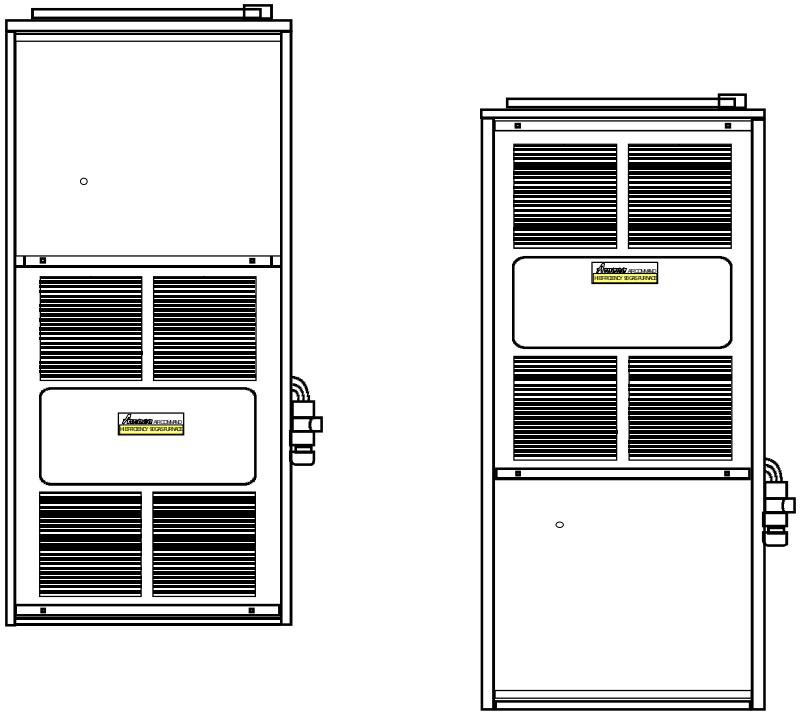
Model and Manufacturing numbers listed on pages 4 & 5.

Service Instructions

48" 90% Condensing Gas Furnaces
GUC, GUD, GUX, GCC, GCD, GDC & Accessories



Amana® Heating • Air Conditioning

BUILT BETTER THAN IT HAS TO BE™

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

RS6610001
Revision 3
June 2000

INDEX

This manual replaces RS6610001 Rev. 2.

REV. 3 - Corrections made to manual, no new models added.

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

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

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

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

⚠ CAUTION **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
GUC045B30A	P9898401F
GUC070B30A	P9898402F
GUC070B40A	P9898403F
GUC090B35A	P9898404F
GUC090B50A	P9898405F
GUC115B50A	P9898406F
GUC045B30B	P1106901F
GUC070B30B	P1106902F
GUC070B40B	P1106903F
GUC090B35B	P1106904F
GUC090B50B	P1106905F
GUC115B50B	P1106906F
GUC045B30C	P1114301F
GUC070B30C	P1114302F
GUC070B40C	P1114303F
GUC090B35C	P1114304F
GUC090B50C	P1114305F
GUC115B50C	P1114306F
GUC045C30C	P1114307F
GUC070C30C	P1114308F
GUC070C40C	P1114309F
GUC090C35C	P1114310F
GUC090C50C	P1114311F
GUC115C50C	P1114312F
GUC045X30A	P1173601F
GUC070X30A	P1173602F
GUC070X40A	P1173603F
GUC090X35A	P1173604F
GUC090X50A	P1173605F
GUC115X50A	P1173606F
GUC045X30B	P1208701F
GUC070X30B	P1208702F
GUC070X40B	P1208703F
GUC090X35B	P1208704F
GUC090X50B	P1208705F
GUC115X50B	P1208706F
GUC045X30B	P1212901F
GUC070X30B	P1212902F
GUC070X40B	P1212903F
GUC090X35B	P1212904F
GUC090X50B	P1212905F
GUC115X50B	P1212906F

MODEL	M/N
GUC090X35BI	P1209404F
GCC045B30A	P9898501F
GCC070B30A	P9898502F
GCC070B40A	P9898503F
GCC090B40A	P9898504F
GCC090B50A	P9898505F
GCC115B50A	P9898506F
GCC045B30B	P1107001F
GCC070B30B	P1107002F
GCC070B40B	P1107003F
GCC090B40B	P1107004F
GCC090B50B	P1107005F
GCC115B50B	P1107006F
GCC045C30C	P1114407F
GCC070C30C	P1114408F
GCC070C40C	P1114409F
GCC090C40C	P1114410F
GCC090C50C	P1114411F
GCC115C50C	P1114412F
GCC045C30C	P1161801F
GCC070C30C	P1161802F
GCC070C40C	P1161803F
GCC090C40C	P1161804F
GCC090C50C	P1161805F
GCC115C50C	P1161806F
GCC045X30A	P1161807F
GCC070X30A	P1161808F
GCC070X40A	P1161809F
GCC090X40A	P1161810F
GCC090X50A	P1161811F
GCC115X50A	P1161812F
GUD045B30A	P1115001F
GUD070B30A	P1115002F
GUD070B40A	P1115003F
GUD090B35A	P1115004F
GUD090B50A	P1115005F
GUD115B50A	P1115006F
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GUD070C30A	P1115008F
GUD070C40A	P1115009F
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GUD090C50A	P1115011F
GUD115C50A	P1115012F

MODEL	M/N
GUD045C30A	P1164501F
GUD070C30A	P1164502F
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GUD090X50A	P1164511F
GUD115X50A	P1164512F
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GUD070X30B	P1208002F
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GUD070X40B	P1213103F
GUD090X35B	P1213104F
GUD090X50B	P1213105F
GUD115X50B	P1213106F
GUX045B30A	P1119801F
GUX070B30A	P1119802F
GUX070B40A	P1119803F
GUX090B35A	P1119804F
GUX090B50A	P1119805F
GUX115B50A	P1119806F
GUX045B30A	P1161701F
GUX070B30A	P1161702F
GUX070B40A	P1161703F
GUX090B35A	P1161704F
GUX090B50A	P1161705F
GUX115B50A	P1161706F

MODEL	M/N
GUX045X30A	P1161707F
GUX070X30A	P1161708F
GUX070X40A	P1161709F
GUX090X35A	P1161710F
GUX090X50A	P1161711F
GUX115X50A	P1161712F
GUX045X30B	P1207801F
GUX070X30B	P1207802F
GUX070X40B	P1207803F
GUX090X35B	P1207804F
GUX090X50B	P1207805F
GUX115X50B	P1207806F
GUX045X30B	P1213001F
GUX070X30B	P1213002F
GUX070X40B	P1213003F
GUX090X35B	P1213004F
GUX090X50B	P1213005F
GUX115X50B	P1213006F
GUX070X30BI	P1209302F
GDC045X30B	P1208101F
GDC070X30B	P1208102F
GDC070X40B	P1208103F
GDC090X40B	P1208104F
GDC090X50B	P1208105F
GDC115X50B	P1208106F
GDC045X30B	P1213201F
GDC070X30B	P1213202F
GDC070X40B	P1213203F
GDC090X40B	P1213204F
GDC090X50B	P1213205F
GDC115X50B	P1213206F
GCD070X30B	P1212802F
GCD090X40B	P1212804F
GCD070X30B	P1217602F
GCD090X40B	P1217604F

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.

FURNACE ACCESSORY KITS

FFK_ Fossil Fuel Kit

FTK_ Furnace Twinning Kit

HANG_ High Altitude Natural Gas Kit

HALP_ High Altitude LP Kit

HAPS_ High Altitude Pressure Switch Kit

LPTK_ LP Conversion Kit

Note: For the furnace accessory kits listed above, see servicing section for available kits and usage.

ADDITIONAL FURNACE ACCESSORY KITS

CCC_ Counterflow Coil Cabinet Assembly

CCU_ Coil Cabinet Upflow Assembly

Note: For the two additional furnace accessory kits listed above, see accessory parts catalog for available kits and usage.

CFC_ Counterflow Filter Cabinet Assembly

CFSB_ Counterflow Subbase

CFRK_ Counterflow Filter Rack Kit

EAC_ Electronic Air Cleaner

EFR_ External Filter Rack Kit

HDF_ Horizontal Duct Flange Kit

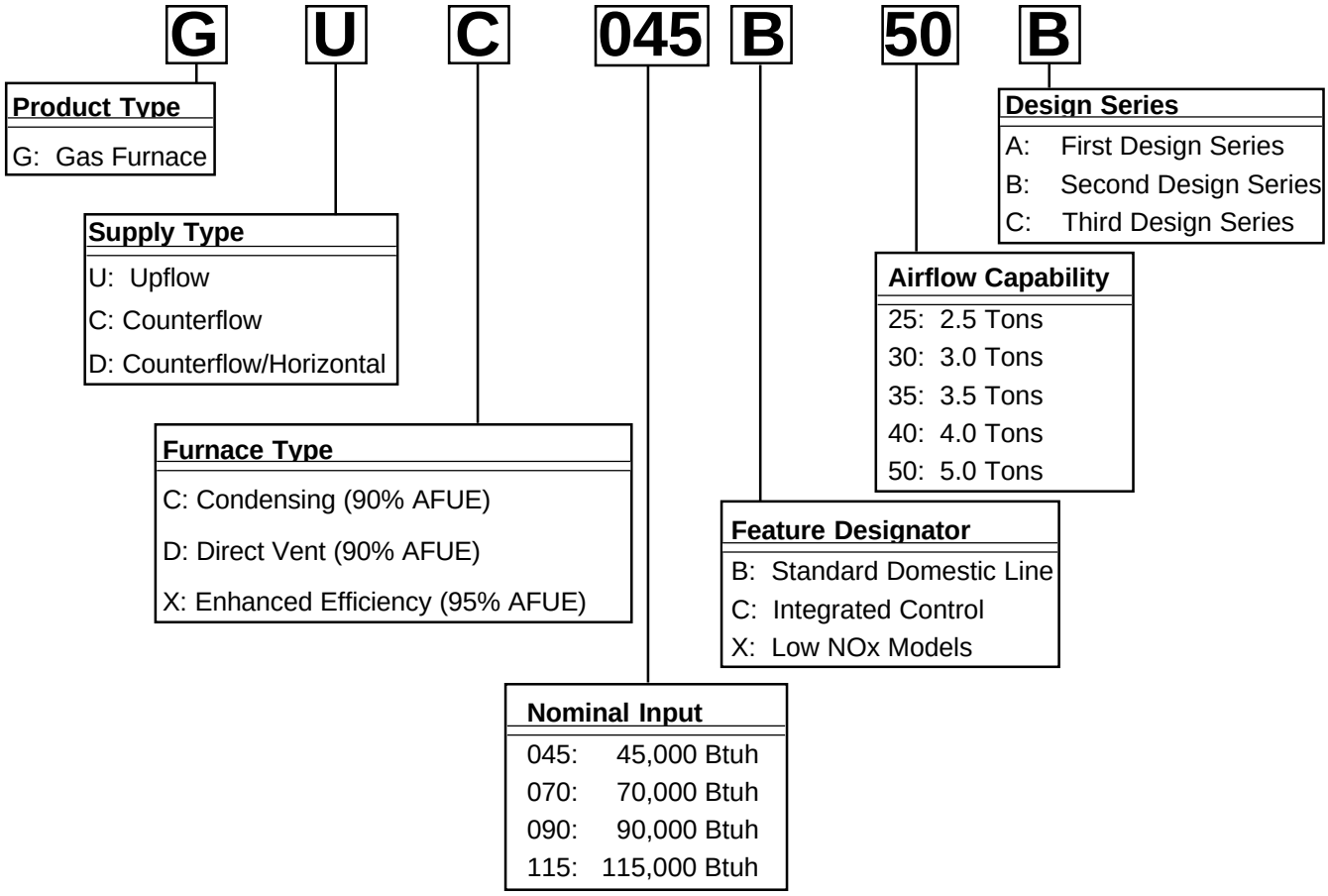
HFC_ Horizontal Filter Cabinet Assembly

MAC_ Media Air Cleaner

MAF_ Media Air Filter (Replacement Filter For MAC_)

Note: For additional furnace accessory kits listed above, see product identification section pages 14, 15 and 16 for available kits 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 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.

LIRE AVANT DE METTRE EN MARCHELIRE

AVERTISSEMENT: Quiconque ne respecte pas á la lettre les instructions dans le présent manuel risque de déclecher un incendie ou une explosion entraînant des dammages 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'appariel pour déceler une odeur de gaz. Renifler près du plancher, car certains gaz sont plus lourds que l'air et peuvent s'accumuler au niveau du so.l

QUE FAIRE S'IL Y A UNE ODEUR DE GAZ

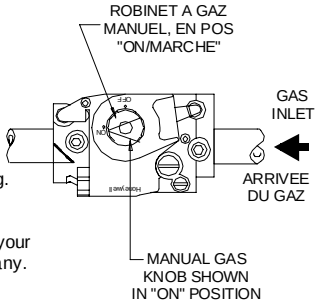
- Ne pas tenter d'allumer l'appariel
- Ne toucher aucun interrupteur électrique; n'utiliser aucun téléphone dans le bâtiment.
- Appeler immédiatement le fournisseur de gaz en employant le téléphone dún voisin. Respecter à la lettre les instructions du fournisseur de gaz.
- Si personne ne répond, appeler le service des incendies.

C. Ne pousser ou tourner le robinet d'admission du gaz qu'à la main; ne jamais emploer 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 reparer 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. 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 MARCHE

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. Torner le robinet a gaz dans le sens des aigilles d'une montre ↷ en position "OFF/ARRET"
6. Attendre cinq (5) minutes pour laisser echapper tout le gaz. Renifler tout autour de l'appareil, y compris près du plancher, pour déceler une odeur de gaz. Si c'est le cas, ARRETER! Passer à l'étape B des instructions de sécuritié sur la portion supérieure de cette étiquette. S'il n'y a pas d'odeur de gaz, passer à l'étape suivanté.
7. Tourner le robinet a gaz dans le sens inverse des aigilles d'ne montre ↶ en pos "ON/MARCHE".
8. Remettre en place le panneau d'accés.
9. Mettre l'appareil sous tension.
10. Régler le thermostat à la température desirée.
11. Si l'appareil ne se met pas en marche, suiyre les instructions intitulées. Comment coupler l'admission de gaz de l'appereil et appeler un technicien qualifié ou le fourrnisseur 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. Torner le robinet a gaz dans le sens des aigilles d'une montre ↷ en position "OFF/ARRET". Ne pas forcer.
4. Remettre en place le panneau d'accès.

11072702

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.

LIRE AVANT DE METTRE EN MARCHELIRE

AVERTISSEMENT: Quiconque ne respecte pas á la lettre les instructions dans le présent manuel risque de déclecher un incendie ou une explosion entraînant des dammages 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'appariel pour déceler une odeur de gaz. Renifler près du plancher, car certains gaz sont plus lourds que l'air et peuvent s'accumuler au niveau du so.l

QUE FAIRE S'IL Y A UNE ODEUR DE GAZ

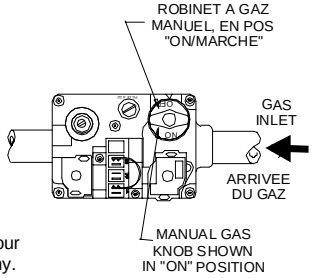
- Ne pas tenter d'allumer l'appariel
- Ne toucher aucun interrupteur électrique; n'utiliser aucun téléphone dans le bâtiment.
- Appeler immédiatement le fournisseur de gaz en employant le téléphone dún voisin. Respecter à la lettre les instructions du fournisseur de gaz.
- Si personne ne répond, appeler le service des incendies.

C. Ne pousser ou tourner le robinet d'admission du gaz qu'à la main; ne jamais emploer 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 reparer 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. 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 MARCHE

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. Torner le robinet a gaz dans le sens des aigilles d'une montre ↷ en position "OFF/ARRET"
6. Attendre cinq (5) minutes pour laisser echapper tout le gaz. Renifler tout autour de l'appareil, y compris près du plancher, pour déceler une odeur de gaz. Si c'est le cas, ARRETER! Passer à l'étape B des instructions de sécuritié sur la portion supérieure de cette étiquette. S'il n'y a pas d'odeur de gaz, passer à l'étape suivanté.
7. Tourner le robinet a gaz dans le sens inverse des aigilles d'ne montre ↶ en pos "ON/MARCHE".
8. Remettre en place le panneau d'accés.
9. Mettre l'appareil sous tension.
10. Régler le thermostat à la température desirée.
11. Si l'appareil ne se met pas en marche, suiyre les instructions intitulées. Comment coupler l'admission de gaz de l'appereil et appeler un technicien qualifié ou le fourrnisseur 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. Torner le robinet a gaz dans le sens des aigilles d'une montre ↷ en position "OFF/ARRET". Ne pas forcer.
4. Remettre en place le panneau d'accès.

11072703

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.

LIRE AVANT DE METTRE EN MARCHELIRE

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

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QUE FAIRE S'IL Y A UNE ODEUR DE GAZ

- Ne pas tenter d'allumer l'appariel
- Ne toucher aucun interrupteur électrique; n'utiliser aucun téléphone dans le bâtiment.
- Appeler immédiatement le fournisseur de gaz en employant le téléphone dún voisin. Respecter à la lettre les instructions du fournisseur de gaz.
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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

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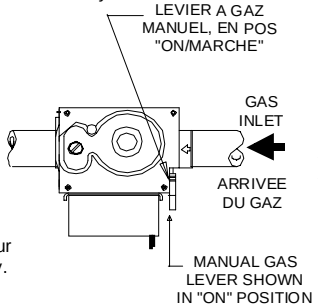
3. Turn off all power to the appliance.
4. This appliance is equipped with an ignition. device which automatically lights the burner. Do not try to light the burner by hand.
5. Turn the gas control lever clockwise ↷ to "OFF" Position. Do not force.
6. Wait five (5) minutes to clear out any gas. Then 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 lever 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 MARCHE

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. Torner le levier a gaz dans le sens des aigilles d'une montre ↷ en position "OFF/ARRET"
6. Attendre cinq (5) minutes pour laisser echapper tout le gaz. Renifler tout autour de l'appareil, y compris près du plancher, pour déceler une odeur de gaz. Si c'est le cas, ARRETER! Passer à l'étape B des instructions de sécuritié sur la portion supérieure de cette étiquette. S'il n'y a pas d'odeur de gaz, passer à l'étape suivanté.
7. Tourner le levier a gaz dans le sens inverse des aigilles d'ne montre ↶ en pos "ON/MARCHE".
8. Remettre en place le panneau d'accés.
9. Mettre l'appareil sous tension.
10. Régler le thermostat à la température desirée.
11. Si l'appareil ne se met pas en marche, suiyre les instructions intitulées. Comment coupler l'admission de gaz de l'appereil et appeler un technicien qualifié ou le fourrnisseur 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 lever 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. Torner le levier a gaz dans le sens des aigilles d'une montre ↷ en position "OFF/ARRET". Ne pas forcer.
4. Remettre en place le panneau d'accès.

11072706

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 á la lettre les instructions dans le présent manuel risque de déclecher un incendie ou une explosion entraînant des dammages 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'appariel pour déceler une odeur de gaz. Renifler près du plancher, car certains gaz sont plus lourds que l'air et peuvent s'accumuler au niveau du so.l

QUE FAIRE S'IL Y A UNE ODEUR DE GAZ

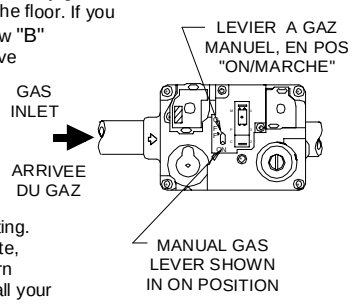
- Ne pas tenter d'allumer l'appariel
- Ne toucher aucun interrupteur électrique; n'utiliser aucun téléphone dans le bâtiment.
- Appeler immédiatement le fournisseur de gaz en employant le téléphone dún voisin. Respecter à la lettre les instructions du fournisseur de gaz.
- Si personne ne répond, appeler le service des incendies.

C. Ne pousser ou tourner le levier d'admission du gaz qu'à la main; ne jamais emploer 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 reparer 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 MARCHE

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 echapper tout le gaz. Renifler tout autour de l'appareil, y compris près du plancher, pour déceler une odeur de gaz. Si c'est le cas, ARRETER! Passer à l'étape B des instructions de sécuritié sur la portion supérieure de cette étiquette. S'il n'y a pas d'odeur de gaz, passer à l'étape suivanté.
7. Pousse le levier du contrôle du gaz à "ON/MARCHE" position.
8. Remettre en place le panneau d'accés.
9. Mettre l'appareil sous tension.
10. Régler le thermostat à la température desirée.
11. Si l'appareil ne se met pas en marche, suiyre les instructions intitulées. Comment coupler l'admission de gaz de l'appereil et appeler un technicien qualifié ou le fourrnisseur de gaz.

TO TURN OFF GAS TO APPLIANCE

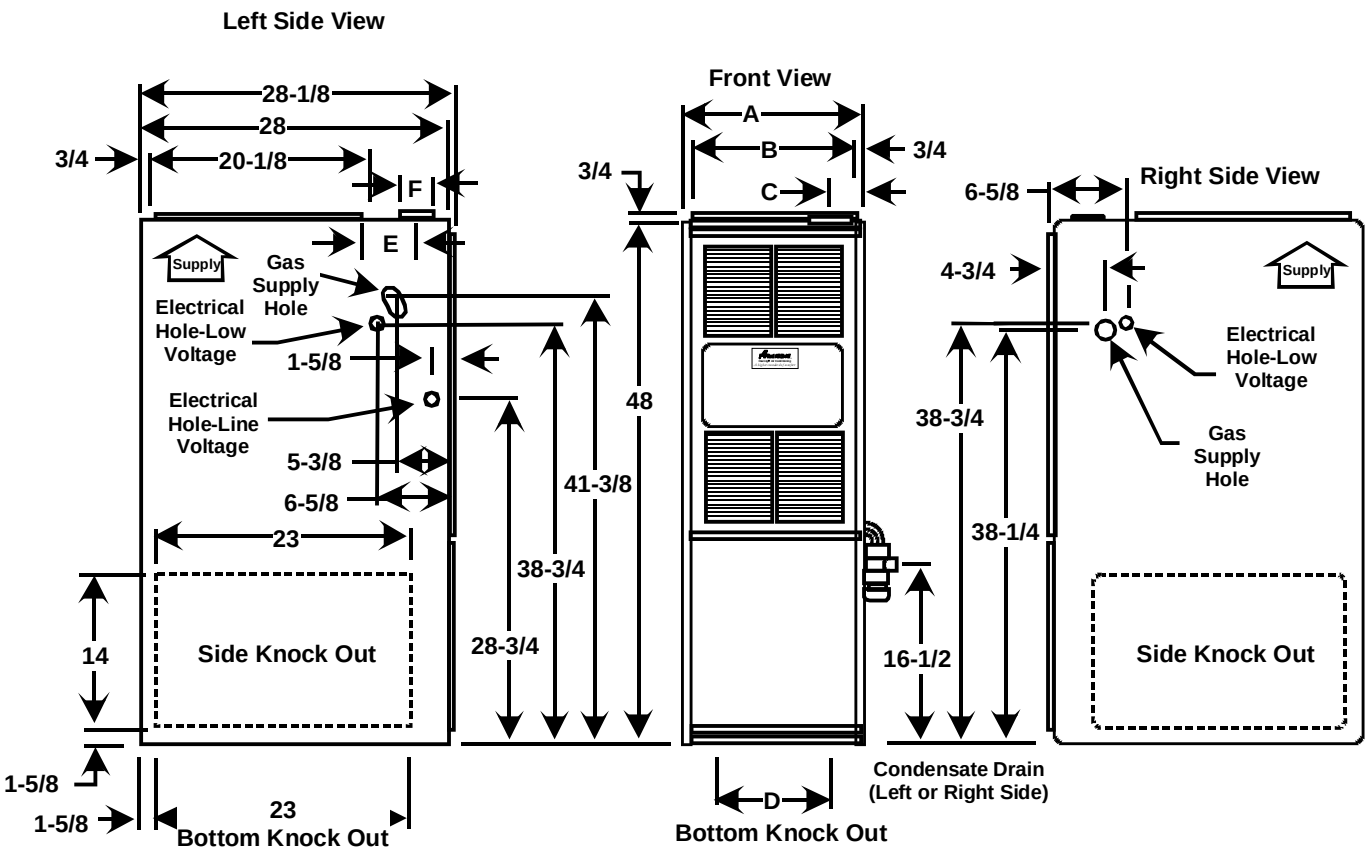
1. Set the thermostat to lowest setting.
2. Turn off all electric power to the appliance if service is to be performed.
3. Push the gas control lever to "OFF" Position. Do not force.
4. Replace control access panel.

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.

11072707

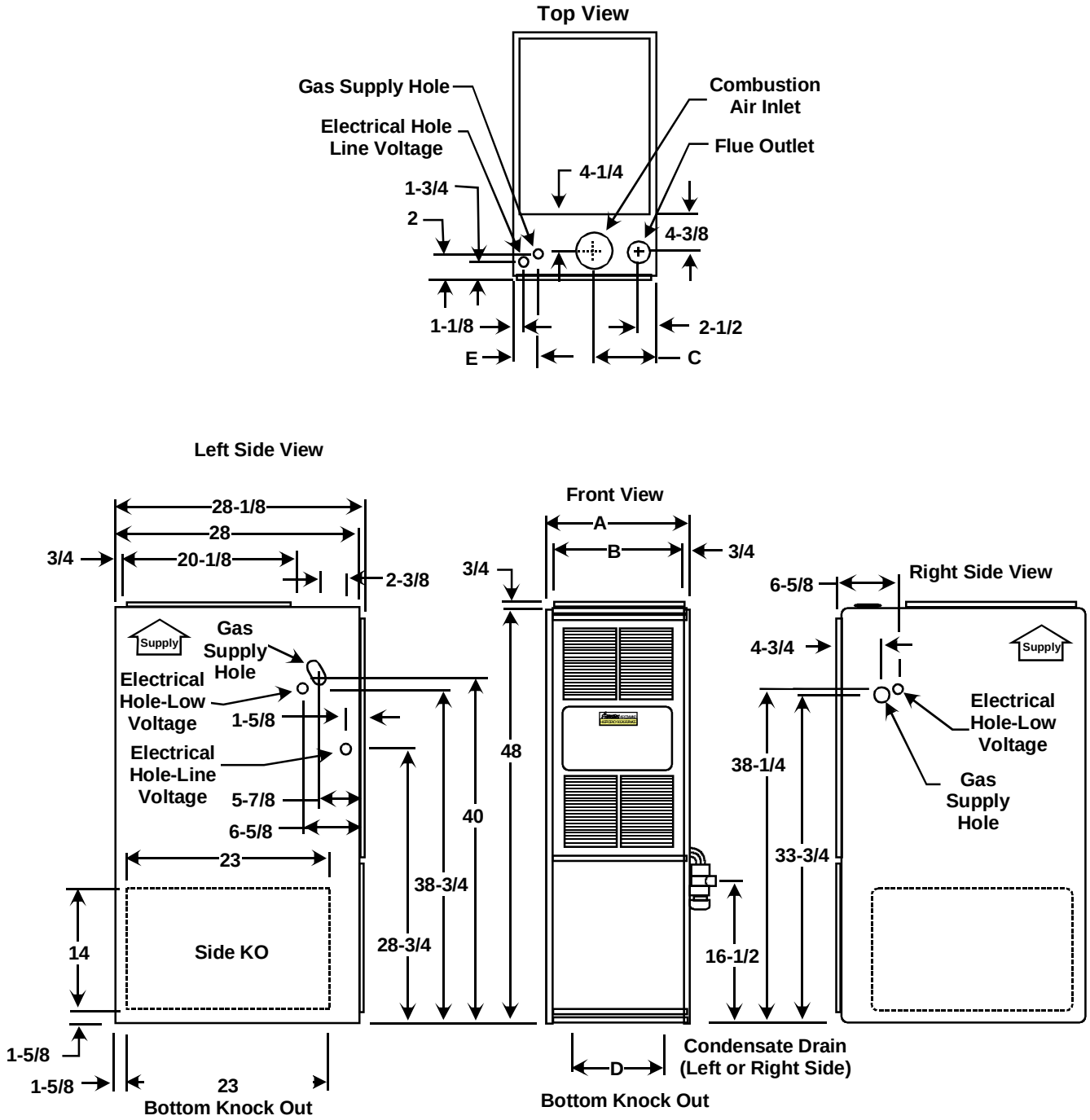
PRODUCT IDENTIFICATION



UPFLOW FURNACE DIMENSIONS						
FURNACE MODEL	A	B	C	D	E	F
GUC/GUX045	16-1/2	15	2	10-1/2	4-1/4	2-3/8
GUC/GUX070	20-1/2	19	2	14-1/2	4-1/4	2-3/8
GUC/GUX090 & 115	24-1/2	23	2	1/-1/2	4-1/4	2-3/8

All dimensions are in inches.

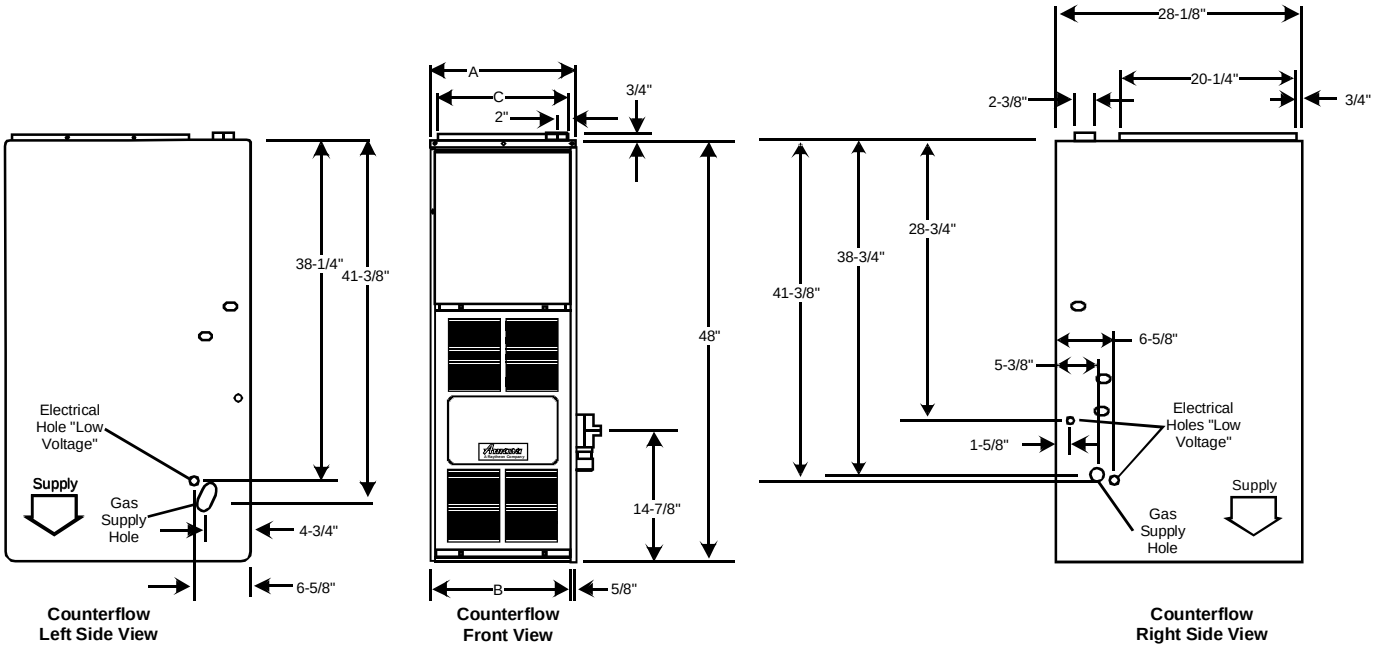
PRODUCT IDENTIFICATION



UPFLOW FURNACE DIMENSIONS					
FURNACE MODEL	A	B	C	D	E
GUD045	16-1/2	15	7	10-1/2	2-5/8
GUD070	20-1/2	19	11	14-1/2	2-5/8
GUD090	24-1/2	23	10-1/2	18-1/2	4-5/8
GUD115	24-1/2	23	12-1/2	18-1/2	2-5/8

All dimensions are in inches.

PRODUCT IDENTIFICATION
ACCESSORIES



COUNTERFLOW FURNACE DIMENSIONS			
FURNACE MODEL	A	B	C
GCC045	16-1/2	15-1/4	14-15/16
GCC070	20-1/2	19-1/4	18-15/16
GCC090 & 115	24-1/2	23-1/4	22-15/16

All dimensions are in inches.

COUNTERFLOW FURNACE DIMENSIONS			
FURNACE MODEL	A	B	C
GDC045	16-1/2	15-7/8	15
GDC / GCD070	20-1/2	19-7/8	19
GDC / GCD090	24-1/2	23-7/8	23
GDC115	24-1/2	23-7/8	23

All dimensions are in inches.

MINIMUM CLEARANCES TO COMBUSTABLE SURFACES				
	UPFLOW	COUNTERFLOW	HORIZONTAL DISCHRAGE LEFT (GDC MODELS ONLY)	HORIZONTAL DISCHARGE RIGHT (GDC MODELS ONLY)
FRONT	3	3	Alcove	Alcove
LEFT SIDE	1	1	6	12
RIGHT SIDE	1	1	12	6
REAR	0	0	0	0
TOP	1	1	6	6
FLUE	0	0	0	0
FLOOR	C	NC*	C	C

C = If placed on combustible floor, floor MUST be wood only.
NC = Non-combustible floor.
* = May be combustable floor (wood only) with special subase no. CFSB20, or 24.
All dimensions are in inches.

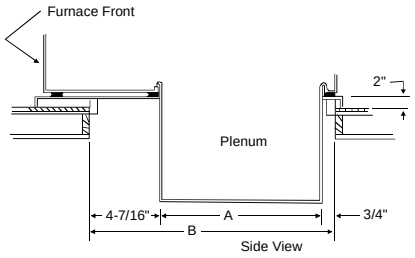
ACCESSIBILITY CLEARANCES (MINIMUM)

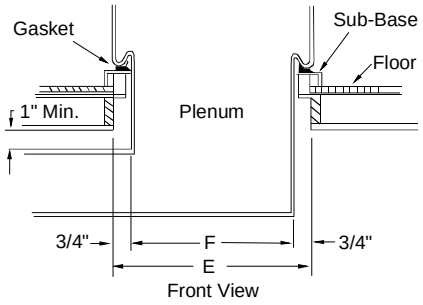
36" at front is required for servicing or cleaning.

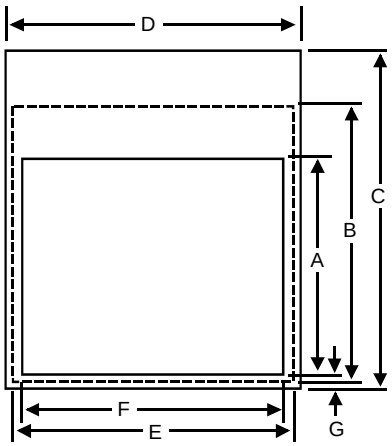
Note: In all cases accessiblility clearance shall take precedence over clearances from the enclosure where accessibility clearances are greater.

PRODUCT IDENTIFICATION

COUNTERFLOW SUBBASE







Counterflow subbase required when GCC,GCD & GDC furnaces are installed directly on wooden floor.

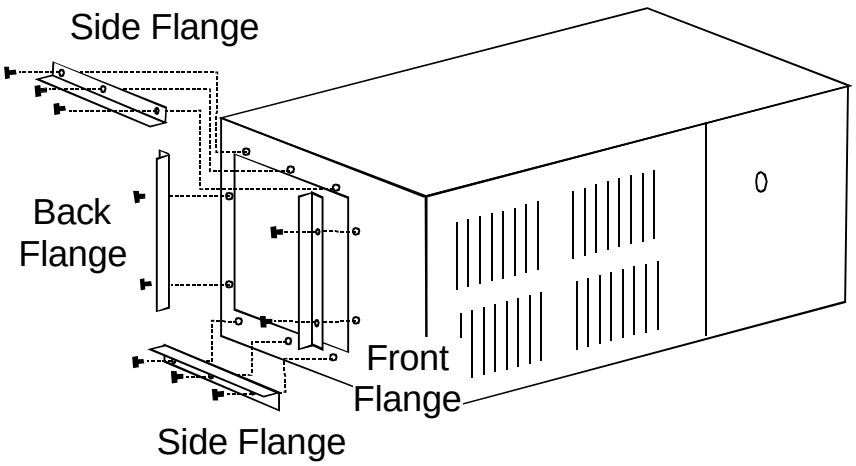
SUBBASE DIMENSIONS								
SUBBASE PART NUMBERS	**USED ON MODELS**	**A**	**B**	**C**	**D**	**E**	**F**	**G**
CFSB16	GCC/GDC045	18-9/16	23-3/4	29	17-1/2	16-1/2	15	1-11/32
CFSB20	GCC/GCD/GDC070	18-9/16	23-3/4	29	21-1/2	20-1/2	19	1-11/32
CFSB24	GCC/GDC090/115 GCD090	18-9/16	23-3/4	29	25-1/2	24-1/2	23	1-11/32

B x E = Floor Opening, A x F = Plenum size
All dimensions are in inches.

HORIZONTAL DUCT FLANGE KIT

HDF01 HORIZONTAL DUCT FLANGE KIT		
USED ON MODELS	**Flange Length**	
	Front & Back	**Sides**
GDC045	14-3/4	20-1/8
GDC070	18-3/4	20-1/8
GDC090/115	22-3/4	20-1/8

All dimensions are in inches.



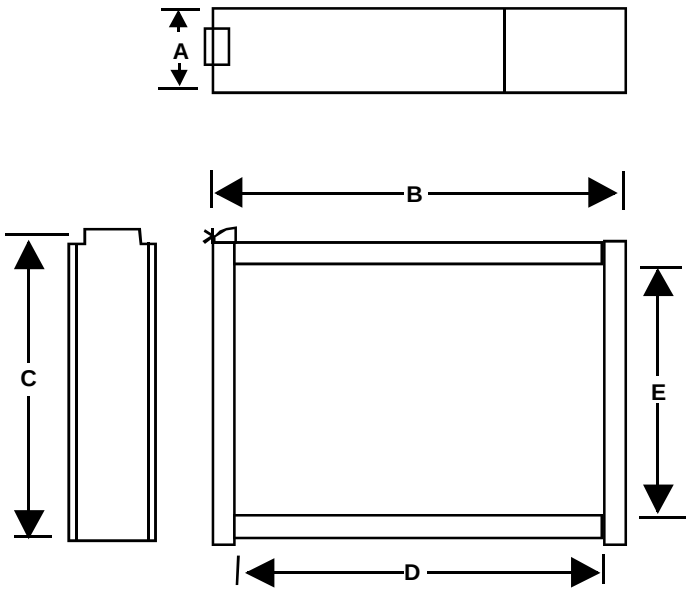
PRODUCT IDENTIFICATION
ACCESSORIES

MEDIA AIR CLEANER

MAC1 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 are in inches.

MEDIA AIR CLEANER
USED ON MODELS
ALL GAS FURNACES

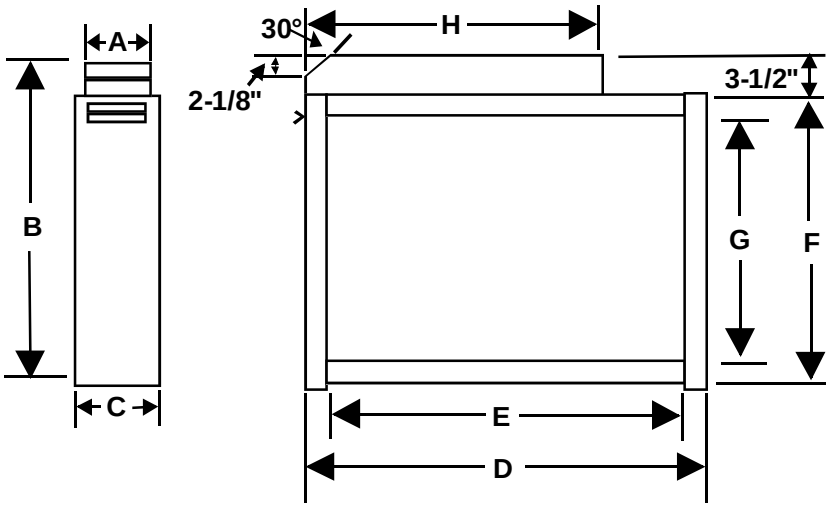


ELECTRONIC AIR CLEANER

EAC5 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

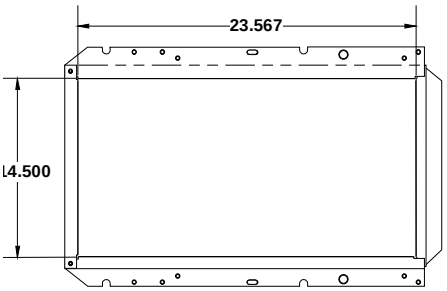
All dimensions are in inches.

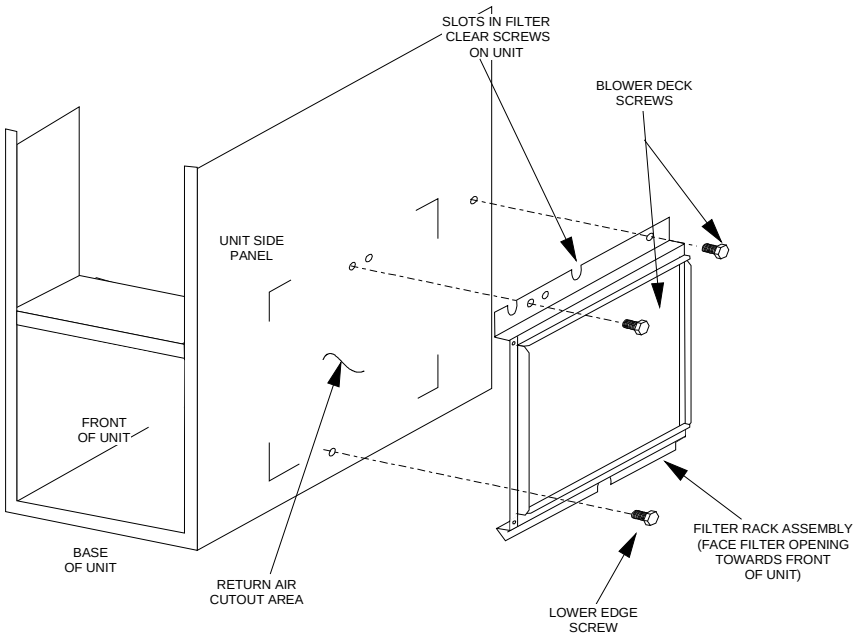
EAC5 ELECTRONIC AIR CLEANER
USED ON MODELS
ALL GAS FURNACES



PRODUCT IDENTIFICATION
ACCESSORIES

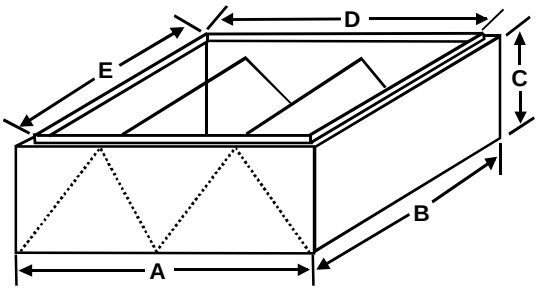
EXTERNAL FILTER RACK KIT





EFR01 EXTERNAL FILTER RACK KIT
USED ON MODELS
GUC
GUD
GUX

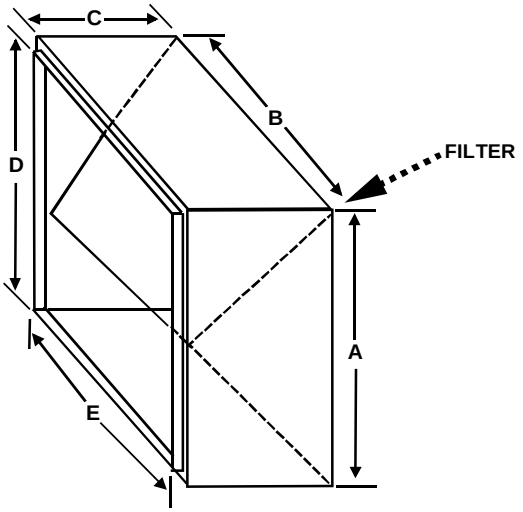
COUNTERFLOW FILTER CABINET



COUNTERFLOW FILTER CABINET						
FILTER KIT PART NUMBERS	USED ON MODELS	A	B	C	D	E
CFC16	GCC045	15-1/8	20-1/2	9-1/2	13-5/8	18-15/16
CFC20	GCC070 & 90B/C40	19-1/8	20-1/2	9-1/2	17-5/8	18-15/16
CFC24	GCC115	23-1/8	20-1/2	9-1/2	21-5/8	18-15/16
CFC20D	GCC090B/C50	19-1/8	20-1/2	9-1/2	17-5/8	18-15/16

All dimensions are in inches.

HORIZONTAL FILTER CABINET



HORIZONTAL FILTER CABINET						
FILTER KIT PART NUMBERS	USED ON MODELS	A	B	C	D	E
HFC16	GDC45,70	15-1/8	20-3/8	13-1/4	13-5/8	16-15/16
HFC20	GDC090	19-1/8	20-3/8	13-1/4	17-5/8	18-15/16
HFC24	GDC115	23-1/8	20-3/8	13-1/4	21-5/8	18-15/16

All dimensions are in inches.

FURNACE SPECIFICATIONS

MODEL	GUC045B30A GUC045B30B	GUC070B30A GUC070B30B	GUC070B40A GUC070B40B	GUC090B35A GUC090B35B	GUC090B50A GUC090B50B	GUC115B50A GUC115B50B
Btuh Input (US)	45,000	70,000	70,000	90,000	90,000	115,000
Output (US)	43,000	65,000	65,000	83,000	84,000	107,000
Input (CAN)	45,000	70,000	70,000	90,000	90,000	115,000
Output (CAN)	43,400	66,400	66,400	85,700	85,700	107,500
High Alt Input (CAN)	40,500	63,000	63,000	81,000	81,000	103,500
Output (CAN)	39,100	59,800	59,800	77,100	77,100	96,800
A.F.U.E.	93.0%	91.1%	91.1%	92.0%	92.0%	91.7%
Rated External Static ("w.c.)	.10 - .50	.12 - .50	.12 - .50	.15 - .50	.15 - .50	.20 - .50
Temperature Rise (°F)	35 - 65	35 - 65	35 - 65	45 - 75	35 - 65	35 - 65
Pressure Switch Trip Point ("w.c)	-1.05	-0.90	-0.90	-1.20	-1.20	-0.65
Blower Wheel (D" x W")	10 x 8	10 x 8	10 x 8	10 x 8	10 x 10	10 x 10
Blower Horsepower	1/3	1/3	3/4	1/2	3/4	3/4
Blower Speeds	3	4	4	4	4	4
Max CFM @ 0.5 E.S.P.	1295	1270	1650	1400	2000	2000
Power Supply	115-60-1	115-60-1	115-60-1	115-60-1	115-60-1	115-60-1
Minimum Circuit Ampacity (MCA)	12.1	11.1	14.9	12.6	15.1	15.1
Maximum Overcurrent Device	15	15	15	15	20	20
Transformer (VA)	40	40	40	40	40	40
Heat Anticipator	0.8	0.8	0.8	0.8	0.8	0.8
Primary Limit Setting (°F)	250	230	230	250	230	180
Auxiliary Limit (°F)	-	-	-	-	-	-
Rollout Limit Setting (°F)	350	350	350	350	350	350
Fan Switch Setting On (°F)	125	125	125	125	125	125
Off (°F)	110	110	110	110	110	110
Gas Supply Pressure (Natural/Propane) ("w.c.)	7 / 11	7 / 11	7 / 11	7 / 11	7 / 11	7 / 11
Manifold Pressure (Natural/Propane) ("w.c.)	3.5 / 10	3.5 / 10	3.5 / 10	3.5 / 10	3.5 / 10	3.5 / 10
Orifice Size (Natural/Propane)	#43 / #54	#43 / #54	#43 / #54	#43 / #54	#43 / #54	#43 / #54
Number of Burners	2	3	3	4	4	5
Vent Connector Diameter (inches)	2	2	2	2	2	2
Filter Type	Permanent	Permanent	Permanent	Permanent	Permanent	Permanent
Filter Size (inches)	16x25x1	16x25x1	16x25x1	16x25x1	16x25x1	16x25x1
Number of Filters	1	1	1	1	2	2
Shipping Weight (lbs.)	162	177	185	201	210	235

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 manufacturers 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 Circulation Blower Amps) + I.D. Blower Amps.

