CONDENSING GAS FURNACE

INSTALLATION AND OPERATION MANUAL

SINGLE STAGE		TWO STAGE
CLHS1-050P36N	**CLHS1-050T36N**	**CLHX1-050E36N**
CLHS1-075P42N	**CLHS1-075T42N**	**CLHX1-075E42N**
CLHS1-100P48N	**CLHS1-100T48N**	**CLHX1-100E48N**
CLHS1-125P60N	**CLHS1-125T60N**	**CLHX1-125E60N**

⚠WARNING

FIRE OR EXPLOSION HAZARD

Failure to follow safety warnings exactly could result in serious injury, death, or property damage.

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

- WHAT TO DO IF YOU SMELL GAS

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

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

⚠AVERTISSEMENT

RISQUE D'INCENDIE OU D' EXPLOSION

Le non-respect des avertissements de sécurité pourrait entraîner des blessures graves, la mort ou des dommages matériels.

- Ne pas entreposer ni utiliser de l'essence ni d'autres vapeurs ou liquides inflammables dans le voisinage de cet appareil, ni de tout autre appareil.

- QUE FAIRE S'IL Y A UNE ODEUR DE GAZ

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

- L'installation et l'entretien doivent être effectués par un installateur qualifié, un organisme de service ou le fournisseur de gaz.

PLEASE READ THESE INSTRUCTIONS PRIOR TO INSTALLATION, INITIAL FIRING, AND BEFORE PERFORMING ANY SERVICE OR MAINTENANCE. THESE INSTRUCTIONS MUST BE LEFT WITH THE HOMEOWNER AND SHOULD BE RETAINED FOR FUTURE REFERENCE BY QUALIFIED SERVICE PERSONNEL.

AHRI CERTIFIED® www.ahridirectory.org

THERMO PRODUCTS, LLC.
BOX 217
NORTH JUDSON, IN 46366
PHONE: (574) 896-2133

C ETL LISTED US Intertek

MG-1041
ECN 5441-MA 160425

MADE IN USA

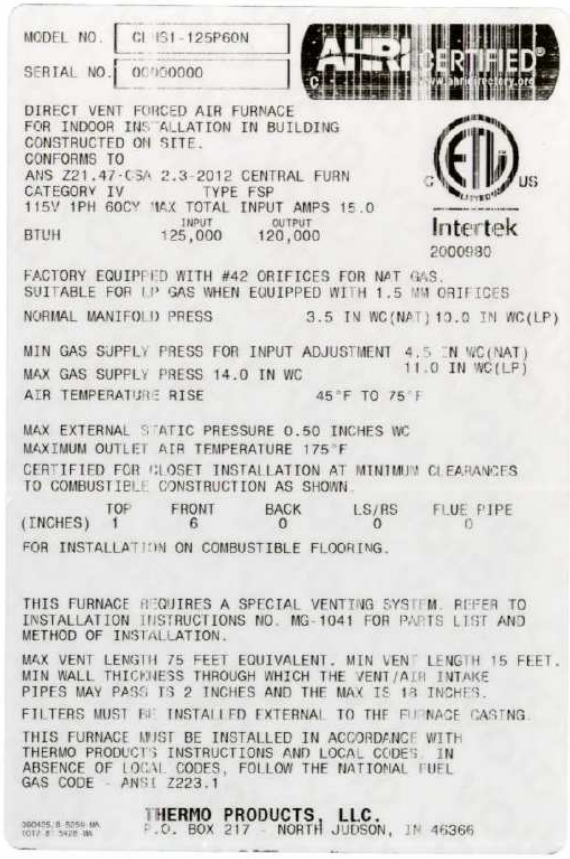
All installations and services must be performed by qualified service personnel.

INDEX

All installations and services must be performed by qualified service personnel.

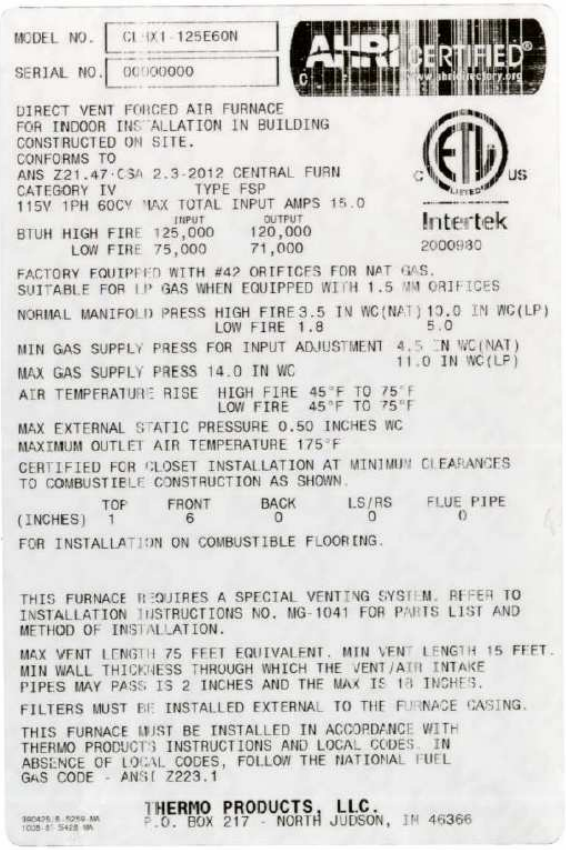
I. SAFETY INFORMATION

This and the following page contain reproductions of the various warning and instruction labels placed on the Thermo Pride Condensing Gas Furnaces. Please read and comply with the contents of these labels.


MODEL NO. CI IS1-125P60N
SERIAL NO. 00000000
AHRI CERTIFIED
DIRECT VENT FORCED AIR FURNACE
FOR INDOOR INSTALLATION IN BUILDING
CONSTRUCTED ON SITE.
CONFORMS TO
ANS Z21.47-CSA 2.3-2012 CENTRAL FURN
CATEGORY IV TYPE FSP
115V 1PH 60CY MAX TOTAL INPUT AMPS 15.0
BTUH INPUT 125,000 OUTPUT 120,000
C ETL US
Intertek
2000980
FACTORY EQUIPPED WITH #42 ORIFICES FOR NAT GAS.
SUITABLE FOR LP GAS WHEN EQUIPPED WITH 1.5 MM ORIFICES
NORMAL MANIFOLD PRESS 3.5 IN WC(NAT) 10.0 IN WC(LP)
MIN GAS SUPPLY PRESS FOR INPUT ADJUSTMENT 4.5 IN WC(NAT) 11.0 IN WC(LP)
MAX GAS SUPPLY PRESS 14.0 IN WC
AIR TEMPERATURE RISE 45°F TO 75°F
MAX EXTERNAL STATIC PRESSURE 0.50 INCHES WC
MAXIMUM OUTLET AIR TEMPERATURE 175°F
CERTIFIED FOR CLOSET INSTALLATION AT MINIMUM CLEARANCES TO COMBUSTIBLE CONSTRUCTION AS SHOWN.

	TOP	FRONT	BACK	LS/RS	FLUE PIPE
(INCHES)	1	6	0	0	0

FOR INSTALLATION ON COMBUSTIBLE FLOORING.
THIS FURNACE REQUIRES A SPECIAL VENTING SYSTEM. REFER TO INSTALLATION INSTRUCTIONS NO. MG-1041 FOR PARTS LIST AND METHOD OF INSTALLATION.
MAX VENT LENGTH 75 FEET EQUIVALENT. MIN VENT LENGTH 15 FEET. MIN WALL THICKNESS THROUGH WHICH THE VENT/AIR INTAKE PIPES MAY PASS IS 2 INCHES AND THE MAX IS 18 INCHES.
FILTERS MUST BE INSTALLED EXTERNAL TO THE FURNACE CASING.
THIS FURNACE MUST BE INSTALLED IN ACCORDANCE WITH THERMO PRODUCTS INSTRUCTIONS AND LOCAL CODES. IN ABSENCE OF LOCAL CODES, FOLLOW THE NATIONAL FUEL GAS CODE - ANSI Z223.1
THERMO PRODUCTS, LLC.
P.O. BOX 217 - NORTH JUDSON, IN 46366


MODEL NO. CI HX1-125E60N
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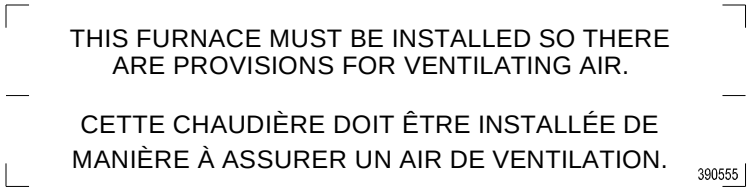
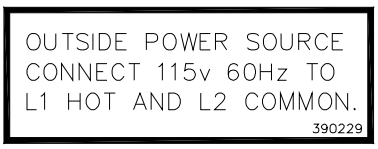

THIS FURNACE MUST BE INSTALLED SO THERE ARE PROVISIONS FOR VENTILATING AIR.

CETTE CHAUDIÈRE DOIT ÊTRE INSTALLÉE DE MANIÈRE À ASSURER UN AIR DE VENTILATION.

390555


OUTSIDE POWER SOURCE
CONNECT 115v 60Hz TO
L1 HOT AND L2 COMMON.
390229

All installations and services must be performed by qualified service personnel.

This and the previous page contain reproductions of the various warning and instruction labels placed on the Thermo Pride Condensing Gas Furnaces. Please read and comply with the contents of these labels.

⚠WARNING

This compartment must be closed except when servicing.

⚠AVERTISSEMENT

Ce compartiment doit être fermé sauf pendant l'entretien.

390290

⚠WARNING

Hazardous flue gas.

Can cause personal Injury or loss of life.

Inspect rubber hose connecting inducer outlet to PVC tee and all vent system joints for leak free connections befor furnace operation.

⚠ATTENTION

Gaz de combustion dangereux.

Peut blesser ou tuer des personnes.

Avant de démarrer la chaudière, inspecter le tuyau en caoutchouc reliant la boîte de sortie de l'évacuateur au T en PVC et tous les joints du système de ventilation pour éliminer les fuites aux raccords.

390556

CAUTION

Moving parts.
Can cause severe personal injury.

Shut off furnace before removing this panel.

Filter maintenance: When it becomes necessary to replace or wash filter remove the dirty filter from the racks provided and wash or replace with identical new filters.

Do not remove this label

⚠WARNING

FIRE, EXPLOSION AND ASPHYXIATION HAZARD

Improper adjustment, alteration , service, maintenance or Installation can cause serious Injury or death.

Read and follow instructions and precautions in User's Information Manual provided with this furnace. Installation and service must be performed by a qualified service agency or the gas supplier.

SPECIAL HOMEOWNERS INSTRUCTIONS

- **For safe operation** it is the responsibility of the owner and/or user that the burner, chimney/vent pipe, heat exchanger and controls should be inspected every year by a qualified heating contractor.
- The owner and/or user should also conduct periodic visual Inspections. Refer to the users Information manual provided with this furnace for details.
- Any deficiencies noted must be corrected at once by a qualified heating contractor. Do not attempt to make repairs yourself!
- For assistance or additional information consult a qualified installer, service agency or the gas supplier.

FOR YOUR SAFETY

WHAT TO DO IF YOU SMELL GAS:

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

⚠WARNING

FIRE AND EXPLOSION HAZARD

Can result in serious injury or death.

Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance. Storage of or use of gasoline or other flammable vapors or liquids in the vicinity of this or any appliance can result in serious injury or death.

AVERTISSEMENT

Les pièces mobiles peuvent blesser gravement des personnes.

Arrêter la chaudière avant d'enlever ce panneau.

Maintenance des filtres : Quand il le faut, retirer les filtres encrassés de leurs boîtiers, les laver ou les remplacer par des filtres neufs identiques.

Ne pas enlever cette étiquette

⚠ ATTENTION

RISQUES D'INCENDIE, D'EXPLOSION ET D'ASPHYXIE

Un mauvais réglage, modification, révision, entretien ou installation peuvent causer des blessures sérieuses ou la mort.

Lisez et respectez les Instructions et précautions du Manuel d'Information de l'utilisateur fourni avec cette chaudière. L'Installation et la révision doivent être réalisées par une agence de service qualifiée ou le fournisseur de gaz.

INSTRUCTIONS SPÉCIALES POUR LES PROPRIÉTAIRES

- **Pour un fonctionnement en toute sécurité** il est de la responsabilité du propriétaire et/ou de l'utilisateur que le brûleur, le tuyau de l'évent ou de la cheminée, l'échangeur de chaleur et les commandes soient inspectés chaque année par un chauffagiste qualifié.
- Le propriétaire et/ou l'utilisateur doivent aussi effectuer des inspections visuelles périodiques. Pour les détails, ils doivent consulter le manuel d'Instructions fourni avec la chaudière.
- Toutes les déficiences doivent être corrigées immédiatement par un chauffagiste qualifié. Ne pas essayer de réparer soi-même!
- Pour toute aide ou informations supplémentaires, consulter un chauffagiste qualifié, une entreprise de service ou le fournisseur de gaz.

POUR VOTRE SÉCURITÉ

QUOI FAIRE SI VOUS SENTEZ UNE ODEUR DE GAZ

1. N'allumez aucun appareil.
2. Ne touchez aucun interrupteur électrique. N'utilisez aucun téléphone du bâtiment.
3. Appelez Immédiatement votre fournisseur de gaz à partir du téléphone d'un voisin. Suivez les directives de votre fournisseur.
4. Si vous ne pouvez pas joindre votre fournisseur, appelez les pompiers.

⚠ AVERTISSEMENT

RISQUES D'INCENDIE ET D'EXPLOSION

Peuvent entraîner des blessures sérieuses ou la mort.
Ne pas stocker ou utiliser d'essence ni autres vapeurs ou liquides inflammables à proximité de cet appareil ou tout autre dispositif.
Le stockage ou l'utilisation d'essence ou autres vapeurs ou liquides inflammables à proximité de cet appareil ou tout autre dispositif peut entraîner des blessures sérieuses ou la mort.

390553

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This and the previous page contain reproductions of the various warning and instruction labels placed on the Thermo Pride Condensing Gas Furnaces. Please read and comply with the contents of these labels.

FOR YOUR SAFETY READ BEFORE OPERATING

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

A. This appliance does not have a pilot. It is equipped with a hot surface igniter that 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 base of unit because some gas is heavier than air and will settle on the floor or ground.

WHAT TO DO IF YOU SMELL GAS

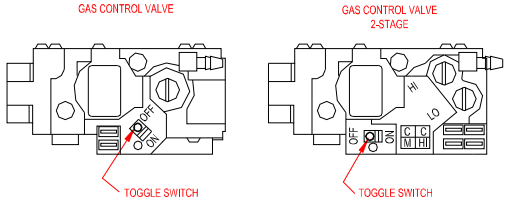
- Do not try to light any appliance.
- Do not touch any electric switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

C. Use only your hand to move the gas control switch. Never use tools. If the switch will not move 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.

OPERATING INSTRUCTIONS

1. STOP! Read the safety information above on this label.
2. Set the thermostat to the lowest setting.
3. Turn off all electric power to the appliance.
4. This appliance is equipped with a hot surface igniter that automatically lights the burner. Do not try to light the burner by hand.
5. Move the gas control switch to the "OFF" position.
6. Wait five (5) minutes to clear out any gas. Then smell for gas, including near the floor or ground. If you smell gas, STOP! Follow "B" in the safety information above on this label. If you don't smell gas, go to the next step.
7. Move the gas control switch to the "ON" position.
8. Turn on all electric power to the appliance.
9. Set thermostat to desired setting, and, if equipped, set the operating mode to "HEAT".
10. If appliance will not operate, follow the instructions "To Turn Off Gas To Appliance" and call your service technician or gas supplier.



TO TURN OFF GAS TO APPLIANCE

1. Set thermostat to lowest setting, and, if equipped, set the operating mode to "COOL" or "OFF".
2. If service is to be performed, turn off all electric power to the appliance.
3. To turn off gas control valve, remove the burner compartment cover.
4. Move the gas control switch to the "OFF" position.
5. Replace the burner compartment cover.

À LIRE, POUR VOTRE SÉCURITÉ, AVANT DE DÉMARRER LA CHAUDIÈRE

ATTENTION ! Si vous ne respectez pas exactement les instructions ci-dessous, un incendie ou une explosion pourraient endommager la propriété, blesser ou tuer des personnes.

A. Cet appareil n'a pas de veilleuse. Il comporte une surface d'allumage chaude qui allume automatiquement le brûleur. N'essayez pas d'allumer le brûleur manuellement.

B. AVANT DE DÉMARRER la chaudière, humez l'air autour de l'appareil pour détecter une éventuelle odeur de gaz. Humez aussi l'air près de la base de la chaudière puisque le gaz étant plus lourd que l'air, il pourrait s'accumuler près du sol ou du plancher.

QUOI FAIRE SI VOUS SENTEZ UNE ODEUR DE GAZ

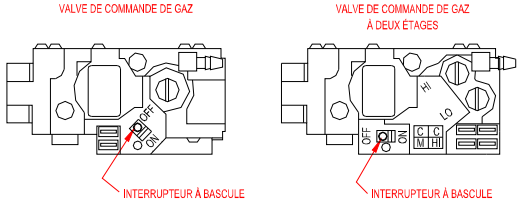
- N'allumez aucun appareil.
- Ne touchez aucun interrupteur électrique; n'utilisez aucun téléphone dans l'immeuble.
- Appelez immédiatement votre fournisseur de gaz à partir du téléphone d'un voisin. Suivez ses instructions.
- Si vous ne pouvez pas joindre votre fournisseur de gaz, appelez les pompiers.

C. Manipulez l'interrupteur de commande de gaz seulement à la main. N'utilisez jamais des outils pour cela. Si vous ne pouvez pas manipuler cet interrupteur manuellement, n'essayez pas de le réparer, appelez un technicien de service qualifié. Forcer l'interrupteur ou tenter de le réparer, pourraient provoquer un incendie ou une explosion.

D. N'utilisez pas la chaudière si l'une de ses pièces a été sous de l'eau. Appelez immédiatement un technicien de service qualifié pour qu'il inspecte la chaudière et remplace toute pièce du système de commande et tout interrupteur de commande de gaz qui ont été sous de l'eau.

INSTRUCTIONS POUR LE FONCTIONNEMENT

1. STOP ! Lisez l'information sur la sécurité au haut de cette étiquette.
2. Réglez le thermostat à sa position la plus basse.
3. Coupez toute l'alimentation électrique la chaudière.
4. Cette chaudière est équipée d'une surface d'allumage chaude qui allume automatiquement le brûleur. N'essayez pas d'allumer le brûleur manuellement.
5. Placez l'interrupteur de commande de gaz à la position «OFF».
6. Attendez cinq (5) minutes pour que tout le gaz soit évacué. Humez l'air pour détecter une éventuelle odeur de gaz, sans oublier de l'humer aussi près du sol ou du plancher. Si vous sentez une odeur de gaz, STOP ! Suivez le point «B» de l'information sur la sécurité au haut de cette étiquette. Si vous ne sentez aucune odeur de gaz, passez à l'étape suivante.Move the gas control switch to the "ON" position.
7. Placez l'interrupteur de commande de gaz à la position «ON».
8. Appliquez toute l'alimentation électrique à la chaudière.
9. Réglez le thermostat à la position désirée et, le cas échéant, mettez le mode de fonctionnement à la position «HEAT».
10. Si la chaudière ne fonctionne pas, suivez les instructions de « POUR COUPER L'ALIMENTATION EN GAZ DE LA CHAUDIÈRE» et appelez votre technicien de service ou votre fournisseur de gaz.



POUR COUPER L'ALIMENTATION EN GAZ DE LA CHAUDIÈRE

1. Réglez le thermostat à sa position la plus basse et, le cas échéant, réglez le mode de fonctionnement à la position «COOL» ou «OFF».
2. S'il faut accomplir une certaine tâche, coupez toute alimentation en électricité de la chaudière.
3. Pour fermer la valve de commande de gaz, enlevez le couvercle du compartiment du brûleur.
4. Mettez l'interrupteur de commande de gaz à la position «OFF».
5. Replacez le couvercle du compartiment du brûleur.

390568

All installations and services must be performed by qualified service personnel.

This page contains various warnings and cautions found throughout this Furnace Manual. Please read and comply with the statements below.

The following safety information should be read, understood, and followed by the installer.

1. Use only with type of gas approved for this furnace. Refer to furnace rating plate.

2. Connect this furnace to an approved vent system only. Combustion products must be discharged outdoors. Connect this furnace to an approved vent system only, as specified in section III parts D though H of these instructions.

⚠**WARNING**: ***This furnace is not to be used for temporary heating of buildings or structures under construction.***

⚠**CAUTION**: ***These high efficiency condensing furnaces are not certified for and shall not be vented into a standard or any type of chimney.***

⚠**WARNING**: ***These furnaces may not be common vented with any other appliance.***

⚠**CAUTION**: ***The vent and air intake elbows must be kept away from bushes, shrubs or any vegetation that may restrict the flow of flue products. It must also be kept clear of any leaves, weeds or other combustible materials. Keep the vent hood clear of snow. Avoid locating the terminals in areas where standing water or condensate drippage may be a problem.***

⚠**CAUTION**: ***Outside combustion air must not come from an area that is directly adjacent to a pool, hot tub or spa. Measures should be taken to prevent the entry of corrosive chemicals or vapors to the combustion and ventilation air supply. Such chemicals include but are not limited to chlorinated and/or fluorinated hydrocarbons such as found in refrigerants, aerosol propellants, dry cleaning fluids, degreasers , bleaches, air fresheners or solvents. Vapors from such products can form acid compounds when burned in a gas flame. Should acid compounds form in your furnace; it may reduce the life of the furnace.***

⚠**WARNING**: ***Because of the potential of odorant fade, a gas leak may not be detected by smell. If this furnace is installed below grade, contact your gas supplier for a gas detector.***

⚠**WARNING**: ***Turn off power to furnace before it is placed into service. The gas piping system must have been leak tested by a qualified heating contractor.***

⚠**WARNING**: ***It may be necessary to purge the air out of the gas line for initial start-up of the furnace after installation. This should be done by a qualified heating contractor. If excessive gas escapes when purging the gas supply at the union, allow the area to ventilate for at least 15 minutes before attempting to start the furnace. LP gas is especially dangerous because the specific gravity of LP gas allows it to accumulate at floor level at a dangerous concentration. For remainder of operating instructions, reference Users Information Manual.***

⚠**WARNING**: ***Heat exchanger oil will burn off on initial firing creating an unpleasant odor. To prevent this odor from occurring more than once, it is suggested that:***

1. ***A window(s) be opened.***
2. ***The thermostat set at highest setting.***
3. ***The furnace remain running at conditions 1&2 for 30 minutes or until odor has dissipated***

⚠**CAUTION**: ***These furnace models are a sealed combustion design, which does not require an air shutter adjustment (air shutters are not used) for proper flame characteristics. Burner door must always be closed before operating furnace.***

All installations and services must be performed by qualified service personnel.

⚠WARNING: ***Personal injury or property damage could result from repair or service of this furnace by anyone other than a qualified heating contractor. Only the homeowner/user routine maintenance described in the Users Information Manual may be performed by the user.***

⚠WARNING

ELECTRICAL SHOCK, FIRE OR EXPLOSION HAZARD

Failure to follow safety warnings exactly could result in dangerous operation, serious injury, death, or property damage.

Improper servicing could result in dangerous operation, serious injury, death or property damage.

- Before servicing, disconnect all electrical power to furnace.
- When servicing controls, label all wires prior to disconnecting. Reconnect wires correctly.
- Verify proper operation after servicing.

⚠AVERTISSEMENT

RISQUE DE CHOC ÉLECTRIQUE, D'INCENDIE OU D'EXPLOSION

Le non-respect des avertissements de sécurité pourrait entraîner un fonctionnement dangereux de l'appareil, des blessures graves, la mort ou des dommages matériels.

Un entretein incorrect pourrait entraîner un fonctionnement dangereux de l'appareil, des blessures graves, la mort ou des dommages matériels.

- Couper toute alimentation électrique au générateur d'air chaud avant de prodéder aux travaux d'entretein.
- Au moment de l'entretien des commandes, étiquetez tous les fils avant de les débrancher. S'assurer de les raccorder correctement.
- S'assurer que l'appareil fonctionne adéquatement aprés l'entretien.

FURNACE MODEL NO. NOMENCLATURE

Model Number Digit	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**
	Category	**Profile**	**Configuration**	**Staging**	**Version**		**Input**	**Input**	**Input**	**Motor Type**	**Clg Airflow Cap**	**Clg Airflow Cap**	**Gas Type**
Gas Furnace Model Nomenclature Example Model Numbers	**C**	**L**	**H**	**S**	**1**	**-**	**0**	**5**	**0**	**P**	**3**	**6**	**N**
	C	**L**	**H**	**X**	**1**	**-**	**1**	**2**	**5**	**E**	**6**	**0**	**N**
C = Condensing	**C**												
L = Low-profile		**L**											
H = Highboy			**H**										
Stage: S = Single, X = 2-Stage				**S**									
Version (Rev)					**1**								
Input Capacity in MBTUH (1000)						**-**	**0**	**5**	**0**				
Motor Type: P = PSC, T = CTM, E = ECM										**P**			
Cooling Airflow Capacity in MBTUH (1000)											**3**	**6**	
Gas Type: N = Natural, P = Liquid Propane													**N**

All installations and services must be performed by qualified service personnel.

