Thermo Pride



For installation in:

- 1. Manufactured Homes
- 2. Modular Homes/Buildings

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.

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

VEUILLEZ LIRE CES INSTRUCTIONS AVANT L'INSTALLATION, LA MISE À FEU INITIALE ET AVANT TOUT ENTRETIEN OU MAINTENANCE. CES INSTRUCTIONS DOIVENT ÊTRE LAISSÉES À L'UTILISATEUR ET DOIVENT ÊTRE CONSERVÉES POUR RÉFÉRENCE ULTÉRIEURE PAR UN PERSONNEL DE MAINTENANCE QUALIFIÉ.



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NOTICE TO THE INSTALLER

Installation of this gas-fired furnace **must** be performed by a qualified installer in accordance with all local codes and authorities having jurisdiction. In the absence of local governing codes, installation shall, the installation shall be in accordance with the current provisions of one or more of the following standards.

Manufactured Home Construction and Safety Standard, Title 24 CFR, Part 3280, or when this Standard is not applicable, NFPA 225.

American National Standard (ANSI-119.2/NFPA-501C), for installations of all recreational vehicles.

American National Standard (ANSI-Z223.1/NFPA-54), for installation of all gas-fired furnaces.

American National Standard Electric Code (ANSI-C1/NFPA-70), for installation of all electrical field wiring.

The gas-fired furnace has been investigated under the ANSI Z21.47:21 test standard. This gas fired unit is listed by Intertek Testing Services and described as, "For installation as central furnace special type for Manufactured (mobile) home."

A qualified installer, also referred to in this instruction manual as a "qualified heating contractor", is an individual, or agency, properly licensed and experienced to install and service oil-burning equipment in accordance with all local codes and ordinances.

Material and Workmanship

This furnace was built with the highest quality materials and attention to workmanship. However, omissions and defects occasionally occur. Before installing the furnace, inspect the furnace thoroughly. If missing parts, defective material, or poor workmanship is evident, report the **model** and **serial numbers** imprinted on the furnace rating label to the seller for adjustment.

Packaging

A complete furnace is contained within a single package. The factory completed all feasible assembly. However certain components including draft regulator and, if supplied, door handle, air filter(s), and air filter rack(s), must be assembled to the furnace, or the venting system, in the field. Refer to the assembly instructions.

Shipping Damage

If this furnace was damaged during transit, please immediately request the transportation company inspect the furnace and issue a **concealed damage report**. The party receiving the furnace should file the claim for shipping damage. **Report any shipping damage immediately.**

It is absolutely essential that a damage report be obtained. If a concealed damage report is not obtained, we cannot provide assistance in recovering your claim against the transportation company.

Warranties

 \triangle WARNING: The manufacturer of this equipment assumes no liability for any damages resulting from unauthorized modifications made to the furnace, or any components thereof, or improper installation of the furnace in the field. Furthermore, any such field modifications VOID THE WARRANTY and place responsibility for safe and reliable operation of the furnace on those who performed the modification(s).

Complete and return any enclosed warranty cards. These must be on file to verify installation dates for replacement of any warrantied part(s).

INSTALLATION GUIDELINES

General Installation

▲ WARNING: The area around the furnace must be kept free and clear of combustible materials, especially papers and rags.

 Δ WARNING: This furnace is not to be used as a construction heater.

NOTE: READ THIS SECTION BEFORE STARTING INSTALLATION

This furnace is equipped with orifices for operation with natural gas. For conversion to propane gas, see instructions in Gas Conversion Section of this manual.

Any reference to L.P. or Propane gas in this manual, any other labels, or markings on this furnace is to be construed to be propane HD-5. A commercial grade of liquefied petroleum gases composed of a minimum of 90 percent liquid propane (C8H8).

The selection of a furnace heating capacity for a proposed installation should be based on a heat loss calculation made according to the manuals provided by the Air Conditioning Contractors of America (ACCA) or the American Society of Heating, Refrigeration and Air Conditioning Engineers, Inc. (ASHRAE).

Do not allow return air temperatures to drop below 55° F for extended periods. To do so may case condensation in the heat exchanger which can cause premature heat exchanger failures.

It is recommended that a commercial available CO alarm be installed 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.

Standard Clearances

Standard clearances are mandatory minimum clearances from heated surfaces of the furnace to combustible materials to assure protection from fire hazard during furnace operation. (Refer to the <u>National Fuel Gas Code</u>, NFPA 54, latest edition, for definitions of combustible and non-combustible materials).

Accessibility clearances, which are typically greater, may exceed fire protection clearances. Therefore, allow ample clearances for servicing the furnace for easy access to the air filter, blower assembly, burner assembly, controls, and vent connections.

materials							
MODELS: GMA1-60D48N GMA1-75D48N GMC1-60D48N GMC1-75D48N	CLOSET (IN.)	ALCOVE (IN.)					
FRONT	6	18					
BACK	0	0					
SIDES	0	0					
ROOF JACK	0	0					
TOP	2	2					
PLENUM SIDES	1/4	1/4					
TOP & SIDES OF DUCT	1	1					
BOTTOM OF DUCT	1	1					
T	ABLE 1						

The minimum clearances from furnace to combustible materials

COMBUSTION AIR

This furnace is a direct vent unit; it is designed to be used only with the approved roof jacks listed in Table 2 below. These roof jacks are designed to provide combustion air to the furnaces and exhaust flue gases to the outside. No other combustion air openings are needed.

Chloride, fluoride, iodide, and bromide bearing compounds when present in the combustion air supplied to the furnace, even in low concentrations, can result in accelerated and severe corrosion of the heat exchanger and/or the venting system. Avoid storing or using these chemicals within close proximity to the furnace. In addition, avoid storing or using any chemicals, of an unknown and possibly flammable nature, in close proximity to the furnace.