FURNACE SPECIFICATIONS

MODEL	GUC045B30C	GUC070B30C	GUC070B40C	GUC090B35C	GUC090B50C	GUC115B50C
Btuh Input (US)	45,000	70,000	70,000	90,000	90,000	115,000
Output (US)	43,000	65,000	65,000	83,000	84,000	107,000
Input (CAN)	45,000	70,000	70,000	90,000	90,000	115,000
Output (CAN)	43,400	66,400	66,400	85,700	85,700	107,500
High Alt Input (CAN)	40,500	63,000	63,000	81,000	81,000	103,500
Output (CAN)	39,100	59,800	59,800	77,100	77,100	96,800
A.F.U.E.	93.0%	91.1%	91.1%	92.0%	92.0%	91.7%
Rated External Static ("w.c.)	.10 - .50	.12 - .50	.12 - .50	.15 - .50	.15 - .50	.20 - .50
Temperature Rise (°F)	25 - 55	35 - 65	35 - 65	35 - 65	35 - 65	35 - 65
Pressure Switch Trip Point ("w.c)	-1.20	-1.05	-1.05	-1.20	-1.20	-0.75
Blower Wheel (D" x W")	10 x 8	10 x 8	10 x 10	10 x 8	10 x 10	10 x 10
Blower Horsepower	1/3	1/3	3/4	1/2	3/4	3/4
Blower Speeds	3	4	4	4	4	4
Max CFM @ 0.5 E.S.P.	1295	1270	1650	1590	2000	2000
Power Supply	115-60-1	115-60-1	115-60-1	115-60-1	115-60-1	115-60-1
Minimum Circuit Ampacity (MCA)	12.1	11.1	14.9	12.6	15.1	15.1
Maximum Overcurrent Device	15	15	15	15	20	20
Transformer (VA)	40	40	40	40	40	40
Heat Anticipator	0.8	0.8	0.8	0.8	0.8	0.8
Primary Limit Setting (°F)	200	230	230	230	230	180
Auxiliary Limit (°F)	-	-	-	-	-	-
Rollout Limit Setting (°F)	350	350	350	350	350	350
Fan Switch Setting On (°F)	125	125	125	125	125	125
Off (°F)	110	110	110	110	110	110
Gas Supply Pressure (Natural/Propane) (" w.c.)	7 / 11	7 / 11	7 / 11	7 / 11	7 / 11	7 / 11
Manifold Pressure (Natural/Propane) (" w.c.)	3.5 / 10	3.5 / 10	3.5 / 10	3.5 / 10	3.5 / 10	3.5 / 10
Orifice Size (Natural/Propane)	#43 / #54	#43 / #54	#43 / #54	#43 / #54	#43 / #54	#43 / #54
Number of Burners	2	3	3	4	4	5
Vent Connector Diameter (inches)	2	2	2	2	2	2
Filter Type	Permanent	Permanent	Permanent	Permanent	Permanent	Permanent
Filter Size (inches)	16x25x1	16x25x1	16x25x1	16x25x1	16x25x1	16x25x1
Number of Filters	1	1	1	1	2	2
Shipping Weight (lbs.)	162	177	185	201	210	235

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 manufacturers 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 Circulation Blower Amps) + I.D. Blower Amps.

FURNACE SPECIFICATIONS

MODEL	GUC045C30C GUC045X30A	GUC070C30C GUC070X30A	GUC070C40C GUC070X40A	GUC090C35C GUC090X35A	GUC090C50C GUC090X50A	GUC115C50C GUC115X50A
Btuh Input (US)	45,000	70,000	70,000	90,000	90,000	115,000
Output (US)	43,000	65,000	65,000	83,000	84,000	107,000
Input (CAN)	45,000	70,000	70,000	90,000	90,000	115,000
Output (CAN)	43,400	66,400	66,400	85,700	85,700	107,500
High Alt Input (CAN)	40,500	63,000	63,000	81,000	81,000	103,500
Output (CAN)	39,100	59,800	59,800	77,100	77,100	96,800
A.F.U.E.	91.3%	90.1%	90.1%	90.8%	91.1%	90.7%
Rated External Static ("w.c.)	.10 - .50	.12 - .50	.12 - .50	.15 - .50	.15 - .50	.20 - .50
Temperature Rise (°F)	25 - 55	35 - 65	35 - 65	35 - 65	35 - 65	35 - 65
Pressure Switch Trip Point ("w.c)	-1.20	-1.05	-1.05	-1.20	-1.20	-0.75
Blower Wheel (D" x W")	10 x 8	10 x 8	10 x 10	10 x 8	10 x 10	10 x 10
Blower Horsepower	1/3	1/3	3/4	1/2	3/4	3/4
Blower Speeds	3	4	4	4	4	4
Max CFM @ 0.5 E.S.P.	1295	1270	1650	1590	2000	2000
Power Supply	115-60-1	115-60-1	115-60-1	115-60-1	115-60-1	115-60-1
Minimum Circuit Ampacity (MCA)	12.1	11.1	14.9	12.6	15.1	15.1
Maximum Overcurrent Device	15	15	15	15	20	20
Transformer (VA)	40	40	40	40	40	40
Heat Anticipator	0.7	0.7	0.7	0.7	0.7	0.7
Primary Limit Setting (°F)	180	180	170	170	150	140
Auxiliary Limit (°F)	-	-	-	-	-	-
Rollout Limit Setting (°F)	350	350	350	350	350	350
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 (Natural/Propane) (" w.c.)	7 / 11	7 / 11	7 / 11	7 / 11	7 / 11	7 / 11
Manifold Pressure (Natural/Propane) (" w.c.)	3.5 / 10	3.5 / 10	3.5 / 10	3.5 / 10	3.5 / 10	3.5 / 10
Orifice Size (Natural/Propane)	#43 / #54	#43 / #54	#43 / #54	#43 / #54	#43 / #54	#43 / #54
Number of Burners	2	3	3	4	4	5
Vent Connector Diameter (inches)	2	2	2	2	2	2
Filter Type	Permanent	Permanent	Permanent	Permanent	Permanent	Permanent
Filter Size (inches)	16x25x1	16x25x1	16x25x1	16x25x1	16x25x1	16x25x1
Number of Filters	1	1	1	1	2	2
Shipping Weight (lbs.)	162	177	185	201	210	235

* Off Heating - This fan delay timing is adjustable (60, 90, 120 or 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 manufacturers 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 Circulation Blower Amps) + I.D. Blower Amps.

FURNACE SPECIFICATIONS

MODEL	GUC045X30B	GUC070X30B	GUC070X40B	GUC090X35B	GUC090X50B	GUC115X50B
Btuh Input (US)	45,000	70,000	70,000	90,000	90,000	115,000
Output (US)	42,900	65,300	65,300	85,000	85,000	107,800
Input (CAN)	45,000	70,000	70,000	90,000	90,000	115,000
Output (CAN)	43,400	66,400	66,400	85,700	85,700	107,500
High Alt Input (CAN)	40,500	63,000	63,000	81,000	81,000	103,500
Output (CAN)	39,100	59,800	59,800	77,100	77,100	96,800
A.F.U.E.	95.3%	93.3%	93.3%	94.4%	94.4%	93.7%
Rated External Static ("w.c.)	.10 - .50	.12 - .50	.12 - .50	.15 - .50	.15 - .50	.20 - .50
Temperature Rise (°F)	25 - 55	35 - 65	35 - 65	35 - 65	35 - 65	35 - 65
Pressure Switch Trip Point ("w.c)	-1.35	-1.25	-1.25	-1.35	-1.35	-1.05
Blower Wheel (D" x W")	10 x 8	10 x 8	10 x 10	10 x 8	10 x 10	10 x 10
Blower Horsepower	1/3	1/3	3/4	1/2	3/4	3/4
Blower Speeds	3	4	4	4	4	4
Max CFM @ 0.5 E.S.P.	1197	1274	1633	1599	1961	1939
Power Supply	115-60-1	115-60-1	115-60-1	115-60-1	115-60-1	115-60-1
Minimum Circuit Ampacity (MCA)	12.1	11.1	14.9	12.6	15.1	15.1
Maximum Overcurrent Device	15	15	15	15	20	20
Transformer (VA)	40	40	40	40	40	40
Heat Anticipator	0.7	0.7	0.7	0.7	0.7	0.7
Primary Limit Setting (°F)	160	160	170	170	140	125
Auxiliary Limit (°F)	-	-	-	-	-	-
Rollout Limit Setting (°F)	350	350	350	350	350	350
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 (Natural/Propane) (" w.c.)	7 / 11	7 / 11	7 / 11	7 / 11	7 / 11	7 / 11
Manifold Pressure (Natural/Propane) (" w.c.)	3.5 / 10	3.5 / 10	3.5 / 10	3.5 / 10	3.5 / 10	3.5 / 10
Orifice Size (Natural/Propane)	#43 / #55	#43 / #55	#43 / #55	#43 / #55	#43 / #55	#43 / #55
Number of Burners	2	3	3	4	4	5
Vent Connector Diameter (inches)	2	2	2	2	2	2
Filter Type	Permanent	Permanent	Permanent	Permanent	Permanent	Permanent
Filter Size (inches)	16x25x1	16x25x1	16x25x1	16x25x1	16x25x1	16x25x1
Number of Filters	1	1	1	1	2	2
Shipping Weight (lbs.)	162	177	185	201	210	235

* Off Heating - This fan delay timing is adjustable (60, 90, 120 or 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 manufacturers 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 Circulation Blower Amps) + I.D. Blower Amps.

FURNACE SPECIFICATIONS

MODEL	GCC045B30A GCC045B30B	GCC070B30A GCC070B30B	GCC070B40A GCC070B40B	GCC090B40A GCC090B40B	GCC090B50A GCC090B50B	GCC115B50A GCC115B50B
Btuh Input (US)	45,000	70,000	70,000	90,000	90,000	115,000
Output (US)	42,000	65,000	65,000	84,000	84,000	106,000
Input (CAN)	45,000	70,000	70,000	90,000	90,000	115,000
Output (CAN)	42,000	65,000	66,000	85,000	85,000	108,000
High Alt Input (CAN)	40,500	63,000	63,000	81,000	81,000	103,500
Output (CAN)	38,000	59,000	59,000	76,000	76,000	97,000
A.F.U.E.	89.4%	91.1%	91.6%	92.3%	92.3%	91.0%
Rated External Static ("w.c.)	.10 - .50	.12 - .50	.12 - .50	.15 - .50	.15 - .50	.20 - .50
Temperature Rise (°F)	25 - 55	35 - 65	25 - 55	35 - 65	35 - 65	40 - 70
Pressure Switch Trip Point ("w.c)	-0.90	-0.75	-0.75	-0.90	-0.90	-0.40
Blower Wheel (D" x W")	10 x 8	10 x 8	11 x 10	11 x 10	11 x 8	11 x 8
Blower Horsepower	1/3	1/3	1/2	1/2	3/4	3/4
Blower Speeds	3	4	4	4	4	4
Max CFM @ 0.5 E.S.P.	1300	1300	1750	1800	2115	2085
Power Supply	115-60-1	115-60-1	115-60-1	115-60-1	115-60-1	115-60-1
Minimum Circuit Ampacity (MCA)	12.1	11.1	14.9	12.6	15.1	15.1
Maximum Overcurrent Device	15	15	15	15	20	20
Transformer (VA)	40	40	40	40	40	40
Heat Anticipator	0.8	0.8	0.8	0.8	0.8	0.8
Primary Limit Setting (°F)	230	230	230	230	230	230
Auxiliary Limit (°F)	160	160	160	160	160	160
Rollout Limit Setting (°F)	325	325	325	325	325	325
Fan Switch Setting On (°F)	125	125	125	125	125	125
Off (°F)	110	110	110	110	110	110
Gas Supply Pressure (Natural/Propane) ("w.c.)	7 / 11	7 / 11	7 / 11	7 / 11	7 / 11	7 / 11
Manifold Pressure (Natural/Propane) ("w.c.)	3.5 / 10	3.5 / 10	3.5 / 10	3.5 / 10	3.5 / 10	3.5 / 10
Orifice Size (Natural/Propane)	#43 / #54	#43 / #54	#43 / #54	#43 / #54	#43 / #54	#43 / #54
Number of Burners	2	3	3	4	4	5
Vent Connector Diameter (inches)	2	2	2	2	2	2
Filter Type	-	-	-	-	-	-
Filter Size (inches)	-	-	-	-	-	-
Number of Filters	-	-	-	-	-	-
Shipping Weight (lbs.)	153	178	178	196	196	210

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 manufacturers 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 Circulation Blower Amps) + I.D. Blower Amps.

FURNACE SPECIFICATIONS

MODEL	GCC045C30C GCC045X30A	GCC070C30C GCC070X30A	GCC070C40C GCC070X40A	GCC090C35C GCC090X35A	GCC090C50C GCC090X50A	GCC115C50C GCC115X50A
Btuh Input (US)	45,000	70,000	70,000	90,000	90,000	115,000
Output (US)	43,000	65,000	66,000	84,000	84,000	105,000
Input (CAN)	45,000	70,000	70,000	90,000	90,000	115,000
Output (CAN)	43,000	67,000	67,000	86,000	86,000	108,000
High Alt Input (CAN)	40,500	63,000	63,000	81,000	81,000	103,500
Output (CAN)	38,700	60,300	60,300	77,400	77,400	97,000
A.F.U.E.	94.0%	91.5%	92.7%	92.1%	92.1%	90.7%
Rated External Static ("w.c.)	.10 - .50	.12 - .50	.12 - .50	.15 - .50	.15 - .50	.20 - .50
Temperature Rise (°F)	25 - 55	35 - 65	25 - 55	35 - 65	35 - 65	40 - 70
Pressure Switch Trip Point ("w.c)	-1.20	-1.05	-1.05	-1.20	-1.20	-0.75
Blower Wheel (D" x W")	10 x 8	10 x 8	11 x 10	11 x 10	11 x 10	11 x 10
Blower Horsepower	1/3	1/3	1/2	1/2	3/4	3/4
Blower Speeds	3	4	4	4	4	4
Max CFM @ 0.5 E.S.P.	1300	1300	1750	1800	2115	2085
Power Supply	115-60-1	115-60-1	115-60-1	115-60-1	115-60-1	115-60-1
Minimum Circuit Ampacity (MCA)	12.1	11.1	14.9	12.6	15.1	15.1
Maximum Overcurrent Device	15	15	15	15	20	20
Transformer (VA)	40	40	40	40	40	40
Heat Anticipator	0.7	0.7	0.7	0.7	0.7	0.7
Primary Limit Setting (°F)	210	210	200	200	200	190
Auxiliary Limit (°F)	160	160	160	160	160	160
Rollout Limit Setting (°F)	325	325	325	325	325	325
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 (Natural/Propane) ("w.c.)	7 / 11	7 / 11	7 / 11	7 / 11	7 / 11	7 / 11
Manifold Pressure (Natural/Propane) ("w.c.)	3.5 / 10	3.5 / 10	3.5 / 10	3.5 / 10	3.5 / 10	3.5 / 10
Orifice Size (Natural/Propane)	#43 / #54	#43 / #54	#43 / #54	#43 / #54	#43 / #54	#43 / #54
Number of Burners	2	3	3	4	4	5
Vent Connector Diameter (inches)	2	2	2	2	2	2
Filter Type	-	-	-	-	-	-
Filter Size (inches)	-	-	-	-	-	-
Number of Filters	-	-	-	-	-	-
Shipping Weight (lbs.)	141	165	165	180	180	192

* Off Heating - This fan delay timing is adjustable (60, 90, 120 or 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 manufacturers 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 Circulation Blower Amps) + I.D. Blower Amps.

FURNACE SPECIFICATIONS

MODEL	GUD045B30A	GUD070B30A	GUD070B40A	GUD090B35A	GUD090B50A	GUD115B50A
Btuh Input (US)	45,000	70,000	70,000	90,000	90,000	115,000
Output (US)	43,000	65,000	65,000	83,000	84,000	107,000
Input (CAN)	45,000	70,000	70,000	90,000	90,000	115,000
Output (CAN)	43,400	66,400	66,400	85,700	85,700	107,500
High Alt Input (CAN)	40,500	63,000	63,000	81,000	81,000	103,500
Output (CAN)	39,100	59,800	59,800	77,100	77,100	98,800
A.F.U.E.	94.8%	93.2%	93.2%	92.7%	92.5%	91.8%
Rated External Static ("w.c.)	.10 - .50	.12 - .50	.12 - .50	.15 - .50	.15 - .50	.20 - .50
Temperature Rise (°F)	25 - 55	35 - 65	35 - 65	45 - 75	35 - 65	35 - 65
Pressure Switch Trip Point ("w.c)	-1.20	-0.90	-0.90	-1.20	-1.20	-0.70
Blower Wheel (D" x W")	10 x 8	10 x 8	10 x 10	10 x 8	10 x 10	10 x 10
Blower Horsepower	1/3	1/3	3/4	1/2	3/4	3/4
Blower Speeds	3	4	4	4	4	4
Max CFM @ 0.5 E.S.P.	1295	1270	1650	1400	2000	2000
Power Supply	115-60-1	115-60-1	115-60-1	115-60-1	115-60-1	115-60-1
Minimum Circuit Ampacity (MCA)	11.3	10.3	14.1	10.1	15.1	15.1
Maximum Overcurrent Device	15	15	15	15	20	20
Transformer (VA)	40	40	40	40	40	40
Heat Anticipator	0.7	0.7	0.7	0.7	0.7	0.7
Primary Limit Setting (°F)	210	180	180	160	160	150
Auxiliary Limit (°F)	-	-	-	-	-	-
Rollout Limit Setting (°F)	275	275	275	275	275	275
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 (Natural/Propane) ("w.c.)	7 / 11	7 / 11	7 / 11	7 / 11	7 / 11	7 / 11
Manifold Pressure (Natural/Propane) ("w.c.)	3.5 / 10	3.5 / 10	3.5 / 10	3.5 / 10	3.5 / 10	3.5 / 10
Orifice Size (Natural/Propane)	#43 / NA	#43 / NA	#43 / NA	#43 / NA	#43 / NA	#43 / NA
Number of Burners	2	3	3	4	4	5
Vent Connector Diameter (inches)	2	2	2	2	2	2
Combustion Air Connector Diameter (inches)	3	3	3	3	3	3
Filter Type	Permanent	Permanent	Permanent	Permanent	Permanent	Permanent
Filter Size (inches)	16x25x1	16x25x1	16x25x1	16x25x1	16x25x1	16x25x1
Number of Filters	1	1	1	1	2	2
Shipping Weight (lbs.)	158	194	194	216	216	231

* Off Heating - This fan delay timing is adjustable (60, 90, 120 or 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. **Note: GUD___B__A models cannot be converted to use 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 manufacturers 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 Circulation Blower Amps) + I.D. Blower Amps.

FURNACE SPECIFICATIONS

MODEL	GUD045C30A GUD045X30A	GUD070C30A GUD070X30A	GUD070C40A GUD070X40A	GUD090C35A GUD090X35A	GUD090C50A GUD090X50A	GUD115C50A GUD115X50A
Btuh Input (US)	45,000	70,000	70,000	90,000	90,000	115,000
Output (US)	43,000	65,000	65,000	84,000	84,000	107,000
Input (CAN)	45,000	70,000	70,000	90,000	90,000	115,000
Output (CAN)	43,700	66,400	66,400	85,500	85,500	109,700
High Alt Input (CAN)	40,500	63,000	63,000	81,000	81,000	103,500
Output (CAN)	39,300	59,800	59,800	77,000	77,000	98,700
A.F.U.E.	94.8%	93.2%	93.2%	92.7%	92.5%	91.8%
Rated External Static ("w.c.)	.10 - .50	.12 - .50	.12 - .50	.15 - .50	.15 - .50	.20 - .50
Temperature Rise (°F)	25 - 55	35 - 65	35 - 65	45 - 75	35 - 65	35 - 65
Pressure Switch Trip Point ("w.c)	-1.20	-0.90	-0.90	-1.20	-1.20	-0.80
Blower Wheel (D" x W")	10 x 8	10 x 8	10 x 10	10 x 8	10 x 10	10 x 10
Blower Horsepower	1/3	1/3	3/4	1/2	3/4	3/4
Blower Speeds	3	4	4	4	4	4
Max CFM @ 0.5 E.S.P.	1295	1270	1650	1400	2000	2000
Power Supply	115-60-1	115-60-1	115-60-1	115-60-1	115-60-1	115-60-1
Minimum Circuit Ampacity (MCA)	11.3	10.3	14.1	10.1	15.1	15.1
Maximum Overcurrent Device	15	15	15	15	20	20
Transformer (VA)	40	40	40	40	40	40
Heat Anticipator	0.7	0.7	0.7	0.7	0.7	0.7
Primary Limit Setting (°F)	210	180	180	160	160	150
Auxiliary Limit (°F)	-	-	-	-	-	-
Rollout Limit Setting (°F)	275	275	275	275	275	275
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 (Natural/Propane) ("w.c.)	7 / 11	7 / 11	7 / 11	7 / 11	7 / 11	7 / 11
Manifold Pressure (Natural/Propane) ("w.c.)	3.5 / 10	3.5 / 10	3.5 / 10	3.5 / 10	3.5 / 10	3.5 / 10
Orifice Size (Natural/Propane)	#43 / #54	#43 / #54	#43 / #54	#43 / #54	#43 / #54	#43 / #54
Number of Burners	2	3	3	4	4	5
Vent Connector Diameter (inches)	2	2	2	2	2	2
Combustion Air Connector Diameter (inches)	3	3	3	3	3	3
Filter Type	Permanent	Permanent	Permanent	Permanent	Permanent	Permanent
Filter Size (inches)	16x25x1	16x25x1	16x25x1	16x25x1	16x25x1	16x25x1
Number of Filters	1	1	1	1	2	2
Shipping Weight (lbs.)	158	194	194	216	216	231

* Off Heating - This fan delay timing is adjustable (60, 90, 120 or 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 manufacturers 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 Circulation Blower Amps) + I.D. Blower Amps.

FURNACE SPECIFICATIONS

MODEL	GUD045X30B	GUD070X30B	GUD070X40B	GUD090X35B	GUD090X50B	GUD115X50B
Btuh Input (US)	45,000	70,000	70,000	90,000	90,000	115,000
Output (US)	43,000	65,700	65,700	84,300	85,100	107,600
Input (CAN)	45,000	70,000	70,000	90,000	90,000	115,000
Output (CAN)	43,000	65,700	65,700	85,000	85,100	107,600
High Alt Input (CAN)	40,500	63,000	63,000	81,000	81,000	103,500
Output (CAN)	38,700	59,100	59,100	76,600	76,600	96,900
A.F.U.E.	95.6%	93.8%	93.8%	94.6%	94.6%	93.6%
Rated External Static ("w.c.)	.10 - .50	.12 - .50	.12 - .50	.15 - .50	.15 - .50	.20 - .50
Temperature Rise (°F)	25 - 55	35 - 65	35 - 65	45 - 75	35 - 65	35 - 65
Pressure Switch Trip Point ("w.c)	-1.38	-1.38	-1.38	-1.57	-1.57	-1.38
Blower Wheel (D" x W")	10 x 8	10 x 8	10 x 10	10 x 8	10 x 10	10 x 10
Blower Horsepower	1/3	1/3	3/4	1/2	3/4	3/4
Blower Speeds	3	4	4	4	4	4
Max CFM @ 0.5 E.S.P.	1131	1188	1561	1395	1914	1896
Power Supply	115-60-1	115-60-1	115-60-1	115-60-1	115-60-1	115-60-1
Minimum Circuit Ampacity (MCA)	11.3	10.3	14.1	10.1	15.1	15.1
Maximum Overcurrent Device	15	15	15	15	20	20
Transformer (VA)	40	40	40	40	40	40
Heat Anticipator	0.7	0.7	0.7	0.7	0.7	0.7
Primary Limit Setting (°F)	170	180	180	160	160	140
Auxiliary Limit (°F)	-	-	-	-	-	-
Rollout Limit Setting (°F)	275	275	275	275	275	275
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 (Natural/Propane) ("w.c.)	7 / 11	7 / 11	7 / 11	7 / 11	7 / 11	7 / 11
Manifold Pressure (Natural/Propane) ("w.c.)	3.5 / 10	3.5 / 10	3.5 / 10	3.5 / 10	3.5 / 10	3.5 / 10
Orifice Size (Natural/Propane)	#43 / #55	#43 / #55	#43 / #55	#43 / #55	#43 / #55	#43 / #55
Number of Burners	2	3	3	4	4	5
Vent Connector Diameter (inches)	2	2	2	2	2	2
Combustion Air Connector Diameter (inches)	3	3	3	3	3	3
Filter Type	Permanent	Permanent	Permanent	Permanent	Permanent	Permanent
Filter Size (inches)	16x25x1	16x25x1	16x25x1	16x25x1	16x25x1	16x25x1
Number of Filters	1	1	1	1	2	2
Shipping Weight (lbs.)	158	194	194	216	216	231

* Off Heating - This fan delay timing is adjustable (60, 90, 120 or 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.
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3. The total heat loss from the structure as expressed in TOTAL BTU/HR must be calculated by the manufacturers 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 Circulation Blower Amps) + I.D. Blower Amps.

FURNACE SPECIFICATIONS

MODEL	GUX045B30A GUX045X30A	GUX070B30A GUX070X30A	GUX070B40A GUX070X40A	GUX090B35A GUX090X35A	GUX090B50A GUX090X50A	GUX115B50A GUX115X50A
Btuh Input (US)	45,000	70,000	70,000	90,000	90,000	115,000
Output (US)	43,600	67,000	67,000	86,000	87,000	110,000
Input (CAN)	45,000	70,000	70,000	90,000	90,000	115,000
Output (CAN)	43,400	67,600	68,200	87,000	87,300	111,100
High Alt Input (CAN)	40,500	63,000	63,000	81,000	81,000	103,500
Output (CAN)	39,600	60,800	61,400	78,300	78,600	100,000
A.F.U.E.	95.5%	95.3%	95.1%	95.3%	95.5%	95.0%
Rated External Static ("w.c.)	.10 - .50	.12 - .50	.12 - .50	.15 - .50	.15 - .50	.20 - .50
Temperature Rise (°F)	35 - 65	40 - 70	35 - 65	40 - 70	35 - 65	40 - 70
Pressure Switch Trip Point ("w.c)	-1.45	-1.20	-1.20	-1.45	-1.45	-1.20
Blower Wheel (D" x W")	10 x 8	10 x 8	10 x 10	10 x 8	10 x 10	11 x 10
Blower Horsepower	1/3	1/3	3/4	1/2	3/4	3/4
Blower Speeds	3	4	4	4	4	4
Max CFM @ 0.5 E.S.P.	1325	1290	1590	1580	1995	2075
Power Supply	115-60-1	115-60-1	115-60-1	115-60-1	115-60-1	115-60-1
Minimum Circuit Ampacity (MCA)	12.1	11.1	14.9	12.6	15.1	15.1
Maximum Overcurrent Device	15	15	15	15	20	20
Transformer (VA)	40	40	40	40	40	40
Heat Anticipator	0.7	0.7	0.7	0.7	0.7	0.7
Primary Limit Setting (°F)	180	180	170	160	160	140
Auxiliary Limit (°F)	-	-	-	-	-	-
Rollout Limit Setting (°F)	350	350	350	350	350	350
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 (Natural/Propane) ("w.c.)	7 / 11	7 / 11	7 / 11	7 / 11	7 / 11	7 / 11
Manifold Pressure (Natural/Propane) ("w.c.)	3.5 / 10	3.5 / 10	3.5 / 10	3.5 / 10	3.5 / 10	3.5 / 10
Orifice Size (Natural/Propane)	#43 / #54	#43 / #54	#43 / #54	#43 / #54	#43 / #54	#43 / #54
Number of Burners	2	3	3	4	4	5
Vent Connector Diameter (inches)	2	2	2	2	2	2
Filter Type	Permanent	Permanent	Permanent	Permanent	Permanent	Permanent
Filter Size (inches)	16x25x1	16x25x1	16x25x1	16x25x1	16x25x1	16x25x1
Number of Filters	1	1	1	1	2	2
Shipping Weight (lbs.)	162	177	188	201	210	235

* Off Heating - This fan delay timing is adjustable (60, 90, 120 or 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 manufacturers 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 Circulation Blower Amps) + I.D. Blower Amps.

FURNACE SPECIFICATIONS

MODEL	GUX045X30B	GUX070X30B	GUX070X40B	GUX090X35B	GUX090X50B	GUX115X50B
Btuh Input (US)	45,000	70,000	70,000	90,000	90,000	115,000
Output (US)	43,600	67,100	67,100	86,200	86,200	109,600
Input (CAN)	45,000	70,000	70,000	90,000	90,000	115,000
Output (CAN)	43,600	67,100	67,100	86,200	96,200	109,600
High Alt Input (CAN)	40,500	63,000	63,000	81,000	81,000	103,500
Output (CAN)	39,200	60,400	60,400	77,600	77,600	98,600
A.F.U.E.	96.9%	95.9%	95.9%	95.8%	95.8%	95.3%
Rated External Static ("w.c.)	.10 - .50	.12 - .50	.12 - .50	.15 - .50	.15 - .50	.20 - .50
Temperature Rise (°F)	35 - 65	40 - 70	35 - 65	40 - 70	35 - 65	40 - 70
Pressure Switch Trip Point ("w.c)	-1.45	-1.20	-1.20	-1.20	-1.20	-1.20
Blower Wheel (D" x W")	10 x 8	10 x 8	10 x 10	10 x 8	10 x 10	11 x 10
Blower Horsepower	1/3	1/3	3/4	1/2	3/4	3/4
Blower Speeds	3	4	4	4	4	4
Max CFM @ 0.5 E.S.P.	1339	1283	1723	1510	1890	1978
Power Supply	115-60-1	115-60-1	115-60-1	115-60-1	115-60-1	115-60-1
Minimum Circuit Ampacity (MCA)	12.1	11.1	14.9	12.6	15.1	15.1
Maximum Overcurrent Device	15.0	15.0	15.0	15.0	20.0	20.0
Transformer (VA)	40	40	40	40	40	40
Heat Anticipator	0.7	0.7	0.7	0.7	0.7	0.7
Primary Limit Setting (°F)	180	180	170	160	140	125
Auxiliary Limit (°F)	-	-	-	-	-	-
Rollout Limit Setting (°F)	350	350	350	350	350	350
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 (Natural/Propane) ("w.c.)	7 / 11	7 / 11	7 / 11	7 / 11	7 / 11	7 / 11
Manifold Pressure (Natural/Propane) ("w.c.)	3.5 / 10	3.5 / 10	3.5 / 10	3.5 / 10	3.5 / 10	3.5 / 10
Orifice Size (Natural/Propane)	#43 / #55	#43 / #55	#43 / #55	#43 / #55	#43 / #55	#43 / #55
Number of Burners	2	3	3	4	4	5
Vent Connector Diameter (inches)	2	2	2	2	2	2
Filter Type	Permanent	Permanent	Permanent	Permanent	Permanent	Permanent
Filter Size (inches)	16x25x1	16x25x1	16x25x1	16x25x1	16x25x1	16x25x1
Number of Filter	1	1	1	1	2	2
Shipping Weight (lbs.)	162	177	185	201	210	235

* Off Heating - This fan delay timing is adjustable (60, 90, 120 or 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 manufacturers 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 Circulation Blower Amps) + I.D. Blower Amps.

FURNACE SPECIFICATIONS

MODEL	GDC045X30B	GDC070X30B	GDC070X40B	GDC090X40B	GDC090X50B	GDC115X50B
Btuh Input (US)	46,000	69,000	69,000	92,000	92,000	115,000
Output (US)	43,300	65,600	65,500	87,000	87,200	107,700
Input (CAN)	46,000	69,000	69,000	92,000	92,000	115,000
Output (CAN)	43,100	65,000	65,000	86,700	86,700	107,200
High Alt Input (CAN)	41,400	62,100	62,100	82,800	82,800	103,500
Output (CAN)	38,800	58,500	58,500	78,000	78,000	96,500
A.F.U.E.	93.7%	94.2%	94.2%	94.2%	94.2%	93.2%
Rated External Static ("w.c.)	.10 - .50	.12 - .50	.12 - .50	.15 - .50	.15 - .50	.20 - .50
Temperature Rise (°F)	25 - 55	35 - 65	30 - 60	35 - 65	35 - 65	40 - 70
Pressure Switch Trip Point ("w.c)	-1.25	-1.05	-1.05	-1.20	-1.20	-1.05
Blower Wheel (D" x W")	10 x 8	10 x 8	11 x 10	11 x 10	11 x 10	11 x 10
Blower Horsepower	1/3	1/3	1/2	1/2	3/4	3/4
Blower Speeds	3	4	4	4	4	4
Max CFM @ 0.5 E.S.P.	1310	1267	1742	1939	2142	2264
Power Supply	115-60-1	115-60-1	115-60-1	115-60-1	115-60-1	115-60-1
Minimum Circuit Ampacity (MCA)	12.1	12.1	12	12.1	15.1	15.1
Maximum Overcurrent Device	15	15	15	15	20	20
Transformer (VA)	40	40	40	40	40	40
Heat Anticipator	0.7	0.7	0.7	0.7	0.7	0.7
Primary Limit Setting (°F)	200	170	180	170	170	170
Auxiliary Limit (°F)	160	160	160	160	160	160
Rollout Limit Setting (°F)	325	350	350	350	350	350
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 (Natural/Propane) ("w.c.)	7 / 11	7 / 11	7 / 11	7 / 11	7 / 11	7 / 11
Manifold Pressure (Natural/Propane) ("w.c.)	3.5 / 10	3.5 / 10	3.5 / 10	3.5 / 10	3.5 / 10	3.5 / 10
Orifice Size (Natural/Propane)	#43 / #55	#43 / #55	#43 / #55	#43 / #55	#43 / #55	#43 / #55
Number of Burners	2	3	3	4	4	5
Vent Connector Diameter (inches)	2	2	2	2	2	2
Filter Type	Disposable	Disposable	Permanent	Permanent	Permanent	Permanent
Filter Size (inches)	15x20x1	15x20x1	16x25x1	16x25x1	16x25x1	16x25x1
Number of Filters	2	2	2	2	2	2
Shipping Weight (lbs.)	162	177	185	201	210	235

* Off Heating - This fan delay timing is adjustable (60, 90, 120 or 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 manufacturers 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 Circulation Blower Amps) + I.D. Blower Amps.

FURNACE SPECIFICATIONS

MODEL	GCD070X30B	GCD090X40B
Btuh Input (US)	69,000	92,000
Output (US)	64,700	85,900
Input (CAN)	69,000	92,000
Output (CAN)	64,300	86,700
High Alt Input (CAN)	62,100	82,800
Output (CAN)	58,500	78,000
A.F.U.E.	93.6%	94.0%
Rated External Static ("w.c.)	.12 - .50	.15 - .50
Temperature Rise (°F)	35 - 65	35 - 65
Pressure Switch Trip Point ("w.c)	-1.05	-1.30
Blower Wheel (D" x W")	10 x 8	11 x 10
Blower Horsepower	1/3	1/2
Blower Speeds	4	4
Max CFM @ 0.5 E.S.P.	1267	1939
Power Supply	115-60-1	115-60-1
Minimum Circuit Ampacity (MCA)	12.1	12.1
Maximum Overcurrent Device	15	15
Transformer (VA)	40	40
Heat Anticipator	0.7	0.7
Primary Limit Setting (°F)	180	170
Auxiliary Limit (°F)	160	160
Rollout Limit Setting (°F)	275	275
Fan Delay ON	30 secs.	30 secs.
Off Heating *	90 secs.	90 secs.
Off Cooling	45 secs.	45 secs.
Gas Supply Pressure (Natural/Propane) ("w.c.)	7 / 11	7 / 11
Manifold Pressure (Natural/Propane) ("w.c.)	3.5 / 10	3.5 / 10
Orifice Size (Natural/Propane)	#43 / #55	#43 / #55
Number of Burners	3	4
Vent Connector Diameter (inches)	2	2
Filter Type	Disposable	Permanent
Filter Size (inches)	15x20x1	16x25x1
Number of Filters	2	2
Shipping Weight (lbs.)	177	201

* Off Heating - This fan delay timing is adjustable (60, 90, 120 or 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.
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4. Minimum Circuit Ampacity calculated as: (1.25 x Circulation Blower Amps) + I.D. Blower Amps.

BLOWER PERFORMANCE SPECIFICATIONS

MODEL	MOTOR SPEED	TONS AC @ 0.5" ESP	External Static Pressure, Inches Water Column													
			0.2		0.3		0.4		0.5		0.6		0.7		0.8	
			CFM	Rise	CFM	Rise	CFM	Rise	CFM	Rise	CFM	Rise	CFM	Rise	CFM	Rise
GUC045_30_	HIGH	3.0	1500	-	1440	-	1375	-	1295	-	1210	-	1120	-	1010	37
	MED	2.5	1275	-	1200	-	1175	-	1125	-	1055	36	975	39	870	43
	LOW	2.0	980	40	970	40	940	42	900	44	865	44	810	47	730	52
GUC070_30_	HIGH	3.0	1460	42	1400	44	1325	46	1270	48	1180	49	1095	53	985	59
	MED	2.5	1245	45	1205	51	1165	52	1115	55	1050	56	980	60	880	-
	MED-LO	2.0	1000	61	985	62	960	63	920	-	880	-	815	-	752	-
	LOW	1.5	820	-	800	-	785	-	755	-	730	-	680	-	635	-
GUC070_40_	HIGH	4.0	1855	-	1785	-	1735	-	1650	37	1575	37	1485	39	1375	42
	MED	3.5	1680	36	1615	38	1560	39	1480	41	1400	42	1310	45	1200	49
	MED-LO	3.5	1525	40	1480	41	1425	43	1350	45	1280	46	1200	49	1100	53
	LOW	3.0	1350	45	1325	46	1275	48	1200	51	1145	51	1045	56	800	-
GUC090B35A	HIGH	4.0	1610	49	1560	50	1470	53	1400	56	1295	58	1295	63	1080	70
	MED	3.5	1440	54	1400	56	1340	58	1280	61	1200	63	1200	67	1020	74
	MED-LO	3.0	1165	67	1150	68	1135	69	1090	72	1055	72	1055	-	920	-
	LOW	2.5	900	-	895	-	890	-	875	-	840	-	840	-	750	-
GUC090B35C GUC090C35C GUC090X35A	HIGH	4.0	1825	41	1750	43	1670	45	1590	48	1500	50	1400	54	1310	58
	MED	3.5	1615	47	1545	49	1485	51	1425	53	1345	56	1260	60	1170	-
	MED-LO	3.0	1325	57	1290	59	1250	61	1195	63	1145	-	1080	-	990	-
	LOW	2.5	1055	-	1040	-	1000	-	970	-	930	-	870	-	800	-
GUC090_50_	HIGH	5.0	2250	-	2175	36	2085	38	2000	39	1890	40	1780	43	1640	46
	MED	4.5	1900	41	1865	42	1805	43	1735	45	1635	46	1590	48	1465	52
	MED-LO	4.0	1700	46	1670	47	1625	48	1565	50	1500	51	1400	54	1255	60
	LOW	3.5	1465	53	1450	54	1400	56	1350	58	1280	59	1195	64	1050	-
GUC115_50_	HIGH	5.0	2280	44	2190	46	2100	48	2000	50	1880	51	1755	55	1600	60
	MED	4.5	1920	52	1865	54	1805	55	1730	58	1650	59	1535	63	1355	-
	MED-LO	4.0	1690	59	1665	60	1610	62	155	64	1485	-	1390	-	1245	-
	LOW	3.5	1455	-	1440	-	1390	-	1350	-	1290	-	1220	-	1115	-

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	0.7	0.8
			CFM	Rise	CFM	Rise	CFM	Rise	CFM	Rise	CFM	Rise	CFM	CFM	CFM
GUC045X30B (MED)	HIGH	3.0	1470	26	1401	28	1337	29	1269	31	1197	32	1121	1030	919
	MED	2.5	1294	30	1254	31	1207	32	1153	34	1089	36	962	940	819
	LOW	2.0	1000	39	999	39	984	39	959	40	920	42	866	785	700
GUC070X30B (HIGH)	HIGH	3.0	1541	39	1509	40	1414	43	1349	45	1274	47	1202	1108	1005
	MED	2.5	1323	46	1274	47	1234	49	1181	51	1121	54	1050	975	880
	MED-LO	2.0	1036	58	1024	59	1006	60	978	62	940	64	890	826	720
	LOW	1.5	788	-	786	-	784	-	765	-	745	-	698	639	563
GUC070X40B (LOW)	HIGH	4.0	1973	-	1894	-	1806	-	1724	35	1633	37	1536	1422	1383
	MED	3.5	1786	-	1729	35	1650	37	1575	38	1501	40	1410	1268	1097
	MED-LO	3.5	1590	38	1553	39	1507	40	1447	42	1384	44	1311	1142	1033
	LOW	3.0	1341	45	1333	45	1311	46	1281	47	1225	49	1133	1033	889
GUC090X35B (HIGH)	HIGH	4.0	1890	41	1825	43	1757	44	1673	46	1599	49	1506	1424	1300
	MED	3.5	1659	47	1614	48	1569	49	1506	52	1441	54	1372	1281	1183
	MED-LO	3.0	1340	58	1340	58	1310	59	1279	61	1240	63	1182	1103	1009
	LOW	2.5	1049	-	1040	-	1034	-	1013	-	985	-	941	883	803
GUC090X50B (MED-LO)	HIGH	4.0	2326	-	2232	35	2123	37	2055	38	1961	40	1861	1756	1616
	MED	3.5	1997	39	1936	40	1874	41	1810	43	1743	45	1659	1556	1429
	MED-LO	3.0	1744	44	1710	45	1681	46	1634	47	1573	49	1503	1415	1292
	LOW	2.5	1483	52	1469	53	1449	54	1429	54	1387	56	1329	1245	1085
GUC115X50B (HIGH)	HIGH	5.0	2325	42	2233	44	2136	46	2046	48	1939	51	1840	1721	1593
	MED	4.5	1988	49	1927	51	1871	52	1797	55	1720	57	1630	1544	1422
	MED-LO	4.0	1729	57	1702	58	1666	59	1611	61	1554	63	1484	1390	1277
	LOW	3.5	1473	-	1460	-	1443	-	1417	-	1372	-	1316	1243	1128

1. CFM chart is with filter(s) as shipped with furnace. If furnace is shipped with two side air return filters, this chart assumes both filters are installed.
2. INSTALLATION IS TO BE ADJUSTED TO OBTAIN TEMPERATURE RISE WITHIN THE RANGE SPECIFIED ON THE RATING PLATE.
3. The chart is for information only. For satisfactory operation, external static pressure must not exceed value shown on rating plate. The shaded area indicates ranges in excess of maximum external static pressure allowed when heating.
4. 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

MODEL	MOTOR SPEED	TONS AC @ 0.5" ESP	External Static Pressure, Inches Water Column													
			0.2		0.3		0.4		0.5		0.6		0.7		0.8	
			CFM	Rise	CFM	Rise	CFM	Rise	CFM	Rise	CFM	Rise	CFM	Rise	CFM	Rise
GCC045_30_	HIGH	3.0	1480	26	1425	27	1365	29	1300	30	1210	31	1110	33	955	39
	MED	2.5	1265	31	1225	35	1175	33	1125	35	1050	35	960	38	820	45
	LOW	2.0	970	40	960	41	930	42	900	44	850	43	785	47	690	54
GCC070_30_	HIGH	3.0	1480	41	1420	43	1360	45	1300	47	1215	49	1120	53	1000	59
	MED	2.5	1265	48	1230	50	1175	52	1125	54	1060	56	970	61	825	-
	MED-LO	2.0	970	63	960	63	930	-	900	-	850	-	785	-	695	-
	LOW	1.5	770	-	760	-	750	-	700	-	655	-	585	-	485	-
GCC070_40_	HIGH	4.0	1975	31	1900	32	1825	33	1750	35	1650	36	1550	38	1430	42
	MED	3.5	1570	39	1530	40	1470	41	1410	43	1330	45	1230	48	1090	54
	MED-LO	3.5	1330	46	1290	47	1240	49	1200	51	1130	53	1040	-	905	-
	LOW	3.0	1110	-	1080	-	1050	-	1000	-	930	-	845	-	705	-
GCC090_40_	HIGH	4.0	2000	39	1940	40	1870	42	1800	44	1710	45	1610	48	1465	53
	MED	3.5	1690	46	1660	47	1615	49	1575	50	1510	51	1430	54	1310	59
	MED-LO	3.0	1450	54	1430	55	1400	56	1350	58	1310	59	1230	63	1115	-
	LOW	2.5	1210	-	1190	-	1170	-	1125	-	1070	-	1000	-	900	-
GCC090_50_	HIGH	4.0	2375	-	2300	-	2200	-	2115	-	2010	38	1880	41	1700	45
	MED	3.5	1955	-	1915	-	1850	36	1780	37	1700	45	1615	48	1490	52
	MED-LO	3.0	1660	40	1625	41	1580	42	1530	44	1470	52	1390	55	1295	59
	LOW	2.5	1415	47	1390	48	1350	49	1300	51	1260	61	1200	64	1125	-
GCC115_50_	HIGH	5.0	2340	-	2260	-	2180	-	2085	41	1995	49	1860	52	1680	58
	MED	4.5	1960	43	1900	45	1830	47	1775	48	1700	57	1590	61	1445	67
	MED-LO	4.0	1675	51	1635	52	1600	53	1550	55	1485	65	1390	-	1270	-
	LOW	3.5	1430	60	1400	61	1370	62	1325	64	1275	-	1200	-	1100	-

1. CFM chart is with filter(s) as recommended by filter charts shown in product design section of this manual. If furnace is to have two return filters, this chart assumes both filters are installed.
2. INSTALLATION IS TO BE ADJUSTED TO OBTAIN TEMPERATURE RISE WITHIN THE RANGE SPECIFIED ON THE RATING PLATE.
3. The chart is for information only. For satisfactory operation, external static pressure must not exceed value shown on rating plate. The shaded area indicates ranges in excess of maximum external static pressure allowed when heating.
4. 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

MODEL	MOTOR SPEED	TONS AC @ 0.5" ESP	External Static Pressure, Inches Water Column													
			0.2		0.3		0.4		0.5		0.6		0.7		0.8	
			CFM	Rise	CFM	Rise	CFM	Rise	CFM	Rise	CFM	Rise	CFM	Rise	CFM	Rise
GUD045_30A	HIGH	3.0	1500	-	1440	-	1375	-	1295	-	1210	-	1120	-	1010	-
	MED	2.5	1275	-	1200	-	1175	-	1125	-	1055	36	975	39	870	43
	LOW	2.0	980	40	970	40	940	42	900	44	865	44	810	47	730	52
GUD070_30A	HIGH	3.0	1460	42	1400	44	1325	46	1270	48	1180	49	1095	53	985	59
	MED	2.5	1245	45	1205	51	1165	52	1115	55	1050	56	980	60	880	-
	MED-LO	2.0	1000	61	985	62	960	63	920	-	880	-	815	-	725	-
	LOW	1.5	820	-	800	-	785	-	755	-	730	-	680	-	635	-
GUD070_40A	HIGH	4.0	1855	-	1785	-	1735	-	1650	37	1575	37	1485	39	1375	42
	MED	3.5	1680	36	1615	38	1560	39	1480	41	1400	42	1310	45	1200	49
	MED-LO	3.5	1525	40	1480	41	1425	43	1350	45	1280	46	1200	49	1100	53
	LOW	3.0	1350	45	1325	46	1275	48	1200	51	1145	51	1045	56	890	-
GUD090_35A	HIGH	4.0	1610	49	1560	50	1470	53	1400	56	1295	58	1200	63	1080	70
	MED	3.5	1440	54	1400	56	1340	58	1280	61	1200	63	1125	67	1020	74
	MED-LO	3.0	1165	67	1150	68	1135	69	1090	72	1055	72	1000	-	920	-
	LOW	2.5	900	-	895	-	890	-	875	-	840	-	805	-	750	-
GUD090_50A	HIGH	4.0	2250	-	2175	36	2085	38	2000	39	1890	40	1780	43	1640	46
	MED	3.5	1900	41	1865	42	1805	43	1735	45	1635	46	1590	48	1465	52
	MED-LO	3.0	1700	46	1670	47	1625	48	1565	50	1500	51	1400	54	1255	60
	LOW	2.5	1465	53	1450	54	1400	56	1350	58	1280	59	1195	64	1050	-
GUD115_50A	HIGH	5.0	2280	44	2190	46	2100	48	2000	50	1880	51	1755	55	1600	60
	MED	4.5	1920	52	1865	46	2100	48	2000	50	1880	51	1755	55	1600	60
	MED-LO	4.0	1690	59	1865	60	1610	62	1555	64	1485	-	1390	-	1245	-
	LOW	3.5	1455	-	1440	-	1390	-	1350	-	1290	-	12220	-	1115	-

