flame is established then lost) to turn on the furnace.

If a flame is not sensed during the first seven seconds after a gas valve has been energized, the ignition control will internally turn off the gas. After 120 seconds, during which time the induced draft blower purges the heat exchanger, the ignitor will reenergize and preheat for 27 seconds. The gas valve is then reenergized. If a flame is not sensed again in seven seconds, the gas valve will de-energize and another purge is performed. The ignition control will cycle the gas valve *three times* before it determines it cannot establish measurable combustion and enter a lockout state. If a flame is sensed but lost after 10 seconds, the control will cycle *four more times* before locking out. A lockout stops ignition attempts and causes the air blower to run continuously. The diagnostic light code for either problem is **one short flash** followed by a longer pause. The control can be reset and brought out of lockout mode by turning the thermostat off and then back on. It can also reset by turning off the electrical disconnect switch to the furnace for 30 seconds. The control will reset after two hours.

IMPORTANT: If you have to frequently reset your furnace, it means that a problem exists that should be corrected. Contact a qualified servicer for further information.

3. Pressure Switch Stuck Closed. A sticking pressure switch can be caused by either a faulty pressure switch, faulty wiring, a disconnected hose, or a restricted intake or flue piping. In the case of a pressure switch sticking closed, the probable cause is a faulty pressure switch or wiring.

If the ignition control senses that the pressure switch is closed and the induced draft blower is off, it will shut down the unit until the fault is corrected. The light code for this problem is **two short flashes** followed by a longer pause.

4. Pressure Switch Stuck Open. A sticking open pressure switch can be caused by a faulty pressure switch, a disconnected hose to the pressure switch, a restricted air intake or flue piping, or a faulty wiring.

If the ignition control senses that the induced draft blower is energized, but the pressure switch is not closed, the control will keep the blower on and wait for the switch to close. The diagnostic light code for this problem is **three short flashes** followed by a pause.

5. Open Thermal Protection Device. If the primary (high) limit, auxiliary limit, or rollout limit control opens, the gas valve is de-energized. Both the induced draft blower motor and air circulating motor are energized on low heat speed. The diagnostic light code for this problem is **four short flashes** followed by a longer pause.

If the primary or auxiliary limit is open, the probable cause is either: low conditioned air flow due to dirty filter or high resistance in duct work, faulty limit, faulty blower, or blower speed set too low. The primary limit will automatically reset, while the auxiliary limit control must be manually reset.

If the rollout limit control is open, the probable cause is insufficient combustion air, restricted flue passage, or restricted heat exchanger. The rollout limit control must be manually reset.

6. Flame Sensed with No Call for Heat. If the control senses a flame when the gas valve is de-energized it will run the induced draft blower and air circulator blower continuously on the low heat speed for each. The diagnostic light code for this problem is **continuous flashing**. The probable cause is either a short to ground in flame sense circuit or miswiring.

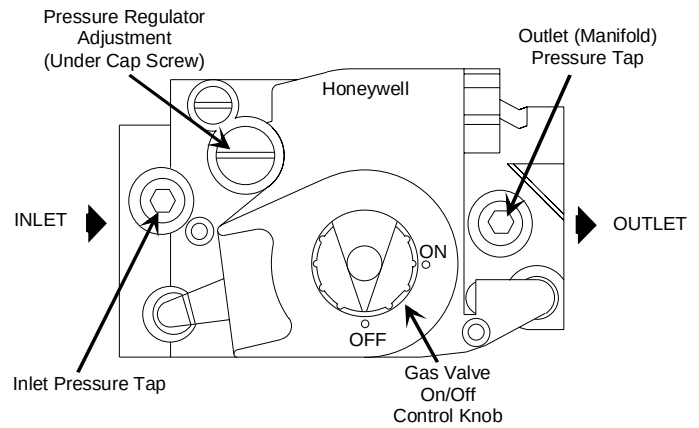
50A51 INTEGRATED IGNITION CONTROL DIAGNOSTIC SIGNAL CHART	
LIGHT SIGNAL	FOR CORRECTIVE ACTION REFER TO ABNORMAL OPERATION NUMBER
Continuous Light	1. Internal Control Failure
1 Flash	2. System Lockout
2 Flashes	3. Pressure Switch Stuck Closed
3 Flashes	4. Pressure Switch Stuck Open
4 Flashes	5. Thermal Protection Device Open
Continuous Flashing	6. Flame Sensed No Call For Heat Stat Recovery (1/4 Second on, 1/4 Second Off)

SYSTEM OPERATION

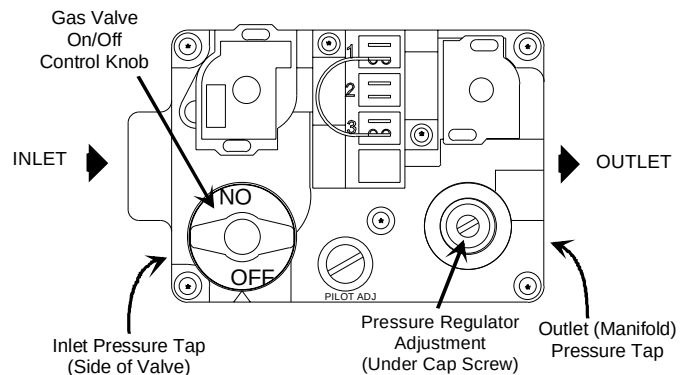
OPERATING INSTRUCTIONS

1. Close the manual gas valve external to the furnace.
2. Turn off the electrical power supply to the furnace.
3. Set room thermostat to lowest possible setting.
4. Remove the door on the front of the furnace.
5. This furnace is equipped with an ignition device which automatically lights the burner. Do not try to light burner by hand.
6. Turn the gas control valve clockwise ↻ to the "Off" position for either the Honeywell VR-8205 gas valve or the White Rodgers 36E35, 36E36 and 36E96 gas valves. The knob should turn easily. Do not use excessive force. For the Robertshaw 7222 gas valve, push in and slide the valve lever on the lefthand side of the valve to the "Off" position and for the White Rodgers 36E22 gas valve slide the switch on top of the valve to the "Off" position. Do not force.
7. Wait five (5) minutes to clear out any gas, then smell for gas, including near the floor.
8. If you smell gas following the five (5) minute waiting period in Step 7, follow the instructions on Pages 8 and 9. If you do not smell gas, then turn the gas control knob counterclockwise ↺ to the "On" position for either the Honeywell VR-8205 gas valve or the White Rodgers 36E35, 36E36 and 36E96 gas valves. The knob should turn easily. Do not use excessive force. For the Robertshaw 7222 gas valve push in and slide the valve lever on the lefthand side of the valve to the "On" position and for the White Rodgers 36E22 gas valve push the selector switch on top of the valve to the "On" position.
9. Replace the door on the front of the furnace.
10. Open the manual gas valve external to the furnace.
11. Turn on the electrical power supply to the furnace.
12. Set the room thermostat to the desired temperature.

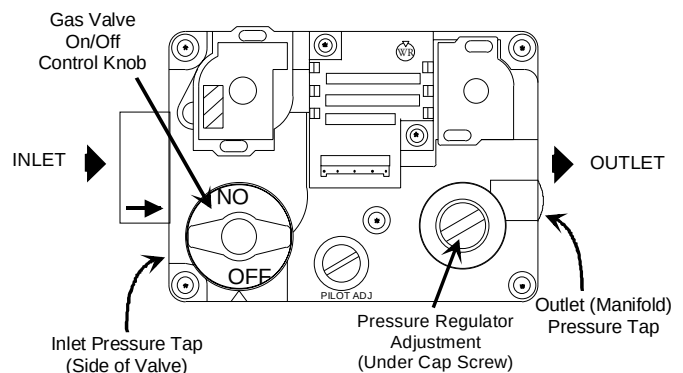
Note: There is approximately 20 second delay between thermostat energizing and burner firing.



**Honeywell Model: VR-8205
GUI(A,C)/GCI(A,C)**

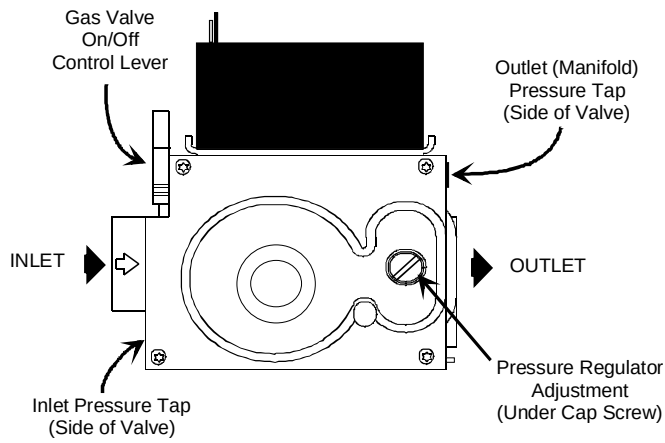


**White-Rodgers Model: 36E36 Type 230
GUI(A,C)/GCI(A,C)**

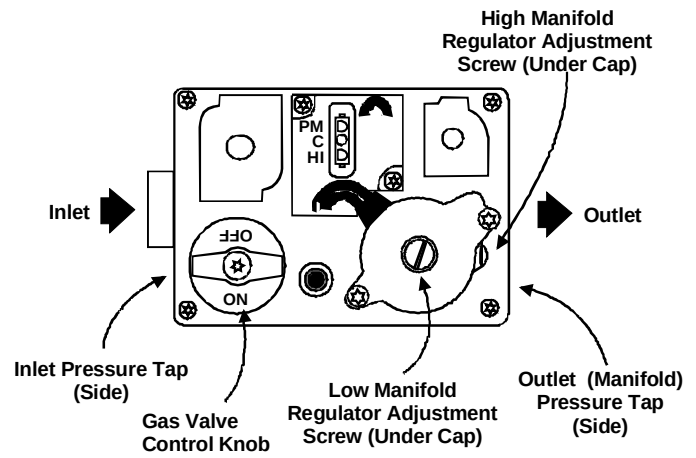


**White-Rodgers Model: 36E35 Type 205
GUIB/GCIB**

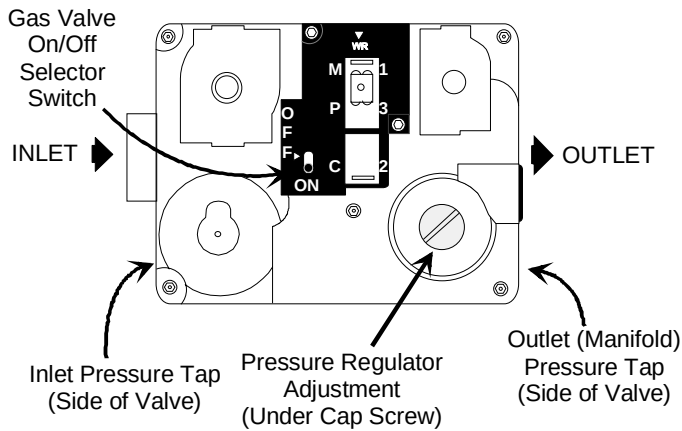
SYSTEM OPERATION



**Robertshaw Model: 7222
GUID**



**White-Rodgers Model: 36E96
GUIIS / GCIS / GUIV**



**White-Rodgers Model: 36E22
GUI(A/C/D) / GCI(A/C)**

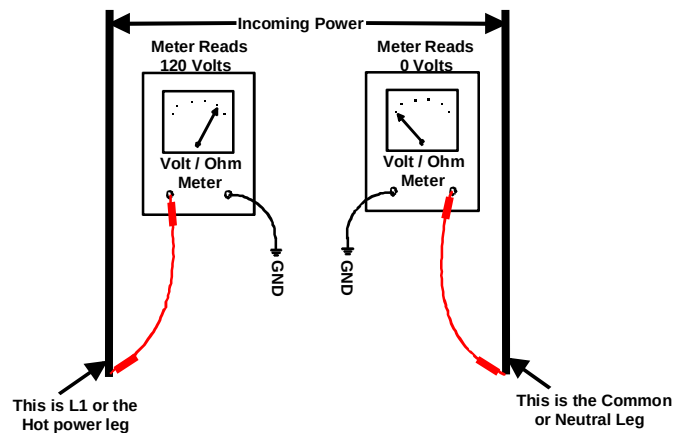
POLARIZATION AND PHASING

As more and more electronic's are introduced to the Heating Trade, Polarization of incoming power and phasing of primary to secondary voltage on transformers becomes more important.

Polarization has been apparent in the Appliance industry since the introduction of the three prong plug, however, the Heating Industry does not use a plug for incoming power, but is hard wired.

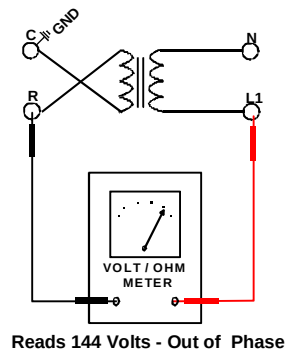
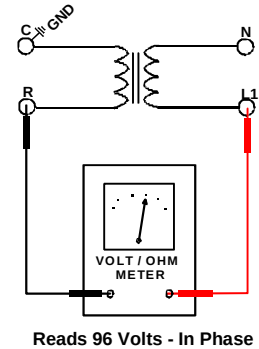
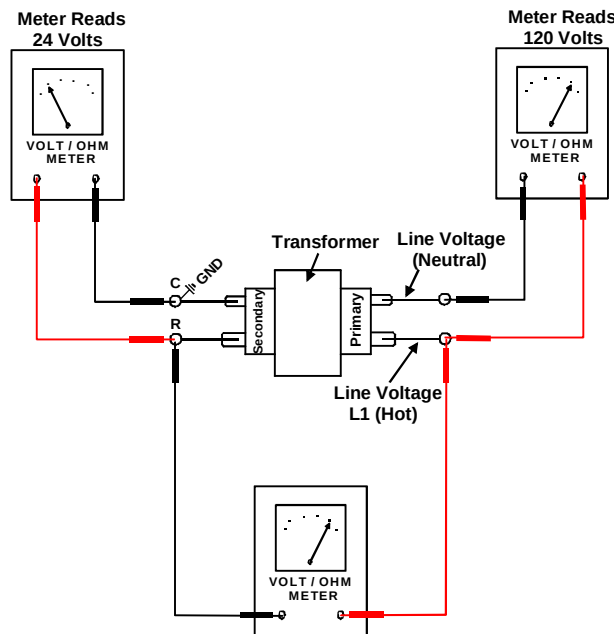
Some of the electronic boards being used today, with flame rectification, will not function properly and/or at all without polarization of incoming power. Some also require phasing between the primary and secondary sides of step-down transformers.

To instill new working habits for our trade, we recommend that these two items be checked during normal installation and/or service calls. See as follows:



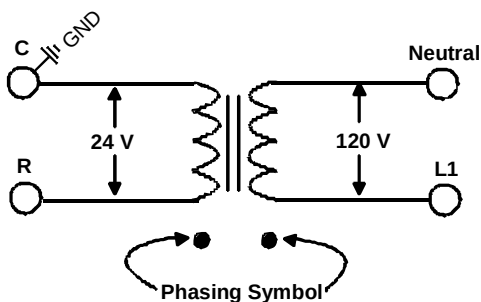
These then should be wired to the furnace accordingly.

CHECKING FOR PHASING - PRIMARY TO SECONDARY OF UNMARKED TRANSFORMERS*



If meter reads approximately 96 volts - the primary to secondary are in phase - if reads approximately 144 volts out of phase - reverse low voltage wires.

***Note:** For flame rectification the common side of the secondary voltage (24 V) is cabinet grounded. If you were to bench test a transformer the primary neutral and secondary common must be connected together for testing purposes.



Some transformers will display phasing symbols as shown in the illustration to the left to assist in determining proper transformer phasing.

Checking for polarization and phasing should become a habit in servicing. Let's start now.

Note: The new Heatcraft HSI-2 integrated ignition control used on the GUID model furnace, has a diagnostic flash code for reversed polarity. The diagnostic light code for this problem is **six short flashes** followed by a pause. (Refer to *TROUBLESHOOTING-DIAGNOSTIC CHART* on pages 50 and 51).

MAINTENANCE



WARNING

To avoid electrical shock, injury or death, disconnect electrical power before performing any maintenance.



CAUTION

If you must handle the ignitor, handle with care. Touching the ignitor body with bare fingers, rough handling, or vibration could result in early ignitor failure. Only a qualified servicer should ever handle the ignitor.

ANNUAL INSPECTION

The furnace should be inspected by a qualified installer, or service agency at least once per year. This check should be performed at the beginning of the heating season. This will ensure that all furnace components are in proper working order and that the heating system functions appropriately. Pay particular attention to the following items. Repair or service as necessary.

- Flue pipe system. Check for blockage and/or leakage. Check the outside termination and the connections at and internal to the furnace.
- Combustion air intake pipe system (where applicable). Check for blockage and/or leakage. Check the outside termination and the connection at the furnace.
- Heat exchanger. Check for corrosion and/or buildup within the heat exchanger passageways.
- Burners. Check for proper ignition, burner flame, and flame sense.
- Drainage system. Check for blockage and/or leakage. Check hose connections at and internal to furnace.
- Wiring. Check electrical connections for tightness and/or corrosion. Check wires for damage.
- Filters.

AIR FILTER



WARNING

Never operate furnace without a filter installed as dust and lint will build up on internal parts resulting in loss of efficiency, equipment damage, and possible fire.

A return air filter is not supplied with this furnace; however, there must be a means of filtering all of the return air. Filter(s) must be supplied at time of installation.

Filters should be inspected, cleaned or changed every two months or as required.

Remember that dirty filters are the most common cause of inadequate heating or cooling performance.



WARNING

Disconnect the electrical power to the furnace before removing the filter or performing any other maintenance.

Maintenance

Improper filter maintenance is the most common cause of inadequate heating or cooling performance. Filters should be cleaned (permanent) or replaced (disposable) every two months or as required. It is the owner's responsibility to keep air filters clean. When replacing a filter, it must be replaced with a filter of the same type and size.

Filter Removal

Depending on the installation, differing filter arrangements can be applied. Filters can be installed in the central return register, the bottom of the blower compartment (upflow only), a side panel external filter rack kit (upflow only), or the ductwork above a counterflow furnace. A media air filter or electronic air cleaner can be used as an alternate filter. The filter sizes given in the *PRODUCT DESIGN* section of this manual and the *SPECIFICATION SHEET* must be followed to ensure proper unit performance. Refer to the following for removal and installation of filters.

Upright Upflow Filter Removal

To remove a filter from the bottom of the blower compartment:

1. Turn off electrical power to furnace.
2. Remove blower compartment door.
3. Push back and up on the wire filter retainer to release it from under the front lip of the furnace basepan. Do not remove. To access the filter, tilt the wire filter retainer upwards.
4. Slide filter forward and out. Vacuum blower compartment.
5. Replace filter and secure retainer opposite of removal.
6. Turn on electrical power to furnace and verify proper unit operation.

To remove filters from an external filter rack in an upright upflow installation, follow the directions provided with external filter rack kit.

Media Air Filter or Electronic Air Cleaner Removal

Follow the manufacturer's directions provided with each accessory for service.

Accommodator Cabinet Filter or Horizontal Housing Filter

Follow the manufacturer's directions provided with each accessory for service.

MAINTENANCE

Upright Counterflow Filter Removal

To remove filters from the ductwork above an upright counterflow installation:

1. Turn off electrical power to furnace.
2. Remove access door in ductwork above furnace.
3. Remove filters.
4. Remove blower compartment door. Vacuum compartment. Replace blower compartment door.
5. Replace filters opposite of removal.
6. Replace access door in ductwork.

Horizontal Unit Filter Removal

Filters in horizontal installations are located in the central return register.

INDUCED DRAFT AND CIRCULATION BLOWERS

The bearings in the induced draft blower and circulator blower motors are permanently lubricated by the manufacturer. No further lubrication is required. Check motor windings for accumulation of dust which may cause overheating. Clean as necessary.

FLUE PASSAGES (QUALIFIED SERVICER ONLY)

At the start of each heating season, inspect and, if necessary, clean the furnace flue passages.