FURNACE LOCATION

▲ CAUTION: DO NOT connect a ducted return air system directly to the furnace. Improper installation may create a fire hazard and damage internal equipment, as well as void all manufacturers' warranties.

For best performance, locate the furnace so that it is centralized with respect to the duct system.

These furnaces are only intended for installation with free air return through the furnace door louvers.

The GMA1 & GMC1 series furnaces may be installed on combustible flooring when utilizing the DC-BASE Combustible Floor Base. The GMA1 series may be installed on the CE118S Coil Cabinet. See Figures 1 and 2 for depictions of the DC-BASE and the CE118S.

These furnaces are approved to be installed on DC-BASE, 79990-60**, 7990-62** and 7990-6301 series Duct Connectors.

These furnaces are listed for closet or alcove applications. All applications must comply with the requirements of this manual.

Furnace and Air Conditioning installations

When used in conjunction with a cooling unit the furnace must be installed on the upstream side of the evaporator coil to avoid condensation in the heat exchanger. If a Self-contained AC system is connected to the same Distribution Duct as the furnace or the furnace is installed parallel to the evaporator coil a damper must be installed at the furnace base to prevent cold air from being discharged up around the heat exchanger.



Coil Cabinet Model: CE118S



ALCOVE INSTALLATION

In this application, a minimum of 18 inches of clearance **must** be provided to the front of the unit. Refer to Figure 3.



GMA1/GMC1 SERIES Figure 3

CLOSET INSTALLATION

▲ WARNING: HAZARD OF ASPHYXIATION: A suction effect will occur when the furnace is operating inside the closet with the closet door closed. For proper operation, the furnace blower shall create no more than a 0.05-inch water column pressure differential between the closet and the adjoining space.

 \triangle WARNING: Do not obstruct any return air openings, including the return grille on the furnace. To do so may cause the furnace to activate the high temperature limit and shutdown, or it may cause asphyxiation.



GMA1/GMC1 SERIES Figure 4

- The return air opening into the closet is to have a minimum free area of 250 square inches, (refer to Figure 4).
- The return air opening may be located in the top, the center or the bottom of the closet door, or sidewall.

▲ WARNING: Do not obstruct any return air openings, including the return grille on the furnace. To do so may cause the furnace to activate the high temperature limit and shutdown, or it may cause asphyxiation.

The cross-sectional area of the return air grille leading into the closet (when located in the floor or ceiling) shall not be less than 250 square inches.

Materials located in the return air system must have a flame spread classification of 200 or less.

Wiring materials located in the return air duct system must conform to Article 300-22 of the latest edition of the <u>National Electrical Code</u>, NFPA 70.

Gas piping shall not be located in, or extend through, the return air duct system.

ROOF JACK

The roof jack assembly and accessories must be listed by a nationally recognized testing agency for the appropriate heating fuel. See Table 2 for the Roof jack Models approved to be used with the GMA / GMC furnace.

Manufacture	Model	Length below Flashing
Thermo Products, LLC	TRJC-2	20" to 36"
Thermo Products, LLC	TRJC-3	27" to 47"
Nortek	(F,S)AW1523- (0,2,4)(A,S)	15" to 23"
Nortek	(F,S)AW2135- (0,2,4)(A,S)	21" to 35"
Nortek	(F,S)AW2747- (0,2,4)(A,S	27" to 47"
JCI	4000-7121/C:	15" to 26"
JCI	4000-7141/C	23" to 44"
JCI	4000-7151/C	30" to 47"
	TABLE 2	

The roof jack assembly must be installed according to the instructions provided with the Roof Jack prior to the furnace installation. (Refer to Figure 3 for flue cutout). Adapters for pitched roofs as well as extended barrel length roof jacks are available from Thermo Products and/or other suppliers.

All vent seams and connections must be sealed with high temperature silicone caulk.

DC-BASE COMBUSTIBLE FLOOR BASE

Make the floor cutouts as shown in Figure 5.

Measure the distance from the surface of the floor to the top of the supply duct. Cut the DC-BASE assembly connector duct to equal the measured distance.

Place the locating bracket (supplied with the DC-BASE assembly) on the back edge of the floor opening. The

tabs will need to be bent down, locate the locating bracket with the tabs inside the back of the floor opening. See Figure 6.

Place the connector duct in the floor opening. Determine which position the plenum angles best fit to the duct opening, cut opening and plenum angles as needed. Attach the plenum angles to the connector duct with screws or pop rivets.

Remove the connector duct; apply a water based duct sealant to the plenum angles to assure a positive seal between the plenum angle, distribution duct and connector duct.

Place the connecter duct back in place, when properly aligned secure to the floor with nails or flat head screws. Secure the plenum angles to the distribution duct with sheet metal screws or pop rivets.







1-1/4







Coil Cabinet: CE118S (GMA1 MODELS ONLY) The CE118S coil cabinet (figure 2) is for applications requiring air conditioning Refer to the installation instructions provide with the Coil Cabinet.

GAS PIPING

 \triangle WARNING: Because of the potential of the odorant to 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: With the gas piping pressurized, all gas piping connections must be leak tested using a strong soap and water solution. Any leaks must be repaired immediately after turning off the gas supply. A final test for gas leakage must be made after purging the gas line.

▲ CAUTION: <u>DO NOT</u> wet electronic components during the leak test. Wetting electronic components may damage 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 system.