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	0.7	0.8
			CFM	Rise	CFM	Rise	CFM	Rise	CFM	Rise	CFM	Rise	CFM	CFM	CFM
GUD045X30B (MED)	HIGH	3.0	1381	28	1319	29	1260	30	1197	32	1131	34	1055	960	847
	MED	2.5	1173	33	1142	34	1103	35	1055	36	998	38	931	848	736
	LO	2.0	908	42	901	43	884	43	855	45	815	47	760	688	602
GUD070X30B (HIGH)	HIGH	3.0	1458	41	1395	43	1334	45	1266	47	1188	50	1111	1015	895
	MED	2.5	1270	47	1229	49	1178	51	1122	53	1060	56	986	898	778
	MED-LO	2.0	1019	59	1001	60	973	61	938	64	891	-	831	750	649
	LO	1.5	782	-	778	-	766	-	746	-	708	-	659	590	501
GUD070X40B (MED-LO)	HIGH	4.0	1861	-	1803	-	1714	35	1647	37	1561	39	1457	1278	1063
	MED	3.5	1699	36	1643	37	1577	38	1512	40	1431	42	1312	1164	977
	MED-LO	3.5	1519	40	1482	41	1439	42	1386	44	1316	46	1196	1063	903
	LO	3.0	1278	47	1277	47	1268	48	1227	49	1164	52	1069	937	839
GUD090X35B (MED)	HIGH	4.0	1664	47	1599	49	1532	51	1465	53	1395	56	1213	1234	1150
	MED	3.5	1465	53	1439	54	1395	56	1345	58	1288	60	1218	1145	1048
	MED-LO	3.0	1089	71	1108	70	1106	70	1092	71	1059	73	1021	961	883
	LO	2.5	850	-	845	-	841	-	834	-	823	-	801	759	688
GUD090X50B (MED)	HIGH	4.0	2271	-	2184	36	2094	37	2000	39	1914	41	1810	1701	1552
	MED	3.5	1951	40	1889	41	1837	42	1770	44	1701	46	1598	1489	1353
	MED-LO	3.0	1724	45	1695	46	1647	47	1598	49	1534	51	1412	1362	1236
	LO	2.5	1495	52	1474	53	1448	54	1407	55	1356	57	1289	1196	1036
GUD115X50B (HIGH)	HIGH	5.0	2358	42	2228	44	2094	47	1997	49	1896	52	1800	1680	1552
	MED	4.5	1922	52	1869	52	1810	55	1743	57	1688	59	1583	1488	1364
	MED-LO	4.0	1699	58	1672	59	1630	61	1583	63	1526	65	1454	1369	1248
	LO	3.5	1475	-	1462	-	1441	-	1414	-	1369	-	1317	1232	1067

1. CFM chart is with filter(s) as recommended by filter charts shown in product design section of this manual. If furnace is to have two return filters, this chart assumes both filters are installed.
2. INSTALLATION IS TO BE ADJUSTED TO OBTAIN TEMPERATURE RISE WITHIN THE RANGE SPECIFIED ON THE RATING PLATE.
3. The chart is for information only. For satisfactory operation, external static pressure must not exceed value shown on rating plate. The shaded area indicates ranges in excess of maximum external static pressure allowed when heating.
4. 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

MODEL	MOTOR SPEED	TONS AC @ 0.5" ESP	External Static Pressure, Inches Water Column													
			0.2		0.3		0.4		0.5		0.6		0.7		0.8	
			CFM	Rise	CFM	Rise	CFM	Rise	CFM	Rise	CFM	Rise	CFM	Rise	CFM	Rise
GUX045_30_	HIGH	3.0	1525	-	1455	-	1390	-	1325	-	1245	-	1180	-	1090	36
	MED	2.5	1230	-	1200	-	1160	-	1125	-	1070	37	1000	40	930	43
	LOW	2.0	970	41	955	41	940	42	905	44	870	45	815	49	685	58
GUX070_30_	HIGH	3.0	1510	41	1445	43	1370	45	1290	48	1200	51	1115	55	1015	61
	MED	2.5	1275	48	1230	50	1175	52	1115	55	1030	60	950	65	860	-
	MED-LO	2.0	990	62	975	63	930	66	900	68	845	-	780	-	675	-
	LOW	1.5	760	-	740	-	720	-	700	-	650	-	600	-	525	-
GUX070_40_	HIGH	4.0	1845	-	1765	-	1680	37	1590	39	1470	42	1375	45	1175	52
	MED	3.5	1635	38	1575	39	1500	41	1440	43	1325	46	1215	51	865	-
	MED-LO	3.5	1490	41	1450	42	1385	44	1320	47	1235	50	100	56	815	-
	LOW	3.0	1315	47	1275	48	1250	49	1180	52	1085	57	875	-	745	-
GUCX090_35_	HIGH	4.0	1800	44	1740	45	1665	48	1580	50	1490	53	1400	57	1315	60
	MED	3.5	1575	50	1515	52	1460	54	1390	57	1325	60	1235	64	1145	69
	MED-LO	3.0	1250	63	1220	65	1185	67	1140	69	1100	-	1045	-	975	-
	LOW	2.5	965	-	950	-	925	-	890	-	850	-	800	-	740	-
GUX090_50_	HIGH	4.0	2230	36	2145	37	2050	39	1945	41	1815	44	1710	46	1610	49
	MED	3.5	1930	41	1870	42	1800	44	1715	46	1610	49	1575	52	1420	56
	MED-LO	3.0	1715	46	1670	47	1610	49	1545	51	1475	54	1345	59	1250	63
	LOW	2.5	1440	55	1410	56	1360	58	1310	60	1245	64	1175	-	1080	-
GUX115_50_	HIGH	5.0	2325	44	2240	45	2150	47	2075	49	1965	51	1865	54	1750	58
	MED	4.5	1840	55	1800	56	1750	58	1690	60	1620	62	1545	65	1465	69
	MED-LO	4.0	1560	65	1530	66	1480	68	1430	-	1380	-	1330	-	1255	-
	LOW	3.5	1300	-	1275	-	1255	-	1215	-	1175	-	1115	-	1060	-

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	0.7	0.8
			CFM	Rise	CFM	Rise	CFM	Rise	CFM	Rise	CFM	Rise	CFM	CFM	CFM
GUX045X30B (LOW)	HIGH	3.0	1605	-	1549	-	1486	-	1419	-	1339	-	1261	1173	1081
	MED	2.5	1322	-	1303	-	1268	-	12224	-	1171	-	1104	1033	951
	LOW	2.0	944	42	966	41	970	41	963	41	938	42	839	809	593
GUX070X30B (HIGH)	HIGH	3.0	1568	-	1503	41	1435	43	1359	45	1283	48	1203	1106	999
	MED-HI	2.5	1395	44	1350	46	1293	48	1234	50	1161	53	1083	999	887
	MED-LO	2.0	1141	54	1119	55	1090	57	1047	59	992	62	932	848	737
	LOW	1.5	903	68	893	69	873	-	848	-	812	-	763	679	590
GUX070X40B (MED-LO)	HIGH	4.0	2065	-	1982	-	1895	-	1818	-	1723	36	1523	1516	1137
	MED-HI	3.5	1791	-	1705	36	1701	36	1641	38	1567	39	1476	1357	1034
	MED-LO	3.5	1567	39	1555	40	1516	41	1476	42	1421	43	1211	1143	964
	LOW	3.0	1300	47	1300	47	1300	47	1294	48	1265	49	1176	982	880
GUX090X35B (HIGH)	HIGH	4.0	1841	43	1764	45	1683	47	1599	50	1510	52	1476	1402	1335
	MED-HI	3.5	1636	48	1574	50	1510	52	1449	55	1372	58	1283	1250	1206
	MED-LO	3.0	1313	60	1298	61	1267	63	1219	65	1161	68	1090	999	871
	LOW	2.5	1012	-	1009	-	997	-	979	-	944	-	897	848	825
GUX090X50B (MED-HI)	HIGH	4.0	2274	35	2182	36	2085	38	1996	40	1890	42	1777	1671	1543
	MED-HI	3.5	1969	40	1909	42	1838	43	1817	44	1688	47	1590	1494	1361
	MED-LO	3.0	1748	45	1714	46	1679	47	1626	49	1552	51	1475	1393	1163
	LOW	2.5	1522	52	1502	53	1470	54	1428	55	1380	57	1313	1212	997
GUX115X50B (HIGH)	HIGH	5.0	2332	43	2249	45	2162	47	2072	49	1978	51	1892	1761	1664
	MED-HI	4.5	1892	54	1841	55	1788	57	1734	58	1663	61	1590	1498	1416
	MED-LO	4.0	1638	62	1607	63	1570	64	1526	66	1473	69	1411	1340	1256
	LOW	3.5	1376	-	1347	-	1332	-	1287	-	1256	-	1204	1141	1060

1. CFM chart is with filter(s) as shipped with furnace. If furnace is shipped with two side air return filters, this chart assumes both filters are installed.
2. INSTALLATION IS TO BE ADJUSTED TO OBTAIN TEMPERATURE RISE WITHIN THE RANGE SPECIFIED ON THE RATING PLATE.
3. The chart is for information only. For satisfactory operation, external static pressure must not exceed value shown on rating plate. The shaded area indicates ranges in excess of maximum external static pressure allowed when heating.
4. 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

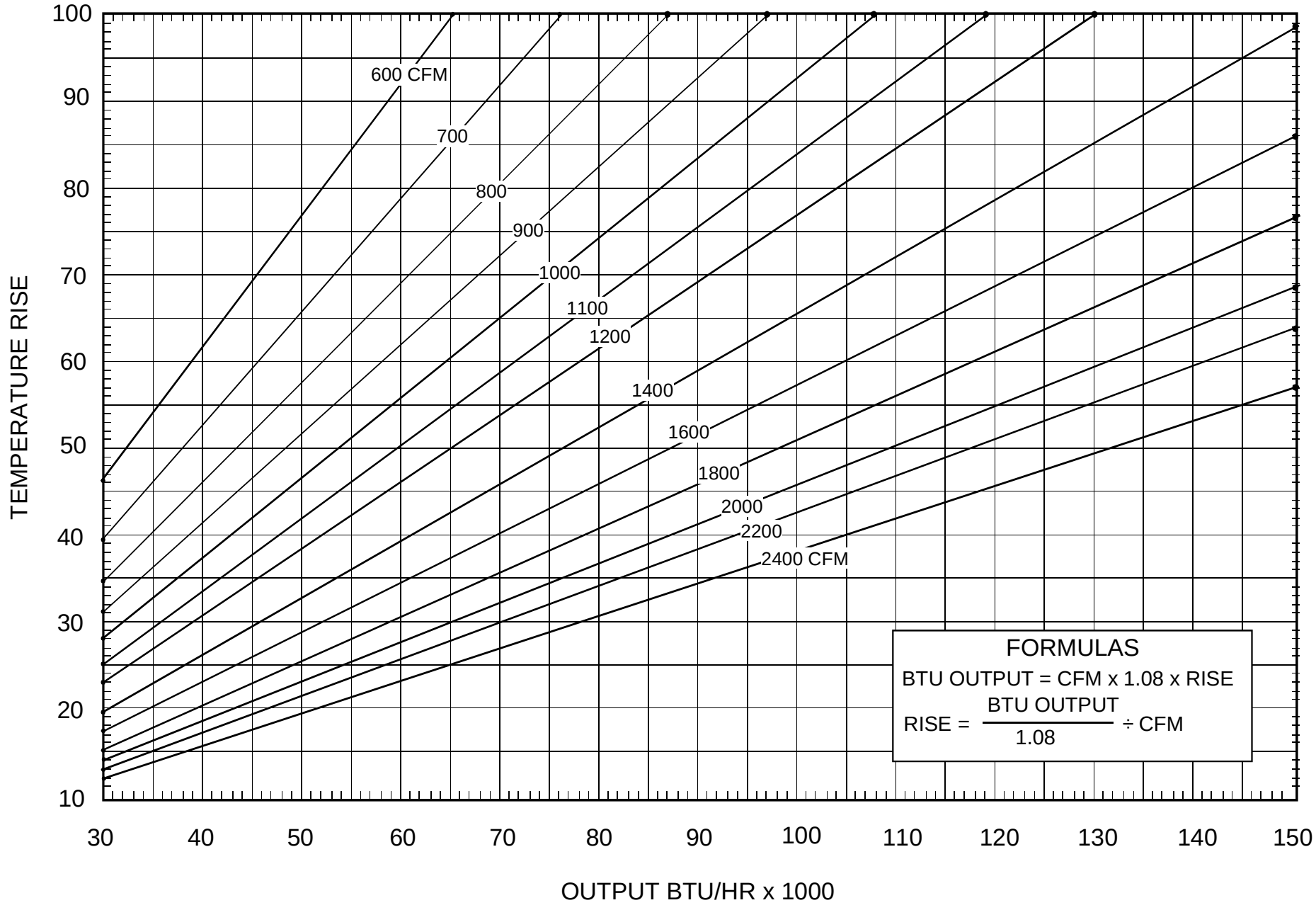
MODEL (Htg. Speed As Shipped)	MOTOR SPEED	TONS AC @ 0.5" ESP	External Static Pressure, Inches Water Column												
			0.1		0.2		0.3		0.4		0.5		0.6	0.7	0.8
			CFM	Rise	CFM	Rise	CFM	Rise	CFM	Rise	CFM	Rise	CFM	CFM	CFM
GDC045X30B (LOW)	HIGH	3.0	1596	-	1533	23	1467	27	1398	28	1310	30	1233	1150	1032
	MED	2.5	1340	30	1307	30	1267	31	1217	33	1158	34	1096	1025	921
	LO	2.0	977	41	986	40	980	41	971	41	945	42	899	829	740
GDC070X30B (HIGH)	HIGH	3.0	1552	38	1481	40	1406	42	1338	44	1267	47	1179	1083	962
	MED	2.5	1336	44	1297	46	1247	48	1195	50	1129	53	1053	878	937
	MED-LO	2.0	1050	57	1038	57	1020	58	990	60	936	63	882	787	669
	LO	1.5	790	-	794	-	783	-	771	-	726	-	673	591	414
GDC070X40B (MED)	HIGH	4.0	2134	-	2032	-	1948	31	1835	32	1742	34	1630	1509	1378
	MED	3.5	1515	39	1476	40	1429	42	1372	43	1307	45	1229	1138	1010
	MED-LO	3.5	1254	47	1218	49	1176	51	1138	52	1070	56	1003	918	816
	LO	3.0	1049	57	1010	59	968	-	923	-	851	-	793	712	622
GDC090X40B (MED)	HIGH	4.0	2142	37	2112	37	2050	38	2003	39	1939	41	1872	1767	1674
	MED	3.5	1781	44	1763	45	1727	46	1702	46	1657	48	1600	1522	1440
	MED-LO	3.0	1482	53	1471	54	1461	54	1429	55	1386	57	1364	1307	1222
	LO	2.5	1238	64	1234	64	1222	64	1198	-	1173	-	1130	1067	991
GDC090X50B (MED)	HIGH	4.0	2447	-	2421	-	2341	-	2257	35	2142	37	2019	1889	1767
	MED	3.5	1889	42	1855	43	1820	44	1767	45	1712	46	1636	1556	1450
	MED-LO	3.0	1602	50	1572	50	1541	51	1494	53	1462	54	1396	1326	1233
	LO	2.5	1345	59	1329	60	1308	61	1277	62	1246	64	1189	1130	1068
GDC115X50B (HIGH)	HIGH	5.0	2510	-	2493	-	2441	41	2361	42	2264	44	2148	2025	1911
	MED	4.5	1918	53	1893	52	1855	53	1816	55	1749	57	1693	1606	1515
	MED-LO	4.0	1595	62	1586	62	1567	63	1537	64	1486	67	1423	1357	1287
	LO	3.5	1334	-	1311	-	1299	-	1275	-	1226	-	1188	1149	1080

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	0.7	0.8
			CFM	Rise	CFM	Rise	CFM	Rise	CFM	Rise	CFM	Rise	CFM	CFM	CFM
GCD045X30B (HIGH)	HIGH	3.0	1552	38	1481	40	1406	42	1338	44	1267	47	1179	1083	962
	MED	2.5	1336	44	1297	46	1247	48	1195	50	1129	53	1053	978	837
	MED-LO	2.0	1050	57	1038	57	1020	58	990	60	936	63	882	787	669
	LOW	1.5	790	-	794	-	783	-	771	-	726	-	673	591	414
GCD090X40B (MED)	HIGH	4.5	2142	37	2112	37	2050	38	2003	39	1939	41	1872	1767	1674
	MED	4.0	1781	44	1763	45	1727	46	1702	46	1657	48	1600	1522	1440
	MED-LO	3.5	1482	53	1471	54	1461	54	1429	55	1386	57	1364	1307	1222
	LOW	3.0	1238	64	1234	64	1222	64	1198	-	1173	-	1130	1067	991

1. CFM chart is with filter(s) as recommended by filter charts shown in product design section of this manual. If furnace is to have two return filters, this chart assumes both filters are installed.
2. INSTALLATION IS TO BE ADJUSTED TO OBTAIN TEMPERATURE RISE WITHIN THE RANGE SPECIFIED ON THE RATING PLATE.
3. The chart is for information only. For satisfactory operation, external static pressure must not exceed value shown on rating plate. The shaded area indicates ranges in excess of maximum external static pressure allowed when heating.
4. 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

(All Except GUD/GCD Direct Vent Models)

⚠ WARNING

Possible death, personal injury or property damage may occur if the furnace is not provided with enough fresh air for proper combustion and ventilation of flue gases. Most homes require outside air to be supplied to the furnace area.

Improved construction and additional insulation in buildings have reduced heat loss by reducing air infiltration and escape around doors and windows. These changes have helped in reducing heating/cooling costs but have created a problem supplying combustion and ventilation air for gas fired and other fuel burning appliances. Appliances that pull air out of the house (clothes dryers, exhaust fans, fireplaces, etc.) increase the problem by starving appliances for air.

If this furnace is to be installed in the same space with other gas appliances, such as a water heater, ensure there is an adequate supply of combustion and ventilation air for the other appliances. Refer to the latest edition of the National Fuel Gas Code NFPA 54/ANSI Z223.1 (Section 5.3), or CAN/CGA B149 Installation Codes (Sections 7.2, 7.3, or 7.4), or applicable provisions of the local building codes for determining the combustion air requirements for the appliances.

Most homes will require 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 NFPA 54/ANSI Z223.1 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 all air 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 supplied for ventilation, including all air required for comfort and proper working conditions for personnel.

(e) A draft hood or a barometric draft regulator shall be installed in the same room as the equipment served so as to prevent any difference in pressure between the hood or regulator and the combustion air supply.

(f) 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 application of one of the methods covered in 5.3.3 and 5.3.4.

(g) 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.

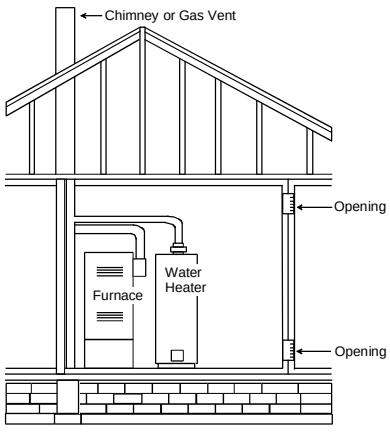
Space, Unconfined.

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 other spaces 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 used to determine the required minimum volume. 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 minimum dimension of air openings shall not be less than 3 inches.

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.



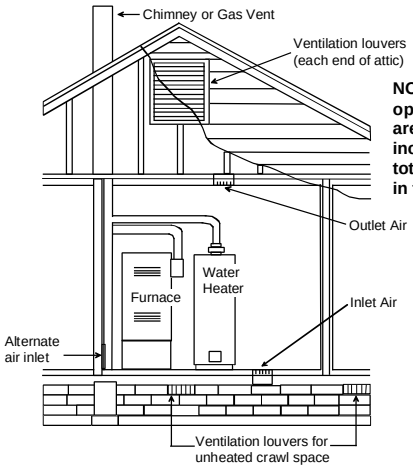
Equipment Located in Confined Spaces; All Air from Inside Building. See 5.3.3-a

COMBUSTION AND VENTILATION AIR

(All Except GUD/GCD Direct Vent Models)

(b) *All Air from Outdoors:* The confined space shall communicate with the outdoors in accordance with one of the following two methods: **Two permanent openings**, one commencing within 12 inches of the top and one commencing within 12 inches of the bottom of the enclosure or **One permanent opening,** commencing within 12 inches of the top of the enclosure where the equipment has clearances of at least 1 inch from the sides and back and 6 inches from the front of the appliance. The openings shall communicate directly, or by ducts, with the outdoors or spaces (crawl or attic) that freely communicate with the outdoors.

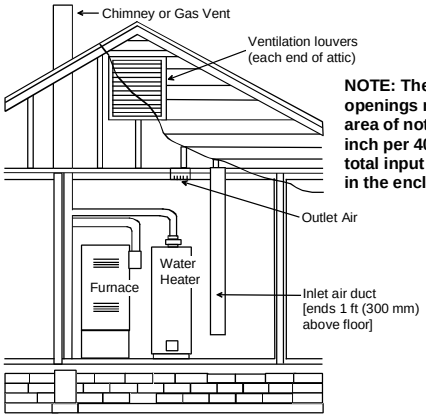
1. When directly communicating with the outdoors, each opening shall have a minimum free area of 1 square inch per 4,000 BTU per hour of total input rating of all equipment in the enclosure.



NOTE: The inlet and outlet air openings must each have a free area of not less than one square inch per 4000 BTU of the total input rating of all equipment in the enclosure.

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

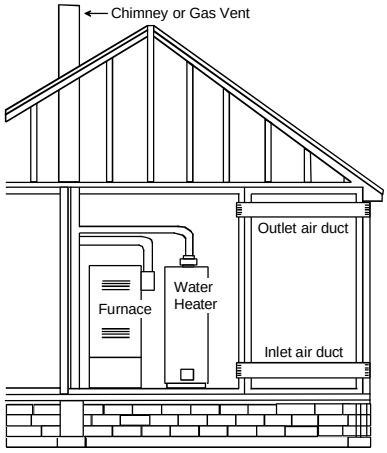
2. When communicating with the outdoors through vertical ducts, each opening shall have a minimum free area of 1 square inch per 4,000 BTU per hour of total input rating of all equipment in the enclosure.



NOTE: The inlet and outlet air openings must each have a free area of not less than one square inch per 4000 BTU of the total input rating of all equipment in the enclosure.

Equipment Located in Confined Spaces; All Air from Outdoors Through Ventilated 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.



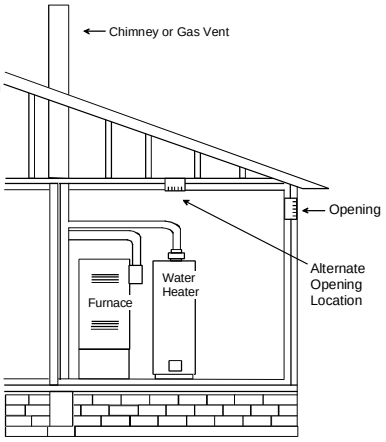
NOTE: The air duct openings must have a free area of not less than one square inch per 2000 BTU of the total input rating of all equipment in the enclosure*.

*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.

NOTE: The single opening must have a free area of not less than one square inch per 3000 BTU of the total input rating of all equipment in the enclosure, but not less than the sum of the areas of all vent connectors in the confined space.



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

5. When directly communicating with the outdoors, the single opening shall have a minimum free area of 1 square inch per 3,000 BTU per hour of total input rating of all equipment in the enclosure.

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.

COMBUSTION AND VENTILATION AIR

(All Except GUD/GCD Direct Vent Models)

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. Air from Inside Building. See 5.3.3-a.

VENT PIPE MATERIALS

WARNING

FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN BODILY INJURY OR DEATH FROM ASPHYXIATION. THEREFORE, CAREFULLY READ AND FOLLOW ALL INSTRUCTIONS GIVEN IN THIS SECTION.

In order to achieve high efficiency, the products of combustion from this furnace are cooled to the point where condensation takes place. Consequently, the venting must be done in a different manner and with different materials than with a conventional system. Two or three inch PVC Schedule 40 pipe meeting ASTM D1785, PVC primer and PVC solvent cement meeting ASTM D2564 specifications must be used. Only DWV type fittings meeting ASTM D2665 for socket dimensions and ASTM D3311 for exterior dimensions can be used. Carefully follow the manufacturer's instructions in cutting, cleaning, and solvent cementing PVC or ABS pipe.

As an alternate to PVC pipe, primer, solvent cement, and fittings; ABS materials which are in compliance with the following specifications may be used: two or three inch ABS Schedule 40 pipe must meet ASTM D1527 and must be CSA listed. Solvent cement for ABS to ABS joints must meet ASTM D2235 and must be CSA listed. The solvent cement used for the PVC to ABS joint must meet ASTM D3138. Fittings must be DWV type fittings which meet ASTM D2661 and ASTM D3311 (exterior dimensions) and are CSA listed. Carefully follow the manufacturer's instructions in cutting, cleaning, and solvent cementing PVC or ABS pipe.

WARNING

SOLVENT CEMENTS ARE COMBUSTIBLE LIQUIDS AND SHOULD BE KEPT AWAY FROM ALL IGNITION SOURCES (IE: SPARKS, OPEN FLAMES, AND EXCESSIVE HEAT). AVOID BREATHING CEMENT VAPORS OR CONTACT WITH SKIN AND EYES.

All 90 degree elbows must be medium (1/4 bend DWV) or long radius (long sweep 1/4 bend DWV) types conforming to ASTM D3311. A medium radius (1/4 bend) elbow is 3 1/16" minimum from the plane of one opening to the centerline of the other opening for 2" pipe (4 9/16" for 3" pipe). These dimensions are shown in the drawing of the medium radius elbow dimensions on page 41.

This furnace **must not be connected to any type B, BW, or L vent** or vent connector and must not be vented into any portion of a factory built or masonry chimney, except when used as a pathway for PVC pipe as described below.

Flexible couplings for joining PVC pipe (sometimes called "no hub connectors") have been used by some installers to connect the field supplied portion of the vent system to the furnace. Amana Heating & Air Conditioning does not encourage nor recommend using these connectors. However, if you do choose to use "no-hub connectors", the connectors must be gas tight, water tight, and able to withstand continuous exposure to the warm, moist, acidic flue products of the furnace.

It is the responsibility of the installer to follow the manufacturers' recommendations and to verify that all flue pipe connectors used are compatible with the furnace flue products. In addition the connectors must possess adequate structural integrity to prevent flue pipe separations during furnace operation.

COMBUSTION AND VENTILATION AIR

(All Except GUD/GCD Direct Vent Models)

VENT PIPING - GUC/GCC/GDC/GUX (ALL INSTALLATIONS), AND GUD/GCD (ONE PIPE SYSTEM)

Important: The length of the vent pipe affects the performance of the furnace and therefore must be carefully sized.

Just as with ductwork, the resistance of the flue pipe is measured in terms of equivalent feet. Equivalent feet is actual length of the pipe plus an additional three feet of pipe for a 90 degree medium radius elbow and 1 1/2 feet for each 45 degree medium radius elbow. A 90 degree short radius elbow is equal to 10 feet of straight pipe. For this reason, the use of a short radius elbow should usually be avoided. **IN NO CASE SHOULD OVER 40 FT. OF ACTUAL 2" PIPE OR 52 EQUIVALENT FEET OF 2" PIPE BE USED.**

If the equivalent vent length is too long, a portion of the vent may be changed to a 3" pipe. The transition from 2" to 3" must be made in a vertical run.

A sample calculation is as follows (All elbows are medium radius):

SECTION	EQ. FT. OF 2" PIPE
Outdoor 2" elbow	3
Outdoor & through the wall pipe - 2" pipe	3
2 - 45 degree elbows, 2"	3
4 - 90 degree elbows, 2"	12
36 feet 2" pipe	36
TOTAL	57

This is greater than the 52 equivalent feet which is allowed. 3" pipe has only 1/3 the pressure drop of 2" pipe. Changing a portion of the piping to 3" will change the pressure drop as follows:

SECTION	EQ. FT. OF 2" PIPE
Outdoor 3" elbow	1
Outdoor & through the wall - 3" pipe	1
2 - 45 degree elbows, 3"	1
4 - 90 degree elbows, 3"	4
33 feet of 3" pipe	11
3 feet of 2" pipe	3
TOTAL	21

This is less than 52 equivalent feet of 2" pipe, so this will be satisfactory.

The inside feet of straight pipe and inside elbows represent the venting system from the furnace to the inside wall. Follow termination instructions for going from the inside wall to the outside in the next paragraph.

COMBUSTION AND VENTILATION AIR

(All Except GUD/GCD Direct Vent Models)

The following expanded venting tables are for the GUC___X__B, GUD___X__B, GUX___X__B, GDC___X__B and GCD___X__B model furnaces only. These venting tables allow applications with up to eight (8) 90° medium radius elbows and a maximum length greater than 40 feet for some models. The furnace models that utilize these expanded tables are listed at the top of each table.

Vent Pipe Diameter for GUC___X__B (All Models), GUX___X__B (All Models), and GUD045X__B (One Pipe System)

# of Inside Elbows	5 to10 Feet	10 to 15 Feet	15 to 20 Feet	20 to 25 Feet	25 to 30 Feet	30 to 35 Feet	35 to 40 Feet	40 to 45 Feet	45 to 50 Feet
1	2"	2"	2"	2"	2"	2"	2"	3"	3"
2	2"	2"	2"	2"	2"	2"	2"	3"	3"
3	2"	2"	2"	2"	2"	2"	3"	3"	3"
4	2"	2"	2"	2"	2"	3"	3"	3"	3"
5	2"	2"	2"	2"	2"	3"	3"	3"	3"
6	2"	2"	2"	2"	3"	3"	3"	3"	3"
7	2"	2"	2"	3"	3"	3"	3"	3"	3"
8	2"	2"	3"	3"	3"	3"	3"	3"	3"

Vent Pipe Diameter for GDC045X__B, GDC070X__B and GDC090X__B Horizontal Installations (One Pipe System)

# of Inside Elbows	5 to10 Feet	10 to 15 Feet	15 to 20 Feet	20 to 25 Feet	25 to 30 Feet	30 to 35 Feet	35 to 40 Feet	40 to 45 Feet	45 to 50 Feet
1	2"	2"	2"	2"	2"	2"	2"	2"	3"
2	2"	2"	2"	2"	2"	2"	2"	3"	3"
3	2"	2"	2"	2"	2"	2"	3"	3"	3"
4	2"	2"	2"	2"	3"	3"	3"	3"	3"
5	2"	2"	2"	3"	3"	3"	3"	3"	3"
6	2"	2"	3"	3"	3"	3"	3"	3"	3"
7	2"	3"	3"	3"	3"	3"	3"	3"	3"
8	3"	3"	3"	3"	3"	3"	3"	3"	3"

Vent Pipe Diameter for GUD070X__B (One Pipe System)

# of Inside Elbows	5 to10 Feet	10 to 15 Feet	15 to 20 Feet	20 to 25 Feet	25 to 30 Feet	30 to 35 Feet	35 to 40 Feet	40 to 45 Feet	45 to 50 Feet
1	2"	2"	2"	2"	2"	2"	2"	3"	3"
2	2"	2"	2"	2"	2"	2"	2"	3"	3"
3	2"	2"	2"	2"	2"	2"	3"	3"	NA
4	2"	2"	2"	2"	2"	3"	3"	NA	NA
5	2"	2"	2"	2"	2"	3"	NA	NA	NA
6	2"	2"	2"	2"	3"	NA	NA	NA	NA
7	2"	2"	2"	3"	NA	NA	NA	NA	NA
8	2"	2"	3"	NA	NA	NA	NA	NA	NA

Vent Pipe Diameter for GDC115X__B Horizontal Installations (One Pipe System)

# of Inside Elbows	5 to10 Feet	10 to 15 Feet	15 to 20 Feet	20 to 25 Feet	25 to 30 Feet	30 to 35 Feet	35 to 40 Feet	40 to 45 Feet	45 to 50 Feet
1	2"	2"	2"	2"	2"	2"	2"	3"	3"
2	2"	2"	2"	2"	2"	2"	3"	3"	3"
3	2"	2"	2"	2"	3"	3"	3"	3"	3"
4	2"	2"	2"	3"	3"	3"	3"	3"	3"
5	2"	2"	3"	3"	3"	3"	3"	3"	3"
6	2"	3"	3"	3"	3"	3"	3"	3"	3"
7	3"	3"	3"	3"	3"	3"	3"	3"	3"
8	3"	3"	3"	3"	3"	3"	3"	3"	3"

Vent Pipe Diameter for GUD090X__B and GUD115X__B (One Pipe System)

# of Inside Elbows	5 to10 Feet	10 to 15 Feet	15 to 20 Feet	20 to 25 Feet	25 to 30 Feet	30 to 35 Feet	35 to 40 Feet	40 to 45 Feet	45 to 50 Feet
1	3"	3"	3"	3"	3"	3"	3"	3"	3"
2	3"	3"	3"	3"	3"	3"	3"	3"	3"
3	3"	3"	3"	3"	3"	3"	3"	3"	NA
4	3"	3"	3"	3"	3"	3"	3"	NA	NA
5	3"	3"	3"	3"	3"	3"	NA	NA	NA
6	3"	3"	3"	3"	3"	NA	NA	NA	NA
7	3"	3"	3"	3"	NA	NA	NA	NA	NA
8	3"	3"	3"	NA	NA	NA	NA	NA	NA

Vent Pipe Diameter for GCD070X__B (One Pipe System)

# of Inside Elbows	5 to10 Feet	10 to 15 Feet	15 to 20 Feet	20 to 25 Feet	25 to 30 Feet	30 to 35 Feet	35 to 40 Feet	40 to 45 Feet	45 to 50 Feet
1	2"	2"	2"	3"	3"	3"	3"	3"	3"
2	2"	2"	3"	3"	3"	3"	3"	3"	3"
3	2"	3"	3"	3"	3"	3"	3"	3"	3"
4	3"	3"	3"	3"	3"	3"	3"	3"	3"
5	3"	3"	3"	3"	3"	3"	3"	3"	NA
6	3"	3"	3"	3"	3"	3"	3"	NA	NA
7	3"	3"	3"	3"	3"	3"	NA	NA	NA
8	3"	3"	3"	3"	3"	NA	NA	NA	NA

Vent Pipe Diameter GDC___X__B (All Models) Counterflow Installations (One Pipe System)

# of Inside Elbows	5 to10 Feet	10 to 15 Feet	15 to 20 Feet	20 to 25 Feet	25 to 30 Feet	30 to 35 Feet	35 to 40 Feet	40 to 45 Feet	45 to 50 Feet
1	2"	2"	2"	2"	2"	2"	2"	2"	3"
2	2"	2"	2"	2"	2"	2"	2"	3"	3"
3	2"	2"	2"	2"	2"	2"	3"	3"	3"
4	2"	2"	2"	2"	3"	3"	3"	3"	3"
5	2"	2"	2"	3"	3"	3"	3"	3"	3"
6	2"	2"	3"	3"	3"	3"	3"	3"	3"
7	2"	3"	3"	3"	3"	3"	3"	3"	3"
8	3"	3"	3"	3"	3"	3"	3"	3"	3"

Vent Pipe Diameter for GCD090X__B (One Pipe System)

# of Inside Elbows	5 to10 Feet	10 to 15 Feet	15 to 20 Feet	20 to 25 Feet	25 to 30 Feet	30 to 35 Feet	35 to 40 Feet	40 to 45 Feet	45 to 50 Feet
1	3"	3"	3"	3"	3"	3"	3"	3"	3"
2	3"	3"	3"	3"	3"	3"	3"	3"	3"
3	3"	3"	3"	3"	3"	3"	3"	3"	NA
4	3"	3"	3"	3"	3"	3"	3"	NA	NA
5	3"	3"	3"	3"	3"	3"	NA	NA	NA
6	3"	3"	3"	3"	3"	NA	NA	NA	NA
7	3"	3"	3"	3"	NA	NA	NA	NA	NA
8	3"	3"	3"	NA	NA	NA	NA	NA	NA

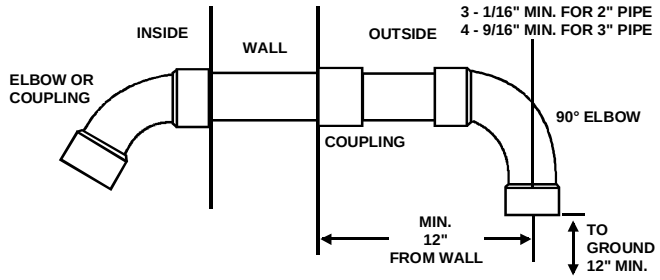
Note: Shaded areas on the tables with **NA** are outside tested range.

COMBUSTION AND VENTILATION AIR

(All Except GUD/GCD Direct Vent Models)

When venting pipe goes through an outside wall, the vent must terminate at least one foot outside to keep moist combustion products away from the structure. The vent termination must be at least three feet above any forced air inlet located within ten feet. It must be at least four feet below, four feet horizontally from or one foot above any door, window, or gravity air inlet into any building. The vent must terminate at least one foot above ground level. If heavy snow is expected locally, this distance may need to be increased. The vent shall not terminate over public walkways, or over an area where condensate or vapor could create a nuisance or hazard or could be detrimental to the operation of regulators, relief valves, or other equipment. Drill a 2 3/8" diameter hole through the wall. Cut a piece of PVC (ABS) pipe that is the thickness of the wall plus the depth of the sockets of the fittings to be installed on the inside and outside of the walls.

To prevent the vent pipe from moving and possibly damaging connections, locate the fitting on the inside wall and a coupling on the outside wall as shown in the following horizontal vent termination drawing. To prevent condensate from freezing inside the PVC flue pipe in extremely cold conditions or in long outdoor runs, insulation may be required on the outside of the PVC pipe. Use 1/2" thickness closed cell foam insulation such as Armaflex or Insultube.



Horizontal Vent Termination

I**n a basement installation**, the vent pipe may be run between the joist spaces. If the vent must go below the joists, then the pipe must run up into the last joist space to go through the header. Two 45° elbows should be used rather than 90's. The horizontal run must not have any sag that can hold condensate and should pitch up at least 1/4" per foot so that condensate will run back to the unit to drain. Support the horizontal run at least every three feet. Allow for some expansion and contraction from temperature fluctuations. The normal direction changes usually account for this, but if you have a long run followed by a short offset of less than 40 inches such as going up into the last joist space, the pipe should be tightly clamped to prevent flex loading on the fittings. Seal around the pipe on the outside wall with silicone caulking material.

If the vent is to be run vertically through the roof, it must extend at least 12 inches above the roof line and shall be at least 12 inches from any vertical wall. If heavy snow is expected to remain on the roof, these distances may need to be increased. The vent must be made tight where it penetrates the roof with a proper flashing such as used with a plastic plumbing vent. The vent may be run through an existing **unused** chimney: however, the pipe must be used all the way through to above the top of the existing chimney. The space between the vent pipe and the chimney must be closed with a weather tight, corrosion resistant flashing. **NEVER VENT WITH AN EXISTING APPLIANCE OR VENT USED BY A SOLID FUEL APPLIANCE.**

When an existing furnace is removed from a venting system serving other appliances, the venting system may be too large to properly vent the remaining attached appliances.

The following steps shall be followed with each appliance remaining connected to the common venting system placed in operation, while the other appliances remaining connected to the common venting system are not in operation.

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

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

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

d. Follow the lighting instructions. Place the appliance being inspected in operation. Adjust thermostat so appliance will operate continuously.

e. Test for spillage at the draft hood relief opening after 5 minutes of main burner operation. Use the flame of a match or candle, or smoke from a cigarette, cigar, or pipe.

f. After it has been determined that each appliance remaining connected to the common venting system properly vents when tested as outlined above, return doors, windows, exhaust fans, fireplace dampers and any other gas burning appliance to their previous conditions of use.

g. If improper venting is observed during any of the above tests, the common venting system must be corrected in accordance with the latest edition of the National Fuel Gas Code, ANSI Z223.1.

If resizing any portion of the common venting system, use the appropriate table in Appendix G in the latest edition of the National Fuel Gas Code, ANSI Z223.1.

COMBUSTION AND VENTILATION AIR

(All Except GUD/GCD Direct Vent Models)

⚠ WARNING

UPON COMPLETION OF THE FURNACE INSTALLATION, CAREFULLY INSPECT THE ENTIRE FLUE SYSTEM BOTH INSIDE AND OUTSIDE THE FURNACE TO ASSURE IT IS PROPERLY SEALED. LEAKS IN THE FLUE SYSTEM CAN RESULT IN SERIOUS PERSONAL INJURY OR DEATH DUE TO EXPOSURE OF FLUE PRODUCTS, INCLUDING CARBON MONOXIDE.

ADDITIONAL CANADIAN VENTING REQUIREMENTS

In Canada venting shall conform to the requirements of the current CANI-B149 Installation Codes.

Use on C.S.A. listed 2" or 3" nominal diameter PVC or ABS pipe and fittings throughout.

The Minimum vent consists of 3 feet of straight pipe with 2 elbows (9 equivalent feet).

A single wall vent shall not be run vertically through the roof. Although, the vent may be run through an existing *unused* chimney as described in the previous venting section provided the space between the vent pipe and the chimney is insulated and closed with a weather tight, corrosion resistant flashing.

Cut all vent pipe at right angles. Remove inside and outside burr at each cut. Use cleaner to clean pipe and fitting socket. Use CSA listed cement to fasten pipe and fittings. Follow manufacturers cleaning and cementing instructions carefully to avoid leakage.

NOTE: ALL PIPING EXPOSED OUTDOORS OR IN UNHEATED AREAS MUST BE INSULATED WITH 1/2" THICK CLOSED CELL FOAM INSULATION SUCH AS "ARMAFLEX" OR "INSULTUBE".

The vent terminal shall **NOT** be located:

1. Less than 12" above the finished grade line.
2. Less than 36" from any building opening or any gas service regulator (for gas service regulators in the Province of Ontario, 72").
3. Less than 72" from the combustion air inlet of another appliance.
4. Directly above a gas utility meter or service regulator.
5. Over a walkway unless 84" above grade.

COMBUSTION AND VENTILATION AIR

(GUD/GCD Direct Vent Models)

COMBUSTION AIR AND VENT PIPING (GUD/GCD DIRECT VENT (TWO PIPE SYSTEM))

General Information and Safety Precautions

⚠ WARNING

FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN BODILY INJURY OR DEATH FROM ASPHYXIATION. THEREFORE, CAREFULLY READ AND FOLLOW ALL INSTRUCTIONS GIVEN IN THIS SECTION.

THIS APPLIANCE HAS BEEN APPROVED FOR DIRECT VENT INSTALLATION ONLY. COMMON VENTING OF THIS FURNACE WITH ANOTHER APPLIANCE (WATER HEATER, ETC.) IS NOT ALLOWED.

Combustion air must be taken from outside the structure for proper furnace operation.

⚠ CAUTION

TERMINATE THE COMBUSTION AIR INTAKE AS FAR AS IS PRACTICAL FROM THE AIR CONDITIONING UNIT OR HEAT PUMP, SWIMMING POOLS, SWIMMING POOL PUMPING UNITS, AND DRYER VENTS.

All combustion air and exhaust piping must be installed in accordance with local codes and these instructions.

When the GUD furnace is installed in confined space where the minimum clearance to combustible surfaces (see Page 10) are applied, such as in a closet or a utility room, two ventilation openings are required with a total minimum free area of 0.25 square inches per 1,000 BTUH of the furnace input rating. One opening must be within 12 inches of the top and one must be within 12 inches of the bottom of the confined space. In typical constructions, the clearance between the door and door frame will usually be adequate to satisfy this ventilation requirement.

When the GUD furnace is installed in the same space with other gas appliances, such as water heater, make sure there is an adequate supply of combustion and ventilation air for the other appliances. See the latest edition of the National Fuel Gas Code (ANSI Z223.1) for determining the combustion air requirements for the appliances.

When an existing furnace is removed from a venting system serving other appliances, the venting system may be too large to properly vent the remaining attached appliances.

The following steps shall be followed with each appliance remaining connected to the common venting system placed in operation, while the other appliances remaining connected to the common venting system are not in operation.

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

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

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

d. Follow the lighting instructions. Place the appliance being inspected in operation. Adjust thermostat so appliance will operate continuously.

e. Test for spillage at the draft hood relief opening after 5 minutes of main burner operation. Use the flame of a match or candle, or smoke from a cigarette, cigar, or pipe.

f. After it has been determined that each appliance remaining connected to the common venting system properly vents when tested as outlined above, return doors, windows, exhaust fans, fireplace dampers and any other gas burning appliance to their previous conditions of use.

g. If improper venting is observed during any of the above tests, the common venting system must be corrected in accordance with the latest edition of the National Fuel Gas Code, ANSI Z223.1.

If resizing any portion of the common venting system, use the appropriate table in Appendix G in the latest edition of the National Fuel Gas Code, ANSI Z223.1.

This Category IV Direct Vent Furnace is designed to be vented to the outside of the structure for the intake of combustion air. Consequently, the venting system must be done in a different manner and with different materials than with a conventional system. Two or three inch PVC Schedule 40 pipe meeting ASTM 1785, PVC primer and PVC solvent cement meeting ASTM D2564 specifications must be used. Only DWV type fittings meeting ASTM D2655 for socket dimensions and ASTM D3311 for exterior dimensions can be used. Carefully follow the manufacturer's instructions in cutting, cleaning, and solvent cementing PVC or ABS pipe.

As an alternate to PVC pipe, primer, solvent cement, and fittings; ABS materials which are in compliance with the following specifications may be used: two or three inch ABS Schedule 40 pipe must meet ASTM D1527 and must be CSA listed. Solvent cement for ABS to ABS joints must meet ASTM D2235 and must be CSA listed. The solvent cement used for the PVC to ABS joint must meet ASTM D3138. Fittings must be DWV type fittings which meet ASTM D2261 and ASTM D3311 (exterior dimensions) and are CSA listed. Carefully follow the manufacturer's instruc-

tions in cutting, cleaning, and solvent cementing PVC or ABS pipe.

⚠ WARNING

SOLVENT CEMENTS ARE COMBUSTIBLE LIQUIDS AND SHOULD BE KEPT AWAY FROM ALL IGNITION SOURCES (IE: SPARKS, OPEN FLAMES, AND EXCESSIVE HEAT). AVOID BREATHING CEMENT VAPORS OR CONTACT WITH SKIN AND EYES.

All 90 degree elbows must be either medium radius (1/4 bend DWV) or long radius (long sweep 1/4 bend DWV) types conforming to ASTM D3311. A medium radius (1/4 bend) elbow is 3 1/16" minimum from the plane of one opening to the centerline of the other opening for 2" pipe (4 9/16" for 3" pipe). These dimensions are shown in the medium radius elbow dimensions drawing on page 41.

This furnace must not be connected to any type B, BW, or L vent or vent connector and must not be vented into any portion of a factory built or masonry chimney, except when used as a pathway for PVC pipe as described below.

Flexible couplings for joining PVC pipe (sometimes called "no hub connectors") have been used by some installers to connect the field supplied portion of the flue gas vent system to the furnace. Amana Heating & Air Conditioning does not encourage nor recommend using these connectors. However, if you do choose to use "no-hub connectors", the connectors must be gas tight, water tight, and able to withstand continuous exposure to the warm, moist, acidic flue products of the furnace.

It is the responsibility of the installer to follow the manufacturer's recommendations and to verify that all flue pipe connectors used are compatible with the furnace flue products. In addition, the connectors must possess adequate structural integrity to prevent flue pipe separations during furnace operation or foreseeable misuse and abuse.