CLEANING FLUE PASSAGES (QUALIFIED SERVICER ONLY)

1. Turn OFF the electrical power and gas supply to the furnace.
2. Disconnect the gas line and remove the burner/ manifold assembly by removing the screws securing the assembly to the partition panel.
3. Disconnect the flue pipe system from the induced draft blower.
4. Remove the induced draft blower, drain and pressure tap hoses from the recuperator coil front cover.
5. Remove the recuperator coil front cover to expose the coil tubes and turbulators.
6. Remove the recuperator coil turbulators individually by slowly pulling each turbulator forward firmly.
7. Clean the recuperator coil tubes using a long handle wire brush, such as a gun cleaning brush.
8. Clean the primary heat exchanger tubes using a wire brush attached to a length of high grade stainless steel cable, such as drain cleanout cable. Attach a variable speed reversible drill to the other end of the cable. Slowly rotate the cable with the drill and insert it into one of the heat exchanger tubes. While reversing the drill, work the cable in and out several times to obtain sufficient cleaning. Repeat for each tube.

9. Clean residue from furnace using a vacuum cleaner.
10. Replace the parts removed in the previous steps in reverse order.
11. Turn on electrical power and gas to furnace. Check for leaks and proper unit operation.
12. Severe heat exchanger fouling is an indication of an operational problem. Perform the checks listed in "Start-up Procedure and Adjustments" section to reduce the chances of repeated fouling.

FLAME SENSOR (QUALIFIED SERVICER ONLY)

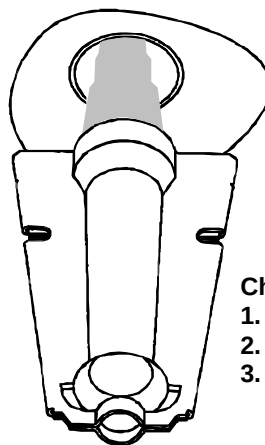
Under some conditions, the fuel or air supply can create a nearly invisible coating on the flame sensor. This coating acts as an insulator, causing a drop in the flame sensing signal. If this occurs, a qualified servicer must carefully clean the flame sensor with emery cloth or steel wool. After cleaning, the flame sensor output should be as listed on the specification sheet.

BURNERS



Electrical components are contained in both compartments. To avoid electrical shock, injury or death, do not remove any internal compartment covers or attempt any adjustment. Contact a qualified service agent at once if an abnormal flame appearance should develop.

Periodically 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 outward from the burner ports without curling downward, floating or lifting off the ports.



- Check the burner flames for:**
1. Good adjustment
 2. Stable, soft and blue
 3. Not curling, floating, or lifting off.

Burner Flame

SERVICING

TEST EQUIPMENT

Proper test equipment for accurate diagnosis is as essential as regulator hand tools.

The following is a must for every service technician and service shop.

1. Dial type thermometers or thermocouple meter (optional) - to measure dry bulb temperature.
2. Amprobe - to measure amperage and voltage.
3. Volt-Ohm Meter - testing continuity, capacitors, and motor windings.
4. Micro-Amp meter for reading flame sense signal.
5. Inclined Manometer - to measure static pressure, pressure drop across coils, filters, and draft.
6. "U" Tube Manometer (12") - to test gas inlet and manifold pressure, Induced Draft negative pressure.

Other recording type instruments can be essential in solving abnormal problems, however, in many instances they may be rented from local sources.

Proper equipment promotes faster, more efficient service and accurate repairs resulting in fewer call backs.

HEATING PERFORMANCE TEST

Before attempting to diagnose an operating fault, run a heating performance test and apply the results to the Service Problem Analysis Guide.

To conduct a heating performance test, the BTU input to the furnace must be calculated.

After the heating cycle has been in operation for at least fifteen minutes and with all other gas appliances turned off, the gas meter should be clocked.

To find the BTU input, multiply the number of cubic feet of gas consumed per hour by the heating value of the gas being used. (The calorific value of the gas being used is found by contacting your local utility.)

Example:

It is found by the gas meter, that it takes forty (40) seconds for the hand on the cubic foot dial to make one complete revolution, with all appliances off, except the furnace. Take this information and locate it on the gas rate chart. Observe the forty (40) seconds, locate and read across to the one (1) cubic foot dial column. There we find the number 90, which shows that ninety (90) cubic feet of gas will be consumed in one (1) hour.

Let's assume the local gas utility has stated that the calorific value of the gas is 1025 BTU.

Multiplying the ninety (90) cubic feet by 1025 BTU gives us an input of 92,250 BTUH.

Checking the BTU input on the rating plate of the furnace being tested.

EXAMPLE: GUIA090B30

INPUT: 92,000 BTU/HR

OUTPUT CAP: 74,000 BTU/HR

Should the figure you calculated not fall within five (5) percent of the nameplate rating of the unit, adjust the gas valve pressure regulator or resize orifices.

Note: For the GUIS, GCIS and GUIV Two-Stage Furnaces the heating performance test will need to be conducted in both the low stage (1st stage) operation, then repeated in the high stage (2nd stage) operation.



Always connect a manometer to the 1/8" pipe tap at the gas valve before adjusting the pressure regulator. In no case should the final manifold pressure vary more than plus or minus .3 inches water column from 3.5 inches water column for natural gas or 10 inches water column for propane gas.

To adjust the pressure regulator on the gas valve, turn down (clockwise) to increase pressure and input, and out (counterclockwise) to decrease pressure and input.

Since normally propane gas is not installed with a gas meter, clocking will be virtually impossible. The gas orifices used with propane are calculated for 2500 BTU gas and with proper inlet pressures and correct piping size, full capacity will be obtained.

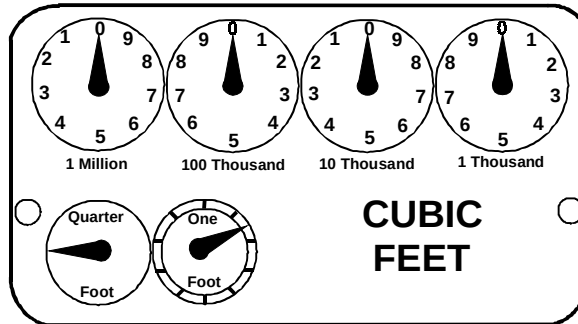
With propane gas, no unit gas valve regulator is used; however, the second stage supply line pressure regulator should be adjusted to give 11" water column with all other gas consuming appliances running. Units installed on propane gas are derated 10% by design when installed with the proper propane conversion kit.

The dissipation of the heat transferred to the heat exchanger is now controlled by the amount of air circulated over its surface.

The amount (CFM) of air circulated is governed by the external static pressure in inches of water column of duct work, cooling coil, registers and etc., applied externally to the unit versus the motor speed tap (direct drive).

A properly operating unit must have the BTU input and CFM of air, within the limits shown to prevent short cycling of the equipment. As the external static pressure goes up, the temperature rise will also increase. Consult the proper tables for temperature rise limitation.

SERVICING



GAS RATE - CUBIC FEET PER HOUR

GAS RATE -- CUBIC FEET PER HOUR											
Seconds for One Revolution	Size of Test Dial					Seconds for One Revolution	Size of Test Dial				
	1/4 cu/ft	1/2 cu/ft	1 cu/ft	2 cu/ft	5 cu/ft		1/4 cu/ft	1/2 cu/ft	1 cu/ft	2 cu/ft	5 cu/ft
10	90	180	360	720	1800	36	25	50	100	200	500
11	82	164	327	655	1636	37	--	--	97	195	486
12	75	150	300	600	1500	38	23	47	95	189	474
13	69	138	277	555	1385	39	--	--	92	185	462
14	64	129	257	514	1286	40	22	45	90	180	450
15	60	120	240	480	1200	41	--	--	--	176	439
16	56	113	225	450	1125	42	21	43	86	172	429
17	53	106	212	424	1059	43	--	--	--	167	419
18	50	100	200	400	1000	44	--	41	82	164	409
19	47	95	189	379	947	45	20	40	80	160	400
20	45	90	180	360	900	46	--	--	78	157	391
21	43	86	171	343	857	47	19	38	76	153	383
22	41	82	164	327	818	48	--	--	75	150	375
23	39	78	157	313	783	49	--	--	--	147	367
24	37	75	150	300	750	50	18	36	72	144	360
25	36	72	144	288	720	51	--	--	--	141	355
26	34	69	138	277	692	52	--	--	69	138	346
27	33	67	133	265	667	53	17	34	--	136	340
28	32	64	129	257	643	54	--	--	67	133	333
29	31	62	124	248	621	55	--	--	--	131	327
30	30	60	120	240	600	56	16	32	64	129	321
31	--	--	116	232	581	57	--	--	--	126	316
32	28	56	113	225	563	58	--	31	62	124	310
33	--	--	109	218	545	59	--	--	--	122	305
34	26	53	106	212	529	60	15	30	60	120	300
35	--	--	103	206	514						

SERVICING

Complaint	No Heat			Unsatisfactory Heat						Test Method Remedy	See Service Procedure Reference
POSSIBLE CAUSE DOTS IN ANALYSIS GUIDE INDICATE "POSSIBLE CAUSE"	SYMPTOM System Will Not Start	Burner Won't Ignite	Burner Ignites-Locks Out	Burner Shuts Off prior to T'Stat being Satisfied	Short Cycles	Long Cycles	Soot and /or Fumes	To Much Heat	Not Enough Heat		
Power Failure	●									Test Voltage	S-1
Blown Fuse	●									Test Voltage	S-4
Loose Connection	●									Check Wiring	S-2
Shorted or Broken Wires	●									Check Wiring	S-3
No Low Voltage	●									Check Transformer	S-4
Faulty Thermostat	●				●	●		●		Check Thermostat	S-3
Faulty Transformer	●									Check Transformer	S-4
Poor or High Resistance Ground			●							Measure Ground Resistance	S-13
Improper Heat Anticipator Setting					●	●		●	●	Adjust Heat Anticipator Setting	S-3
Improper Thermostat Location					●	●		●	●	Relocate Thermostat	
Faulty Limit or Roll Out Switch		●		●						Test Control	S-5 & 7
Faulty Flame Sensor			●							Test Flame Sensor	S-14
Faulty Ignition Control		●	●							Test Control	S-13
Gas Valve or Gas Supply Shut Off		●								Turn Valves to On Position	S-11
Faulty Induced Draft Blower		●					●			Test Blower	S-9 & 10
Broken or Shorted Ignitor		●								Test Ignitor	S-12
Dirty Flame Sensor, Low uA			●							Clean Flame Sensor	S-14
Flame Sensor not in Flame, Low uA			●							Test/Adjust Position of Flame Sensor	S-14
Faulty Gas Valve		●					●		●	Replace Gas Valve	S-11
Open Auxiliary Limit		●		●						Reset Control	S-6
Improper Air Flow or Distribution				●					●	Check Duct Static	S-21
Cycling on Limit				●	●				●	Check Controls & Temperature Rise	S-5 & 22
Delayed Ignition							●			Test for Delayed Ignition	S-19
Flashback							●			Test for Flashback	S-20
Orifice Size							●	●	●	Check Orifices	S-16
Gas Pressure		●					●	●	●	Check Gas Pressure	S-18
Cracked Heat Exchanger							●			Check Burner Flames	S-15
Stuck Gas Valve		●					●	●		Replace Gas Valve	S-11
Furnace Undersized									●	Replace with Proper Size Furnace	
Faulty Pressure Switch		●	●	●						Test Pressure Switch	S-8
Blocked or Restricted Flue							●			Check Flue/Drawdown Pressure	S-8
Open Roll Out Switch		●	●							Test Control	S-7
Bouncing On Pressure Switch			●							Test Negative Pressure	S-8

SERVICING

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SERVICING

S-1 CHECKING VOLTAGE



Disconnect Electrical Power Supply:

1. Remove blower compartment door from furnace to gain entry to Junction Box.
2. Remove cover from Junction Box and gain access to incoming power lines.

With Power ON:



LINE VOLTAGE NOW PRESENT.

3. Using a voltmeter, measure the voltage across the hot and neutral connections.

Note: To energize the furnace, the Door Interlock Switch must be engaged at this point.

4. No reading - indicates open wiring, open fuse, no power, or etc. from unit to fused disconnect service. Repair as needed.
5. With ample voltage at line voltage connectors, energize the furnace blower motor.
6. With the blower motor in operation, the voltage should be 115 volts $\pm$ 10 percent.
7. If the reading falls below the minimum voltage, check the line wire size. Long runs of undersized wire can cause low voltage. If wire size is adequate, notify the local power company of the condition.
8. After completing check and/or repair, replace Junction Box cover and reinstall blower compartment door.
9. Turn on electrical power and verify proper unit operation.

S-2 CHECKING WIRING



Disconnect Electrical Power Supply:

1. Check wiring visually for signs of overheating, damaged insulations and loose connections.
2. Using an ohmmeter to check continuity of any suspected open wires.
3. If any wires must be replaced, replace with AWM, 105°C. 4/64 thick insulation of the same gauge or its equivalent.

S-3 CHECKING THERMOSTAT, WIRING, AND ANTICIPATOR

S-3A Thermostat and Wiring



Disconnect Electrical Power Supply:

1. Remove the blower compartment door to gain access to the thermostat low voltage wires located at the furnace integrated control module terminals.
2. Remove the thermostat low voltage wires at the furnace control panel terminal board.
3. Jumper terminals R to W on the integrated control module.

With Power On (and Door Interlock Switch closed):



LINE VOLTAGE NOW PRESENT.

4. Induced Draft Motor must run and pull in pressure switch.
 5. If the hot surface ignitor heats and approximately 20 seconds later the gas valve opens and the burners ignite, the trouble is in the thermostat or wiring.
 6. With power off, check the continuity of the thermostat and wiring. Repair or replace as necessary.
- If checking the furnace in the air conditioning mode, proceed as follows.
7. With power off, Jumper terminals R to Y to G.
 8. Turn on the power.
 9. If the furnace blower motor starts and the condensing unit runs, then the trouble is in the thermostat or wiring. Repair or replace as necessary.
 10. After completing check and/or repair of wiring and check and/or replacement of thermostat, reinstall blower compartment door.
 11. Turn on electrical power and verify proper unit operation.

S-3B Heating Anticipator

The heating anticipator is a wire wound adjustable heater which is energized during the "ON" cycle to help prevent overheating of the conditioned space.

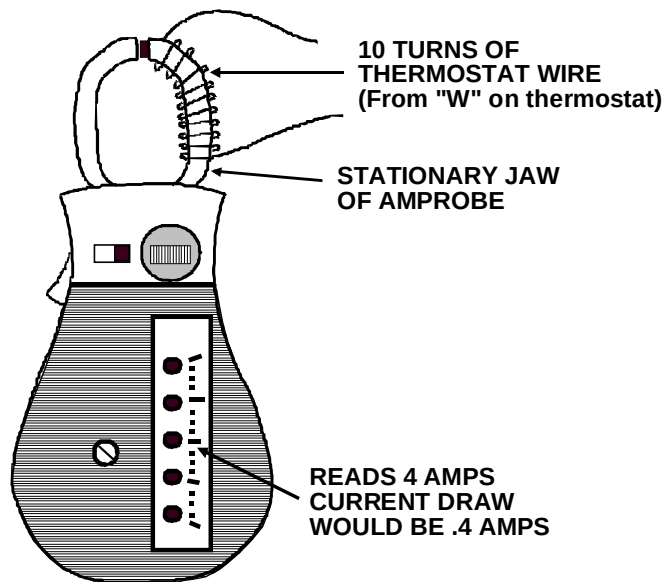
The anticipator is a part of the thermostat and if it should fail for any reason, the thermostat must be replaced.

The heating anticipator setting for furnaces covered in this manual are listed in the following chart.

HEATING ANTICIPATOR	
GUI_	0.70 amps
GCI_	0.70 amps

SERVICING

If the anticipator current draw is unknown, then an amp draw should be taken to determine the anticipator setting. Use an amprobe as shown in the following drawing.



Checking Heating Anticipator Current (Amp) Draw

S-3C Cooling Anticipator

The cooling anticipator is a small heater (resistor) in the thermostat. During the "OFF" cycle it heats the bimetal element helping the thermostat call for the next cooling cycle. This prevents the room temperature from rising too high before the system is restarted. A properly sized anticipator should maintain room temperature within 1 1/2 to 2 degrees range.

The anticipator is fixed in the subbase and is not to be replaced. If the anticipator should fail for any reason, the subbase must be changed.

S-4 CHECKING TRANSFORMER AND CONTROL CIRCUIT

A step-down transformer 120 volt primary to 24 volt secondary, 40 VA (Heating and Cooling Models) supplies ample capacity of power for either operation.



Disconnect Electrical Power Supply:

1. Remove blower compartment door to gain access to the thermostat low voltage wires located at the furnace integrated control module.
2. Remove the thermostat low voltage wires at the furnace integrated control module terminals.

With Power On (and Door Interlock Switch closed):



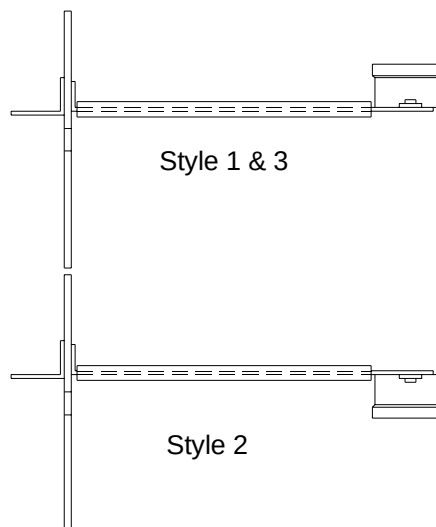
LINE VOLTAGE NOW PRESENT.

3. Use a voltmeter, check voltage across terminals R and C. Must read 24 VAC.
4. No voltage indicates faulty transformer, open fuse, bad wiring, bad splice, or open door interlock switch.
5. Check transformer primary voltage at incoming line voltage connections, fuse, splices, and blower door interlock switch.
6. If line voltage is available to the primary side of transformer and not at secondary side, the transformer is inoperative. Replace.
7. After completing check and/or replacement of transformer and check and/or repair of control circuit, reinstall blower compartment door.
8. Turn on electrical power and verify proper unit operation.

S-5 CHECKING PRIMARY LIMIT CONTROL

These furnaces use a nonadjustable, automatic reset, Klaxon type limit control (stat on a stick), part number 107283__.

Style 1 is an open face limit, styles 2 and 3 are closed face limits. Limit styles are not interchangeable, use only the limit listed for that furnace. The following drawing illustrates the different styles of limit switches.



T.O.D. PRIMARY LIMIT (107283 _ _)																												
Part Number	01	02	04	05	06	07	12	13	15	16	17	18	19	20	22	24	25	26	27	28	29	30	31	34	36	37	38	
Open Setting	210	150	190	180	200	190	160	130	250	200	160	240	170	140	230	135	170	220	120	210	130	200	160	180	195	140	215	
Style	1	2	2	1	2	1	2	2	1	1	1	2	2	2	3	3	3	3	2	2	2	3	3	3	3	3	3	
Sleeve Colors	Red	Green	Yellow	Blue	Black	Yellow	Red	Green	Brown	Black	Red	Tan	Blue	Orange	Orange	Green	Blue	Black	Brown	Yellow	Orange	Tan	Brown	Yellow	1 Blue 1 Yellow	1 Red 1 Yellow	1 Green 1 Yellow	
GUI_045_30									A,B						C, D													
GUI_070_30										A,B								C, D										
GUI_070_40	A,B																C, D	V					S					
GUI_070_40 (10x8 Blower)																											C,D	
GUI_090_30				A,B									C									D,S						
GUI_090_50						A,B							C									D,S		V				
GUI_115_40											A,B		C															
GUI_115_40			C,D	A,B																		S			V			
GUI_140_50											A,B					C	S									V		
GCI_045_30												A,B,C																
GCI_070_30					A,B															C								
GCI_070_40					C,S								A,B															
GCI_070_40 (10x8 Blower)																											C	
GCI_090_30							C						A,B															
GCI_090_50							A,B						C,S															
GCI_115_40								A,B											C									
GCI_115_50		C						A,B							A,B													
GCI_140_50														A,B							C							

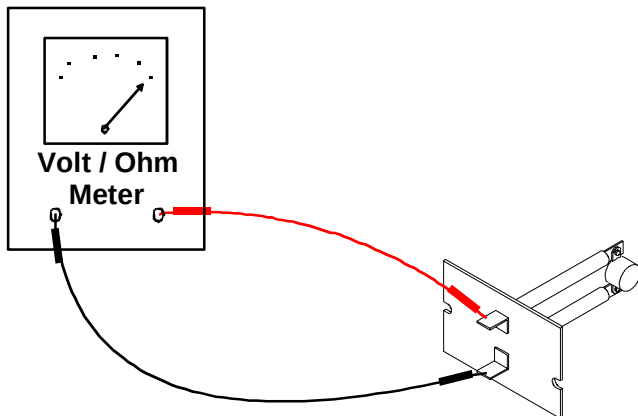
SERVICING

SERVICING

WARNING

Disconnect Electrical Power Supply:

1. Remove burner compartment door to gain access to the primary limit.
2. Remove low voltage wires at limit control terminals.
3. With an ohmmeter, test between these two terminals as shown in the following drawing. Should read continuous unless heat exchanger temperature is above limit control setting. If not as above, replace the control.