▲ WARNING: The furnace and its gas valve must be disconnected from the gas supply during pressure testing of the gas supply system at pressures in excess of 1/2 PSIG (13.9 inches W.G.). The furnace can be isolated from the gas supply by closing the manual gas shutoff valve serving the appliance at test pressures equal to, or less than, 1/2 PSIG or (13.9 inches W.G.).

▲ WARNING: Copper and brass tubing and fittings (except tin lined) shall not be used if the gas contains more than a trace (0.3 grains per 100 cubic ft.) of hydrogen sulfide gas. Check with your gas supplier.

Sizing and installation of fuel lines must be in accordance with federal, state, and local regulations.

A qualified installer or service person must install all gas piping and perform all required testing.

Piping from the natural gas meter to the furnace shall be in accordance with requirements of the local gas utility.

Piping from the propane tank to the furnace must follow the recommendations of the gas supplier. In the absence of local codes governing gas piping selection and installation, follow the <u>National Fuel Gas Code</u>, ANSI Z223.1 / NFPA 54-1999, or latest edition.

A readily accessible, manual gas shutoff valve (designcertified for the applicable gas) with a non-displaceable rotor member shall be installed within six (6) feet of the furnace.

A pipe union, or flanged connection, shall be provided directly up stream of the burner to allow burner removal. Unions must be of a ground joint type or flange-jointed type using a gasket resistant to the corrosive effects of LP gases. Pipe dope or sealant design-certified to be resistant to the action of the LP gases should be used on all threaded joints.

The burner is setup to be piped to the gas supply through the right or left-hand side of the furnace. For service purposes, it is recommended the gas union be located inside the furnace.

A drip leg must be used on both propane and natural gas installations immediately upstream of the furnace in order to trap oil, condensate, and other impurities which might otherwise lodge in the gas valve, or plug the main burner orifice. A drip leg shall be provided at the outlet of the gas meter when there is excessive condensation between the gas meter and the furnace.

Failure to install drip leg(s) may void the manufacturer's limited warranty on the furnace.

For natural gas, the maximum supply pressure is 14.0 in. W.G. and the minimum supply pressure, for purposes of input adjustment, is 5.5 in. W.G.

For propane gas, the maximum supply pressure is 14.0 in. W.G. and the minimum supply pressure, for purposes of input adjustment, is 11.0 in. W.G.

ELECTRICAL WIRING

 \triangle CAUTION: When testing electrical equipment, always follow standard electrical procedures and precautions.

A Separate power supply from all other circuits is needed, it should be no smaller than 14 Ga., insulated copper wire with a temperature rating of 60°C, or greater. Install current protection and disconnect. All electrical wiring must be installed in strict accordance with local ordinances and codes. In the absence of local ordinances and codes, all electrical wiring must conform to the requirements of the <u>National Electric Code</u>, ANSI/NFPA 70- latest edition.

Remove the Furnace Control Box Cover. Route the Power Supply Lines through the knock out in the left side casing with a conduit connector or proper connection. Connect the power supply L1 (Hot) line to the Black wire labeled L1. Connect the power supply L2 (Neutral) to the white wire labeled L2. Connect the Power Supply Ground wire to the Green Wire. Secure all connections with the yellow wire nuts provided.

Refer to the electrical diagrams contained in Appendix B of this manual for an electrical schematic, a connection diagram, and operating instructions.

Room Thermostat

A room thermostat must be connected to the Furnace control. This is typically a low voltage (24 VAC) circuit. Consult the National Electrical Code, ANSI/NFPA 70-2017, or latest edition for guidelines for proper wiring methods and materials for this circuit. The room thermostat should be located on an interior wall in the natural circulating path of the room air.

The thermostat should **not** be installed in a location where it is directly exposed to,

- cold air infiltration, i.e. drafts from outside openings such as windows and doors,
- air currents produced by supply air registers, and
- heat from a nearby source, such as a fireplace, electrical appliances, lamps, solar radiation, a wall enclosing warm air ducts, a chimney, or a flue gas vent.

Most room thermostats are equipped with an adjustable heat anticipator, set the thermostat heat anticipator to match the control current of the furnace as indicted on the furnace wiring diagram.

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 proper hook up. Tighten any loose connections.
- 2. Using a soap solution, leak test gas piping connections.
- Check all tubing connections to the pressure switch, inducer, burner box, and gas valve and make sure they are connected firmly at all their connection points.
- Check flue pipe, combustion air inlet, and all joints for tightness and to make sure 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.

INTIAL OPERATION OF THE FURNACE:

INTIAL START UP

 \triangle 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.

 \triangle WARNING: It may be necessary to purge the air out of the gas line for initial start-up of the furnace after installation. A qualified heating contractor should do this. 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. Propane gas is especially dangerous because the specific gravity of propane gas allows it to accumulate at floor level at a dangerous concentration. ▲ 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) is opened.

2. The thermostat is set at highest setting.

3. The furnace remains running at conditions 1&2 for 30 minutes or until odor has dissipated.

ADJUSTMENT OF HEAT INPUT RATE:

This furnace is shipped from the factory for use with natural gas a Propane gas Conversion Kit is included; follow the instructions provided with the Conversion Kit if the gas supply is Propane gas.

The orifices for this furnace were sized: 1) for natural gas having a heating value of 1025 BTU per cubic foot and a specific gravity of 0.65, or for liquefied propane gas with a heating value of 2500 BTU per cubic foot and a specific gravity of 1.55. The rating label inside the furnace vestibule will specify which gas your furnace is orificed for.