This furnace is supplied with 2" and 3" air intake terminal screens. These screens were shipped in the same plastic sack which held this manual. For both vertical and horizontal installations, insert the appropriately sized screen into the air intake terminal until it is firmly secured at the hub of the terminal elbow. Discard the unused screen.

If the vent (flue) pipe is exposed to extremely cold temperatures and/or long runs through unheated spaces or outdoors, insulation may be required on the outside of the vent pipe to prevent condensate from freezing. Canadian installers must take note of the "Additional Canadian Venting Requirements" on page 42. Where required, use 1/2" thick closed cell foam insulation such as Armaflex or Insultube.

If the combustion air pipe is to be installed above a suspended ceiling or other area where dripping of condensation will be objectionable, insulation of the combustion air pipe may be required. Where required, use 1/2" thick closed cell foam insulation such as Armaflex or Insultube.

LOCATION OF EXHAUST AND INTAKE TERMINATIONS

1. All Installations

This furnace can be installed with either a vertical or horizontal direct vent. In either case, the exhaust vent and the combustion air intake pipe must be located on the same side of the structure and separated by no less than 3 inches and no more than 24 inches.

The following points must also be considered when installing the vent pipe in either a horizontal or vertical application:

1. The vent termination must be at least 3 feet above any forced air inlet located within 10 feet.

Exception: This provision shall not apply to the combustion air intake of a direct vent furnace.

2. The vent termination must be at least 12 inches from any door, window, or gravity air inlet into any building.
3. The vent must terminate at least 2 feet above ground level or roof level. If heavy snow accumulation is expected, this distance will need to be increased.
4. The vent shall not terminate over public walkways or over an area where condensate or vapor could create a nuisance or hazard or could be detrimental to the operation of regulators, relief valves, or other equipment.
5. In addition, the combustion air intake should not be terminated in areas that are frequently very dusty or dirty.

⚠ CAUTION

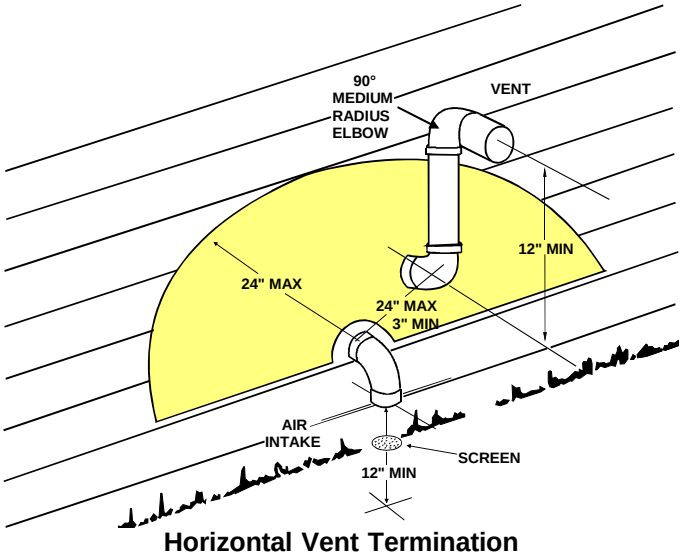
DO NOT TERMINATE THE COMBUSTION AIR INTAKE WHERE THE AIR IS OFTEN HEAVILY CONTAMINATED WITH COMPOUNDS CONTAINING CHLORINE OR FLUORINE. COMMON RESIDENTIAL SOURCES OF SUCH COMPOUNDS INCLUDE:

- **SWIMMING POOLS AND SWIMMING POOL PUMPS/FILTER**
- **CLOTHES DRYER VENTS**
- **REMOTE AIR CONDITIONING OR HEAT PUMP UNITS (A REFRIGERANT LEAK WOULD CONTAMINATE THE COMBUSTION AIR.)**
- **PLUMBING VENT STACKS**
- **BATHROOM OR SWIMMING POOL EXHAUST FANS**
- **UNDRIED PAINT STRIPPERS, ADHESIVES, PAINTS, VARNISHES, SEALERS, WAXES, AND SOLVENTS. THESE ARE OFTEN USED DURING NEW CONSTRUCTION OR REMODELING.**
- **VARIOUS COMMERCIAL AND INDUSTRIAL PROCESSES MAY ALSO BE SOURCES OF CHLORINE/FLUORINE COMPOUNDS.**

COMBUSTION AND VENTILATION AIR

(GUD/GCD Direct Vent Models)

2. Horizontal Vent/Intake Terminations



Horizontal Vent Termination

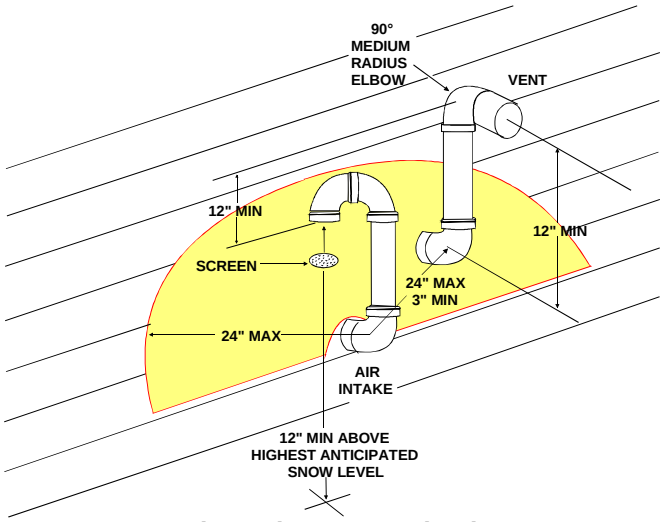
Position the combustion air intake terminal away from obstructions, above anticipated snow accumulations, and at least 12" above grade, as shown in the drawing above.

The exhaust vent must penetrate the wall within the shaded region as shown in the previous drawing.

All exhaust vent and air intake terminal fittings must be medium radius (1/4 bend DWV) 90 degree elbows.

To prevent unnecessary shutdown of furnace due to pressure switch trips, always determine anticipated snow accumulation level, and install the terminals accordingly to prevent exhaust vent and air intake blockages.

If installation above snow accumulation is required, add additional elbows as shown in the following figure. A 12" minimum clearance between the air intake and the highest anticipated snow level must be maintained. The exhaust vent must penetrate the wall within the shaded region as shown in the drawing below.

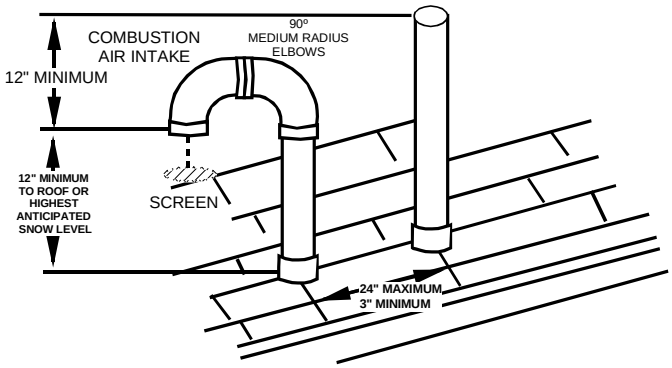


Horizontal Vent Termination above Anticipated Snow Level

DO NOT point terminals into window wells, stairwells, alcoves, or other recessed areas. It is preferable for the air intake to terminate on opposite or adjacent sides of the structure from the dryer vent. If this is not practical, maintain a 3 foot clearance (residential laundry) or a 10 foot clearance (commercial laundry).

3. Vertical Vent/Intake Terminations

If the vent and air intake pipes are to be run vertically through the roof, they must extend at least 12" above the roof line and shall be no closer than 12" to any vertical wall. The vent pipe must extend at least 12" above the air intake, as shown in the following drawing.



Vertical Vent Termination

In areas where heavy snow accumulation is expected, these distances will need to be increased. The vent and air intake pipes must be made tight where they pass through the roof with a proper flashing such as used with a plastic plumbing vent.

Maintain at least a three foot clearance from the air intake pipe to plumbing vent stacks.

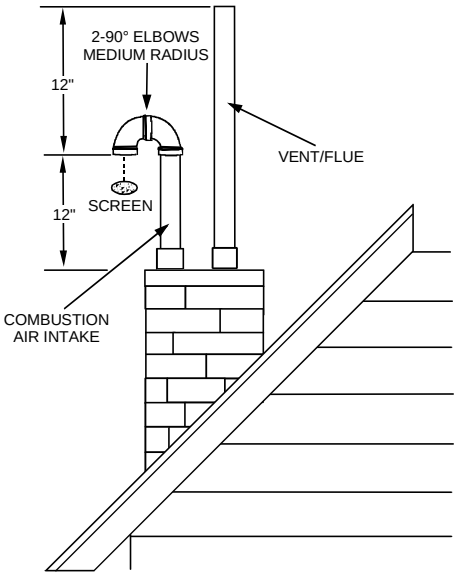
The vent and air intake pipe may be run through an existing unused chimney. However, the pipes must be run all the way through the chimney, with the air intake pipe terminating at least 12" above the top of the chimney.

The flue pipe must terminate at least 12" above the air intake. The air intake and exhaust may run side by side or as far apart as necessary within the chimney.

Refer to the following drawing for explanation. The open space around the two pipes must be closed with a weather tight, corrosion resistant flashing. **NEVER VENT WITH AN EXISTING APPLIANCE OR A VENT USED BY A SOLID FUEL APPLIANCE.**

COMBUSTION AND VENTILATION AIR

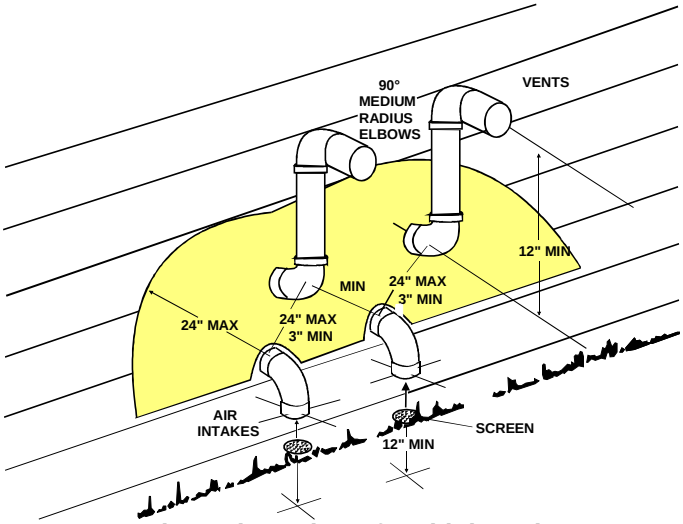
(GUD/GCD Direct Vent Models)



Venting Through an Existing Chimney

4. Vent/Intake Terminations for Installations of Multiple Direct Vent Furnaces

If more than one direct vent furnace is to be installed vertically through a common roof top, maintain the same clearance between the exhaust vent and air intake terminations of adjacent units as with the exhaust vent and air intake terminations of a single unit, as shown in the vertical vent termination drawing above.



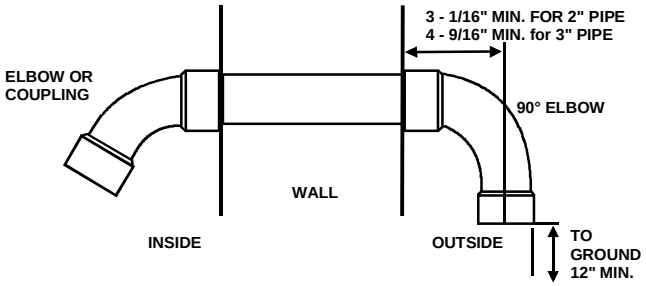
Horizontal Venting of Multiple Units

If more than one direct vent furnace is to be installed horizontally through a common side wall, maintain the clearances as shown in horizontal venting drawing above. Always terminate all exhaust vent outlets at the same elevation and always terminate all air intakes at the same elevation.

SIZING OF EXHAUST VENT AND COMBUSTION AIR INLET PIPES

Consult the following direct vent piping charts to select the proper diameter exhaust and combustion air piping. The vent and air intake piping is sized for each unit model number based on total line length and number of 90° elbows required. Two 45° elbows are equivalent to one 90° elbow. For horizontal piping, the elbow(s) used for vent and air pipe termination outside the structure as shown in the first horizontal venting figure are not counted when using the following direct vent piping charts. The additional two 90° elbows as shown in the previous horizontal venting above anticipated snow level figure must be counted. If vertical piping is used, the two additional 90° elbows on the air intake as shown in the two vertical venting figures must be counted. WHEN THE VENT SYSTEM REQUIRED IS BORDERLINE WITH NEXT SIZE COMBINATION CATEGORY, USE THE NEXT LARGER SIZE.

Important: One short radius 90° elbow is equivalent to 3 1/3 medium radius elbows. For this reason, short radius 90° elbows must not be used. The proper centerline-to-centerline dimensions for medium radius 90° elbows are shown in the medium radius elbow dimension drawing below.



Medium Radius Elbow Dimensions

Example: An installation calls for a 45,000 Btuh furnace. It must be vented 50 feet and use two medium radius 90° elbows on both inlet and exhaust. With this in mind, we must look at the GUD direct vent tables on pages 48 or 49 to determine the correct inlet and exhaust pipe size. With three elbows and 50 feet of straight pipe, 3" inlet pipe must be used and 2" exhaust pipe.

Important: When three inch diameter exhaust pipe is used, the transition from two inch pipe must be made in a vertical run. This is necessary for proper condensate drainage and pressure switch operation.

COMBUSTION AND VENTILATION AIR

(GUD/GCD Direct Vent Models)

VENT PIPE INSTALLATION

1. Horizontal or Vertical

The size of the vent and air intake pipes is determined by the heating capacity of the furnace and the length and number of elbows of the pipe runs. To properly size the pipes, refer to the previous Section.

Use only the fittings, primer, and solvent cement which are described on page 43 and 44. An air intake screen (as described on page 45) must be installed. This screen is supplied with the furnace. Do not place a screen in the exhaust vent termination. It is not needed, and the furnace flue products could cause it to corrode.

⚠ WARNING

SOLVENT CEMENTS ARE COMBUSTIBLE LIQUIDS AND SHOULD BE KEPT AWAY FROM ALL IGNITION SOURCES. (IE: SPARKS, OPEN FLAMES, AND EXCESSIVE HEAT). AVOID BREATHING CEMENT VAPORS OR CONTACT WITH SKIN AND EYES.

Under some conditions, insulation of some or all of the vent pipe and/or combustion air pipe may be required. Do not install insulation until after the flue system has been inspected for leaks as described below.

⚠ WARNING

UPON COMPLETION OF THE FURNACE INSTALLATION, CAREFULLY INSPECT THE ENTIRE FLUE SYSTEM BOTH INSIDE AND OUTSIDE THE FURNACE TO ASSURE IT IS PROPERLY SEALED. LEAKS IN THE FLUE SYSTEM CAN RESULT IN SERIOUS PERSONAL INJURY OR DEATH DUE TO EXPOSURE OF FLUE PRODUCTS, INCLUDING CARBON MONOXIDE.

2. Horizontal Only

For each 2 inch pipe, drill a 2 3/8 inch diameter hole through the wall at the proper location.

For each 3 inch pipe, drill a 3 1/2 inch diameter hole through the wall at the proper location.

Cut a piece of PVC (ABS) pipe that is the thickness of the wall plus the depth of the sockets of the fittings to be installed on the inside and outside of the walls.

To prevent the vent pipe from moving, and possibly damaging the connections, locate the fittings on the inside wall and the elbow on the outside as shown in the drawing of the medium radius elbow dimensions on page 46 for the air intake.

In a basement installation, the vent pipe may be run between the joist spaces. If the pipes must go below the joists, then the pipes must run up into the last joist space to go through the header. Two 45° elbows should be used rather than 90's.

The horizontal run of exhaust pipe must not have any sag that can hold condensate and should pitch up at least 1/4" per foot so that condensate will run back to the unit to drain. Support the horizontal run at least every three feet.

Allow for some expansion and contraction from temperature fluctuations. The normal direction changes usually account for this, but if you have a long run followed by a short offset of less than 40 inches such as going up into the last joist space, the pipes should be tightly clamped to prevent flex loading on the fittings. Seal around the pipe on the outside wall with silicone caulking material.

ADDITIONAL CANADIAN VENTING REQUIREMENTS

In Canada venting shall conform to the requirements of the current CANI-B149 Installation Codes.

Use only C.S.A. listed 2" or 3" nominal diameter PVC or ABS pipe and fittings throughout.

Refer to the following charts on pages 48 and 49 for the correct inlet and exhaust pipe sizing.

A single wall vent shall not be run vertically through the roof. Although, the vent may be run through an existing *unused* chimney as described in the previous venting section provided the space between the vent pipe and the chimney is insulated and closed with a weather tight, corrosion resistant flashing.

Cut all vent pipe at right angles. Remove inside and outside burr at each cut. Use clean pipe and fitting socket. Use CSA listed cement to fasten pipe and fittings. Follow manufacturers cleaning and cementing instructions carefully to avoid leakage.

Note: ALL PIPING EXPOSED OUTDOORS OR IN UNHEATED AREAS MUST BE INSULATED WITH 1/2" THICK CLOSED CELL FOAM INSULATION SUCH AS "ARMAFLEX" OR "INSULTUBE".

The vent terminal shall NOT be located:

1. Less than 12" above the finished grade line.
2. Less than 36" from any building opening or any gas service regulator (for gas service regulators in the Province of Ontario, 72").
3. Less than 72" from the combustion air inlet of another appliance.
4. Directly above a gas utility meter or service regulator.
5. Over a walkway unless 84" above grade.

COMBUSTION AND VENTILATION AIR

(GUD/GCD Direct Vent Models)

The following four venting tables on this page are for the earlier GUD direct vent (two pipe system) model furnaces only. These venting tables allow applications with up to six (6) 90° medium radius elbows and a maximum length of 40 feet. The furnace models that utilize these expanded tables are listed at the top of each table.

Vent and Combustion Pipe Diameter for GUD045B__A, GUD045C__A and GUD045X__A Direct Vent (Two Pipe System)

# of Inside Elbows	VENT TYPE	FEET OF STRAIGHT PIPE EACH RUN						
		5 to10 Feet	10 to 15 Feet	15 to 20 Feet	20 to 25 Feet	25 to 30 Feet	30 to 35 Feet	35 to 40 Feet
1	INLET	2"	2"	2"	2"	2"	2"	2"
	EXHAUST	2"	2"	2"	2"	2"	2"	2"
2	INLET	2"	2"	2"	2"	2"	2"	3"
	EXHAUST	2"	2"	2"	2"	2"	2"	2"
3	INLET	2"	2"	2"	2"	2"	3"	3"
	EXHAUST	2"	2"	2"	2"	2"	2"	2"
4	INLET	2"	2"	2"	2"	3"	3"	3"
	EXHAUST	2"	2"	2"	2"	2"	2"	2"
5	INLET	2"	2"	2"	3"	3"	3"	3"
	EXHAUST	2"	2"	2"	2"	2"	2"	2"
6	INLET	2"	2"	3"	3"	3"	3"	3"
	EXHAUST	2"	2"	2"	2"	2"	2"	2"

Vent and Combustion Pipe Diameter for GUD090B__A, GUD090C__A and GUD090X__A Direct Vent (Two Pipe System)

# of Inside Elbows	VENT TYPE	FEET OF STRAIGHT PIPE EACH RUN						
		5 to10 Feet	10 to 15 Feet	15 to 20 Feet	20 to 25 Feet	25 to 30 Feet	30 to 35 Feet	35 to 40 Feet
1	INLET	2"	2"	3"	3"	3"	3"	3"
	EXHAUST	2"	2"	2"	2"	2"	2"	2"
2	INLET	2"	3"	3"	3"	3"	3"	3"
	EXHAUST	2"	2"	2"	2"	2"	2"	2"
3	INLET	3"	3"	3"	3"	3"	3"	3"
	EXHAUST	2"	2"	2"	2"	2"	2"	3"
4	INLET	3"	3"	3"	3"	3"	3"	3"
	EXHAUST	2"	2"	2"	2"	2"	3"	3"
5	INLET	3"	3"	3"	3"	3"	3"	3"
	EXHAUST	2"	2"	2"	2"	3"	3"	3"
6	INLET	3"	3"	3"	3"	3"	3"	3"
	EXHAUST	2"	2"	2"	3"	3"	3"	3"

Vent and Combustion Pipe Diameter for GUD070B__A, GUD070C__A and GUD070X__A Direct Vent (Two Pipe System)

# of Inside Elbows	VENT TYPE	FEET OF STRAIGHT PIPE EACH RUN						
		5 to10 Feet	10 to 15 Feet	15 to 20 Feet	20 to 25 Feet	25 to 30 Feet	30 to 35 Feet	35 to 40 Feet
1	INLET	2"	2"	2"	2"	2"	2"	2"
	EXHAUST	2"	2"	2"	2"	2"	2"	2"
2	INLET	2"	2"	2"	2"	2"	2"	3"
	EXHAUST	2"	2"	2"	2"	2"	2"	2"
3	INLET	2"	2"	2"	2"	2"	3"	3"
	EXHAUST	2"	2"	2"	2"	2"	2"	2"
4	INLET	2"	2"	2"	2"	3"	3"	3"
	EXHAUST	2"	2"	2"	2"	2"	2"	2"
5	INLET	2"	2"	2"	3"	3"	3"	3"
	EXHAUST	2"	2"	2"	2"	2"	2"	2"
6	INLET	2"	2"	3"	3"	3"	3"	3"
	EXHAUST	2"	2"	2"	2"	2"	2"	2"

Vent and Combustion Pipe Diameter for GUD115B__A, GUD115C__A and GUD115X__A Direct Vent (Two Pipe System)

# of Inside Elbows	VENT TYPE	FEET OF STRAIGHT PIPE EACH RUN						
		5 to10 Feet	10 to 15 Feet	15 to 20 Feet	20 to 25 Feet	25 to 30 Feet	30 to 35 Feet	35 to 40 Feet
1	INLET	2"	3"	3"	3"	3"	3"	3"
	EXHAUST	2"	2"	2"	2"	2"	2"	2"
2	INLET	3"	3"	3"	3"	3"	3"	3"
	EXHAUST	2"	2"	2"	2"	2"	2"	3"
3	INLET	3"	3"	3"	3"	3"	3"	3"
	EXHAUST	2"	2"	2"	2"	2"	3"	3"
4	INLET	3"	3"	3"	3"	3"	3"	3"
	EXHAUST	2"	2"	2"	2"	3"	3"	3"
5	INLET	3"	3"	3"	3"	3"	3"	3"
	EXHAUST	2"	2"	2"	3"	3"	3"	3"
6	INLET	3"	3"	3"	3"	3"	3"	3"
	EXHAUST	2"	2"	3"	3"	3"	3"	3"

The following three expanded venting tables are for the later GUD direct vent (two pipe system) model furnaces only. These venting tables allow applications with up to eight (8) 90° medium radius elbows and a maximum length greater than 40 feet for some models. The furnace models that utilize these expanded tables are listed at the top of each table.

Vent and Combustion Air Pipe Diameter for GUD045X__B, GUD070X__B Direct Vent (Two Pipe System)

# of Inside Elbows	Vent Type	Inside Feet of Straight Pipe															
		5 to 10 Feet	10 to 15 Feet	15 to 20 Feet	20 to 25 Feet	25 to 30 Feet	30 to 35 Feet	35 to 40 Feet	40 to 45 Feet	45 to 50 Feet	50 to 55 Feet	55 to 60 Feet	60 to 65 Feet	65 to 70 Feet	70 to 75 Feet	75 to 80 Feet	80 to 85 Feet	85 to 90 Feet
1	Inlet	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	3"	3"	3"	3"	3"	3"	NA
	Exhaust	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	3"	3"	NA
2	Inlet	2"	2"	2"	2"	2"	2"	2"	2"	2"	3"	3"	3"	3"	3"	3"	NA	NA
	Exhaust	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	3"	3"	NA	NA
3	Inlet	2"	2"	2"	2"	2"	2"	2"	2"	3"	3"	3"	3"	3"	3"	NA	NA	NA
	Exhaust	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	3"	3"	NA	NA	NA
4	Inlet	2"	2"	2"	2"	2"	2"	2"	3"	3"	3"	3"	3"	3"	NA	NA	NA	NA
	Exhaust	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	3"	3"	NA	NA	NA	NA
5	Inlet	2"	2"	2"	2"	2"	2"	3"	3"	3"	3"	3"	3"	NA	NA	NA	NA	NA
	Exhaust	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	3"	3"	NA	NA	NA	NA	NA
6	Inlet	2"	2"	2"	2"	2"	3"	3"	3"	3"	3"	3"	NA	NA	NA	NA	NA	NA
	Exhaust	2"	2"	2"	2"	2"	2"	2"	2"	2"	3"	3"	NA	NA	NA	NA	NA	NA
7	Inlet	2"	2"	2"	2"	3"	3"	3"	3"	3"	3"	NA	NA	NA	NA	NA	NA	NA
	Exhaust	2"	2"	2"	2"	2"	2"	2"	2"	3"	3"	NA	NA	NA	NA	NA	NA	NA
8	Inlet	2"	2"	2"	3"	3"	3"	3"	3"	3"	NA	NA	NA	NA	NA	NA	NA	NA
	Exhaust	2"	2"	2"	2"	2"	2"	2"	3"	3"	NA	NA	NA	NA	NA	NA	NA	NA

COMBUSTION AND VENTILATION AIR

(GUD/GCD Direct Vent Models)

Vent and Combustion Air Pipe Diameter for GUD090X__B Direct Vent (Two Pipe System)

# of Inside Elbows	Vent Type	Inside Feet of Straight Pipe																
		5 to 10 Feet	10 to 15 Feet	15 to 20 Feet	20 to 25 Feet	25 to 30 Feet	30 to 35 Feet	35 to 40 Feet	40 to 45 Feet	45 to 50 Feet	50 to 55 Feet	55 to 60 Feet	60 to 65 Feet	65 to 70 Feet	70 to 75 Feet	75 to 80 Feet	80 to 85 Feet	85 to 90 Feet
1	Inlet	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	NA
	Exhaust	2"	2"	2"	2"	2"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	NA
2	Inlet	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	NA	NA
	Exhaust	2"	2"	2"	2"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	NA	NA
3	Inlet	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	NA	NA	NA
	Exhaust	2"	2"	2"	2"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	NA	NA	NA
4	Inlet	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	NA	NA	NA	NA
	Exhaust	2"	2"	2"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	NA	NA	NA	NA
5	Inlet	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	NA	NA	NA	NA	NA
	Exhaust	2"	2"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	NA	NA	NA	NA	NA
6	Inlet	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	NA	NA	NA	NA	NA	NA
	Exhaust	2"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	NA	NA	NA	NA	NA	NA
7	Inlet	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	NA	NA	NA	NA	NA	NA	NA
	Exhaust	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	NA	NA	NA	NA	NA	NA	NA
8	Inlet	3"	3"	3"	3"	3"	3"	3"	3"	3"	NA	NA	NA	NA	NA	NA	NA	NA
	Exhaust	3"	3"	3"	3"	3"	3"	3"	3"	3"	NA	NA	NA	NA	NA	NA	NA	NA

Vent and Combustion Air Pipe Diameter for GUD115X__B Direct Vent (Two Pipe System)

# of Inside Elbows	Vent Type	Inside Feet of Straight Pipe																
		5 to 10 Feet	10 to 15 Feet	15 to 20 Feet	20 to 25 Feet	25 to 30 Feet	30 to 35 Feet	35 to 40 Feet	40 to 45 Feet	45 to 50 Feet	50 to 55 Feet	55 to 60 Feet	60 to 65 Feet	65 to 70 Feet	70 to 75 Feet	75 to 80 Feet	80 to 85 Feet	85 to 90 Feet
1	Inlet	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	NA
	Exhaust	2"	2"	2"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	NA
2	Inlet	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	NA	NA
	Exhaust	2"	2"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	NA	NA
3	Inlet	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	NA	NA	NA
	Exhaust	2"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	NA	NA	NA
4	Inlet	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	NA	NA	NA	NA
	Exhaust	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	NA	NA	NA	NA
5	Inlet	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	NA	NA	NA	NA	NA
	Exhaust	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	NA	NA	NA	NA	NA
6	Inlet	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	NA	NA	NA	NA	NA	NA
	Exhaust	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	NA	NA	NA	NA	NA	NA
7	Inlet	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	NA	NA	NA	NA	NA	NA	NA
	Exhaust	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	NA	NA	NA	NA	NA	NA	NA
8	Inlet	3"	3"	3"	3"	3"	3"	3"	3"	3"	NA	NA	NA	NA	NA	NA	NA	NA
	Exhaust	3"	3"	3"	3"	3"	3"	3"	3"	3"	NA	NA	NA	NA	NA	NA	NA	NA

Note: Shaded areas on the tables with **NA** are outside tested range.

The following two venting tables are for the GCD___X__B direct vent (two pipe system) model furnaces only. These venting tables allow applications with up to four (4) 90° medium radius elbows and a maximum length of 40 feet. The furnace models that utilize these expanded tables are listed at the top of each table.

Vent and Combustion Air Pipe Diameter for GCD070X__B Direct Vent (Two Pipe System)

# of Inside Elbows	Vent Type	Inside Feet of Straight Pipe						
		5 to 10 Feet	10 to 15 Feet	15 to 20 Feet	20 to 25 Feet	25 to 30 Feet	30 to 35 Feet	35 to 40 Feet
1	Inlet	2"	2"	2"	2"	2"	2"	2"
	Exhaust	2"	2"	2"	2"	2"	2"	2"
2	Inlet	2"	2"	2"	2"	2"	2"	2"
	Exhaust	2"	2"	2"	2"	2"	2"	3"
3	Inlet	2"	2"	2"	2"	2"	2"	2"
	Exhaust	2"	2"	2"	2"	2"	3"	3"
4	Inlet	2"	2"	2"	2"	2"	2"	2"
	Exhaust	2"	2"	2"	2"	3"	3"	3"

Vent and Combustion Air Pipe Diameter for GCD090X__B Direct Vent (Two Pipe System)

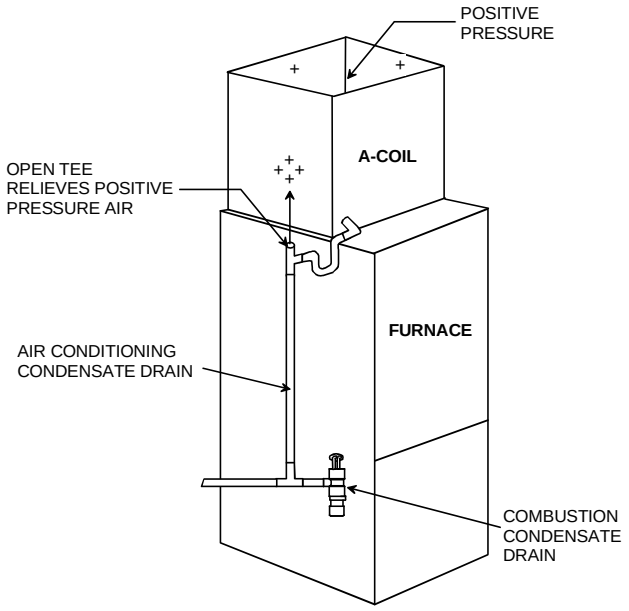
# of Inside Elbows	Vent Type	Inside Feet of Straight Pipe						
		5 to 10 Feet	10 to 15 Feet	15 to 20 Feet	20 to 25 Feet	25 to 30 Feet	30 to 35 Feet	35 to 40 Feet
1	Inlet	2"	2"	2"	2"	2"	2"	3"
	Exhaust	2"	2"	3"	3"	3"	3"	3"
2	Inlet	2"	2"	2"	2"	2"	3"	3"
	Exhaust	2"	3"	3"	3"	3"	3"	3"
3	Inlet	2"	2"	2"	2"	3"	3"	3"
	Exhaust	3"	3"	3"	3"	3"	3"	3"
4	Inlet	2"	2"	2"	3"	3"	3"	3"
	Exhaust	3"	3"	3"	3"	3"	3"	3"

CONDENSATE DRAIN

The Air Command 90 and 95 achieves its high efficiency by condensing some of the flue products into a slightly acidic water which must be piped to a drain. A drain well which is shipped with the furnace must be installed on either side of the furnace cabinet. The condensate from the recuperative coil and the induced draft blower flows into this drain well which acts as a trap. No other trap must be used. A PVC (or CPVC) pipe must be run from the side of the well to a drain maintaining a horizontal downward slope in accordance with good plumbing practice. **DO NOT TRAP THIS LINE.**

PVC (or CPVC) pipe is recommended since it is corrosion resistant, rigid, and not easily damaged. The drain line must not be routed outside where it could possibly freeze and become blocked. The top of the well must be left open so that any blockage in the drain line will be relieved out the top of the drain well and not back up in the unit.

See the separate condensate drain system Installation Instructions for details on properly installing the drain lines and standpipe.



Condensate Drain Lines

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 Pressure	
Natural	Min. 5.0" W.C., Max. 10.0" W.C.
Propane	Min. 11.0"W.C., Max. 13.0" W.C.

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.

HIGH ALTITUDE DERATE

(United States Installations Only)

When this furnace is installed at altitudes above 2,000 feet the furnace input must be derated 4 percent for each 1,000 feet above sea level because the density of the air is reduced.

In some areas the gas supplier will derate the gas at a rate of 4 percent for each 1,000 feet above sea level. If he does not do so, smaller orifices will be required at altitudes above 3,500 feet (non-derated natural gas) or 4,500 feet (non-derated propane). **Note:** Altitude derate depends on the model of furnaces that is being installed.

A different pressure switch is required at altitudes more than 4,000 feet above sea level. This is required regardless of the heat content of the fuel used. For the proper pressure switch, refer to Pressure Switch Trip Points and Usage Chart on pages 87, 88 and 89. For detailed installation instructions, refer to the installation instructions provided with each kit.

High altitude kits can be purchased depending upon the altitude. For the proper high altitude orifice kit, refer to chart on page 90. For detailed installation instructions, refer to the installation instructions provided with each kit.

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 or CAN/CGA B149 Installation Codes.

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 0.5 psig or less and pressure drop of 0.3" W.C.; Based on 0.60 Specific Gravity Gas)

$$CFH = \frac{\text{BTUH Furnace Input}}{\text{Heating Value of Gas (BTU/Cubic Foot)}}$$

CONNECTING THE GAS PIPING - NATURAL GAS

Refer to pages 11, 12 and 13 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.
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.
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

⚠ CAUTION

TO AVOID THE POSSIBILITY OF PROPERTY DAMAGE, PERSONAL INJURY OR FIRE, THE FOLLOWING INSTRUCTIONS MUST BE PERFORMED REGARDING GAS CONNECTIONS AND PRESSURE TESTING.

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 and its individual shutoff valve must be disconnected from the gas supply piping system during any pressure testing of that system at test pressures in excess of 1/2 psig (3.48 kPa).

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

⚠ WARNING

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) or Natural Standards of Canada B149.2, Installation Code for Propane Gas Burning Appliances and Equipment.

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.)

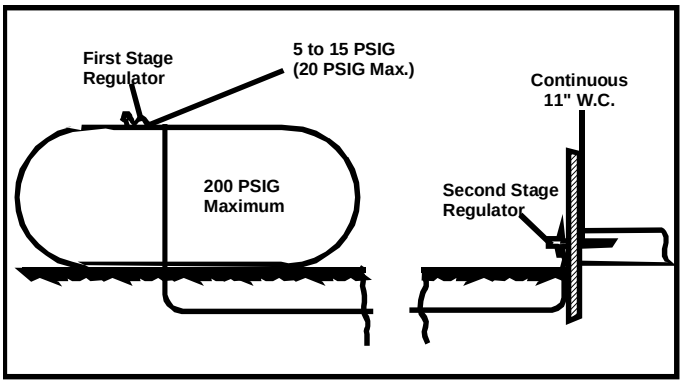
3. Pressure drop in lines between regulators, and between second stage regulator and the appliance. Pipe size required will depend on length of pipe run and total load of all appliances.

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.

The following drawing illustrates a typical propane gas installation.

TYPICAL PROPANE PIPING



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 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 on pages 7, 8, 9 or 10. Failure to do so could result in SERIOUS PERSONAL INJURY OR DEATH.

PROPANE PIPING AND TANK SIZING CHARTS

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"	1/2"	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 Gas Piping Charts

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.

Propane Tank Sizing Chart

PRODUCT DESIGN

ELECTRICAL WIRING

WARNING

TO AVOID THE RISK OF ELECTRICAL SHOCK, WIRING OF THE UNIT MUST BE PROPERLY POLARIZED AND GROUNDED.

WARNING

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, or in Canada, Canadian Electrical Code, C22.1, Part 1. A fused disconnected must be provided and sized in accordance with the unit minimum circuit ampacity.

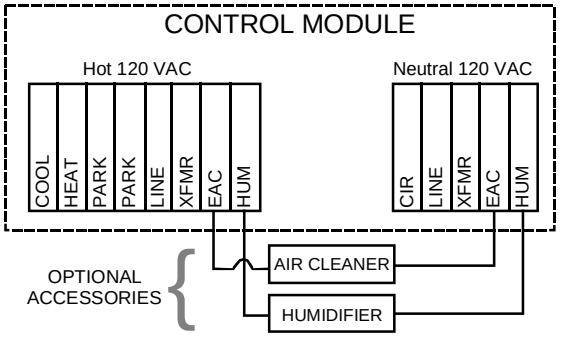
LINE VOLTAGE CONNECTION OF OPTIONAL HUMIDIFIER AND ELECTRONIC AIR CLEANER

Units using the WR50A50 or WR50A55 ignition control will have accessory terminals on the ignition control for connection of field supplied humidifiers and/or electronic air cleaners.

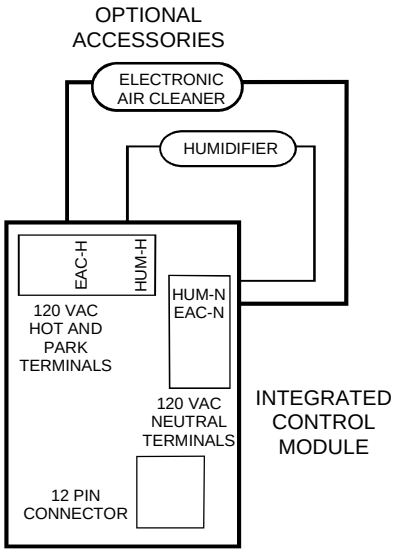
Accessory Load Specifications	
Humidifier	1.0 Amp maximum at 120 VAC
Electronic Air Cleaner	1.0 Amp maximum at 120 VAC

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 below. 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.



Accessory Wiring (WR50A50 Ignition Control)



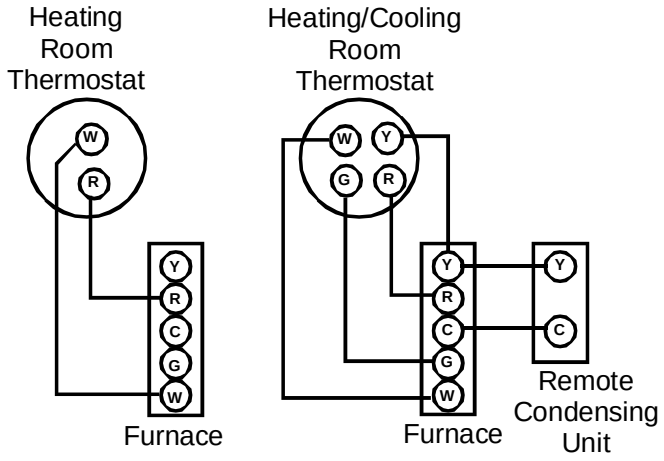
Accessory Wiring (WR50A55 Ignition Control)

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.

PRODUCT DESIGN

Thermostat Requirements

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
(24 VAC Control Circuit)

Continuous Fan Operation

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

AIR CIRCULATION FAN TIMING

All items in this section refer to the air circulation fan, not to the induced draft fan. The timing sequence for the induced draft fan 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 circulation fan will come on 37 seconds after the gas valve opens. This timing is not adjustable.

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

	Style A	Style B
60 Second Delay	1 2 ON OFF	B2 B1 B3 B4
90 Second Delay	1 2 ON OFF	B2 B1 B3 B4
120 Second Delay	1 2 ON OFF	B2 B1 B3 B4
180 Second Delay	1 2 ON OFF	B2 B1 B3 B4

Heating Fan Off Adjustments

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.

It is recommended that the outlet duct be provided with an access panel. This access should be large enough to inspect the air chamber above the heat exchanger for any smoke or combustion gas leaks. A cover should be attached tightly to prevent air leaks.

For air delivery of less than 1800 CFM:

Use one side return or one bottom return ductwork connection.

For air delivery of 1800 CFM or higher:

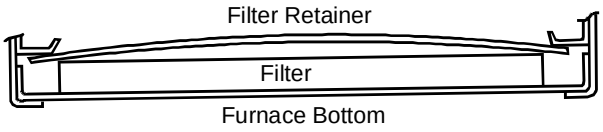
Use two side returns or one side return and one bottom return connection.

Upflow furnace models with 3, 3 1/2, or 4 ton blowers are shipped with one filter, intended for the return air duct to be attached to either side of the furnace cabinet. If the return air duct is to be attached to the bottom of the furnace cabinet, the filter that was supplied with the furnace may not be of the proper size. Refer to the following chart for filter sizes when using bottom return.

PRODUCT DESIGN

GUC, GUD, GUX Upflow Installations Bottom Return Filter Sizes		
Furnace Model	**Permanent (Qty), Size**	**Disposable (Qty), Size**
045_30	(1) 14x25x1	(2) 16x20x1
070_30	(1) 16x25x1	(2) 16x20x1
070_40	(1) 16x25x1	(2) 16x20x1
090_35	(1) 20x25x1	(2) 20x20x1
090_50	(1) 20x25x1	(2) 20x20x1
115_50	(1) 20x25x1	(2) 20x20x1

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



Bottom Filter Retainer

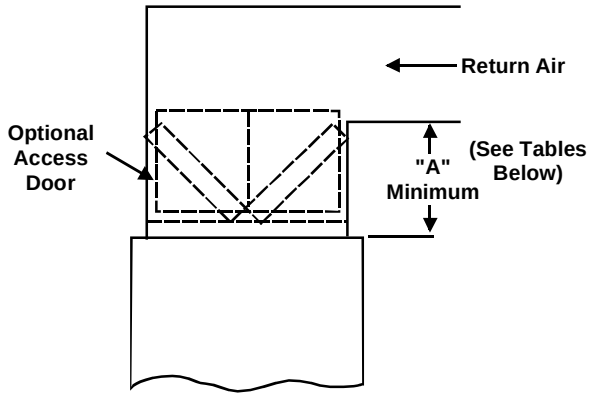
Upflow furnace models with 5 ton blowers are shipped with two filters. If these furnaces are to be operated at high speed, then two return air connections must be made. These may be made on both sides of the furnace cabinet, or on one side and the bottom. If one of the returns is connected to the bottom, refer to the chart above for proper filter size. If the furnaces are operated at high speed, failure to have two return air connections could result in insufficient airflow for air conditioning requirements and excessive air velocity through the filter. If these furnaces will not be run on high speed, one return air connection will be adequate.

GUC, GUD, GUX Upflow Installations Side Return Minimum Recommended Filter Sizes		
Furnace Model	**Disposable* (Qty), Size**	**Permanent* (Qty), Size**
045_30	(1) 24x24 (576)	(1) 16x25 (280)
070_30	(1) 24x24 (576)	(1) 16x25 (280)
070_40	(2) 16x25 (768)	(1) 16x25 (372)
090_35	(2) 14x25 (692)	(1) 16x25 (342)
090_50	(2) 20x25 (960)	(2) 16x25 (465)
115_50	(2) 20x25 (960)	(2) 16x25 (465)

* Quantity - Inches (Total Minimum Surface Area in Square Inches)

Permanent filter sizes are as shipped with furnace. The minimum permanent filter size area is based on allowable face velocity of 620 feet per minute.

Counterflow furnaces may have the filters installed in the return air plenum above the furnace. For proper filter performance the sides of the plenum must be at least as tall as dimension A shown in the following drawing.



Counterflow Filter Location

Note: For easier filter inspection and replacement, the installer may wish to consider providing a removable panel in the front of the return air plenum.

Recommended filter size and type are provided in the following charts. Later Model GCC furnaces are shipped with filters as shown in the first chart. The second filter chart is for the GDC model furnaces and the third filter chart is for the GCD model furnaces.

GCC Counterflow Installations Minimum Recommended Filter Sizes		
Furnace Model	**Dimension "A"**	**Filter (Qty), Size, Type**
045_30	13	(2) 14x20x1 Disposable
070_30	11-3/4	(2) 14x20x1 Disposable
070_40	13	(2) 15x20x1 Permanent
090_40,50	11-1/4	(2) 15x20x1 Permanent
115_50	11-1/4	(2) 15x20x1 Permanent

GDC Counterflow Installations Minimum Recommended Filter Sizes		
Furnace Model	**Dimension "A"**	**Filter (Qty), Size, Type**
045_30	14-1/4	(2) 15x20x1 Disposable
070_30	13	(2) 15x20x1 Disposable
070_40	13	(2) 15x20x1 Permanent
090_40,50	11-1/4	(2) 15x20x1 Permanent
115_50	11-1/4	(2) 15x20x1 Permanent

GCD Counterflow Filter Rack Installations Minimum Recommended Filter Sizes		
Furnace Model	**Dimension "A"**	**Filter (Qty), Size, Type**
070_30	13	(2) 15x20x1 Disposable
090_40	11-1/4	(2) 15x20x1 Permanent

If preferred, external filter grilles may be used in place of the filters discussed above. If this is done, refer to the following charts for minimum filter sizes for each furnace which will be operated at high speed either heating or cooling. Permanent filters should be sized upon manufacturer's recommendations. Disposable filters should be sized based upon a face velocity of 300 feet per minute or less.

GCC Counterflow Installations
Minimum Recommended Filter Sizes

Furnace Model	Permanent (Qty), Size	Disposable (Qty), Size
045_30	(1) 16x25x1 or (1) 20x20x1	(2) 16x20x1
070_30	(1) 16x25x1 or (1) 20x20x1	(2) 16x20x1
070_40	(1) 20x25x1	(2) 20x20x1
090_40,50	(1) 20x25x1	(2) 20x20x1
115_50	(1) 20x25x1	(2) 20x25x1

GDC Horizontal Installations
Minimum Recommended Filter Sizes

Furnace Model	Permanent (Qty), Size	Disposable (Qty), Size
045_30	(1) 16x25x1 or (1) 20x20x1	(2) 15x20x1
070_30	(1) 16x25x1 or (1) 20x20x1	(2) 15x20x1
070_40	(1) 20x25x1	(2) 20x20x1
090_40,50	(1) 20x25x1	(2) 20x25x1
115_50	(1) 20x25x1	(2) 20x25x1

GCD Counterflow External Filter Installations
Minimum Recommended Filter Sizes

Furnace Model	High Velocity Permanent	Disposable
070_30	(1) 16x25x1 or (1) 20x20x1	(2) 15x20x1
090_40	(1) 20x25x1	(2) 15x20x1

Guide dimples locate the bottom or side cutouts. Use a straight edge to scribe lines connecting the dimples. Cut out the opening on these lines. For bottom return air connection the bottom of the cabinet has to be removed before the furnace is positioned on the raised platform or set on top of the return air duct.

A closed return duct system must be used, with the return duct connected to the furnace. **Note:** *Ductwork must never be attached to the back of the furnace.* Supply and return duct connections to the unit may be made with flexible joints to minimize noise transmission. If a central return is used, a connecting duct must be installed between the unit and the utility room wall. 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.

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 GUC, GUD and GUX 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.

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

SYSTEM OPERATION

NORMAL SEQUENCE OF OPERATION

(Models with White Rodgers 50E47-170 Control)

1. Thermostat calls for heat. The induced draft blower is immediately energized.
2. The pressure switch contacts transfer.
3. The ignitor is energized and is allowed to preheat for 34 seconds.
4. The gas valve is energized, delivering gas to the burners and starting combustion.
5. Four seconds after the gas valve is energized the ignitor is de-energized. Seven seconds after the gas valve is energized, the control checks the signal from the flame sensor. Gas flow will continue only if a proper signal is present.
6. The unit will continue to fire while the helical fan control heats up. The fan control will start the main circulating air blower approximately 75 seconds after the gas valve opens (this time may vary depending upon the control setting).
7. The furnace will deliver heat to the conditioned space until the thermostat is satisfied.
8. The gas valve will be de-energized when the thermostat opens.
9. There is a 90 second delay (approximate) before the main air blower and the induced draft blower stop. This allows any additional heat in the heat exchanger to be transferred to the conditioned space and to purge combustion products for the heat exchanger and vent system.

