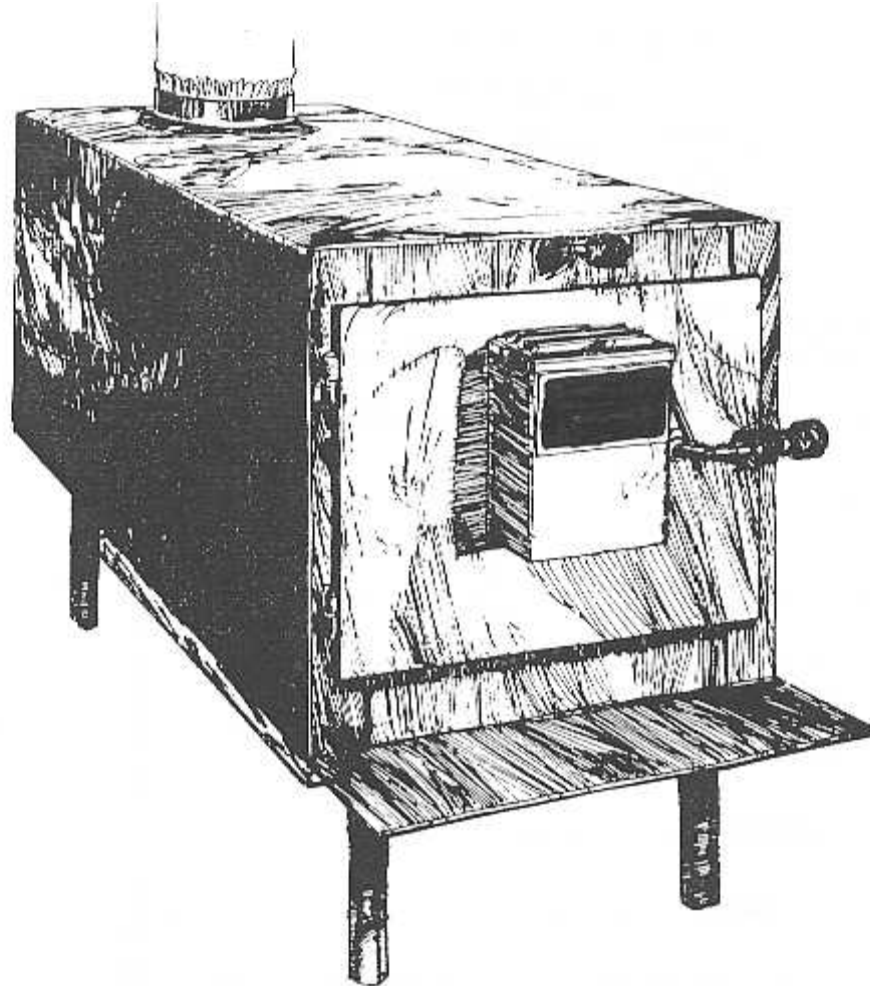


Thermo-Control[®]

The ultimate wood burning system.



Owner's Manual and Installation Guide

Thermo-Control®

The ultimate wood burning system.

P. O. Box 640
Cobleskill, New York 12043
Telephone (518) 296-8517

Sixth Edition — November 2011

Tested & Listed by Energy Testing Laboratory of Maine according to ETLM Standard 78-1 & Underwriters Laboratory Standards 1482 & 737.

| |
|--------------------------|
| Your Unit Serial # _____ |
| Your Unit Model # _____ |
| Date Purchased _____ |
| Dealer's Name _____ |
| Address _____ |
| Telephone # _____ |

I, Frank C. Gross, a Registered Professional Engineer in the Commonwealth of Massachusetts, No. 10127, have examined the drawings as stamped and the actual construction of the Thermo-Control Wood-Burning Central Heating Units, Models No. 200, No. 400, No. 500 and the optional equipment for Hot Water Heat Piping, Warm Air Hood and for Domestic Hot Water Piping as manufactured by Thermo-Control, PO Box 640, Cobleskill, New York 12043.

The designs of these units are based on good engineering principles and the units are built in accordance with standard engineering practices of formed 3/16" and 1/4" steel. All welds are continuous, to form a sealed combustion chamber. The combustion chamber is lined with firebrick to prevent overheating of that area. Air for combustion is regulated very effectively by a simple automatic thermostat. A gasket provides a good seal for the reinforced steel door. The chimney vent in each model is more than adequate.