If the furnace is installed at an altitude that is more than 2,000 feet above sea level, it is mandatory the input to the burner be reduced approximately 4.0% for every 1,000 feet that it is above sea level. Refer to Table 3 for the proper orifice size at the various altitudes. If the furnace is installed at an elevation of 2,000 feet or less, no reduction in input is required. Your gas supplier may supply you with the correct orifice, or contact Thermo Pride Technical Service @ 1-800-348-5130 to obtain.

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

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.

With all other gas appliances turned off and using a stopwatch, clock the time required for the (small) dial on the gas meter to make one full revolution. The meter dial will state the cubic feet of flow for one revolution usually one, two or five.

High Altitude Deration Chart

Elevation	Natura	al Gas	Propar	ne Gas
(Feet)	GM*1-60	GM*1-75	GM*1-60	GM*1-75
0-2,000	#28	#22	#43	#39
2,001- 3,000	#30	#26	2.10mm	#42
3,001- 4,000	#30	#27	#45	2.30mm
4,001- 5,000	1/8"	#28	2.00mm	#43
5,001- 6,000	#31	#29	1.95mm	2.20mm
6,001- 7,000	#31	#29	#48	2.15mm
7,001- 8,000	#32	#30	#49	#45
8,001- 9,000	#33	1/8"	#50	2.00mm
9,001- 10,000	#35	#31	#51	1.95mm

TABLE 3

FORMULA:

 $\frac{BTU/Cu Ft x Number of Cu Ft x 3600 Seconds}{ETU/hr} = Input BTU/hr$ Seconds for one revolution

EXAMPLE:

 $\frac{1025BTU/Cu Ft \times 2 Cu Ft \times 3600 Seconds}{1025BTU/Cu Ft \times 2 Cu Ft \times 3600 Seconds} = 76,678 BTU/hr$ 93.80 Seconds for one revolution

Check the model number of the furnace, the input rate, the type of gas, and the manifold pressure on the rating label located in the burner vestibule. The calculated BTU input should be within ± 2% of the furnace rating.

Make sure that the gas supply pressure to the furnace is within the allowable range of 5.5" to 14" WC pressure on natural gas and 11.0" to 14.0" WC 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. Pressure Bosses, which accepts 5/16" ID hose) on the gas valve are used for inlet & outlet (manifold) pressure measurement. The port is opened with 3/32" hex key, see Figure 7.

GMC1 MODEL	GMC1 MODEL FURNACES							
	SUPPLY PRESSURE	MANIFOLD PRESSURE						
NAT	MAX 14" WC MIN 5.5" WC	3.5 <u>+</u> .3" WC						
PROPANE	MAX 14" WC	10.0" + .3" WC						

MIN 11" WC

GAS PRESSURE CHART FOR ALL GMA1 /

TABLE 4

This gas furnace is equipped with a fixed orifice sized for the manifold pressure shown on the rating label. The input can only be increased, or decreased, by adjusting the manifold pressure. Locate the outlet pressure boss (see Figure 7) on the gas valve, back the outlet pressure test screw out one turn counterclockwise, not more than one turn. Use a U tube manometer or recently calibrated pressure gage to measure the pressure. To adjust the pressure, remove the screw cap from the regulator on the gas valve and using the adjustment screw. Decrease the pressure by turning the screw counterclockwise or increase it by turning the screw clockwise.

▲ CAUTION: ADJUSTMENTS TO THE LISTED PRESSURE MUST NOT EXCEED 0.3" WC. A 0.3" WC adjustment will increase or decrease the input approximately 4.0%.

Replace screw (cap) when adjustment is complete. The correct input can be assumed if the furnace manifold pressure is the same as that shown on the rating label if a gas meter is not available for natural gas or the unit is installed on an unmetered propane gas supply. Shut off the gas supply to the furnace. Remove the pressure gage and re-tighten the outlet pressure test screw. If the rated input cannot be obtained with the present orifice at the correct pressure, your local das supplier may assist

in sizing the proper orifice. Thermo Products 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 fuel gas.

BURNER ADJUSTMENT

▲ CAUTION: The GMA1 / GMC1 furnace models utilize an in-shot burner design that does not require an air shutter adjustment (air shutters are not used) for proper flame characteristics.

This unit is designed to not require any burner adjustment. The flames should be checked by looking through the sight glass located on the burner mounting plate. Burner flames should be clear, blue, and almost transparent in color, See Figure 7

NOTE: It is not unusual for propane to have mostly blue flames with yellow or orange tips visible in the chamber after it has struck the flame spreader.



Figure 7

SETTING TEMPERATURE RISE

The furnace is designed and wired at the factory for a heating blower speed that should result in an approximate temperature rise of 60°F for all furnace listed in this manual.

The blower motor is wired on low speed for heating mode of the 60K models and medium low speed for heating mode of the 75K models.

The temperature rise through the furnace may vary depending on the duct system, elevation, heating value, etc. for each installation.

After 10 to 15 minutes of continuous operation, the temperature rise through the furnace must fall within a range of 45° F to 75° F. If the outlet or supply duct temperature is too high, check to make sure the return air filter is clean, the return air registers are free from obstruction, the outlet registers are properly adjusted and clear, and the supply and return air ducts are open.

The circulating air blower is not moving enough air if the supply air temperature is still too high. Before proceeding further, turn off the power supply to the furnace and remove the blower door. The speed of the blower must be increased by changing the speed tap from the motor (see wiring diagram). This is accomplished by locating the control panel attached to the blower housing and switching the blower lead, which should be connected to the "Heat" terminal on the integrated furnace control, with one of the higher speed blower leads attached to a terminal marked "Park". Be sure to attach any unused blower leads to a terminal marked "Park". Replace the blower door and turn on the power supply.

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 section IV. H. Gas Piping of this 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.