II. FURNACE SPECIFICATIONS

A. CLHS1 SERIES (Single Stage, PSC Blower Motor)

MODEL NO.	CLHS1-050P	CLHS1-075P	CLHS1-100P	CLHS1-125P
BTU/Hr INPUT	50,000	75,000	100,000	125,000
BTU/Hr OUTPUT	48,000	73,000	96,000	120,000
HT. OF CASING	34-1/2”	34-1/2”	34-1/2”	34-1/2”
WIDTH OF CASING	17-1/2”	21”	21”	24-1/2”
DEPTH OF CASING	28-1/2”	28-1/2”	28-1/2”	28-1/2”
WARM AIR OUTLET	16-1/2 x 20	20 x 20	20 x 20	23-1/2 x 20
RETURN AIR INLET	25 x 16	25 x 16	25 x 16	25 x 16
DIA. OF FLUE	2”	2”	3”	3”
DIA. OF COMBUSTION AIR INTAKE	2”	2”	3”	3”
CFM @ 0.2” & 0.5” w.c. STATIC	0.2” - 0.5”	0.2” - 0.5”	0.2” - 0.5”	0.2” - 0.5”
@HI SPEED (BLACK)	1507 - 1150	1647 - 1318	1844 – 1442	2267 - 1920
@MH SPEED (YELLOW)	1145 - 943	1428 - 1193	1654 – 1325	2011 - 1755
@ML SPEED (BLUE)	901 - 733	954 - 890	1294 – 1145	1767 - 1542
@LO SPEED (RED, HEATING)	633 - 452	697 - 656	904 – 852	1527 - 1337
TEMPERATURE RISE	60	60	60	60
BLOWER MOTOR HP	1/2	1/2	3/4	3/4
NO. OF SPEEDS	4	4	4	4
RUN CAPACITOR	10 mfd	15 mfd	15 mfd	15 mfd
LARGEST RECOMMENDED AIR CONDITIONER	3 Ton	3.5 Ton	4 Ton	5 Ton
SIZE OF FILTERS	24-3/4” x 15-3/4”	24-3/4” x 15-3/4”	24-3/4” x 15-3/4”	24-3/4” x 19-3/4”

NOTES:
1. BTU output based on annual fuel utilization efficiency rated by manufacturer.
2. On all outlet and inlet dimensions, the first dimension is width.
3. Electrical characteristics at 120 volts, 60 Hz., 1 phase (less than 15 amps. for all models).
4. All specifications are subject to change without notice.

All installations and services must be performed by qualified service personnel.

B. CLHS1 SERIES (Single Stage, Constant Torque Blower Motor)

MODEL NO.	CLHS1-050T	CLHS1-075T	CLHS1-100T	CLHS1-125T
BTU/Hr INPUT	50,000	75,000	100,000	125,000
BTU/Hr OUTPUT	48,000	73,000	96,000	120,000
HT. OF CASING	34-1/2”	34-1/2”	34-1/2”	34-1/2”
WIDTH OF CASING	17-1/2”	21”	21”	24-1/2”
DEPTH OF CASING	28-1/2”	28-1/2”	28-1/2”	28-1/2”
WARM AIR OUTLET	16-1/2 x 20	20 x 20	20 x 20	23-1/2 x 20
RETURN AIR INLET	25 x 16	25 x 16	25 x 16	25 x 16
DIA. OF FLUE	2”	2”	3”	3”
DIA. OF COMBUSTION AIR INTAKE	2”	2”	3”	3”
CFM @ 0.2” & 0.5” w.c. STATIC	0.2” - 0.5”	0.2” - 0.5”	0.2” - 0.5”	0.2” - 0.5”
@HI SPEED (BLACK)	1360 - 1193	1531 – 1368	1762 – 1547	2047 – 1882
@MH SPEED (YELLOW)	1167 - 1000	1379 – 1210	1558 – 1391	1813 – 1617
@MED SPEED (BLUE)	987 - 797	1189 – 982	1416 – 1229	1710 – 1513
@ML SPEED (PURPLE)	827 - 610	1133 – 933	1357 – 1186	1553 – 1330
@LO SPEED (RED, HEATING)	672 - 420	1025 – 800	1178 – 976	1444 – 1180
TEMPERATURE RISE	60	60	60	60
BLOWER MOTOR HP	1/2	1/2	3/4	3/4
NO. OF SPEEDS	5	5	5	5
LARGEST RECOMMENDED AIR CONDITIONER	3 Ton	3.5 Ton	4 Ton	5 Ton
SIZE OF FILTERS	24-3/4” x 15-3/4”	24-3/4” x 15-3/4”	24-3/4” x 15-3/4”	24-3/4” x 19-3/4”

NOTES:
1. BTU output based on annual fuel utilization efficiency rated by manufacturer.
2. On all outlet and inlet dimensions, the first dimension is width.
3. Electrical characteristics at 120 volts, 60 Hz., 1 phase (less than 15 amps. for all models).
4. All specifications are subject to change without notice.

All installations and services must be performed by qualified service personnel.

C. CLHX1 SERIES (Two Stage, ECM Blower Motor)

MODEL NO. (High fire/Low fire)	CLHX1-050E	CLHX1-075E	CLHX1-100E	CLHX1-125E
BTU/Hr INPUT	50,000 / 35,000	75,000 / 53,000	100,000 / 70,00	125,000 / 75,000
BTU/Hr OUTPUT	48,000 / 34,000	73,000 / 51,000	97,000 / 68,000	120,000 / 71,000
HEIGHT OF CASING	34-1/2”	34-1/2”	34-1/2”	34-1/2”
WIDTH OF CASING	17-1/2”	21”	21”	24-1/2”
DEPTH OF CASING	28-1/2”	28-1/2”	28-1/2”	28-1/2”
WARM AIR OUTLET	16-1/2 x 20	20 x 20	20 x 20	23-1/2 x 20
RETURN AIR INLET	25 x 16	25 x 16	25 x 16	25 x 16
DIA. OF FLUE	2”	2”	3”	3”
DIA. OF COMBUSTION AIR INTAKE	2”	2”	3”	3”
CFM				
@ COOLING TAP A	711	850	1031	1246
@ COOLING TAP B	870	1055	1236	1420
@ COOLING TAP C	1061	1257	1428	1617
@ COOLING TAP D	1241	1386	1621	2000
CFM (High fire/Low fire)				
@ HEATING TAP A	432 / 617	648 / 926	841 / 1201	869 / 1448
@ HEATING TAP B	489 / 698	722 / 1031	921 / 1315	963 / 1605
@ HEATING TAP C	534 / 762	791 / 1130	1039 / 1484	1080 / 1800
@ HEATING TAP D	589 / 841	909 / 1298	1207 / 1724	1210 / 2017
TEMPERATURE RISE	60	60	60	60
BLOWER MOTOR HP	1/2	1/2	3/4	3/4
LARGEST RECOMMENDED AIR CONDITIONER	3 Ton	3.5 Ton	4 Ton	5 Ton
SIZE OF FILTERS	24-3/4” x 15-3/4”	24-3/4” x 15-3/4”	24-3/4” x 15-3/4”	24-3/4” x 19-3/4”

NOTES:
1. BTU output based on annual fuel utilization efficiency rated by manufacturer.
2. On all outlet and inlet dimensions, the first dimension is width.
3. Electrical characteristics at 120 volts, 60 Hz., 1 phase (less than 15 amps. for all models).
4. All specifications are subject to change without notice.

All installations and services must be performed by qualified service personnel.

D. INSTALLATION PARTS PACKAGES - CLHS1

PARTS PACKAGE #S00S4541/4542/ 4543/4544	DESCRIPTION	PART #	QUANTITY
	#10-32 x ½ green ground screw	300109	1
	#10-32 hex nut	300110	1
	Wire nut	300132	2
	#8 x ½ TEK screws for mounting J-box	300208	6
	3/16” dia. star washer	300270	1
	#8 x ¾ TEK screws for mounting trap	300283	2
	Spring clamp, 11/16”	300299	2
	Adapter, ½" CPVC X PVC	320833	1
	Trap Assembly	320928	1
	Grommet for 2” PVC flue pipe	350007	1
	Grommet for ½” gas pipe	350009	1
	J-box wire bushing	350016	1
	2 x 4 electrical J-box cover	350020	1
	2 x 4 electrical J-box	350024	1
	Grommet for 11/16” drain tubing	350210	2
	Thermostat wire busing	350750	1
	5/16” tubing, 13” long	410061	1
	Flange for 2” PVC air intake	614524	1
S00S4541	LP Gas Conversion Kit (050)	AOPS7746	1
S00S4542	LP Gas Conversion Kit (075)	AOPS7747	1
S00S4543	LP Gas Conversion Kit (100)	AOPS7748	1
S00S4544	LP Gas Conversion Kit (125)	AOPS7749	1
	Installation notice	MG-966	1

E. INSTALLATION PARTS PACKAGES - CLHX1

PARTS PACKAGE #S00S4545/4546/ 4547/4548	DESCRIPTION	PART #	QUANTITY
	#10-32 x ½ green ground screw	300109	1
	#10-32 hex nut	300110	1
	Wire nut	300132	2
	#8 x ½ TEK screws for mounting J-box	300208	6
	3/16” dia. star washer	300270	1
	#8 x ¾ TEK screws for mounting trap	300283	2
	Spring clamp, 11/16”	300299	2
	Adapter, ½" CPVC X PVC	320833	1
	Trap Assembly	320928	1
	Grommet for 2” PVC flue pipe	350007	1

All installations and services must be performed by qualified service personnel.

	Grommet for ½" gas pipe	350009	1
	J-box wire bushing	350016	1
	2 x 4 electrical J-box cover	350020	1
	2 x 4 electrical J-box	350024	1
	Grommet for 11/16" drain tubing	350210	2
	Thermostat wire busing	350750	1
	5/16" tubing, 13" long	410061	1
	Flange for 2" PVC air intake	614524	1
S00S4545	LP Gas Conversion Kit (050)	AOPS7751	1
S00S4546	LP Gas Conversion Kit (075)	AOPS7752	1
S00S4547	LP Gas Conversion Kit (100)	AOPS7753	1
S00S4548	LP Gas Conversion Kit (125)	AOPS7754	1
	Installation notice	MG-966	1

III. GENERAL INSTALLATION

Install this furnace only in a location and position as specified in Section III of these instructions.

This furnace is equipped with orifices size for operation with natural gas. For conversion to Propane Gas see instruction in Gas Conversion Section of this manual.

These Category Type IV furnaces are shipped completely assembled and wired (internally). See the Dealer Receiving and Freight Claim Procedure Section of the price guide for parts shortage or damage. The furnace and duct system must be adjusted to obtain a temperature rise of 45°F to 75°F through the furnace after installation. The recommended minimum return air temperature is 55°F. Always install furnace to operate within the furnace's intended temperature rise range with a duct system which has an external static pressure within the allowable range, as specified in Section III of these instructions. See furnace rating plate. The installation must conform with local codes, or in the absence of local codes, with the National Fuel Gas Codes (ANSI Z223.1 or latest edition), and these instructions.

⚠WARNING: ***This furnace is not to be used for temporary heating of buildings or structures under construction.***

Many of the chemicals used during construction, when burned, form acid bearing condensate that can substantially reduce the life of the heat exchanger.

It is recommended that a commercially available CO alarm be installed in conjunction with any fossil fuel burning appliance. The CO alarm shall be installed according to the alarm manufacturer's installation instructions and be listed in accordance with the latest edition of the UL Standard for Single and Multiple Station Carbon Monoxide Alarms, UL 2034, or the CSA International Standard, Residential Carbon Monoxide Alarming Devises, CSA 6.19.

A. CODES AND CLEARANCES

The following items must be considered when choosing the size and location of the furnace.

1. All local codes and/or regulations take precedence over the instructions in this manual and should be followed accordingly. In the absence of local codes, installation must conform with these instructions, regulations of the National Fire Protection Association, provisions of National Electrical Code (ANSI/NFPA70 or latest edition), and the National Fuel Gas Code (ANSI Z223.1 or latest edition).

2. The BTU output capacity of the furnace proposed for installation should be based on a heat loss calculation made according to the manuals provided by the Air Conditioning Contractors of America (ACCA) or ASHRAE.

All installations and services must be performed by qualified service personnel.

3. MINIMUM CLEARANCES TO COMBUSTIBLE MATERIALS

MODEL NO.	FROM SIDES OF FURNACE & REAR	FRONT	TOP OF PLENUM	FROM THE FLUE OR VENT	SIDE OF PLENUM
CLHS1-050	0 IN.	6 IN.	0 IN.	0 IN.	1 IN.
CLHS1-075	0 IN.	6 IN.	0 IN.	0 IN.	1 IN.
CLHS1-100	0 IN.	6 IN.	0 IN.	0 IN.	1 IN.
CLHS1-125	0 IN.	6 IN.	0 IN.	0 IN.	1 IN.
CLHX1-050	0 IN.	6 IN.	0 IN.	0 IN.	1 IN.
CLHX1-075	0 IN.	6 IN.	0 IN.	0 IN.	1 IN.
CLHX1-100	0 IN.	6 IN.	0 IN.	0 IN.	1 IN.
CLHX1-125	0 IN.	6 IN.	0 IN.	0 IN.	1 IN.

TABLE 1

The CLHS1 & CLHX1 furnaces may be installed on combustible flooring. The furnace shall not be installed directly on carpeting or other combustible material other than wood flooring. These furnaces may be installed in an alcove or in a closet if the minimum clearances to combustible construction (listed previously) are met. The minimum clearances are listed for fire protection. Clearance for servicing the front of the furnaces and to all points on the furnace requiring access must be 24".

Equipment must be installed in accordance with regulations of the National Board of Fire Underwriters. Authorities having jurisdiction should be consulted before installations are made.

B. FURNACE LOCATION

⚠CAUTION*: These high efficiency condensing furnaces are not certified for and shall not be vented into a standard or any type of chimney.*

The following shall be considered for locating the furnace:

1. For best performance locate the furnace so that it is centralized with respect to the duct system and as near as possible to a floor drain since condensate drainage must be provided.

2. Place the unit so that proper venting can be achieved, with a minimum number of elbows, in accord with the instructions in this manual.

3. The furnace must be located on a level, dry surface. The furnace must be installed so that the electrical components are protected from water. If the area becomes wet or damp at times, the furnace should be raised above the floor using a concrete base, bricks, patio blocks, etc.

NOTICE: Ensure furnace is level after installation to ensure proper drainage and operation.

4. This furnace must be connected to a drain in accordance with these instructions. If it is not practical to connect the unit to a drain, a condensate pump must be used and can be ordered as an accessory, part number 350224. If an acid neutralizer kit is required by local code or the customer, it is available under part number 320095.

5. A Furnace installed in a residential garage must be installed so the burner and ignition source are located higher than 18 inches above the floor. Also, the furnace must be located or protected to avoid physical damage by vehicles.

6. A gas fired furnace for installation in a residential garage must be installed as specified in Section III of these instructions.

All installations and services must be performed by qualified service personnel.

C. REPLACING EXISTING FURNACE FROM A COMMON VENT

⚠**WARNING**: ***These furnaces may NOT be common vented with any other appliance.***

D. GENERAL REQUIREMENTS FOR VENTING

The furnace venting system must be installed by a qualified service person in accordance with local installation codes and these instructions. In the absence of applicable local codes, conform to the National Fuel Gas Code, NFPA 54 /ANSI Z223.1-2002, or latest edition thereof.

Provide adequate combustion and ventilation air to the furnace space as specified in Section III parts D through H.

Installation shall, at least, conform to the following requirements.

1. The exhaust vent / combustion air intake terminations specified by Thermo Products, in this manual, shall be used.

2. All plastic pipe and pipefittings sourced to complete the exhaust vent and air intake systems shall be constructed of rigid PVC (polyvinyl chloride) thermoplastic. All components shall have a wall thickness equivalent to Schedule 40 series materials.

   In addition, all sourced PVC components shall be listed by a nationally recognized testing agency (e.g. NSF, UL, etc.) as conforming to one (1) or more of the following design standards.

PVC Pipe Designation	Design Standard
Cellular Core	ASTM-F891
DWV (Drain-Waste-Vent)	ASTM-D2665
Schedule 40	ASTM-D1785

3. The exhaust vent pipe and combustion air pipe shall be at least as large as the exhaust vent / air intake pipe specified by Thermo Products. **Size reduction is never permissible.** The required exhaust vent / air intake pipe sizes are:

   - **2-inch PVC thermoplastic pipe, for models CLHS1–050/075 & CLHX1-050/075**
   - **3-inch PVC thermoplastic pipe, for models CLHS1–100/125 & CLHX1–100/125**

4. All horizontal runs of exhaust vent pipe shall slope upward at least ¼ inch per foot from the outlet of the furnace to the vent termination, beyond the outside wall. This slope will permit proper drainage of the condensate.

   Horizontal runs of air intake pipe shall slope downward at least ¼ inch per foot from the outlet of the last elbow or last horizontal run, before exiting the wall, to the intake termination beyond the outside wall. This slope will permit proper drainage of any precipitation that enters the intake pipe.

5. The exhaust vent pipe shall be supported at every joint (no more than 4-feet between supports) to prevent pipe blockage due to condensate trapped at a local low point, or sag, in the vent system.

6. The **maximum permissible length of piping** (consisting of a combination of straight pipe and a corresponding number of elbows) permitted is:

   - **75 equivalent feet,** for the **exhaust vent system,** and
   - **75 equivalent feet,** for the **combustion air intake system**

7. The maximum quantity of Schedule 40 series, type DWV thermoplastic pipe elbows allowed in each system is listed in Table 2. When counting pipe elbows, this excludes all elbows, or equivalent pipefittings, used inside the furnace jacket in addition to those used to construct the termination. Furthermore, a credit of 5-feet of straight pipe may be taken for each elbow, up to maximum of three (3) elbows, which is dropped from the maximum permissible number for each system.

Thermoplastic Pipe Vent Size (Nominal)	2 in. Diameter IPS			3 in. Diameter IPS		
Furnace Model	Exhaust or Intake Pipe Len. (ft.)	Maximum Qty. of Exhaust Elbows [1]	Maximum Qty. of Intake Elbows [1]	Exhaust or Intake Pipe Len. (ft.)	Maximum Qty. of Exhaust Elbows [1]	Maximum Qty. of Intake Elbows [1]
CLHS1 / CLHX1-50	35	8	8	-	-	-
CLHS1 / CLHX1-75						
CLHS1 / CLHX1-100	**Not Permitted**			35	8	8
CLHS1 / CLHX1-125						

TABLE 2

Superscripts:
[1] Two (2) 45° elbows can be substituted for one (1) 90° elbow.

Care should be taken to design the shortest possible intake and exhaust systems. Each system should contain as few elbows as possible to insure the satisfactory operation of the furnace. However, system length should never be less than 5 ft of pipe with two (2) 90 deg. elbows. This is separate from the elbows used at the termination and those inside the furnace cabinet. For best overall operation of the combustion system, we recommend the actual equivalent lengths for both the constructed intake and the exhaust systems have approximately the same value.

8. Use a saw designed to cut thermoplastic pipe. All cuts should be made at right angles to the pipe wall. Smooth jagged edges and remove all burrs and strings. **All pipe joints must utilize standard PVC Schedule 40 series, DWV type elbows, couplings, and fittings.** Clean all pipe surfaces at connections using a fine abrasive material or approved PVC cleaner (primer). Secure all pipe joints using suitable permanent PVC pipe solvent cement. Joints are **NOT** to be made by simply gluing raw edges of butted together vent pipe.

   Piping joints inside the furnace vestibule should be sealed with silicone caulk, rather than pipe cement, to allow for disassembly and removal of piping, if necessary, during maintenance.

   Seal the vent installation by caulking the gap around the two (2) holes where the thermoplastic pipes pass through the wall.

   NOTICE: Use silicone caulk to seal the Combustion Air pipe as it passes through the 2" Intake Air Flange.

9. Vent connections shall be checked for leakage with the furnace running. Use a mild soap and water solution to check for leaks.

10. Vent pipe passing through an unheated space shall be insulated with 1-inch thick, foil-faced fiberglass insulation, or equivalent, to prevent freezing of condensate within the pipe.

11. No clearance is required from the outer surface of the thermoplastic piping to combustible materials for fire hazard prevention.

12. Thermo Products does not require screens be installed in the exhaust vent and air intake piping. However, optional stainless steel screens are available from Thermo Products, under part no. 320226 for 3" vent and 320219 for 2" vent.

NOTICE: The furnace may be vented either through the sidewall or the roof. For sidewall instructions, continue to the following section. For roof venting, refer to Section III G, of this manual

E. SIDEWALL VENTING

1. Vent and combustion air pipes may pass through a maximum wall thickness of 18 inches. The minimum wall thickness is 2 inches. Referring to Figure 1, the maximum distance from the outer wall to the center of the elbow is 12 inches.

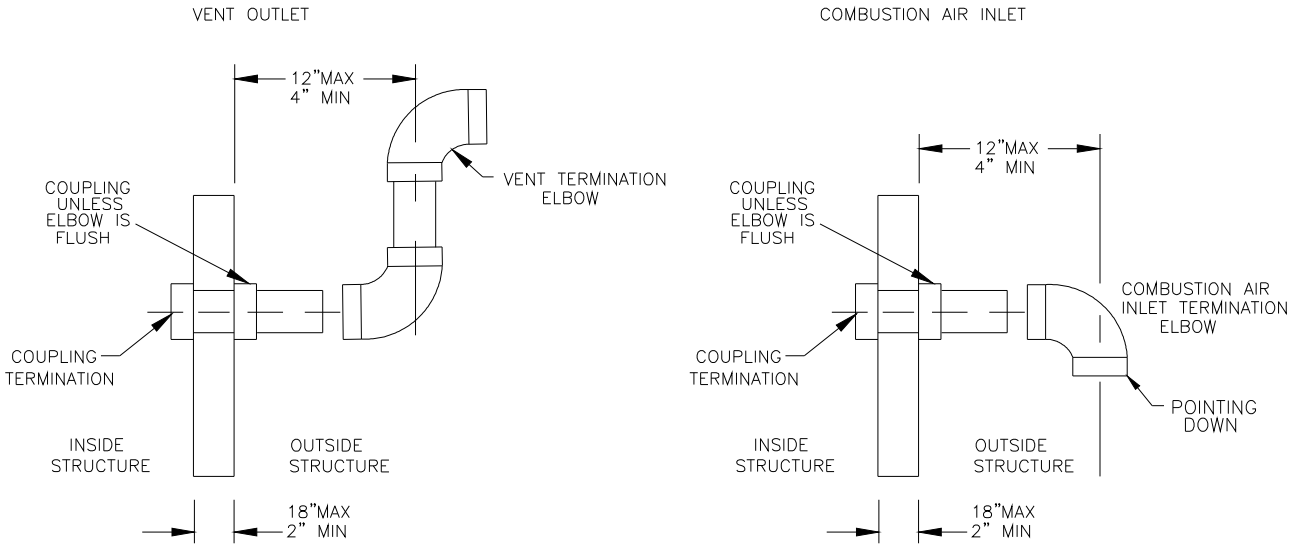


Figure 1: Proper Direct Vent Terminations

NOTICE: If exterior sidewall building materials are subject to degradation from contact with flue gases or moisture, a minimum 24-inch diameter shield shall be fabricated from stainless steel or UV-resistant plastic sheet. The protective shield shall be installed around the vent pipe on the outside wall.

2. The exhaust vent termination elbow shall be installed in accordance with these instructions and any applicable local codes. Refer to Figures 1 and 2 for typical examples of proper terminations.

    a. The exhaust vent termination must be installed in the same atmospheric pressure zone (i.e. on the same wall) as the air intake termination.

    b. The bottom edge of the vent termination elbow must be installed at least 12-inches above the outlet of intake termination elbow.

c. The horizontal distance between the inlet and exhaust terminations should be minimized, when possible, and should never exceed 24-inches.

d. The vent and intake systems should utilize the same numbers of elbows and approximately the same length of straight pipe to reach the outside termination.

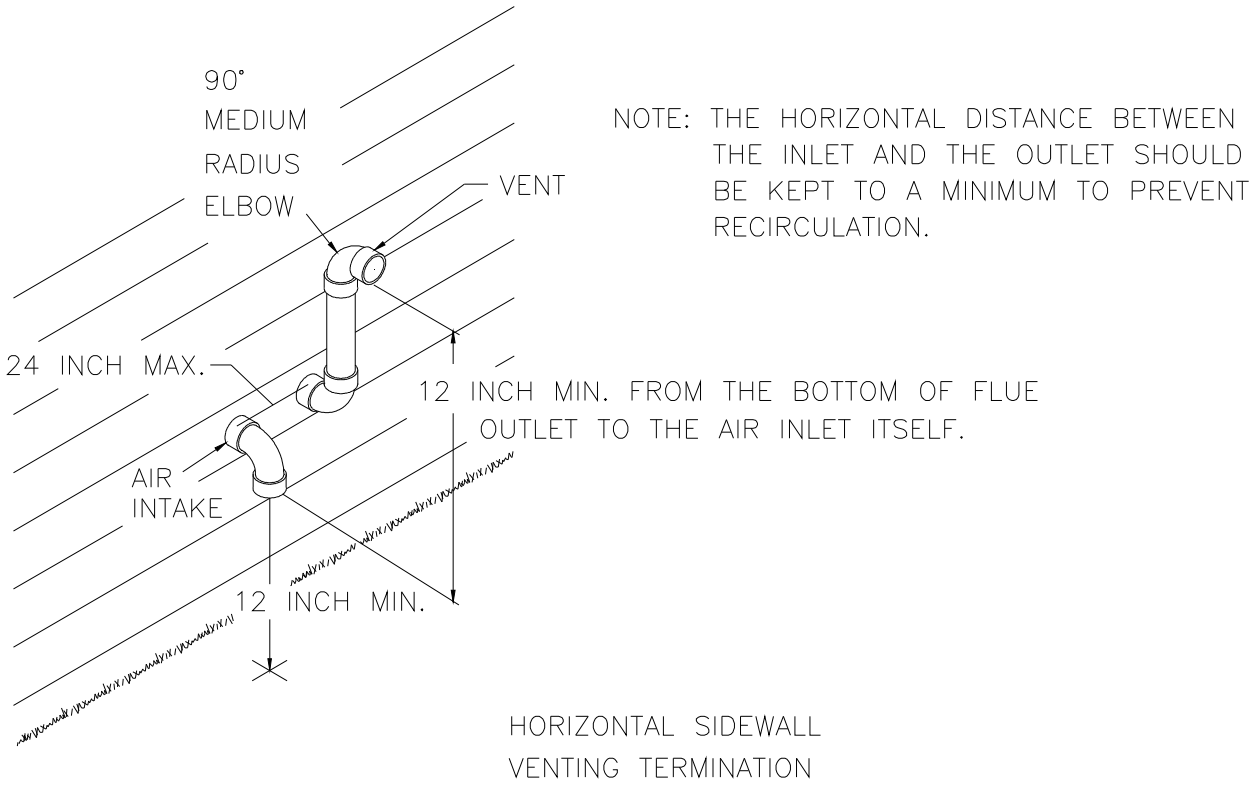


Figure 2: Typical Relative Locations of Direct Vent Terminations When Sidewall Venting

3. Exhaust Vent Terminal Location Clearance Requirements

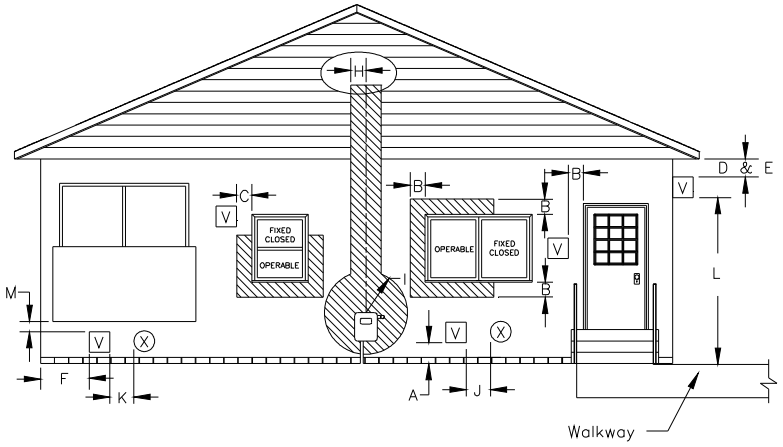
a. The vent terminal shall be located at least 3-feet above any forced air inlet located within 10-feet. Refer to Figure 3 for a depiction of the minimum required clearances between vent terminations and building features according to the National Fuel Gas Code (NFGC).

b. The vent terminal shall be at least 12-inches below, 12-inches horizontally from, or 12-inches above, any door, window, or gravity air inlet into a building. The bottom of the vent terminal shall be located at least 12-inches above grade.