If the units are installed and operated in accordance with the owner's manual and comply with State and Local requirements for clearances, size and height of chimney to give adequate draft, they will operate very satisfactorily and in a safe manner.



Frank C. Gross
Frank C. Gross

NOTE: Read Sections IV through VIII BEFORE installing and using your product.

TABLE OF CONTENTS

| | Page # |
|--|--------|
| I. Introduction..... | 4 |
| II. Unit Illustration and Features..... | 5 |
| III. Specifications Chart..... | 6 |
| IV. Basic Installation..... | 7 |
| A. Safety First | |
| B. The Chimney | |
| C. Installing the Unit and Chimney Connector | |
| V. Wood Heating System..... | 12 |
| A. Domestic Hot Water Model..... | 13 |
| B. Hot Water Home Heating Model..... (Hydronic Heating) | 14 |
| C. Hot Air Model..... | 19 |
| VI. Operating Procedures..... | 22 |
| VII. Creosote and Chimney Maintenance..... | 26 |
| VIII. Firewood..... | 27 |
| IX. Trouble Shooting Guide..... | 29 |
| X. Glossary of Terms..... | 30 |
| XI. Warranty..... | 31 |

I. INTRODUCTION

Congratulations on your purchase of a **Thermo-Control wood-burning product!** Your decision to acquire a wood-burning unit was undoubtedly one you reached after careful thought and we're proud you selected Thermo-Control. Whether this is your first venture into the art of wood burning, or if you were born with the proverbial ax in hand, we're confident you will find Thermo-Control to be a superior product.

Quality engineered to bring you the ultimate in efficiency, construction and versatility, Thermo-Control's features are many, but you'll be happy to learn that its benefits are even more numerous!

There's much to be said about wood as a source of fuel. A clean fuel, it's available in most areas, is economical to use and if harvested and used with care, it will provide a never-ending supply of dependable heat for generations to come. An excellent source of heat, wood is even more efficient when burned in Thermo-Control, a well constructed, high recovery wood-burning unit. With Thermo-Control, you can depend upon a favorable heating value ratio. Therefore, with a standard cord of seasoned hardwood, you derive the same heat as you would with a ton of coal or 200 gallons of fuel oil!

If you have access to wood, your benefits can be multiplied - you save money on fuel, with proper harvesting you improve the woodlot, and of course the health advantages should never be minimized. But even more important, when utilized in a properly constructed unit, wood can work with other fuels to provide long lasting centralized heat. As a result, you have the best of both - the money-saving qualities of wood and the convenience of more sophisticated fuels.

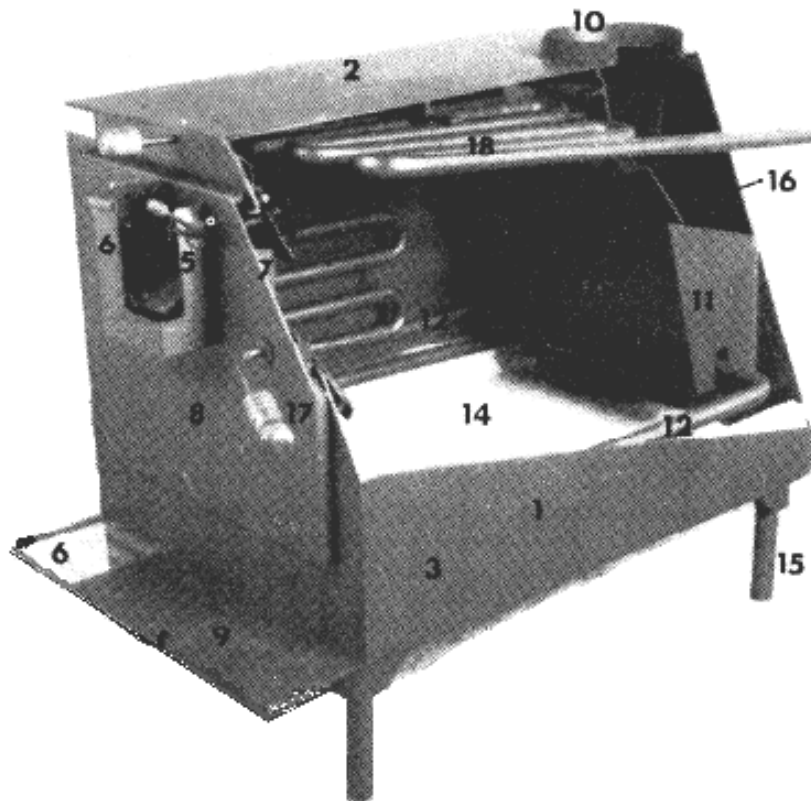
The purpose of Thermo-Control is to produce the most heat with the least amount of wood and a minimum of care and maintenance. Manufactured of heavy gauge hot rolled steel, Thermo-Control boasts the exclusive automatic thermostat, which insures constant, even temperature. The generous firebox and expansive door virtually eliminate the need for splitting wood, with several models accommodating two foot logs. If necessary you need fill your Thermo-Control only two or three times a day, and then forget it, sure that your home will be comfortably warm, despite the chill outside.