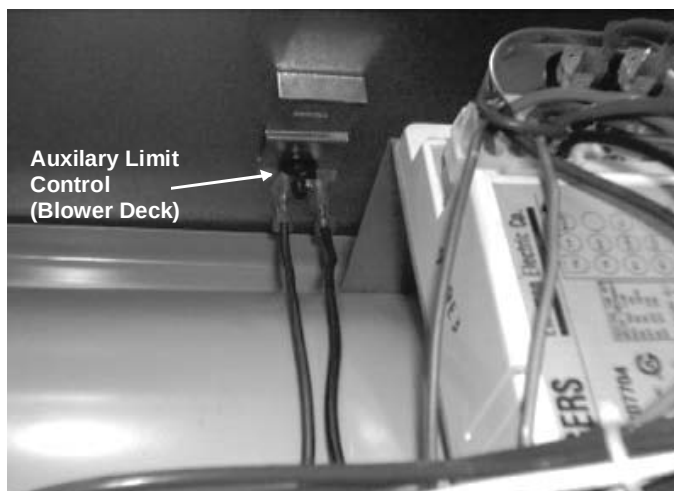


Testing Primary Limit Control

4. After completing check and/or replacement of primary limit control, reinstall burner compartment door.
 5. Turn on electrical power and verify proper unit operation.
- To aid in identifying these controls, refer to the T.O.D. Primary Limit chart on the previous page for style number, temperature setting and sleeve color(s) code.

S-6 CHECKING AUXILIARY LIMIT CONTROL

A manual reset limit is located on the lower side of the blower deck, near the center, as shown in the following drawing.



If this limit control opens, the air circulation blower and vent blower will run continuously. On models with the 50A50, 50A51, HSI 1-1A and HSI-2 ignition controls the diagnostic light will flash four times. These symptoms are identical to a trip of the primary limit control.

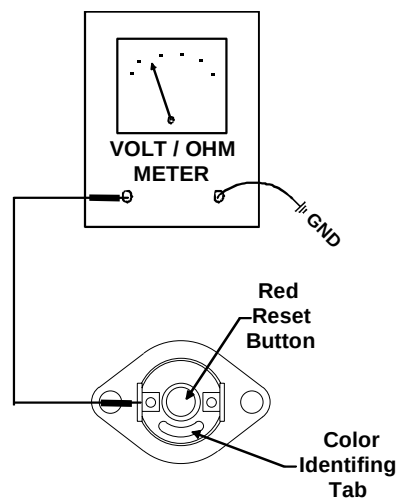
The auxiliary limit control is designed to prevent furnace operation in case of main blower failure on horizontal installations. It may also open if the power supply is interrupted while the furnace is firing.

The auxiliary limit control is suitable for both horizontal right and horizontal left installations. Regardless of airflow direction, it does not need to be relocated.

WARNING

Disconnect Electrical Power Supply

1. Remove blower compartment door to gain access to the auxiliary limit control located in the furnace blower compartment area.
2. Remove the wires from the auxiliary limit control terminals.
3. Use an ohmmeter, test for continuity across the two terminals (refer to the following auxiliary limit control figure). No reading indicates the control is open. Push red reset button, test again - if still open, replace the control.



Testing Auxiliary Limit Control

WARNING

To avoid possible fire, only reset the auxiliary limit control once. If it should open a second time, a qualified servicer must determine why the auxiliary limit opened before resetting again.

Note: If it becomes necessary to slide the blower assembly out of the furnace, the auxiliary limit control should be removed first. After the blower assembly is reinstalled, the auxiliary limit must be reinstalled.

SERVICING

To aid in identifying these controls, color coded labels are attached to the back of the controls. Refer to the chart below for color codes and temperature settings.

AUXILLARY LIMIT SWITCHES (101235 _)		
Part Number	06	16
Open Setting (°F)	160°	150°
Color	Orange	Red
GUI_045	A,B,C,D	
GUI_070	A,B,C,D	S,V
GUI_090	A,B,C,D	S,V
GUI_115	A,B,C,D,S,V	
GUI_140	A,B,C,D,S,V	
GCI_045	A,B,C	
GCI_070	A,B,C,S	
GCI_090	A,B,C,S	
GCI_115	A,B,C	
GCI_140	A,B,C	

S-7 CHECKING FLAME ROLLOUT SWITCH

A temperature activated manual reset control is mounted to the manifold assembly, as shown in the following drawing. The control is designed to open should a flame roll out occur. An over firing condition or flame impingement on the heat shield may also cause the control to open. If the rollout control opens, the air circulation blower and vent blower will run continuously. On models with the WR50A50, WR50A51 and HSI 1-1A ignition controls the diagnostic light will flash four times. These symptoms are identical to a trip of the primary limit control. On models with the HSI-2 ignition control the diagnostic light will flash five times indicating a trip of the rollout switch.

To aid in identifying these controls, color coded labels have been affixed to the back of these controls. Refer to the chart below for temperature settings and color codes.

ROLLOUT LIMIT SWITCHES (101235 _)						
Part Number	08	09	10	11	12	13
Open Setting	260	275	300	250	325	350
Color	BROWN	PINK	LT GREEN	LT BLUE	LT PURPLE	GRAY
GUI_045	A,B	C, D				
GUI_070	V		A,B,C,D			
GUI_090		D	A,B,C,V			
GUI_115			D		V	A,B,C
GUI_140		A,B			C,V	
GCI_045				A,B,C		
GCI_070		A,B,C				
GCI_090					A,B,C	
GCI_115		A,B,C				
GCI_140		A,B,C				

If the rollout control has opened the circuit between the ignition control and gas valve will be interrupted. The ignition will cycle and try to light 3 times but will not sense flame and go into lockout.



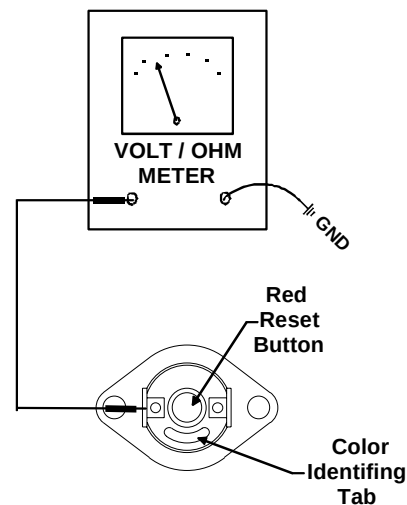
WARNING

LINE VOLTAGE NOW PRESENT.

1. Remove the burner compartment door to gain access to the rollout switch(es) mounted to burner bracket.

The servicer should reset the ignition control by opening and closing the thermostat circuit. Then look for the ignitor glowing which indicates there is power to the ignition control. Measure the voltage between each side of the rollout control and ground while the ignition control is try to power the gas valve.

2. Measure the voltage between each side of the rollout control and ground during the ignition attempt. Refer to the following figure.



Checking Flame Rollout Switch

- a. If no voltage is measured on either side of control it indicates ignition control or wiring to control problem.
 - b. If voltage is measured on one side of the control and not the other it indicates the control is open.
 - c. If voltage is measured on both sides of the control the wiring to gas valve or valve is a fault.
3. After check and/or replacement of rollout switch, reinstall burner compartment door and verify proper unit operation.

S-8 CHECKING PRESSURE SWITCH

A pressure control device is used to measure negative pressure at the induced draft blower motor inlet to detect a partial or blocked flue.

The pressure control is a safety device to prevent the combustion cycle from occurring with inadequate venting caused by a restricted or blocked vent pipe.

SERVICING

PRESSURE SWITCH TRIP POINTS AND USAGE CHART

MODEL	MINIMUM NEGATIVE PRESSURE WITH FLUE NOT FIRING TYPICAL SEA LEVEL DATA	MINIMUM NEGATIVE PRESSURE WITH FLUE FIRING TYPICAL SEA LEVEL DATA	CATEGORY 1 PRESSURE SWITCH TRIP POINTS AND USAGE								
			0 to 7500 ft.			7501 to 9500 ft.			9501 to 11000 ft.		
			TRIP POINT	PRESSURE SWITCH (Prod.)	LABEL COLOR	TRIP POINT	HIGH ALTITUDE KIT	LABEL COLOR	TRIP POINT	HIGH ALTITUDE KIT	LABEL COLOR
GUIA/B045A/B	-2.30	-1.64	-1.54	10727902	GREEN	-1.42	HAC1PS01 10727903	ORANGE	-1.42	HAC1PS01 10727903	ORANGE
GUIA/B070A/B	-2.30	-1.52	-1.42	10727903	ORANGE	-1.30	HAC1PS02 10727904	PURPLE	-1.30	HAC1PS02 10727904	PURPLE
GUIA/B090A/B	-2.10	-1.40	-1.30	10727904	PURPLE	-1.20	HAC1PS03 10727906	GRAY	-1.20	HAC1PS03 10727906	GRAY
GUIA/B115A/B	-1.90	-1.17	-1.10	10727905	YELLOW	-1.05	HAC1PS06 10727908	WHITE	-1.00	HAC1PS07 10727910	WHITE
GUIA/B140A/B	-1.80	-1.25	-1.20	10727906	GRAY	-1.14	HAC1PS04 10727909	PURPLE	-1.10	HAC1PS05 10727905	YELLOW
GUIA/B045CA/CX	-2.40	-1.90	-1.80	10727914	GREEN	-1.66	HAC1PS13 10727918	GREEN	-1.66	HAC1PS13 10727918	GREEN
GUIA/B070CA/CX	-2.30	-1.52	-1.42	10727903	ORANGE	-1.30	HAC1PS02 10727904	PURPLE	-1.30	HAC1PS02 10727904	PURPLE
GUIA/B090CA/CX	-2.10	-1.40	-1.30	10727904	PURPLE	-1.20	HAC1PS03 10727906	GRAY	-1.20	HAC1PS03 10727906	GRAY
GUIA/B115CA/CX	-1.90	-1.17	-1.10	10727905	YELLOW	-1.05	HAC1PS06 10727908	WHITE	-1.00	HAC1PS07 10727910	WHITE
GUIA/B140CA/CX	-1.80	-1.25	-1.20	10727906	GRAY	-1.14	HAC1PS04 10727909	PINK	-1.10	HAC1PS05 10727905	YELLOW
GCIA045A/B	-2.00	-1.40	-1.30	10727904	PURPLE	-1.20	HAC1PS03 10727906	GRAY	-1.20	HAC1PS03 10727906	GRAY
GCIA070A/B	-2.00	-1.20	-1.10	10727905	YELLOW	-1.00	HAC1PS07 10727910	WHITE	-1.00	HAC1PS07 10727910	WHITE
GCIA090A/B	-1.70	-1.15	-1.05	10727908	WHITE	-0.95	HAC1PS08 10727907	RED	-0.95	HAC1PS08 10727907	RED
GCIA115A/B	-1.70	-1.02	-0.95	10727907	RED	-0.89	HAC1PS09 10727911	RED	-0.85	HAC1PS10 10727912	LT BLUE
GCIA140A/B	-1.70	-1.15	-1.10	10727905	YELLOW	-1.05	HAC1PS06 10727908	WHITE	-1.00	HAC1PS07 10727910	WHITE
GCIA045CA/CX	-2.40	-1.90	-1.80	10727914	GREEN	-1.20	HAC1PS03 10727906	GRAY	-1.20	HAC1PS03 10727906	GRAY
GCIA070CA/CX	-2.30	-1.52	-1.42	10727903	ORANGE	-1.00	HAC1PS07 10727910	WHITE	-1.00	HAC1PS07 10727910	WHITE
GCIA090CA/CX	-2.00	-1.30	-1.20	10727906	GRAY	-0.95	HAC1PS08 10727907	RED	-0.95	HAC1PS08 10727907	RED
GCIA115CA/CX	-1.90	-1.24	-1.14	10727909	PINK	-0.89	HAC1PS09 10727911	RED	-0.85	HAC1PS10 10727912	LT BLUE
GCIA140CA/CX	-1.75	-1.15	-1.05	10727908	WHITE	-1.05	HAC1PS06 10727908	WHITE	-1.00	HAC1PS07 10727910	WHITE
			0 to 6000 ft.			6000 to 8500 ft.			8500 to 11000 ft.		
GCIC GUIC GUID	-0.85	-0.60	-0.55	10727920	DK BLUE	-0.50	HAC1PS11 10727915	LT BLUE	-0.41	HAC1PS12 10727916	ORANGE

Note: Replacement pressure switch number is listed below High Altitude Pressure Switch Kit number.

PRESSURE SWITCH TRIP POINTS AND USAGE CHART

MODEL	MINIMUM NEGATIVE PRESSURE WITH FLUE NOT FIRING TYPICAL SEA LEVEL DATA		MINIMUM NEGATIVE PRESSURE WITH FLUE FIRING TYPICAL SEA LEVEL DATA		CATEGORY 1 PRESSURE SWITCH TRIP POINTS AND USAGE														
					0 to 3000 ft.					3001 to 7000 ft.					7001 to 8500 ft.				
					LOW FIRE TRIP POINT	HIGH FIRE TRIP POINT	PRESSURE SWITCH (Prod.)	PS1 LABEL COLOR	PS2 LABEL COLOR	LOW FIRE TRIP POINT	HIGH FIRE TRIP POINT	HIGH ALTITUDE KIT	PS1 LABEL COLOR	PS2 LABEL COLOR	LOW FIRE TRIP POINT	HIGH FIRE TRIP POINT	HIGH ALTITUDE KIT	PS1 LABEL COLOR	PS2 LABEL COLOR
GUIS070_35	-0.50	-0.90	-0.52	-0.85	-0.45	-0.80	11177103	DK BLUE	ORANGE	-0.37	-0.66	HATS01 11177105	PURPLE	WHITE	-0.32	-0.55	HATS06 11177108	RED	GRAY
GUIS090_30 GUIS090_50	-0.42	-0.90	-0.44	-0.79	-0.37	-0.74	11177102	PURPLE	YELLOW	-0.37	-0.60	HATS02 11177106	PURPLE	LT BLUE	-0.32	-0.55	HATS06 11177108	RED	GRAY
GUIS115_50	-0.42	-0.85	-0.42	-0.71	-0.37	-0.66	11177105	PURPLE	WHITE	-0.37	-0.55	HATS03 11177107	PURPLE	GRAY	-0.27	-0.46	HATS07 11177110	RED	PINK
GUIS140_50	-0.37	-0.85	-0.39	-0.71	-0.32	-0.66	11177104	RED	WHITE	-0.32	-0.55	HATS04 11177108	RED	GRAY	-0.23	-0.37	HATS08 11177109	GREEN	PINK
GCIS070_35	-0.32	-0.80	-0.37	-0.60	-0.27	-0.55	11177101	GREEN	GRAY	-0.27	-0.46	HATS05 11177109	GREEN	PINK	-0.23	-0.37	HATS09 11177111	GRAY	DK BLUE
GCIS090_50	-0.32	-0.37	-0.37	-0.60	-0.27	-0.55	11177101	GREEN	GRAY	-0.27	-0.46	HATS05 11177109	GREEN	PINK	-0.23	-0.37	HATS09 11177111	GRAY	DK BLUE
GUIV070_40	-0.50	-0.90	-0.52	-0.85	-0.45	-0.80	11177103	DK BLUE	ORANGE	-0.37	-0.66	HATS01 11177105	PURPLE	WHITE	-0.32	-0.55	HATS06 11177108	RED	GRAY
GUIV090_50	-0.42	-0.90	-0.44	-0.79	-0.37	-0.74	11177102	PURPLE	YELLOW	-0.37	-0.60	HATS02 11177106	PURPLE	LT BLUE	-0.32	-0.55	HATS06 11177108	RED	GRAY
GUIV115_50	-0.42	-0.85	-0.42	-0.71	-0.37	-0.66	11177105	PURPLE	WHITE	-0.37	-0.55	HATS03 11177107	PURPLE	GRAY	-0.27	-0.46	HATS07 11177110	RED	PINK
GUIV140_50	-0.37	-0.85	-0.39	-0.71	-0.32	-0.66	11177104	RED	WHITE	-0.32	-0.55	HATS04 11177108	RED	GRAY	-0.23	-0.37	HATS08 11177109	GREEN	PINK

Note: Replacement pressure switch number is listed below High Altitude Pressure Switch Kit number.

SERVICING

SERVICING



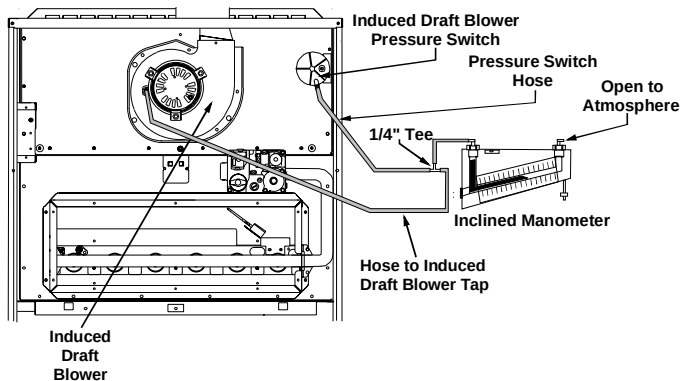
WARNING

Disconnect Electrical Power Supply:

1. Remove burner compartment door to gain access to pressure switch.
2. Remove wires from the pressure switch electrical terminals.
3. Using a VOM check from common terminal to NC (Normally Closed) - should read closed. Check from Common to NO (Normally Open) - should read open.

If switch reads as above proceed to Step 4, otherwise replace control.

4. Remove the pressure control hose from the control and interconnect with an inclined manometer as shown in the following figure.



**ID Blower Pressure Switch
Negative Pressure Measurement**

Reconnect pressure switch electrical wires.



WARNING

LINE VOLTAGE NOW PRESENT.

4. Energize furnace for heating cycle. The induced draft blower motor will begin to run. The inclined manometer should read approximately the negative pressure shown in the pressure switch usage charts on pages 77 and 78.

Note: GUIA/B and GCIA/B furnaces can pull negative pressures in excess of -3.0" WC. Use appropriate manometer for measuring negative pressure. Refer to the charts on pages 77 and 78 for pressure switch usage and trip points.

5. Remove and check the two electrical wires and using the VOM check from Common to NC (Normally Closed) - should read open. Check from Common to NO (Normally Open) - should read closed. If not as above, replace control.
6. Reconnect wires to the control and place in a heating cycle.

7. Begin to restrict the flue outlet until the pressure control trips - cycling OFF the burner. The trip points should be as shown on the preceding pages.

8. If not as listed, replace control.

9. After completing check and/or repair of pressure switch, reinstall burner compartment door.

10. Turn on electrical power and verify proper unit operation.

The pressure readings listed in the *PRESSURE SWITCH USAGE AND TRIP POINT CHARTS* on pages 77 and 78 must be adhered to for proper operation.

S-8A HIGH ALTITUDE PRESSURE SWITCH

For those altitudes starting at 7500 feet and above, it will be necessary to replace the pressure switch and orifices.

These changes are required to compensate for the reduction in atmospheric pressure (less available air for combustion) as the altitude increases.

High altitude pressure switches and kits are listed in the Pressure Switch Usage and Trip Point Chart. Refer to section *S-20 HIGH ALTITUDE APPLICATION (USA)* for high altitude orifice requirements.

S-9 CHECKING AIR CIRCULATOR BLOWER MOTOR OR INDUCED DRAFT BLOWER MOTOR



WARNING

Disconnect Electrical Power Supply

1. Remove blower compartment door to gain access to the circulator blower motor and induced draft blower motor wire leads connected at integrated ignition control.
2. Disconnect the motor wire leads from its connection point at integrated ignition control module and capacitor if applicable.