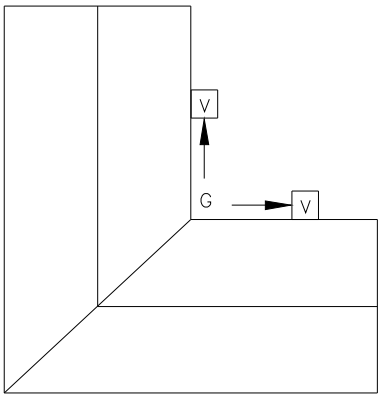
c. The vent terminal shall **not** be located:
- over public walkways or over an area where wetting of surfaces by condensate, or water vapor, could create a nuisance or hazard,
- near soffit vents, crawl space vents, or other areas where condensate or water vapor could create a nuisance, hazard, or cause property damage,
- where wetting of components by condensate, or water vapor, could be detrimental to the operation of pressure regulators, relief valves, or any other equipment.

d. The vent terminal shall be installed a minimum of 14-inches from any obstruction and 3-feet from an inside corner of an L-shaped structure.

All installations and services must be performed by qualified service personnel.



Front View of a Typical Single-Story House



Plan View of an "L"-Shaped House

LEGEND

V = Vent terminal

X = Air supply inlet

= Vent terminal installation prohibited within this region

Dimension	Clearance Definition	Requirement for US Installations*
A	Distance above grade, veranda, porch, deck, or balcany	12 inches
B	Distance to window or door that may be opened	12 inches
C	Distance to permanently closed window	12 inches ***
D	Distance to ventillated soffit located above the terminal within a horizontal distance of 2 feet from the centerline of the terminal	24 inches ***
E	Distance to unventilated soffit	24 inches ***
F	Distance to outside corner	24 inches ***
G	Distance to inside corner	3 feet ***
H	Distance to each side of centerline extended above meter/regulator assembly	4 feet ***
I	Distance to service regulator vent outlet	4 feet ***
J	Distance to nonmechanical air supply inlet to building or the combustion air inlet to any other appliance	12 inches
K	Distance to mechanical air supply inlet	3 feet above, if within 10 feet horizontally
L	Distance above paved sidewalk or paved driveway located on public property	7 feet ****
M	Distance below veranda, porch, deck, or balcany	24 inches ***

* In accordance with the current edition of the National Fuel Gas Code, ANSI Z223.1/NFPA 54.

*** Clearance in accordance with local installation codes, the requirements of the gas supplier, and the manufacturer's installation instructions.

**** In direct vent applications, clearance in accordance with local installation codes, the requirements of the gas supplier, and the manufacturer's installation instructions.

Figure 3: NFGC Minimum Clearances Between the Vent Terminal and Various Building Features

All installations and services must be performed by qualified service personnel.

4. Vent Terminal Location Guidelines

⚠CAUTION: Bushes, shrubs, or any vegetation that may restrict the flow of flue products must be kept away from vent and air intake terminations. Terminations must also be kept clear of any leaves, weeds, combustible materials, snow, and ice build-up. Avoid locating the vent terminal over areas where dripping of condensate, or small pools of acidic condensate, could create a problem.

In addition to following any local code requirements, when possible, utilize the guidelines below in locating the vent terminal to help insure trouble-free operation of a sidewall vented furnace:

- Avoid locating the vent terminal on a wall facing prevailing winds and wide-open areas. When impractical, choose a location that protects the vent from strong winds, such as behind a fence or hedge.

- In geographical areas with considerable snowfall, it is advisable to locate the vent terminal much higher than the minimum 12-inches above ground to prevent blockage by snow accumulation or drifting.

- The vent and combustion air terminations shall be checked periodically, at least at the start of each heating season, for restriction or blockage from foreign material in the exhaust vent or in the air intake piping. Clean the air intake and vent terminations when necessary.

NOTICE: When using this termination method the furnace is susceptible to a nuisance shut off due to high winds blowing directly into the vent and changing the internal pressure enough to activate a safety pressure switch. It is best practice to locate the vent so that prevailing winds do not blow directly into the open vent termination.

5. Alternate Vent Termination for Wind Gusts in Excess of 25 MPH

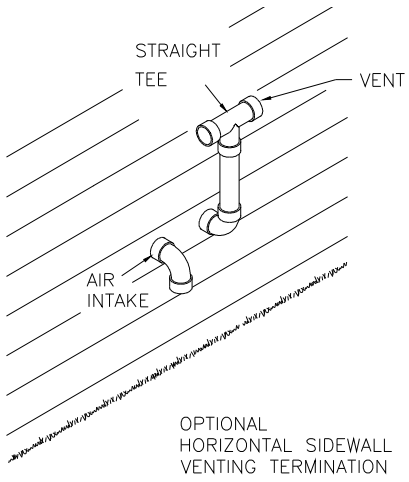


Figure 4: Optional Termination

If the exhaust vent is to be installed in a location which may be exposed to winds blowing directly at the vent termination, this alternate configuration should be used. All previous venting instructions still apply, with the exception that the elbow on the exhaust vent termination is replaced with a straight tee. A sanitary tee may be used if a straight tee is unavailable, but optimal performance is achieved with a straight tee. The air intake remains unchanged.

All installations and services must be performed by qualified service personnel.

6. Optional Direct Vent Terminations

Three optional vent kits are available for direct vent terminations, refer to Figure 5.

- The concentric vent kits (Thermo Products p/n AOPS7488 & AOPS7489) provide a means for the vent and intake to be installed through a single opening in the roof or exterior wall. Kit p/n AOPS7488 is used on furnace models CLHS1/CLHX1-50 & 75. Kit p/n AOPS7489 is used on furnace models CLHS1/CLHX1-100 &125.

- The sidewall vent cap (Thermo Products part no. 370191) is a cover installed over the exhaust vent and air intake pipes on the exterior of the building. For horizontal sidewall vent applications only. This kit may be used on any size furnace in the CLHS1/CLHX1 family.

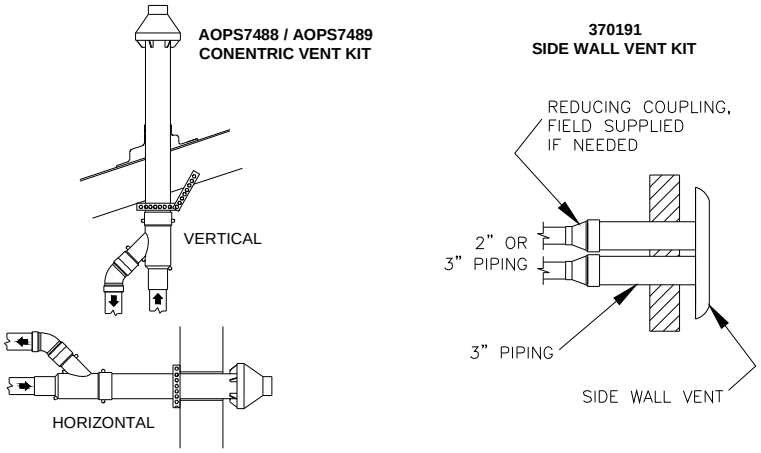


Figure 5: Optional Direct Vent Kits for the CLHS1 / CLHX1 Model Series of Furnaces

Install these optional kits according to the instructions provided with each kit. In horizontal or side wall installations. The location and clearance requirements are identical to those of the standard vent terminations described in this manual.

NOTICE: When using these alternate termination kits the furnace is more susceptible to a nuisance shut off due to high winds blowing directly into the vent and changing the internal pressure enough to activate a safety pressure switch. It is best practice to locate the vent so that prevailing winds do not blow directly into the open vent termination.

F. CONNECTING FURNACE TO ROOF VENT / INTAKE TERMINATIONS

If it is not desirable, or feasible, to vent the furnace through a sidewall, it may be vertically vented through the roof. Installation shall conform to the following guidelines, which are illustrated in Figure 6, below.

1. The outlet of the exhaust vent and the inlet of the combustion air intake, i.e. the terminations, shall be a minimum of 12-inches above highest anticipated snow level.

2. The exhaust vent outlet must be installed a minimum of 12-inches above the air intake inlet.

3. Where exposed to prevailing winds, the combustion air intake shall be installed upwind of the vent outlet.

4. The exhaust vent and combustion air intake shall be a minimum of 3-inches and a maximum of 24 inches apart.

NOTICE: When the vent termination is installed correctly, a draft should NOT be present in the system during the furnace off-cycle.

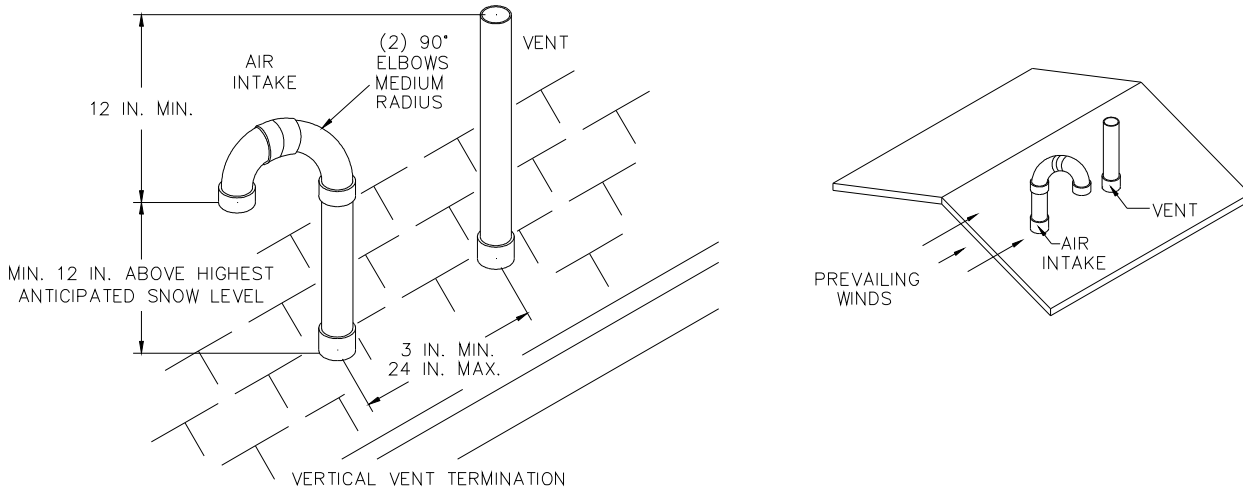


Figure 6: Typical Rooftop Vent and Air Intake Termination Construction Details

G. CONNECTING FURNACE TO VENT / INTAKE TERMINATIONS

1. Figure 7 depict typical exhaust vent and air intake connections for the furnace model series CLHS1 / CLHX1, as well as a list of required parts to correctly install each system.

   For the -100 & -125 models, which require 3-inch PVC pipe, there will still be a short section of 2-inch PVC pipe & fittings at the furnace, as the grommet and intake flange are both sized for 2-inch. The length of 2-inch PVC pipe between the furnace cabinet and the 2-inch x 3-inch reducer fitting must be kept to a minimum. The maximum length of that 2-inch PVC pipe should be 12 inches.

All installations and services must be performed by qualified service personnel.

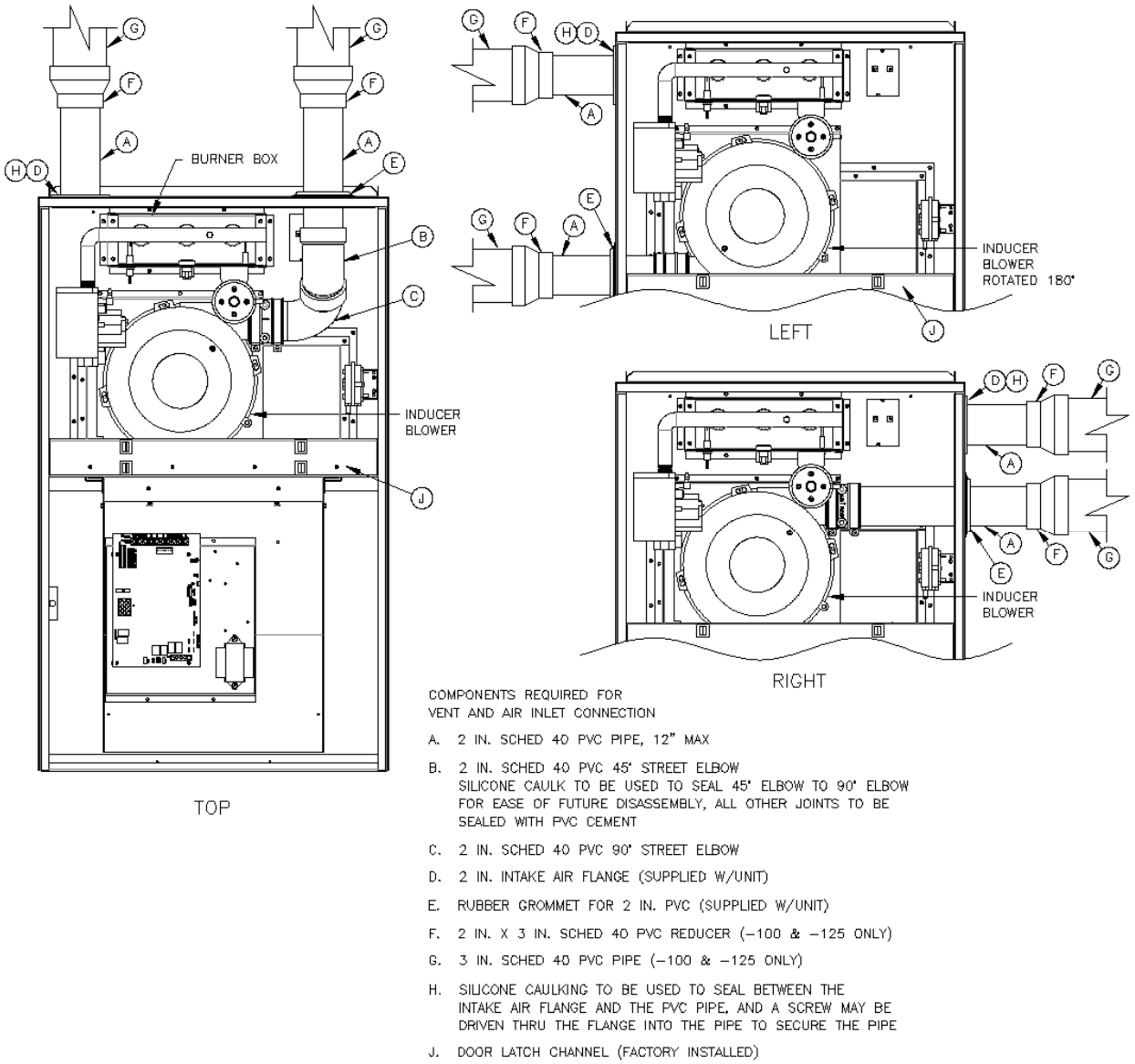


Figure 7: Required Exhaust Vent and Air Intake Piping

2. Connecting The Exhaust Vent To The Inducer

   a. The Exhaust Vent piping may exit the furnace thru either the top, left or right side as depicted in Figure 7. Upon selection of the location to exit the furnace, cut out the appropriate knock-out and install the rubber grommet provided. The grommet should be installed from the inside so that the insulation is captured between the flange of the grommet and the metal panel. All PVC connections inside the cabinet should be sealed with silicone caulk to enable easy disassembly for future repairs.

   b. If the Vent is going through the Top panel, connect a 2-inch 90° PVC street elbow to the flexible drain adapter already installed on the inducer blower. Tilt the street elbow so it is installed at a 45° angle from the vertical. Tighten the worm clamp on the flexible drain adapter to seal and hold the elbow in place. Then connect a 2-inch 45° PVC street elbow to the previously installed elbow so that it points up toward the top panel. Now a section of 2-inch PVC pipe can be installed through the rubber grommet in the top panel into the 45° street elbow.

c. If the Vent is going thru the Left side panel, remove the Door Latch Channel and its 4 screws. Then remove the Inducer Blower and the 4 nuts & washers which attach it. The Inducer Blower should then be rotated 180° and re-installed. Do not over-tighten the 4 nuts which attach the inducer, as that may cause the inducer's internal blower wheel to rub. Replace the 5/16" ID tubing which ran from the inducer to the pressure switch with the longer piece of tubing provided in the parts kit. Now re-install the Door Latch Channel and its mounting screws. The flexible drain adapter that was factory installed on the exit of the inducer must be retained at the exit of the inducer. Now a section of 2-inch PVC pipe can be installed through the rubber grommet in the left panel into the flexible drain adapter. Tighten the worm clamp on the flexible drain adapter to seal and hold the PVC pipe in place.

d. If the Vent is going thru the Right side panel, merely install a section of 2-inch PVC pipe through the rubber grommet in the right panel into the flexible drain adapter. Tighten the worm clamp on the flexible drain adapter to seal and hold the PVC pipe in place.

3. Connecting The Combustion Air Intake Piping

⚠**CAUTION**: ***Outside combustion air must NOT be drawn from an area directly adjacent to a pool, hot tub or spa. Measures should be taken to prevent the entry of corrosive chemicals or vapors into the combustion air supply. Such chemicals include but are not limited to chlorinated and/or fluorinated hydrocarbons such as found in refrigerants, aerosol propellants, dry cleaning fluids, degreasers , bleaches, air fresheners or solvents. Vapors from such products can form reactive acid producing chemical species when burned in a gas flame. Should acidic compounds form in the furnace they may significantly reduce the useful life of the furnace.***

a. The Combustion Air Intake piping may enter the furnace thru either the top, left or right side as depicted in Figure 7. Upon selection of the location to exit the furnace, cut out the appropriate knock-out and install the Intake Air Flange provided using 4 self-tapping screws.

b. A section of 2-inch PVC pipe should then be inserted into the Intake Air Flange, using silicone caulk to seal the pipe to the flange. The pipe may protrude into the furnace up to 1 inch past the flange. For increased rigidity, a self-tapping screw may be installed thru the flange into the PVC pipe.

H. CONDENSATE DRAIN LINE & TRAP ASSEMBLY

1. The following diagrams depict typical condensate drain and trap connections for the furnace models series CLHS1 and CLHX1, refer to the illustrations in Figures 8a-8b and 9.

NOTICE: If the 11/16 inch tubing is difficult to slide through the rubber grommet, spray some mild soap or light oil (such as WD-40) on the tube prior to pushing through the grommet to serve as a lubricant. Wipe off excess after installation.

All installations and services must be performed by qualified service personnel.

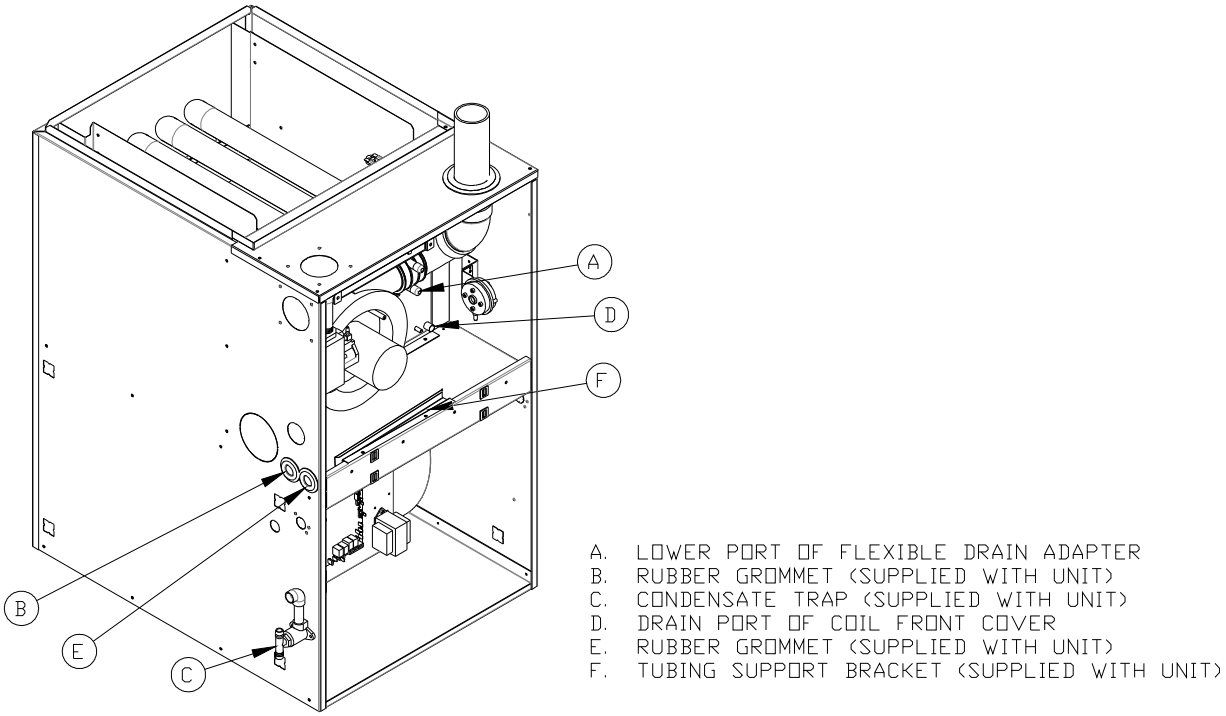


Figure 8a. Condensate Trap Assembly, Left Side

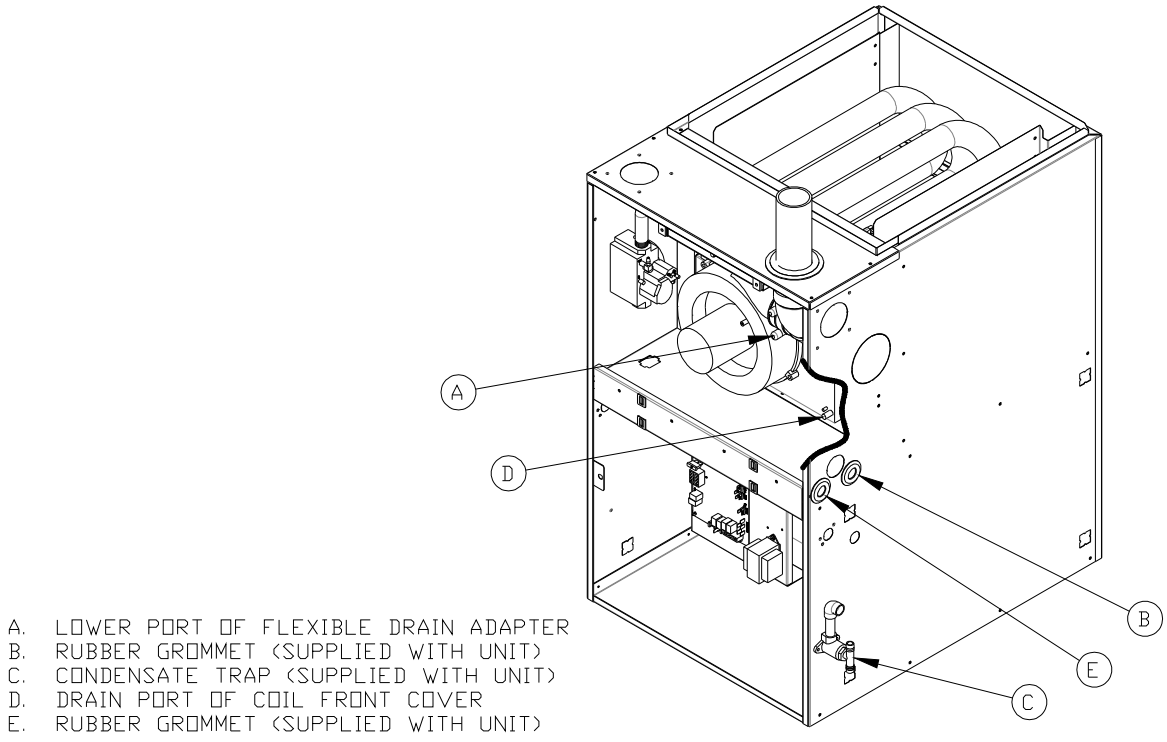


Figure 8b. Condensate Trap Assembly, Right Side

All installations and services must be performed by qualified service personnel.