The versatility of Thermo-Control wood-burning furnaces and boilers is best demonstrated by the way they can be used. Each of the three basic sizes can be equipped with interior piping for use with a hot water baseboard heating system, for hook-up to a water heater for domestic hot water, or a combination. The Thermo-Control can also be manufactured with a warm air plenum for attaching directly to a warm air furnace, with the added option of interior piping for domestic or hot water heating use. Three sizes of wet-based boilers complete the line.

Versatility is the word with Thermo-Control, and as we consider the various features which make Thermo-Control superior, you'll conclude that you made a wise investment when you made the move to our top quality line!

- We ask that you follow our policy of **"KEEPING SAFETY FIRST"** when installing and using your Thermo-Control wood-burning product.
- We strongly suggest that you first read through the entire manual before installing your unit in accordance with Section IV - Basic Installation.
- We further recommend that you solicit the aid of your local volunteer or municipal fire department when making the inspection of your chimney as outlined in Section IV of this manual. Your fire department could also be very helpful with advice regarding the proper installation of your stove, the chimney connector, and protection of combustible materials.

II. UNIT ILLUSTRATIONS AND FEATURES



MODEL 500 ILLUSTRATED

- Your Thermo-Control wood-burning unit has been designed with many specific functions in mind. Safety, of utmost importance, is built into every feature of each model. They have been ruggedly and handsomely designed to give you years of safe, efficient, dependable, and versatile service. Their features are listed on the following pages.

1. RUGGED EXPANSIVE FIREBOX

- Constructed of 1/4" & 3/16" thick hot rolled steel
- Top and sides are one continuous piece
- Continuous welds are made at all interior seams
- Air tight construction

2. LARGE FLAT TOP SURFACE

- Provides a constant supply of heat for cooking

3. HEAT RESISTANT MATTE BLACK FINISH

- Resistant to 1200° F/650° C
- Can easily be touched up or refinished if scratched

4. FRONT SWING PLATE

- Allows for easy, fast, full loading

5. THERMOSTATIC CONTROL

- Automatically controls primary air intake
- Provides even, constant combustion
- Aids in regulating heat transfer to room(s)
- Encased in protective casing

6. NAMEPLATE AND OPERATING INSTRUCTIONS

- Thermo-Control name and address
- Unit model number
- Firing rate and heating capacity
- Operating clearances, if required

7. DOWNDRAFT PRIMARY AIR CHAMBER

- Preheats primary air for hotter combustion
- Begins downdraft and cross-draft combustion process by directing primary air to bottom of stove

8. LARGE REINFORCED DOOR & GASKETED DOOR OPENING

- Large opening allows for easy and efficient loading, stoking, and ash removal
- Heavy gasket provides air-tight construction for better combustion control

9. SAFETY APRON

- For catching and easily removing any ashes spilled while cleaning

CONTINUED ON FOLLOWING PAGE

II. UNIT ILLUSTRATIONS AND FEATURES (cont)

10. STOVE PIPE COLLAR

- Designed for “inside” smoke pipe connection to eliminate creosote drip

11. COMBUSTION BAFFLE

- Designed to force volatile gases to circulate over fire bed for hotter and more efficient combustion