3. Using an ohmmeter, test for continuity between each of the motor leads.

4. Touch one probe of the ohmmeter to the motor frame (ground) and the other probe in turn to each lead.

If the windings do not test continuous or a reading is obtained to ground, replace the motor.

5. After completing check and/or replacement of circulator blower motor or induced draft blower motor, reinstall blower compartment door.

6. Turn on electrical power and verify proper unit operation.

SERVICING

S-9A ECM MOTOR INTERFACE BOARD

GUIV model furnaces use an ECM blower motor. These motors use an electronic control module attached to the motors end bell to control motor operation. Some unique features of the ECM motor are:

1. Constant Airflow. These motors will maintain constant airflow in excess of .80 static. In other words, as the static increases so does the motors RPM so that a constant CFM is maintained.
- Note:** The motor in these units will move more air under higher static conditions than a similar sized unit using a PSC motor. Because this motor does not load up and reduce airflow like a PSC motor, in some undersized duct installations this may cause noise or high airflow complaints.
2. Ramp-up/Ramp-down feature. These motors ramp up and down at the beginning or end of a cycle to reduce air rush noise.
3. High voltage is present at these motors all the time. Motor operation is controlled through the low voltage motor interface board.

A motor interface board, mounted on the control bracket is used to control blower operation in 3 modes of operation. Fan only, cooling speed, and heating speed. Refer to the airflow table in the *BLOWER PERFORMANCE* section of this manual for details.

The cooling and heating speeds are adjusted by relocating the jumper pins on the motor interface board. Refer to *Speed Tap Adjustments* figure on page 44.

There is a LED on the motor interface board that serves to indicate the airflow that the motor is supposed to be delivering, depending upon the positioning of the pin selectors on the interface board. The number of blinks multiplied by 100 yields the programmed CFM (Example: 10 Blinks x 100 = 1000 CFM). The indicated CFM may vary, depending on the mode of operation and the signals being sent to the control board at the time.

Note: An inductor (*Power Correction Factor Choke*) is required when powering 3/4 horsepower ECM motors with 115 volts. The operation of this inductor is to reduce the line current by storing the electrical energy in a magnetic field, such that the voltage AC waveform leads the current AC waveform. In other words, the inductor reduces line current which extends the life of the 3/4 horsepower ECM motor. The furnaces requiring this inductor are the GUIV090,115, 140DX50 models.

IMPORTANT: If the inductor fails, there will be no motor operation since this is the LINE power supply, black wire (BK-6), from the integrated ignition control to the motor. To determine if the inductor is at fault, you can bypass by the inductor by disconnecting the black wire (BK-6) wire from the inductor and connecting it directly to the motor. If the motor operates then the inductor will need to be replaced.

S-10 CHECKING CAPACITOR

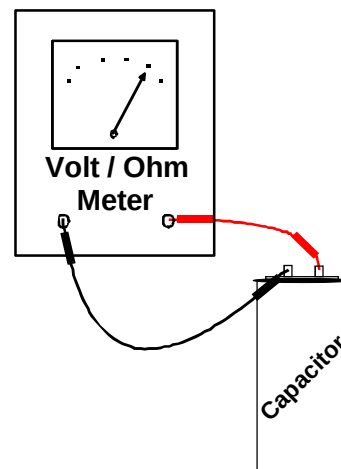
The direct drive motors are of the permanent split capacitor design. A run capacitor is wired across the auxiliary and a portion of the main windings. The capacitors primary function is to reduce the line current while greatly improving the torque characteristics of a motor. This is accomplished by using the 90° phase relationship between the capacitor current and voltage in conjunction with the motor windings so that the motor will give two phase operation when connected to a single phase circuit. The capacitor also reduces the line current to the motor by improving the power factor to the load.



DISCHARGE CAPACITOR THROUGH A 20 TO 30 OHM RESISTOR BEFORE HANDLING

Two quick ways to test a capacitor are a resistance and a capacitance check. Refer to the next two figures for proper meter connections for the resistance and capacitance testing of the capacitor.

S-10A Resistance Check



Testing Capacitor Resistance



Disconnect Electrical Power Supply:

1. Remove blower compartment door to gain access to capacitor.
2. Discharge capacitor and remove wire leads.
3. Set an ohmmeter on its highest ohm scale and connect the leads to the capacitor.
 - a. Good Condition - indicator swings to zero and slowly returns toward infinity.
 - b. Shorted - indicator swings to zero and stops there - replace.

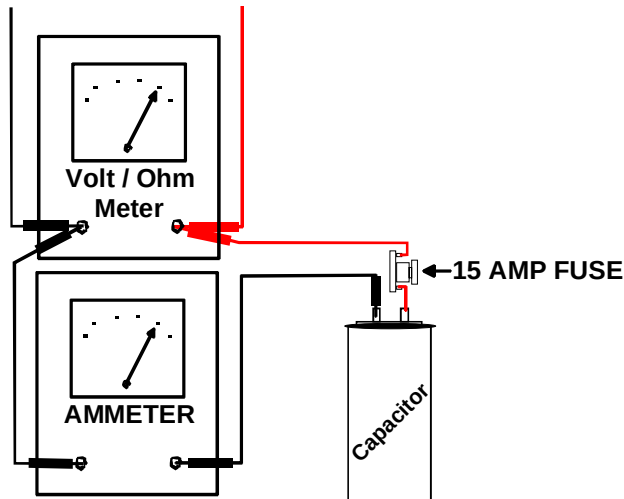
SERVICING

- c. Open - no reading - replace. Reverse leads. Check again no reading - replace.
- d. Reverse leads and recheck.

- 4. Reverse leads Some redundant coils have (dividers) diodes.

If not as above, replace the entire valve.

S-10B Capacitance Test



Testing Capacitance

With power On (and Door Interlock Switch closed):



WARNING

LINE VOLTAGE NOW PRESENT.

Using a hookup as shown above, take the amperage and voltage readings and use them in the formula:

Capacitance (MFD)= 2650 x Amperage/Voltage

- 4. After completing check and/or replacement of capacitor, reinstall blower compartment door.
- 5. Turn on electrical power and verify proper unit operation.

S-11 CHECKING GAS VALVE (Redundant)

A combination redundant operator type gas valve which provides all manual and automatic control functions required for gas fired heating equipment is used.

The valve provides control of main burner gas flow, pressure regulation, and 100 percent safety shut-off.



WARNING

Disconnect Electrical Power Supply:

- 1. Remove wire connections from gas valve terminals.
- 2. Using an ohmmeter, test across the gas valve coil terminals, both the redundant and the main valve.
- 3. Should read approximately 130 Ohms for the Robertshaw main valve operator coils, 100 Ohms for Honeywell and 100 Ohms for White-Rodgers. The redundant coil will vary somewhat as well.

S-12 CHECKING HOT SURFACE IGNITOR

A silicone carbide restrictive element ignitor is used for ignition. The normal operating temperature is approximately 2550°F.



WARNING

Disconnect Electrical Power Supply:

- 1. Remove burner compartment door to gain access to hot surface ignitor.
- 2. Ignitor cool - approximately 70 - 75°F.
- 3. Disconnect the ignitor from the Ignition Control Module and line voltage terminal board.
- 4. Using an ohmmeter measure the resistance of the ignitor - should read between 50 to 200 ohms.
- 5. Reconnect ignitor.



WARNING

LINE VOLTAGE NOW PRESENT.

- 6. Place unit in heating cycle, measure current draw of ignitor during preheat cycle. Should read approximately 4 to 5 amps.
- 7. After check and/or replacement of hot surface igniter, reinstall burner compartment door and verify proper unit operation.

S-13 CHECKING WHITE-RODGERS 50A50 OR 50A51 AND HEATCRAFT HSI 1-1A OR HSI-2 INTEGRATED IGNITION CONTROL MODULE

Note: Failure to earth ground the furnace, reversing the neutral and hot wire connection to the line (polarity), or a high resistance connection in the neutral line may cause the control to lockout due to failure to sense flame.



CAUTION

To avoid the risk of electrical shock, wiring to the unit must be properly polarized and grounded. Disconnect power before performing service listed below.

The ground wire must run from the furnace all the way back to the electrical panel. Proper grounding can be confirmed by disconnecting the electrical power and measuring resistance between the neutral (white) connection and the burner closest to the flame sensor. Resistance should be less than 10 ohms.

SERVICING

The ignition control module is a combination electronic and electromechanical device and is not field repairable. Complete unit must be replaced.

The WR50A50, WR50A51 or the HSI 1-1A, HSI-2 ignition controls, control all furnace operations including blower operation in air conditioning. Blower time delays are controlled by the ignition control, see *AIR CIRCULATION FAN TIMING* section in the *PRODUCT DESIGN* section of this manual for blower delay information.



LINE VOLTAGE NOW PRESENT.

These tests must be completed within a given time frame due to the operation of the ignition control. Refer to *SEQUENCE OF OPERATION* section of this manual for corresponding timing charts.

The ignition control is capable of diagnosing many furnace failures to speed troubleshooting. A flashing red or green diagnostic indicator light on the control flashes a code for any discovered failures.

When the control is powered up normally the light will flash once for about one second. This can be used to test for 120 volts and 24 volts to the control since both must be present for the light to flash. If this step fails, check for 120 volts to the control and check the transformer and its associated wiring. If this step is successful give the control a call for heat and wait five (5) seconds or until the furnace goes into lockout. If the control detects a failure it will now be shown on the diagnostic indicator light. Refer to the *ABNORMAL OPERATION* section in the *SEQUENCE OF OPERATION* section of this manual for more detail on failure codes.

The indicator light may be viewed by looking through the sight glass in the blower compartment door. If the blower compartment door is removed, failure to hold the door switch closed while removing the blower compartment door will result in the loss of the stored failure code. In most cases recycling the ignition control will result in the same failure code originally displayed.

1. Check for 120 volts from Line 1 (BK6 wire) to line 2 neutral (WH-33 wire) at the ignition control. No voltage - check the door switch connections and wire harness for continuity.
2. Check for 24 volts from W to C at the thermostat connections on the ignition control. No voltage - check transformer, room thermostat, and wiring.
3. Check for 120 volts to the induced draft blower by measuring voltage between IND (VT-55) and neutral for the 50A50, HSI 1-1A and HSI-2 ignition controls, and between IND (BK) and RED (RD) for the 50A51 ignition control. No voltage - replace ignition control.

4. If voltage is present in Steps 1 through 3 and the induced draft blower is operating, check for 120 volts to the ignitor during the 17 second preheat cycle. Measure voltage between terminals IGN (RD-22) and neutral. No voltage - check pressure switch.
5. Seventeen seconds after a call for heat begin checking for 24 volts to the gas valve. Voltage will be present for seven seconds only if proof of flame has been established. Measure voltage from Pin 9 MV terminal (GY-47 wire) to Pin 12 MV terminal (BR-21) on the ignition control 12 Pin connector for the 50A50, HSI 1-1A or HSI-2 ignition controls, and from Pin 7 MV terminal (GY-47) to Pin 8 MV terminal (BR-21) on the ignition control 12 Pin connector for the 50A51 ignition control. No voltage - replace ignition control.
6. If proof of flame was established 120 volts will be provided to the air circulation blower 54 seconds after a call for heat. Check for 120 volts from the CIR terminal (WH) wire to the heat terminal on the ignition control. No voltage - replace ignition control.

Note: Accessory Electronic Air Cleaners and Humidifiers powered through the ignition control accessory terminals, under some circumstances can create interference with the ignition control causing intermittent lockouts. If the source of the lockouts cannot be otherwise determined, it is recommended that these accessories be disconnected from the ignition control and powered through alternate means.

S-13A CHECKING WR50A52 INTEGRATED IGNITION CONTROL MODULE (RADIANT SENSE)

Note: Failure to earth ground the furnace, reversing the neutral and hot wire connection to the line (polarity), or a high resistance connection in the neutral line may cause the control to lockout due to failure to sense flame.



To avoid the risk of electrical shock, wiring to the unit must be properly polarized and grounded. Disconnect power before performing service listed below.

The ground wire must run from the furnace all the way back to the electrical panel. Proper grounding can be confirmed by disconnecting the electrical power and measuring resistance between the neutral (white) connection and the burner closest to the flame sensor. Resistance should be less than 10 ohms.

The ignition control module is a combination electronic and electromechanical device and is not field repairable. Complete unit must be replaced.

The WR50A52 ignition control, controls all furnace operations including blower operation in air conditioning. Blower time delays are controlled by the ignition control and are nonadjustable, see the specification section for blower delay information.

SERVICING



LINE VOLTAGE NOW PRESENT.

These tests must be completed within a given time frame due to the operation of the ignition control. See "Sequence of Operation" section for timing chart.

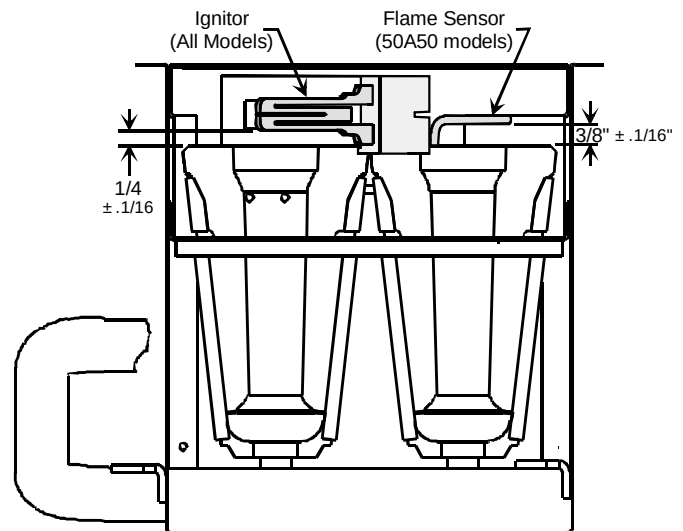
1. Check for 120 volts from Line 1 (BK6 wire) to line 2 neutral (WH-33 wire) at the ignition control. No voltage - check the door switch connections and wire harness for continuity.
2. Check for 24 volts from W to C at the thermostat connections on the ignition control. No voltage - check transformer, room thermostat, and wiring.
3. Check for 120 volts to the induced draft blower by measuring voltage between IND (VT-55) and neutral. No voltage - check for pressure switch stuck closed. If pressure switch in N.O. position replace ignition control.
4. If voltage is present in Steps 1 through 3 and the induced draft blower is operating, check for 120 volts to the ignitor during the 17 second preheat cycle. If the flame switch has not transferred, the control will continue to power the ignitor until the flame switch transfers, or for 90 seconds. Voltage will be present for one second after the gas valve has opened. Measure voltage between terminals IGN (RD-22) and neutral. No voltage - check pressure switch.
5. Seventeen seconds after a call for heat begin checking for 24 volts to the gas valve. Measure voltage from terminal 5 (YL-8 wire) to terminal 3 (RD-5) on the gas valve. No voltage - check flame switch and ignitor position.
6. If proof of flame was established 120 volts will be provided to the air circulation blower 45 seconds after the gas valve opens. Check for 120 volts from the CIR terminal (WH) wire to the heat terminal on the ignition control. No voltage - replace ignition control.

Note: If cycling the ignition control during testing, the flame switch must be allowed to cool and switch back to the N.C. position before the next ignition attempt.

S-14 CHECKING FLAME SENSOR - FLAME RECTIFICATION - IGNITION CONTROL MODULE

A flame sensing device is used in conjunction with the ignition control module to prove combustion. If proof of flame is not present the control will de-energize the gas valve and "retry" for ignition or lockout.

The following drawings illustrate from a bottom view, the approximate distances for the ignitor and flame sensor to the gas inshot burner. You will note they are in the main burner stream, not in the carry over ports as shown in the following figure.



Models with Integrated Ignition Control & Flame Sensor Probe



Disconnect Electrical Power Supply:

1. Disconnect the flame sensor BU-36 wire from the sensor terminal.
2. Connect a micro-amp meter in series with this wire and the sensor terminal.
3. Be sure the negative side of the meter is to BU-36 wire and the positive side of the meter is to sensor terminal.



LINE VOLTAGE NOW PRESENT.

4. Place the unit into a heating cycle.
5. As soon as flame is established a micro-amp reading should be evident once proof of flame (micro-amp reading) is established, the hot surface ignitor will be de-energized.
6. The Integrated Ignition controls will have 1 to 4 micro-amps. If the micro-amp reading is less than the minimum specified, check for high resistance wiring connections, sensor to burner gap, dirty flame sensor, or poor grounding.
7. If absolutely no reading, check for continuity on all components and if good - replace ignition control module.

Note: Contaminated fuel or combustion air can create a nearly invisible coating on the flame sensor. This coating works as an insulator causing a loss in the flame sense signal. If this situation occurs the flame sensor must be cleaned with emery cloth or steel wool.

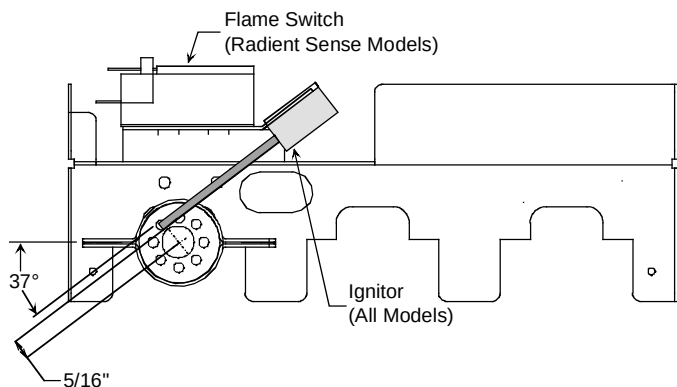
SERVICING

S-14A Models with WR50A52 Ignition Control & Radiant Sense Flame Sensor

The Radiant Sensor is a single pole double throw switch that is activated by a combination of the heat radiating from the burner flame, and the reflected heat from the ignitor.

Once the pressure switch contacts close, power is supplied through the N.C. contacts of the Radiant Sensor to the gas valves terminal 4 (GN-7 wire). When the Radiant Sensor senses sufficient heat from the ignitor, the sensor will switch to the N.O. position supplying 24V. to the gas valves terminal 5 (YL-8 wire).

If you should experience a flame sense problem with the GUIB series furnace, it is important to verify correct positioning and alignment of the components before replacing the flame sensor. The following drawing illustrates the proper positioning and alignment of the ignitor, radiant shield, and flame sensor.



Models with Integrated Ignition Control & Flame Sensor Probe

Note: Any bending, twisting, or distortion of the electrical tabs on the sensor will adversely affect the calibration of the switch and result in unacceptable performance of the sensor.

Refer to the Radiant Sense System Schematic in the wiring section for details.



Disconnect Electrical Power Supply:

1. Remove burner compartment door to gain access to the radiant flame sensor.
2. Disconnect the wires from the Radiant Sensor.
3. Using a VOM check from common terminal to NC (Normally Closed) - should read closed. Check from Common to NO (Normally Open) - should read open.



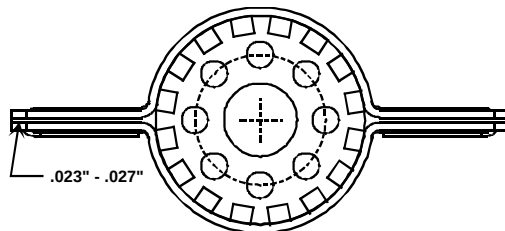
LINE VOLTAGE NOW PRESENT.

4. Place unit into a heating cycle.
5. Using a VOM check from chassis ground, to pin 8 FSO (GR-9 wire) on ignition control. No power check pressure switch and ignition control.
6. Within the ignitor preheat period, check from chassis ground, to pin 12 FSI (BR-10 wire) on ignition control. No power check BR-10 wire.
6. When the Radiant Sensor senses sufficient heat it will close the N.O. contacts. Power should now be read at pin 4 MV FS (VT-12 wire). No power check VT-12 wire, replace Radiant Sensor if necessary.
7. After check and/or replacement of radiant flame sensor, reinstall burner compartment door and verify proper unit operation.

S-15 CHECKING MAIN BURNERS

The main burners are used to provide complete combustion of various fuels in a limited space, and transfer this heat of the burning process to the heat exchanger.