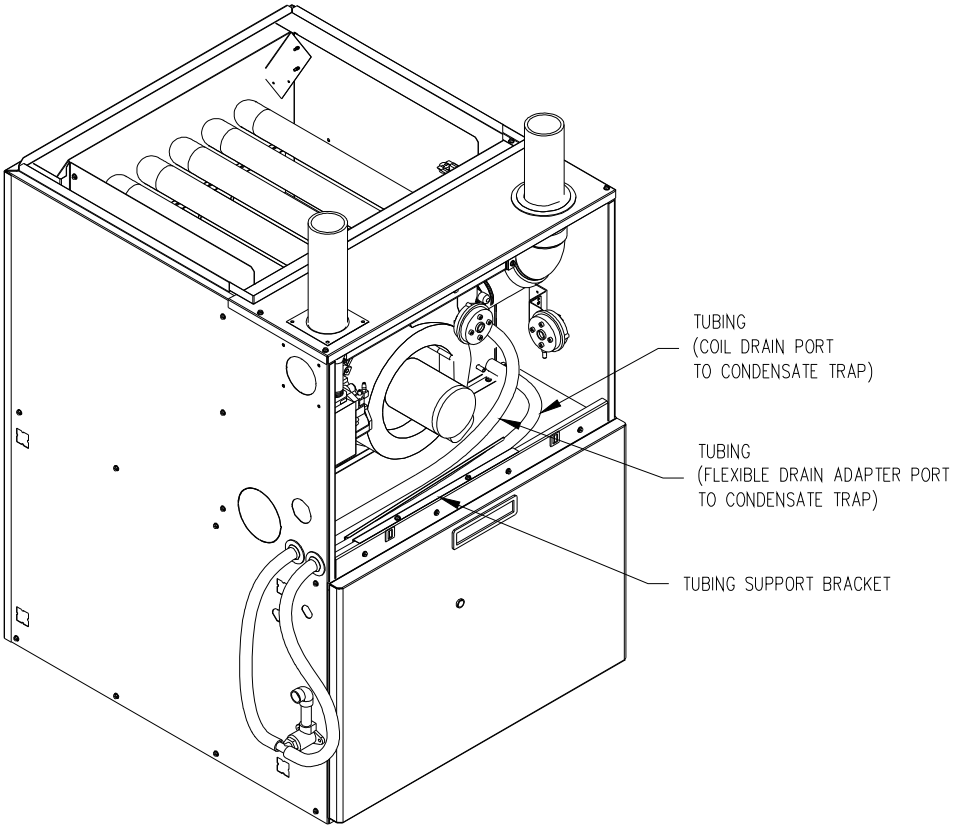


Figure 9. Condensate Trap Assembly, Left Side with Tubing Installed

2. Determine from which side of the furnace the condensate disposal lines will be run.

   NOTICE: On the model series CLHS1 / CLHX1 the condensate disposal line **must** be on the opposite side as the return air inlet. The return air cutout is sufficiently large to block normal placement of the condensate trap and condensate lines.

   Drive two (2) #8 x 3/4 inch sheet metal screws with black protective coating (supplied with furnace) to attach the condensate trap to the furnace casing. Pilot holes are provided on both sides of the casing for mounting the trap. After attaching the trap, rotate the black barb tee clockwise 90° so that the barbs are horizontal.

3. Attach one (1) drain hose (a length of 11/16 inch O.D. clear, colorless tubing) from the drain port of the Coil Front Cover plate through the rubber grommet (“E” in Figures 8a & 8b) in the side panel and connect to one of the barbs of the condensate trap. Tubing should create a gentle bend with no kinks. Cut to length as necessary and discard excess. Use the spring-type hose clamp(s) provided in the parts package to secure all connections.

   If the condensate trap is on the Left Side of the furnace, as in Figure 8a, the tubing from the Coil Front Cover must be snapped into this bracket to hold it in place as shown in Figure 9. The tubing support bracket may be temporarily removed to allow easier assembly of the tubing into the bracket, but it must be reinstalled properly.

NOTICE: For condensate traps on the Left Side, failure to attach the support bracket or insert the tubing properly may create a water trap in the tubing, leading to furnace shut-off as a result of a blocked condensate drain.

4. Attach the second drain hose (a length of 11/16 inch O.D. clear, colorless tubing) from the lower port of the Flexible Drain Adapter ("A" in Figures 8a & 8b) to the plastic hose barb tee provided in the condensate trap assembly. Cut to length as necessary and discard excess. Attach the drain hose to the hose barb on the other side of the condensate trap tee. Use the spring-type hose clamp(s) provided in the parts package to secure all connections.

5. Plan, source, and install a condensate drain line using ½ inch diameter CPVC (chlorinated polyvinyl chloride) thermoplastic pipe and pipefittings. In the event ½ inch PVC is preferred, a CPVC to PVC adapter is included in the parts kit provided with the furnace. Route the line in the shortest possible manner to reach a nearby drain. Secure all joints using cement. For gravity drainage, the condensate drain line must maintain a minimum ¼ inch per foot downward slope toward the drain. The drain line must be watertight, supported, and secured such that it cannot be easily moved.

   NOTICE: If an air conditioning condensate drain line is combined with the furnace condensate drain line, the air conditioning evaporator coil must have a separate trap installed ahead of the connection joint.

6. A condensate pump may be required when,
   - a suitable drain is not present,
   - the drain is above the trap outlet level on the furnace, or
   - the drain line cannot be sloped downward its full length to the drain.

7. **CAUTION: Continual exposure to condensate may injure plants and damage certain building materials, including many metals, wood, stone, and concrete.**

   Flue gas condensate is slightly acidic with a pH of about 3.5. (A pH level of 7.0 is considered neutral. Carbonated cola drinks with a pH of 3.1 are actually slightly more acidic than condensate.) If local codes require an acid neutralizing kit, a kit is available from Thermo Products under part no. 320095. Follow the instructions enclosed with the neutralizing kit for proper installation.

8. The condensate piping in the furnace and the drain system should be flushed out at the start of every heating season. This will ensure trouble free operation and will keep the acidity level well above a pH of 3.4, i.e. more towards neutral.

   To flush the condensate drain system, follow these steps.

   a. Turn off electrical power to the furnace at the disconnecting switch and adjust the room thermostat to "OFF", or to the lowest temperature setting.

   b. Flush the drain system by removing the drain hose from the Coil Front Cover of the secondary heat exchanger and running tap water into the open end of the tubing. Run at least a quart of water through the drain system, until the water leaving the drain system is clear and colorless in color and free of any particulate matter.

   c. Replace the drain tubing by pushing it firmly onto the nipple. Make sure the spring-type hose clamp is returned to the original position to prevent leaks.

   d. If any of the electrical controls are inadvertently wetted during the flushing process, dry them with a soft cloth and wait 24 hours before operating the furnace.

e. Adjust the room thermostat to the "HEAT" position, or to the desired temperature, and restore electrical power to the furnace.

9. If the condensate trap is not primed at the time the furnace is powered up, the furnace will run and eventually produce enough condensate to cause the furnace to shut off. At that time the condensate will flow out of the heat exchanger into the trap and the furnace will restart, resuming normal operation.

I. GENERAL GAS PIPING

⚠WARNING*: Because of the potential of odorant fade, a gas leak may not be detected by smell. If this furnace is installed below grade, contact your gas supplier for a gas detector.*

1. Left and right gas supply piping - These furnaces are set-up to be gas piped through either the left or right side by using a nipple, elbow and a straight pipe.

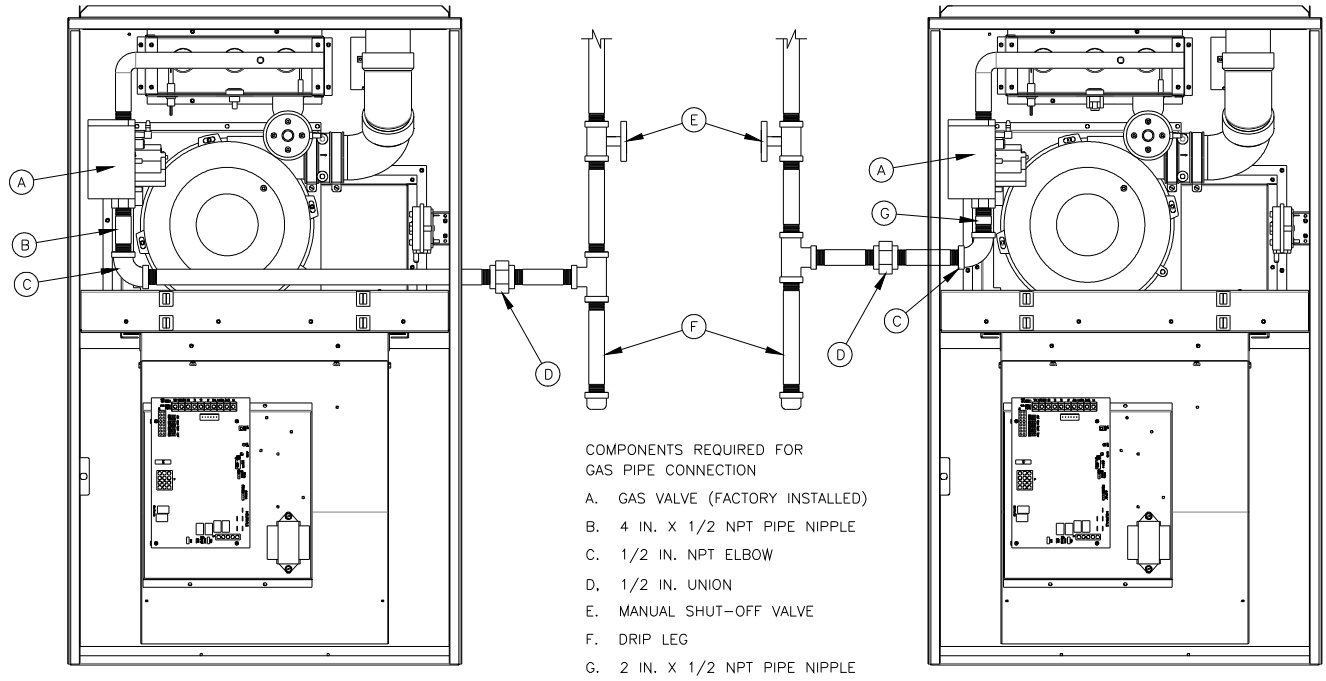


Figure 10

2. A drip leg must be used on both LP and natural gas installations prior to the furnace in order to trap oil, condensate and other impurities which might otherwise lodge in the gas valve or plug the burner orifice. Failure to install a drip leg may void the limited warranty on the furnace.

3. A 1/8 inch NPT plugged tapping, accessible for test gage connection, must be installed immediately upstream of the gas supply connection to the furnace.

4. If local codes allow the use of a flexible gas appliance connector, always use a new listed connector. Do not use a connector which has previously serviced another gas appliance.

5. The furnace and its equipment 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 psi (3.5 kPa).

All installations and services must be performed by qualified service personnel.

⚠WARNING

FIRE OR EXPLOSION HAZARD

Failure to follow the safety warning exactly could result in serious injury, death or property damage.

Never test for gas leaks with an open flame. Use a commercially available soap solution made specifically for the detection of leaks to check all connections. A fire or explosion may result causing property damage, personal injury or loss of life.

⚠AVERTISSEMENT

RISQUE D'INCENDIE OU D' EXPLOSION

Le non-respect des avertissements de sécurité pourrait d'entraîner des blessures graves, la mort ou des dommages matériels.

Ne jamais utiliser une flamme nue por vérifier la présence des fuites de gaz. Pour la vérification de tous les joints, utiliser plutôt une solution savonneuse commerciale fabriquée spécifiquement pur la détection des fuites de gaz. Un incendie ou une explosion peut entraîner des dommages matériels, des blessures ou la mort.

⚠CAUTION*: Care must be taken not to wet electronic components during leak test. Wetting the electronic components may damage their circuitry and cause a hazardous situation. Dry moisture from all leads and terminals if wetting occurs. Wait at least 24 hours for the circuit to fully dry before energizing the burner circuit.*

J. REQUIREMENTS AND SIZING OF DUCT WORK

The duct system must be sized and installed by a qualified installer or service person, following the design standards of the Air Conditioning Contractors of America (ACCA) or ASHRAE.

1. When it is located in the same room as the furnace, a return air register must be installed a minimum of 20 feet away from the furnace.

2. When a furnace is installed so that supply ducts carry air circulated by the furnace to arears outside the space containing the furnace, the return air shall also be handled by ducts(s) sealed to the furnace casing and terminating outside the space containing the furnace.

3. The return air duct system must equal the supply air duct system in its capabilities. Use a supplier's catalog for proper sizing of outlet and return air registers and grills to ensure that they meet the CFM requirements of the run to which they are connected.

4. If the furnace is used in connection with an air conditioning evaporator coil, the furnace must be installed parallel with or on the upstream side of the coil, to prevent condensation in the heat exchanger. If the evaporator coil is installed with a parallel flow arrangement, dampers or other means to control flow of air should be installed to prevent chilled air from entering the furnace. If such a device is manually operated, it must be equipped with a means to prevent operation of either the furnace or air conditioner unless it is in the full heat or cool position.

We recommend that the outlet duct be equipped with a removable access panel to allow for visual inspection of the heat exchanger to check for leakage or to allow for insertion of a probe sampler in the air stream. This removable access cover should be attached to ensure there is no air leakage.

All installations and services must be performed by qualified service personnel.

5. The duct system shall be sized for the maximum CFM requirement of the installation whether it is for heating or cooling. Two common rules for heating and cooling follow:

A. COOLING: 400 CFM (1200 BTU's) per ton of cooling is typically required.
B. HEATING: 14 CFM of heating per 1,000 BTU's of furnace output based on a nominal temperature rise.

EXAMPLE:
Heating output of a furnace is 100,000 BTU: 100 x 14 CFM = 1400 CFM
Air conditioning installed is 4 tons: 4 x 400 CFM = 1600 CFM

NOTE: The duct system must be sized for the larger CFM requirement for cooling. If only 3 tons of cooling were installed: 3 x 400 CFM = 1200 CFM. The duct would then have to be sized for the 1400 CFM heating requirement.

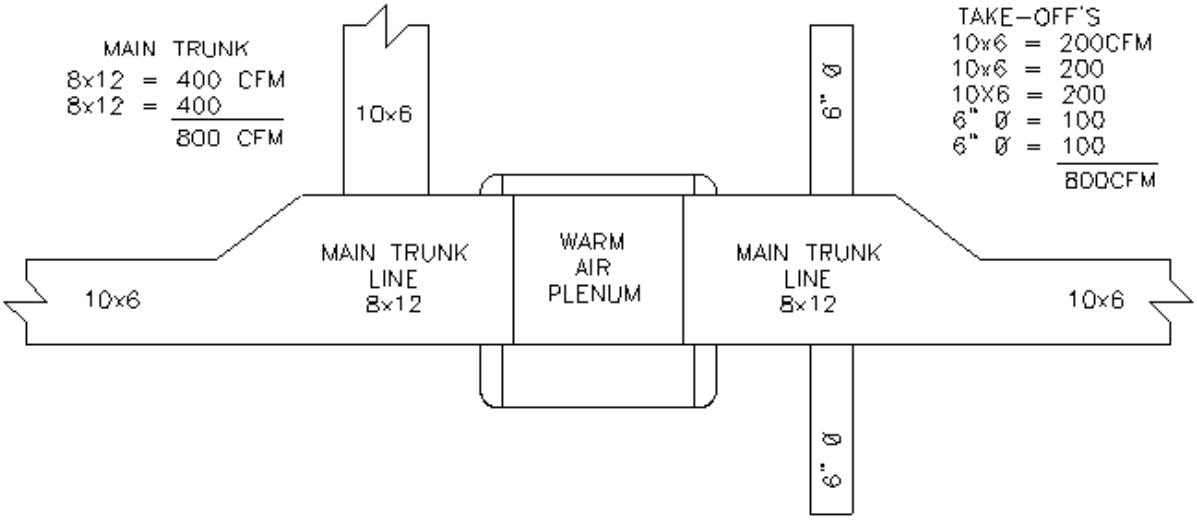


Figure 11

All trunk lines, take-offs, registers and grill-free areas must be figured when determining the air handling capacity of a duct system. One can obtain the necessary duct system size by utilizing the chart below. (For example, see Figure 11.) Use a supplier's catalog for proper sizing of outlet and return air registers to insure that the register will meet the CFM requirements of the run to which it is connected.

The main trunk lines, take offs, registers and grills of the supply return air duct system must have an adequate square inch area to move the desired CFM in order to achieve proper movement.

Each of the system components (trunk lines, take offs, runs and register and grill-free areas) must be properly sized and matched together to ensure the necessary air handling capacity of a duct system. A 12" x 8" duct with a 400 CFM capacity for example will not flow 400 CFM if the register(s) to which it connects only flows a total of 200 CFM.

The speed of the blower motor may have to be changed to obtain the proper 45°F to 75°F temperature rise for heating when an air conditioning coil is installed. This depends on the static resistance of an individual duct system and the size of the air conditioner.

All installations and services must be performed by qualified service personnel.

K. FILTERS

It is necessary to cut the return air opening in the casing depending upon the needs of the specific installation. It is possible to cut the return air opening in either the left, right, back or bottom of the cabinet.

NOTICE: If your furnace will require air delivery above 1800 CFM it is advisable that both sides, or a combination of 1 side and the back, be used.

This furnace has been factory supplied with a high quality re-usable filter rated for air velocities up to 600 ft/min. An optional Thermo Pride filter rack assembly (part no. AOPS7547 for -050, -075 & -100 and AOPS7375 for -125) is available which is sized for the filter provided. See Figure 12.

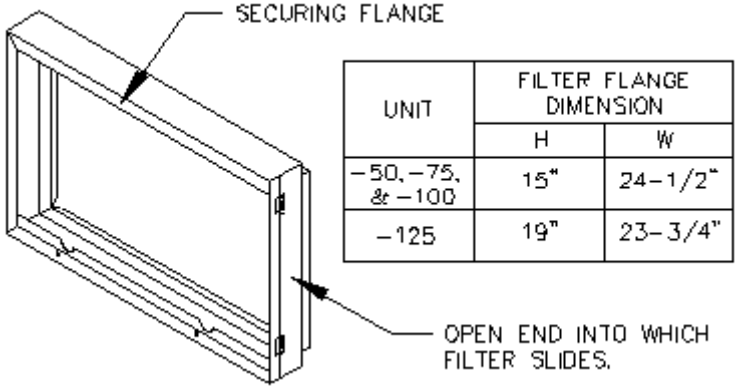
This filter should be inspected monthly. When dirty, the filter must be cleaned or replaced, if necessary, to assure proper furnace operation. Follow the cleaning, removal and replacement procedure below.

NOTICE: If the furnace is installed in a home or structure being remodeled, dust levels may be much higher than normal. The filter must be inspected daily and cleaned as needed until dusty conditions have been eliminated.

⚠WARNING: This furnace is not to be used for temporary heating of buildings or structures under construction.

The filter rack or drop chute will be located between the return air plenum and the return air opening of the furnace. Slide dirty filter out of the filter rack. Clean the filter by vacuuming, rinsing with tap water, hosing or dipping in an ordinary detergent solution. Replace the completely dry filter in the rack.

If an optional Thermo Pride filter rack is used with the furnace, it will serve as a template to scribe a mark for the return air opening on the casing. Place the filter rack on the casing 1 inch up from the bottom of the furnace on either the Left or Right side of the cabinet. Align the back of the filter rack with the back of the cabinet, and place the securing flange against the casing for locating the return air opening.



UNIT	FILTER FLANGE DIMENSION	
	H	W
-50, -75, & -100	15"	24-1/2"
-125	19"	23-3/4"

Figure 12

NOTICE: While scribing the return air opening, the filter rack can be held into position by tape or similar means.

Position the open end of the filter rack so that it is accessible for filter replacement. Once the filter rack is positioned correctly, scribe a line along the inside of the securing flange of the filter rack on three of the sides. To scribe a line on the fourth side, on the open end, use the open end support for a guide. Remove the filter rack and cut the return air opening in the casing.

Now the filter rack can be permanently attached to the furnace with screws or pop-rivets along the securing flange. Connect the return plenum to the filter rack and slide the filter into place.

All installations and services must be performed by qualified service personnel.

Use of Non Thermo Pride Filter Retention Means

If a method other than the Thermo Pride filter rack is selected for retention of the filter and/or use of a different filter type is desired, see Table 3 for minimum size guidelines for selecting a filter system for the CLHS1 or CLHX1 furnaces.

MINIMUM FILTER AREA REQUIRED (LENGTH X WIDTH)

FILTER TYPE	MAX. RATED VELOCITY	EQUATION: REQUIRED CFM / MAX. RATED VELOCITY X 144 = FILTER AREA (IN^2) HEATING VALUES PROVIDED IN CHART BELOW			
		-050	-075	-100	-125
THERMO PRIDE * SUPPLIED PERMANENT FILTER	600 FT/MIN	176 IN^2	264 IN^2	352 IN^2	440 IN^2
STANDARD PERMANENT FILTER	500 FT/MIN	211 IN^2	317 IN^2	422 IN^2	528 IN^2
DISPOSABLE TYPE FILTER	300 FT/MIN	352 IN^2	528 IN^2	704 IN^2	880 IN^2

TABLE 3

* The Thermo Pride supplied filter can be cut to size to fit other filter retention systems as long as the minimum size requirement is met. NOTICE: Any internal stiffeners used in the filter must not be removed, although they can be cut to size as needed.

NOTICE: The filter areas in Table 3 are the **minimum** areas required based on the CFM generated by the furnace for standard heating speeds only. The following formula can be used to determine the minimum filter area required for cooling if the unit is equipped with cooling. This value should then be compared to the value shown in Table 3 and the larger of the two should then be used for determining the minimum filter area required for that installation.

FORMULA:
(tons of cooling) x (400 CFM per ton) x (144 square inches per foot) = filter area in sq.inches
(max. rated velocity of filter from Table 3 for the filter type)

EXAMPLE:
If you have a CLHS1-100 furnace with 4 tons of cooling and a standard permanent filter.

4 tons x 400 CFM x 144 = 460 square inches for cooling
500 fpm

For heating, a CLHS1-100 needs 422 square inches of filter. The filter system must be designed for the larger CFM requirement determined for cooling of 460 square inches. A filter would have to be sized so that the area (length X width) was at least 460 sq. in.

L. WIRING

All wiring shall be performed by a qualified electrician or service person. The wiring must comply with local codes, the instructions in this manual, and in the absence of codes with the National Electrical Code (ANSI/NFPA-70 or latest edition).

1. The following items are guidelines to complete the wiring portion of the installations.

All installations and services must be performed by qualified service personnel.

a. A separate power supply circuit with over current protection and a disconnect switch must be provided. See furnace specifications or furnace rating label for maximum fuse size.

b. All CLHS1 and CLHX1 Series furnaces are supplied with a fuse disconnect switch box to be mounted on the outside surface of the right or left side casing so a fuse disconnect can be mounted on the furnace. Make the 120 volt supply connection in this junction box. A green screw and a strain relief are provided in order to connect the power supply ground wire and provide strain relief for the 120 volt power leads from the furnace in the fuse disconnect box. A disconnect switch can be field mounted on the 2x4 box provided. If not, the disconnect switch must be located reasonably close to and within sight of the furnace.

NOTICE: The hot surface igniter and operation of this furnace depends on correct polarity. The hot leg of the supply circuit must be connected to the **black** line lead and the common leg to the white line lead in the field mounted junction box. The hot leg must pass through the disconnect switch in all cases to prevent the hazard of electrical shock when servicing.

IMPORTANT: The furnace must be grounded in accordance with local codes and with the National Electrical Code (ANSI/NFPA NO. 70 or latest edition).

2. Electronica Air Cleaner (EAC) and Humidifier Installation

The ignition module on this furnace has designated terminals to control the operation of an electronic air cleaner and/or humidifier. These terminals provide line voltage (1.0 Amp @ 120VAC) for the control of these accessories (See Figures 13 & 14). The Humidifier is energized whenever the combustion inducer motor is energized. The EAC is energized whenever the circulation blower motor is energized for heating or cooling, but not for continuous fan.

NOTICE: It is important to confirm that the operating voltage of the humidifier or EAC being installed matches the output of this control. If not, a field supplied relay or transformer may be necessary to provide the proper control and supply voltage for the accessory being installed. See the manufacturer's instructions for the humidifier or EAC for additional instructions.

3. Thermostat Anticipator Setting

When using an analog thermostat, proper control of the indoor temperature can only be achieved if the thermostat is calibrated to the heating and/or cooling cycle. A vital consideration of this calibration is related to the thermostat heat anticipator. Newer digital thermostats do not have an Anticipator Setting and do not require calibration.

The proper thermostat heat anticipator setting is 0.4 Amps for furnace operation only. To increase length of cycle, increase setting of heat scale; to decrease length of cycle, decrease setting of heat scale. Anticipators for the cooling operation are generally pre-set by the thermostat manufacturer and require no adjustment. Anticipators for the heating operation are of two types, pre-set and adjustable. Those that are pre-set will not have an adjustment scale and are generally marked accordingly.

All installations and services must be performed by qualified service personnel.

4. CLHS1 (Single Stage) Blower Motor Speed Wiring

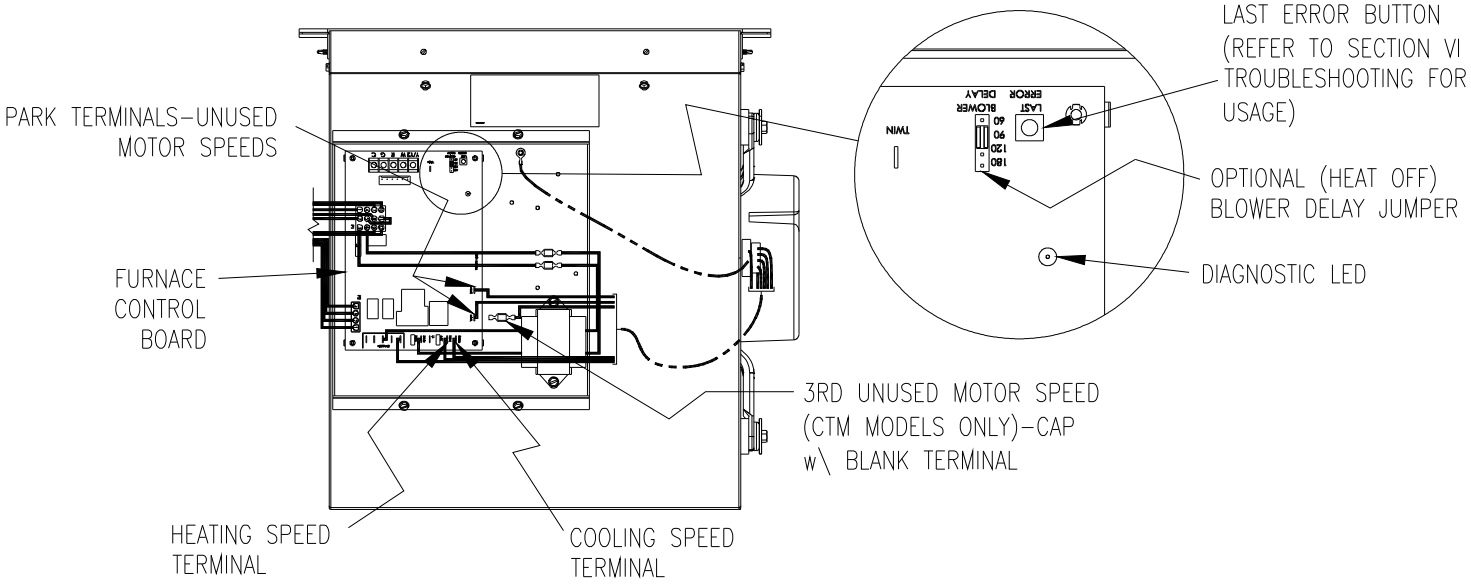


Figure 13

⚠WARNING*: TURN OFF THE ELECTRICAL POWER to the furnace before attempting to change blower speed wiring.*

A. The furnace is factory wired to the ignition control with standard heating and cooling speeds. When changing motor speeds, simply switch the needed speed to either the heating or cooling terminal as applicable on the module to obtain the desired CFM. The unused speeds should then be reconnected to the module in the "park" positions.