12. SECONDARY AIR TUBES

- Provide additional, preheated fresh air to secondary combustion chamber for almost total combustion of volatile gases and smoke
- Aids in providing hotter exhaust air, thus reducing creosote and soot buildup in the smoke pipe and chimney flue

13. BAFFLE BYPASS DAMPER & CONTROL ROD

- By opening the bypass damper, the exhaust gases and smoke are allowed to vent directly to the smoke pipe, thus eliminating back drafting at the door when loading, stoking, or removing ash
- Direct venting also promotes faster ignition when starting a new fire or adding logs

14. FIREBRICK LINED COMBUSTION CHAMBER

- Provides insulation protection to the firebox bottom and aids in protecting floor on which the unit is placed

- Insulating quality creates much hotter combustion temperatures, thus maximum combustion efficiency

15. WIDE STANCE ADJUSTABLE LEGS

- Permit easy leveling and safe stabilization of unit

16. SECONDARY COMBUSTION CHAMBER

- Allows for near total combustion of volatile gases which have passed under the baffle, thus optimum combustion efficiency

- Assures hotter flue gas temperatures which minimize possibility of creosote buildup

17. TIGHT LOCKING HANDLE

- Draws door tightly closed to provide air tight seal with gasket

- Handle designed to be “cool” to the touch

18. OPTIONAL HOT WATER PIPE COILS

- May be ordered with the unit or installed anytime

- For use with domestic hot water heater or boiler for baseboard radiation

III. SPECIFICATIONS CHART

| | | Model 200 | Model 400 | Model 500 | Model 2000 | Model 2500 | Model 3000 |
|------------------------------------|---|------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| OVERALL DIMENSIONS | H | 27 in | 27 in | 33 in | 48 in | 60 in | 72 in |
| | W | 18 in | 24 in | 24 in | 31 in | 35 1/2 in | 48 in |
| | L | 33 in | 34 in | 40 in | 54 in | 56 in | 67 in |
| WATER CAPACITY | | N/A | N/A | N/A | 130 gal | 170 gal | 300 gal |
| WEIGHT | | 240 lbs | 310 lbs | 480 lbs | 885 lbs | 1400 lbs | 1940 lbs |
| FLUE SIZE | | 6 in | 8 in | 8 in | 8 in | 8 in | 10 in |
| DOOR OPENING | H | 132 sq in | 198 sq in | 271 sq in | 271 sq in | 271 sq in | 497 sq in |
| | W | 11 in | 11 in | 15 1/2 in | 15 1/2 in | 15 1/2 in | 25 1/2 in |
| | | 12 in | 18 in | 17 1/2 in | 17 1/2 in | 17 1/2 in | 19 1/2 in |
| MAXIMUM LOG LENGTH | | 20 in | 20 in | 27 in | 27 in | 36 in | 38 in |
| FIREBOX DIMENSIONS | H | 18 in | 18 in | 24 in | 24 in | 29 in | 35 in |
| | W | 18 in | 24 in | 24 in | 24 in | 28 in | 30 in |
| | D | 21 in | 21 in | 28 in | 28 in | 37 in | 40 in |
| FIREBOX CAPACITY | | 4 cu ft or 120 lbs | 5.25 cu ft or 150 lbs | 9 cu ft or 270 lbs | 9 cu ft or 270 lbs | 17 cu ft or 510 lbs | 23 cu ft or 720 lbs |
| APPROX. BURNING RATE (hardwood/hr) | | 4-12 lbs | 5-15 lbs | 7.5-18 lbs | 7.5-18 lbs | 12-30 lbs | 18-45 lbs |
| APPROX. HEAT CAPACITY (BTU/hr) | | 55,000 | 90,000 | 125,000 | 125,000 | 200,000 | 300,000 |
| HEATING RANGE | | Up to 1,200 sq ft (9,600 cu ft) | Up to 1,600 sq ft (12,800 cu ft) | Up to 2,500 sq ft (20,000 cu ft) | Up to 2,500 sq ft (20,000 cu ft) | Up to 4,000 sq ft (32,000 cu ft) | Up to 5,500 sq ft (44,000 cu ft) |

Thermo-Control wood-burning furnaces & boilers are constructed of rugged 1/4" and 3/16" hot rolled steel. All specifications are subject to change without notification.