Check safety limit control as follows:

- a) Shut off incoming power.
- 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 high air temperatures are reached in furnace at limit control setting with blower out of operation, burner should shut off. Set thermostat above room temperature calling for heat
- f) Shut off electrical power.

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

Make certain thermostat will automatically start and stop furnace.

INSTALLER'S INSTRUCTIONS TO USER

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

The location of all the instructions in the furnace must be kept along with instructions for any accessories in the plastic pouch near the furnace.

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.

The sequence of operation of the furnace.

The correct operation and maintenance of the appliance as outlined in the Users Information section of this manual.

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

Review with and encourage the user to read the Users Information section of this manual along with the warnings and instructions outlined in this manual.

Recommend the user has a qualified heating contractor

inspect the furnace at the start of each heating season. Inform the user of the frequency of inspection required for reach item in the User Information Section of this manual.

SERVICE:

TROUBLESHOOTING

THIS SECTION IS ONLY TO BE PERFORMED BY TRAINED, QUALIFIED SERVICE PERSONNEL, AND NOT BY THE FURNACE OWNER.

NOTICE: BEFORE TROUBLESHOOTING, FAMILIARIZE YOURSELF WITH THE START UP AND CHECKOUT PROCEDURE. ALL INSTALLATION AND SERVICES MUST BE PERFORMED BY QUALIFIED HEATING CONTRACTORS

When testing electrical equipment, always follow standard electrical procedures and precautions.

Note – check diagnostic code through view port prior to removal of door.

- Check for line voltage (110-120VAC) to the furnace. If there is no line voltage applied to the furnace, check that disconnecting switch is "on", fuses or circuit breakers have not blown or tripped.
- 2. Make sure thermostat is "calling for heat".
- 3. Check for adequate fuel supply and pressure. Are all the fuel shutoff valves open?
- 4. To assist you in troubleshooting this furnace, it is equipped with an integrated ignition control with diagnostics. These diagnostics evaluate what malfunction the control system has experienced and will activate a flashing light on the control in different sequences to help pinpoint the failure.

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.

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).

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

Fault Code History

The control stores the last 5 fault codes. Press the pushbutton switch and release within 5 seconds, the control will flash the stored fault codes (in red color). The most recent fault code is flashed first, the oldest fault code is flashed last. If the fault history is empty, the control will flash the LED in green color 2 flashes.

To clear fault history hold the pushbutton switch for more than 5 seconds and rerelease. The control will flash the LED in green color 3 flashes to indicate fault memory has been cleared.

The control keeps the LED off while the pushbutton switch is pressed to provide visual feedback and to assist determining when fault history display begins.

Power must be disconnected before servicing.

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.









MAINTENANCE:

A qualified heating contractor should perform the following maintenance procedures at the beginning of each heating season. Correct any deficiencies at once.

▲ 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: To avoid injury from moving parts, shut off the power to the furnace before removing blower compartment door.

ELECTRICAL:

Check all wiring for loose connections and any signs of damage or unusual wear.

Check for correct voltage at the furnace when operating. Check amp-draw on blower motor and inducer motor to assure they are not exceeding nameplate amp rating. Check for correct operation and proper settings (if manually adjustable) of all controls.

BURNER

If it appears that material is accumulating in or around the burner, the burner can be removed for inspection and cleaning, see Figure 8. The burner assembly is removed by removing the seven screws around the burner mounting plate and pulling the complete assembly from the burner chamber. When reinstalling make sure all gaskets are in good condition and properly position.



Figure 8

COMBUSTION FAN ASSEMBLY

Inspect the pressure switch and tubing connections and inspect the fan assembly for warpage, deterioration and debris or other build-up. Remove any debris from the fan and motor assembly.

INSPECTING THE VENTING SYSTEM

The venting system should be inspected during the annual maintenance check-up or during each subsequent service call.

Check the vent system for restrictions due to soot, or carbon build-up, as well as foreign matter, or any materials, that cause the venting system to restrict the proper venting of combustion products. If a restriction is found, the roof jack <u>must</u> be cleaned or replaced to ensure proper venting. Vent pipes should also be inspected for any signs of corrosion, deterioration, or leakage that may cause combustion by-products to infiltrate the home or indoor environment.

If signs of corrosion, deterioration, or leakage are evident, the Roof Jack <u>must</u> be replaced with a properly sized, agency-approved, Roof Jack.

GASKETS/SEALING MATERIALS

Inspect all visible gaskets for signs of degradation, especially any seals which were removed as part of the inspection. Replace any suspect gaskets.

HEAT EXCHANGER

Inspect for corrosion, pitting, warpage, deterioration, carbon build-up, and loose gaskets in the flue pipe, and accessible areas of the heat exchanger.

HOUSE AIR BLOWER

Check and clean the blower wheel, housing, and compartment with a vacuum.

IMPORTANT: The blower motor is permanently lubricated **and should not be oiled.**

USER INFORMATION SECTION:

WARNINGS AND CAUTIONS:

▲ WARNING: If you suspect there is a problem with the furnace, pertaining to the venting system or any other related problem, immediately contact a qualified service agency. If a service agency is not available, contact your fuel supplier.

▲ WARNING: Personal injury or property damage could result from major repair or service of this furnace by anyone other than a qualified contractor. The user should only perform the routine maintenance described in the user section of this manual.

 \triangle WARNING: The area around the furnace should be kept free and clear of combustible materials, especially papers and rags.

 \triangle CAUTION: Do not block or obstruct air openings on the furnace casing. Do not block or obstruct air openings communicating within the area in which the furnace is installed.