Proper ignition, combustion, and extinction are primarily due to burner design, orifice sizing, gas pressure, primary and secondary air, vent and proper seating of burners.



Beckett Burner



Disconnect Gas and Electrical Power Supply:

In checking main burners, look for signs of rust, oversized and undersized carry over ports restricted with foreign material, etc as shown in the previous drawing.

SERVICING

S-16 CHECKING ORIFICES

A predetermined fixed gas orifice is used in all of these furnaces. That is an orifice which has a fixed bore and position as shown in the following drawing.

No resizing should be attempted until all factors are taken into consideration such as inlet an manifold gas pressure, alignment, and positioning, specific gravity and BTU content of the gas being consumed.

The only time resizing is required is when a reduction in firing rate is required for an increase in altitude.

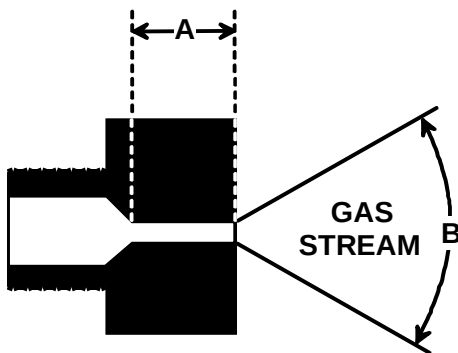
Orifices should be treated with care in order to prevent damage. They should be removed and installed with a box-end wrench in order to prevent distortion. In no instance should an orifice be peened over and redrilled. This will change the angle or deflection of the vacuum effect or entraining of primary air, which will make it difficult to adjust the flame properly. This same problem can occur if an orifice spud of a different length is substituted.



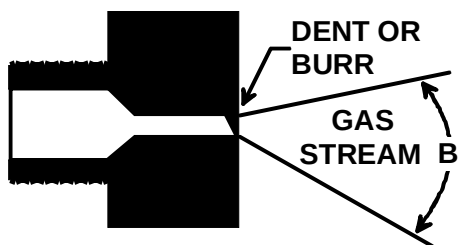
WARNING

Disconnect Gas and Electrical Power Supply:

1. Check orifice visually for distortion and/or burrs.
2. Check orifice size with orifice sizing drills.
3. If resizing is required, a new orifice of the same physical size and angle with proper drill size opening should be installed.



The length of Dimension "A" determines the angle of Gas Stream "B".



A dent or burr will cause a severe deflection of the gas stream.

S-17 HIGH ALTITUDE APPLICATION (USA)

For those altitudes starting at 6000 feet for "C" and "D" model furnaces, or 7500 feet for "A" and "B" model furnaces, it will be necessary to replace the pressure switch and orifices. For those altitudes starting at 3000 feet for "S" and "V" model furnaces, it will be necessary to replace the pressure switch and orifices.

These changes are required to compensate for the reduction in atmospheric pressure (less available air for combustion) as the altitude increases.

The following chart gives the orifice drill size and high altitude kit required for different elevations.

GUIA/B GCIA/B	0 to 7500 ft.	Nat. #43	Original Equipment Factory Installed (10716003 orifices)
GUIC/D GCIC	0 to 6000 ft.	Nat. #43	Original Equipment Factory Installed (10716003 orifices)
GUIS GCIS GUIV	0 to 3000 ft.	Nat. #43	Original Equipment Factory Installed (10716003 orifices)
GUIA/B GCIA/B	7500 to 11000 ft.	Nat. #45	HANG07 High Altitude Orifice Kit (uses 10716005 orifices)
GUIC/D GCIC	6000 to 11000 ft.	Nat. #45	HANG07 High Altitude Orifice Kit (uses 10716005 orifices)
GUIS GCIS GUIV	3001 to 7000 ft.	Nat. #44	HATS01-05 High Altitude Orifice Kit (uses 10716004 orifices)
GUIS GCIS GUIV	7001 to 8500 ft.	Nat. #45	HATS06-09 High Altitude Orifice Kit (uses 10716005 orifices)
GUIA/B GCIA/B	0 to 7500 ft.	Propane #55	LPTK06, 07, 07A or 09 Propane Conversion Kit (uses 10716009 orifices)
GUIC GCIC	0 to 6000 ft.	Propane #55	LPTK07, 07A or 09 Propane Conversion Kit (uses 10716009 orifices)
GUID	0 to 6000 ft.	Propane #55	LPTK08 or 09 Propane Conversion Kit (uses 10716009 orifices)
GUIS GCIS GUIV	0 to 7000 ft.	Propane #55	LPTK07A or 09 Propane Conversion Kit (uses 10716009 orifices)
GUIA/B GCIA/B	7500 to 11000 ft.	Propane #56	HALP05 OR 09 Propane Conversion Kit (uses 10716010 orifices)
GUIC GCIC	6000 to 11000 ft.	Propane #56	HALP09 Propane Conversion Kit (uses 10716010 orifices)
GUID	6000 to 11000 ft.	Propane #56	HALP07 OR 09 Propane Conversion Kit (uses 10716010 orifices)
GUIS GCIS GUIV	7001 to 8500 ft.	Propane #56	HALP09 Propane Conversion Kit (uses 10716010 orifices)

High altitude pressure switches and kits are listed in the Pressure Switch Usage and Trip Point Chart.

SERVICING

S-18 CHECKING GAS PRESSURE

Gas Supply Pressure Measurement



To prevent unreliable operation or equipment damage, the inlet gas supply pressure must be as specified on the unit rating plate with all other household gas fired appliances operating.

Gas inlet and manifold pressures should be checked and adjusted in accordance to the type of fuel being consumed.

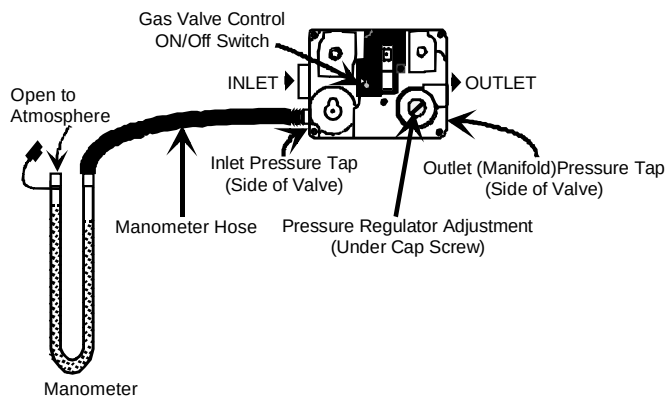
The line pressure supplied to the gas valve must be within the range specified below. The supply pressure can be measured at the gas valve inlet pressure tap or at a hose fitting installed in the gas piping drip leg. The supply pressure must be measured with the burners operating. To measure the gas supply pressure, use the following procedure.



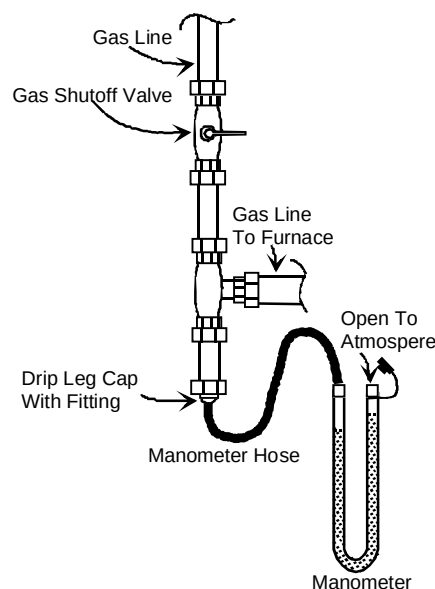
Disconnect Electrical Power and Shut Off Gas Supply:

1. After turning off gas to furnace at the manual gas shutoff valve external to the furnace, remove burner compartment door to gain access to the gas valve.
3. Connect a calibrated water manometer (or appropriate gas pressure gauge) at either the gas valve inlet pressure tap or the gas piping drip leg as shown in the following two figures.

Note: At either location, a hose fitting must be installed prior to making the hose connection.



**Measuring Inlet Gas Pressure
(Gas Valve Tap)**



**Measuring Inlet Gas Pressure
(Alternate Method)**

4. Turn ON the gas and electrical power supply and operate the furnace and all other gas consuming appliances on the same gas supply line.
5. Measure furnace gas supply pressure with burners firing. Supply pressure must be within the range specified in the following table.

Inlet Gas Supply Pressure	
Natural Gas	Minimum:5.0" W.C. Maximum :10.0" W.C.
Propane Gas	Minimum:11.0" W.C. Maximum :13.0" W.C.

If supply pressure differs from above, make necessary adjustments to pressure regulator, gas piping size, etc., and/or consult with local gas utility.



Disconnect Electrical Power and Shut Off Gas Supply:

6. Disconnect manometer after turning off gas at manual shutoff valve. Reinstall plug before turning on gas to furnace.
7. Turn OFF any unnecessary gas appliances started in step 3.
8. Turn on gas to furnace and check for leaks. If leaks are found, repair and then reinstall burner compartment door.
9. Turn on electrical power and verify proper unit operation.

SERVICING

Gas Manifold Pressure Measurement and Adjustment



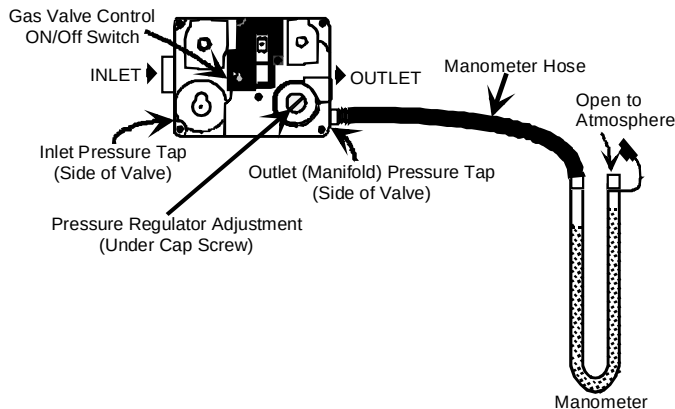
To prevent unreliable operation or equipment damage, the gas manifold pressure must be as specified on the unit rating plate. Only minor adjustments should be made by adjusting the gas valve pressure regulator.

Only small variations in gas pressure should be made by adjusting the gas valve pressure regulator. The manifold pressure must be measured with the burners operating. To measure and adjust the manifold pressure, use the following procedure.



Disconnect Electrical Power and Shut Off Gas Supply:

1. After turning off gas to furnace at the manual gas shutoff valve external to the furnace, remove burner compartment door to gain access to the gas valve.
2. Connect a calibrated water manometer (or appropriate gas pressure gauge) at the gas valve outlet pressure tap as shown in the following figure.



Measuring Manifold Gas Pressure
(Gas Valve Tap)



LINE VOLTAGE NOW PRESENT.

3. Turn ON the gas and electrical power supply and operate the furnace.
4. Measure gas manifold pressure with burners firing. Adjust manifold pressure using the table below.

Manifold Gas Pressure	
Natural Gas	3.5" w.c.
Propane Gas	10.0" w.c.

The final manifold pressure must not vary more than ± 0.3 "w.c. from the above specified pressures. Any necessary major changes in gas flow rate should be made by changing the size of the burner orifice.

5. To adjust the gas valve pressure regulator, remove the regulator cap.
6. Turn the adjustment screw clockwise to increase the pressure, or counterclockwise to decrease the pressure.
7. Securely replace the regulator cap.



Disconnect Electrical Power and Shut Off Gas Supply:

8. Disconnect manometer after turning off gas at manual shutoff valve. Reinstall gas valve outlet pressure tap plug before turning on gas to furnace.
9. Turn on gas to furnace and check for leaks. If leaks are found, repair and then reinstall burner compartment door.
10. Turn on electrical power and verify proper unit operation.

Gas Valve Adjustment Procedures for GUIS/GCIS/GUIV Two-Stage Furnaces

Natural Gas Adjustments



Disconnect Electrical Power and Shut Off Gas Supply:

1. After turning off gas to furnace at the manual gas shutoff valve external to the furnace, remove burner compartment door to gain access to the gas valve.
2. Connect a calibrated water manometer (or appropriate gas pressure gauge) at the gas valve outlet pressure tap. Refer to previous *Measuring Manifold Gas Pressure* figure for proper connection.



LINE VOLTAGE NOW PRESENT.

3. Turn ON the gas and electrical power supply and operate the furnace.
4. Adjust the high stage regulator to required manifold pressure setting.
5. Reinstall high stage cap screw and recheck manifold pressure setting with cap on.
6. Adjust low stage regulator to required manifold pressure setting.
7. Reinstall low stage cap screw and recheck manifold pressure setting with cap on.

SERVICING

WARNING

Disconnect Electrical Power and Shut Off Gas Supply:

8. Disconnect manometer after turning off gas at manual shutoff valve. Reinstall gas valve outlet pressure tap plug before turning on gas to furnace.
9. Turn on gas to furnace and check for leaks. If leaks are found, repair and then reinstall burner compartment door.
10. Turn on electrical power and verify proper unit operation. Make sure furnace operates at the proper manifold pressure at both high and low stage outputs.

For natural gas, the manifold pressure must be between 3.0 and 3.6 inches water column (3.5 nominal). The low stage manifold pressure must be between 1.6 and 2.2 inches water column (1.9 nominal).

Propane Gas Adjustments

WARNING

Disconnect Electrical Power and Shut Off Gas Supply:

1. After turning off gas to furnace at the manual gas shutoff valve external to the furnace, remove burner compartment door to gain access to the gas valve.
2. Connect a calibrated water manometer (or appropriate gas pressure gauge) at the gas valve outlet pressure tap. Refer to previous *Measuring Manifold Gas Pressure* figure for proper connection.

WARNING

LINE VOLTAGE NOW PRESENT.

3. Turn ON the gas and electrical power supply and operate the furnace.
4. Adjust the high stage regulator to required manifold pressure setting.
5. Reinstall high stage cap screw and recheck manifold pressure setting with cap on.
6. Adjust low stage regulator to required manifold pressure setting.
7. Reinstall low stage cap screw and recheck manifold pressure setting with cap on.

WARNING

Disconnect Electrical Power and Shut Off Gas Supply:

8. Disconnect manometer after turning off gas at manual shutoff valve. Reinstall gas valve outlet pressure tap plug before turning on gas to furnace.

9. Turn on gas to furnace and check for leaks. If leaks are found, repair and then reinstall burner compartment door.
10. Turn on electrical power and verify proper unit operation. Make sure furnace operates at the proper manifold pressure at both high and low stage outputs.

For propane gas, the manifold pressure must be between 9.7 and 10.3 inches water column (10.0 nominal). The low stage manifold pressure must be between 5.7 and 6.3 inches water column (6.0 nominal).

S-19 CHECKING FOR DELAYED IGNITION

Delayed ignition is a delay in lighting a combustible mixture of gas and air which has accumulated in the combustion chamber.

When the mixture does ignite, it may explode and/or rollout causing burning in the burner venturi.

If delayed ignition should occur, the following should be checked:

1. Improper gas pressure - adjust to proper pressure (See *S-18 CHECKING GAS PRESSURE*).
2. Improper burner positioning - burners should be in locating slots, level front to rear and left to right.
3. Carry over (lighter tube or cross lighter) obstructed - clean.
4. Main burner orifice(s) deformed, or out of alignment to burner - replace.

S-20 CHECKING FOR FLASHBACK

Flashback will also cause burning in the burner venturi, but is caused by the burning speed being greater than the gas-air flow velocity coming from a burner port.

Flashback may occur at the moment of ignition, after a burner heats up or when the burner turns off. The latter is known as extinction pop.

Since the end results of flashback and delayed ignition can be the same (burning in the burner venturi) a definite attempt should be made to determine which has occurred.

If flashback should occur, check for the following:

1. Improper gas pressure - adjust to proper pressure (See *S-18 CHECKING GAS PRESSURE*).
2. Check burner for proper alignment and/or replace burner.
3. Improper orifice size - check orifice for obstruction.

SERVICING

S-21 CHECKING DUCT STATIC

The maximum and minimum allowable external static pressures are found in the specification section. These tables also show the amount of air being delivered at a given static by a given motor speed or pulley adjustment.

The furnace motor cannot deliver proper air quantities (CFM) against statics other than those listed.

Too great of an external static pressure will result in insufficient air that can cause excessive temperature rise, resulting in limit tripping, etc. Whereas not enough static may result in motor overloading.

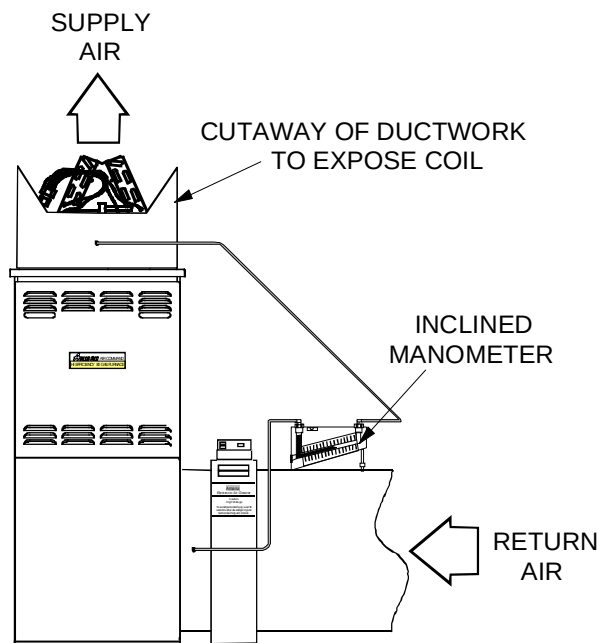
To determine proper air movement, proceed as follows:

1. With clean filters in the furnace, use a draft gauge (inclined manometer) to measure the static pressure of the return duct at the inlet of the furnace. (Negative Pressure)
2. Measure the static pressure of the supply duct. (Positive Pressure)
3. Add the two (2) readings together for total external static pressure.

Note: Both readings may be taken simultaneously and read directly on the manometer if so desired. If an air conditioning coil or Electronic Air Cleaner is used in conjunction with the furnace, the readings must also include these components, as shown in the following drawing.

4. Consult proper tables for the quantity of air.

If the total external static pressure exceeds the minimum or maximum allowable statics, check for closed dampers, registers, undersized and/or oversized poorly laid out duct work.



Checking Static Pressure

S-22 CHECKING TEMPERATURE RISE

Temperature rise is related to the BTUH output of the furnace and the amount of air (CFM) circulated over the heat exchanger.

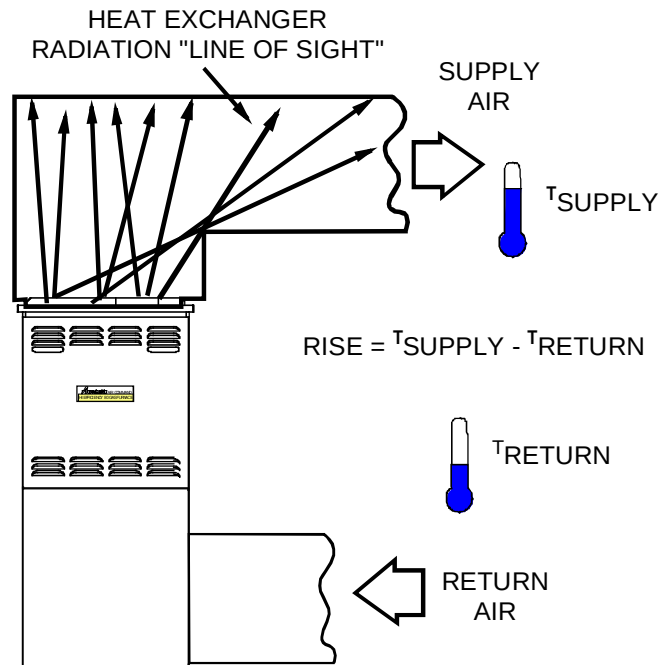
All furnaces are designed for a given range of temperature increase; that is the temperature of the air leaving the furnace minus the temperature of the air entering the furnace.

The more air (CFM) being delivered through a given furnace, the less the rise will be; so the less air (CFM) being delivered, the greater the rise. The temperature rise should be adjusted in accordance to a given furnace specifications and its external static pressure.

1. Check BTU input to furnace - do not exceed input rating stamped on rating plate.
2. Take entering and leaving air temperatures.