IV. BASIC INSTALLATION

A. SAFETY FIRST:

Most important for the safe and efficient use of any wood-burning unit is the owner's understanding that the "total heat assembly" — the **Unit**, the **Chimney**, and the **Chimney Connector** — must be given proper consideration. Each integral part is extremely important.

A wood furnace/boiler, well constructed and properly placed, may be connected to a structurally sound, adequately sized, and clean chimney. But if the stovepipe connecting the two is installed improperly (for example) loosely or too close to combustible materials, it renders the assembly unsafe.

Although relatively few house fires result from the use of wood burning appliances, many insurance companies will verify, as stated below, the common causes of house fires which are directly related to the use of wood burning appliances.

- If any part of a heating assembly is installed too close to combustible materials, those materials can combust spontaneously.
- If creosote is allowed to build up through improper use of the appliance a chimney fire can occur.
- Inadequate protection against sparks can cause nearby combustible materials to ignite (ex. - carpet & furniture.)
- Some owners are guilty of careless operation of the appliance.

Before you begin to install your wood-burning unit, thoroughly read the entire manual and proceed responsibly for both you and your family.

B. THE CHIMNEY:

Your first responsibility is to thoroughly inspect and prepare your chimney, whether it is new or old, covered or exposed.

Following is a checklist and illustration to aid you in inspecting your chimney. Don't leave an item uninspected or unprepared. A cracked or unlined chimney can cause a fire! If, for example, you cannot climb a roof to inspect or repair a chimney, find someone who can.

- The chimney should be thoroughly inspected for sound construction. Loose or cracked bricks, blocks mortar joints, blocked flue tile, as well as damaged or worn chimney caps, etc. should all be replaced or repaired by a qualified mason.
- The chimney flue should be airtight and unobstructed. It should be checked along its entire length for any possible blockage or obstruction (ex. - swallows' nests or broken flue tile). The use of a strong flashlight and a mirror are sometimes helpful in inspecting. All blockages must be removed and all broken tile replaced or repaired.
- The flue should be inspected for creosote and soot buildup. If buildup exists, it should be cleaned thoroughly. A properly sized chimney cleaning brush may be purchased and its use, as directed by the manufacturer, is a standard and acceptable method of cleaning. There are many homemade tools and methods used for cleaning chimneys, but these are generally not as effective.
- Upon completion of cleaning of an existing chimney or completion of construction of a new chimney, the flue lining should be clean and smooth.
- The chimney should be insulated. It should be constructed so that the flue lining retains as much heat as possible. If masonry, it should have a continuous fire-clay tile lined flue as illustrated. If a prefabricated metal chimney is to be used it must be U.L. approved and of the double-walled, solid insulated, stainless steel type all-fuel chimney systems (or equal). We recommend this over the use of triple wall metal chimneys which utilize "flow of air" between the metal walls as an insulator, since circulating air may sometimes allow the flue lining to remain cool enough to cause condensation and creosote buildup and reduce effective draft.
- Many localities now have people established in the chimney sweep business. Some of these people are qualified not only to clean chimneys, but to inspect and even repair them. We recommend that you invest in this service.

CHIMNEY CHECKLIST

The cap should be such that it helps to prevent downdraft while providing adequate exhaust draft.

Top of chimney must be at least 2' higher than peak or highest portion of roof within 10' horizontally.

Min. 3' from top of chimney to point at which it passes through the roof.

A chimney which rises within house is better insulated than a chimney which is located outside the house and exposed to weather.

Recommended min. height = approx. 20'.