SELF DIAGNOSTIC IGNITION CONTROL

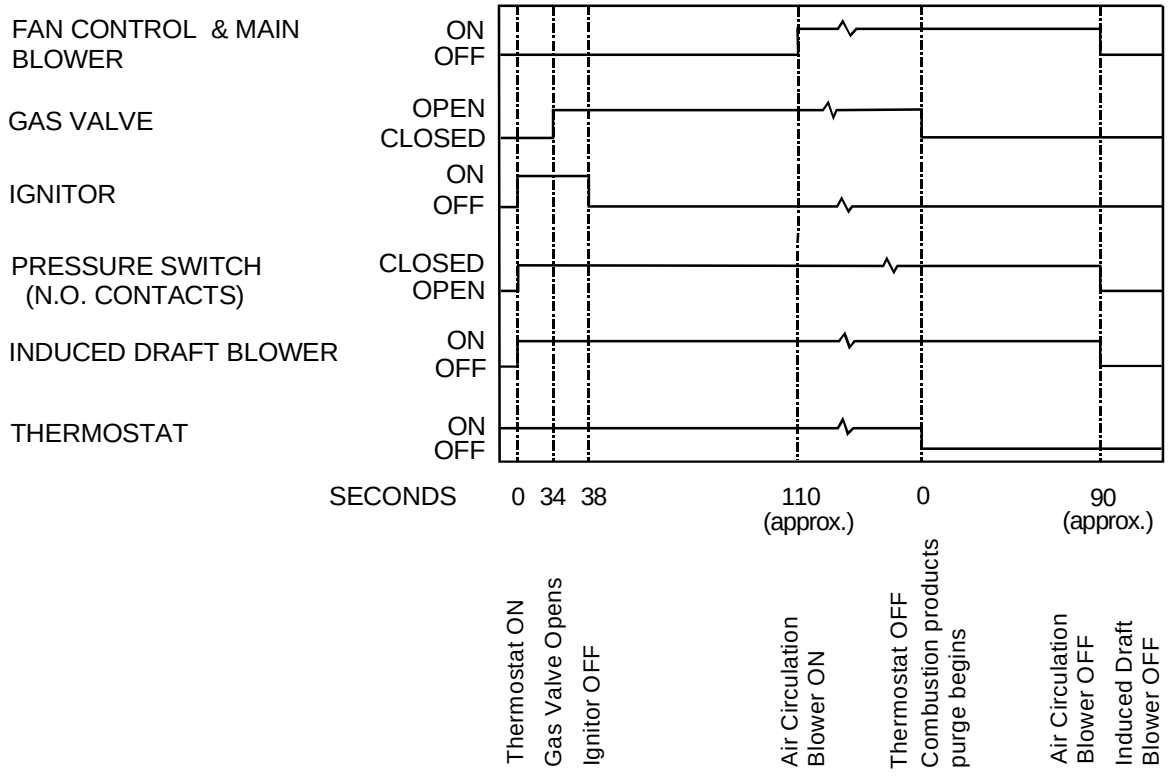
In this furnace, there may be a red indicator light located on the ignition control board near the MV terminal. This light is designed to help the servicer diagnose potential service problems with either the furnace or the ignition control itself. If the furnace is malfunctioning, and the red light is on continuously, the ignition control is faulty. If the red light is flashing, the furnace is probably in a lockout condition. If the indicator light is not on and the furnace does not operate properly, then the problem likely exists elsewhere in the furnace and not in the ignition control board.

RESET AFTER CONTROL LOCKOUT

If ignition has not been achieved for any reason after three ignition cycles, the electronic control module will lockout the furnace. A lockout causes both the air blower and the induced draft blower to run continuously, and ignition is no longer attempted. The control's diagnostic light will then repeatedly flash once and then pause. When this occurs, it may be necessary to reset the control by turning the thermostat setting below room temperature for thirty seconds and then returning the setting to the desired temperature. The control may also be reset after a lockout by turning off the electrical disconnect switch to the furnace for thirty seconds.

Important: If the furnace frequently has to be reset, it means that a problem exists that should be corrected. Contact a servicer for further information.

HEATING TIMING CHART FOR WHITE-RODGERS 50E47-170 IGNITION CONTROL OPERATION



SYSTEM OPERATION

NORMAL SEQUENCE OF OPERATION

(Models with White-Rodgers 50A50-205, 206, 288 or 298 & 50A60-288 Integrated Ignition Control)

Power Up

The normal power up sequence is as follows:

1. 115 VAC power applied to furnace.
2. Integrated control module performs internal checks.
3. Integrated control module flashes LED one time.
4. Integrated control module monitors safety circuits continuously.
5. Furnace awaits call from thermostat.

Heating Mode

The normal operational sequence in heating mode is as follows:

1. R and W thermostat contacts close, initiating a call for heat.
2. Integrated control module performs safety circuit checks.
3. Induced draft blower is energized causing pressure switch contacts to close. Humidifier terminals are energized with induced draft blower. **Note: The GDC model furnace has a second pressure switch ("coil cover") that would also close at this point.**
4. Ignitor warm up begins (*17 seconds*) upon close of pressure switch contacts.
5. Gas valve opens at end of igniter warm up period, delivering gas to burners and establishing flame.
6. Integrated control module monitors flame presence (*within seven seconds after gas valve is energized*). Gas valve will remain open only if flame is sensed.
7. Circulator blower is energized on heat speed following a fixed thirty second blower on delay. Electronic air cleaner terminals are energized with circulator blower.
8. Furnace runs, integrated control module monitors safety circuits continuously.
9. R and W thermostat contacts open, completing the call for heat.
10. Gas valve closes, extinguishing flame.
11. Induced draft blower is de-energized following a fifteen second post purge. Humidifier terminals are de-energized.
12. Circulator blower is de-energized following a selectable heat off delay period (60, 90, 120, or 180 seconds). Electronic air cleaner terminals are de-energized.
13. Furnace awaits next call from thermostat.

Cooling Mode

The normal operational sequence in cooling mode is as follows:

1. R and Y thermostat contacts close, initiating a call for cool.
2. Integrated control module performs safety circuit checks.
3. Outdoor fan and compressor are energized.
4. Circulator blower is energized on cool speed following a fixed five second on delay. Electronic air cleaner terminals are energized with circulator blower.
5. Furnace circulator blower and outdoor cooling unit run, integrated control module monitors safety circuits continuously.
6. R and Y thermostat contacts open, completing the call for cool.
7. Outdoor fan and compressor are de-energized.
8. Circulator blower is de-energized following a fixed forty five second cool off delay period. Electronic air cleaner terminals are de-energized.
9. Furnace awaits next call from thermostat.

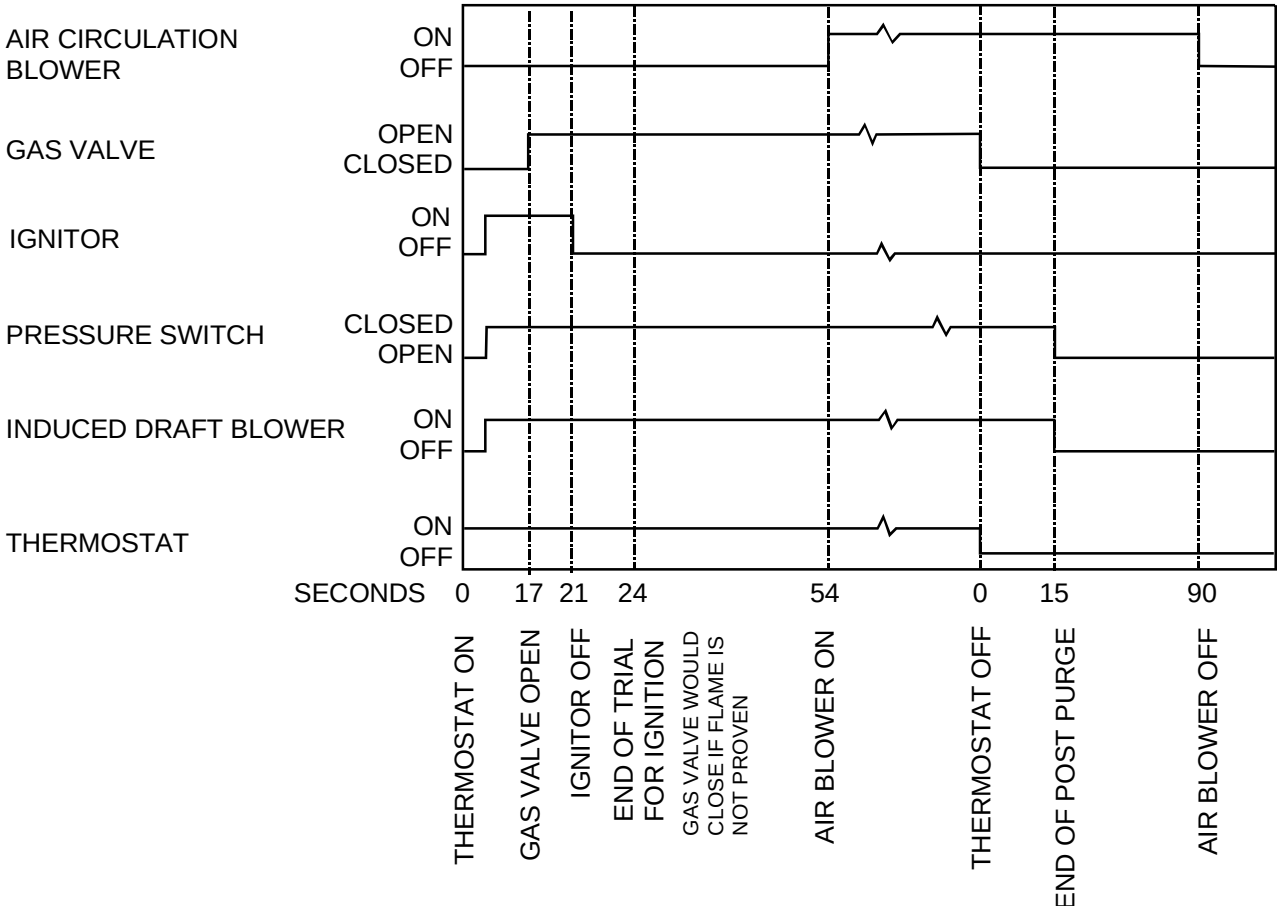
Fan Only Mode

The normal operational sequence in fan only mode is as follows:

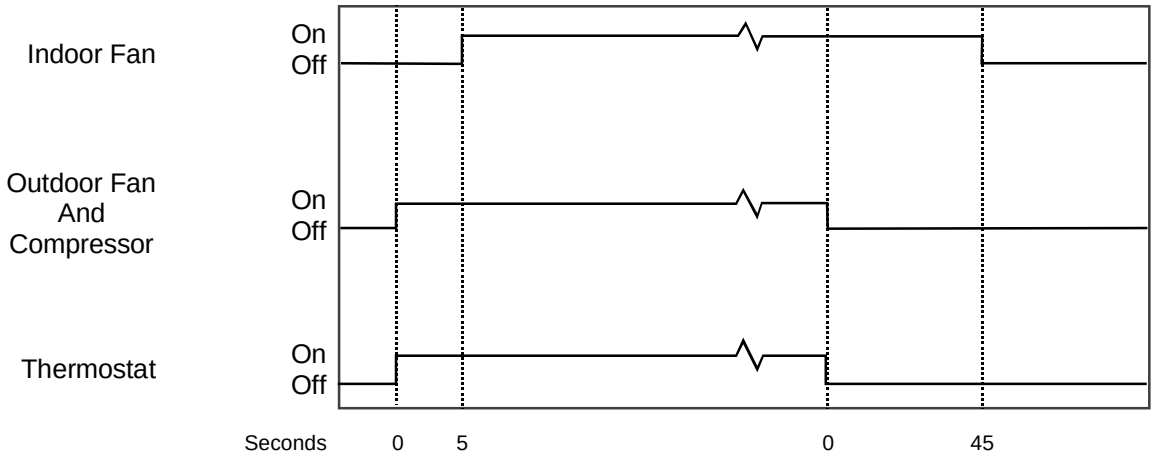
1. R and G thermostat contacts close, initiating a call for fan.
2. Integrated control module performs safety circuit checks.
3. Circulator blower is energized on cool speed. Electronic air cleaner terminals are energized.
4. Circulator blower runs, integrated control module monitors safety circuits continuously.
5. R and G thermostat contacts open, completing the call for fan.
6. Circulator blower is de-energized. Electronic air cleaner terminals are de-energized.
7. Furnace awaits next call from thermostat.

SYSTEM OPERATION

HEATING TIMING CHART FOR WHITE-RODGERS 50A50-205, 206, 288 or 298 & 50A60-288 INTEGRATED IGNITION CONTROL OPERATION



Cooling Timing Chart for White-Rodgers 50E47-170 and 50A50-205, 206, 288 or 298 and 50A60-288 Ignition Control Operation



SYSTEM OPERATION

ABNORMAL OPERATION

(Models with White-Rodgers 50A50-205, 206 or 298 Integrated Ignition Control)

1. **Internal Control Failure** with White-Rodgers 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 will indicate this condition with **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.

3. **Pressure Switch Stuck Closed**

   If the control senses the pressure switch is closed when the vent blower is off, it waits until the fault is corrected. The light code for this problem is **two short flashes** followed by a longer pause. The probable cause is 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 on and wait for the switch to close. The diagnostic light code for the 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 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 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. **Missing Jumper Wire**

   If the jumper between R01 and R02 is not present, the air circulation blower and induced draft blower will be energized all the time. The diagnostic light code for this is **five flashes** followed by a pause. The probable cause is a missing jumper.

7. **Flame Sensed with No Call for Heat**

   If the control senses a flame when the gas valve is deenergized, it will run the air circulation blower and the induced draft blower continuously. The diagnostic light code for this is **continuous light flashing**. Probable cause is miswiring.

50A50-205,206 & 298 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. Missing Jumper Wire on Control
Continuous Flashing	7. Flame Sensed No Call For Heat

SYSTEM OPERATION

ABNORMAL OPERATION

(Models with White-Rodgers 50A50-288 or 50A60-288 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* below for an interpretation of the LED signals and to the information in this section for a description of the problem.

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. **Note: The GDC model furnace has a second pressure switch ("coil cover") connected to the recoupe coil cover that could create this two short flash code fault also, due to 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. **Note: The GDC model furnace has a second pressure switch ("coil cover") connected to the recoupe coil cover that could create this three short flash code fault also, due to either a disconnected hose to the pressure switch, faulty pressure switch or wiring, or restricted or blocked recoupe coil or drain.**
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.

50A50-288 & 50A60-288 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

SYSTEM OPERATION

NORMAL SEQUENCE OF OPERATION

(Models with White-Rodgers 50A55-288 Integrated Ignition Control)

Power Up

The normal power up sequence is as follows:

1. 115 VAC power applied to furnace.
2. Integrated control module performs internal checks.
3. Integrated control module flashes LED one time.
4. Integrated control module monitors safety circuits continuously.
5. Furnace awaits call from thermostat.

Heating Mode

The normal operational sequence in heating mode is as follows:

1. R and W thermostat contacts close, initiating a call for heat.
2. Integrated control module performs safety circuit checks.
3. Induced draft blower is energized causing pressure switch contacts to close. Humidifier terminals are energized with induced draft blower.
4. Ignitor warm up begins upon close of pressure switch contacts. The White-Rodgers 50A55 ignition control has a variable standard ignitor warm up period between a *17-second maximum* and a *five-second minimum*.
5. Gas valve opens at end of igniter warm up period, delivering gas to burners and establishing flame.
6. Integrated control module monitors flame presence. Gas valve will remain open only if flame is sensed.
7. Circulator blower is energized on heat speed following a fixed thirty second blower on delay. Electronic air cleaner terminals are energized with circulator blower.
8. Furnace runs, integrated control module monitors safety circuits continuously.
9. R and W thermostat contacts open, completing the call for heat.
10. Gas valve closes, extinguishing flame.
11. Induced draft blower is de-energized following a fifteen second post purge. Humidifier terminals are de-energized.
12. Circulator blower is de-energized following a selectable heat off delay period (60, 90, 120, or 180 seconds). Electronic air cleaner terminals are de-energized.
13. Furnace awaits next call from thermostat.

Cooling Mode

The normal operational sequence in cooling mode is as follows:

1. R and Y thermostat contacts close, initiating a call for cool.
2. Integrated control module performs safety circuit checks.
3. Outdoor fan and compressor are energized.
4. Circulator blower is energized on cool speed following a fixed five second on delay. Electronic air cleaner terminals are energized with circulator blower.
5. Furnace circulator blower and outdoor cooling unit run, integrated control module monitors safety circuits continuously.
6. R and Y thermostat contacts open, completing the call for cool.
7. Outdoor fan and compressor are de-energized.
8. Circulator blower is de-energized following a fixed forty five second cool off delay period. Electronic air cleaner terminals are de-energized.
9. Furnace awaits next call from thermostat.

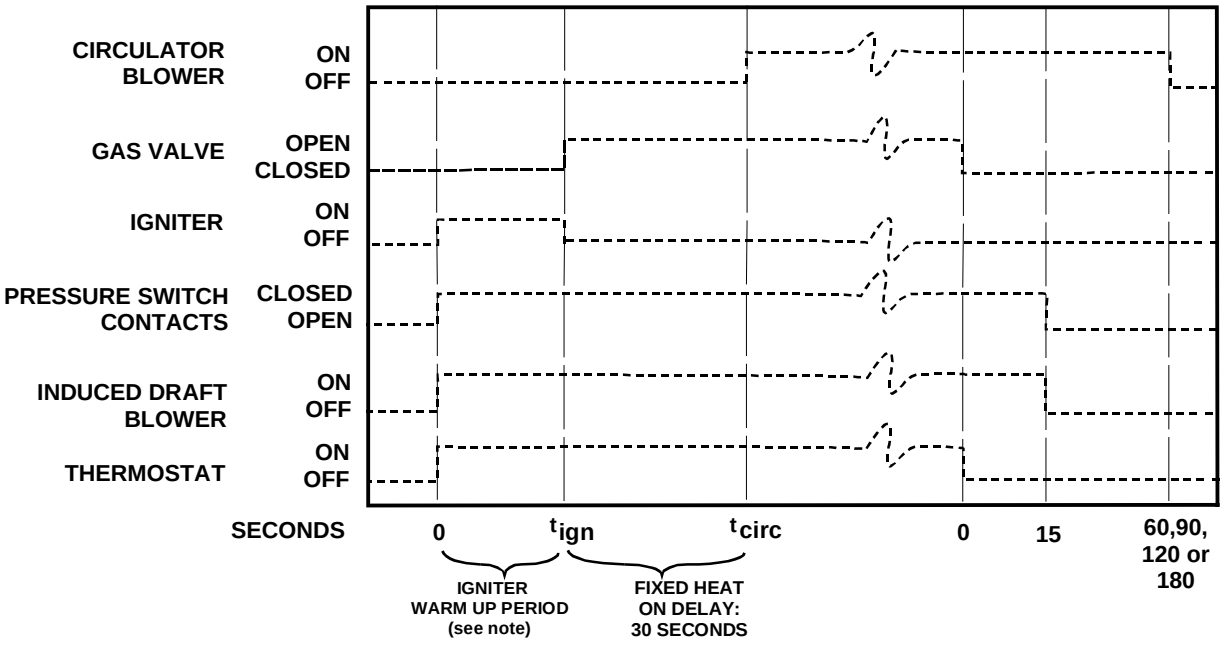
Fan Only Mode

The normal operational sequence in fan only mode is as follows:

1. R and G thermostat contacts close, initiating a call for fan.
2. Integrated control module performs safety circuit checks.
3. Circulator blower is energized on cool speed. Electronic air cleaner terminals are energized.
4. Circulator blower runs, integrated control module monitors safety circuits continuously.
5. R and G thermostat contacts open, completing the call for fan.
6. Circulator blower is de-energized. Electronic air cleaner terminals are de-energized.
7. Furnace awaits next call from thermostat.

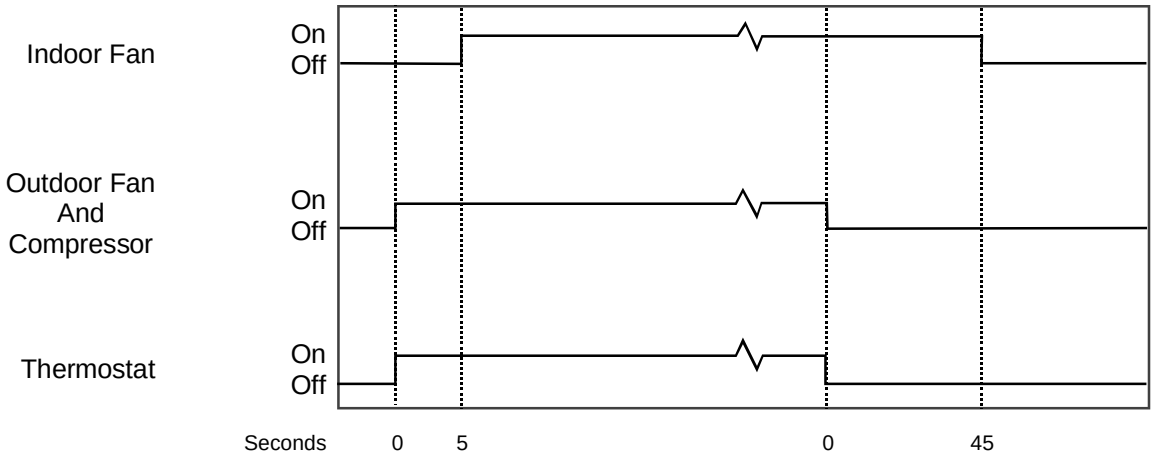
SYSTEM OPERATION

HEATING TIMING CHART FOR WHITE-RODGERS 50A55-288
INTEGRATED IGNITION CONTROL OPERATION



NOTE: **WHITE-RODGERS** INTEGRATED CONTROL MODULE HAS A VARIABLE STANDARD IGNITER WARM UP PERIOD BETWEEN A 17-SECOND MAXIMUM AND A FIVE-SECOND MINIMUM.

Cooling Timing Chart for White-Rodgers 50A55-288 Integrated Ignition Control Operation



SYSTEM OPERATION

ABNORMAL OPERATION

(Models with White-Rodgers 50A55-288 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 *Troubleshooting Chart* on the following pages for an interpretation of the LED signals and to the information in this section for a description of the problem.

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 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. **Low Flame Sense Signal.** If the furnace continues to operate and the micro-amp signal from the flame sensor falls below specified level. The diagnostic light code for this problem is **seven flashes** followed by a pause. The probable cause is either a coated/oxidized sensor, incorrectly positioned sensor in burner flame or lazy burner flame due to improper gas pressure or combustion air.
9. **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.

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 White-Rodgers 50A55-288 Integrated 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 or loose. - 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 ignitor or ignitor 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 incorrect 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.

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 White-Rodgers 50A55-288 Integrated 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 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.
- Normal furnace operation. but - Interated control module diagnostic LED is flashing seven flashes.	 7 Flashes	- 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.	- Clean 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	- 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.
- 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.

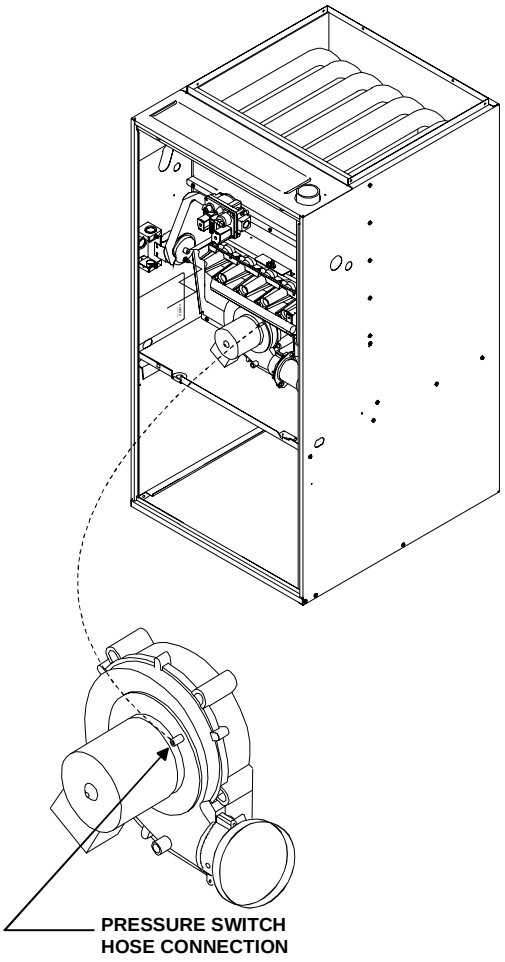
2) LED flash code will cease if power to the control module is interrupted through the disconnect or door switch.

3) Integrated control module will automatically attempt to reset from lock out after 20 minutes.

SYSTEM OPERATION

HEATING CYCLE

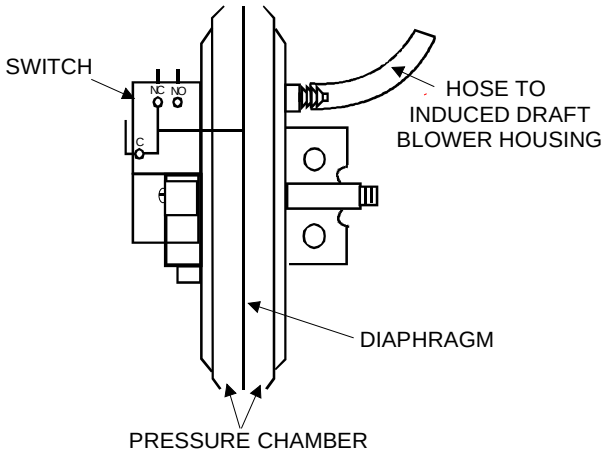
In order to illustrate the heating sequence using a induced draft blower, the following has been simplified to give a better understanding of the pressure switch operation.



The above illustration shows how the induced-draft blower assembly is mounted within the furnace. The inlet of the blower assembly is installed to the outlet of the recuperative coil (condensing coil). From the outlet of the blower assembly is attached the PVC flue pipe.

A hose from the pressure switch is attached to the induced-draft blower housing. This is open to the inlet of the blower wheel inside the housing (negative pressure side). When the blower is in operation, a negative pressure will be created on the entire heat exchanger flue passages.

A pressure control using a single pole, double throw electrical switch is used as a safety requirement in case of a blocked flue. **Note: The GDC model furnace has an additional pressure switch (labeled "coil cover") that is attached to the recoupe coil cover as a safety requirement in case of a restricted or blocked recouperator coil or drain.**



GUC, GCC, GUX & GDC Pressure Switch

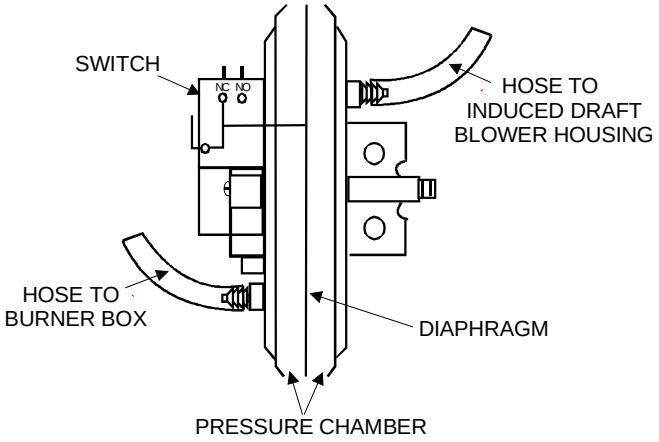
With furnace in the off position the induced draft blower will not be running. Atmospheric pressure will therefore be on both sides of the diaphragm and the electrical switch will be made between (C) common and (NC) normally closed terminals.

When the induced draft blower is in operation, the blower will create a negative pressure on one side of the diaphragm and atmospheric pressure will be on the other side causing the diaphragm to move toward the negative pressure.

This in turn will open the (NC) normally closed switch and make the (C) common to the (NO) normally open terminals.

The pressure switch used in the GUD and GCD (figure below) is a differential type pressure switch. A second pressure tap on the back side of the pressure switch is connected to the burner box to read its negative pressure. Actual pressure switch operation, however, has not changed.

In the event of a partially restricted or blocked flue pipe (or inlet air pipe on the GUD and GCD) the induced draft blower will not be able to operate against a higher static, therefore creating less negative pressure which would open the contacts (C) to (NO).



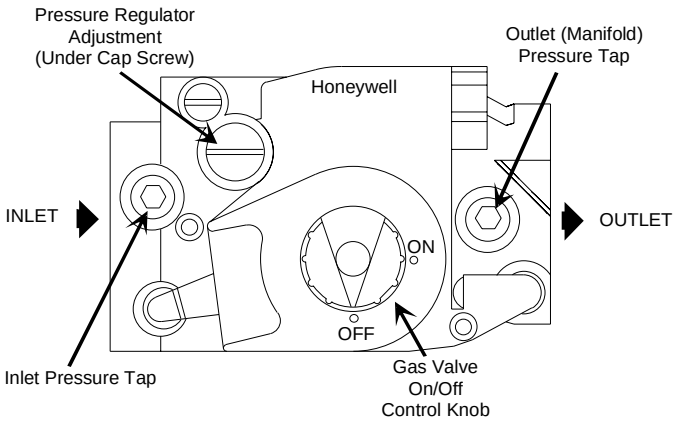
GUD & GCD Pressure Switch

SYSTEM OPERATION

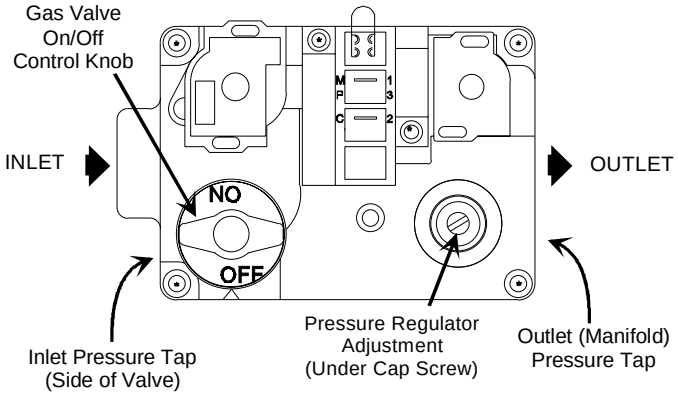
OPERATING INSTRUCTIONS

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 the Honeywell Model VR-8205 gas valve, or the White-Rodgers Model 36E36 and 36E37 gas valves or the Robertshaw Model 7100. For the Robertshaw Model 7200 and 7222 gas valves, push in and slide the lever to the "Off" position and for the White-Rodgers Model 36E22 and 36E23 gas valves, slide the switch on top 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 Page 7. If you do not smell gas, then turn the gas control knob counterclockwise ↶ to the "On" position for the Honeywell Model VR-8205 gas valve or the White-Rodgers Model 36E36 and 36E37 gas valves or the Robertshaw Model 7100. For the Robertshaw Model 7200 and 7222 gas valves, push in and slide the lever to the "On" position and for the White-Rodgers Model 36E22 and 36E23 gas valves, push the selector switch on top of the valve to the "On" position. Do not force.
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.

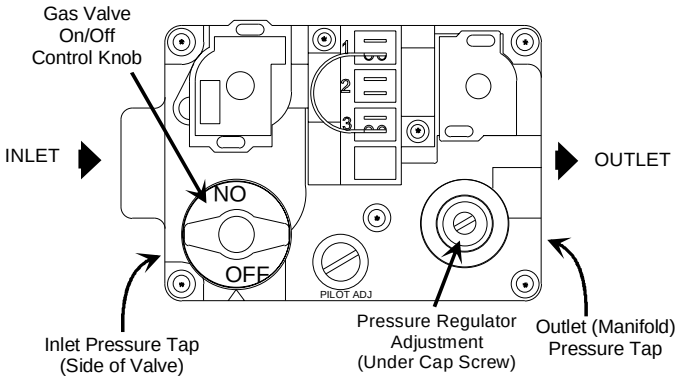
Note: There is an approximate 20 second delay between thermostat energizing and burner firing.



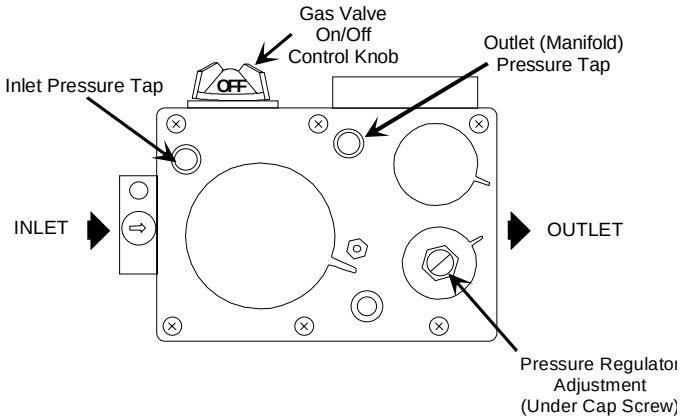
Honeywell Model: VR-8205



White-Rodgers Model: 36E36

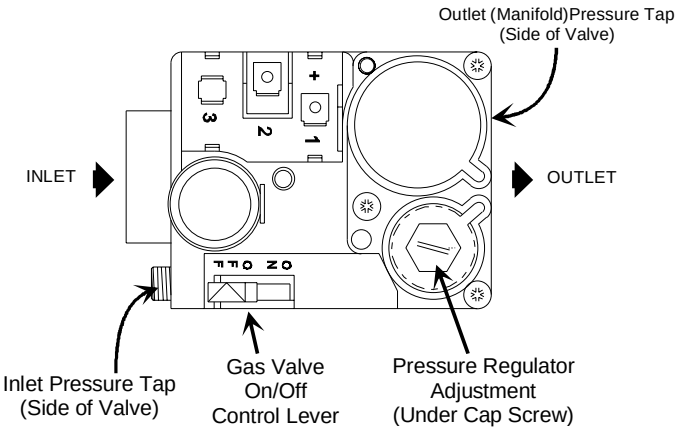


White-Rodgers Model: 36E37

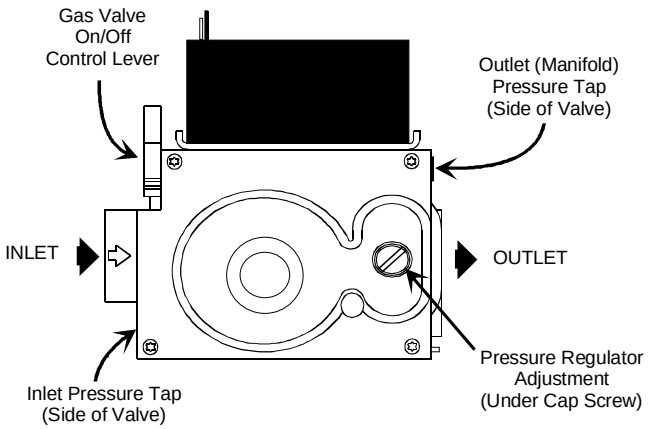


Robertshaw (Grayson) Model: 7100

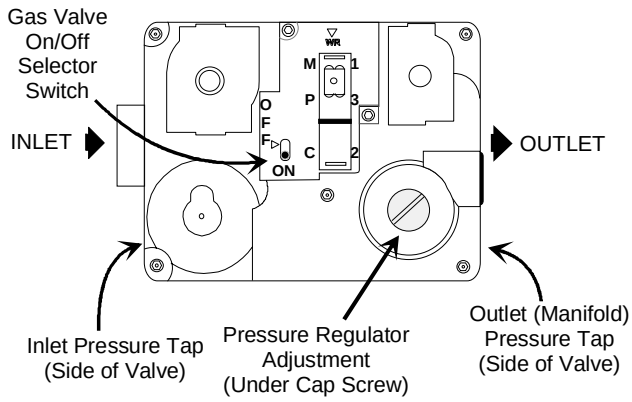
SYSTEM OPERATION



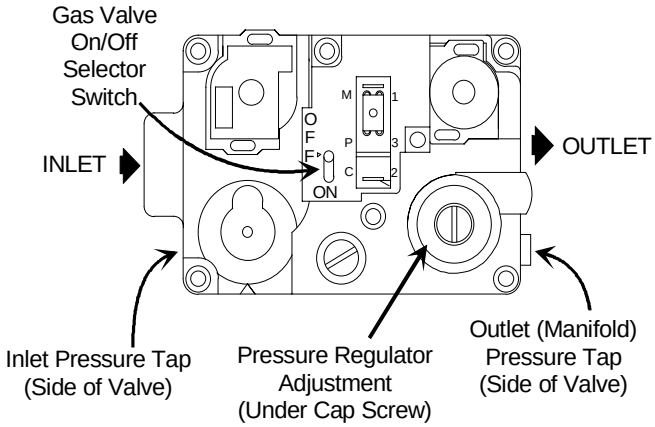
Robertshaw (Grayson) Model: 7200



Robertshaw (Grayson) Model: 7222



White-Rodgers Model 36E22



White-Rodgers Model 36E23

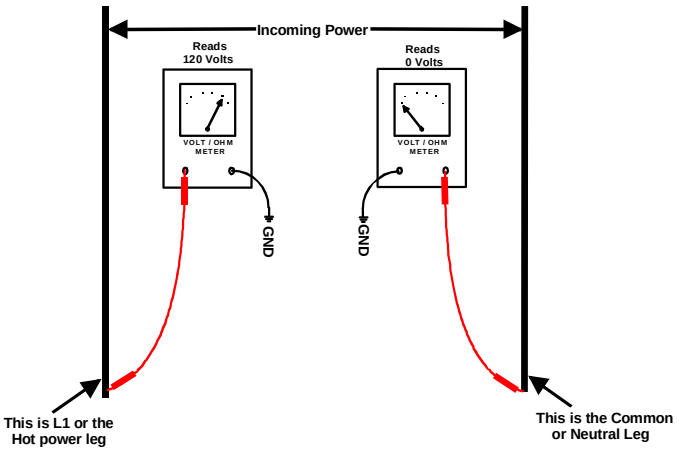
POLARIZATION AND PHASING

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.

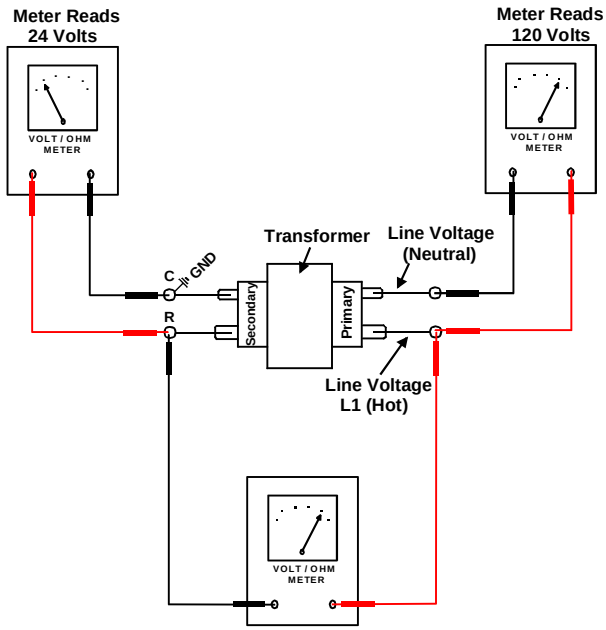
Some of the electronic boards being used today, with flame rectification, will not function properly and/or at all without polarization of incoming power. Some also require phasing between the primary and secondary sides of step-down transformers.

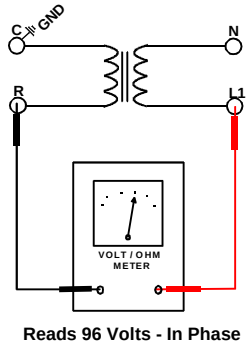
To instill new working habits for our trade, we recommend that these two items be checked during normal installation and/or service calls. See as follows:



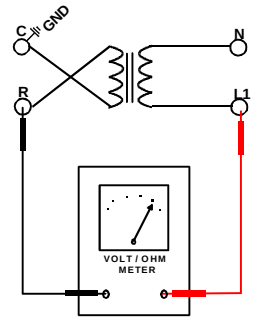
These then should be wired to the furnace accordingly.

CHECKING FOR PHASING - PRIMARY TO SECONDARY OF UNMARKED TRANSFORMERS*





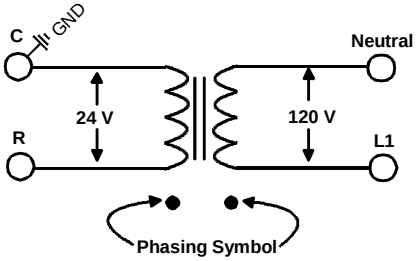
Reads 96 Volts - In Phase



Reads 144 Volts - Out of Phase

If meter reads approximately 96 volts - the primary to secondary are in phase - if meter 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.

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.

Have the furnace checked at least once every year, before the heating season begins, to be sure that there is adequate combustion air and that the vent system is working properly.

Have vent pipe checked to be sure it is not blocked by debris, which could permit fumes to enter the house. Replace any leaking sections of vent pipe.

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.

This furnace is equipped with a permanent type washable high-velocity filter(s). Filter(s) should be inspected and cleaned every two months as required. If the replacement of the filter(s) becomes necessary, it must be replaced with a filter(s) of the same type and size.

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.

To remove the filter, turn the latches on lower door. Remove the door. The blower motor will automatically stop through the interlock switch.

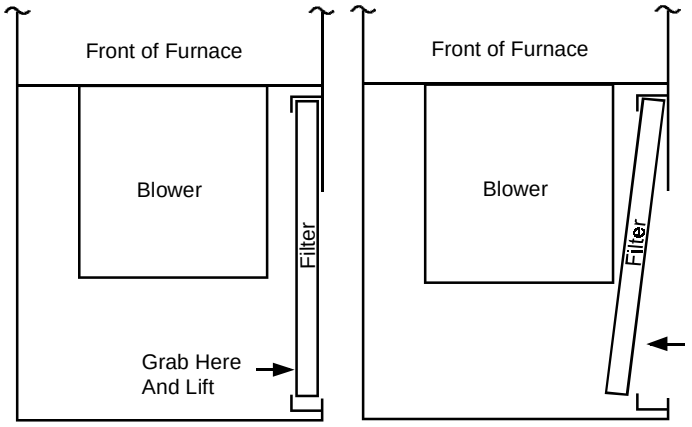
The filter is designed for high velocity heating and cooling applications. Filters must be inspected, cleaned or changed every two months or as required. It is the owner's responsibility to keep air filters clean. **Note:** Dirty filters are the most common cause of inadequate heating or cooling performance.

To remove the filter contained in the furnace retaining rails, disconnect electrical power to the furnace and remove the lower door by turning the door latches 1/4 turn.

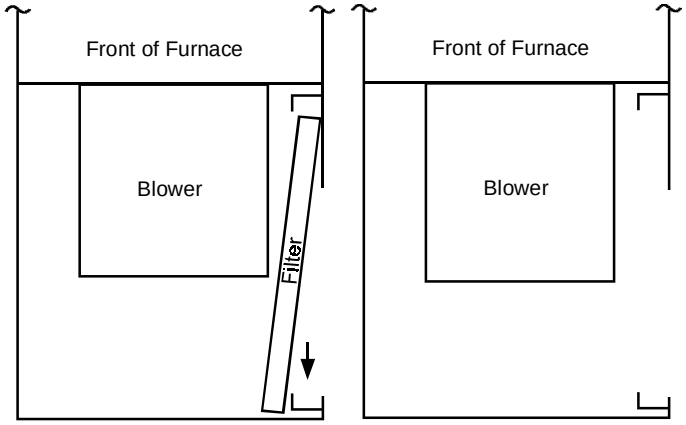
Grasp the lower portion of the filter, lift up to disengage it from the lower railing, move towards blower, drop filter down. Pull filter outward. Refer to the filter removal drawing below.

Side Air Return

1. Lift filter above bottom rail.
2. Tilt filter to clear rail.



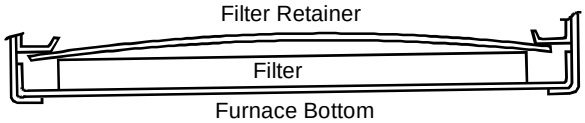
3. Lower filter below top rail.
4. Pull filter out.



Filter Removal

Bottom Air Return

The filter is held in place by a sheet metal retainer strap. Refer to the filter retainer drawing below. To change and clean the filter, slide one end of the retainer towards the front and remove filter.



Bottom Filter Retainer

The filter must be of the permanent washable type with dimensions of 16 x 25 x 1. (Side return(s) only.)

Use a vacuum cleaner to clean out the blower area and the adjacent area of the return air duct.

Clean, wash, and dry the permanent filter. Both sides should then be sprayed with a dust adhesive as recommended on adhesive container. Reinstall filter by placing it into the furnace along the side of the blower. Engage filter in the top rail, move towards side of furnace, and drop it into the bottom rail. BE SURE AIRFLOW DIRECTION ARROW POINTS TOWARDS BLOWER.

When the filter is located in the bottom of the furnace on a bottom return system the filter is held in its location by a sheet metal retainer strap. To change or clean the filter, merely slide one end of the retainer towards the front and remove the filter.

When using either of the following accessories: External Filter Rack Kit (EFR01), Media Air Cleaner (MAC1) or Electronic Air Cleaner (EAC5) refer to the specific installations instructions provided with each accessory for filter maintenance instructions.

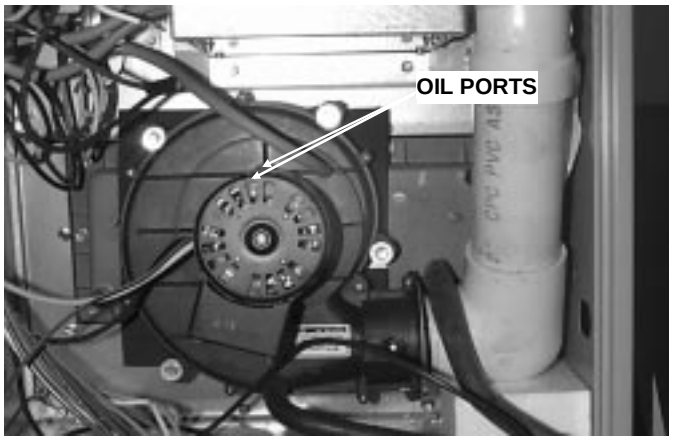
BLOWER MOTOR (QUALIFIED SERVICER ONLY)

If desired, the blower motor may be oiled by adding four (4) to six (6) drops of SAE#20 or #30 oil to each oil port, once a year. TO AVOID PREMATURE MOTOR FAILURE, DO NOT OVER OIL.

NOTE: Some blower motors which are permanently lubricated do not have oil ports. Oil cannot be added to these motors.

INDUCED DRAFT BLOWER MOTOR (QUALIFIED SERVICER ONLY)

If desired, the induced draft blower motor may be oiled annually with six (6) drops of Anderoil 465 oil (three (3) drops in each oil tube - see drawing below). TO AVOID PREMATURE MOTOR FAILURE, DO NOT OVER OIL.



Induced Draft Blower Motor

Note: Some induced draft blower motors which are permanently lubricated do not have oil ports. Oil cannot be added to these motors.

SEALED COMBUSTION CHAMBER - GUD (QUALIFIED SERVICER ONLY)

To inspect the combustion chamber at the start of each heating season:

1. Shut off the electrical power and gas supply.
2. Looking through the observation window, check for significant amounts of dirt, soot or debris.
3. If contaminates are present, remove the cover and clean the chamber.

⚠ CAUTION

This furnace is equipped with a sealed combustion chamber. It is mandatory to replace all gaskets that are removed. Order replacement gaskets prior to starting service. Only a qualified servicer should ever open the combustion chamber.

CONDENSATE DRAINAGE SYSTEM (QUALIFIED SERVICER ONLY)

The drain tubes, standpipe, and field-supplied drain line must be check annually and cleaned as often as necessary to ensure proper condensate drainage.