CAREFUL: Be sure the location selected for the leaving air temperature will not allow radiation from the heater exchanger to the thermometer.

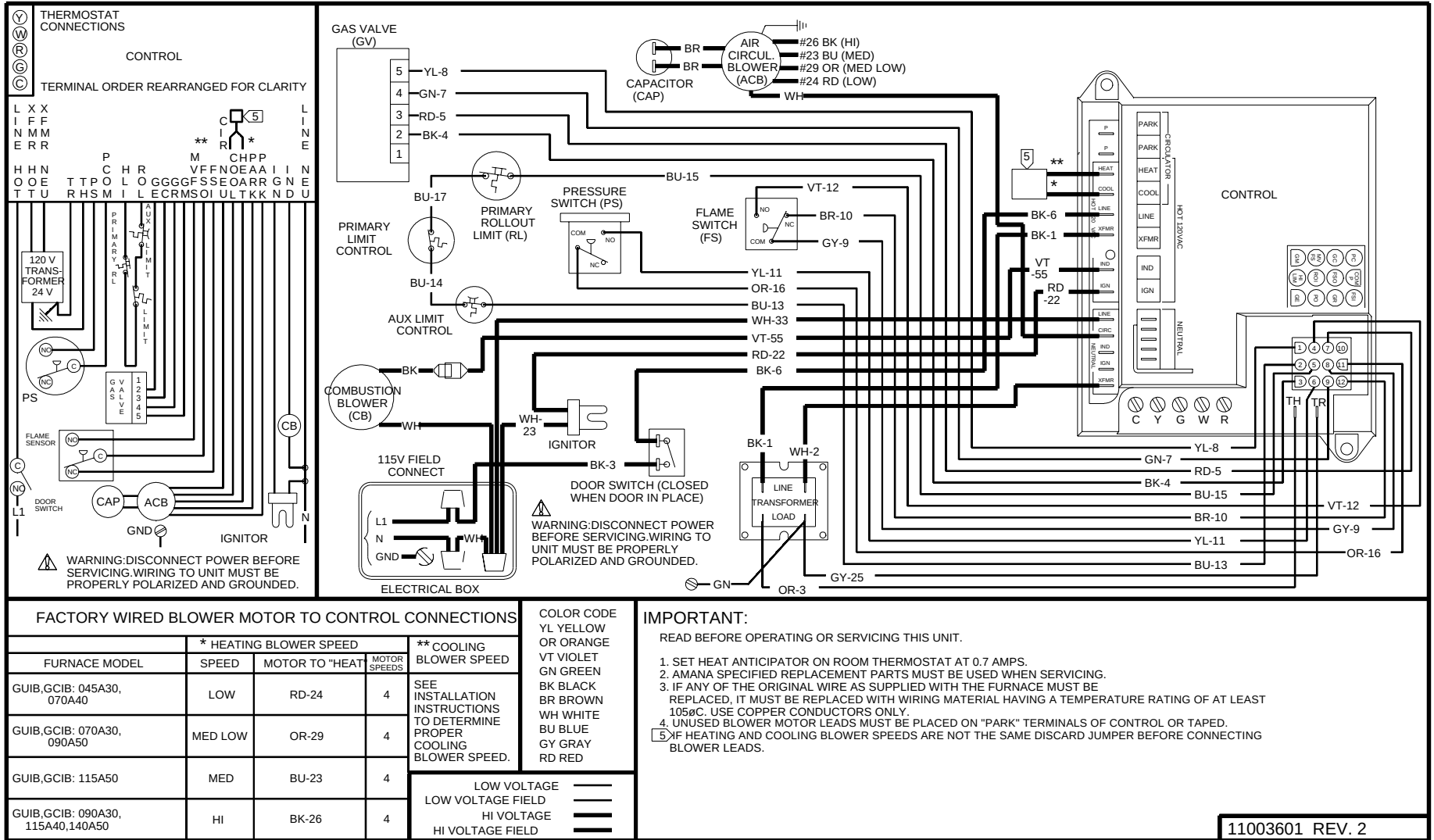
3. Adjust belt drive furnaces motor pulley accordingly and/or select the proper speed tap for direct drive furnaces.
4. Take motor amperage draw to determine that the motor is not overloaded during adjustments.



Checking Temperature Rise



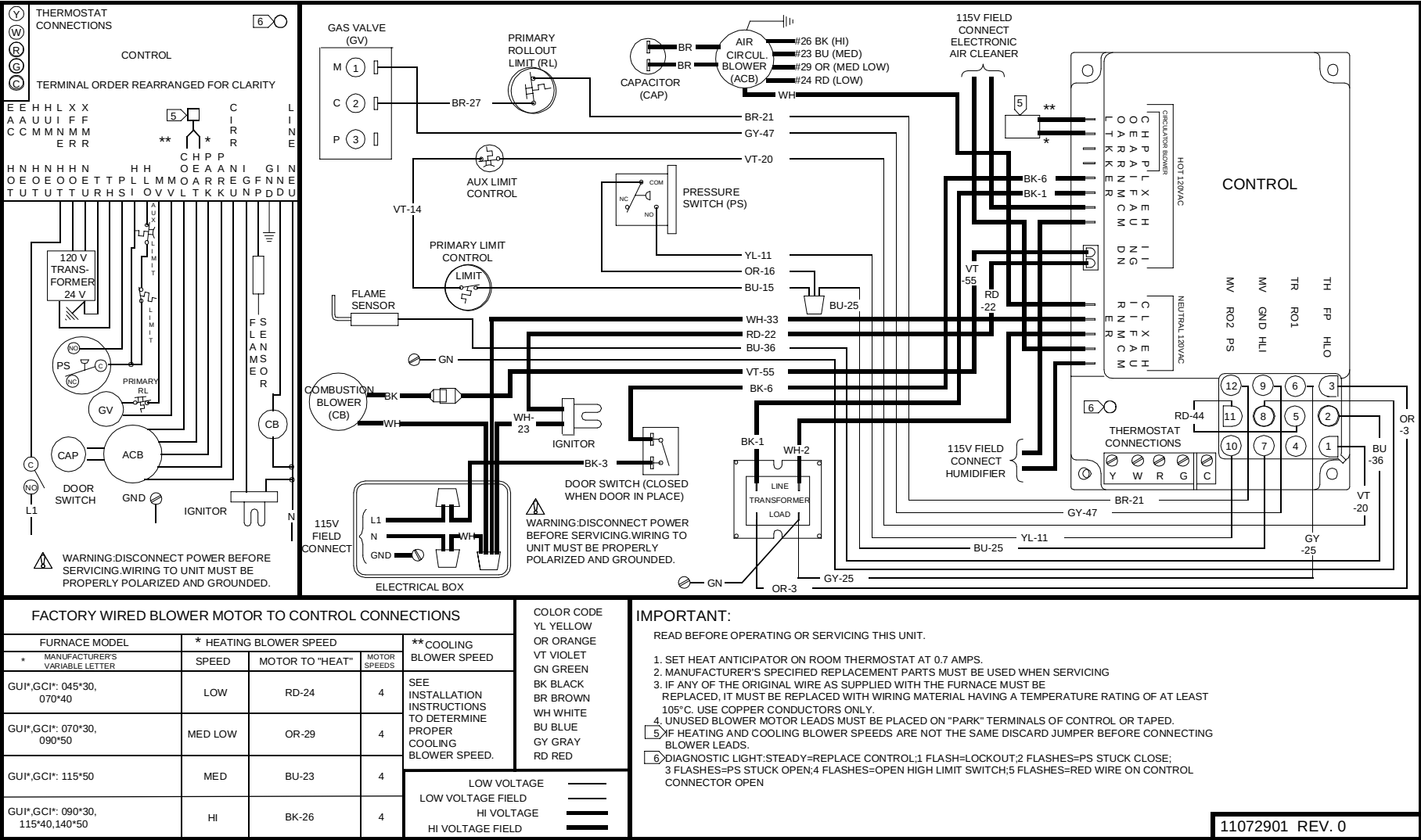
WIRING DIAGRAMS



WARNING

TO AVOID POSSIBLE ELECTRICAL SHOCK, PERSONAL INJURY, OR DEATH, DISCONNECT THE POWER BEFORE SERVICING.

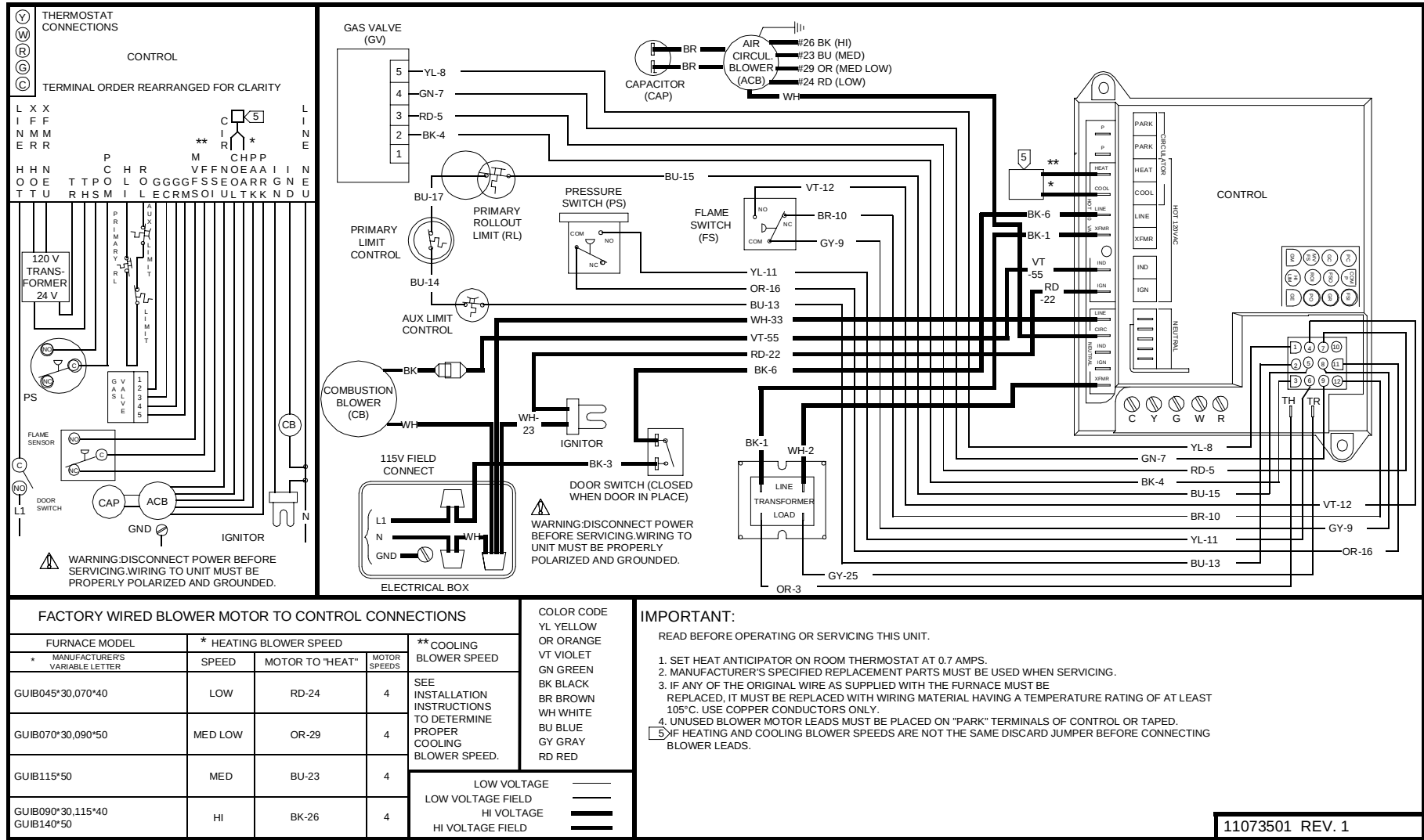
WIRING DIAGRAMS



WARNING

TO AVOID POSSIBLE ELECTRICAL SHOCK, PERSONAL INJURY, OR DEATH, DISCONNECT THE POWER BEFORE SERVICING.

WIRING DIAGRAMS



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WARNING

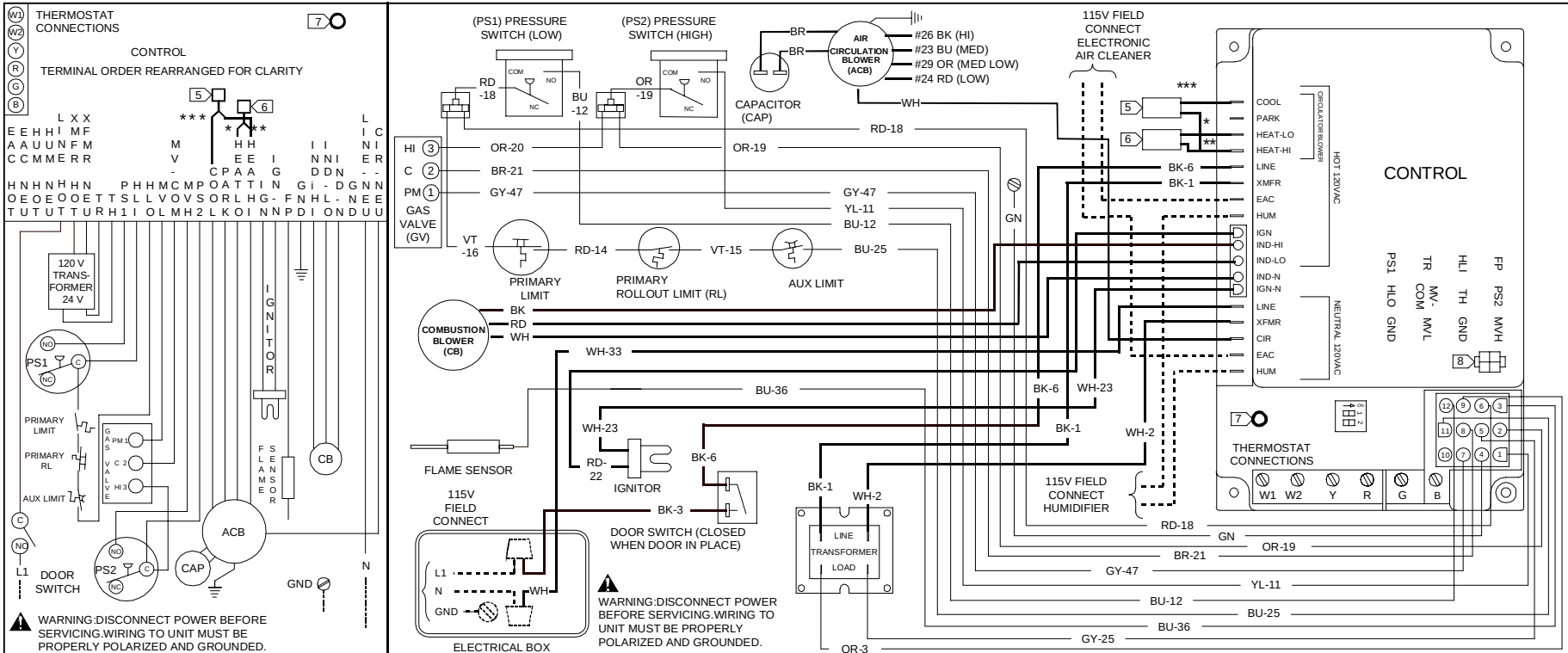
TO AVOID POSSIBLE ELECTRICAL SHOCK, PERSONAL INJURY, OR DEATH, DISCONNECT THE POWER BEFORE SERVICING.



**TO AVOID POSSIBLE ELECTRICAL SHOCK, PERSONAL INJURY,
OR DEATH, DISCONNECT THE POWER BEFORE SERVICING.**



WIRING DIAGRAMS



FACTORY WIRED BLOWER MOTOR TO CONTROL CONNECTIONS					COLOR CODE YL YELLOW OR ORANGE VT VIOLET GN GREEN BK BLACK BR BROWN WH WHITE BU BLUE GY GRAY RD RED	
FURNACE MODEL	HIGH STAGE **		LOW STAGE *			*** COOLING BLOWER SPEED
* MANUFACTURER'S VARIABLE LETTER	MOTOR SPEEDS	MOTOR TO HEAT	MOTOR SPEEDS	MOTOR TO HEAT	SEE INSTALLATION INSTRUCTIONS TO DETERMINE PROPER COOLING BLOWER SPEED.	
GUISO70*35	MED LOW	OR-29	LOW	RD-24		
GUISO90*30	HIGH	BK-26	MED-LO	OR-29		
GUISO90*50	MED LOW	OR-29	LOW	RD-24		
GUIS115*50	MED LOW	OR-29	LOW	RD-24		
GUIS140*50	MED HI	BU-23	LOW	RD-24		
GCISO70*35	MED LOW	OR-29	LOW	RD-24		
GCISO90*50	MED LOW	OR-29	LOW	RD-24	LOW VOLTAGE	_____
					LOW VOLTAGE FIELD	-----
					HI VOLTAGE	=====
					HI VOLTAGE FIELD	-----

IMPORTANT:
READ BEFORE OPERATING OR SERVICING THIS UNIT

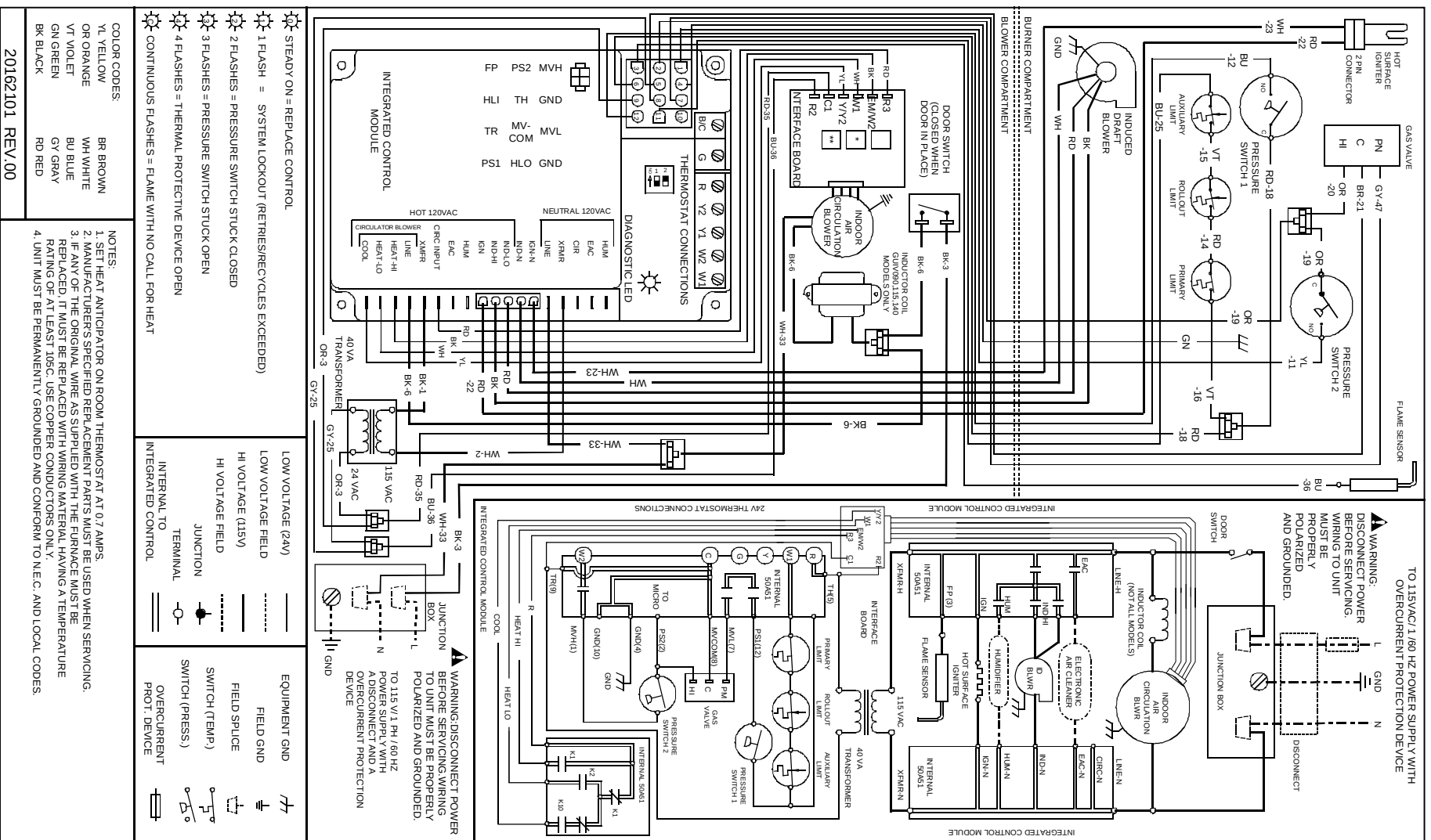
1. SET HEAT ANTICIPATOR ON ROOM THERMOSTAT AT 0.7 AMPS.
2. AMANA SPECIFIED REPLACEMENT PARTS MUST BE USED WHEN SERVICING.
3. IF ANY OF THE ORIGINAL WIRE AS SUPPLIED WITH THE FURNACE MUST BE REPLACED, IT MUST BE REPLACED WITH WIRING MATERIAL HAVING A TEMPERATURE RATING OF AT LEAST 105C. USE COPPER CONDUCTORS ONLY.
4. UNUSED BLOWER MOTOR LEADS MUST BE PLACED ON "PARK" TERMINALS OF CONTROL OR TAPED.
5. IF HEATING AND COOLING BLOWER SPEEDS ARE NOT THE SAME DISCARD JUMPER BEFORE CONNECTING BLOWER LEADS. USED ONLY IF HIGH STAGE HEAT AND COOLING USE THE SAME SPEED.
6. IF HIGH STAGE HEAT AND LOW STAGE HEAT SPEEDS ARE NOT THE SAME DISCARD JUMPER BEFORE CONNECTING BLOWER LEADS. USED ONLY IF HIGH STAGE HEAT AND LOW STAGE HEAT USE THE SAME SPEED.
7. DIAGNOSTIC LIGHT: CONTINUOUS= INTERNAL LOCKOUT-REPLACE CONTROL; 1 FLASH= EXTERNAL LOCKOUT-CHECK FURNACE; 2 FLASHES= PRESSURE SWITCH STUCK CLOSED; 3 FLASHES= PRESSURE SWITCH STUCK OPEN; 4 FLASHES= THERMAL PROTECTION DEVICE OPEN; CONTINUOUS FLASH#FLAME SENSED-NO CALL FOR HEAT STAT RECOVERY: (1/4 SEC. ON, 1/4 SEC. OFF)
8. PLUG CONNECT FOR FURNACE TWINNING.