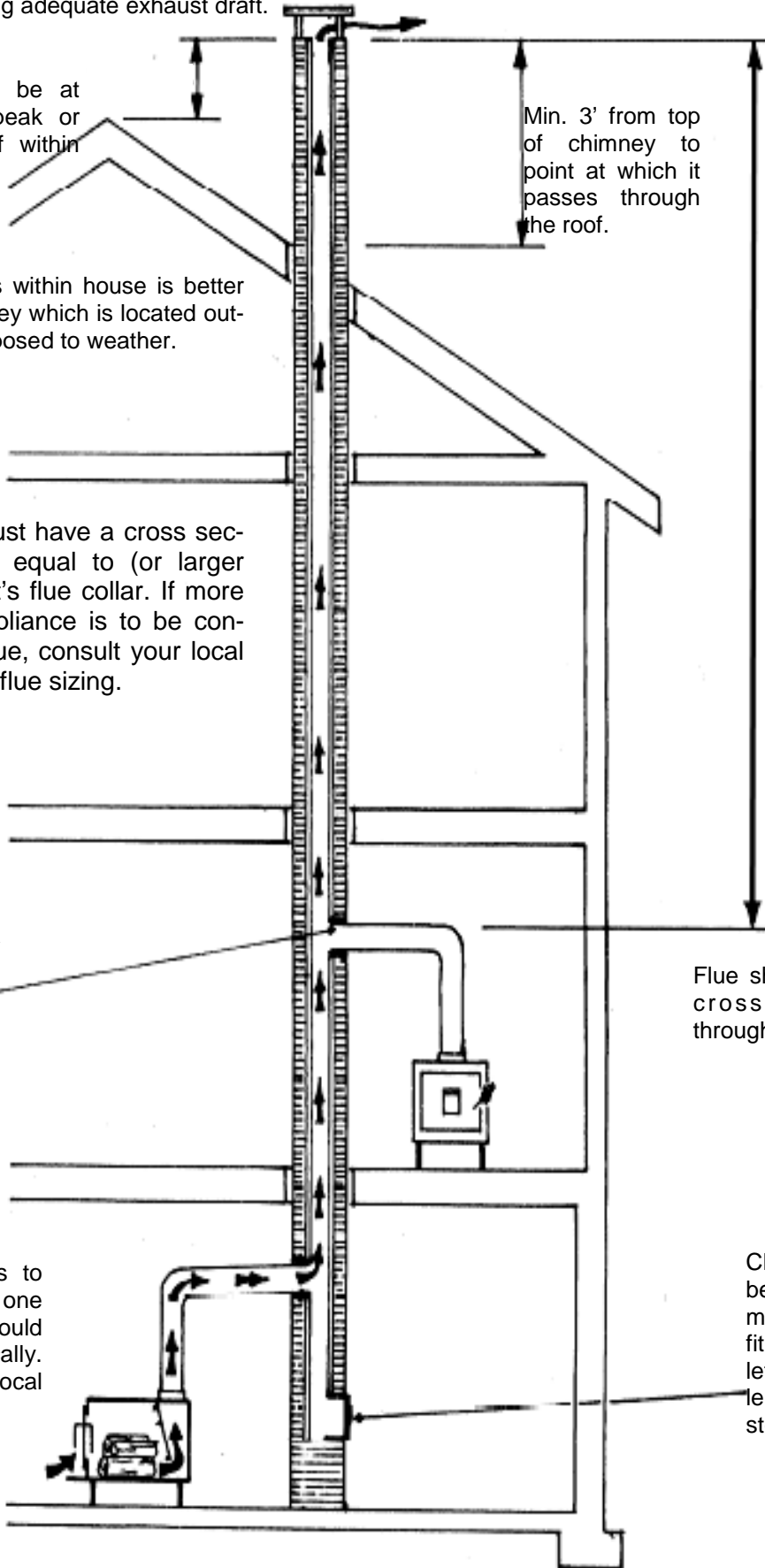
The chimney flue must have a cross sectional area at least equal to (or larger than) that of the unit's flue collar. If more than one unit or appliance is to be connected to a single flue, consult your local building authority for flue sizing.

The chimney thimble should be constructed of fire clay and should have an inside diameter which is nominally equal to the outside diameter of the smoke pipe to assure a reasonably air tight fit. The thimble must not extend beyond the flue lining.

Flue should be of constant cross-sectional area throughout its length.

If the chimney flue is to serve more than one stove, the thimble should be separated vertically. Again, contact your local building authority.

Cleanout door should be provided and it must have an airtight fit. It should not be left open for any length of time when stove is in operation.