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 electrical power and gas supply to the furnace.
2. Remove the burner assembly by disconnecting the gas line and removing the manifold brackets from the partition panel.
3. Remove the collector box insulation and then remove the collector box from the partition panel.
4. Disconnect the PVC vent from the induced draft blower so that the blower can be removed from the recouperator coil cover.
5. Remove the recouperator coil cover and remove the turbulators from the recouperator coil tubes.
6. The recouperator coil tubes can now be cleaned using a long handled round wire brush, such as a gun cleaning brush.

7. The primary heat exchanger tubes can be cleaned using a round 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 spring cable. Slowly rotate the cable with the drill and insert it into one of the primary heat exchanger tubes. While reversing the drill, work the cable in and out several times to obtain sufficient cleaning. Repeat for each tube.
8. When all heat exchanger tubes have been cleaned and the residue removed with a vacuum, replace all the parts in the reverse order in which they were removed.
9. To reduce the chances of repeated fouling of the flue passages, perform the steps listed in the System Operation Section.

FLAME SENSOR (QUALIFIED SERVICER ONLY)

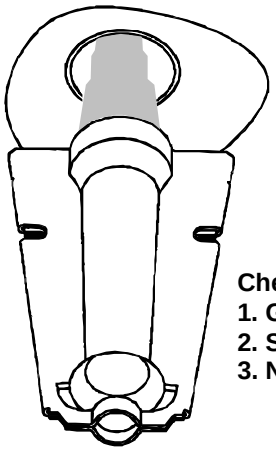
Under some conditions, the fuel or air supply can create a nearly invisible coating on the flame sensor. This coating acts as an insulator, causing a drop in the flame sensing signal. If this occurs, a qualified servicer must carefully clean the flame sensor with steel wool. After cleaning, the flame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

BURNERS

WARNING

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 flames 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. Inclined Manometer - to measure static pressure, pressure drop across coils, filters, and draft.
5. Water Manometer (12") - to test gas inlet and manifold 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: GUC090B35A

INPUT: 90,000 BTU/HR

OUTPUT CAP: 83,000

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.

⚠ CAUTION

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.

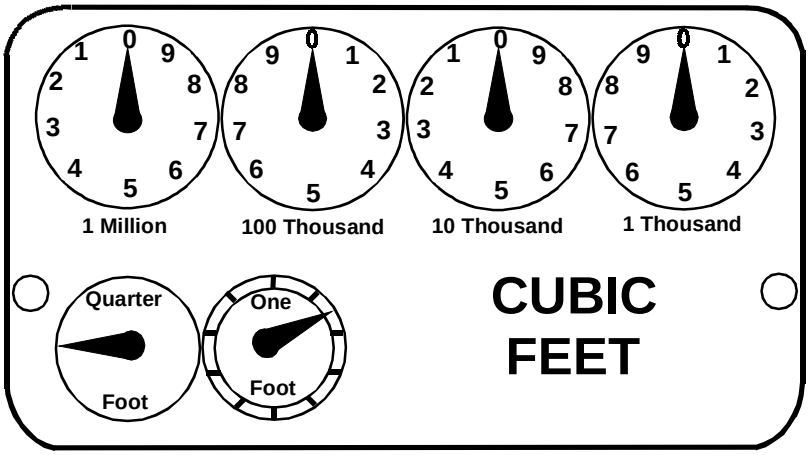
Since normally propane gas is not installed with a gas meter, clocking will be virtually impossible. The gas orifices used with propane are calculated for 2500 BTU gas and with proper inlet pressures and correct piping size, full capacity will be obtained.

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.

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) or pulley adjustments of the motor and blower (belt 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.



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-21
Improper Heat Anticipator Setting					●	●		●	●	Adjust Heat Anticipator Setting	S-3
Improper Thermostat Location					●	●		●	●	Relocate Thermostat	
Faulty Limit or Roll Out Switch		●		●						Test Control	S-6 & 23
Faulty Flame Sensor			●							Test Flame Sensor	S-22
Faulty Ignition Control		●	●							Test Control	S-21
Gas Valve or Gas Supply Shut Off		●								Turn Valves to On Position	S-10
Faulty Induced Draft Blower		●					●			Test Blower	S-8
Broken or Shorted Ignitor		●								Test Ignitor	S-20
Faulty Combustion Relay		●								Test Relay	S-5
Dirty Flame Sensor, Low uA			●							Clean Flame Sensor	S-22
Flame Sensor not in Flame, Low uA			●							Test/Adjust Position of Flame Sensor	S-22
Faulty Gas Valve		●					●		●	Replace Gas Valve	S-10
Open Auxiliary Limit		●		●						Reset Control	S-7
Improper Air Flow or Distribution				●					●	Check Duct Static	S-16
Cycling on Limit				●	●				●	Check Controls & Temperature Rise	S-6 & 17
Delayed Ignition							●			Test for Delayed Ignition	S-14
Flashback							●			Test for Flashback	S-15
Orifice Size							●	●	●	Check Orifices	S-12
Gas Pressure		●					●	●	●	Check Gas Pressure	S-13
Cracked Heat Exchanger							●			Check Burner Flames	S-11
Stuck Gas Valve		●					●	●		Replace Gas Valve	S-10
Furnace Undersized									●	Replace with Proper Size Furnace	
Faulty Pressure Switch		●	●	●						Test Pressure Switch	S-18
Blocked or Restricted Flue							●			Check Flue/Drawdown Pressure	S-18
Open Roll Out Switch		●	●							Test Control	S-23
Bouncing On Pressure Switch			●							Test Negative Pressure	S-18

SERVICING

SERVICING SECTION INDEX

SERVICING

S-1 CHECKING VOLTAGE

Disconnect Electrical Power Supply:

1. Remove access 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:

WARNING

LINE VOLTAGE NOW PRESENT.

3. Using a voltmeter, measure the voltage across the hot and neutral connections. "With Blower Door Installed"
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 ± 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.

S-2 CHECKING WIRING

WARNING

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

WARNING

Disconnect Electrical Power Supply:

1. Remove the thermostat low voltage wires at the furnace control panel terminal board.
2. Jumper terminals R to W.

With Power ON:

WARNING

LINE VOLTAGE NOW PRESENT.

Combustion I.D. Motor must run.

3. If the hot surface ignitor heats and approximately 45 seconds later the gas valve opens and the burners ignite, the trouble is in the thermostat or wiring.
4. 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.

5. With power off, Jumper terminals R to Y to G.
6. Turn on the power.
7. 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.

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 our furnaces covered in this manual are:

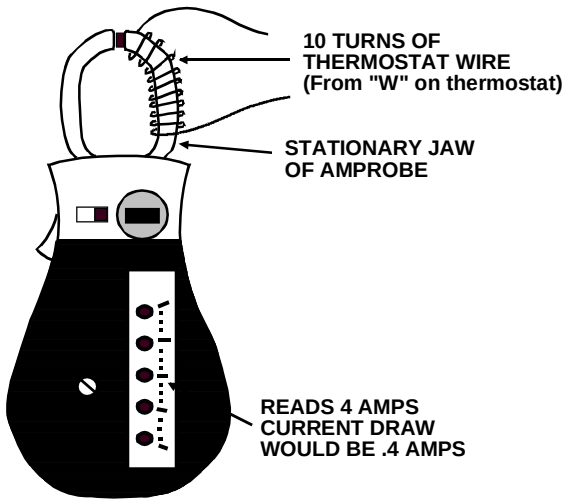
GUC, GCC with

WR50E47 control..... **.80 Amps**

GUD, GUX, GUC, GCC, GCD, GDC,

with WR50A50 Integrated Control..... **.70 Amps**

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 figure.



Checking Heating Anticipator Current (Amp) Draw

3-C 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.

WARNING

Disconnect Electrical Power Supply:

1. Remove the thermostat leads from the low voltage terminal board.
2. With power on, using a voltmeter, check voltage across terminals R and C. Must read 24 VAC.

WARNING

LINE VOLTAGE NOW PRESENT.

3. No voltage indicates faulty transformer, open fuse, bad wiring, bad splice, or open door switch.
4. Check transformer primary voltage at incoming line voltage connections, fuse, splices, and blower door.
5. If line voltage is available to the primary side of transformer and not at secondary side, the transformer is inoperative. Replace.

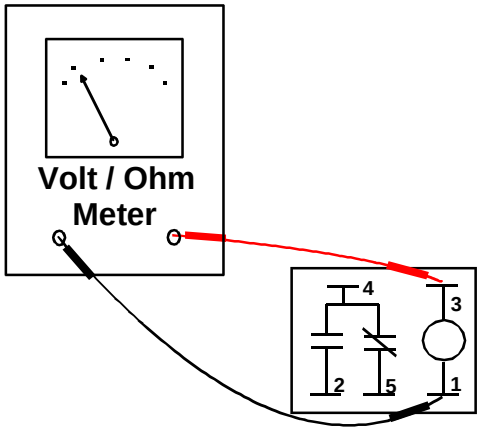
S-5 CHECKING FAN RELAY (A/C MODELS)

(Not Used on Models with WR50A50 Control)

WARNING

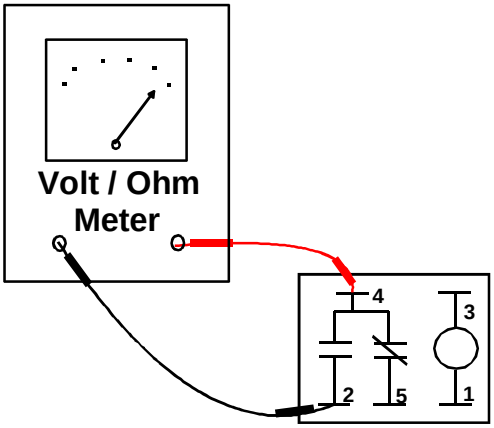
Disconnect Electrical Power Supply:

1. Tag and disconnect all wires from male spade connections of relay.
2. Using an ohmmeter, test across the coil terminals 1 and 3 - should read approximately 12 ohms as shown in the following figure. If the coil does not test continuous - replace.



Testing Fan Relay Coil

3. On the single pole double throw relays, test across terminals 4 and 5, should read continuous, 2 and 4 should have no reading as shown in the following figure.
4. Apply 24 volts to coil terminals and retest. 4 to 5 should have no reading, 4 to 2 should test continuous. If not, replace the relay.

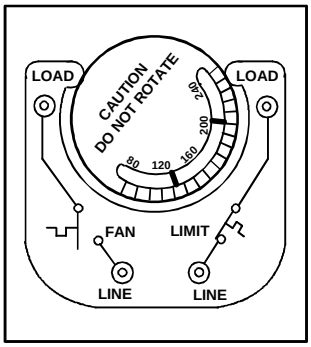


Testing Fan Relay Contacts

S-6 CHECKING COMBINATION FAN AND LIMIT CONTROL

(Models with WR50E47 Ignition Control)

A combination fan and limit switch is used on furnaces using the WR50E47 ignition control. The limit setting is fixed and must not be readjusted in the field, as shown in the following figure.



Honeywell Combination Fan and Limit Control

SERVICING

Depending on the individual type of furnace (upflow, counterflow, etc.) will determine as to what the cutout point setting of the control will be. Refer to the chart on page 81 for temperature settings.

In all instances the limit control is wired in series with the ignition control.

If the temperature within the furnace should exceed this setting, the control will open, de-energizing the ignition control which in turn will open the electrical circuit to the gas valve.

The control will automatically reset when the temperature within the combustion chamber is sufficiently lowered.

WARNING

Disconnect Electrical Power Supply:

1. Remove load and line voltage wires at fan portion terminals.
2. Set fan "OFF" and fan "ON" indicators above the heat exchanger temperature.
3. With an ohmmeter, test between these two terminals, should have no reading.
4. Set fan "OFF" and fan "ON" indicators below the heat exchanger temperature.
5. With an ohmmeter, test between these two terminals, should read continuous.

If not as above, replace the complete control.

6. Remove load and line voltage wires at limit position terminals.
7. With an ohmmeter, test between these two terminals, should read continuous unless heat exchanger temperature is above limit control setting.
8. A fan control set too low may not let furnace recycle til discharge air is uncomfortable.

If not as above, replace the complete control.

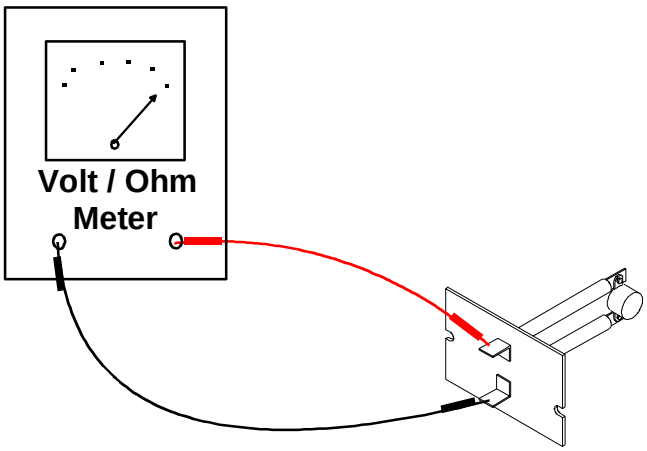
Notice: Reset the fan "OFF" and "ON" settings back to their original positions. These settings should have been predetermined at the time of installation.

S-6A CHECKING PRIMARY LIMIT CONTROL

(Models with WR50A50, 50A55 or 50A60 Control)

Furnaces using the integrated ignition control use a nonadjustable automatic reset Klixon type limit control (stat on a stick). To aid in identifying these controls, the controls have color coded insulating sleeves. Refer to the chart on page 82 for temperature settings and color codes.

1. Remove low voltage wires at limit control terminals.
2. With an ohmmeter, test between these two terminals as shown in the following figure. Should read continuous unless heat exchanger temperature is above limit control setting. If not as above, replace the control.



Testing Primary Limit Control

S-7 CHECKING AUXILIARY LIMIT CONTROL

(Counterflow Models)

On the counterflow furnaces, an additional limit switch is required for safety control of high temperature within the furnace or duct work.

This control is preset nonadjustable control mounted in the blower compartment area.

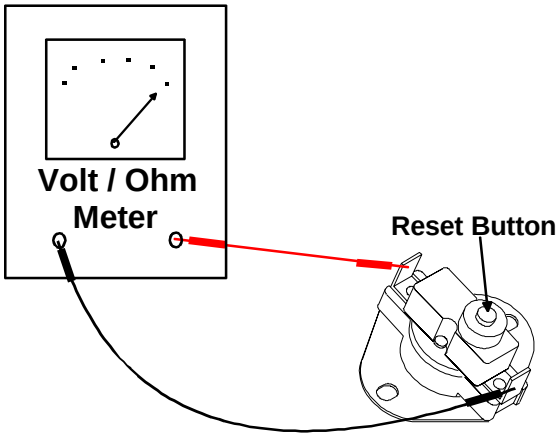
It is connected in series with the limit control wiring to the ignition control. If its temperature should be exceeded, it will open, interrupting the voltage to the gas valve causing it to close.

WARNING

Disconnect Electrical Power Supply:

1. Remove the wires from the auxiliary limit control terminals.
2. Using an ohmmeter, test for continuity across the two terminals as shown in the following figure. No reading indicates the contol is open. Push the red reset button, test again - if still open, replace the control.

Refer to the chart on page 83 for temperature settings and color codes.



Testing Auxiliary Limit Control

SERVICING

Honeywell Combination Fan/Limit						
	Part #	M0352917	M0352918	M0352919	M0352920	M0352921
	Open Setting (°F)	230	200	180	250	160
Model #	Mfg #					
GUC045B30A	P9898401F				1	
GUC070B30A	P9898402F		1			
GUC070B40A	P9898403F		1			
GUC090B35A	P9898404F	1				
GUC090B50A	P9898405F	1				
GUC115B50A	P9898406F					1
GUC045B30B	P1106901F				1	
GUC070B30B	P1106902F		1			
GUC070B40B	P1106903F		1			
GUC090B35B	P1106904F	1				
GUC090B50B	P1106905F	1				
GUC115B50B	P1106906F					1
GUC045B30C	P1114301F		1			
GUC070B30C	P1114302F				1	
GUC070B40C	P1114303F				1	
GUC090B35C	P1114304F	1				
GUC090B50C	P1114305F	1				
GUC115B50C	P1114306F			1		
GCC045B30A	P9898501F	1				
GCC070B30A	P9898502F	1				
GCC070B40A	P9898503F	1				
GCC090B40A	P9898504F	1				
GCC090B50A	P9898505F	1				
GCC115B50A	P9898506F			1		
GCC045B30A	P1107001F	1				
GCC070B30A	P1107002F	1				
GCC070B40A	P1107003F	1				
GCC090B40A	P1107004F	1				
GCC090B50A	P1107005F	1				
GCC115B50A	P1107006F			1		

SERVICING

T.O.D. PRIMARY LIMIT									
Part Number	10250801	10250802	10250803	10250804	10250805	10250806	10250807	10250808	10250815
Open Setting (°F)	210	180	160	150	200	190	170	140	125
Sleeve Colors	Red	Brown	Orange	Green	Blue	Yellow	Black	White	Red
Sleeve Colors	Red	Brown	Orange	Green	Blue	Yellow	Black	White	Green
GUC045_30_		1							
GUC070_30_		1							
GUC070_40_							1		
GUC090_35_							1		
GUC090_50_				1					
GUC115_50								1	
GUC045X30B			1						
GUC070X30B			1						
GUC090X50B								1	
GUC115X50B									1
GUD045_30_	1								
GUD045X30B							1		
GUD070_30_		1							
GUD070_40_		1							
GUD090_35_			1						
GUD090_50_			1						
GUD115_50_				1					
GUD115X50B								1	
GUX045_30_		1							
GUX070_30_		1							
GUX070_40_							1		
GUX090_35_			1						
GUX090_50_			1						
GUX090X50B								1	
GUX115_50_								1	
GUX115X50B									1
GCC045_30_	1								
GCC070_30_	1								
GCC070_40_					1				
GCC090_40_					1				
GCC090_50_					1				
GCC115_50_						1			
GCD070X30B		1							
GCD090X40B							1		
GDC045X30B					1				
GDC070X30B							1		
GDC070X40B		1							
GDC090X40B							1		
GDC090X50B							1		
GDC115X50B							1		

AUXILLARY LIMIT SWITCHES	
PART NUMBER	M0352005
OPEN SETTING (°F)	160
GCC___B__A GCC___B__B GCC___C__C GCC___X__A	1
GDC___X__B	1
GCD___X__B	1

S-8 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 and 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.

S-9 CHECKING CAPACITOR

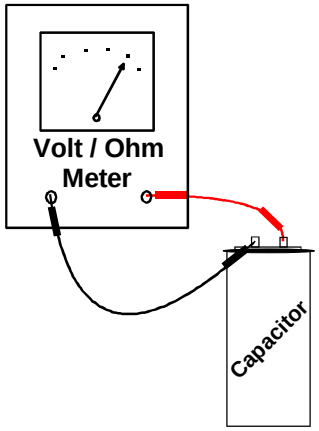
The direct drive motors are of the permanent split capacitor design. A run capacitor is wired across the auxiliary and a portion of the main windings. The capacitors primary function is to reduce the line current while greatly improving the torque characteristics of a motor. This is accomplished by using 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.

WARNING

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 as shown in the following two figures.

S-9A Resistance Check



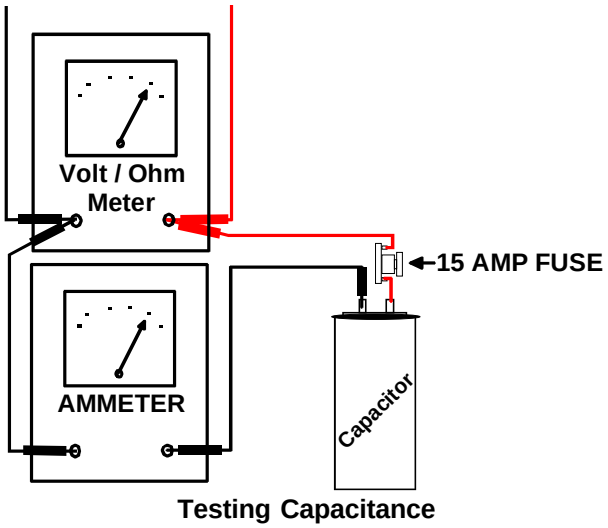
Testing Capacitor Resistance

WARNING

Disconnect Electrical Power Supply:

1. Discharge capacitor and remove wire leads.
2. 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.
   c. Open - no reading - replace. Reverse leads. Check again no reading - replace.
   d. Reverse leads and recheck.

S-9B Capacitance Test



Testing Capacitance

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

SERVICING

S-10 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.

With Power OFF:

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 and 100 ohms for Honeywell and White-Rodgers main valve operator coils. The redundant coil will vary somewhat as well.
4. Reverse leads. Some redundant coils have (dividers) diodes.

If not as above, replace the entire valve.

S-11 CHECKING MAIN BURNERS

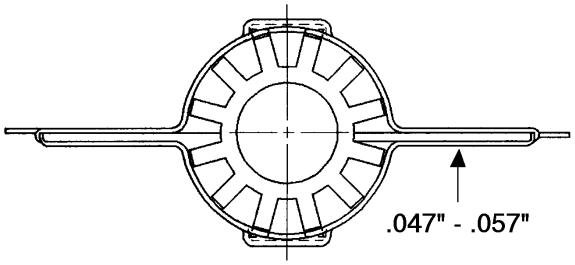
The main burners are used to provide complete combustion of various fuels in a limited space, and transfer this heat of the burning process to the heat exchanger.

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.

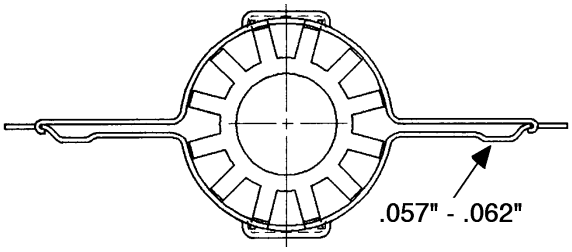
⚠ WARNING

Disconnect Electrical Power and Shut Off Gas Supply:

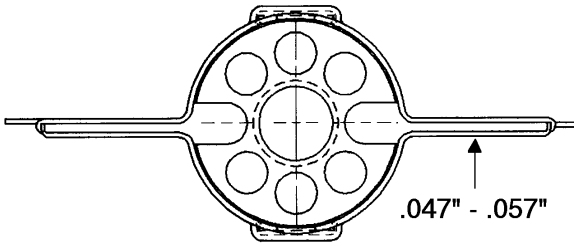
In checking main burners, look for signs of rust, oversized and undersized carryover ports restricted with foreign material, etc.



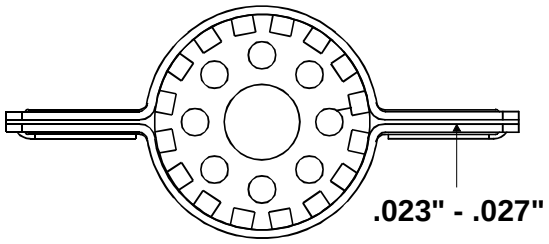
Standard Burner GUC, GCC, GUX Models



"P" Stype Burner GUD-B Models



Burner GUD-C Models



Beckett Burner GUC, GUD, GUX, GCD and GCD X-B Models

S-12 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.

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.

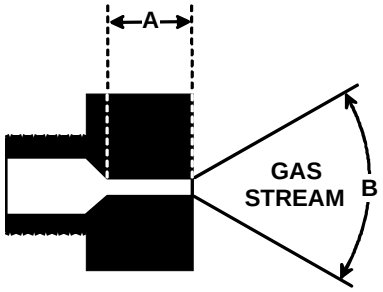
The only time resizing is required is when a reduction in firing rate is required for an increase in altitude.

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.

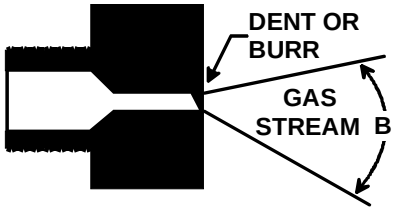
With Power and Gas OFF:

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.

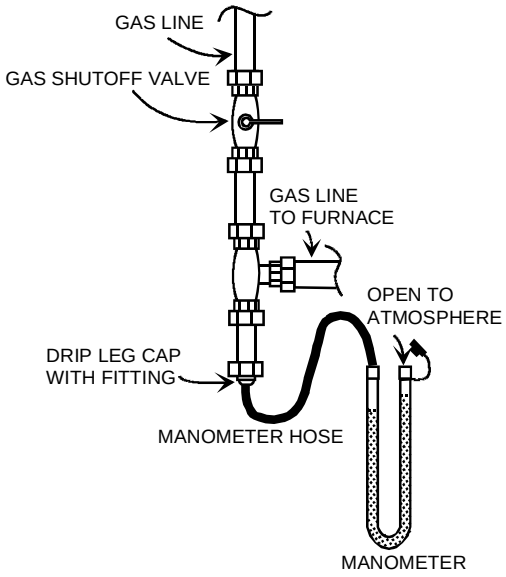
SERVICING



The length of Dimension "A" determines included angle of Spray "B".



A dent of burr will cause severe deflection of gas stream.



Measuring Inlet Gas Pressure

S-13 CHECKING GAS PRESSURE

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

⚠ WARNING

Disconnect Electrical Power and Shut Off Gas Supply:

1. Connect a water manometer or adequate gauge upstream of the gas valve. (If no provisions provided, suggest removing cap from dripleg and install a predrilled cap with hose fitting as shown in the following measuring inlet gas pressure figure).
2. Remove the pressure tap fitting at the manifold if provided or from the gas valve and install fitting to connect another manometer or gauge as shown in the following measuring manifold gas pressure figure with Power and Gas ON:
3. Put furnace into heating cycle and turn on all other gas consuming appliances.

For **NATURAL GAS:**

a. Inlet pressure should be a nominal 7" w.c.

b. Manifold pressure should be 3.5 ± .3"w.c.

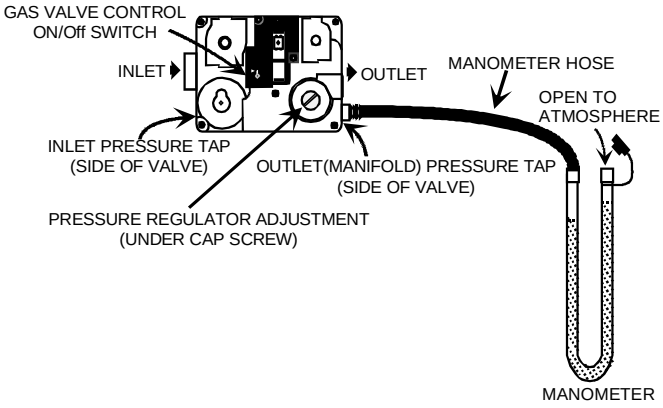
(Canadian - Sea Level 4.2" ± .3" w.c.)

For **PROPANE GAS:**

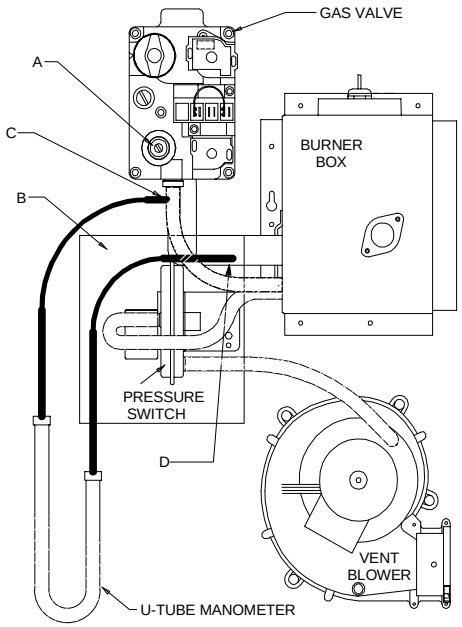
a. Inlet pressure should be a nominal 11" w.c.

b. Manifold pressure should be a nominal 10" w.c.

If operating pressures differ from above, make necessary pressure regulator adjustments, check piping size, etc., and/or consult with local utility.



Measuring Manifold Gas Pressure



***GUD & GCD Models Only:**
Measuring Manifold Gas Pressure

To properly adjust manifold gas pressure on either the GUD or GCD Direct Vent furnace the negative side of the manometer must be connected to the gas valve vent tap hose. Failure to connect both sides of the manometer as shown will result in an overfiring condition.

A. CAP OVER ADJUSTMENT SCREW MUST BE IN PLACE WHEN FURNACE IS OPERATING.

B. SEE PRESSURE SWITCH DIAGRAM FOR PRESSURE SWITCH HOSE CONNECTIONS.

   TO MEASURE MANIFOLD PRESSURE CONNECT MANOMETER BETWEEN C AND D.

C. HOSE BETWEEN GAS VALVE AND AIR BOX (TEE TO BE SUPPLIED BY SERVICER).

D. TAPPED OPENING IN MANIFOLD (HOSE BARB TO BE SUPPLIED BY SERVICER).

S-14 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-13)
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-15 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-13)
2. Check burner for proper alignment and/or replace burner.
3. Improper orifice size - check orifice for obstruction.

S-16 CHECKING DUCT STATIC

The maximum and minimum allowable external static pressures are found in the blower performance specification section on pages 30-34. 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.

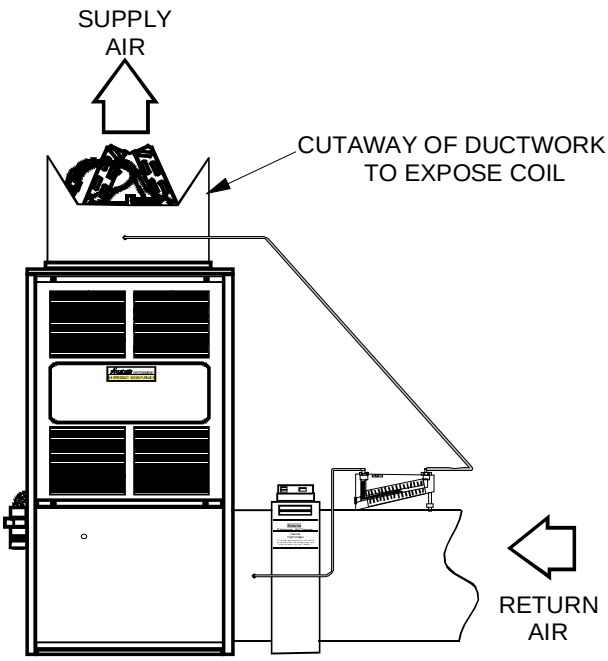
To determine proper air movement, proceed as follows:

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 figure.

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-17 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.

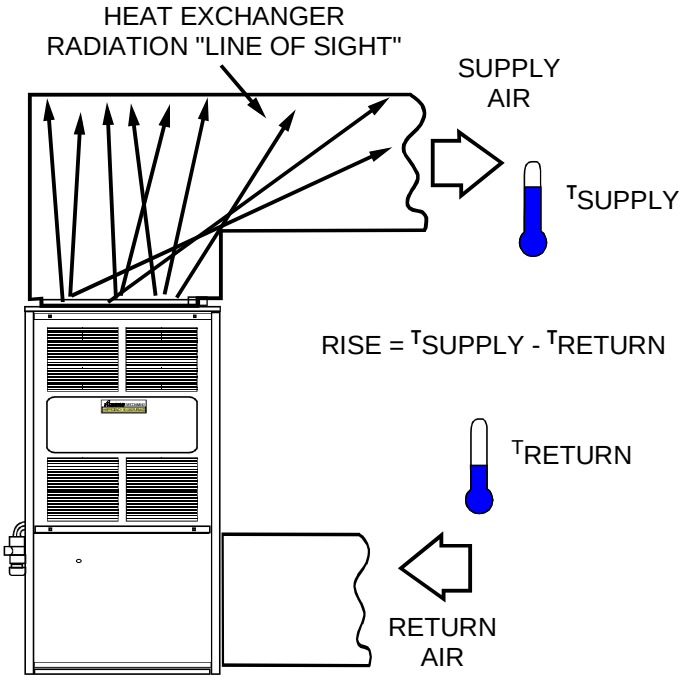
All furnaces are designed for a given range of temperature increase; that is the temperature of the air leaving the furnace minus the temperature of the air entering the furnace.

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

S-18 CHECKING PRESSURE CONTROL

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

Note: The GDC model furnace has a second pressure switch that is connected to the recouperator coil cover to detect a restricted or blocked recouperator coil or drain.

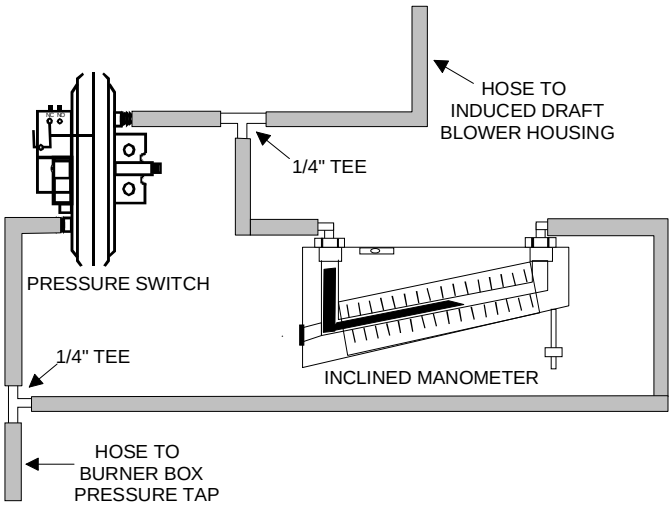
WARNING

Disconnect Electrical Power Supply:

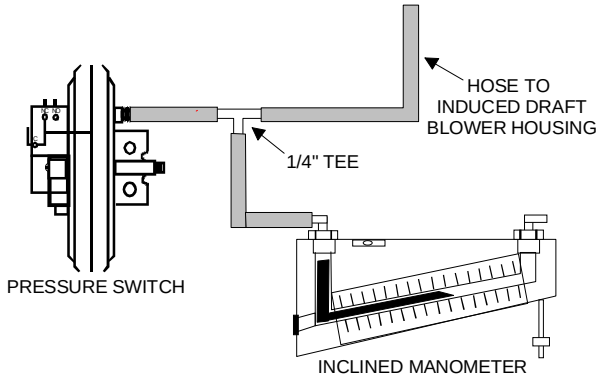
1. Remove wires from the electrical terminals on switch.
2. Using a VOM check from common terminal to NC (Normally Closed) - should read closed. Check from Common to NO (Normally Open) - should read open.

If switches read as above proceed to Step 3, otherwise replace control.

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



GUD & GCD Models Only



GUC, GCC, GUX & GDC Models

Reconnect wires to electrical terminals on switch. Refer to wiring diagram for proper wire connections.

SERVICING

PRESSURE SWITCH TRIP POINTS AND USAGE CHART									
MODEL #	MIN. NEG. PRESSURE WITH FLUE NOT FIRING 0 to 4000 ft.	MIN. NEG. PRESSURE WITH FLUE FIRING 0 to 4000 ft.	MAX. NEG. PRESSURE AIR BOX 0 to 4000 ft.	PRESSURE SWITCH TRIP POINTS AND USAGE					
				0 to 4000 ft.		4001 to 7000 ft.		7001 to 10000 ft.	
				TRIP POINT	PRESSURE SWITCH	TRIP POINT	HIGH ALTITUDE KIT	TRIP POINT	HIGH ALTITUDE KIT
GUC045B__A GUC045B__B	-1.50	-1.20	NA	-1.05	C6456506	-0.75	HAPS06 C6456503	-0.54	HAPS04 C6456508
GUC045B__C GUC045C__C GUC045X__A	-1.80	-1.35	NA	-1.20	C6456507	-0.90	HAPS07 C6456502	-0.65	HAPS05 C6456504
GUC045X__B	-1.55	-1.45	NA	-1.35	11111901 or 20028401	-1.20	HAPS17 11111903	-1.05	HAPS23 11111902
GUC070B__A GUC070B__B	-1.50	-1.05	NA	-0.90	C6456502	-0.75	HAPS06 C6456503	-0.54	HAPS04 C6456508
GUC070B__C GUC070C__C GUC070X__A	-1.50	-1.20	NA	-1.05	C6456506	-0.75	HAPS06 C6456503	-0.54	HAPS04 C6456508
GUC070X__B	-1.45	-1.35	NA	-1.25	11111905 or 20028405	-1.05	HAPS23 11111902	-0.90	HAPS22 11111907
GUC090B__A GUC090B__B GUC090B__C GUC090C__C GUC090X__A	-1.80	-1.35	NA	-1.20	C6456507	-0.90	HAPS07 C6456502	-0.65	HAPS05 C6456504
GUC090X__B GUC090X__BI	-1.55	-1.45	NA	-1.35	11111901 or 20028401	-1.20	HAPS17 11111903	-1.05	HAPS23 11111902
GUC115B__A GUC115B__B	-1.60	-0.80	NA	-0.65	C6456504	-0.54	HAPS04 C6456508	-0.30	HAPS02 C6456509
GUC115B__C GUC115C__C GUC115X__A	-1.60	-0.90	NA	-0.75	C6456503	-0.54	HAPS04 C6456508	-0.40	HAPS03 C6456505
GUC115X__B	-1.25	-1.15	NA	-1.05	11111902 or 20028402	-0.90	HAPS22 11111907	-0.75	HAPS21 11111906
GCC045B__A GCC045B__B	-1.50	-1.05	NA	-0.90	C6456502	-0.75	HAPS06 C6456503	-0.54	HAPS04 C6456508
GCC045C__C GCC045X__A	-2.00	-1.90	NA	-1.20	C6456507	-0.90	HAPS07 C6456502	-0.65	HAPS05 C6456504
GCC070B__A GCC070B__B	-1.60	-0.90	NA	-0.75	C6456503	-0.54	HAPS04 C6456508	-0.40	HAPS03 C6456505
GCC070C__C GCC070X__A	-1.75	-1.40	NA	-1.05	C6456506	-0.75	HAPS06 C6456503	-0.54	HAPS04 C6456508
GCC090B__A GCC090B__B	-1.80	-1.05	NA	-0.90	C6456502	-0.75	HAPS06 C6456503	-0.54	HAPS04 C6456508
GCC090C__C GCC090X__A	-1.95	-1.80	NA	-1.20	C6456507	-0.90	HAPS07 C6456502	-0.65	HAPS05 C6456504
GCC115B__A GCC115B__B	-1.60	-0.55	NA	-0.40	C6456505	-0.30	HAPS02 C6456509	-0.22	HAPS01 C6456510
GCC115C__C GCC115X__A	-1.25	-1.10	NA	-0.75	C6556503	-0.54	HAPS04 C6456508	-0.40	HAPS03 C6456505

Note: Replacement pressure switch number listed below high altitude kit number.

SERVICING

PRESSURE SWITCH TRIP POINTS AND USAGE CHART									
MODEL #	MIN. NEG. PRESSURE WITH FLUE NOT FIRING 0 to 4000 ft.	MIN. NEG. PRESSURE WITH FLUE FIRING 0 to 4000 ft.	MAX. NEG. PRESSURE AIR BOX 0 to 4000 ft.	PRESSURE SWITCH TRIP POINTS AND USAGE					
				0 to 4000 ft.		4001 to 7000 ft.		7001 to 10000 ft.	
				TRIP POINT	PRESSURE SWITCH	TRIP POINT	HIGH ALTITUDE KIT	TRIP POINT	HIGH ALTITUDE KIT
GUD045B__A GUD045C__A GUD045X__A	-1.65	-1.50	-0.06	-1.20	10207903	-0.90	HAPS08 10207901	-0.70	HAPS09 10207902
GUD045X__B	-1.58	-1.46	-0.06	-1.38	10207911	-1.20	HAPS19 10207903	-1.05	HAPS18 10207912
GUD070B__A GUD070C__A GUD070X__A	-1.65	-1.20	-0.13	-0.90	10207901	-0.70	HAPS09 10207902	-0.50	HAPS11 10207906
GUD070X__B	-1.58	-1.46	-0.13	-1.38	10207911	-1.20	HAPS19 10207903	-1.05	HAPS18 10207912
GUD090B__A GUD090C__A GUD090X__A	-1.80	-1.50	-0.25	-1.20	10207903	-0.90	HAPS08 10207901	-0.70	HAPS09 10207902
GUD090X__B	-1.79	-1.69	-0.25	-1.57	10207910	-1.30	HAPS20 10207909	-1.20	HAPS19 10207903
GUD115B__A	-1.45	-1.00	-0.45	-0.70	10207902	-0.50	HAPS11 10207906	-0.40	HAPS12 10207907
GUD115C__A GUD115X__A	-1.45	-1.00	-0.45	-0.80	10207904	-0.60	HAPS10 10207905	-0.40	HAPS12 10207907
GUD115X__B	-1.58	-1.46	-0.45	-1.38	10207911	-1.20	HAPS19 10207903	-1.05	HAPS18 10207912
GCD070X__B	-1.25	-1.15	-0.13	-1.05	10207912 or 20030204	-0.80	HAPS25 10207904	-0.70	HAPS24 10207902
GCD090X__B	-1.50	-1.40	-0.25	-1.30	10207909 or 20030201	-1.05	HAPS18 10207912	-0.97	HAPS26 10207908
GUX045B__A GUX045X__A	-1.75	-1.60	NA	-1.45	C6456511	-1.20	HAPS13 C6456507	-0.75	HAPS06 C6456503
GUX045X__B	-1.67	-1.57	NA	-1.45	20028404	-1.20	HAPS17 11111903	-1.05	HAPS23 11111902
GUX070B__A GUX070X__A	-1.70	-1.35	NA	-1.20	C6456507	-0.90	HAPS07 C6456502	-0.65	HAPS05 C6456504
GUX070X__B	-1.40	-1.30	NA	-1.20	20028403	-1.05	HAPS23 11111902	-0.90	HAPS22 11111907
GUX070X__BI	-1.40	-1.30	NA	-1.20	11111903	-1.05	HAPS23 11111902	-0.90	HAPS22 11111907
GUX090B__A GUX090X__A	-1.90	-1.60	NA	-1.45	C6456511	-1.20	HAPS13 C6456507	-0.75	HAPS06 C6456503
GUX090X__B	-1.40	-1.30	NA	-1.20	20028403	-1.05	HAPS23 11111902	-0.90	HAPS22 11111907
GUX115B__A GUX115X__A	-1.80	-1.35	NA	-1.20	C6456507	-0.90	HAPS07 C6456502	-0.65	HAPS05 C6456504
GUX115X__B	-1.40	-1.30	NA	-1.20	20028403	-1.05	HAPS23 11111902	-0.90	HAPS22 11111907

Note: Replacement pressure switch number listed below high altitude kit number.

SERVICING

PRESSURE SWITCH TRIP POINTS AND USAGE CHART											
MODEL #	MIN. NEG. PRESSURE WITH FLUE NOT FIRING 0 to 4000 ft.	MIN. NEG. PRESSURE WITH FLUE FIRING 0 to 4000 ft.	MIN. NEG. PRESSURE COIL COVER NOT FIRING 0 to 4000 ft.	MIN. NEG. PRESSURE COIL COVER FIRING 0 to 4000 ft.	PRESSURE SWITCH TRIP POINTS AND USAGE						
					0 to 4000 ft.			4001 to 7000 ft.		7001 to 10000 ft.	
					TRIP POINT COIL COVER PRESSURE SWITCH	TRIP POINT PRESSURE SWITCH	PRESSURE SWITCH	TRIP POINT PRESSURE SWITCH	HIGH ALTITUDE KIT	TRIP POINT PRESSURE SWITCH	HIGH ALTITUDE KIT
GDC045X__B	-1.45	-1.35	-0.15	-0.25	-0.10	-1.25	11111905	-1.05	HAPS23 11111902	-0.90	HAPS22 11111907
GDC070X__B	-1.25	-1.15	-0.15	-0.25	-0.10	-1.05	11111902	-0.90	HAPS22 11111907	-0.75	HAPS21 11111906
GDC090X__B	-1.40	-1.30	-0.15	-0.25	-0.10	-1.20	11111903	-1.05	HAPS23 11111902	-0.90	HAPS22 11111907
GDC115X__B	-1.25	-1.15	-0.15	-0.25	-0.10	-1.05	11111902	-0.90	HAPS22 11111907	-0.75	HAPS21 11111906

Note: Replacement pressure switch number listed below high altitude kit number.

GDC Furnace High Altitude Applications: The Induced Draft Blower Pressure Switch requires changing while the Coil Cover Pressure Switch does not.

With Power ON:

WARNING

LINE VOLTAGE NOW PRESENT.

4. Energize furnace for heating cycle. The combustion relay should be energized and the induced draft blower motor will begin to run. The inclined manometer should read approximately negative 1.25" to 2.0" w.c. with no combustion. The inclined manometer used on the recouperator coil cover pressure switch on the GDC model furnace should read approximately negative 0.15" w.c. with no combustion. Refer to the charts on pages 88, 89 and 90 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 all 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. On the GDC model furnace, a blocked drain test will also need to be performed until the coil cover pressure control trips - cycling OFF the burner. The trip points should be as shown on pages 88, 89 and 90.
8. If not as listed, replace control.

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 and, or too many effective feet of vent pipe. Also there is a second pressure control on the GDC model furnaces that prevents the combustion cycle from occurring if there is a restricted or blocked recoup coil or drain.

The pressure readings listed in the Pressure Switch Usage and Trip Point table must be adhered to for proper operation.

S-19 HIGH ALTITUDE APPLICATION (USA)

For those altitudes starting at 3500 feet and above, it may be necessary to replace either the pressure switch or orifices. In some instances both must be changed.

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.

High altitude pressure switches and kits are listed on pages 88, 89 and 90 in the Pressure Switch Usage and Trip Point Chart.

Note: Applications above 4500 feet are not approved for the *GUC090X35BI* furnace.

WARNING

PROPANE CONVERSION AND HIGH ALTITUDE KITS CAN NOT BE USED WITH THE GUD-B MODEL FURNACE. TO DO SO WILL RESULT IN UNSATISFACTORY FURNACE OPERATION, AND THE POSSIBILITY OF PROPERTY DAMAGE, PERSONAL INJURY OR FIRE.

GUC, GUD GUX, GCC	0 to 3500 ft.	Nat. #43	Original Equipment Factory Installed (uses C6437603 orifices)
GU(C,D,X)___X__B GCD___X__B GDC___X__B	0 to 4000 ft.	Nat. #43	Original Equipment Factory Installed (uses 10716003 orifices)
GUC, GUD GUX, GCC	3500 to 6000 ft.	Nat. #44	HANG01 or NG01A High Altitude Orifice Kit (uses C6437604 orifices)
GU(C,D,X)___X__B GCD___X__B GDC___X__B	4000 to 7000 FT.	Nat. #44	HANG09 High Altitude Orifice Kit (uses 10716004 orifices)
GUC, GUD GUX, GCC	6000 to 7500 ft.	Nat. #45	HANG02 or NG02A High Altitude Orifice Kit (uses C6437605 orifices)
GU(C,D,X)___X__B GCD___X__B GDC___X__B	7000 to 10000 ft.	Nat. #45	HANG10 High Altitude Orifice Kit (uses 10716005 orifices)
GUC, GUD GUX, GCC	7500 to 8500 ft.	Nat. #46	HANG03 or NG03A High Altitude Orifice Kit (uses C6437606 orifices)
GUC, GUD GUX, GCC	8500 to 10000 ft.	Nat. #47	HANG04 or NG04A High Altitude Orifice Kit (uses C6437607 orifices)
GUC, GUD GUX, GCC	10000 to 11500 ft.	Nat. #48	HANG05 or NG05A High Altitude Orifice Kit (uses C6437608 orifices)
GUC, GUD GUX, GCC	0 to 4500 ft.	Propane #54	LPTK05 Propane Conversion Kit (uses C6437602 or 10716002 orifices)
GU(C,D,X)___X__B GCD___X__B GDC___X__B	0 to 4500 ft.	Propane #55	LPTK07 or 07A or 09 Propane Conversion Kit (uses 10716009 orifices)
GUC090X3BI	0 to 4500 ft.	Propane #55	LPTK08 Propane Conversion Kit (uses 10716009 orifices)
GUC, GUD GUX, GCC	4500 to 7500 ft.	Propane #55	HALP01 or 03 or LP01A Propane Conversion Kit (uses C6437609 orifices)
GU(C,D,X)___X__B GCD___X__B GDC___X__B	4500 to 9500 ft.	Propane #55	HALP08 Propane Conversion Kit (uses C6437609 orifices)
GUC, GUD GUX, GCC	7500 to 11500 ft.	Propane #56	HALP02 or 04 or LP02A Propane Conversion Kit (uses C6437610 orifices)

S-20 CHECKING HOT SURFACE IGNITOR

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

Disconnect Electrical Power Supply:

1. Ignitor cool - approximately 70 - 75°F.
2. Disconnect the ignitor from the Ignition Control Module and line voltage terminal board.
3. Using an ohmmeter measure the resistance of the ignitor - should read between 50 to 400 ohms.
4. Reconnect ignitor.