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WARNING

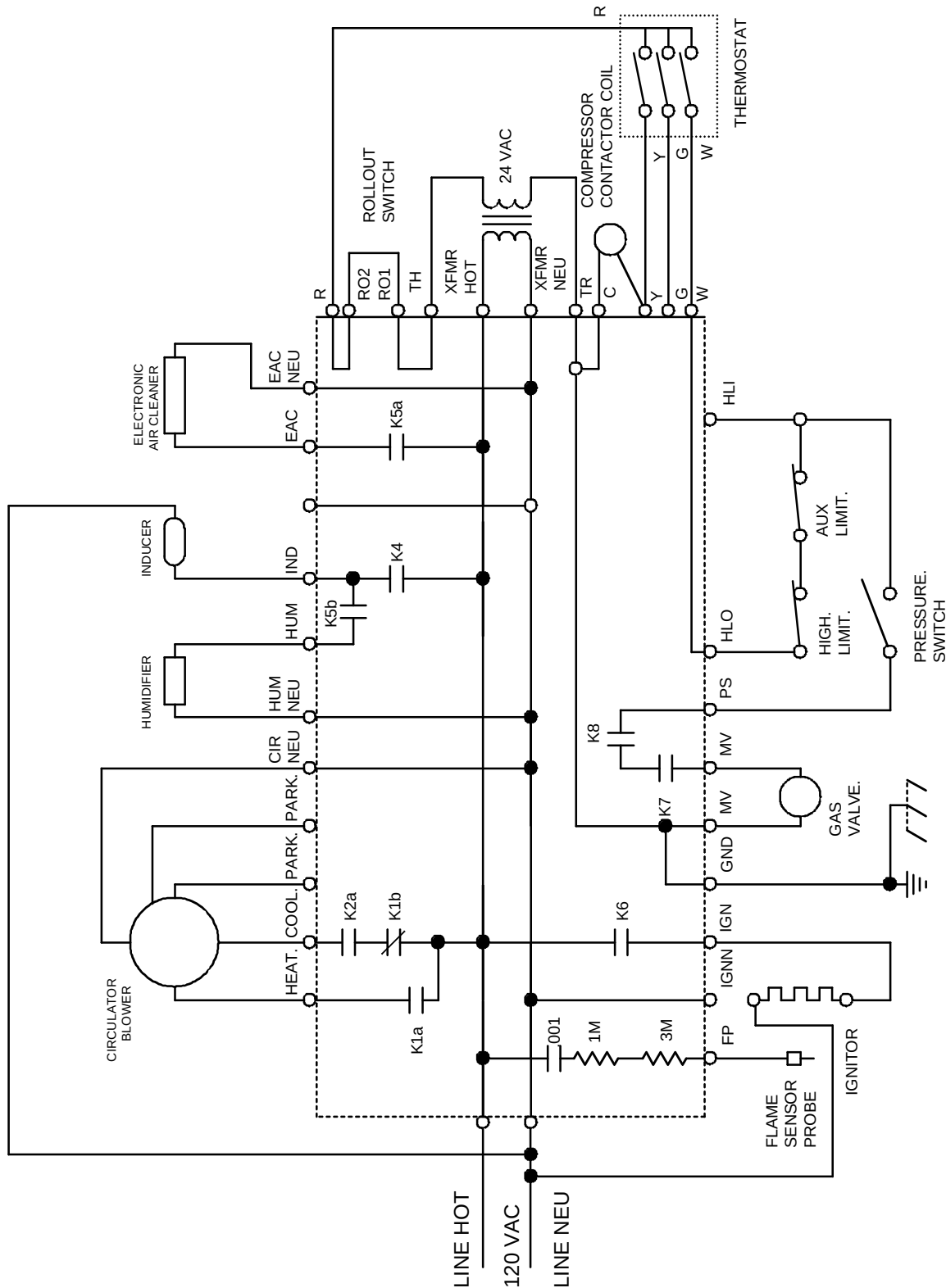
TO AVOID POSSIBLE ELECTRICAL SHOCK, PERSONAL INJURY, OR DEATH, DISCONNECT THE POWER BEFORE SERVICING.

WIRING DIAGRAMS



**TO AVOID POSSIBLE ELECTRICAL SHOCK, PERSONAL INJURY,
OR DEATH, DISCONNECT THE POWER BEFORE SERVICING.**

SCHEMATICS



GUIA, GUIC, GCIA, GCIC

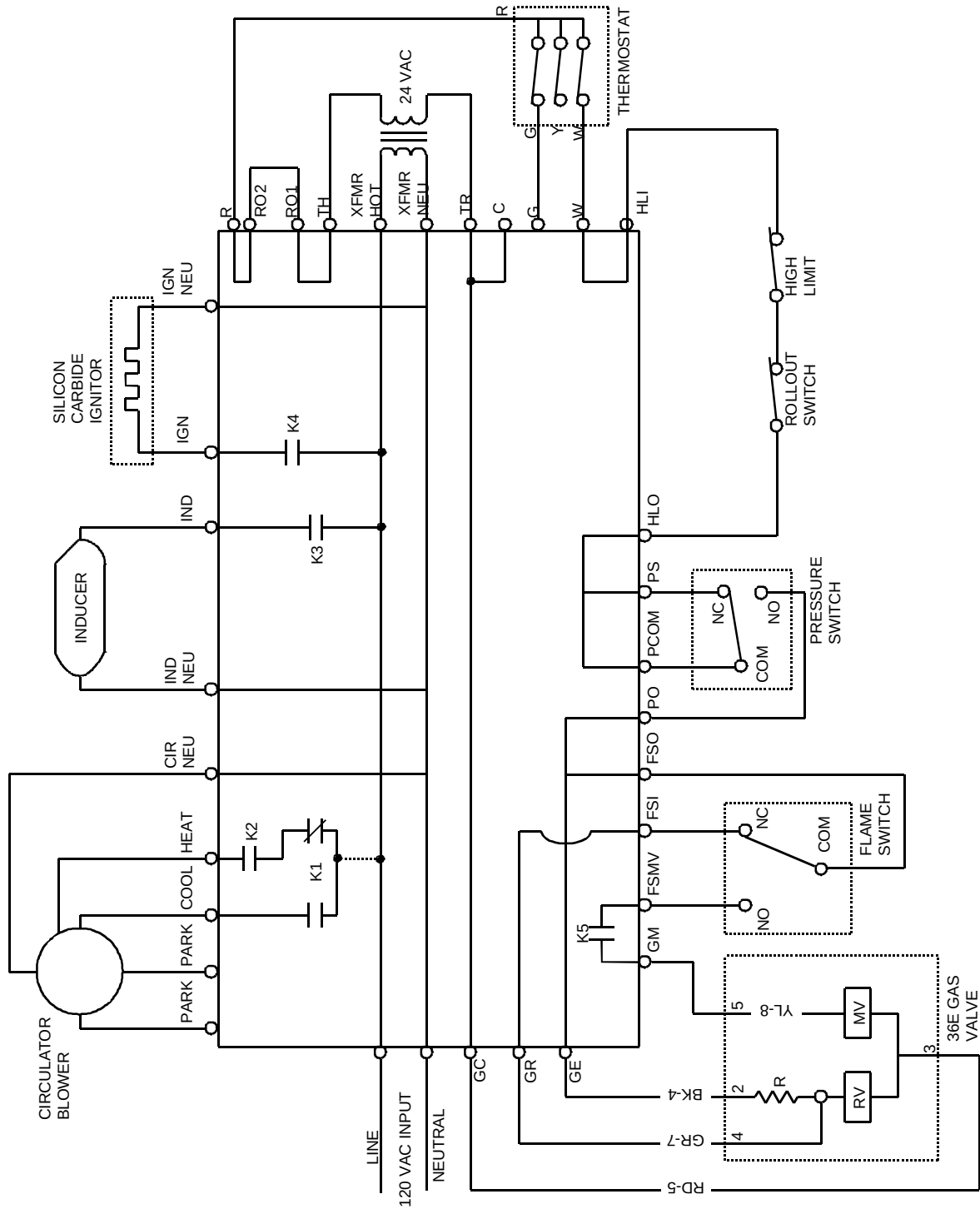
WHITE-RODGERS 50A50 INTEGRATED IGNITION CONTROL

This schematic is for reference only. Not all wiring is as shown above, refer to the appropriate wiring diagram for the unit being serviced.

WARNING

TO AVOID POSSIBLE ELECTRICAL SHOCK, PERSONAL INJURY, OR DEATH, DISCONNECT THE POWER BEFORE SERVICING.

SCHEMATICS



GUIB, GCIB

WHITE-RODGERS 50A52 RADIANT SENSE IGNITION CONTROL

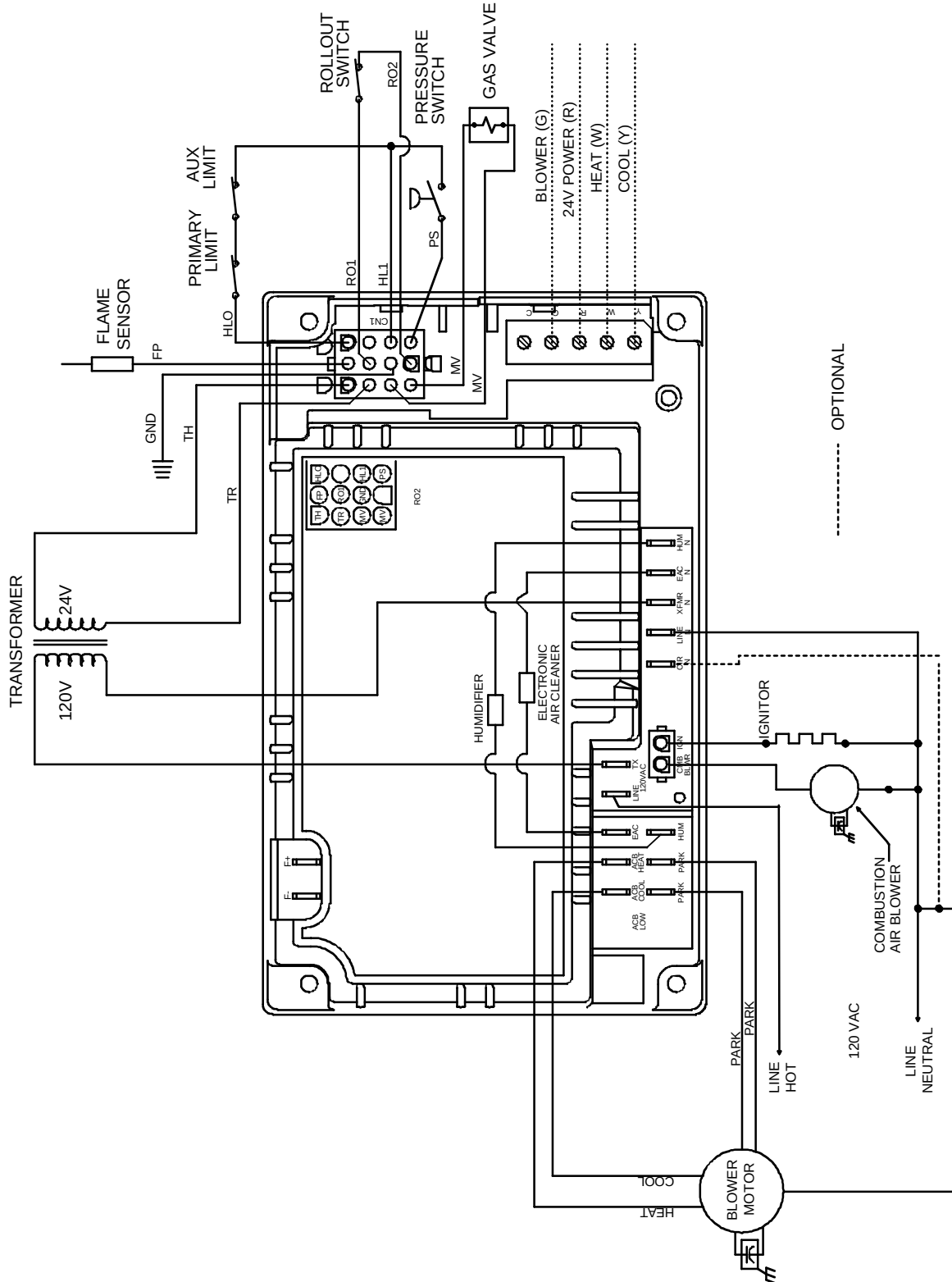
This schematic is for reference only. Not all wiring is as shown above, refer to the appropriate wiring diagram for the unit being serviced.

WARNING



TO AVOID POSSIBLE ELECTRICAL SHOCK, PERSONAL INJURY, OR DEATH, DISCONNECT THE POWER BEFORE SERVICING.

SCHEMATICS



GUID

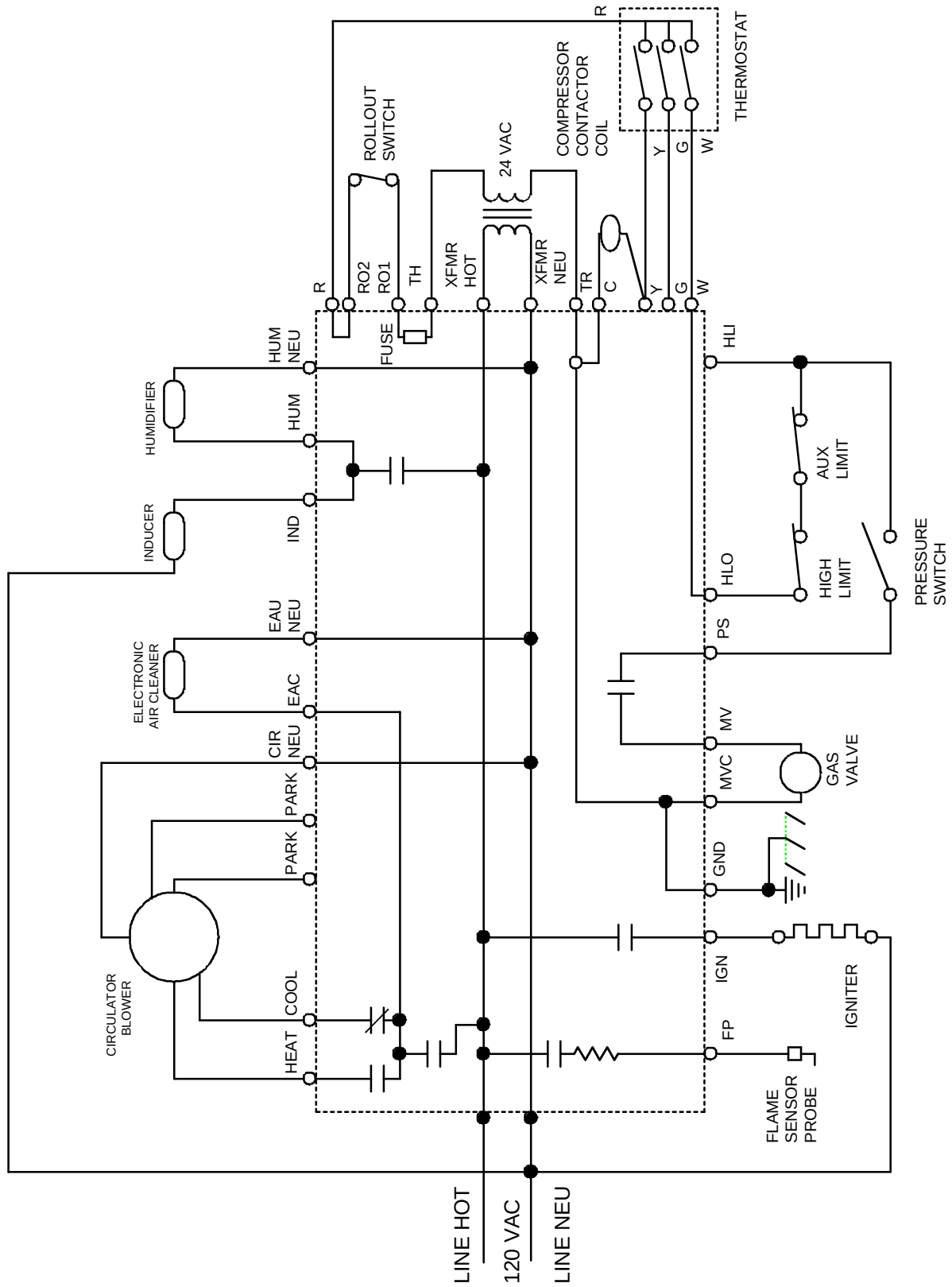
HEATCRAFT HSI 1-1A INTEGRATED IGNITION CONTROL

This schematic is for reference only. Not all wiring is as shown above, refer to the appropriate wiring diagram for the unit being serviced.

WARNING

TO AVOID POSSIBLE ELECTRICAL SHOCK, PERSONAL INJURY, OR DEATH, DISCONNECT THE POWER BEFORE SERVICING.