 \triangle CAUTION: Do not allow the outside air intake to be blocked or obstructed by vegetation, ice, snow, or any other materials.

 \triangle WARNING: Do not use this furnace if any part has been underwater. Immediately call a qualified service agency to inspect the furnace and to replace any part of the electrical or control system, which has been underwater.

▲ WARNING: Should overheating occur or the fuel supply fail to shut off, shut off the manual fuel supply valve to the furnace before shutting off the electrical supply.

FILTER LOCATION AND CLEANING

 \triangle CAUTION: To avoid injury from moving part, hot surfaces or electrical shock, shut off the power to the furnace and allow the furnace to cool before removing furnace access door to service filter.

The air filter should be inspected each month and replaced when dirty. Replacing the air filter frequently may prevent airborne contaminants from going through the furnace and depositing in the furnace, duct system, and interior of the building.

See Figure 9 for the location of the return air filter.

COMPONENT LOCATIONS

The following diagram shows a typical furnace installation and typical position of the components referenced in these instructions.



Figure 9

INSPECTION AREAS

IMPORTANT: 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.

- VESTIBULE: The furnace vestibule areas or burner compartment should be inspected by removing front door of the furnace and looking for signs of excessive heat such as discoloration of components, materials damaged from rust or corrosion, soot or carbon buildup.
- EXTERIOR OF FURNACES: The furnace exterior should be inspected for signs of excessive heat such as discoloration of materials or damage from rust or corrosion.

VENT CONNECTOR: The furnace vent pipe should be inspected for signs of rust, corrosion pitting, or holes in the pipe. Check for leakage around seams in pipe indicated by soot or condensate streaks.

ROOF JACKS: The furnace roof jack should be inspected for signs of rust or corrosion, pitting or holes, signs of excessive condensation or moisture leaking from roof jack.

EXTENDED SHUTDOWN

If this furnace is shut down or off for an extended period of time, several steps can be taken to help insure a smooth and reliable start up.

ON SHUT DOWN:

- 1. Close the gas supply shutoff valve(s).
- 2. Turn the furnace power switch "off" and disconnect electrical power to the unit.

ON START-UP:

- 1. Have the heating system (and furnace) inspected and started by a qualified service person.
- 2. Set the room thermostat above room temperature.
- 3. Open all shutoff valves in the gas supply line.
- 4. Turn "on" the main power at the disconnecting switch and at the furnace power switch to start the inducer.
- 5. Follow the "BURNER OPERATION AND ADJUSTMENT" procedure in Section K.



APPENDIX A – REPLACEMENT PARTS

ITEM	SUB- ASSEMBLY	(GMA1-60D	48N)	(GMA1-75D48N)		
	PARTS DESCRIPTION	PART NO.	OTY.	PART NO.	οτγ.	
1	BASE	12731	1	12731	1	
2						
	SIDE CASING, LEFT	12732	1	12732	1	
4	SIDE CASING, RIGHT	12733	1	12733	1	
5	TOP COMBUSTION AIR TRANS ASM	S00S8249	1	S00S8249	1	
6	REAR CASING	12734	1	12734	1	
7	FRONT DOOR	12771-7	1	12771-7	1	
8	CONTROL BOX COVER	12796	1	12796	1	
9	FINGER BLOCK-OFF	12776	1	12776	1	
10	COMBUSTION AIR TUBE	12752	1	12752	1	
11	FAN METERING ORIFICE	12777	1	12778	1	
12	BLOWER PAN	12739	1	12739	1	
13	BLOWER SUB-ASSEMBLY	S00S4611	1	S00S4611	1	
13A	BLOWER, 12-8T HSG, 11-8 WHL	340368	1	340368	1	
13B	WHEEL, 11-8	340369	1	340369	1	
13C	MOTOR 3/4 HP 4SP PSC	351044	1	351044	1	
13D	CAPACITOR 15MFD/370VAC	350064	1	350064	1	
13E	CAPACITOR INSULATING BOOT	350036	1	350036	1	
13F	MOTOR MOUNT BRACKET	A0PS7670	1	A0PS7670	1	
13G	WRAP, BLOWER RETAINER	12741	1	12741	1	
14	COMBUSTION AIR BOOSTER	340373	1	340373	1	
15	FILTER	370206	2	370206	2	
16	FILTER RETAINER	12753	2	12753	2	
17	CLEAR WINDOW PLUG	350248	1	350248	1	
18	CAM LATCH ASSEMBLY	50043	1	50043	1	
19	-	-	-	-	-	
20	GASKET, HX COLLECTOR BOX	330400	1	330400	1	
21	GASKET, FLUE	330401	1	330401	1	
22	GASKET, COMBUSTION AIR	330402	1	330402	1	
23	HEAT EXCHANGER ASSEMBLY	32722	1	32722	1	
24	FRONT SEPARATOR PANEL	12774	1	12774	1	
25	VELOCITY PLATE	12749	1	12749	1	
26	GASKET, FRONT SEPARATOR	330399	1	330399	1	
27	LIMIT SHIELD	12794	1	12794	1	
28	DIVIDER PANEL	12738	1	12738	1	
29	CONTROL BOX	12795	1	12795	1	
30	COMBUSTION VENTURI BOX	S00S8246	1	S00S8246	1	
31	BURNER ASSEMBLY	S00S8247	1	S00S8248	1	
32	LIMIT	351053	1	351054	1	
33	TRANSFORMER	351058	1	351058	1	
34	GROMMET	300033	2	300033	2	
35	FURNACE CONTROL	350211	1	350211	1	
76	PRESSURE SWITCH	350860	1	350860	1	
20						
37	HARNESS, VESTIBULE CONTROL	351045	1	351045	1	