WARNING

LINE VOLTAGE NOW PRESENT.

5. Place unit in heating cycle, measure current draw of ignitor during preheat cycle. Should read approximately 4 to 5 amps.

S-21 CHECKING WR50E47 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 ground or neutral lines may cause the control to lockout due to failure to flame sense.

WARNING

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 an is not field repairable. Complete unit must be replaced.

WARNING

Disconnect Electrical Power Supply:

1. Disconnect wires from TR and TH. Using an ohmmeter, should measure approximately 12 ohms. If no reading, replace module.

Additional testing must be completed within a given time element due to retry and lockout nature of control.

With Power ON:

WARNING

LINE VOLTAGE NOW PRESENT.

Furnace thermostat calling for heat (45 second preheat time).

1. Check for 120 volts from L1 terminal of control module to neutral. No voltage - check wire connections, continuity, etc.
2. Voltage Present - check for 120 volts from IGN. Terminal of control module to neutral. No voltage - replace Ignition Control Module.
3. After 45 seconds preheat time, check for 24 volts at terminals MV to MV of control module (7 seconds only) no voltage - bad ignition control module, replace.
4. If above tests are not completed within the prescribed time limit, the control will retry two more times. However, you will have a 60 second delay before the next try and your preheat time will be increased to 55 seconds. After the second retry, if no ignition, the control will go into lockout. To reset, must de-energize control for approximately five (5) seconds.

S-21A CHECKING WR50A50, 50A55 or 50A60 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.

WARNING

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 integrated 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.

WARNING

LINE VOLTAGE NOW PRESENT.

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

The ignition control is capable of diagnosing many furnace failures to speed troubleshooting. A flashing red 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 "Sequence of Operation" section for more detail on failure codes.

To view the indicator light upon initial inspection of the furnace the blower door switch must be held closed while removing the blower compartment door. The indicator light may then be viewed by looking through the peep hole in the control compartment cover. 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. 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 (R0-22) 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. 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.

S-22 CHECKING FLAME SENSOR-FLAME RECTIFICATION - IGNITION CONTROL MODULE

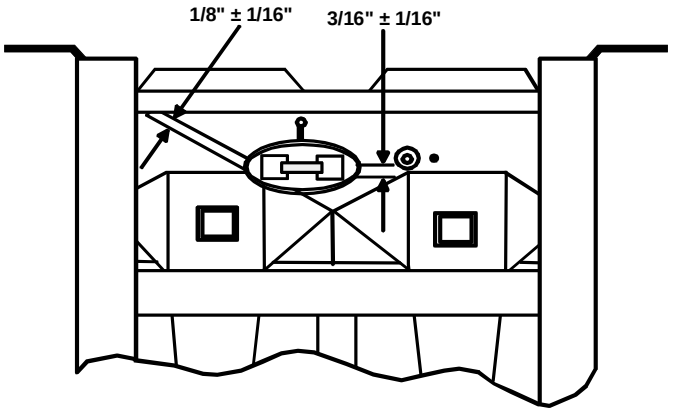
A flame sensing device is used in conjunction with the ignition control module to prove combustion. If a micro-amp signal is not present the control will deenergize the gas valve and "retry" for ignition or lockout.

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

WARNING

Disconnect Electrical Power Supply:

1. Disconnect the flame sensor wire from terminal FP of the ignition control module.
2. Connect a micro-amp meter in series with this wire and terminal FP.



3. Be sure the negative side of the meter is to the wire and the positive of the meter is to terminal FP.

With Power ON:

WARNING

LINE VOLTAGE NOW PRESENT.

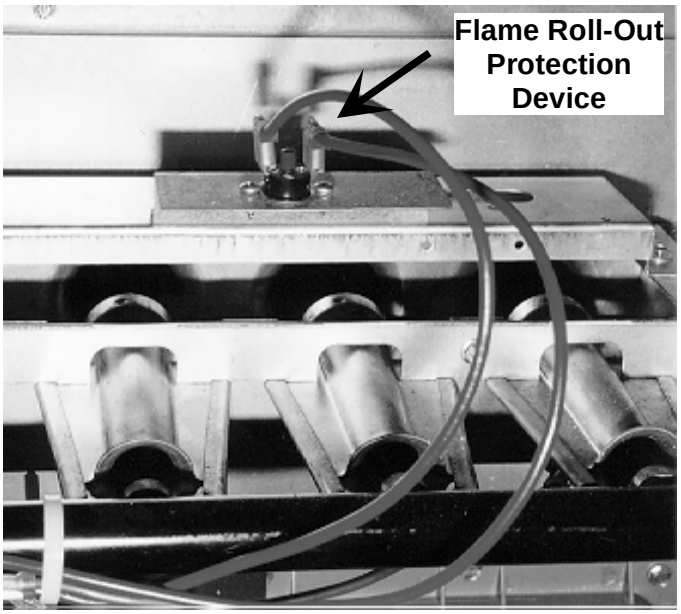
4. Place the unit into a heating cycle.
5. As soon as flame is established a micro-amp reading should be evident once proof of flame (micro-amp reading) is established, the hot surface ignitor will be de-energized.
6. The micro-amp reading will vary with the vintage of the control being used. *Early production White-Rodgers 50E47 controls Amana Part # C6411101 prior to 8731 date code on the control will have 1.5 to 6 micro-amps. From 8731 date code on, the control will have 10 to 14 micro-amps. The White-Rodgers 50E47 control Amana Part # C6411102 with the red diagnostic indicator light and the White-Rodgers 50A50, 50A55 or 50A60 Amana Part # 102077** integrated 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, the distance between the sensor and flame ground connections 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 steel wool.

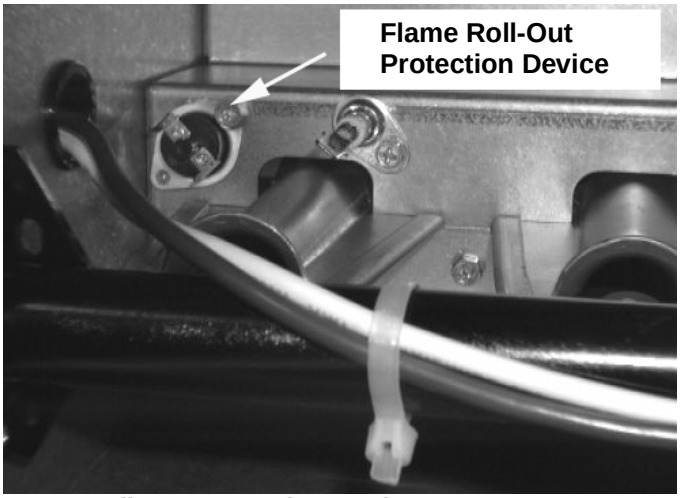
SERVICING

S-23 CHECKING FLAME ROLLOUT SWITCH

The protection device is located on the manifold assembly on GUC, GCC, GDC and GUX models (Refer to the following figure Roll-Out Protection Device - All Except GUD & GCD) and on the burner bracket on GUD and GCD models (Refer to the following figure Roll-Out Protection Device - GUD & GCD).



Roll-Out Protection Device - All Except GUD & GCD



Roll-Out Protection Device - GUD & GCD

This control is wired is series with the gas valve. 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.

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

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

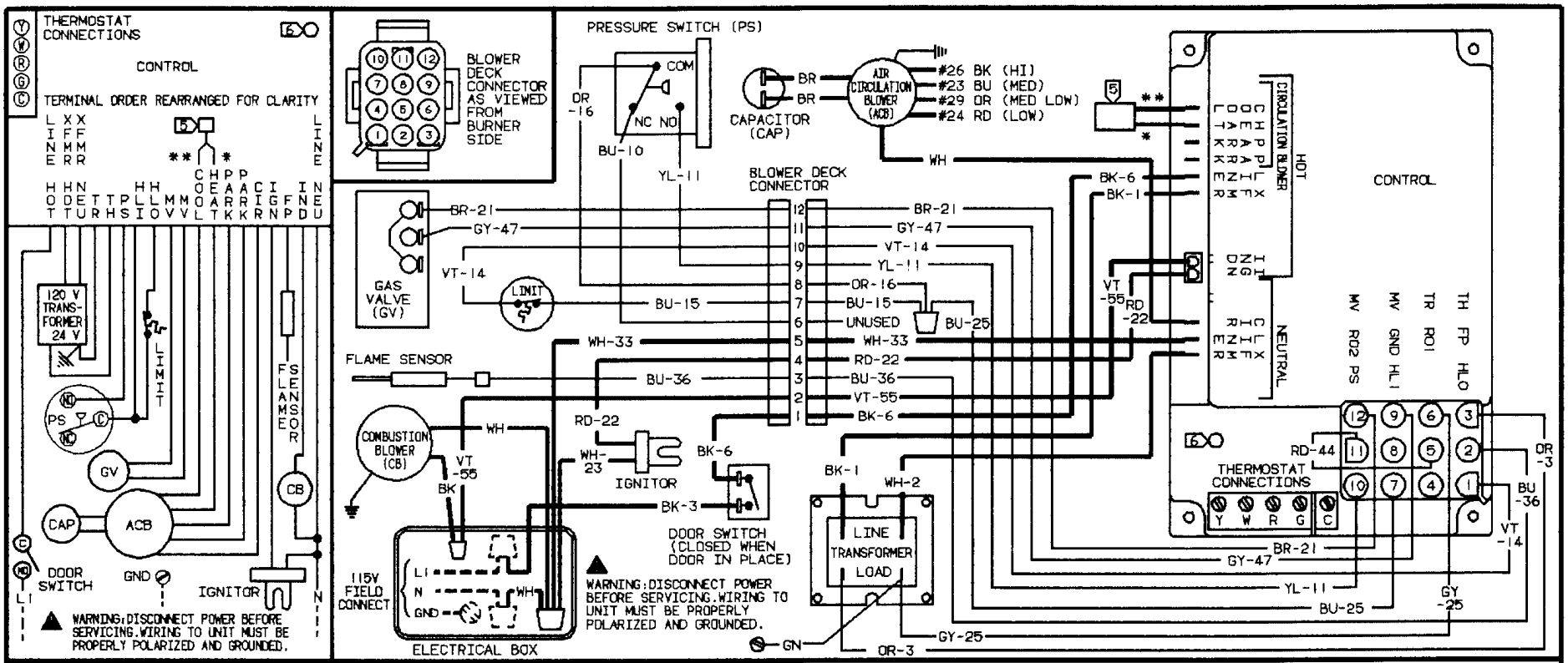
The servicer should reset the ignition control by opening and closing the thermostat circuit. Then look for the ignitor glowing which indicates there is power to the ignition control. Measure the voltage between each side of the rollout control and ground during the seven (7) second ignition attempt.

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 at fault.

ROLLOUT LIMT SWITCHES					
Part Number	10123503 or 10123522	10123504 or 10123531	10123509 or 10123528	10123512 or 10123531	10123513 or 10123532
Open Setting (°F)	350	325	275	325	350
Color Code (s)	White	Red / Light Purple	Pink	Light Purple	Gray
GU(C,X)045,070,090,115	1				
GCC045,070,090,115		1			
GUD045,070,090,115			1		
GCD070,090			1		
GDC045				1	
GDC070,090,115					1



FACTORY WIRED BLOWER MOTOR TO CONTROL CONNECTIONS

FURNACE MODEL	* HEATING BLOWER SPEED			** COOLING BLOWER SPEED
	SPEED	MOTOR TO "HEAT"	MOTOR SPEEDS	
GUD: 045B30A	LOW	RD-24	3	SEE INSTALLATION INSTRUCTIONS TO DETERMINE PROPER COOLING BLOWER SPEED.
GUD: 070B40A	MED LOW	OR-29	4	
GUD: 090B35A,090B50A	MED	BL-23	4	
GUD: 070B30A,115B50A	HI	BK-26	4	

COLOR CODE
YL YELLOW
OR ORANGE
VT VIOLET
GN GREEN
BK BLACK
BR BROWN
WH WHITE
BU BLUE
GY GRAY
RD RED

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 105°C. 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.
6. DIAGNOSTIC LIGHT:STEADY=REPLACE CONTROL;1 FLASH=LOCKOUT;2 FLASHES=PS STUCK CLOSED; 3 FLASHES=PS STUCK OPEN;4 FLASHES=OPEN HIGH LIMIT SWITCH;5 FLASHES=RED WIRE ON CONTROL CONNECTOR OPEN

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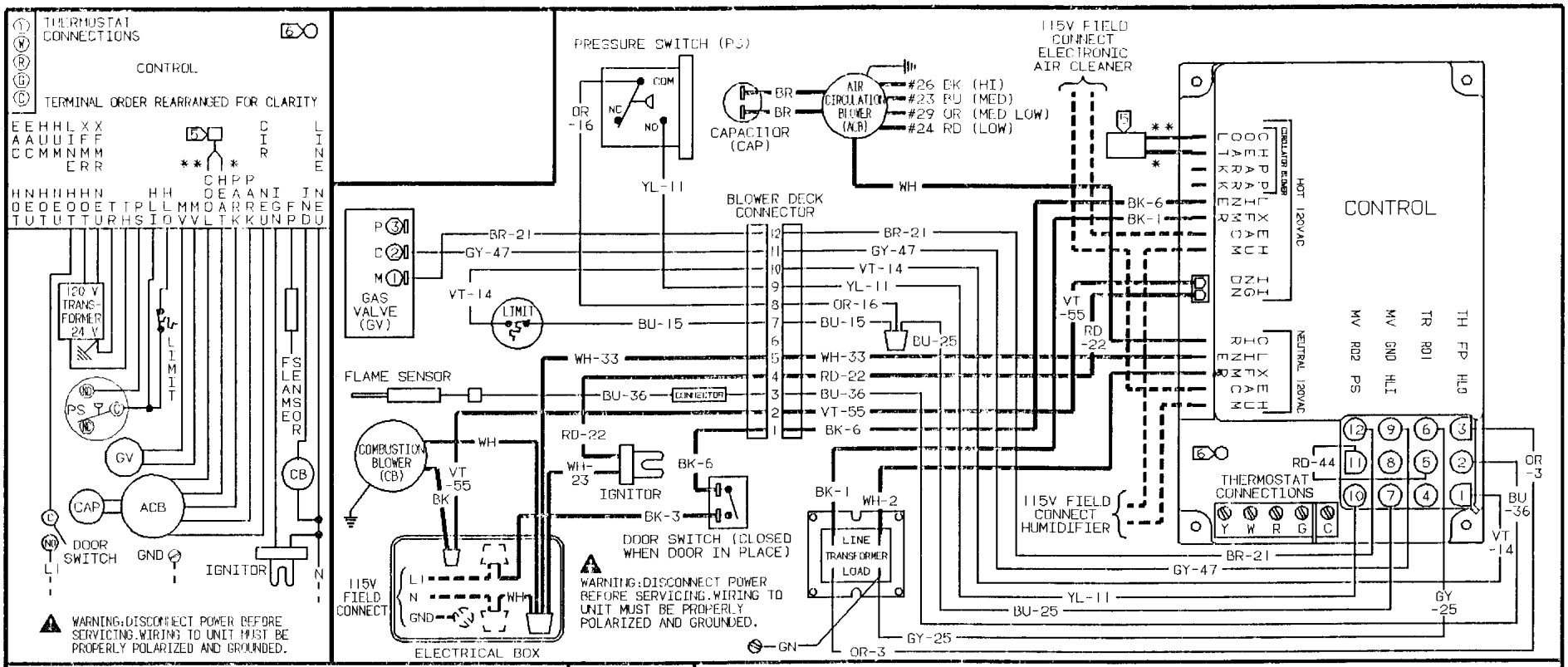
WARNING TO AVOID POSSIBLE ELECTRICAL SHOCK, PERSONAL INJURY, OR DEATH, DISCONNECT THE POWER BEFORE SERVICING.

WIRING DIAGRAMS



FACTORY WIRED BLOWER MOTOR TO CONTROL CONNECTIONS

FURNACE MODEL	* HEATING BLOWER SPEED: SPEED	MOTOR TO "HEAT"	MOTOR SPEEDS	** COOLING BLOWER SPEED
GUD: 045C30A,045X30A	LOW	RD-24	3	SEE INSTALLATION INSTRUCTIONS TO DETERMINE PROPER COOLING BLOWER SPEED.
GUD: 070C40A,070X40A	MED LOW	OR-29	4	
GUD: 090C35A,090C50A 090X35A,090X50A	MED	BU-23	4	
GUD: 070C30A,115C50A 070X30A,115X50A	HI	BK-26	4	

COLOR CODE
YL YELLOW
OR ORANGE
VT VIOLET
GN GREEN
BK BLACK
BR BROWN
WH WHITE
BU BLUE
GY GRAY
RD RED

LOW VOLTAGE
LOW VOLTAGE FIELD
HI VOLTAGE
HI VOLTAGE FIELD

IMPORTANT:

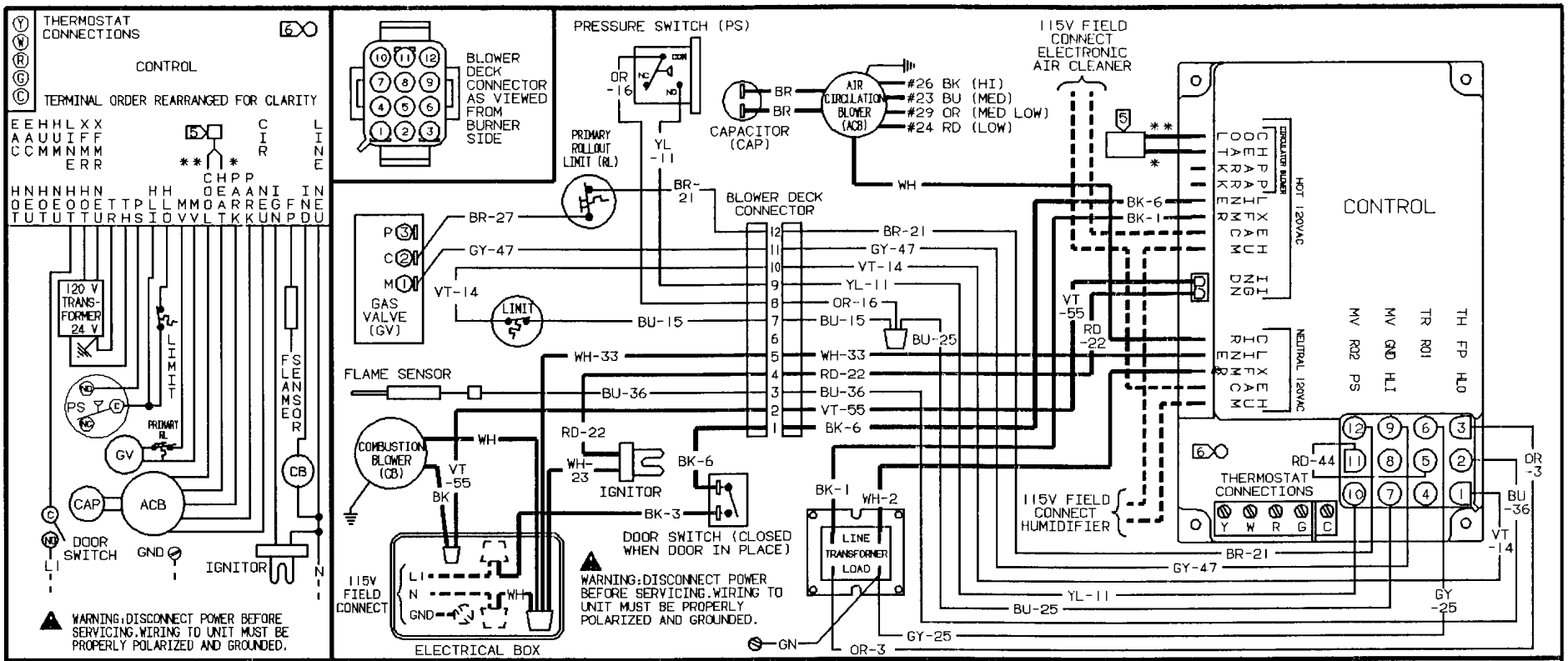
READ BEFORE OPERATING OR SERVICING THIS UNIT.

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 105°C. 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.
6. DIAGNOSTIC LIGHT:STEADY=REPLACE CONTROL;1 FLASH=LOCKOUT;2 FLASHES=PS STUCK CLOSED; 3 FLASHES=PS STUCK OPEN;4 FLASHES=OPEN HIGH LIMIT SWITCH;5 FLASHES=RED WIRE ON CONTROL CONNECTOR OPEN

10623901 REV. 0

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

WIRING DIAGRAMS



FACTORY WIRED BLOWER MOTOR TO CONTROL CONNECTIONS

FURNACE MODEL	* HEATING BLOWER SPEED			** COOLING BLOWER SPEED
	SPEED	MOTOR TO "HEAT"	MOTOR SPEEDS	
GUX: 045B30A,045X30A GUC: 045C30C,045X30A	LOW	RD-24	3	SEE INSTALLATION INSTRUCTIONS TO DETERMINE PROPER COOLING BLOWER SPEED.
GUC: 070C40C,070X40A	MED LOW	OR-29	4	
GUX: 070B40A,090B50A 070X40A,090X50A GUC: 090C35C,090C50C 090X35A,090X50A	MED	BU-23	4	
GUX: 070B30A,115B50A, 090B35A,070X30A 090X35A,115X50A GUC: 070C30C,115C50C 070X30A,115X50A	HI	BK-26	4	

COLOR CODE	
YL	YELLOW
OR	ORANGE
VT	VIOLET
GN	GREEN
BK	BLACK
BR	BROWN
WH	WHITE
BU	BLUE
GY	GRAY
RD	RED

LOW VOLTAGE ——
LOW VOLTAGE FIELD - - - -
HI VOLTAGE ——
HI VOLTAGE FIELD - - - -

IMPORTANT:

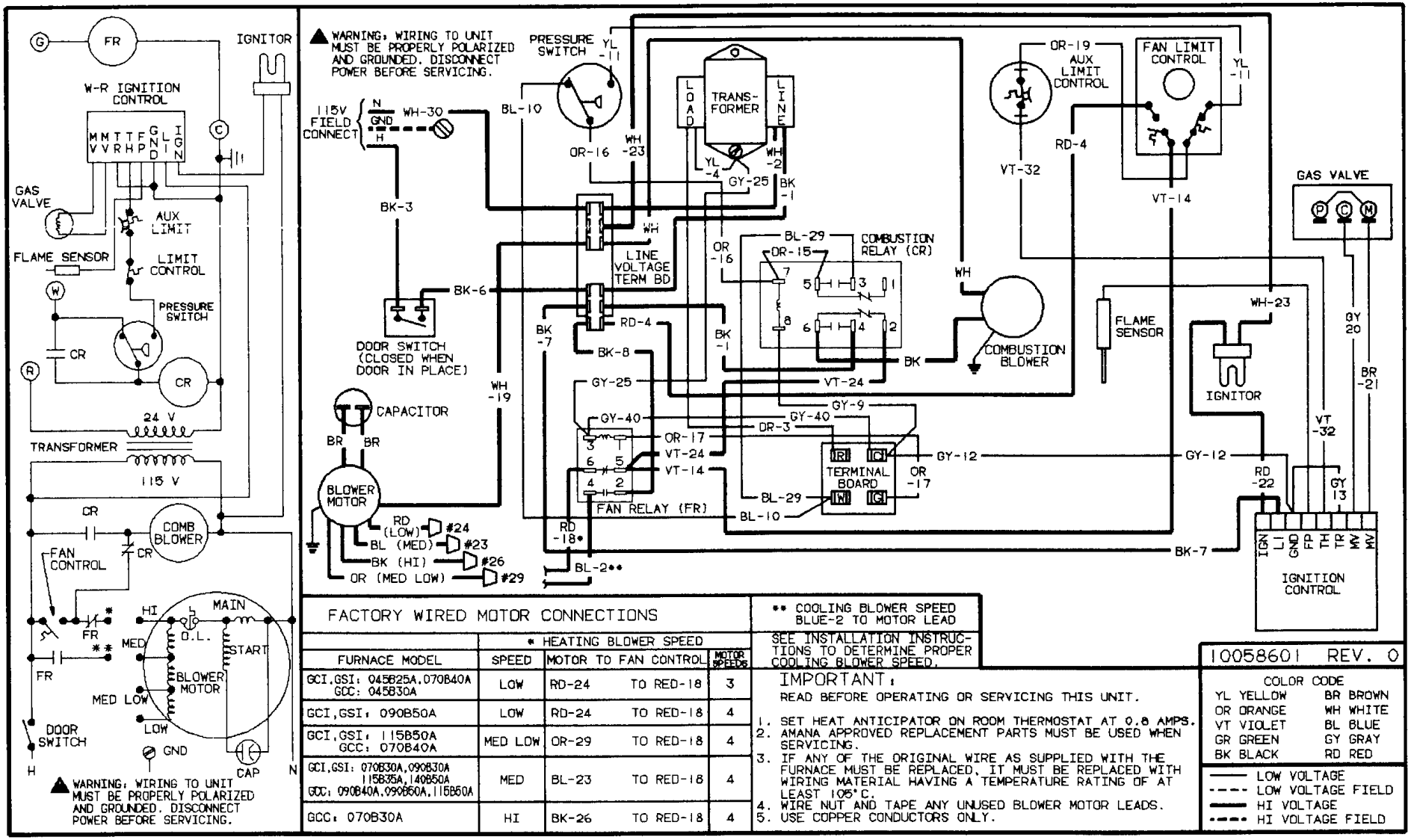
READ BEFORE OPERATING OR SERVICING THIS UNIT.

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 105°C. 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.
6. DIAGNOSTIC LIGHT:STEADY=REPLACE CONTROL;1 FLASH=LOCKOUT;2 FLASHES=PS STUCK CLOSED; 3 FLASHES=PS STUCK OPEN;4 FLASHES=OPEN HIGH LIMIT SWITCH;5 FLASHES=RED WIRE ON CONTROL CONNECTOR OPEN

10623801 REV. 0

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

WIRING DIAGRAMS



FACTORY WIRED MOTOR CONNECTIONS

FURNACE MODEL	* HEATING BLOWER SPEED: SPEED	MOTOR TO FAN CONTROL		MOTOR SPEEDS
GCI,GSI: 045B25A,070B40A GCC: 045B30A	LOW	RD-24	TO RED-18	3
GCI,GSI: 090B50A	LOW	RD-24	TO RED-18	4
GCI,GSI: 115B50A GCC: 070B40A	MED LOW	OR-29	TO RED-18	4
GCI,GSI: 070B30A,090B30A 115B35A,140B50A GCC: 090B40A,090B60A,115B50A	MED	BL-23	TO RED-18	4
GCC: 070B30A	HI	BK-26	TO RED-18	4

** COOLING BLOWER SPEED BLUE-2 TO MOTOR LEAD

SEE INSTALLATION INSTRUCTIONS TO DETERMINE PROPER COOLING BLOWER SPEED.

10058601 REV. 0

IMPORTANT:

READ BEFORE OPERATING OR SERVICING THIS UNIT.

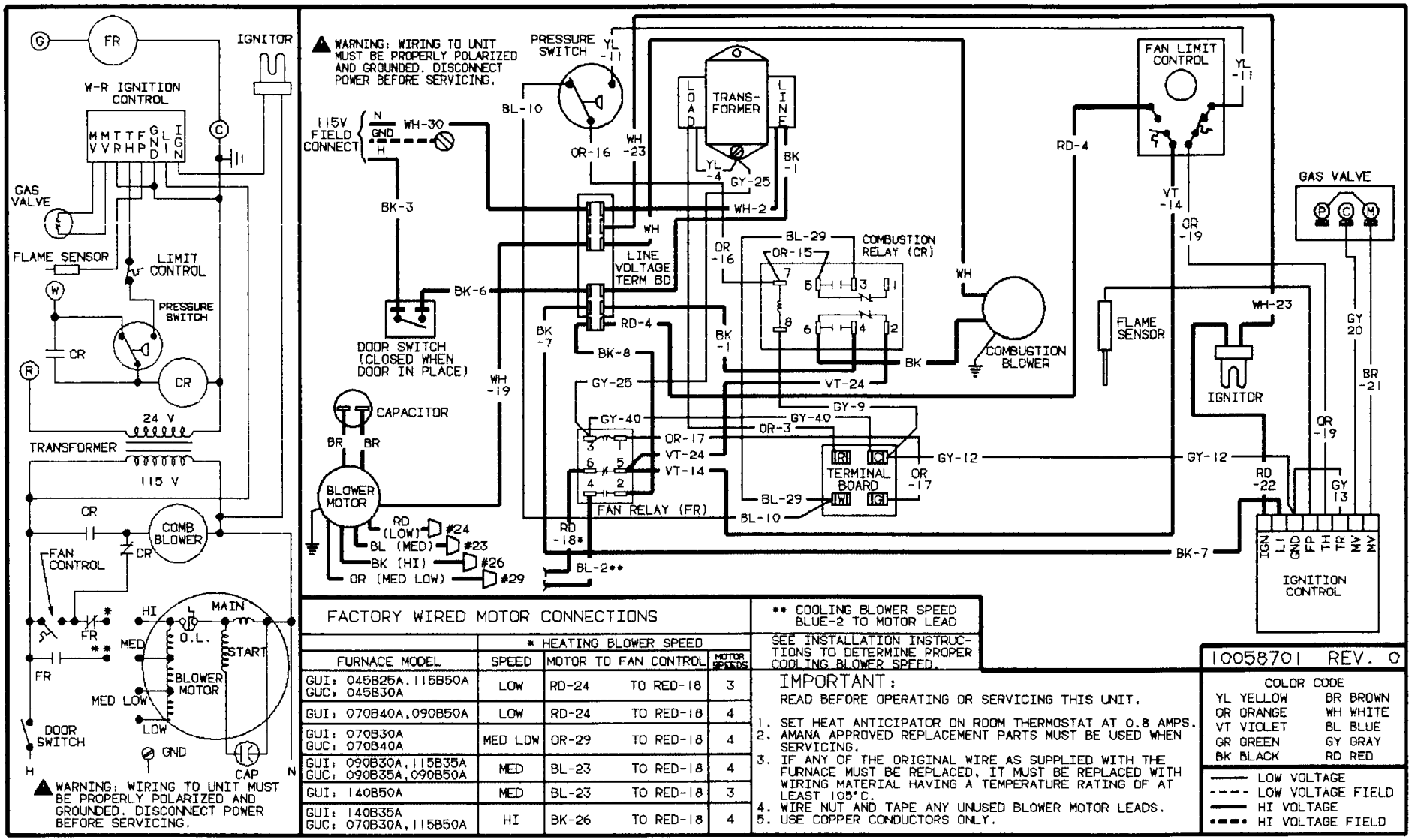
1. SET HEAT ANTICIPATOR ON ROOM THERMOSTAT AT 0.8 AMPS.
2. AMANA APPROVED REPLACEMENT PARTS MUST BE USED WHEN SERVICING.
3. IF ANY OF THE ORIGINAL WIRE AS SUPPLIED WITH THE FURNACE MUST BE REPLACED, IT MUST BE REPLACED WITH WIRING MATERIAL HAVING A TEMPERATURE RATING OF AT LEAST 105°C.
4. WIRE NUT AND TAPE ANY UNUSED BLOWER MOTOR LEADS.
5. USE COPPER CONDUCTORS ONLY.

COLOR CODE

YL YELLOW	BR BROWN
OR ORANGE	WH WHITE
VT VIOLET	BL BLUE
GR GREEN	GY GRAY
BK BLACK	RD RED

LOW VOLTAGE
LOW VOLTAGE FIELD
HI VOLTAGE
HI VOLTAGE FIELD

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



FACTORY WIRED MOTOR CONNECTIONS

FURNACE MODEL	* HEATING BLOWER SPEED: SPEED	MOTOR TO FAN CONTROL		MOTOR SPEEDS
GUI: 045B25A, 115B50A GUC: 045B30A	LOW	RD-24	TO RED-18	3
GUI: 070B40A, 090B50A	LOW	RD-24	TO RED-18	4
GUI: 070B30A GUC: 070B40A	MED LOW	OR-29	TO RED-18	4
GUI: 090B30A, 115B35A GUC: 090B35A, 090B50A	MED	BL-23	TO RED-18	4
GUI: 140B50A	MED	BL-23	TO RED-18	3
GUI: 140B35A GUC: 070B30A, 115B50A	HI	BK-26	TO RED-18	4

** COOLING BLOWER SPEED BLUE-2 TO MOTOR LEAD

SEE INSTALLATION INSTRUCTIONS TO DETERMINE PROPER COOLING BLOWER SPEED.

10058701 REV. 0

IMPORTANT:

READ BEFORE OPERATING OR SERVICING THIS UNIT.

1. SET HEAT ANTICIPATOR ON ROOM THERMOSTAT AT 0.8 AMPS.
2. AMANA APPROVED 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 105°C.
4. WIRE NUT AND TAPE ANY UNUSED BLOWER MOTOR LEADS.
5. USE COPPER CONDUCTORS ONLY.

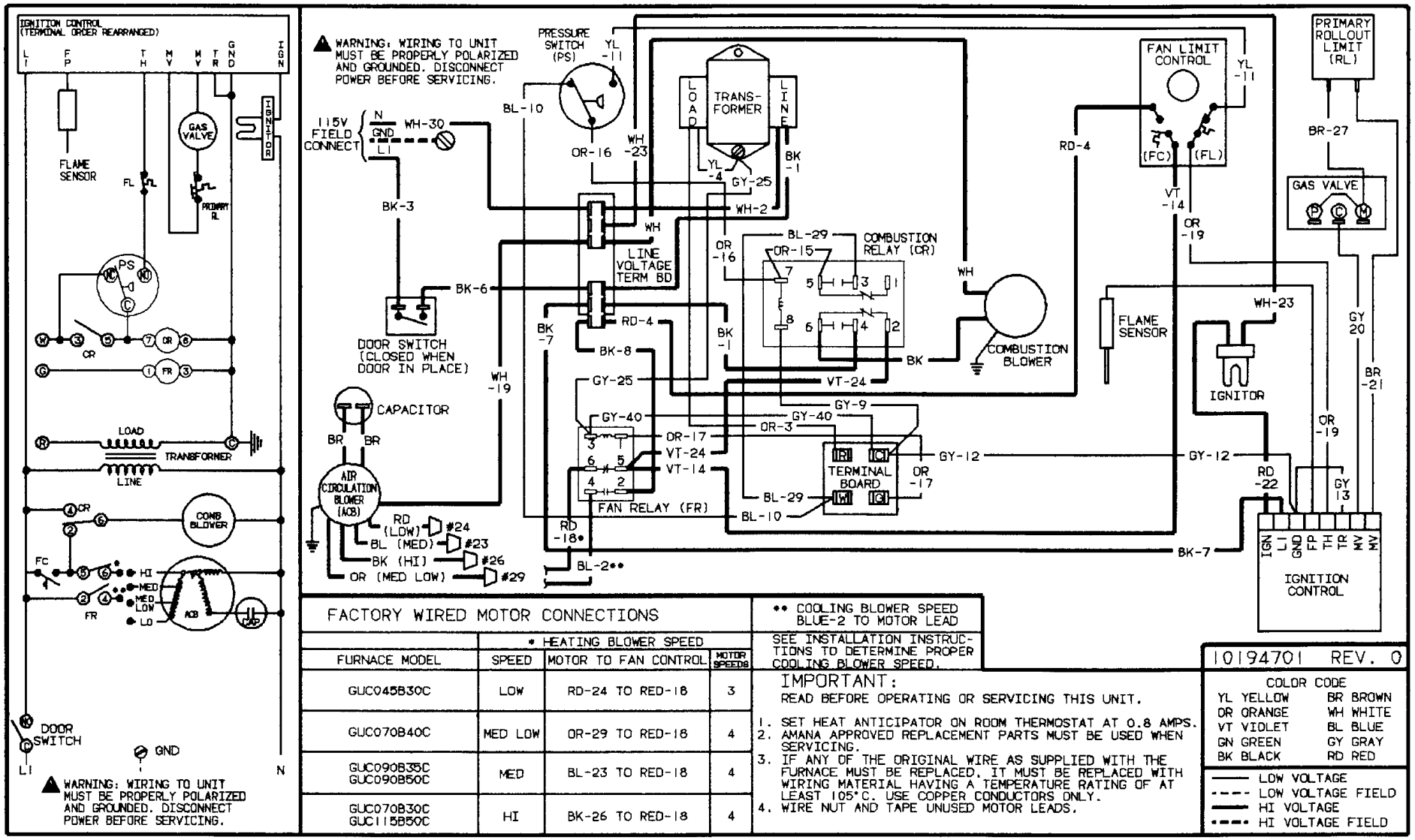
COLOR CODE

YL YELLOW	BR BROWN
OR ORANGE	WH WHITE
VT VIOLET	BL BLUE
GR GREEN	GY GRAY
BK BLACK	RD RED

LOW VOLTAGE
LOW VOLTAGE FIELD
HI VOLTAGE
HI VOLTAGE FIELD

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

WIRING DIAGRAMS



FACTORY WIRED MOTOR CONNECTIONS

FURNACE MODEL	* HEATING BLOWER SPEED: SPEED	MOTOR TO FAN CONTROL	MOTOR SPEEDS
GUC045B30C	LOW	RD-24 TO RED-18	3
GUC070B40C	MED LOW	OR-29 TO RED-18	4
GUC090B35C GUC090B50C	MED	BL-23 TO RED-18	4
GUC070B30C GUC115B50C	HI	BK-26 TO RED-18	4

** COOLING BLOWER SPEED BLUE-2 TO MOTOR LEAD

SEE INSTALLATION INSTRUCTIONS TO DETERMINE PROPER COOLING BLOWER SPEED.

IMPORTANT:
READ BEFORE OPERATING OR SERVICING THIS UNIT.

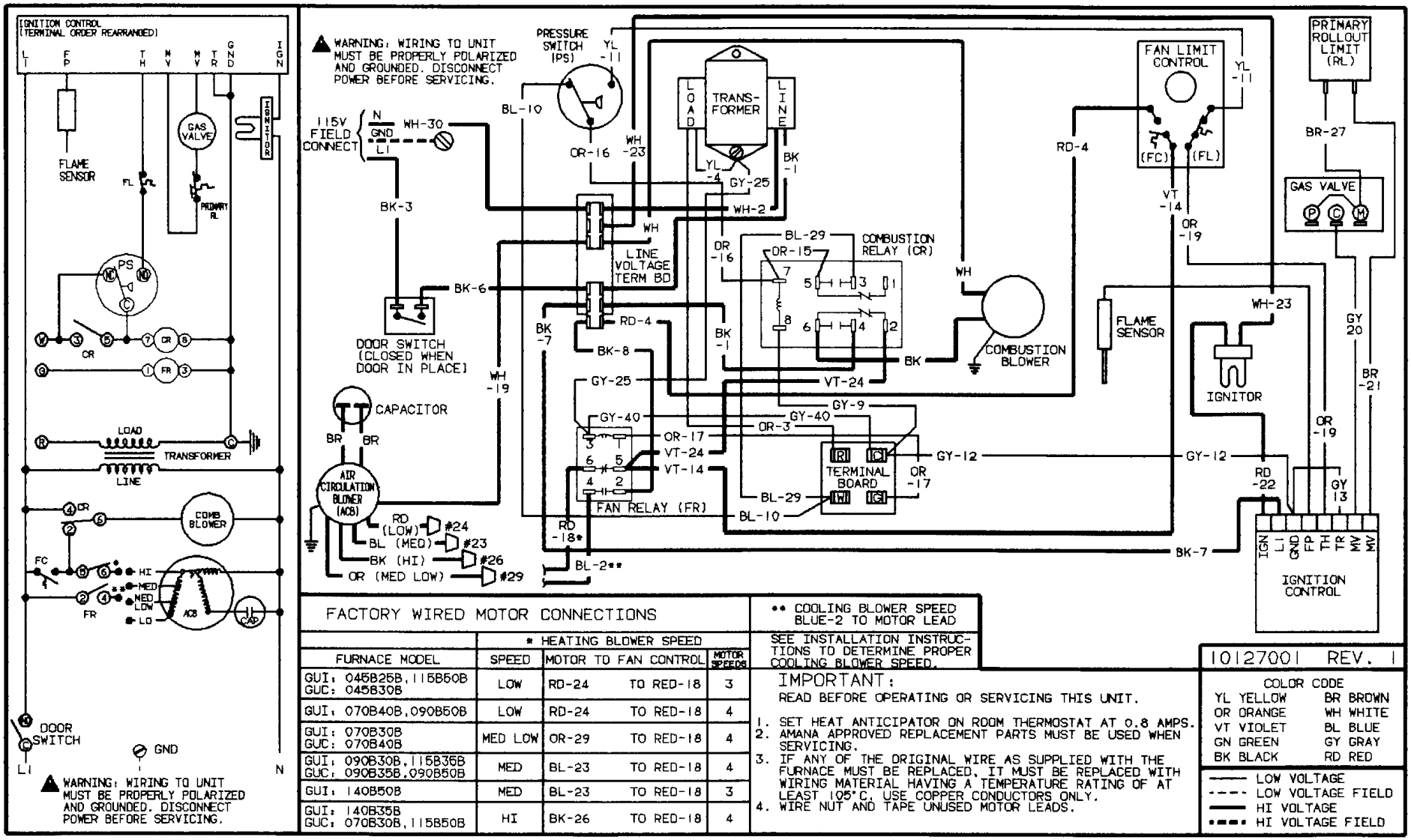
1. SET HEAT ANTICIPATOR ON ROOM THERMOSTAT AT 0.8 AMPS.
2. AMANA APPROVED REPLACEMENT PARTS MUST BE USED WHEN SERVICING.
3. IF ANY OF THE ORIGINAL WIRE AS SUPPLIED WITH THE FURNACE MUST BE REPLACED, IT MUST BE REPLACED WITH WIRING MATERIAL HAVING A TEMPERATURE RATING OF AT LEAST 105°C. USE COPPER CONDUCTORS ONLY.
4. WIRE NUT AND TAPE UNUSED MOTOR LEADS.

10194701 REV. 0

COLOR CODE	
YL YELLOW	BR BROWN
OR ORANGE	WH WHITE
VT VIOLET	BL BLUE
GN GREEN	GY GRAY
BK BLACK	RD RED

LOW VOLTAGE
LOW VOLTAGE FIELD
HI VOLTAGE
HI VOLTAGE FIELD

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



FACTORY WIRED MOTOR CONNECTIONS

FURNACE MODEL	* HEATING BLOWER SPEED: SPEED	MOTOR TO FAN CONTROL		MOTOR SPEEDS
GUI: 045B26B, 115B60B GUC: 045B30B	LOW	RD-24	TO RED-18	3
GUI: 070B40B, 090B60B	LOW	RD-24	TO RED-18	4
GUI: 070B30B GUC: 070B40B	MED LOW	OR-29	TO RED-18	4
GUI: 090B30B, 115B36B GUC: 090B35B, 090B60B	MED	BL-23	TO RED-18	4
GUI: 140B60B	MED	BL-23	TO RED-18	3
GUI: 140B35B GUC: 070B30B, 115B60B	HI	BK-26	TO RED-18	4

** COOLING BLOWER SPEED BLUE-2 TO MOTOR LEAD

SEE INSTALLATION INSTRUCTIONS TO DETERMINE PROPER COOLING BLOWER SPEED.

IMPORTANT:

READ BEFORE OPERATING OR SERVICING THIS UNIT.

1. SET HEAT ANTICIPATOR ON ROOM THERMOSTAT AT 0.8 AMPS.
2. AMANA APPROVED 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 105°C. USE COPPER CONDUCTORS ONLY.
4. WIRE NUT AND TAPE UNUSED MOTOR LEADS.