B. The optional blower delay jumpers on the integrated control (Figure 13) are used to determine the length of the heat delay–to-fan-off periods. The delay-to-fan-on period is preset and non-adjustable. The available options for the delay-to-fan-off are as follows: 60, 90, 120 & 180 sec.

The factory default for optimum performance of the delay-to-fan-off period is 90 seconds.

All installations and services must be performed by qualified service personnel.

5. CLHX1 (Two Stage) Blower Motor Speeds

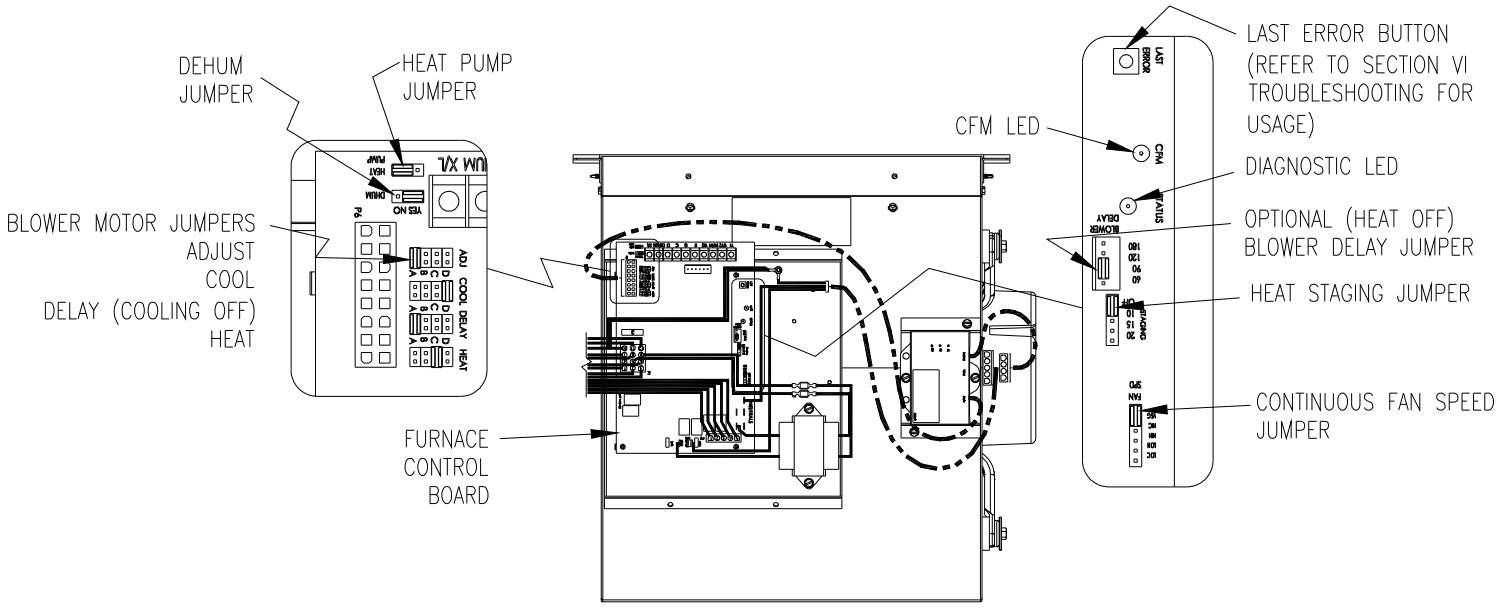


Figure 14

⚠WARNING*: TURN OFF THE ELECTRICAL POWER to the furnace before attempting to change blower speed wiring.*

A. The selection of blower motor speeds for the CLHX1 is made through the use of jumpers on the integrated control (Figure 14). There are jumpers for each of the following functions: Heat, Delay, Cool and Adjust. Each function has 4 selections: A, B, C and D. The default setting for each function is as follows:

Function	Default	
Heat	C	
Delay	A	
Cool	D	(125k unit default setting C)
Adjust	A	

B. The 4 Heat & 4 Cool functions are the predefined blower speeds listed in the specifications Section II, B.

C. The Adjust function is a slight increase or decrease in all blower speeds, as follows:

Jumper	Adjustment
A	None
B	+10%
C	-10%

D	Do Not Use (Test Mode)

D. The Delay function is for the Blower-Off delay during cooling only. Once the thermostat has satisfied the call for cooling, the blower will continue to run at 82% of the selected speed for the delay period. The selections are follows:

Jumper	Delay-Off
A	30 sec.
B	45 sec.
C	60 sec.
D	None

There is a predefined Blower-On ramp function for cooling only. Upon the thermostat call for cooling, the blower will run at 50% for 30 sec. after which it will run at 82% for the next 30 sec. Then the blower will run at 100% of the selected cooling speed until the thermostat is satisfied.

E. The optional blower delay jumpers on the integrated control (Figure 14) are used to determine the length of the heat delay–to-fan-off periods. The delay-to-fan-on period is preset and non-adjustable. The available options for the delay-to-fan-off are as follows: 60, 90, 120 & 180 sec.

6. Field Wiring and Replacement Wiring

Field wiring between the furnace and devices not attached to the furnace shall conform with the temperature limitation for Type T wire [63°F rise (35°C)] when installed with the manufacturer's instructions. If any of the original factory supplied furnace wiring is replaced, or a separate device other than the thermostat is wired internal to the unit, 105°C thermoplastic or equivalent wire must be used.

M. ADDITIONAL FEATURES

1. Heat Staging

The CLHX1 furnace control board has the option of selecting the preferred method for the activation of the second stage of heating. Selections are made with a jumper at the P5 terminal strip (see Figure 14). The selections available are as follows: OFF, 10, 15 & 20. The default selection is OFF.

Selecting 10, 15 or 20 will enable the furnace to activate second stage heating once it has run for 10, 15 or 20 minutes at the low stage. Selecting the OFF position will require that the furnace received a call for W2 heat from the thermostat to enable the second stage of heating.

2. Thermostat Call for Fan

When the thermostat calls for continuous fan (G) without a call for heat or cooling, the indoor fan is immediately energized according to the jumper setting on P17 (see Figure 14). The jumper selection offers 5 speeds for continuous fan (VS G, High Cool, Low Cool, High Heat and Low Heat). VS G indicates that the control should use the pre-programmed Variable Speed for G, which is 50% of the selected High Cool speed.

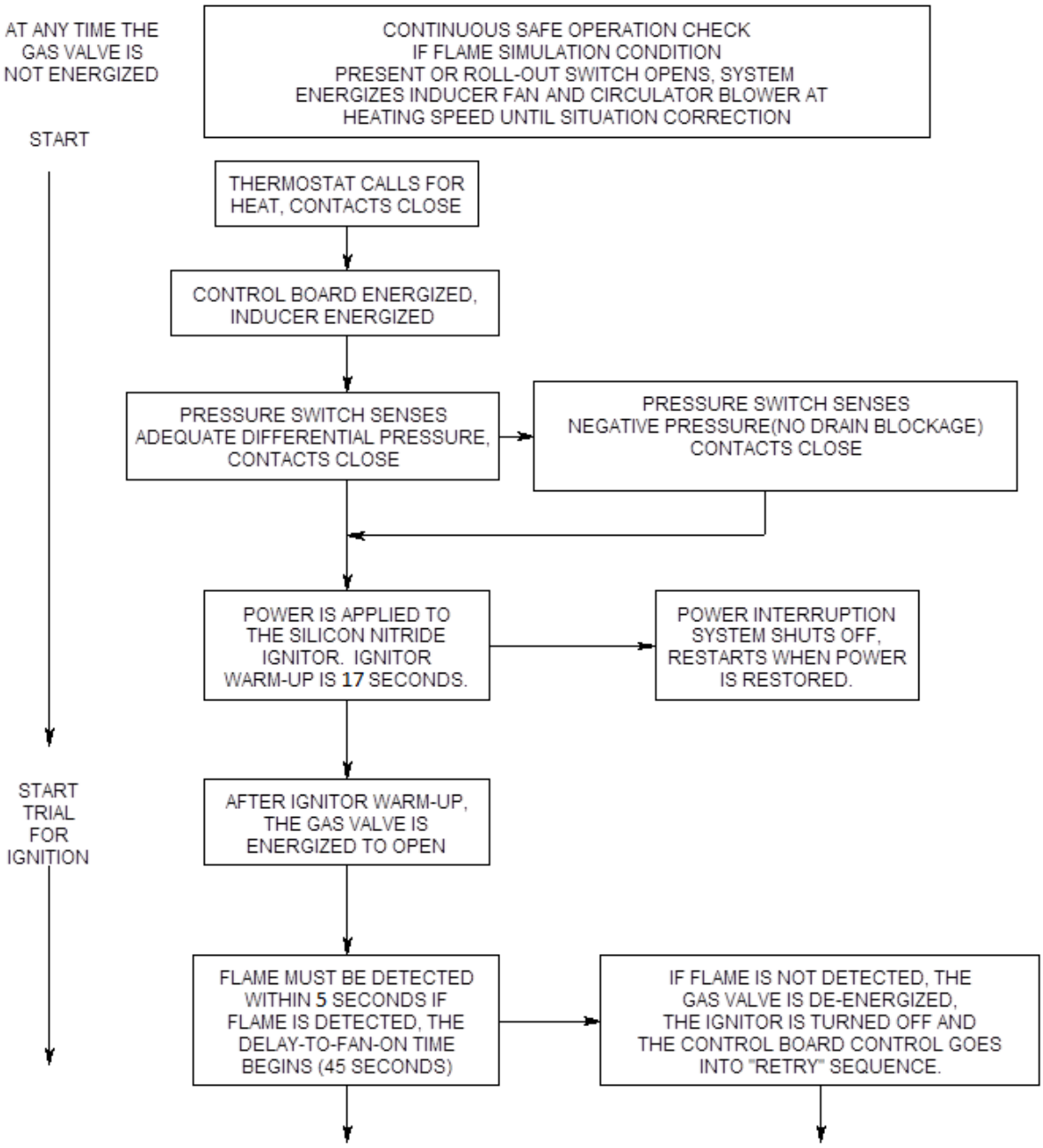
3. Dehumidifier (Dehum) and Heat Pump

The CLHX1 furnace control board has jumpers which should be used to indicate the presence of a dehumidifier, or operation with a heat pump. A jumper is provided for each option, and available selections are marked YES and NO.

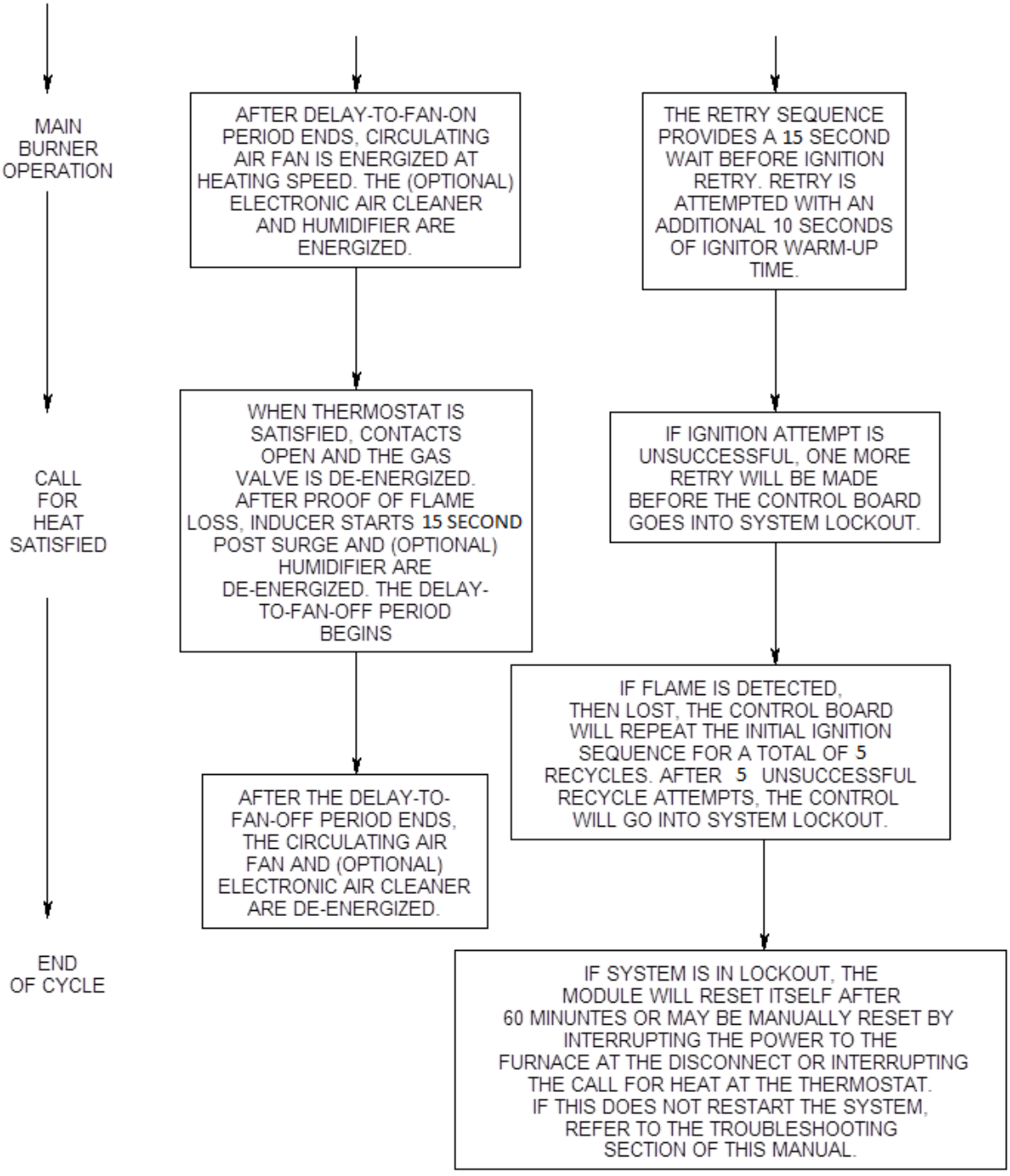
All installations and services must be performed by qualified service personnel.

IV. STARTING THE UNIT

A. SEQUENCE OF OPERATIONS



All installations and services must be performed by qualified service personnel.



B. INITIAL START UP

This furnace does not have a pilot. It is equipped with a hot surface igniter, which automatically lights the burner. Do not attempt to light the burner by hand. Check the following items before the initial start-up.

1. Check all wiring for loose connections and proper hook up.
2. Leak test gas piping connections.

3. Check all tubing to the pressure switch and drain, making sure they are connected firmly at all connection points.
4. Check flue pipe, combustion air inlet and all PVC connections for tightness and to ensure there is no blockage.
5. Make sure air filter is in place.
6. Make sure the outside vent and air intakes are installed according to instructions and are free from blockage.
7. Make sure that the drain trap is properly connected to the furnace and to the buildings drain system.
8. Make sure that the combustion door is properly installed.
9. Prime the condensate trap by adding water through a drain hose to expedite the setup & startup process.

⚠**WARNING**: ***Turn off power to furnace before it is placed into service. The gas piping system must have been leak tested by a qualified heating contractor. (See Section III, J, of these instructions on the installation of gas piping).***

⚠**WARNING**: ***It may be necessary to purge the air out of the gas line for initial start-up of the furnace after installation. This should be done by a qualified heating contractor. If excessive gas escapes when purging the gas supply at the union, allow the area to ventilate for at least 15 minutes before attempting to start the furnace. LP gas is especially dangerous because the specific gravity of LP gas allows it to accumulate at floor level at a dangerous concentration. For remainder of operating instructions, reference Users Information Manual.***

⚠**WARNING**: ***Heat exchanger oil will burn off on initial firing creating an unpleasant odor. To prevent this odor from occurring more than once, it is suggested that:***
1. A window(s) be opened.
2. The thermostat be set at highest setting.
3. The furnace remain running at conditions 1&2 for 30 minutes or until odor has dissipated.

C. ADJUSTMENT OF BTU INPUT RATE

The Orifice for this furnace was sized: 1) for natural gas having a heating value of 1025 BTU per cubic foot and a specific gravity of 0.65, or 2) for liquefied propane gas with a heating value of 2,500 BTU per cubic foot and a specific gravity of 1.55. The information plate inside the furnace vestibule will specify which gas your furnace is setup to use. If the furnace is installed at an altitude that is more than 2,000 feet above sea level, it is mandatory that the input to the burner be reduced 4.0% for every 1,000 feet that it is above sea level. If the furnace is installed at an elevation of 5,000 feet, its input must be reduced 20.0%. Example: a furnace rated at 100,000 BTU at sea level must be reduced to a firing rate of 80,000 (100,000 x 0.80 = 80,000) at an elevation of 5,000 feet. If the furnace is installed at an elevation of 2,000 feet or less, no reduction in input is required. If installed above 2,000 feet, the furnace installer should contact Thermo-Products for replacement orifices.

To check the input of your natural gas furnace, allow the unit to operate for 10 to 15 minutes and proceed as follows:

a. Call your gas supplier and ask for the BTU content (heating value) of one cubic foot of the gas, supplied to the installation area. An alternate approach is to assume a value of 1025 BTU/Cu Ft, which is the national average.
b. With all other gas appliances turned off and using a stopwatch, clock the time required for the dial on the gas meter to make one full revolution. The meter will state how many cubic feet has flowed for one revolution; usually one, two or five. The unit must have been in operation at least 10 minutes before clocking.

FORMULA: BTU Content x Number of CU FT x 3600 / Time Required for Revolution = Input BTU/Hr

EXAMPLE:
The gas meter reads 2 CU FT per revolution, and it takes 74.8 sec. to complete 1 revolution.
1025 BTU/CU FT x 2 CU FT x 3600 / 74.8 sec. = 98,663 BTU/Hr

All installations and services must be performed by qualified service personnel.

Check for the model number of this furnace, its input, the type of gas and the manifold pressure on the information plate located on the vestibule panel behind the upper front panel. In the example above, if the furnace was a CLHS1-100 model, then the 98,663 BTU input would be acceptable because it was within 2% of the listed input of 100,000 BTU.

Make sure that the gas supply pressure to the furnace falls within the maximum range of 4.5" to 14.0" w.c. pressure on natural gas and 11.0" to 14.0" w.c. on Propane gas. The pressure to the furnace must be checked while the furnace burner and any other gas appliances on the same supply system are operating.

GAS PRESSURE CHART FOR ALL CHLS1 & CLHX1 MODEL FURNACES

Fuel Gas Type	**Propane**		**Natural**	
Operating Mode and Model Series	High Fire	**CLHX1** Low Fire	High Fire	**CLHX1** Low Fire
Normal Manifold Pressure (in. W.G.)	10.0 ± 0.3	5.0 ± 0.3	3.5 ± 0.3	1.8 ± 0.3
Maximum Gas Supply Pressure (in. W.G.)	14		14	
Minimum Gas Supply Pressure (in. W.G.)	11		4.5	

TABLE 4

This gas furnace is equipped with a fixed orifice sized for the manifold pressure shown on the information plate. The input should only be increased or decreased by adjusting the manifold pressure. Remove the 1/8" threaded pipe plug located on the manifold and connect a U-Tube manometer or pressure gage to measure the pressure.

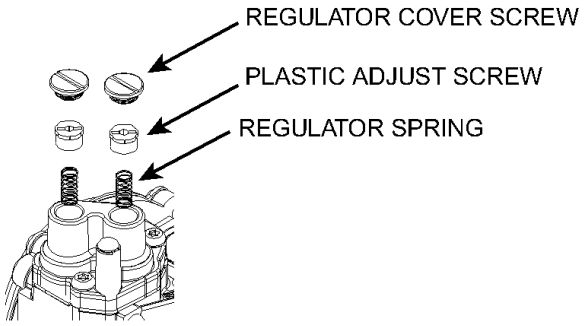


Figure 15

To adjust the pressure, remove the brass regulator screw cover from the regulator on the outlet side of the gas valve and using the adjustment screw. Refer to Figure 15, Two stage regulator shown. Decrease the pressure by turning the screw counterclockwise or increase it by turning the screw clockwise. ADJUSTMENTS TO THE LISTED PRESSURE MUST NOT EXCEED THE VALUES IN TABLE 4. Replace screw cover when adjustment is complete. The correct input can be assumed if the furnace manifold pressure is the same as that shown on the information label if a gas meter is not available for natural gas, or the unit is installed on liquefied petroleum gases which are not metered.

Shut off the gas supply to the furnace. Remove the pressure gage and re-install the pipe plug using a thread compound resistant to the action of Liquefied Petroleum gases. If the rated input cannot be obtained with the present orifice at the correct pressure, your installer should contact Thermo Products to assist in sizing the proper orifice.

All installations and services must be performed by qualified service personnel.

Our Engineering Department will gladly assist in sizing the orifice if you provide them with the heating value in BTU per cubic foot and the specific gravity of the gas.

D. BURNER ADJUSTMENT

This unit is designed to require no burner adjustment. Flames should be visually examined at the start of the heating season and monthly during the heating season. The flames should be checked by looking through the sight glass in the combustion door and observing the flames inside the burner box. Burner flames should be clear, blue and almost transparent in color. (See Figure 16). Burner flames should not impinge or fire against the side of the tube opening. **NOTE:** It is not unusual to have orange tipped flames visible in the tube for Propane gas.

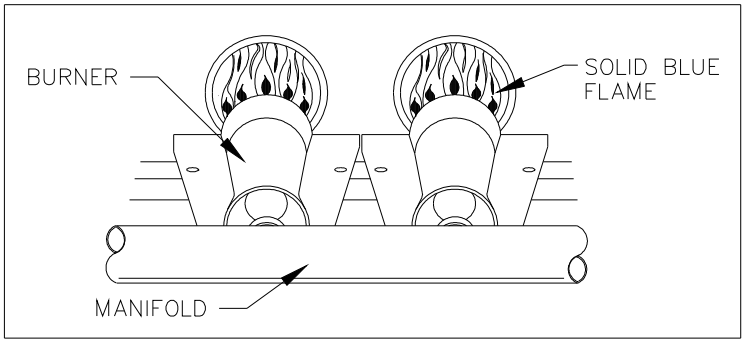


Figure 16

⚠CAUTION*: These furnace models are an in-shot burner design, which does not require an air shutter adjustment (air shutters are not used) for proper flame characteristics. Combustion door should always be in place when operating furnace.*

E. FURNACE CHECKOUT PROCEDURE

Before any system of gas piping is finally put into service, it shall be carefully tested to assure that it is gas tight as indicated in the manual.

NOTICE: All controls on the unit should be checked for proper functioning prior to the qualified service personnel leaving the job site. Specifically the following should be checked:

With furnace in normal heating operation, check to make certain blower will start and stop automatically under control of integrated fan control.

1. Check safety limit control as follows:
    a. Shut off incoming power.
    b. Block return air opening or disconnect blower motor leads.
    c. Restore power to furnace.
    d. Set thermostat above room temperature calling for heat.
    e. When temperatures are reached in furnace at limit control setting with blower out of operation, burner should shut off.
    f. Shut off electrical power.

IMPORTANT: Remove blockage or reconnect blower motor and restore power.

2. Make certain thermostat will automatically start and stop furnace.

3. Block the PVC flue outlet gradually with a flat piece of metal, until the pressure switch functions shutting off the main burners.

4. Block the PVC air inlet gradually with a flat piece of metal until pressure switch functions shutting off the main burners.

IMPORTANT: Remove flue & air inlet blockage when done.

5. Remove the blower door with the house air blower operating. The door interrupt switch is in the 120 volt circuit and will shut down the entire system. Replace the blower door and the blower will resume operation.

V. INSTALLER'S INSTRUCTIONS TO USER:

After completing the installation, the installer shall inform and/or demonstrate to the homeowner:

1. The location of all the instructions in the furnace and that these instructions and the users information manual must be kept along with instructions for any accessories in the plastic pouch on the outside of the furnace.

2. The location and use of the manual gas shut off valve and furnace electrical disconnect switch. Instruct user to always shut off gas before shutting off electric power.

3. The sequence of operation of the furnace.

4. The correct operation and maintenance of the appliance as outlined in the users information manual.

5. That failure to maintain and operate this furnace in accordance with these instructions could result in hazardous conditions, bodily injury, property damage and may void the limited warranty on the furnace.

6. Review with and encourage the user to read the label reproductions and all warnings and instructions outlined on the front cover and in sections I, II and III of this manual and in the Users Information Manual.

7. Recommend that the user have a qualified heating contractor inspect the furnace at the start of each heating season. Inform the user of the frequency of inspection required for each item in Section III of the User's Manual.

VI. TROUBLESHOOTING

NOTICE: Before troubleshooting, familiarize yourself with the startup and checkout procedures.

To assist you in troubleshooting this furnace, it is equipped with an integrated ignition control with diagnostics. These diagnostics evaluate what control system has experienced a failure and will activate a flashing light on the control in different sequences to help pinpoint the failure which has occurred.