GMA1 SERIES



GMC1 SERIES

ITEM	SUB- ASSEMBLY	(GMC1-60D4	48N)	(GMC1-75D4	18N)
	PARTS	PART NO	ΟΤΥ	PART NO	οτγ
1	BASE	12760	1	12760	1
2	BROE				
2	SIDE CASING LEFT	12757	1	12757	1
		12758	1	12758	1
4		50059340	1	50059240	1
5	TOP COMBUSTION AIR TRANS ASM	12750		10750	1
b 	REAK CASING	12739		12/09	1
/	FRUNT DOUR	12736-7		12/36-/	
8	CONTROL BOX COVER	12/96	1	12/96	1
9	FINGER BLOCK-OFF	12776	1	12776	1
10	COMBUSTION AIR TUBE	12752	1	12752	1
11	FAN METERING ORIFICE	12777	1	12778	1
12	BLOWER PAN	12739	1	12739	1
13	BLOWER SUB-ASSEMBLY	S00S4611	1	S00S4611	1
13A	BLOWER, 12-8T HSG, 11-8 WHL	340368	1	340368	1
13B	WHEEL, 11-8	340369	1	340369	1
13C	MOTOR 3/4 HP 4SP PSC	351044	1	351044	1
13D	CAPACITOR 15MFD/370VAC	350064	1	350064	1
13E	CAPACITOR INSULATING BOOT	350036	1	350036	1
13F	MOTOR MOUNT BRACKET	A0PS7670	1	AOPS7670	1
13G	WRAP, BLOWER RETAINER	12741	1	12741	1
14	COMBUSTION AIR BOOSTER	340373	1	340373	1
15	FILTER	370206	2	370206	2
16		19753	2	12753	2
17		350248	1	350248	1
17	CLEAR WINDOW PLUG	50047	1	50043	1
18	CAM LATCH ASSEMBLT	50045		50045	'
19	-	-	-	-	-
20	GASKET, HX COLLECTOR BOX	330400	1	330400	1
21	GASKET, FLUE	330401	1	330401	1
22	GASKET, COMBUSTION AIR	330402	1	330402	1
23	HEAT EXCHANGER ASSEMBLY	32722	1	32722	1
24	FRONT SEPARATOR PANEL	12737	1	12737	1
25	VELOCITY PLATE	12749	1	12749	1
26	GASKET, FRONT SEPARATOR	330399	1	330399	1
27	LIMIT SHIELD	12794	1	12794	1
28	DIVIDER PANEL	12738	1	12738	1
29	CONTROL BOX	12795	1	12795	1
30	COMBUSTION VENTURI BOX	S00S8246	1	S00S8246	1
31	BURNER ASSEMBLY	S00S8247	1	S00S8248	1
32	LIMIT	35105.3	1	35105.3	1
33	TRANSFORMER	351058	1	351058	1
34	CROMMET	300033	2	300033	2
35		350211	1	350211	1
35		350211	1	350211	1
J0	PRESSURE SWITCH	300000		300000	
<u>ی</u> ا ک	HARNESS, VESTIBULE CONTROL	351045	1	351045	1
38	AUX. LIMIT SWITCH	351055		351055	1
39	HURIZONTAL SEPARATOR PANEL	12/61		12/61	1
40	COIL ACCESS DOOR	12762-7	1	12762-7	1
41	SIDE ANGLE	12763	2	12763	2
42	COIL ACCESS PANEL, LEFT	12764	1	12764	1
43	COIL ACCESS PANEL, RIGHT	12765	1	12765	1
44	COIL TRIM PANEL	12766	1	12766	1
		50044	2	50044	2
45	STRIKE & LATCH	J0044	4	20044	2

GMC1 SERIES



GMA1/GMC1 SERIES - BURNER ASEMBLY



APPENDIX B – WIRING DIAGRAM REVISE

APPENDIX C – SPECS

GMA1-60

ALTERATIONS REQ'D FOR A/C @ DESIGN EXTERNAL STATIC PRESSURE						
COOLING UNIT	HTG Speed	Recommended CLG Speed				
24,000	LOW	LOW				
30,000	LOW	MEDIUM LOW				
36,000	LOW	MEDIUM HIGH				
42,000	LOW	MEDIUM HIGH				
48,000	LOW	HIGH				

Speed Tap \	ap \ Furnace Airflow (CFM) vs. External Static pressure (in. WC.						
Static							
Pressure	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Low	735	721	707	683	621	586	536
ML	951	939	924	897	880	845	766
МН	1304	1260	1254	1207	1178	1221	1057
High	1551	1513	1466	1430	1369	1314	1244

Speed Tap \	Tap \ Temperature Rise vs. External Static Pressure (in. WC.)						;.)
Static							
Pressure	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Low	60	61	62	65	71	75	82
ML	46	47	48	49	50	52	58
МН	34	35	35	36	37	39	42
High	28	29	30	31	32	33	35

Speed Tap \	Furnace Motor Current Draw (Amps) vs. External Static pressure (in. WC.)							
Pressure	0.1	0.2	0.3	0.4	0.5	0.6	0.7	
Low	3.01	2.95	2.90	2.82	2.70	2.62	2.53	
ML	4.06	3.84	3.75	3.62	3.48	3.34	3.13	
МН	5.43	5.29	5.16	5.01	4.74	4.58	4.31	
High	6.63	6.49	6.30	6.17	5.96	5.76	5.54	

Speed Tap \	Furnace Motor Watts vs. External Static pressure (in. WC.)						/C.)
Static							
Pressure	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Low	296	294	292	290	279	276	268
ML	411	397	390	378	370	361	342
МН	582	572	560	542	529	506	482
High	734	724	705	694	671	658	632