SCHEMATICS



GUID

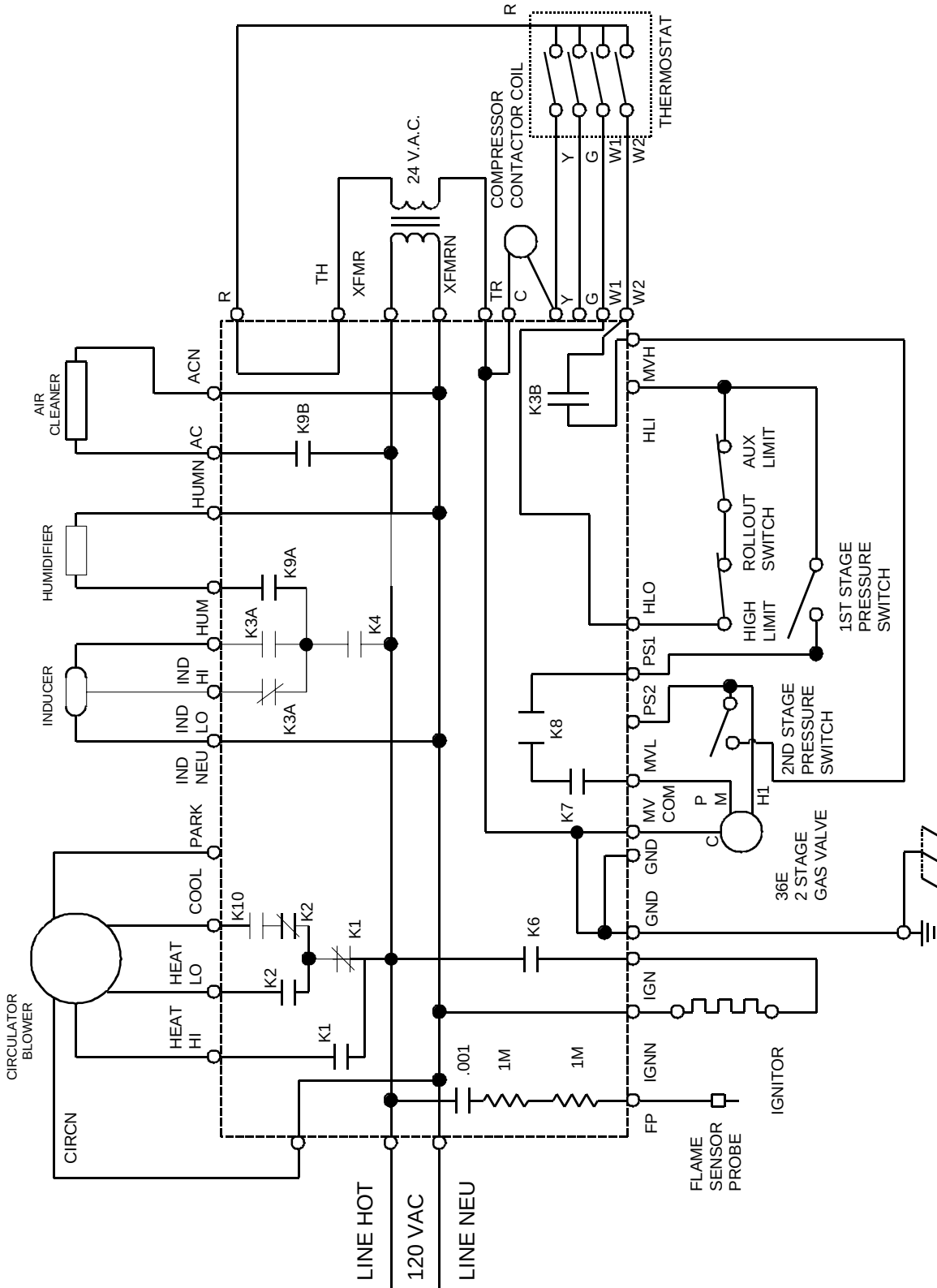
HEATCRAFT HSI-2 INTEGRATED IGNITION CONTROL

This schematic is for reference only. Not all wiring is as shown above, refer to the appropriate wiring diagram for the unit being serviced.

WARNING

TO AVOID POSSIBLE ELECTRICAL SHOCK, PERSONAL INJURY, OR DEATH, DISCONNECT THE POWER BEFORE SERVICING.

SCHEMATICS



GUIS, GCIS

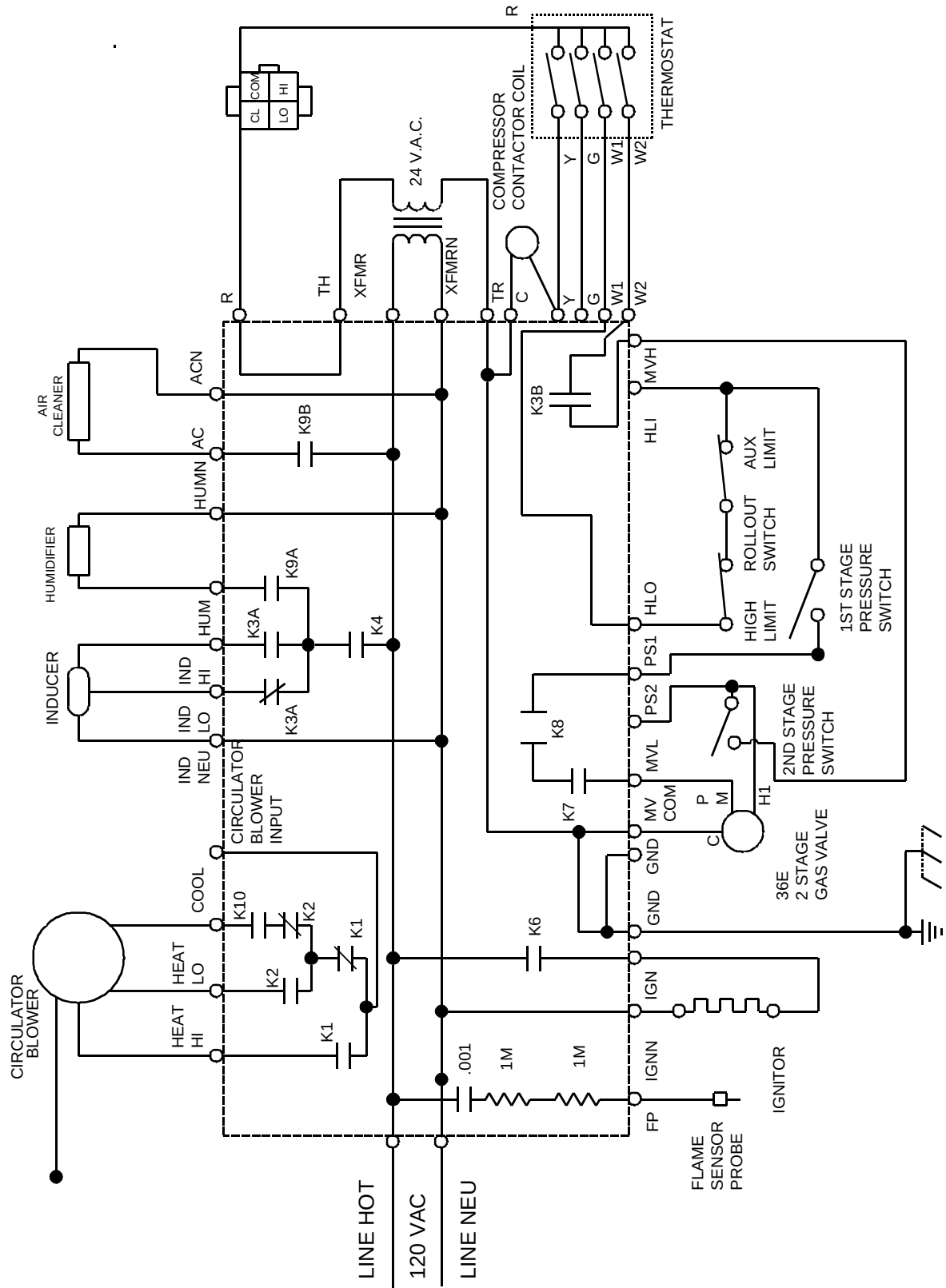
WHITE-RODGERS 50A51-215 INTEGRATED IGNITION CONTROL

This schematic is for reference only. Not all wiring is as shown above, refer to the appropriate wiring diagram for the unit being serviced.

TO AVOID POSSIBLE ELECTRICAL SHOCK, PERSONAL INJURY, OR DEATH, DISCONNECT THE POWER BEFORE SERVICING.

WARNING

SCHEMATICS



GUIV

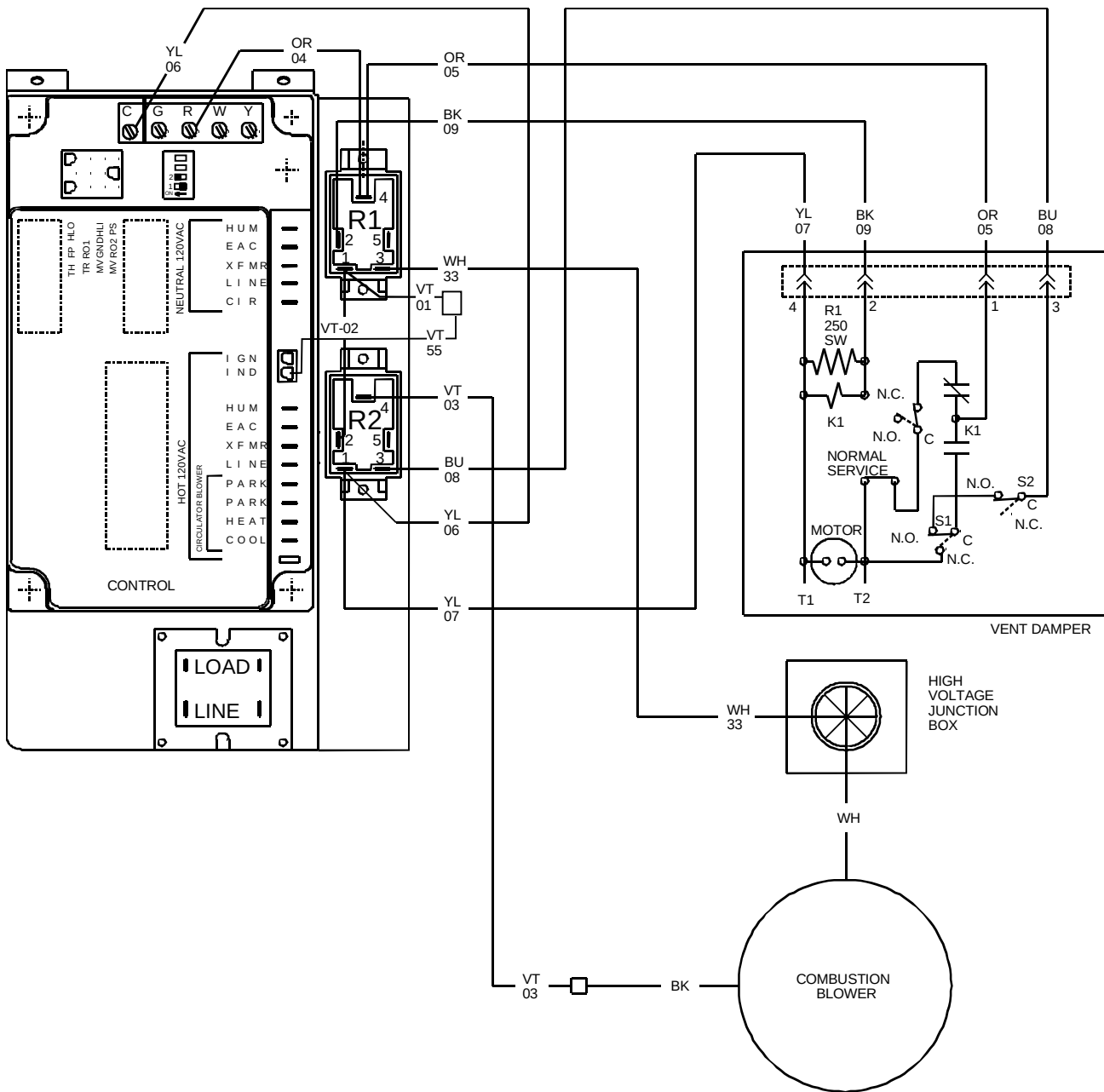
WHITE-RODGERS 50A51-255 INTEGRATED IGNITION CONTROL

This schematic is for reference only. Not all wiring is as shown above, refer to the appropriate wiring diagram for the unit being serviced.

WARNING

TO AVOID POSSIBLE ELECTRICAL SHOCK, PERSONAL INJURY, OR DEATH, DISCONNECT THE POWER BEFORE SERVICING.

SCHEMATICS



Point to Point Wiring

FURNACE COMMON VENT KIT- CVK4-7

This schematic is for reference only. Not all wiring is as shown above, refer to the appropriate wiring diagram for the unit being serviced.

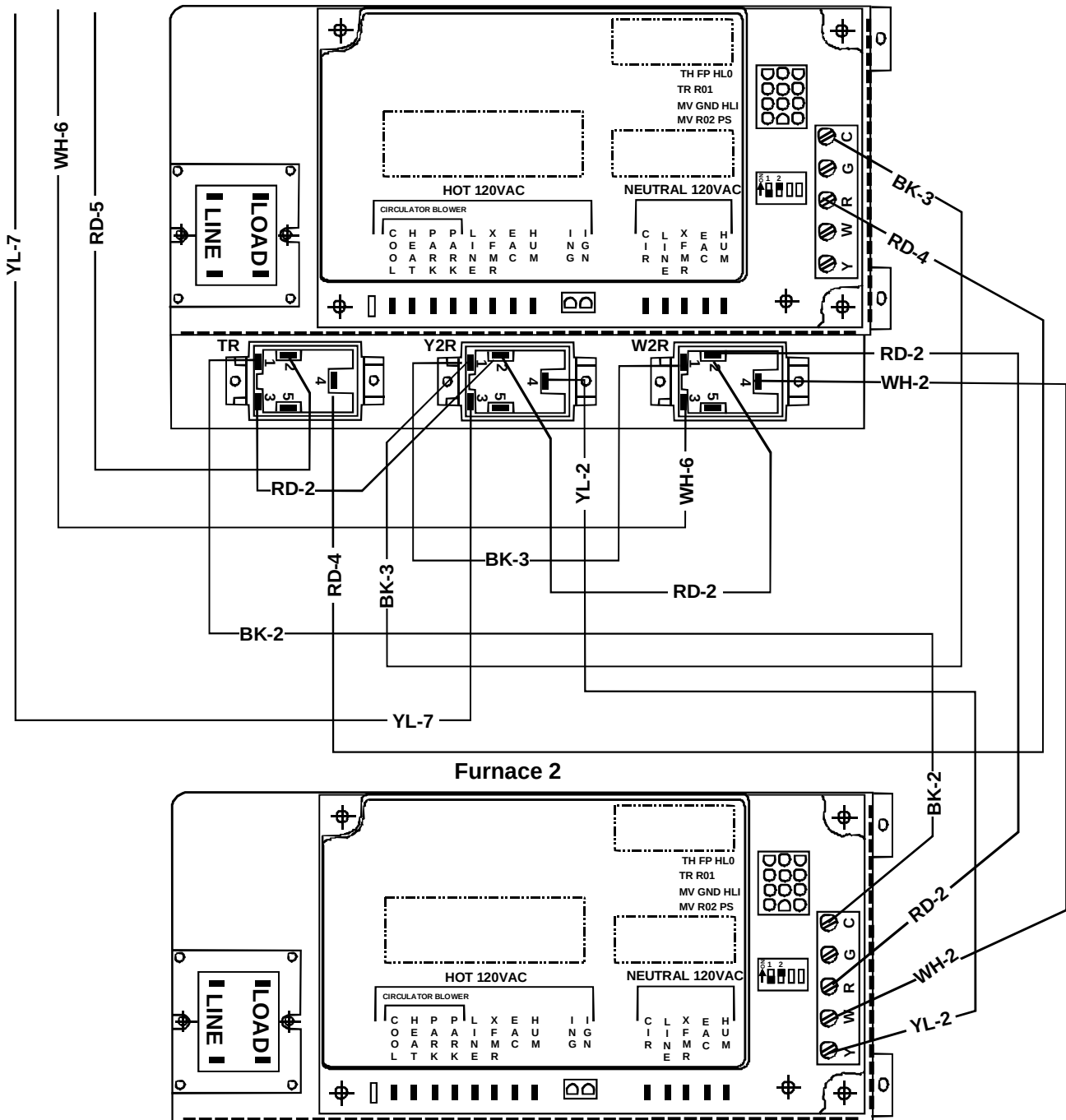
TO AVOID POSSIBLE ELECTRICAL SHOCK, PERSONAL INJURY, OR DEATH, DISCONNECT THE POWER BEFORE SERVICING.

WARNING



SCHEMATICS

Furnace 1



Furnace 2

FURNACE TWINING KIT - FTK02A

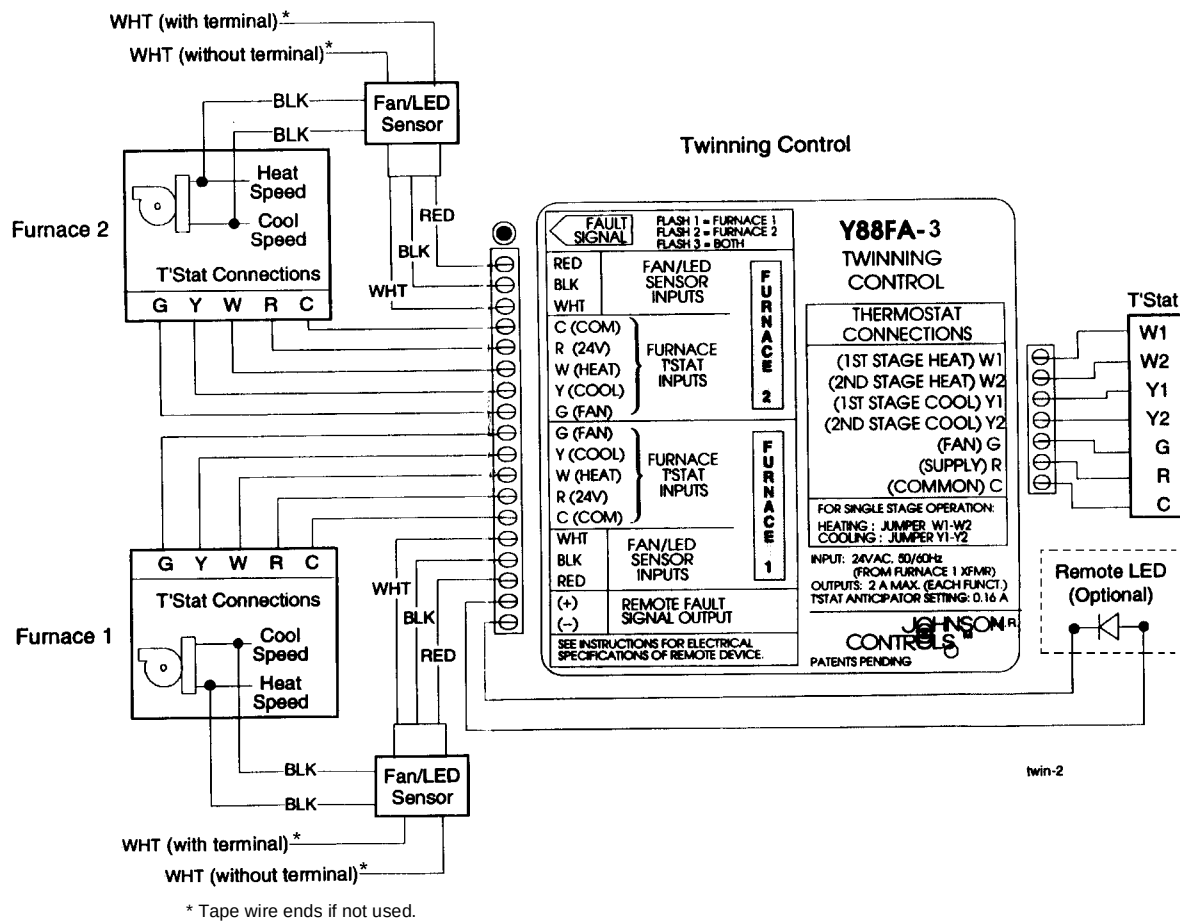
This schematic is for reference only. Not all wiring is as shown above, refer to the appropriate wiring diagram for the unit being serviced.

(Not for use with GUIIS/GCIS/GUIV Furnaces)

TO AVOID POSSIBLE ELECTRICAL SHOCK, PERSONAL INJURY, OR DEATH, DISCONNECT THE POWER BEFORE SERVICING.

WARNING

SCHEMATICS



FURNACE TWINNING KIT - FTK03A

This schematic is for reference only. Not all wiring is as shown above, refer to the appropriate wiring diagram for the unit being serviced.

(Not for use with GUIS/GCIS/GUIV Furnaces)

TO AVOID POSSIBLE ELECTRICAL SHOCK, PERSONAL INJURY, OR DEATH, DISCONNECT THE POWER BEFORE SERVICING.

WARNING