IMPORTANT: For your convenience, Thermo Products has installed a sight glass in the blower door of this furnace. The number of flashes in groups should be observed through this sight glass and recorded before turning off power to the furnace. Pressing the "Last Error" button on the control board will initiate the display of the last 5 failure codes, even if the furnace power has been shut off.

DIAGNOSTIC FEATURES

The integrated control continuously monitors its own operation and the operation of the system. If a failure occurs, the LED will indicate a failure code as shown below. If the failure is internal to the control, the light will stay on continuously. In this case, the entire control should be replaced, as the control is not field-repairable.

All installations and services must be performed by qualified service personnel.

If the sensed failure is in the system (external to the control), the LED will flash in the following flash-pause sequences to indicate failure status (each flash will last approximately 0.25 seconds, and each pause will last approximately 1 second).

CLHS1 (Single Stage Furnaces)

LED Off - No power to control, pushbutton switch pressed, or control fault
LED steady ON (Any color) - Control hardware fault detected
Slow Green flash - No call for heat, no active errors
Slow Orange flash - Call for heat present, no active errors
1 RED flash - High limit switch open
2 RED flashes - Pressure switch open with inducer on
3 RED flashes - Pressure switch closed with inducer off
4 RED flashes - 1 hour lockout code
5 RED flashes - Incorrect line voltage polarity or incorrect polarity on 24 VAC line from transformer
6 RED flashes – Too many limit trips in one call for heat
7 RED flashes – Pressure switch cycle lockout
8 RED flashes - Too many flame dropouts detected
9 RED flashes – Not Used
10 RED flashes – Flame present with gas valve off
Rapid flash – Incorrect 24 VAC phasing/twinning error

CLHX1 (Two Stage Furnaces)

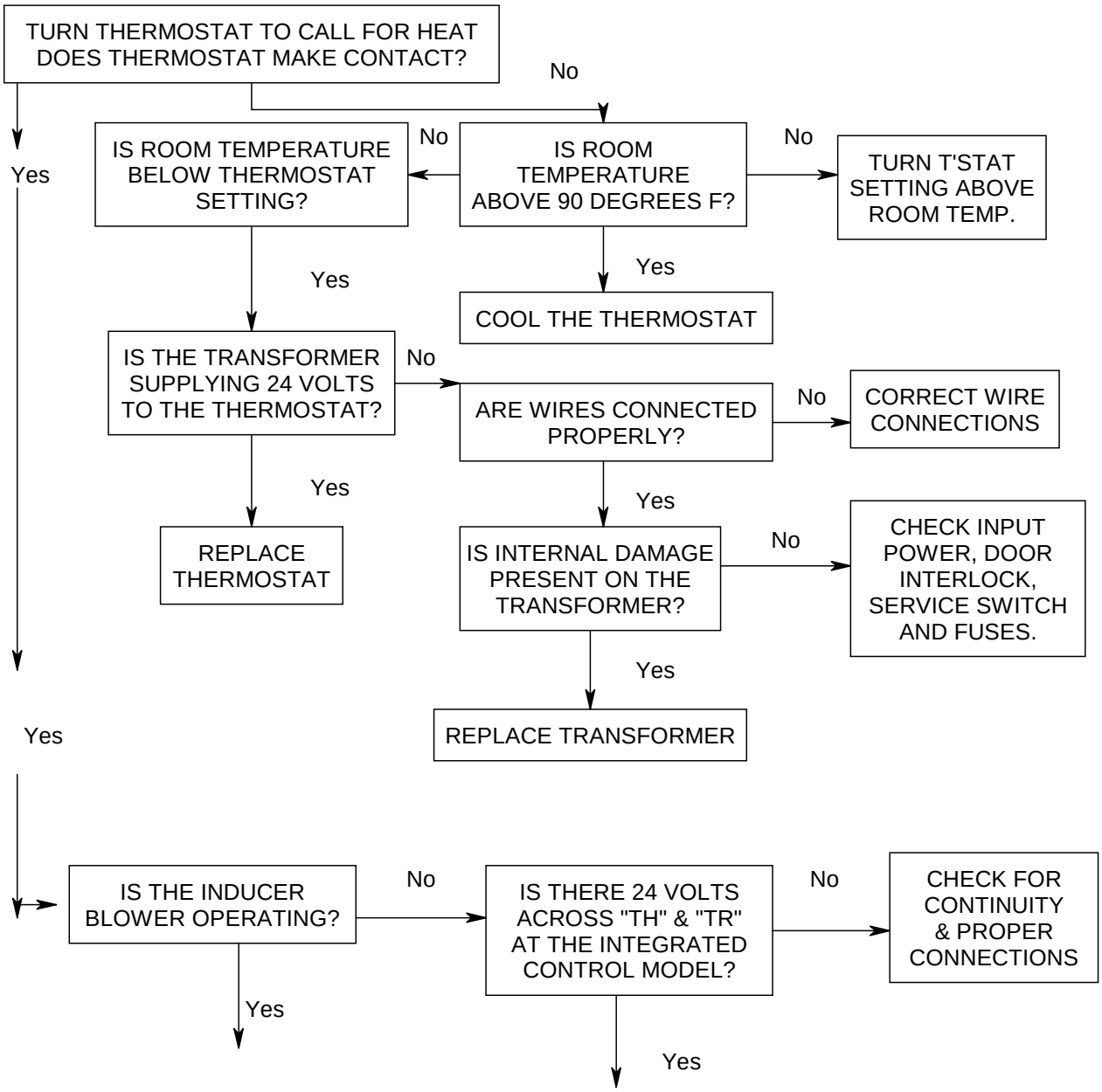
LED Off - No power to control, pushbutton switch pressed, or control fault
LED steady ON (RED) - Control hardware fault detected
Slow GREEN flash - No call for heat, no active errors
Slow ORANGE flash - Call for heat present, no active errors
Fast ORANGE flash - Call for heat present, Low Flame Current (below 1.5uA)
1 RED flash - Flame present with gas valve off
2 RED flashes - Pressure switch closed with inducer off
3 RED flashes – 1st stage pressure switch open with inducer on
4 RED flashes – Limit/Rollout switch open
5 RED flashes – Limit/Rollout open more than 15 minutes
6 RED flashes - Pressure switch cycle lockout
7 RED flashes – 1-hour Lockout code
8 RED flashes - Lockout due to too many flame dropouts
9 RED flashes - Incorrect line voltage polarity or incorrect polarity on 24 VAC line from transformer
10 RED flashes – Gas valve fault code
11 RED flashes – Limit/Rollout switch open from 5 to 15 minutes
12 RED flashes – Opened/damaged HSI (not available on 1171-121 model)
13 RED flashes – 2nd stage pressure switch open with high speed inducer on
4 ORANGE flashes – Y thermostat demand without G thermostat demand

⚠WARNING*: Power must be disconnected before servicing.*

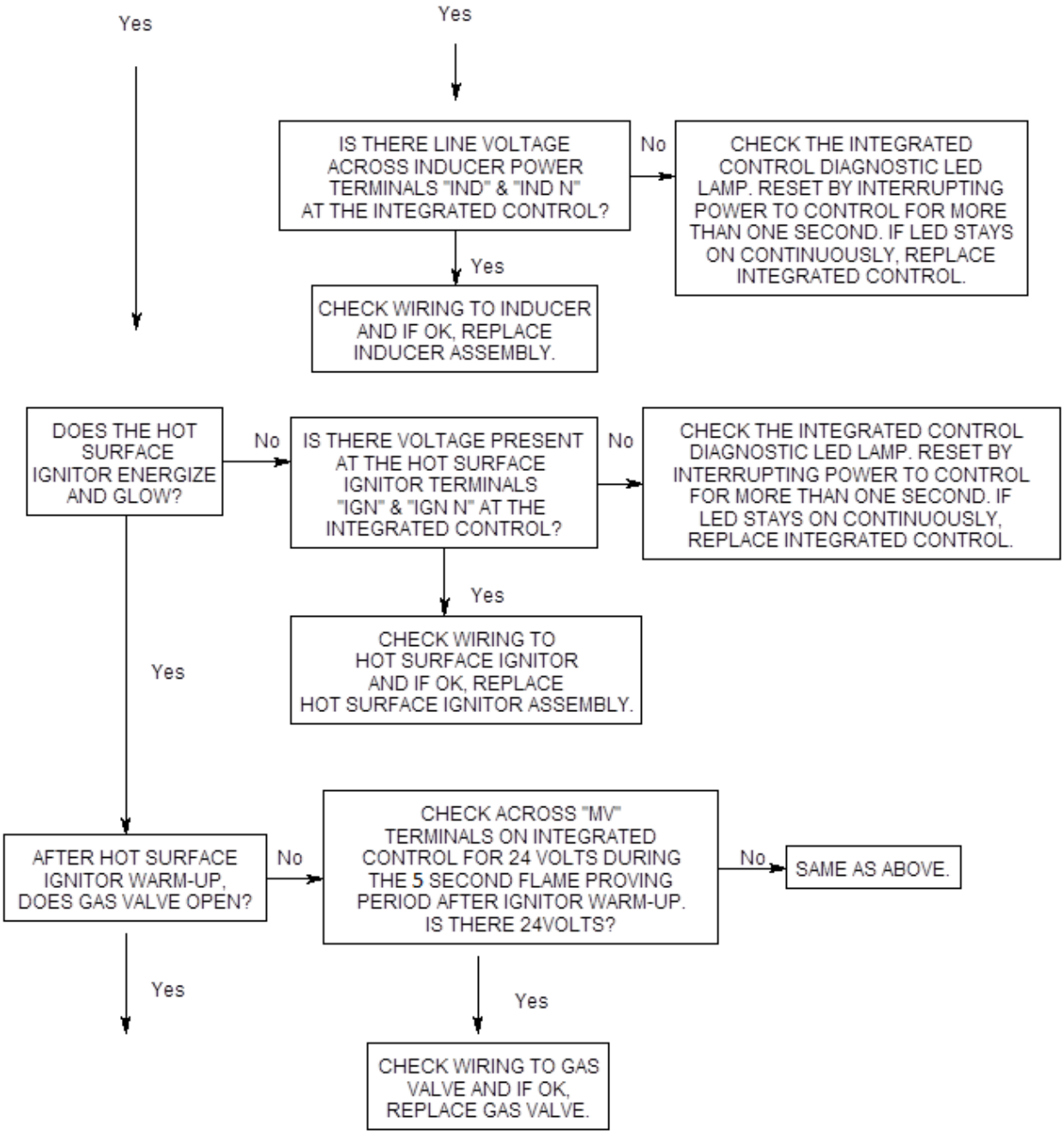
All installations and services must be performed by qualified service personnel.

TROUBLESHOOTING GUIDE
THE SYSTEM IS STARTED BY SETTING THE THERMOSTAT TO CALL FOR HEAT. THE FOLLOWING SHOULD HELP ESTABLISH THE TYPE OF MALFUNCTION OR DEVIATION FROM THE NORMAL OPERATION.

TO USE THIS DIAGRAM, YOU JUST NEED TO FOLLOW THE INSTRUCTIONS IN THE BOXES.



All installations and services must be performed by qualified service personnel.



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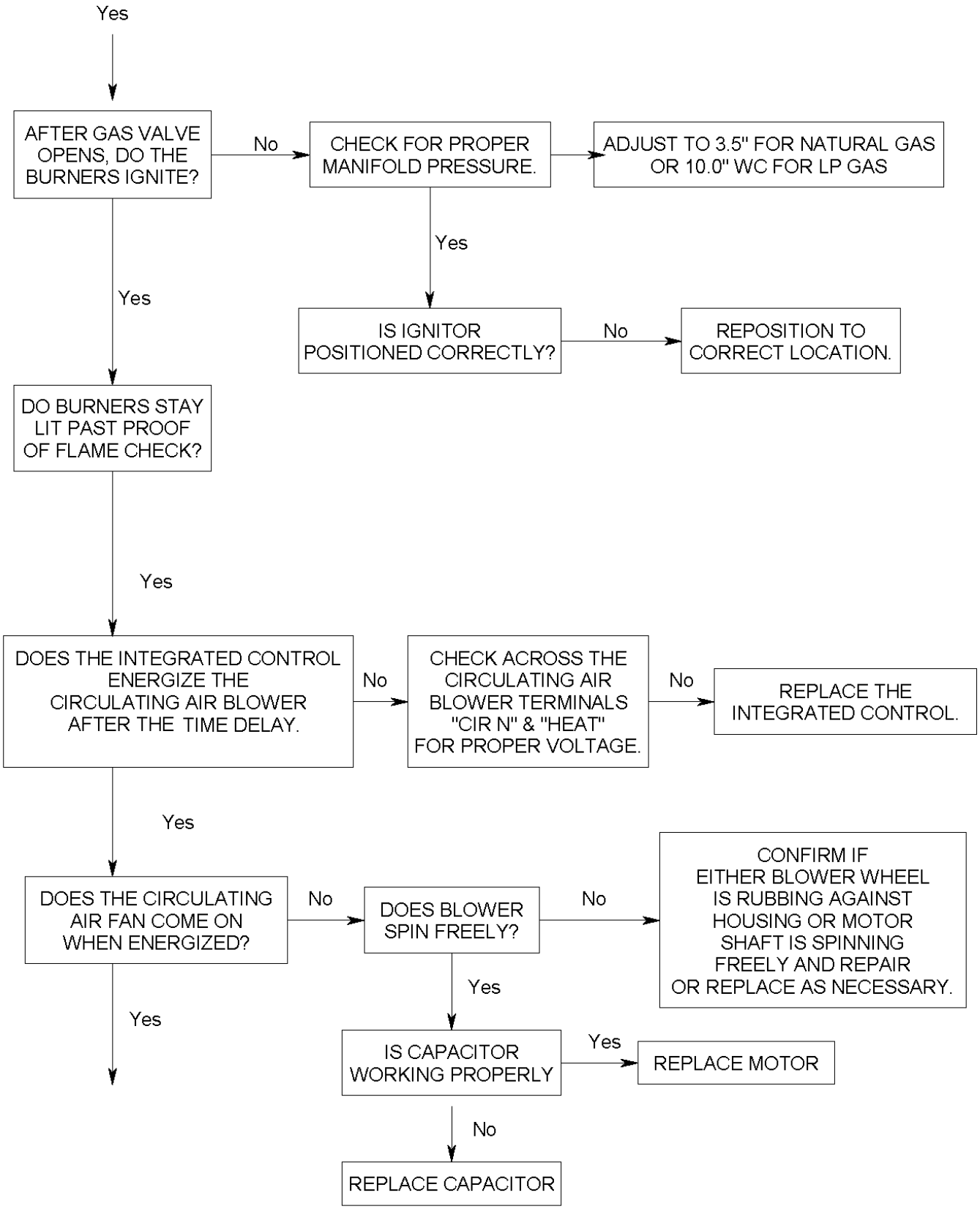

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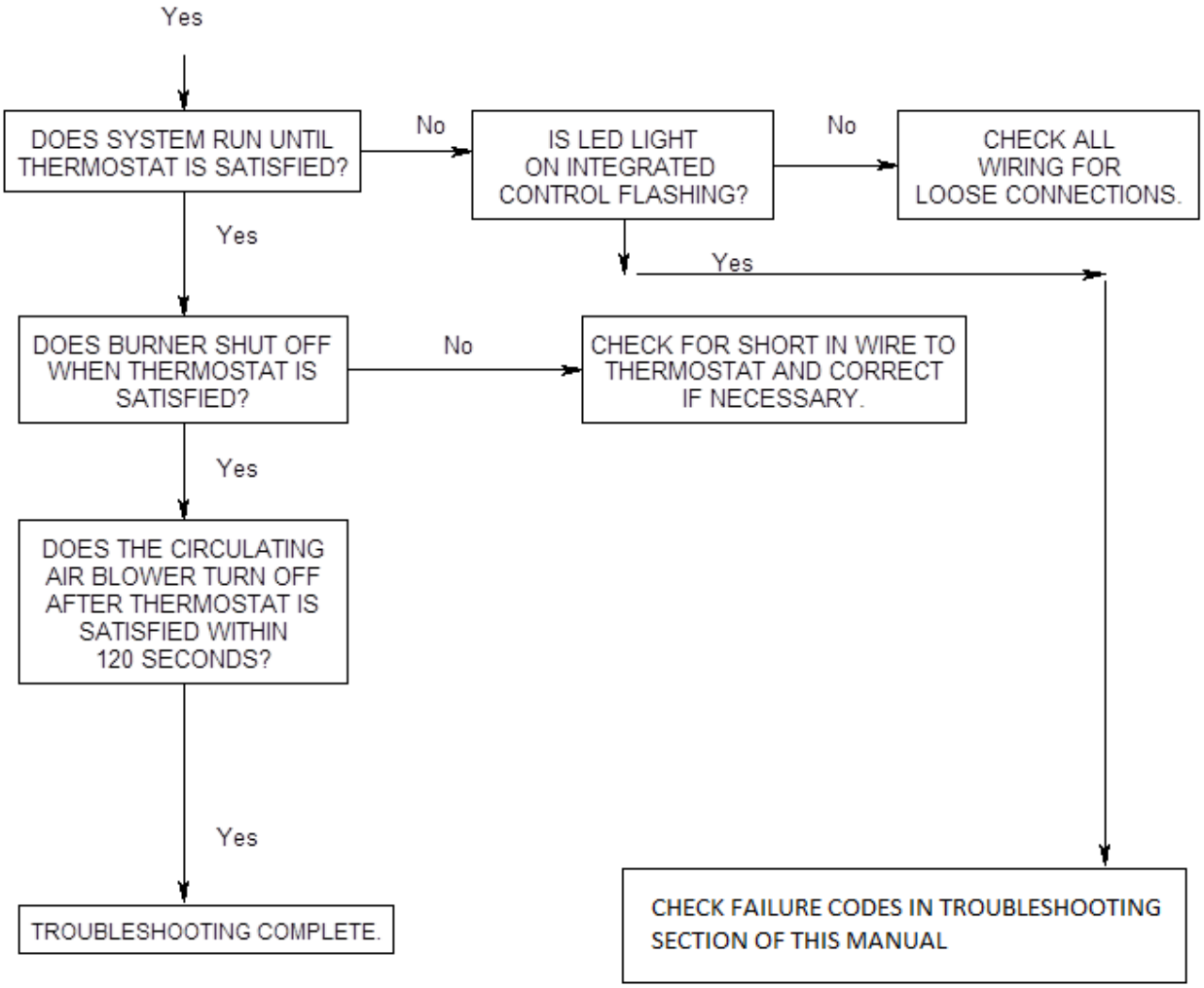
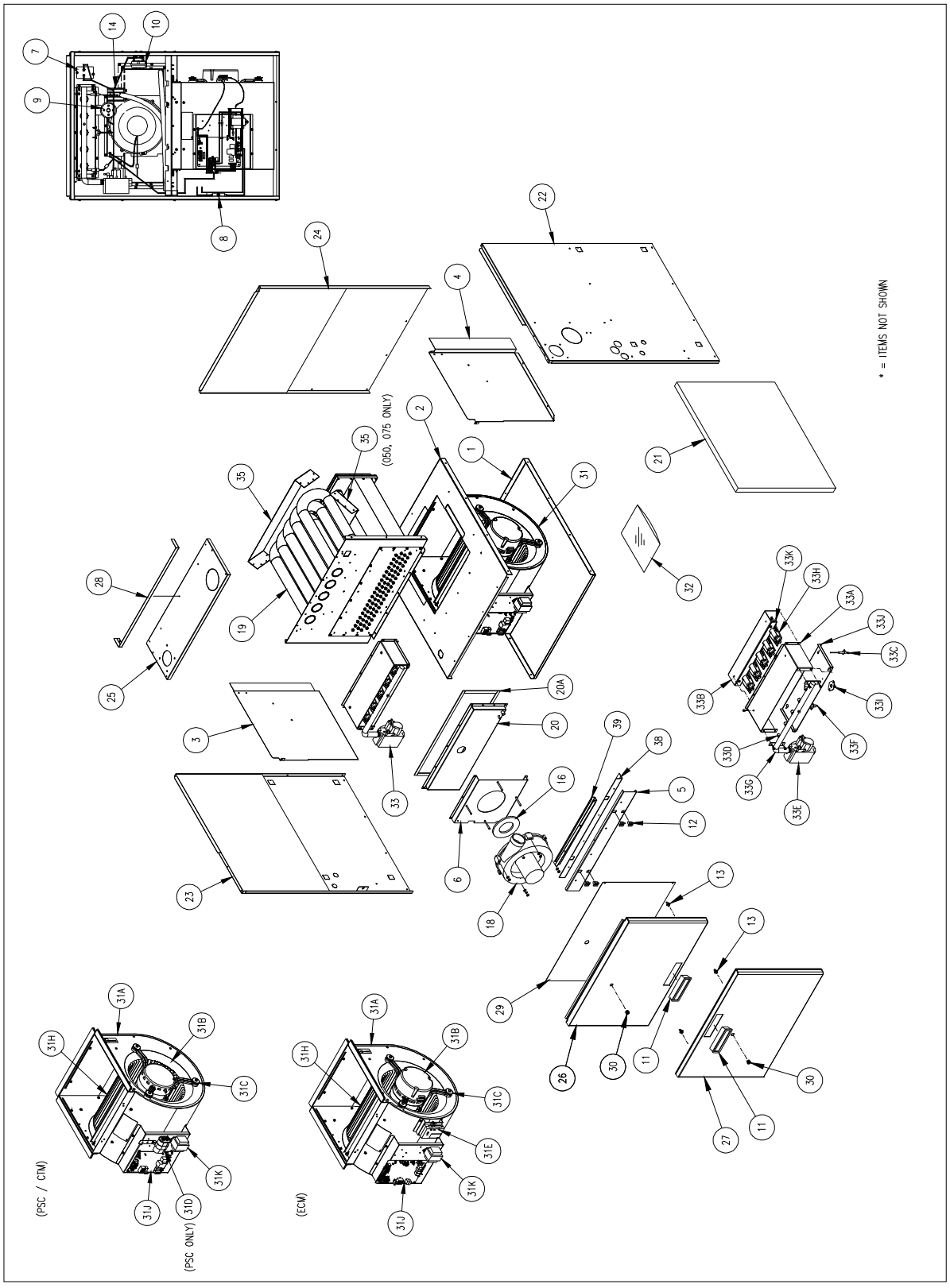


All installations and services must be performed by qualified service personnel.

Appendix –A Replacement Parts List``



All installations and services must be performed by qualified service personnel.

ITEM	SUB-ASSEMBLY / PARTS DESCRIPTION	CLHS1-050P36N		CLHS1-075P42N		CLHS1-100P48N		CLHS1-125P60N	
		PART NO.	QTY.	PART NO.	QTY.	PART NO.	QTY.	PART NO.	QTY.
1	BASE	14483	1	14484	1	14484	1	14486	1
2	BLOWER PAN	14557	1	14558	1	14558	1	14559	1
3	AIR SIDE BAFFLE, LEFT	14491	1	14491	1	14491	1	14491	1
4	AIR SIDE BAFFLE, RIGHT	14492	1	14492	1	14492	1	14492	1
5	FRONT CENTER PANEL	14525	1	14526	1	14526	1	14527	1
6	INDUCER MOUNTING PLATE	24517	1	24517	1	24517	1	24517	1
7	LIMIT SWITCH	350264	1	350953	1	350817	1	350953	1
*7A	GASKET, LIMIT SWITCH	330388	1	330388	1	330388	1	330388	1
8	SWITCH, DOOR INTERLOCK	350139	1	350139	1	350139	1	350139	1
9	PRESSURE SWITCH (UPPER)	350584	1	350584	1	350586	1	350590	1
10	PRESSURE SWITCH (LOWER)	350584	1	350584	1	350586	1	350586	1
11	DOOR PULL	320157	2	320157	2	320157	2	320157	2
12	LATCH	320208	4	320208	4	320208	4	320208	4
13	STRIKE	320209	4	320209	4	320209	4	320209	4
14	DRAIN FITTING	320913	1	320913	1	320913	1	320913	1
15	–	–	–	–	–	–	–	–	–
16	GASKET, INDUCER	330137	1	330137	1	330137	1	330137	1
18	INDUCER ASSEMBLY W\ GASKET	AOPS7416	1	AOPS7416	1	AOPS7416	1	AOPS7416	1
19	HEAT EXCHANGER ASSEMBLY	34493	1	34494	1	34495	1	34496	1
20	COIL OUTLET BOX	34518	1	34519	1	34520	1	34521	1
20A	PUTTY TAPE	3300017	5.5'	3300017	5.5'	3300017	5.5'	3300017	5.5'
21	FILTER	370023 (16x25)	1	370023 (16x25)	1	370023 (16x25)	1	370051 (20x25)	1
22	CASING, RIGHT SIDE	614466	1	614466	1	614466	1	614466	1
23	CASING, LEFT SIDE	624465	1	624465	1	624465	1	624465	1
24	CASING, REAR	614467	1	614468	1	614468	1	614470	1
25	CASING, TOP FRONT	614471	1	614472	1	614473	1	614474	1
26	DOOR, BURNER ACCESS	614475	1	614476	1	614476	1	614478	1
27	DOOR, BLOWER ACCESS	614479	1	614480	1	614480	1	614482	1
28	PLENUM ANGLE, FRONT	614498	1	614499	1	614499	1	614501	1
29	REAR PANEL, BURNER DOOR	614533	1	614534	1	614534	1	614536	1
30	WINDOW PLUG	350248	2	350248	2	350248	2	350248	2
31	BLOWER ASSEMBLY	S00S4550	1	S00S4551	1	S00S4552	1	S00S4553	1
31A	BLOWER HOUSING w\ WHL ASS'Y	S00S4517 (10-9R)	1	S00S4518 (10-10R)	1	S00S4518 (10-10R)	1	S00S4519 (12-11T)	1
31B	MOTOR, DD, MULTI-SPEED w\ CAP	AOPS7757 (1/2 HP)	1	AOPS7758 (1/2 HP)	1	AOPS7759 (3/4 HP)	1	AOPS7760 (3/4 HP)	1
31C	MOTOR BRACKET ASSEMBLY	AOPS7746	1	AOPS7746	1	AOPS7746	1	AOPS7746	1
31D	CAPACITOR	350073	1	350077	1	350077	1	350077	1
31E	–	–	–	–	–	–	–	–	–
31F	–	–	–	–	–	–	–	–	–
31G	–	–	–	–	–	–	–	–	–
31H	BLOWER WHEEL	340083	1	340097	1	340097	1	340109	1
31J	CONTROL, GAS FUR, 1-STG PSC	350211	1	350211	1	350211	1	350211	1
31K	TRANSFORMER 24V	350405	1	350405	1	350405	1	350405	1
*31L	WIRE HARNESS, BLOWER	350575	1	350575	1	350575	1	350575	1
32	PARTS PACKAGE	S00S4541	1	S00S4542	1	S00S4543	1	S00S4544	1
*32A	LP CONVERSION KIT	AOPS7746	1	AOPS7747	1	AOPS7748	1	AOPS7749	1
*32B	–	–	–	–	–	–	–	–	–
*32C	CPVC X PVC ADAPTER	320833	1	320833	1	320833	1	320833	1
*32D	CPVC TRAP ASSEMBLY	320928	1	320928	1	320928	1	320928	1
33	BURNER BOX ASSEMBLY	S00S8225	1	S00S8226	1	S00S8227	1	S00S8228	1
33A	BURNER BOX WRAP	14508	1	14509	1	14510	1	14511	1
33B	SHOOT PLATE	14512	1	14513	1	14514	1	14515	1
33C	FLAME SENSOR	350759	1	350759	1	350759	1	350759	1
33D	ORIFICE, .094/#42	380600	2	380600	3	380600	4	380600	5
33E	GAS VALVE, w\ LP KIT	AOPS7674	1	AOPS7674	1	AOPS7674	1	AOPS7674	1
33F	IGNITER, NITRIDE	380771	1	380771	1	380771	1	380771	1
33G	MANIFOLD, 1/2"	380826	1	380827	1	380828	1	380829	1
33H	BURNER, INSHOT	380830	2	380830	3	380830	4	380830	5
33I	LIMIT SWITCH (ROLLOUT)	350485	1	350485	1	350485	1	350485	1
33J	BURNER BOX COVER	14539	1	14540	1	14541	1	14542	1
33K	BURNER HOLDER	14543	1	14544	1	14545	1	14546	1
35	AIR SIDE BAFFLE, MIDDLE	14538	2	14538	2	14548	1	14548	1
*36	WIRE HARNESS, VESTIBULE	350576	1	350576	1	350576	1	350576	1
*37	WIRE HARNESS, SUPPLY	350579	1	350579	1	350579	1	350579	1
38	ANGLE	14554	1	14555	1	14555	1	14556	1
39	TUBING SUPPORT BRACKET	14549	1	14549	1	14547	1	14547	1

All installations and services must be performed by qualified service personnel.