ALTERATIONS REQ'D FOR A/C @ DESIGN EXTERNAL STATIC PRESSURE						
	HTG	Recommended CLG				
	Speed	<u>Speed</u>				
24,000	MED LOW	LOW				
30,000	MED LOW	MEDIUM LOW				
36,000	MED LOW	MEDIUM HIGH				
42,000	MED LOW	MEDIUM HIGH				
48,000	MED LOW	HIGH				

GMA1-75

Speed Tap \	Fur	Furnace Airflow (CFM) vs. External Static pressure (in. WC.)					
Static							
Pressure	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Low	735	721	707	683	621	586	536
ML	951	939	924	897	880	845	766
МН	1304	1260	1254	1207	1178	1221	1057
High	1551	1513	1466	1430	1369	1314	1244

Speed Tap \	Temperature Rise vs. External Static Pressure (in. WC.)						.)
Static							
Pressure	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Low	75	77	78	81	89	94	103
ML	58	59	60	61	63	65	72
MH	42	44	44	46	47	49	52
High	35	36	37	38	40	42	44

Speed Tap \	Furnace	e Motor Cur	rrent Draw	(Amps) vs. External Static pressure (in. WC.)				
Pressure	0.1	0.2	0.3	0.4	0.5	0.6	0.7	
Low	3.01	2.95	2.90	2.82	2.70	2.62	2.53	
ML	4.06	3.84	3.75	3.62	3.48	3.34	3.13	
МН	5.43	5.29	5.16	5.01	4.74	4.58	4.31	
High	6.63	6.49	6.30	6.17	5.96	5.76	5.54	

Speed Tap \	Fu	rnace Moto	or Watts vs.	External St	tatic pres	sure (in. W	/C.)
Static							
Pressure	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Low	296	294	292	290	279	276	268
ML	411	397	390	378	370	361	342
MH	582	572	560	542	529	506	482
High	734	724	705	694	671	658	632

GMC1-60

ALTERATIONS REQ'D FOR A/C @ DESIGN EXTERNAL STATIC PRESSURE					
	HTG	Recommended CLG			
	Speed	<u>Speed</u>			
24,000	LOW	LOW			
30,000	LOW	MEDIUM LOW			
36,000	LOW	MEDIUM HIGH			
42,000	LOW	MEDIUM HIGH			
48,000	LOW	HIGH			

Speed Tap \	Fur	Furnace Airflow (CFM) vs. External Static pressure (in. WC.)					VC.)
Static							
Pressure	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Low	743	712	698	656	612	562	515
ML	931	923	891	863	847	789	727
МН	1309	1267	1241	1198	1141	1099	1036
High	1561	1504	1458	1392	1327	1261	1182

Speed Tap \	Temperature Rise vs. External Static Pressure (in. WC.)						;.)
Static							
Pressure	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Low	59	62	63	67	72	79	86
ML	47	48	49	51	52	56	61
МН	33	35	35	37	38	40	42
Hiah	28	29	30	31	33	35	37

Speed Tap \	Furnace Motor Current Draw (Amps) vs. External Sta WC.)						sure (in.
Pressure	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Low	3.04	2.93	2.88	2.79	2.72	2.64	2.53
ML	3.85	3.78	3.66	3.55	3.45	3.31	3.15
МН	5.40	5.23	5.06	4.88	4.70	4.52	4.30
High	6.60	6.41	6.22	6.04	5.85	5.65	5.43

Speed Tap \	Furnace Motor Watts vs. External Static pressure (in. WC.)						/C.)
Static							
Pressure	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Low	301	298	294	290	282	277	269
ML	387	391	381	374	369	353	345
МН	582	565	551	535	516	505	481
High	735	717	702	678	661	639	617

GMC1-75

ALTERATIONS REQ'D FOR A/C @ DESIGN EXTERNAL STATIC PRESSURE					
	HTG	Recommended CLG			
	Speed	<u>Speed</u>			
24,000	MED LOW	LOW			
30,000	MED LOW	MEDIUM LOW			
36,000	MED LOW	MEDIUM HIGH			
42,000	MED LOW	MEDIUM HIGH			
48,000	MED LOW	HIGH			

Speed Tap \	Furnace Airflow (CFM) vs. External Static pressure (in. WC.)						
Static							
Pressure	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Low	743	712	698	656	612	562	515
ML	931	923	891	863	847	789	727
МН	1309	1267	1241	1198	1141	1099	1036
High	1561	1504	1458	1392	1327	1261	1182

Speed Tap \	Temperature Rise vs. External Static Pressure (in. WC.)						
Static							
Pressure	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Low	74	78	79	84	90	98	107
ML	59	60	62	64	65	70	76
MH	42	43	44	46	48	50	53
High	35	36	38	39	41	44	47

Speed Tap \	Furnace Motor Current Draw (Amps) vs. External Static pressure (in. WC.)							
Pressure	0.1	0.2	0.3	0.4	0.5	0.6	0.7	
Low	3.04	2.93	2.88	2.79	2.72	2.64	2.53	
ML	3.85	3.78	3.66	3.55	3.45	3.31	3.15	
МН	5.40	5.23	5.06	4.88	4.70	4.52	4.30	
High	6.60	6.41	6.22	6.04	5.85	5.65	5.43	

Speed Tap \	Furnace Motor Watts vs. External Static pressure (in. WC.)						
Static							
Pressure	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Low	301	298	294	290	282	277	269
ML	387	391	381	374	369	353	345
МН	582	565	551	535	516	505	481
High	735	717	702	678	661	639	617