10127001 REV. 1

COLOR CODE

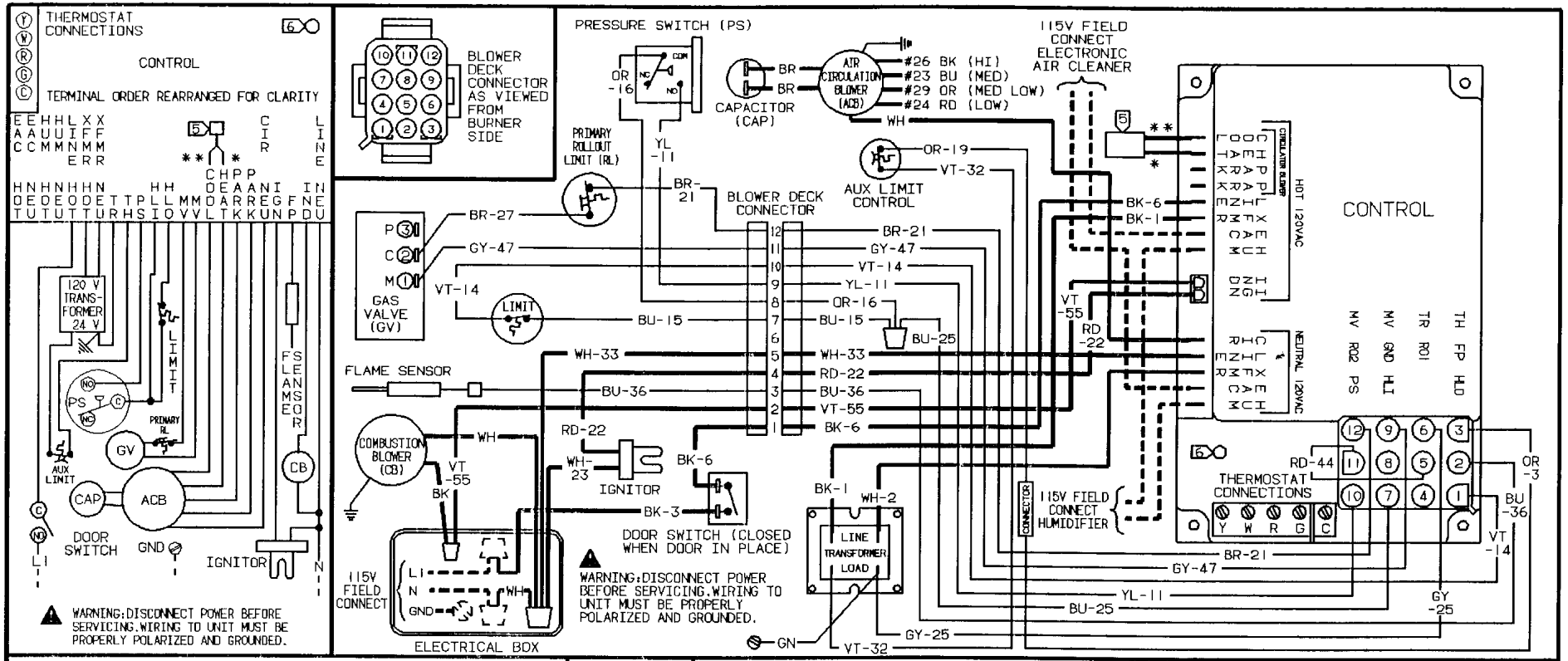
YL YELLOW	BR BROWN
OR ORANGE	WH WHITE
VT VIOLET	BL BLUE
GN GREEN	GY GRAY
BK BLACK	RD RED

LOW VOLTAGE
LOW VOLTAGE FIELD
HI VOLTAGE
HI VOLTAGE FIELD

WIRING DIAGRAMS

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

WIRING DIAGRAMS



FACTORY WIRED BLOWER MOTOR TO CONTROL CONNECTIONS

FURNACE MODEL	* HEATING BLOWER SPEED: SPEED	MOTOR TO "HEAT"	MOTOR SPEEDS	** COOLING BLOWER SPEED
GCC: 045C30C 045X30A	LOW	RD-24	3	SEE INSTALLATION INSTRUCTIONS TO DETERMINE PROPER COOLING BLOWER SPEED.
GCC: 070C40C 070X40A	MED LOW	OR-29	4	
GCC: 090C40C,090C50C, 115C50C,090X40A 090X50A,115X50A	MED	BU-23	4	
GCC: 070C30C 070X30A	HI	BK-26	4	

COLOR CODE
YL YELLOW
OR ORANGE
VT VIOLET
GN GREEN
BK BLACK
BR BROWN
WH WHITE
BU BLUE
GY GRAY
RD RED

LOW VOLTAGE
LOW VOLTAGE FIELD
HI VOLTAGE
HI VOLTAGE FIELD

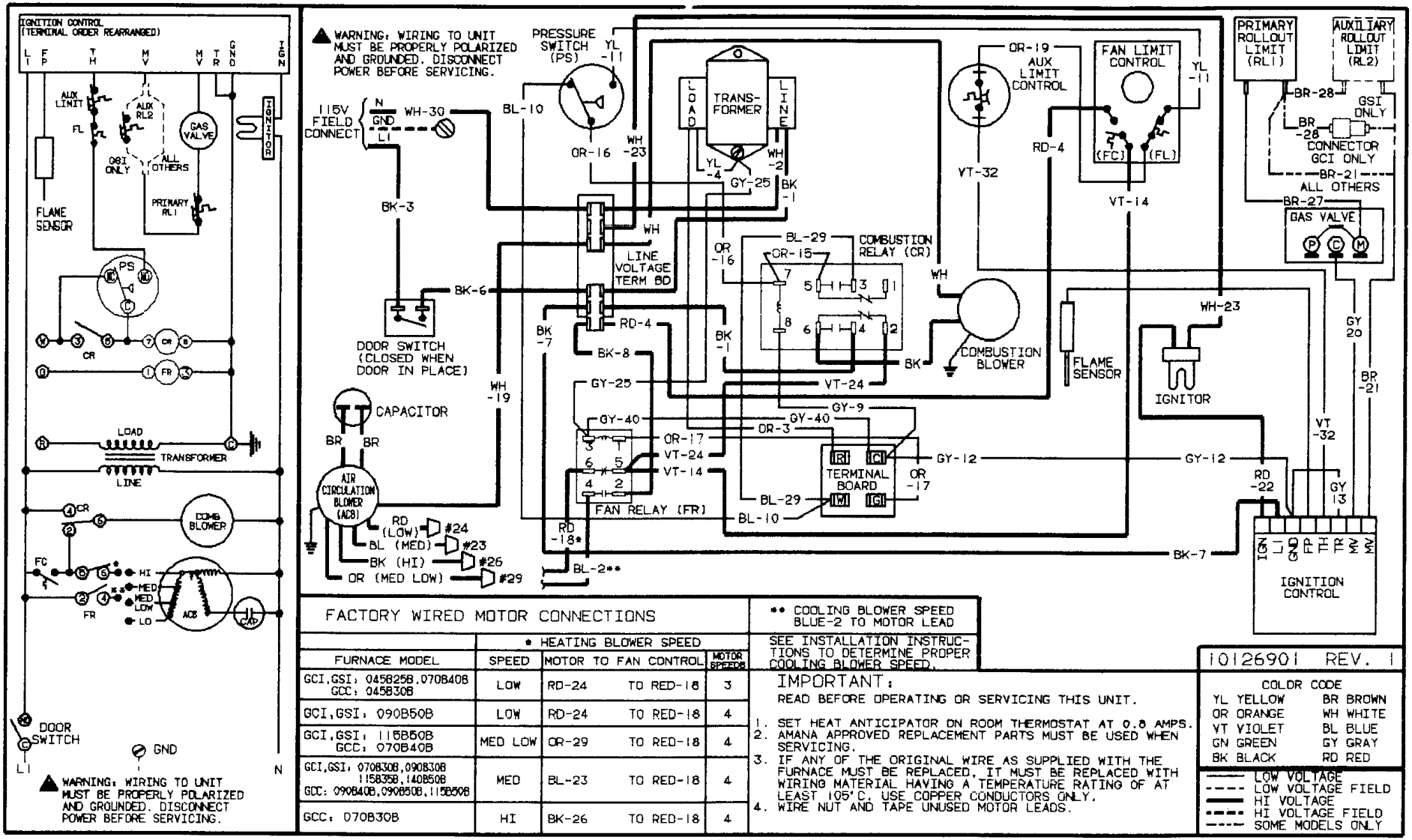
IMPORTANT:

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 105°C. 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.
6. DIAGNOSTIC LIGHT:STEADY=REPLACE CONTROL;1 FLASH=LOCKOUT;2 FLASHES=PS STUCK CLOSED; 3 FLASHES=PS STUCK OPEN;4 FLASHES=OPEN HIGH LIMIT SWITCH;5 FLASHES=RED WIRE ON CONTROL CONNECTOR OPEN

10623701 REV. 0

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



FACTORY WIRED MOTOR CONNECTIONS

FURNACE MODEL	* HEATING BLOWER SPEED: SPEED	MOTOR TO FAN CONTROL		MOTOR SPEED#
GCI,GSI: 045B25B,070B40B GCC: 045B30B	LOW	RD-24	TO RED-18	3
GCI,GSI: 090B50B	LOW	RD-24	TO RED-18	4
GCI,GSI: 115B50B GCC: 070B40B	MED LOW	OR-29	TO RED-18	4
GCI,GSI: 070B30B,090B30B 115B35B,140B50B GCC: 090B40B,090B50B,115B50B	MED	BL-23	TO RED-18	4
GCC: 070B30B	HI	BK-26	TO RED-18	4

** COOLING BLOWER SPEED BLUE-2 TO MOTOR LEAD

SEE INSTALLATION INSTRUCTIONS TO DETERMINE PROPER COOLING BLOWER SPEED.

10126901 REV. 1

IMPORTANT:

READ BEFORE OPERATING OR SERVICING THIS UNIT.

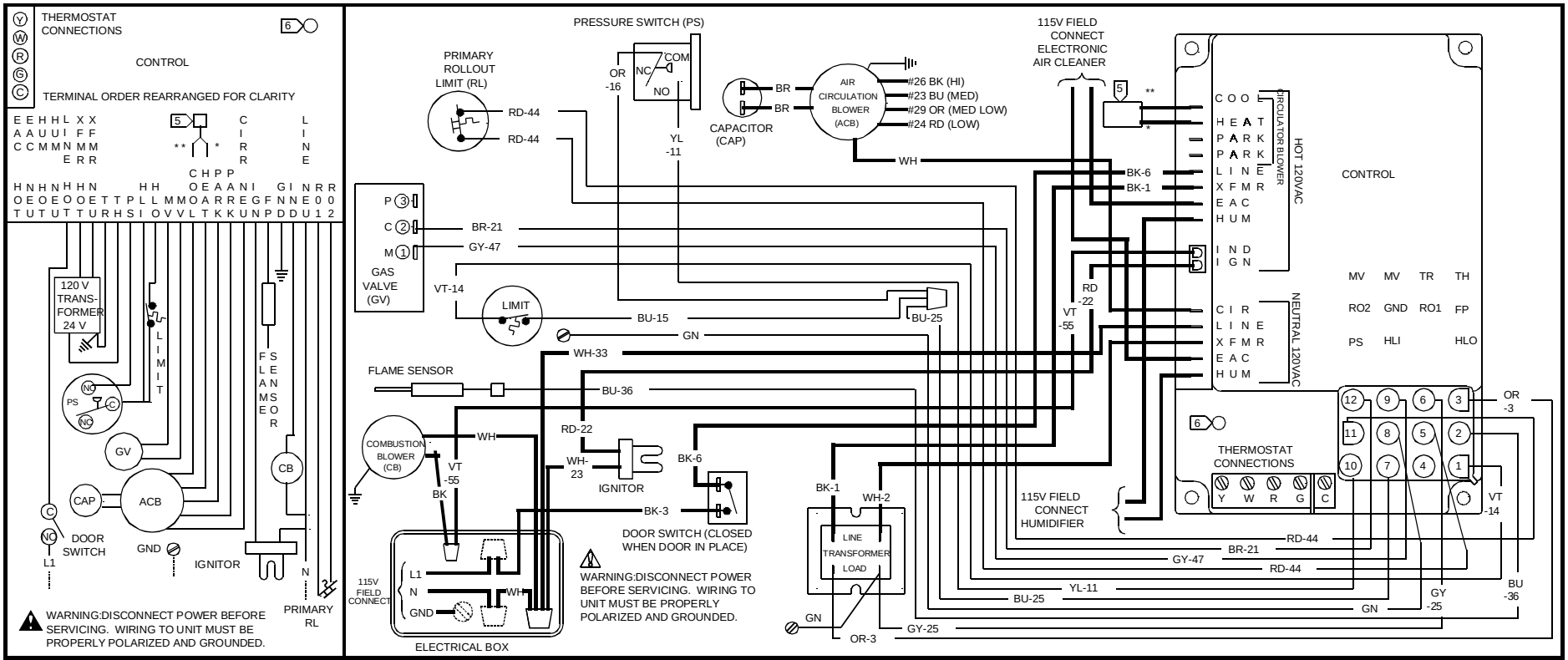
1. SET HEAT ANTICIPATOR ON ROOM THERMOSTAT AT 0.8 AMPS.
2. AMANA APPROVED REPLACEMENT PARTS MUST BE USED WHEN SERVICING.
3. IF ANY OF THE ORIGINAL WIRE AS SUPPLIED WITH THE FURNACE MUST BE REPLACED, IT MUST BE REPLACED WITH WIRING MATERIAL HAVING A TEMPERATURE RATING OF AT LEAST 105°C. USE COPPER CONDUCTORS ONLY.
4. WIRE NUT AND TAPE UNUSED MOTOR LEADS.

COLOR CODE	
YL YELLOW	BR BROWN
OR ORANGE	WH WHITE
VT VIOLET	BL BLUE
GN GREEN	GY GRAY
BK BLACK	RD RED

LOW VOLTAGE
LOW VOLTAGE FIELD
HI VOLTAGE
HI VOLTAGE FIELD
SOME MODELS ONLY

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

WIRING DIAGRAMS



FACTORY WIRED BLOWER MOTOR TO CONTROL CONNECTIONS

FURNACE MODEL	* HEATING BLOWER SPEED			** COOLING BLOWER SPEED
* MANUFACTURER'S VARIABLE LETTER	SPEED	MOTOR TO "HEAT"	MOTOR SPEEDS	
GUX: 045X30*	LOW	RD-24	3	SEE INSTALLATION INSTRUCTIONS TO DETERMINE PROPER COOLING BLOWER SPEED.
GUC: 070X400*	LOW	RD-24	4	
GUC: 045X30* GUD: 045X30*	MED	BU-23	3	
GUC: 090X50* GUD: 070X40* GUX: 070X40*	MED LOW	OR-29	4	
GUX: 070X30*, 090X50* GUD: 090X35*, 090X50*	MED	BU-23	4	
GUX: 090X35*, 115X50* GUC: 070X30*, 115X50*, 090X35* GUD: 070X30*, 115X50*	HI	BK-26	4	

COLOR CODE
YL YELLOW
OR ORANGE
VT VIOLET
GN GREEN
BK BLACK
BR BROWN
WH WHITE
BU BLUE
GY GRAY
RD RED

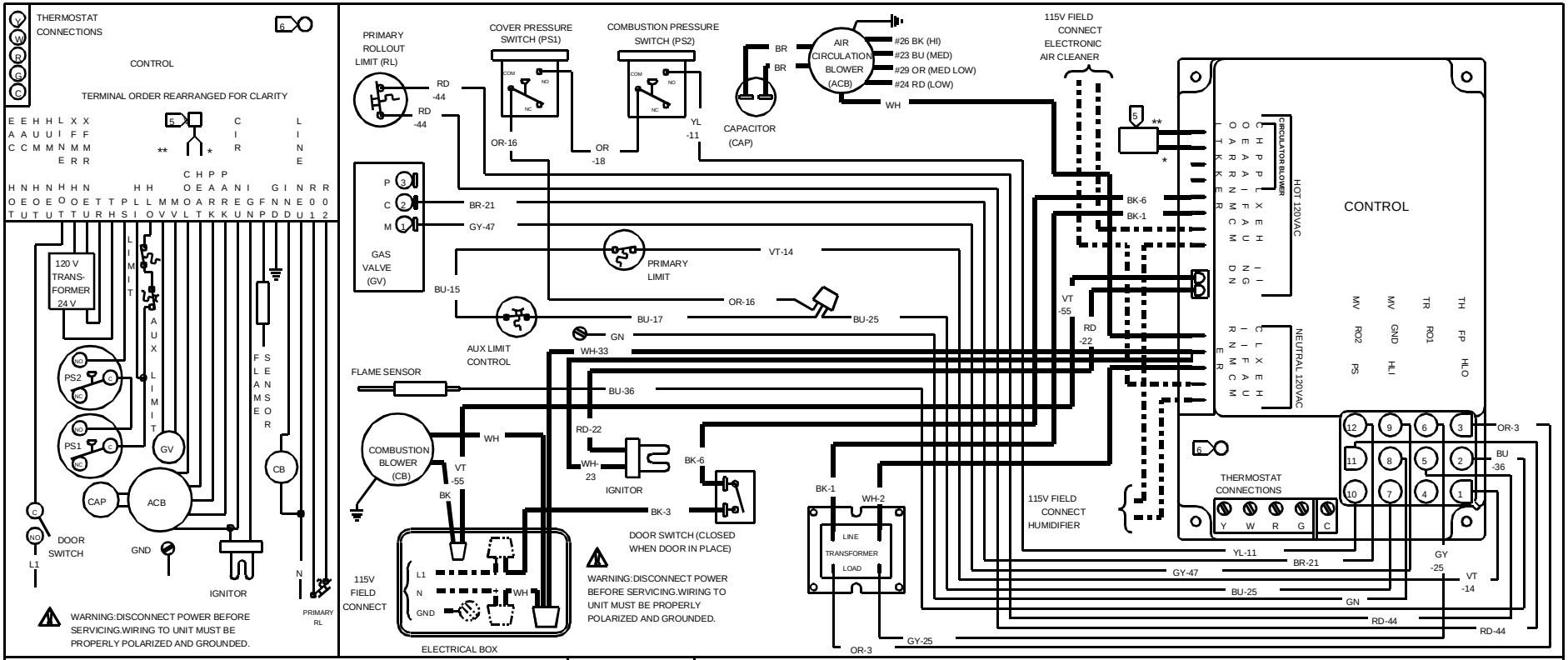
LOW VOLTAGE
LOW VOLTAGE FIELD
HI VOLTAGE
HI VOLTAGE FIELD

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 105° C 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.
6. DIAGNOSTIC LIGHT:STEADY=REPLACE CONTROL;1 FLASH=LOCKOUT;2 FLASHES=PS STUCK CLOSED; 3 FLASHES=PS STUCK OPEN;4 FLASHES=OPEN HIGH LIMIT SWITCH;5 FLASHES=OPEN ROLLOUT CONTROL: CONTINUOUS FLASHING=FLAME-NO CALL FOR HEAT

11165501 REV. 0

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



FACTORY WIRED BLOWER MOTOR TO CONTROL CONNECTIONS

FURNACE MODEL * MANUFACTURER'S VARIABLE LETTER	* HEATING BLOWER SPEED: SPEED	MOTOR TO "HEAT"	MOTOR SPEEDS
GDC: 045X30*	LOW	RD-24	3
GDC: 070X40* 090X40* 090X50* 115X50*	MED	BU-23	4
GDC: 070X30*	HI	BK-26	4

** COOLING BLOWER SPEED

SEE INSTALLATION INSTRUCTIONS TO DETERMINE PROPER COOLING BLOWER SPEED.

COLOR CODE
YL YELLOW
OR ORANGE
VT VIOLET
GN GREEN
BK BLACK
BR BROWN
WH WHITE
BU BLUE
GY GRAY
RD RED

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 105°C. 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.

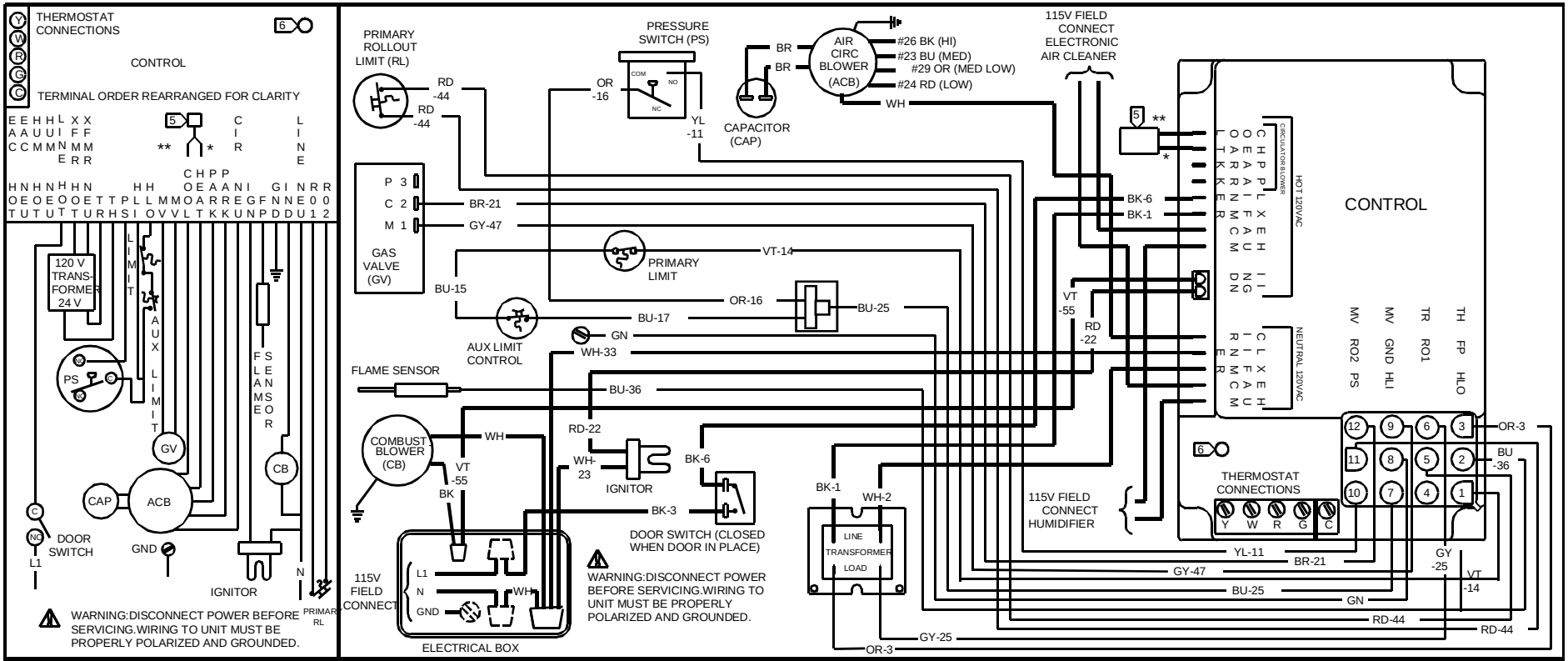
6 DIAGNOSTIC LIGHT:STEADY=REPLACE CONTROL;1 FLASH=LOCKOUT;2 FLASHES=PS STUCK CLOSED; 3 FLASHES=PS STUCK OPEN;4 FLASHES=OPEN LIMIT SWITCH;5 FLASHES=OPEN ROLLOUT CONTROL; CONTINUOUS FLASHING=FLAME-NO CALL FOR HEAT

11173201 REV. 1

WIRING DIAGRAMS

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

WIRING DIAGRAMS



FACTORY WIRED BLOWER MOTOR TO CONTROL CONNECTIONS

FURNACE MODEL * MANUFACTURER'S VARIABLE LETTER	* HEATING BLOWER SPEED			**COOLING BLOWER SPEED
	SPEED	MOTOR TO "HEAT"	MOTOR SPEEDS	
GCD: 045X30*	LOW	RD-24	3	SEE INSTALLATION INSTRUCTIONS TO DETERMINE PROPER COOLING BLOWER SPEED.
GCD: 070X40* 090X40* 090X50* 115X50*	MED	BU-23	4	
GCD: 070X30*	HI	BK-26	4	

COLOR CODE
YL YELLOW
OR ORANGE
VT VIOLET
GN GREEN
BK BLACK
BR BROWN
WH WHITE
BU BLUE
GY GRAY
RD RED

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 105°C. USE COPPER CONDUCTORS ONLY.
4. UNUSED BLOWER MOTOR LEADS MUST BE PLACED ON "PARK" TERMINALS OF CONTROL OR TAPED.

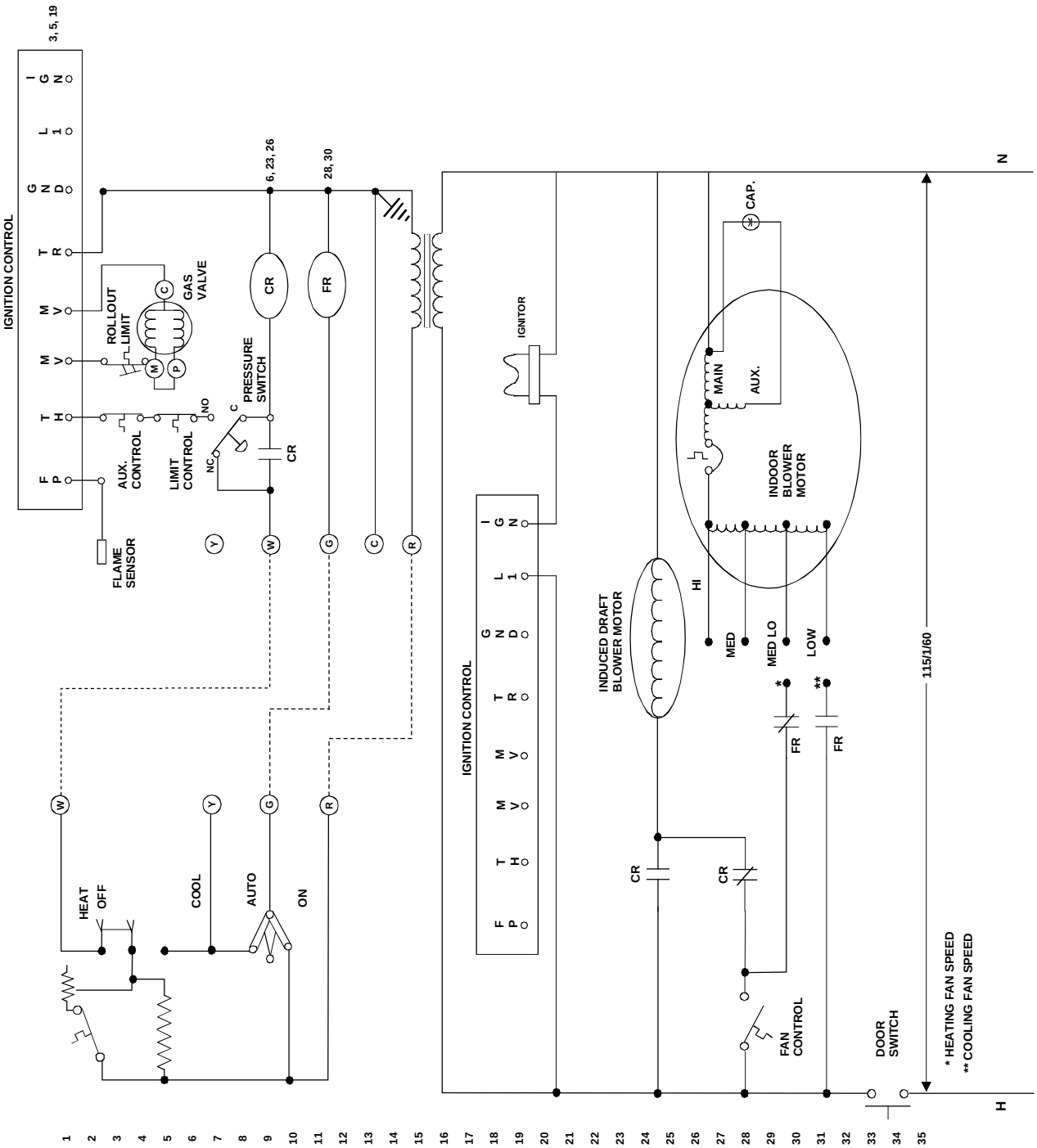
5 IF HEATING AND COOLING BLOWER SPEEDS ARE NOT THE SAME DISCARD JUMPER BEFORE CONNECTING. BLOWER LEADS.

6 DIAGNOSTIC LIGHT:STEADY=REPLACE CONTROL;1 FLASH=LOCKOUT;2 FLASHES=PS STUCK CLOSED; 3 FLASHES=PS STUCK OPEN;4 FLASHES=OPEN LIMIT SWITCH;5 FLASHES=OPEN ROLLOUT CONTROL; CONTINUOUS FLASHING=FLAME-NO CALL FOR HEAT

20000101 REV. 0

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

SCHEMATICS

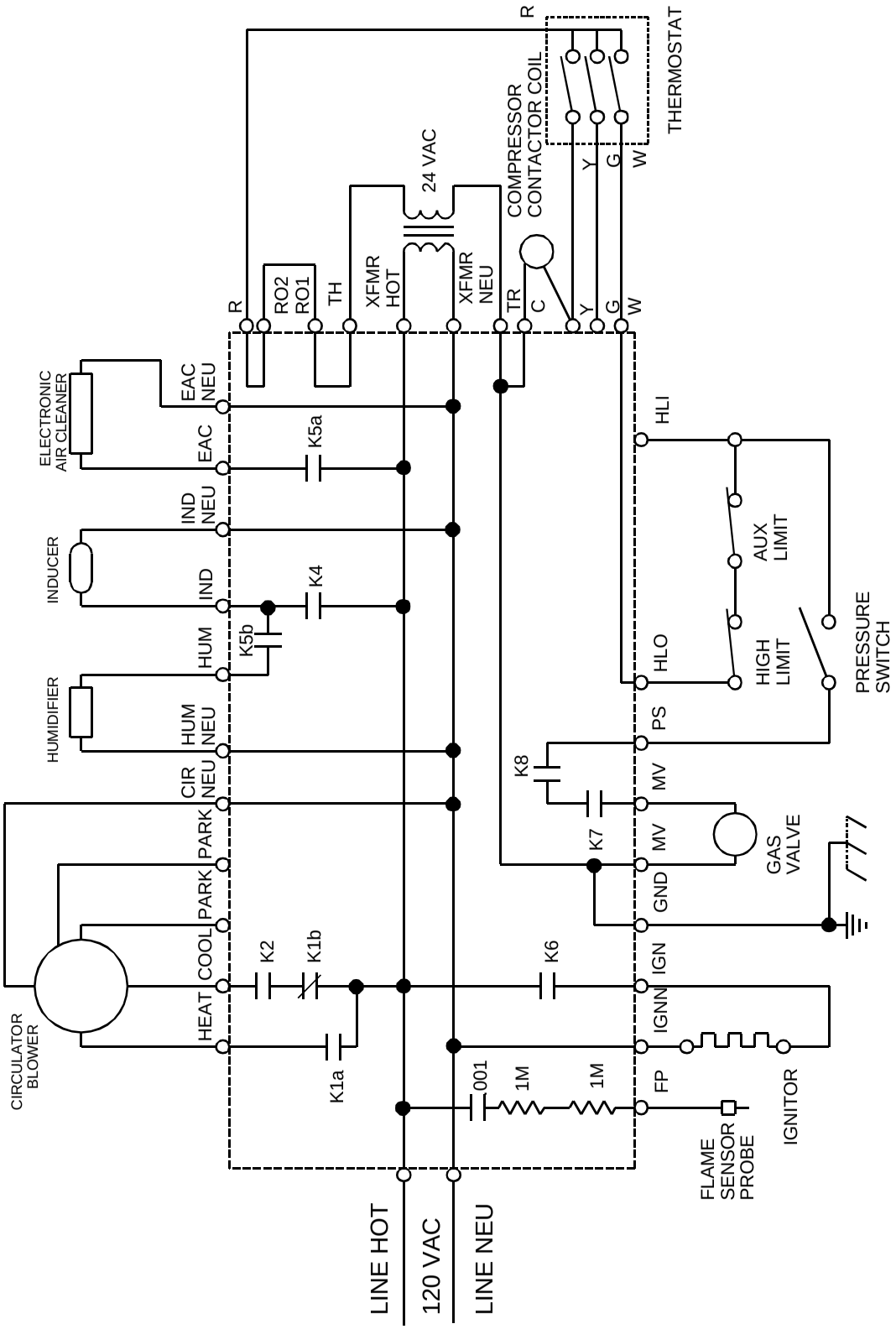


TYPICAL SCHEMATIC
EARLY GUC and GCC MODELS
WHITE-RODGERS 50E47 IGNITION CONTROL
(Rollout Limit not used on "A" models, Aux Limit not used on GUC models)
This schematic is for reference only. Not all wiring is as shown above,
refer to the appropriate wiring diagram for the unit being serviced.

WARNING

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

SCHEMATICS

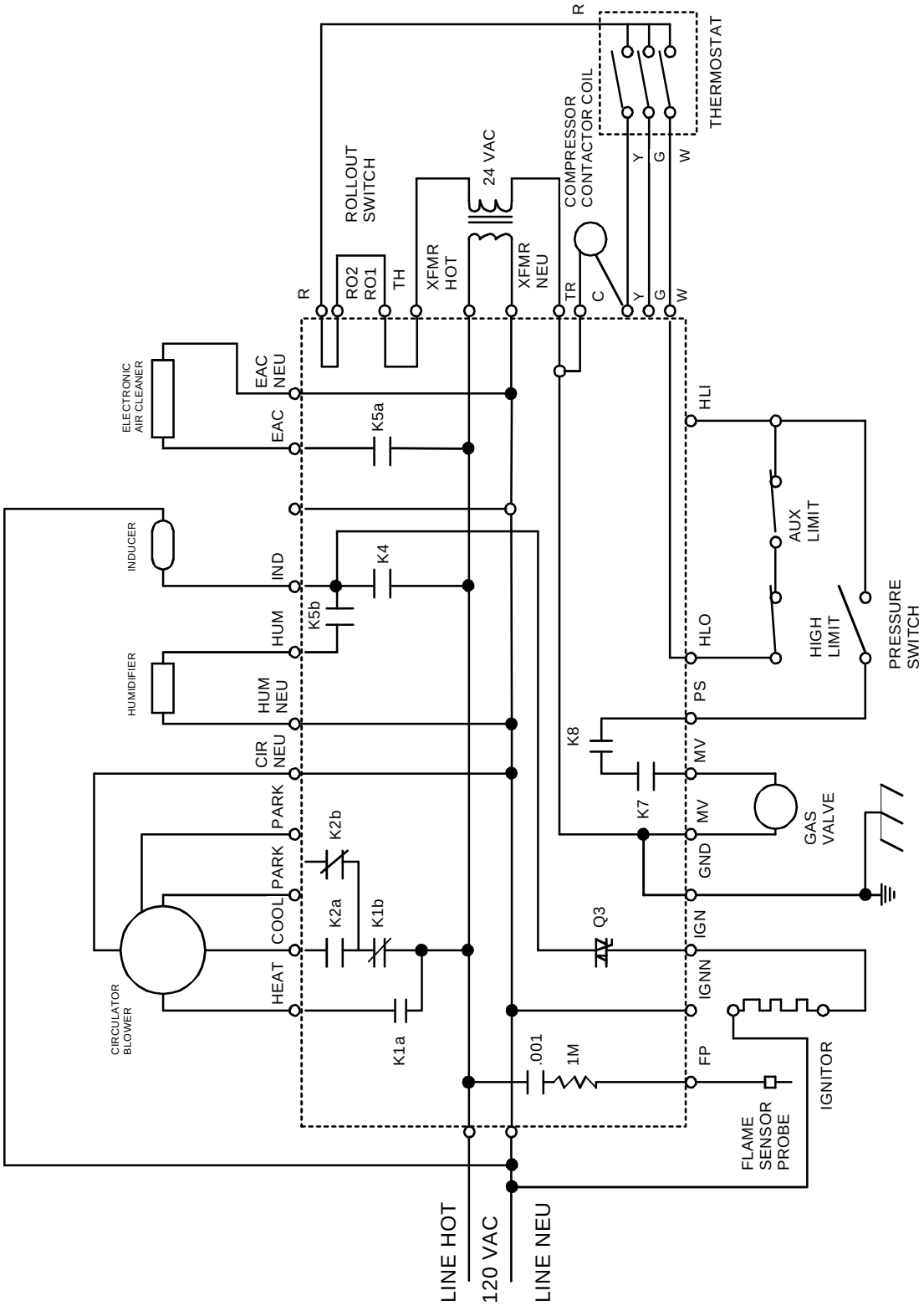


TYPICAL SCHEMATIC
GUC, GUD, GUX, GCC AND GCD MODELS
WHITE-RODGERS 50A50 OR 50A55 INTEGRATED IGNITION CONTROL
(Aux Limit used on GCC models only)
This schematic is for reference only. Not all wiring is as shown above,
refer to the appropriate wiring diagram for the unit being serviced.

WARNING

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

SCHEMATICS



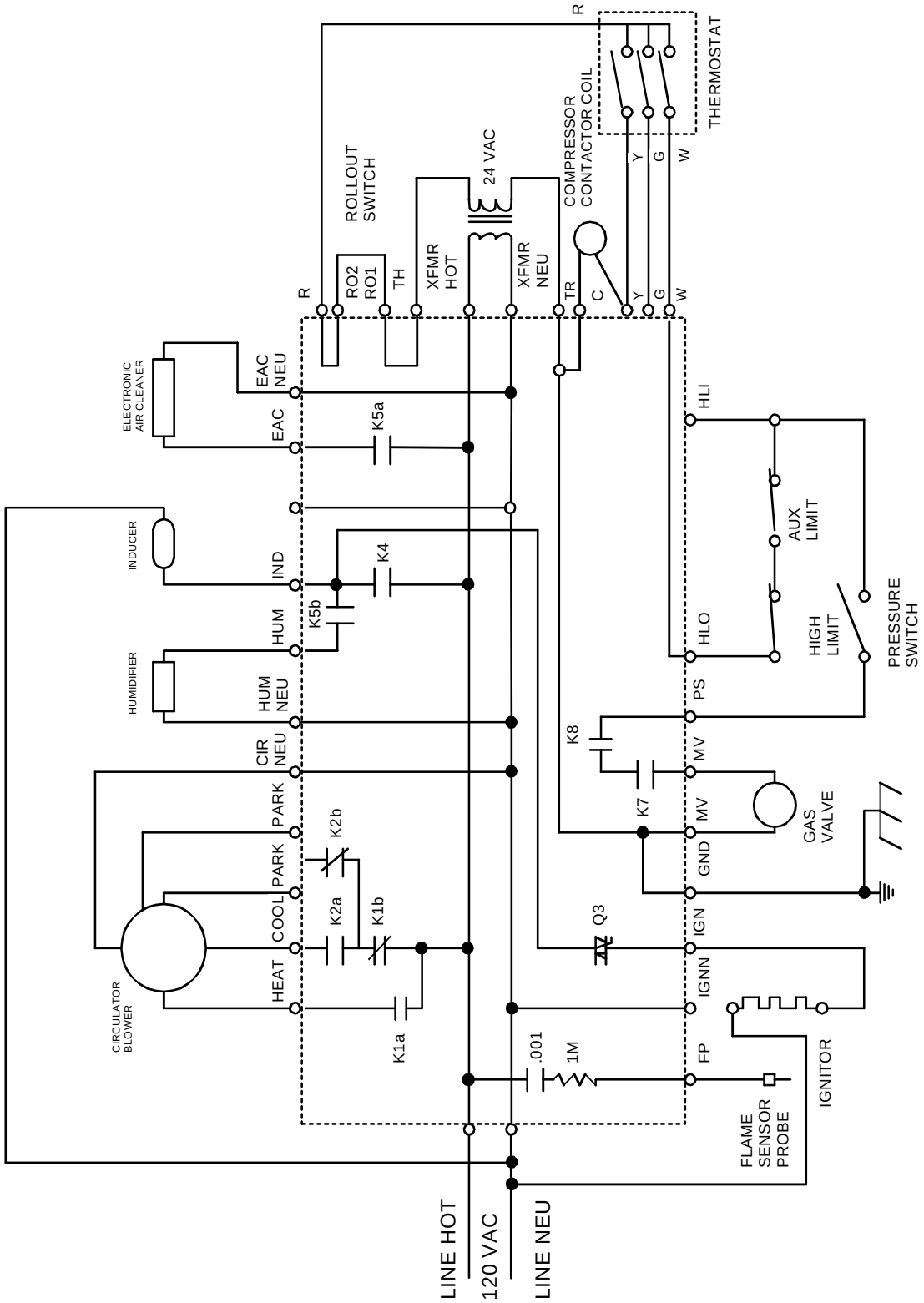
TYPICAL SCHEMATIC
GDC MODELS
WHITE-RODGERS 50A50 INTEGRATED IGNITION CONTROL

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



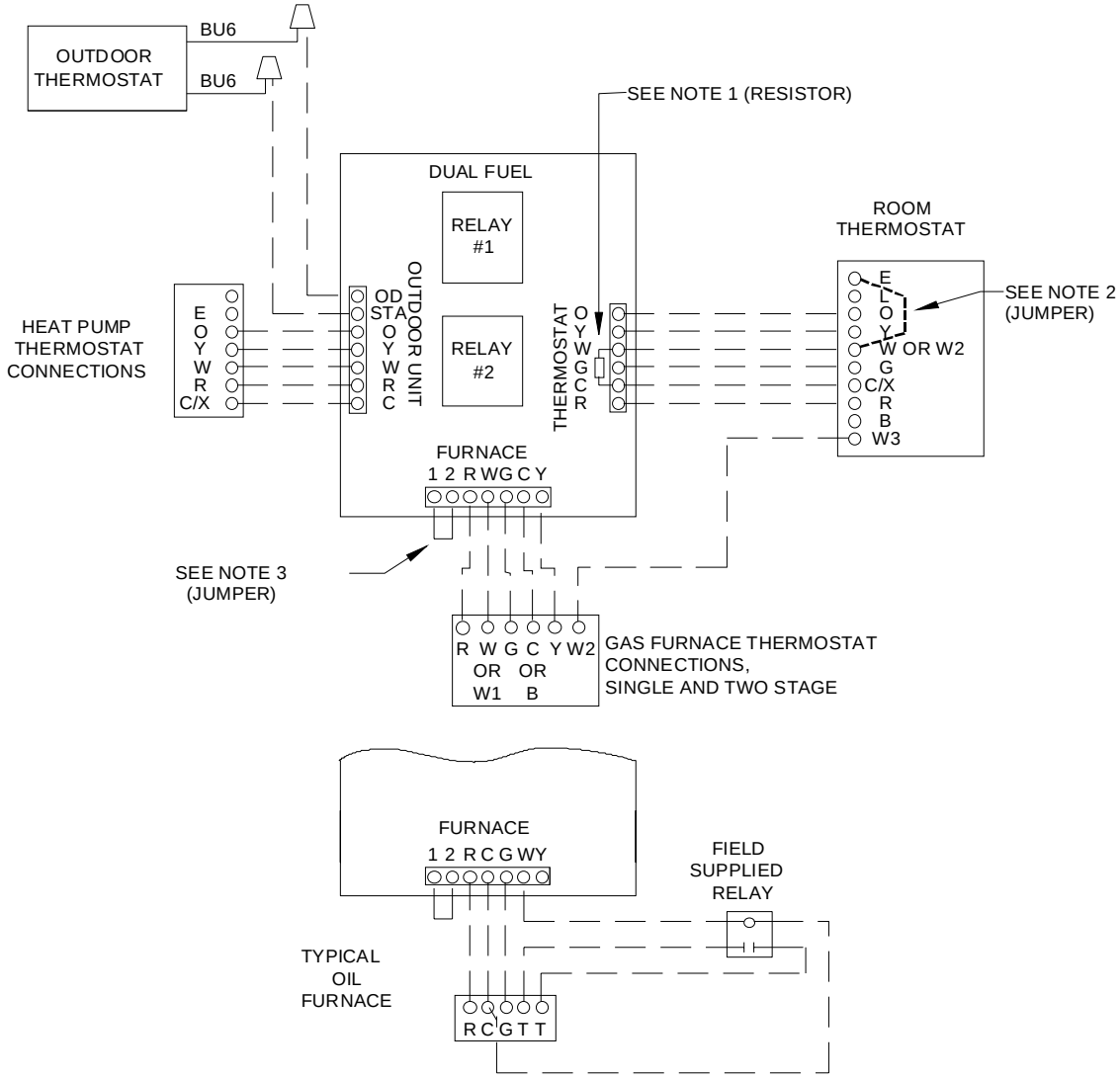
TYPICAL SCHEMATIC
GUX070X30BI MODELS
WHITE-RODGERS 50A60 INTEGRATED IGNITION CONTROL

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



Notes:

1. Resistor must be installed between "W" and "C" if an electronic room thermostat is used.
2. Some room thermostats will require a jumper between "E" and "W" in order to energize furanace in emergency heat mode.
3. Intall jumper from "1" to "2" for air tempering during defrost.

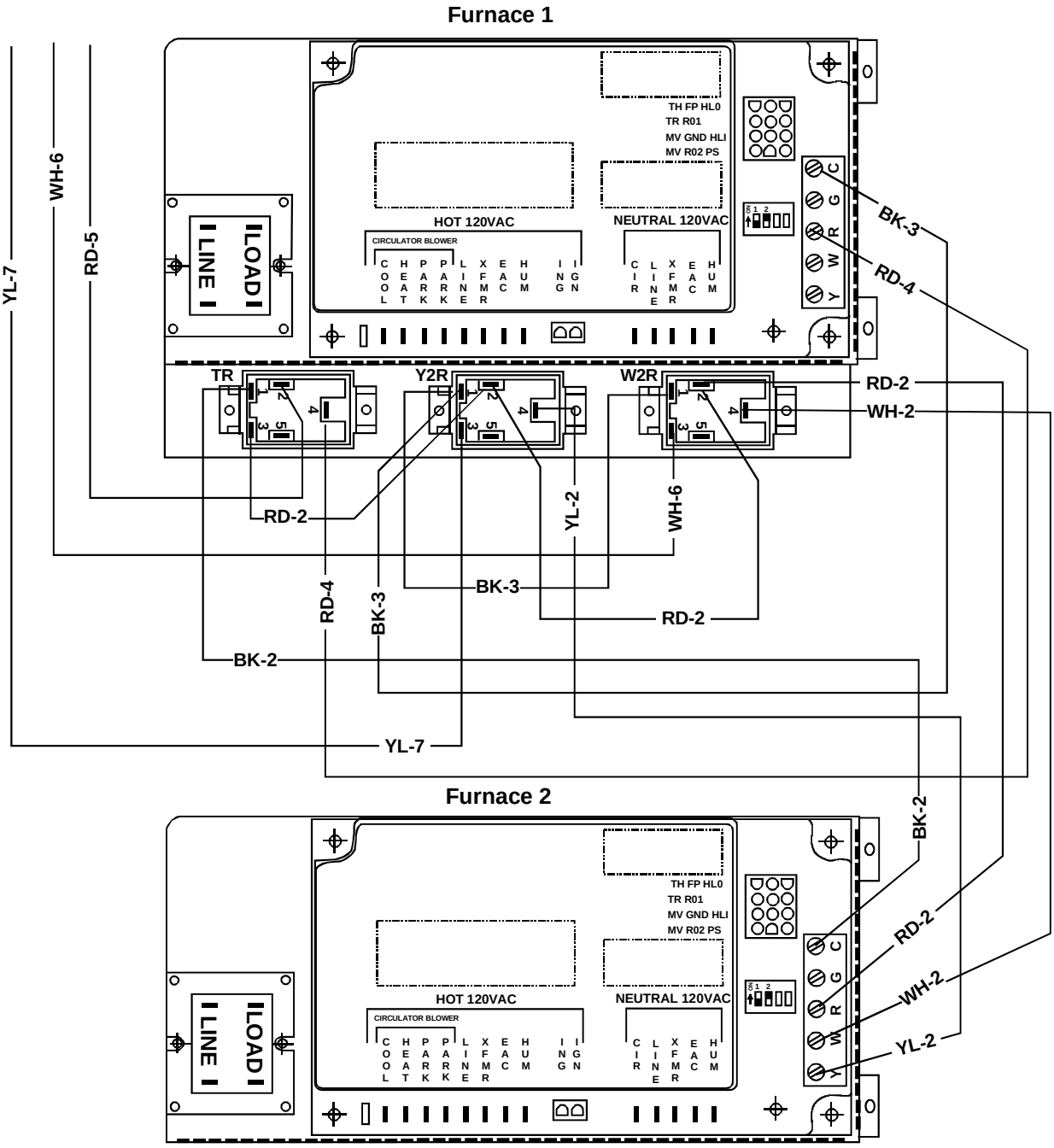
FOSSIL FUEL KIT - FFK03A

This wiring diagram 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



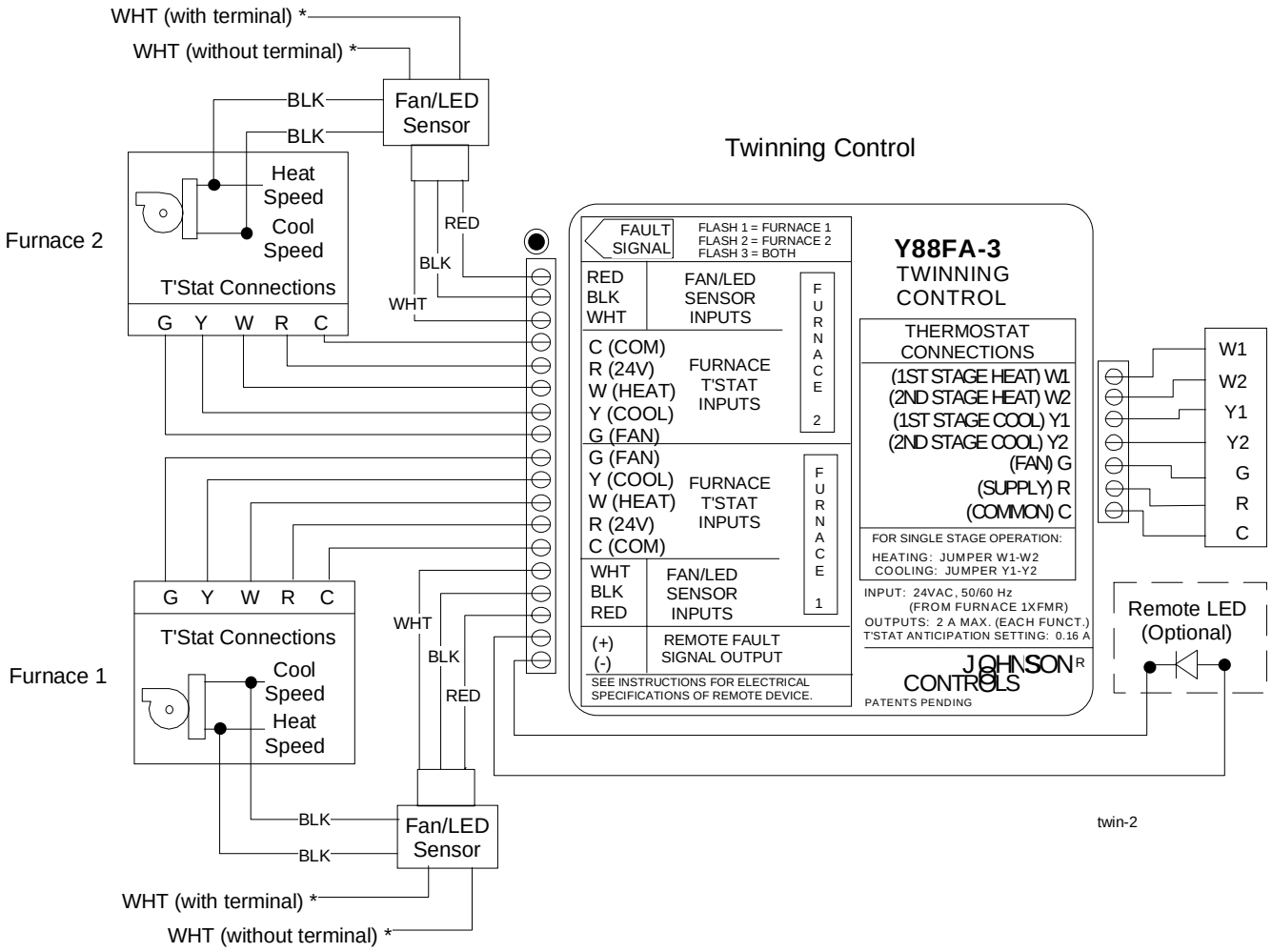
FURNACE TWINNING KIT - FTK02A

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

WARNING

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

SCHEMATICS



* Tape wire ends if not used.

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.

WARNING

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