ITEM	SUB-ASSEMBLY / PARTS DESCRIPTION	CLHS1-050T36N		CLHS1-076T42N		CLHS1-100T48N		CLHS1-125T60N	
		PART NO.	QTY.	PART NO.	QTY.	PART NO.	QTY.	PART NO.	QTY.
1	BASE	14483	1	14484	1	14484	1	14486	1
2	BLOWER PAN	14557	1	14558	1	14558	1	14559	1
3	AIR SIDE BAFFLE, LEFT	14491	1	14491	1	14491	1	14491	1
4	AIR SIDE BAFFLE, RIGHT	14492	1	14492	1	14492	1	14492	1
5	FRONT CENTER PANEL	14525	1	14526	1	14526	1	14527	1
6	INDUCER MOUNTING PLATE	24517	1	24517	1	24517	1	24517	1
7	LIMIT SWITCH	350264	1	350953	1	350817	1	350953	1
*7A	GASKET, LIMIT SWITCH	330388	1	330388	1	330388	1	330388	1
8	SWITCH, DOOR INTERLOCK	350139	1	350139	1	350139	1	350139	1
9	PRESSURE SWITCH (UPPER)	350584	1	350584	1	350586	1	350590	1
10	PRESSURE SWITCH (LOWER)	350584	1	350584	1	350586	1	350586	1
11	DOOR PULL	320157	2	320157	2	320157	2	320157	2
12	LATCH	320208	4	320208	4	320208	4	320208	4
13	STRIKE	320209	4	320209	4	320209	4	320209	4
14	DRAIN FITTING	320913	1	320913	1	320913	1	320913	1
15	–	–	–	–	–	–	–	–	–
16	GASKET, INDUCER	330137	1	330137	1	330137	1	330137	1
18	INDUCER ASSEMBLY W\ GASKET	A0PS7416	1	A0PS7416	1	A0PS7416	1	A0PS7416	1
19	HEAT EXCHANGER ASSEMBLY	34493	1	34494	1	34495	1	34496	1
20	COIL OUTLET BOX	34518	1	34519	1	34520	1	34521	1
20A	PUTTY TAPE	3300017	5.5'	3300017	5.5'	3300017	5.5'	3300017	5.5'
21	FILTER	370023 (16x25)	1	370023 (16x25)	1	370023 (16x25)	1	370051 (20x25)	1
22	CASING, RIGHT SIDE	614466	1	614466	1	614466	1	614466	1
23	CASING, LEFT SIDE	624465	1	624465	1	624465	1	624465	1
24	CASING, REAR	614467	1	614468	1	614468	1	614470	1
25	CASING, TOP FRONT	614471	1	614472	1	614473	1	614474	1
26	DOOR, BURNER ACCESS	614475	1	614476	1	614476	1	614478	1
27	DOOR, BLOWER ACCESS	614479	1	614480	1	614480	1	614482	1
28	PLENUM ANGLE, FRONT	614498	1	614499	1	614499	1	614501	1
29	REAR PANEL, BURNER DOOR	614533	1	614534	1	614534	1	614536	1
30	WINDOW PLUG	350248	2	350248	2	350248	2	350248	2
31	BLOWER ASSEMBLY	S00S4521	1	S00S4522	1	S00S4523	1	S00S4524	1
31A	BLOWER HOUSING w\ WHL ASS'Y	S00S4517 (10-9R)	1	S00S4518 (10-10R)	1	S00S4518 (10-10R)	1	S00S4519 (12-11T)	1
31B	MOTOR, DD, MULTI-SPEED	350362 (1/2 HP)	1	350212 (1/2 HP)	1	350213 (3/4 HP)	1	350395 (3/4 HP)	1
31C	MOTOR BRACKET ASSEMBLY	A0PS7746	1	A0PS7746	1	A0PS7746	1	A0PS7746	1
31D	–	–	–	–	–	–	–	–	–
31E	–	–	–	–	–	–	–	–	–
31F	–	–	–	–	–	–	–	–	–
31G	–	–	–	–	–	–	–	–	–
31H	BLOWER WHEEL	340083	1	340097	1	340097	1	340109	1
31J	CONTROL, GAS FUR, 1-STG PSC	350211	1	350211	1	350211	1	350211	1
31K	TRANSFORMER 24V	350405	1	350405	1	350405	1	350405	1
31L	WIRE HARNESS, BLOWER	350575	1	350575	1	350575	1	350575	1
32	PARTS PACKAGE	S00S4541	1	S00S4542	1	S00S4543	1	S00S4544	1
*32A	LP CONVERSION KIT	A0PS7746	1	A0PS7747	1	A0PS7748	1	A0PS7749	1
*32B	–	–	–	–	–	–	–	–	–
*32C	CPVC X PVC ADAPTER	320833	1	320833	1	320833	1	320833	1
*32D	CPVC TRAP ASSEMBLY	320928	1	320928	1	320928	1	320928	1
33	BURNER BOX ASSEMBLY	S00S8225	1	S00S8226	1	S00S8227	1	S00S8228	1
33A	BURNER BOX WRAP	14508	1	14509	1	14510	1	14511	1
33B	SHOOT PLATE	14512	1	14513	1	14514	1	14515	1
33C	FLAME SENSOR	350759	1	350759	1	350759	1	350759	1
33D	ORIFICE, .094/#42	380600	2	380600	3	380600	4	380600	5
33E	GAS VALVE, w\ LP KIT	A0PS7674	1	A0PS7674	1	A0PS7674	1	A0PS7674	1
33F	IGNITER, NITRIDE	380771	1	380771	1	380771	1	380771	1
33G	MANIFOLD, 1/2"	380826	1	380827	1	380828	1	380829	1
33H	BURNER, INSHOT	380830	2	380830	3	380830	4	380830	5
33I	LIMIT SWITCH (ROLLOUT)	350485	1	350485	1	350485	1	350485	1
33J	BURNER BOX COVER	14539	1	14540	1	14541	1	14542	1
33K	BURNER HOLDER	14543	1	14544	1	14545	1	14546	1
35	AIR SIDE BAFFLE, MIDDLE	14538	2	14538	2	14548	1	14548	1
*36	WIRE HARNESS, VESTIBULE	350576	1	350576	1	350576	1	350576	1
*37	WIRE HARNESS, SUPPLY	350579	1	350579	1	350579	1	350579	1
38	ANGLE	14554	1	14555	1	14555	1	14556	1
39	TUBING SUPPORT BRACKET	14549	1	14549	1	14547	1	14547	1

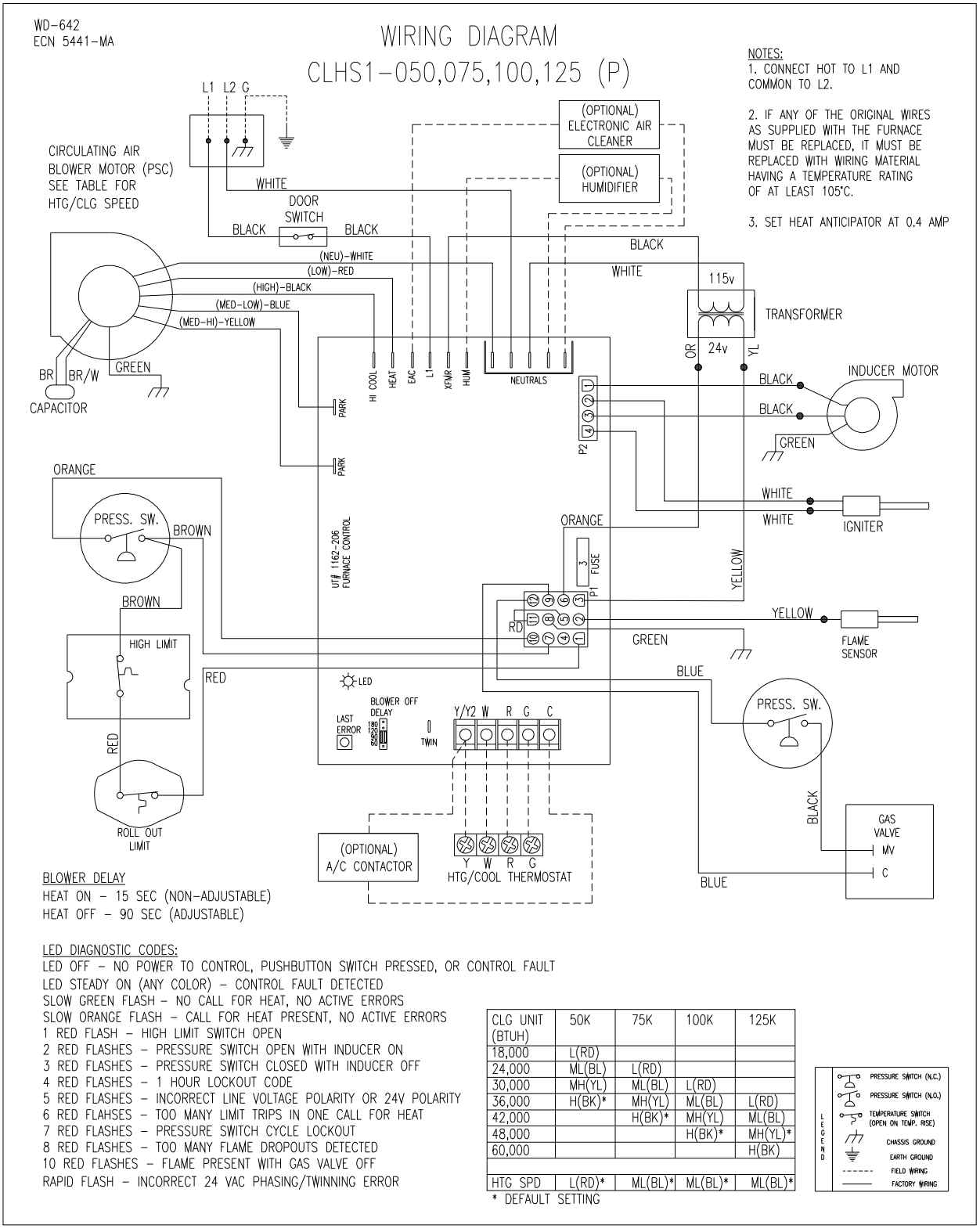
All installations and services must be performed by qualified service personnel.

ITEM	SUB-ASSEMBLY / PARTS DESCRIPTION	CLHX1-050E36N		CLHX1-075E42N		CLHX1-100E48N		CLHX1-125E60N	
		PART NO.	QTY.	PART NO.	QTY.	PART NO.	QTY.	PART NO.	QTY.
1	BASE	14483	1	14484	1	14484	1	14486	1
2	BLOWER PAN	14560	1	14561	1	14561	1	14562	1
3	AIR SIDE BAFFLE, LEFT	14491	1	14491	1	14491	1	14491	1
4	AIR SIDE BAFFLE, RIGHT	14492	1	14492	1	14492	1	14492	1
5	FRONT CENTER PANEL	14525	1	14526	1	14526	1	14527	1
6	INDUCER MOUNTING PLATE	24517	1	24517	1	24517	1	24517	1
7	LIMIT SWITCH	350264	1	350953	1	350817	1	350953	1
*7A	GASKET, LIMIT SWITCH	330388	1	330388	1	330388	1	330388	1
8	SWITCH, DOOR INTERLOCK	350139	1	350139	1	350139	1	350139	1
9	PRESSURE SWITCH (UPPER)	350584	1	350584	1	350586	1	350590	1
10	PRESSURE SWITCH (LOWER)	350585	1	350585	1	350587	1	350587	1
11	DOOR PULL	320157	2	320157	2	320157	2	320157	2
12	LATCH	320208	4	320208	4	320208	4	320208	4
13	STRIKE	320209	4	320209	4	320209	4	320209	4
14	DRAIN FITTING	320913	1	320913	1	320913	1	320913	1
15	–	–	–	–	–	–	–	–	–
16	GASKET, INDUCER	330137	1	330137	1	330137	1	330137	1
18	INDUCER ASSEMBLY W\ GASKET	AOPS7613	1	AOPS7613	1	AOPS7613	1	AOPS7613	1
19	HEAT EXCHANGER ASSEMBLY	34493	1	34494	1	34495	1	34496	1
20	COIL OUTLET BOX	34518	1	34519	1	34520	1	34521	1
20A	PUTTY TAPE	3300017	5.5'	3300017	5.5'	3300017	5.5'	3300017	5.5'
21	FILTER	370023 (16x25)	1	370023 (16x25)	1	370023 (16x25)	1	370051 (20x25)	1
22	CASING, RIGHT SIDE	614466	1	614466	1	614466	1	614466	1
23	CASING, LEFT SIDE	624465	1	624465	1	624465	1	624465	1
24	CASING, REAR	614467	1	614468	1	614468	1	614470	1
25	CASING, TOP FRONT	614471	1	614472	1	614473	1	614474	1
26	DOOR, BURNER ACCESS	614475	1	614476	1	614476	1	614478	1
27	DOOR, BLOWER ACCESS	614479	1	614480	1	614480	1	614482	1
28	PLENUM ANGLE, FRONT	614498	1	614499	1	614499	1	614501	1
29	REAR PANEL, BURNER DOOR	614533	1	614534	1	614534	1	614536	1
30	WINDOW PLUG	350248	2	350248	2	350248	2	350248	2
31	BLOWER ASSEMBLY	S00S4525	1	S00S4526	1	S00S4527	1	S00S4528	1
31A	BLOWER HOUSING w\ WHL ASS'Y	S00S4517 (10-9R)	1	S00S4518 (10-10R)	1	S00S4518 (10-10R)	1	S00S4519 (12-11T)	1
31B	MOTOR, DD, ECM	350254 (1/2 HP)	1	350254 (1/2 HP)	1	350255 (3/4 HP)	1	350255 (3/4 HP)	1
31C	MOTOR BRACKET ASSEMBLY	AOPS7746	1	AOPS7746	1	AOPS7746	1	AOPS7746	1
31D	–	–	–	–	–	–	–	–	–
31E	16x4 BOX, PROGRAMMED	AOPS7643	1	AOPS7644	1	AOPS7645	1	AOPS7646	1
*31F	WIRE HARNESS, MOTOR POWER	350850	1	350850	1	350850	1	350850	1
*31G	WIRE HARNESS, MOTOR CONTROL	350849	1	350849	1	350849	1	350849	1
31H	BLOWER WHEEL	340083	1	340097	1	340097	1	340109	1
31J	CONTROL, GAS FUR, 2-STG ECM	350221	1	350221	1	350221	1	350221	1
31K	TRANSFORMER 24V	350405	1	350405	1	350405	1	350405	1
31L	–	–	–	–	–	–	–	–	–
32	PARTS PACKAGE	S00S4545	1	S00S4546	1	S00S4547	1	S00S4548	1
*32A	LP CONVERSION KIT	AOPS7751	1	AOPS7752	1	AOPS7753	1	AOPS7754	1
*32B	–	–	–	–	–	–	–	–	–
*32C	CPVC X PVC ADAPTER	320833	1	320833	1	320833	1	320833	1
*32D	CPVC TRAP ASSEMBLY	320928	1	320928	1	320928	1	320928	1
33	BURNER BOX ASSEMBLY	S00S8230	1	S00S8231	1	S00S8232	1	S00S8233	1
33A	BURNER BOX WRAP	14508	1	14509	1	14510	1	14511	1
33B	SHOOT PLATE	14512	1	14513	1	14514	1	14515	1
33C	FLAME SENSOR	350759	1	350759	1	350759	1	350759	1
33D	ORIFICE, .094/#42	380600	2	380600	3	380600	4	380600	5
33E	GAS VALVE, w\ LP KIT	AOPS7731	1	AOPS7731	1	AOPS7731	1	AOPS7731	1
33F	IGNITER, NITRIDE	380771	1	380771	1	380771	1	380771	1
33G	MANIFOLD, 1/2"	380826	1	380827	1	380828	1	380829	1
33H	BURNER, INSHOT	380830	2	380830	3	380830	4	380830	5
33I	LIMIT SWITCH (ROLLOUT)	350485	1	350485	1	350485	1	350485	1
33J	BURNER BOX COVER	14539	1	14540	1	14541	1	14542	1
33K	BURNER HOLDER	14543	1	14544	1	14545	1	14546	1
35	AIR SIDE BAFFLE, MIDDLE	14538	2	14538	2	14548	1	14548	1
*36	WIRE HARNESS, VESTIBULE	350578	1	350578	1	350578	1	350578	1
*37	WIRE HARNESS, SUPPLY	350579	1	350579	1	350579	1	350579	1
38	ANGLE	14554	1	14555	1	14555	1	14556	1
39	TUBING SUPPORT BRACKET	14549	1	14549	1	14547	1	14547	1

All installations and services must be performed by qualified service personnel.

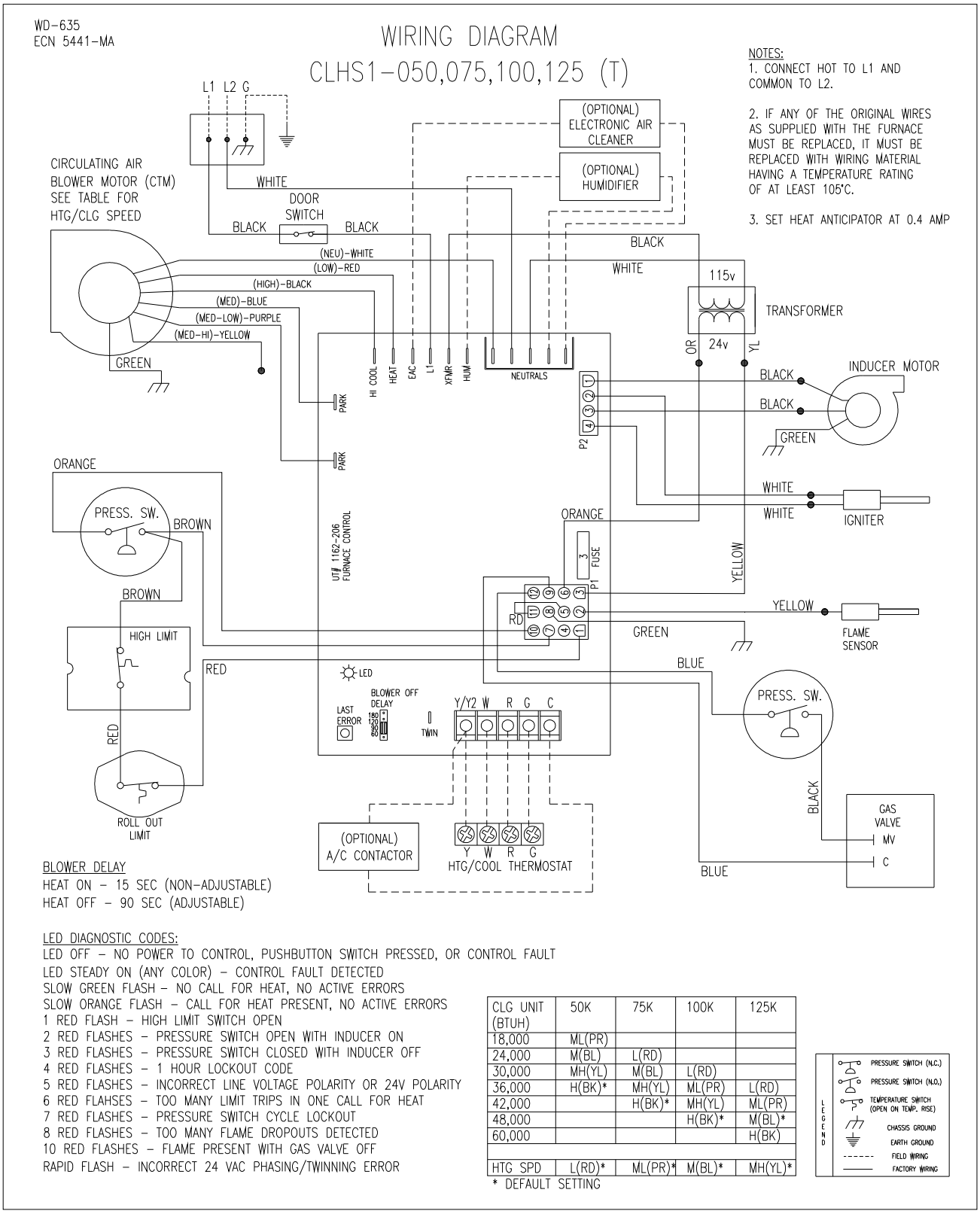
Appendix – B Wiring Diagrams

1. CLHS1-050, -075, -100 and -125 with PSC Blower Motor



All installations and services must be performed by qualified service personnel.

2. CLHS1-050, -075, -100 and -125 with Constant Torque Blower Motor



BLOWER DELAY
HEAT ON – 15 SEC (NON-ADJUSTABLE)
HEAT OFF – 90 SEC (ADJUSTABLE)

LED DIAGNOSTIC CODES:
LED OFF – NO POWER TO CONTROL, PUSHBUTTON SWITCH PRESSED, OR CONTROL FAULT
LED STEADY ON (ANY COLOR) – CONTROL FAULT DETECTED
SLOW GREEN FLASH – NO CALL FOR HEAT, NO ACTIVE ERRORS
SLOW ORANGE FLASH – CALL FOR HEAT PRESENT, NO ACTIVE ERRORS
1 RED FLASH – HIGH LIMIT SWITCH OPEN
2 RED FLASHES – PRESSURE SWITCH OPEN WITH INDUCER ON
3 RED FLASHES – PRESSURE SWITCH CLOSED WITH INDUCER OFF
4 RED FLASHES – 1 HOUR LOCKOUT CODE
5 RED FLASHES – INCORRECT LINE VOLTAGE POLARITY OR 24V POLARITY
6 RED FLAHSES – TOO MANY LIMIT TRIPS IN ONE CALL FOR HEAT
7 RED FLASHES – PRESSURE SWITCH CYCLE LOCKOUT
8 RED FLASHES – TOO MANY FLAME DROPOUTS DETECTED
10 RED FLASHES – FLAME PRESENT WITH GAS VALVE OFF
RAPID FLASH – INCORRECT 24 VAC PHASING/TWINNING ERROR

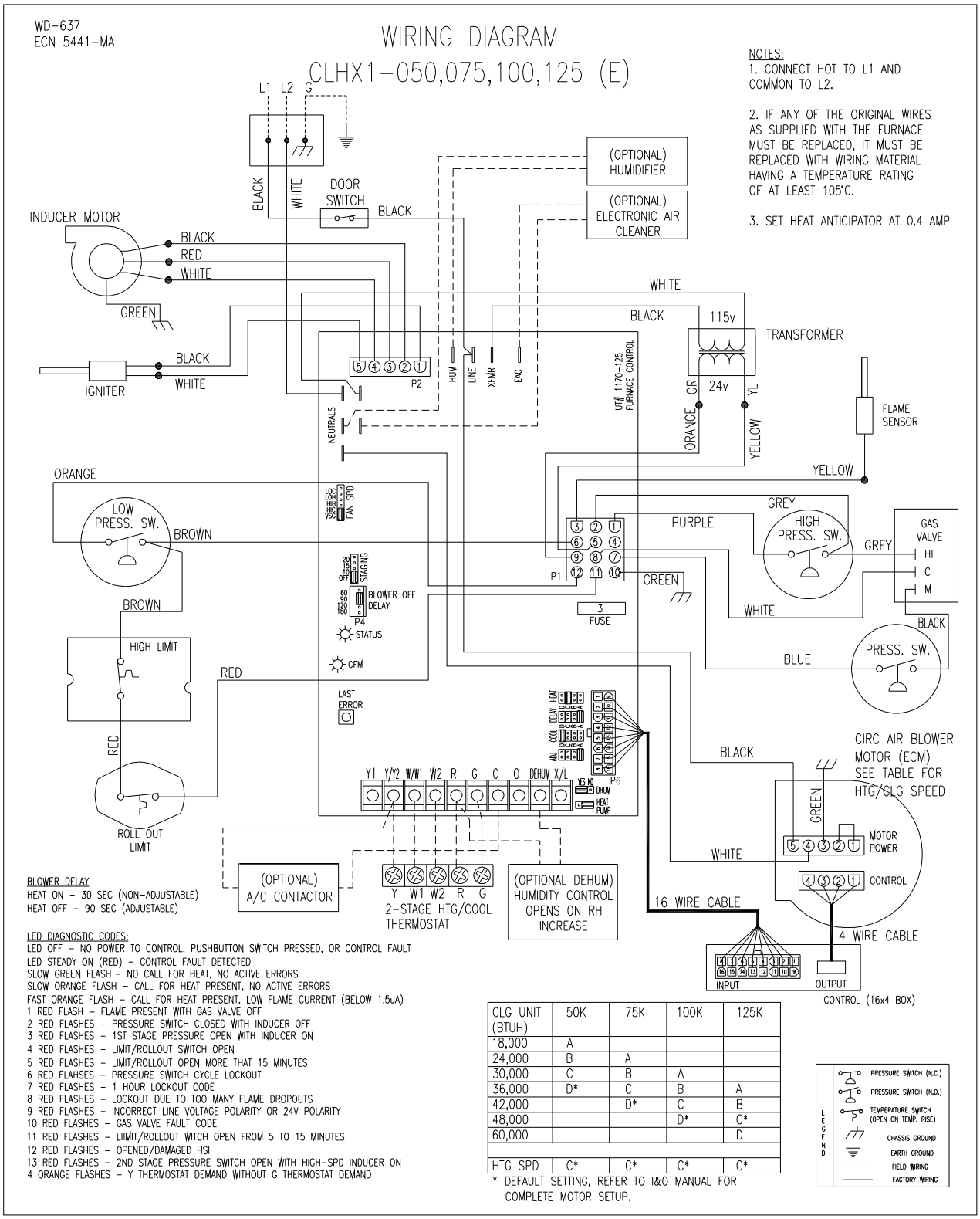
CLG UNIT (BTUH)	50K	75K	100K	125K
18,000	ML(PR)			
24,000	M(BL)	L(RD)		
30,000	MH(YL)	M(BL)	L(RD)	
36,000	H(BK)*	MH(YL)	ML(PR)	L(RD)
42,000		H(BK)*	MH(YL)	ML(PR)
48,000			H(BK)*	M(BL)*
60,000				H(BK)
HTG SPD	L(RD)*	ML(PR)*	M(BL)*	MH(YL)*

* DEFAULT SETTING

LEGEND
PRESSURE SWITCH (N.C.)
PRESSURE SWITCH (N.O.)
TEMPERATURE SWITCH (OPEN ON TEMP. RISE)
CHASSIS GROUND
EARTH GROUND
FIELD WIRING
FACTORY WIRING

All installations and services must be performed by qualified service personnel.

3. CLHS1-050, -075, -100 and -125 with ECM Blower Motor



All installations and services must be performed by qualified service personnel.

Appendix C – Speed Specifications

CLHS1-050P (Single Stage with PSC blower motor)

Alterations Req'd For A/C @ Design External Static Pressure		
Cooling Unit	HTG Speed	Recommended CLG Speed
18,000	Med Low (Blue)	Low (Red)
24,000	Low (Red)	Med Low (Blue)
30,000	Low (Red)	Med High (Yellow)
36,000	Low (Red)	High (Black)

Temperature Rise (°F)

	External Static Pressure (in WC)						
Speed Tap	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Low (Red)	67	69	75	83	97	119	146
Med Low (Blue)	47	49	51	54	60	66	73
Med High (Yellow)	37	38	40	43	47	51	58
High (Black)	28	29	31	34	38	42	48

Airflow (CFM)

	External Static Pressure (in WC)						
Speed Tap	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Low (Red)	653	633	583	528	452	370	301
Med Low (Blue)	926	901	855	812	733	669	599
Med High (Yellow)	1176	1145	1097	1012	943	866	761
High (Black)	1593	1507	1405	1293	1150	1044	915

Current (A)

	External Static Pressure (in WC)						
Speed Tap	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Low (Red)	3.7	3.6	3.5	3.4	3.3	3.3	3.3
Med Low (Blue)	4.7	4.5	4.3	4.2	4.1	3.9	3.8
Med High (Yellow)	5.6	5.3	5.1	4.9	4.7	4.5	4.3
High (Black)	7.2	6.9	6.6	6.2	6.0	5.8	5.6

Power (W)

	External Static Pressure (in WC)						
Speed Tap	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Low (Red)	362	358	350	343	337	332	326
Med Low (Blue)	473	461	446	436	418	403	394
Med High (Yellow)	588	563	537	514	498	477	453
High (Black)	777	739	705	668	640	613	586

Note: Shading indicates recommended operating range for heating.

All installations and services must be performed by qualified service personnel.

CLHS1-075P (Single Stage with PSC blower motor)

Alterations Req'd For A/C @ Design External Static Pressure		
Cooling Unit	HTG Speed	Recommended CLG Speed
24,000	Med Low (Blue)	Low (Red)
30,000	Med High (Yellow)	Med Low (Blue)
36,000	Med Low (Blue)	Med High (Yellow)
42,000	Med Low (Blue)	* High (Black)

* This speed not recommended at static pressures of 0.3 in WC or less

Temperature Rise (°F)

	External Static Pressure (in WC)						
Speed Tap	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Low (Red)	95	95	95	97	101	104	113
Med (Blue)	69	69	69	70	74	80	87
Med High (Yellow)	44	46	49	51	55	64	70
High (Black)	38	40	44	47	50	57	64

Airflow (CFM)

	External Static Pressure (in WC)						
Speed Tap	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Low (Red)	696	697	694	680	656	635	582
Med (Blue)	952	954	958	941	890	828	757
Med High (Yellow)	1509	1428	1344	1281	1193	1034	941
High (Black)	1743	1647	1516	1405	1318	1165	1024

Current (A)

	External Static Pressure (in WC)						
Speed Tap	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Low (Red)	7.0	6.9	6.7	6.5	6.3	6.1	5.9
Med (Blue)	7.8	7.5	7.3	7.0	6.5	6.2	6.0
Med High (Yellow)	8.8	8.3	7.8	7.5	7.1	6.6	6.4
High (Black)	10.2	9.9	9.7	9.5	9.4	9.2	9.0

Power (W)

	External Static Pressure (in WC)						
Speed Tap	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Low (Red)	530	528	524	518	509	498	484
Med (Blue)	635	625	612	594	558	536	517
Med High (Yellow)	793	749	709	682	648	596	575
High (Black)	892	856	820	793	770	731	705

Note: Shading indicates recommended operating range for heating.

All installations and services must be performed by qualified service personnel.

CLHS1-100P (Single Stage with PSC blower motor)

Alterations Req'd For A/C @ Design External Static Pressure		
Cooling Unit	HTG Speed	Recommended CLG Speed
30,000	Med Low (Blue)	Low (Red)
36,000	Med High (Yellow)	Med Low (Blue)
42,000	Med Low (Blue)	Med High (Yellow)
48,000	Med Low (Blue)	High (Black)

Temperature Rise (°F)

	External Static Pressure (in WC)						
Speed Tap	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Low (Red)	89	88	85	88	93	103	111
Med (Blue)	62	61	62	65	69	78	92
Med High (Yellow)	47	48	50	56	60	66	77
High (Black)	40	43	46	50	55	60	67

Airflow (CFM)

	External Static Pressure (in WC)						
Speed Tap	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Low (Red)	889	904	926	898	852	772	710
Med (Blue)	1270	1294	1282	1212	1145	1017	857
Med High (Yellow)	1702	1654	1575	1420	1325	1205	1028
High (Black)	1958	1844	1733	1572	1442	1319	1182

Current (A)

	External Static Pressure (in WC)						
Speed Tap	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Low (Red)	7.9	7.6	7.3	6.9	6.4	6.1	5.8
Med (Blue)	9.1	8.5	8.1	7.6	7.3	6.7	6.2
Med High (Yellow)	10.2	9.5	8.8	8.1	7.8	7.5	7.0
High (Black)	11.1	10.6	10.1	9.6	9.3	9.0	8.8

Power (W)

	External Static Pressure (in WC)						
Speed Tap	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Low (Red)	643	633	620	595	565	540	525
Med (Blue)	795	765	733	688	659	609	567
Med High (Yellow)	954	889	826	760	727	688	633
High (Black)	1049	987	929	862	830	792	756

Note: Shading indicates recommended operating range for heating.

All installations and services must be performed by qualified service personnel.

CLHS1-125P (Single Stage with PSC blower motor)

Alterations Req'd For A/C @ Design External Static Pressure		
Cooling Unit	HTG Speed	Recommended CLG Speed
36,000	Med High (Yellow)	Low (Red)
42,000	Med High (Yellow)	Med Low (Blue)
48,000	Med Low (Blue)	Med High (Yellow)
60,000	Med High (Yellow)	* High (Black)

* This speed not recommended at static pressures of 0.3 in WC or less

Temperature Rise (°F)

	External Static Pressure (in WC)						
Speed Tap	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Low (Red)	70	72	75	78	82	87	94
Med Low (Blue)	61	62	64	67	71	76	82
Med High (Yellow)	53	55	56	59	63	67	74
High (Black)	48	49	51	54	57	61	68

Airflow (CFM)

	External Static Pressure (in WC)						
Speed Tap	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Low (Red)	1562	1527	1469	1414	1337	1264	1170
Med Low (Blue)	1809	1769	1710	1635	1542	1442	1338
Med High (Yellow)	2088	2011	1947	1857	1755	1644	1487
High (Black)	2311	2267	2135	2030	1920	1807	1620

Current (A)

	External Static Pressure (in WC)						
Speed Tap	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Low (Red)	8.7	8.4	8.1	7.8	7.5	7.3	7.0
Med Low (Blue)	9.7	9.2	8.9	8.6	8.2	7.9	7.7
Med High (Yellow)	10.8	10.2	9.9	9.5	9.1	8.7	8.4
High (Black)	12.0	11.7	11.3	10.8	10.5	10.1	9.7

Power (W)

	External Static Pressure (in WC)						
Speed Tap	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Low (Red)	860	828	800	777	752	735	708
Med Low (Blue)	963	931	899	868	834	811	786
Med High (Yellow)	1100	1050	1017	982	939	908	858
High (Black)	1154	1153	1146	1107	1068	1024	972

Note: Shading indicates recommended operating range for heating.

All installations and services must be performed by qualified service personnel.

CLHS1-050T (Single Stage with Constant Torque blower motor)

Alterations Req'd For A/C @ Design External Static Pressure		
Cooling Unit	HTG Speed	Recommended CLG Speed
18,000	Low (Red)	Med Low (Purple)
24,000	Low (Red)	Med (Blue)
30,000	Low (Red)	Med High (Yellow)
36,000	Low (Red)	High (Black)

Temperature Rise (°F)

	External Static Pressure (in WC)						
Speed Tap	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Low (Red)	59	62	69	75	86	94	103
Med Low (Purple)	52	56	58	67	73	82	91
Med (Blue)	42	46	45	51	58	62	67
Med High (Yellow)	39	38	41	43	44	49	53
High (Black)	30	33	35	34	37	38	40

Airflow (CFM)

	External Static Pressure (in WC)						
Speed Tap	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Low (Red)	758	672	598	511	420	322	213
Med Low (Purple)	905	827	761	698	610	546	461
Med (Blue)	1046	987	908	851	797	716	644
Med High (Yellow)	1216	1167	1124	1048	1000	945	889
High (Black)	1404	1360	1322	1269	1193	1156	1110

Current (A)

	External Static Pressure (in WC)						
Speed Tap	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Low (Red)	2.4	2.5	2.5	2.5	2.5	2.6	2.7
Med Low (Purple)	2.7	2.8	2.9	3.0	3.0	3.1	3.1
Med (Blue)	3.2	3.3	3.4	3.5	3.6	3.7	3.7
Med High (Yellow)	4.0	4.2	4.3	4.4	4.5	4.7	4.7
High (Black)	5.4	5.4	5.6	5.7	5.9	5.9	6.0

Power (W)

	External Static Pressure (in WC)						
Speed Tap	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Low (Red)	199	207	210	212	216	220	225
Med Low (Purple)	235	243	249	257	262	267	272
Med (Blue)	279	291	297	307	313	321	325
Med High (Yellow)	354	366	377	387	395	407	416
High (Black)	466	474	489	501	514	521	530

Note: Shading indicates recommended operating range for heating.

All installations and services must be performed by qualified service personnel.

CLHS1-075T (Single Stage with Constant Torque blower motor)

Alterations Req'd For A/C @ Design External Static Pressure		
Cooling Unit	HTG Speed	Recommended CLG Speed
24,000	Med Low (Purple)	Low (Red)
30,000	Med Low (Purple)	Med Blue)
36,000	Med Low (Purple)	Med High (Yellow)
42,000	Med Low (Purple)	High (Black)

Temperature Rise (°F)

	External Static Pressure (in WC)						
Speed Tap	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Low (Red)	63	67	71	79	86	94	103
Med Low (Purple)	57	61	64	69	74	79	86
Med (Blue)	55	58	61	65	70	75	80
Med High (Yellow)	48	50	52	55	57	61	64
High (Black)	44	45	46	48	50	57	63

Airflow (CFM)

	External Static Pressure (in WC)						
Speed Tap	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Low (Red)	1089	1025	967	869	800	733	670
Med Low (Purple)	1197	1133	1078	990	933	865	803
Med (Blue)	1251	1189	1122	1064	982	914	856
Med High (Yellow)	1424	1379	1314	1254	1210	1132	1075
High (Black)	1577	1531	1480	1432	1368	1214	1086

Current (A)

	External Static Pressure (in WC)						
Speed Tap	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Low (Red)	3.6	3.6	3.7	3.8	3.9	3.9	4.0
Med Low (Purple)	4.1	4.2	4.3	4.4	4.5	4.5	4.6
Med (Blue)	4.3	4.4	4.5	4.6	4.7	4.8	4.8
Med High (Yellow)	5.4	5.5	5.6	5.7	5.8	6.0	6.0
High (Black)	6.7	6.7	6.9	7.0	7.1	6.5	6.0

Power (W)

	External Static Pressure (in WC)						
Speed Tap	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Low (Red)	317	324	331	342	347	353	358
Med Low (Purple)	364	374	381	393	400	406	412
Med (Blue)	387	397	405	415	425	432	438
Med High (Yellow)	496	507	516	526	536	549	557
High (Black)	621	632	645	655	660	606	568

Note: Shading indicates recommended operating range for heating.

All installations and services must be performed by qualified service personnel.

CLHS1-100T (Single Stage with Constant Torque blower motor)

Alterations Req'd For A/C @ Design External Static Pressure		
Cooling Unit	HTG Speed	Recommended CLG Speed
30,000	Med (Blue)	Low (Red)
36,000	Med (Blue)	Med Low (Purple)
42,000	Med (Blue)	Med High (Yellow)
48,000	Med (Blue)	High (Black)

Temperature Rise (°F)

	External Static Pressure (in WC)						
Speed Tap	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Low (Red)	71	75	79	84	90	100	109
Med Low (Purple)	62	65	68	72	74	79	83
Med (Blue)	60	62	66	69	72	75	79
Med High (Yellow)	55	56	58	61	63	66	68
High (Black)	49	50	51	53	57	61	67

Airflow (CFM)

	External Static Pressure (in WC)						
Speed Tap	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Low (Red)	1239	1178	1107	1046	976	883	806
Med Low (Purple)	1414	1357	1295	1224	1186	1120	1062
Med (Blue)	1467	1416	1341	1276	1229	1177	1119
Med High (Yellow)	1601	1558	1505	1448	1391	1340	1301
High (Black)	1799	1762	1716	1646	1547	1438	1322

Current (A)

	External Static Pressure (in WC)						
Speed Tap	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Low (Red)	3.9	4.1	4.2	4.3	4.4	4.5	4.5
Med Low (Purple)	4.8	4.9	5.1	5.2	5.2	5.3	5.5
Med (Blue)	5.1	5.2	5.4	5.5	5.6	5.6	5.8
Med High (Yellow)	6.0	6.1	6.3	6.4	6.5	6.6	6.7
High (Black)	7.3	7.5	7.7	7.9	7.6	7.3	6.9

Power (W)

	External Static Pressure (in WC)						
Speed Tap	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Low (Red)	328	341	351	359	370	379	386
Med Low (Purple)	406	422	434	446	452	464	477
Med (Blue)	434	451	464	473	483	490	502
Med High (Yellow)	523	540	557	569	579	589	597
High (Black)	655	668	689	712	683	656	612

Note: Shading indicates recommended operating range for heating.

All installations and services must be performed by qualified service personnel.

CLHS1-125T (Single Stage with Constant Torque blower motor)

Alterations Req'd For A/C @ Design External Static Pressure		
Cooling Unit	HTG Speed	Recommended CLG Speed
36,000	Med High (Yellow)	Low (Red)
42,000	Med High (Yellow)	Med Low (Purple)
48,000	Med High (Yellow)	Med (Blue)
60,000	Med High (Yellow)	High (Black)

Temperature Rise (°F)

	External Static Pressure (in WC)						
Speed Tap	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Low (Red)	73	76	81	86	93	99	106
Med Low (Purple)	68	71	74	78	83	87	93
Med (Blue)	62	64	67	70	73	77	81
Med High (Yellow)	59	61	63	65	68	71	75
High (Black)	53	54	55	57	58	60	63

Airflow (CFM)

	External Static Pressure (in WC)						
Speed Tap	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Low (Red)	1512	1444	1365	1275	1180	1111	1038
Med Low (Purple)	1625	1553	1481	1414	1330	1263	1186
Med (Blue)	1767	1710	1649	1582	1513	1437	1359
Med High (Yellow)	1878	1813	1753	1685	1617	1544	1463
High (Black)	2093	2047	1988	1938	1882	1819	1745

Current (A)

	External Static Pressure (in WC)						
Speed Tap	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Low (Red)	4.4	4.6	4.7	4.8	4.9	5.0	5.1
Med Low (Purple)	5.2	5.4	5.5	5.6	5.7	5.9	6.0
Med (Blue)	6.0	6.3	6.4	6.5	6.7	6.8	7.0
Med High (Yellow)	6.3	6.6	6.7	6.8	7.0	7.1	7.3
High (Black)	8.7	8.9	9.0	9.3	9.5	9.7	9.7

Power (W)

	External Static Pressure (in WC)						
Speed Tap	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Low (Red)	386	402	412	427	439	447	457
Med Low (Purple)	464	480	493	506	517	529	540
Med (Blue)	543	566	580	592	607	622	636
Med High (Yellow)	578	600	611	626	642	656	670
High (Black)	810	830	843	866	886	901	919

Note: Shading indicates recommended operating range for heating.

All installations and services must be performed by qualified service personnel.

CLHX1-050E (Two Stage with ECM blower motor)

Alterations Req'd For A/C @ Design External Static Pressure		
Cooling Unit	HTG Speed	Recommended CLG Speed
18,000	C	A
24,000	C	B
30,000	C	C
36,000	C	D

HEATING SPEEDS

CLHX1-050E36N

Speed Tap	Temp Rise (°F)	Airflow (CFM)		High Fire Current (A)		High Fire Power (W)	
		Low Fire	High Fire	0.2" Static	0.5" Static	0.2" Static	0.5" Static
A	75	432	617	2.3	3.3	237	332
B	68	489	698	2.4	3.6	251	354
C	60	534	762	2.5	3.8	258	377
D	53	589	841	2.7	4.1	276	402

Note: Shading indicates recommended operating range for heating

CLHX1-050E36N

Cooling (BTUH)	Cooling Tap	Adjust Tap	AIRFLOW (CFM)						High Current (A)		High Power (W)	
			HIGH			LOW						
			Cool	Dehum	Cont. Fan	Cool	Dehum	Cont. Fan	0.2" Static	0.5" Static	0.2" Static	0.5" Static
18,000	A	A	711	604	355	498	423	249	1.0	2.2	75	171
		B	782	665	391	547	465	274				
		C	640	544	320	448	381	224				
24,000	B	A	870	739	435	609	517	304	1.4	2.8	110	241
		B	957	813	478	670	569	335				
		C	783	665	391	548	466	274				
30,000	C	A	1061	902	530	742	631	371	2.0	3.6	166	317
		B	1167	992	583	817	694	408				
		C	955	811	477	668	568	334				
36,000	D	A	1241	1055	621	869	738	434	2.9	4.9	249	442
		B	1365	1160	683	956	812	478				
		C	1117	949	558	782	665	391				

All installations and services must be performed by qualified service personnel.

CLHX1-075E (Two Stage with ECM blower motor)

Alterations Req'd For A/C @ Design External Static Pressure		
Cooling Unit	HTG Speed	Recommended CLG Speed
24,000	C	A
30,000	C	B
36,000	C	C
42,000	C	D

HEATING SPEEDS

CLHX1-075E36N

Speed Tap	Temp Rise (°F)	Airflow (CFM)		High Fire Current (A)		High Fire Power (W)	
		Low Fire	High Fire	0.2" Static	0.5" Static	0.2" Static	0.5" Static
A	75	648	926	3.1	4.9	314	483
B	68	722	1031	3.5	5.3	357	528
C	60	791	1130	3.8	6.0	383	595
D	53	909	1298	4.8	7.2	489	708

Note: Shading indicates recommended operating range for heating

CLHX1-075E36N

Cooling (BTUH)	Cooling Tap	Adjust Tap	AIRFLOW (CFM)						High Current (A)		High Power (W)	
			HIGH			LOW						
			Cool	Dehum	Cont. Fan	Cool	Dehum	Cont. Fan	0.2" Static	0.5" Static	0.2" Static	0.5" Static
24,000	A	A	850	722	425	595	506	297	1.2	3.0	96	254
		B	935	795	467	654	556	327				
		C	765	650	382	535	455	268				
30,000	B	A	1055	897	528	739	628	369	2.1	3.9	173	343
		B	1161	987	580	813	691	406				
		C	950	807	475	665	565	332				
36,000	C	A	1257	1068	628	880	748	440	3.1	5.2	363	469
		B	1382	1175	691	968	822	484				
		C	1131	961	565	792	673	396				
42,000	D	A	1386	1178	693	970	824	485	4.4	6.0	389	551
		B	1524	1296	762	1067	907	533				
		C	1247	1060	624	873	742	436				

All installations and services must be performed by qualified service personnel.

CLHX1-100E (Two Stage with ECM blower motor)

Alterations Req'd For A/C @ Design External Static Pressure		
Cooling Unit	HTG Speed	Recommended CLG Speed
30,000	C	A
36,000	C	B
42,000	C	C
48,000	C	D

HEATING SPEEDS

CLHX1-100E48N

Speed Tap	Temp Rise (°F)	Airflow (CFM)		High Fire Current (A)		High Fire Power (W)	
		Low Fire	High Fire	0.2" Static	0.5" Static	0.2" Static	0.5" Static
A	75	841	1201	3.9	5.8	388	561
B	68	921	1315	4.4	6.5	434	634
C	60	1039	1484	5.2	7.6	510	745
D	53	1207	1724	6.6	9.6	647	946

Note: Shading indicates recommended operating range for heating

CLHX1-100E48N

Cooling (BTUH)	Cooling Tap	Adjust Tap	AIRFLOW (CFM)						High Current (A)		High Power (W)	
			HIGH			LOW						
			Cool	Dehum	Cont. Fan	Cool	Dehum	Cont. Fan	0.2" Static	0.5" Static	0.2" Static	0.5" Static
30,000	A	A	1031	876	515	722	613	361	1.7	3.3	134	280
		B	1134	964	567	794	675	397				
		C	928	789	464	650	552	325				
36,000	B	A	1236	1051	618	865	735	433	2.2	4.2	205	372
		B	1360	1156	680	952	809	476				
		C	1112	946	556	779	662	389				
42,000	C	A	1428	1214	714	999	850	500	3.2	5.4	275	493
		B	1571	1335	785	1099	934	550				
		C	1285	1092	643	900	765	450				
48,000	D	A	1621	1378	810	1135	964	567	4.4	7.1	402	663
		B	1783	1515	891	1248	1061	624				
		C	1459	1240	729	1021	868	511				

All installations and services must be performed by qualified service personnel.

CLHX1-125E (Two Stage with ECM blower motor)

Alterations Req'd For A/C @ Design External Static Pressure		
Cooling Unit	HTG Speed	Recommended CLG Speed
36,000	C	A
42,000	C	B
48,000	C	C
60,000	C	D

HEATING SPEEDS

CLHX1-125E60N

Speed Tap	Temp Rise (°F)	Airflow (CFM)		High Fire Current (A)		High Fire Power (W)	
		Low Fire	High Fire	0.2" Static	0.5" Static	0.2" Static	0.5" Static
A	75	869	1448	4.4	6.5	435	644
B	68	963	1605	5.2	7.3	508	717
C	60	1080	1800	6.1	8.5	603	828
D	53	1210	2017	7.8	10.0	768	992

Note: Shading indicates recommended operating range for heating.

CLHX1-125E60N

Cooling (BTUH)	Cooling Tap	Adjust Tap	AIRFLOW (CFM)						High Current (A)		High Power (W)	
			HIGH			LOW						
			Cool	Dehum	Cont. Fan	Cool	Dehum	Cont. Fan	0.2" Static	0.5" Static	0.2" Static	0.5" Static
36,000	A	A	1246	1059	623	872	741	436	2.0	3.9	158	340
		B	1370	1165	685	959	815	480				
		C	1121	953	561	785	667	392				
42,000	B	A	1420	1207	710	994	845	497	2.5	4.5	213	398
		B	1562	1328	781	1094	930	547				
		C	1278	1087	639	895	761	447				
48,000	C	A	1617	1374	808	1132	962	566	3.3	5.4	286	494
		B	1779	1512	889	1245	1058	623				
		C	1455	1237	728	1019	866	509				
60,000	D	A	2000	1700	1000	1400	1190	700	5.7	8.2	517	761
		B	2200	1870	1100	1540	1309	770				
		C	1800	1530	900	1260	1071	630				