C. INSTALLING THE UNIT AND CHIMNEY CONNECTOR:

At this point, you have already checked and prepared your chimney according to the guidelines in the previous section. You are now ready to install the other two integral parts of your heat assembly — your **Thermo-Control Wood-Burning Unit** and its **Chimney Connector** (also referred to as the **Stovepipe**).

The majority of all house fires resulting from the use of wood-burning products are caused by Poor Installation or Improper Use. An essential factor in installing your unit is Providing Adequate Clearance Between the Stovepipe and Any Combustible Surface.

Listed below are guidelines and illustrations to aid you in installing your unit and chimney connector for their safe and effective use. After reading this section, please read through the sub-section of Wood Heating Systems (section V) which outlines the installation procedures for your particular hot water or hot air model.

THE WOOD-BURNING UNIT:

- Locate the serial number of your Thermo-Control Wood-Burning Unit. Write this number in the space provided on the inside front cover of this manual for easy reference. Fill in also the model number and date purchased.
- Now turn to the inside back cover and fill in the warranty card, add a postage stamp, and mail it immediately.
- The wood-burning unit should be placed on a completely non-combustible floor such as concrete, brick, stone, etc. If your floor consists of wood or other combustible materials, it must be protected with a non-flammable surface.
- The unit should be installed in a space which has a total unobstructed volume equal to at least 20 times the volume of the unit (see Specifications Chart - Section III). Do not install in closets, hallways, small alcoves, or other such restrictive spaces.
- The unit should be located as close to the chimney as is practical while maintaining the following clearances:
- The Minimum Clearance between the Top, Sides, or Rear and Any Unprotected Combustible Surface or Material is 48".
- The Minimum Clearance from the front of the Wood-Burning Unit to any Combustible Material or Obstruction is 48".
- In some cases it may not be convenient to install your unit the required minimum dimension of 48" from a combustible wall or ceiling. There are many thermal protective materials on the market which can be reasonably purchased for use in this type of situation. If such a material is U.L. listed and is placed between the stove and the combustible surfaces according to the manufacturers' instructions and as required by State and Local Codes and ordinances, the minimum clearance distance may be effectively reduced.
- **A word of caution:** Many decorative bricks and materials are not fireproof. Other brands specify that they are fireproof, but keep in mind that they may not provide thermal protection to surfaces which they cover. Many of these will conduct the heat and transfer it through to the combustible surface with little reduction in temperature.
- **Note:** Combustible materials should never be heated to a point where you cannot rest your hand on it indefinitely.
- The minimum clearance from the front of your Thermo-Control unit should never be reduced.
- The protective floor covering, if required, must extend beyond the sides and rear of the unit a Minimum of 12", and it must extend beyond the front of the stove a Minimum of 18".
- When you have determined the exact location of the unit, place the protective floor covering (if required) and set the unit in place. Level the unit by adjusting each leg at the bottom.

THE CHIMNEY CONNECTOR (STOVEPIPE):

An approved metal stovepipe with minimum thickness of 24 gauge should be installed as per the following instructions and illustrations:

- The minimum clearance from the stovepipe to a combustible wall or ceiling is 18" for all Thermo-Control wood-burning models.
- The unit's flue collar is designed so that the crimped end of the first section of the stovepipe can be fitted inside the collar. Each subsequent length of pipe or elbow should be fitted in the same manner, with the crimped end down or, in a horizontal run, toward the unit. This will help to prevent the possibility of any creosote or tars from leaking at the joints and running down the outside of the pipe. Contrary to popular opinion, smoke will not come out of these joints.
- The stovepipe should be as short and straight as possible. Try to avoid having to use more than one elbow or more than 10 feet in total length of stovepipe.
- A horizontal run of stovepipe should be either level or, more preferably pitched slightly up toward the chimney. It must never pitch down toward the chimney.
- The smoke pipe should fit snugly and securely into the chimney thimble and must not extend beyond the chimney flue lining.
- Once the sections of stovepipe have been cut to length and snugly fit together, they should be secured at each joint with at least three (3) short self-tapping sheet metal screws spaced equally about the overlapping portion of the joint.
- The stovepipe, completely assembled, should be capable of withstanding a moderate blow (ex. - as from the side of your fist) at its mid or weakest point, without loosening or bending.
- In most cases it is not necessary to install a stovepipe damper with your Thermo-Control Unit.

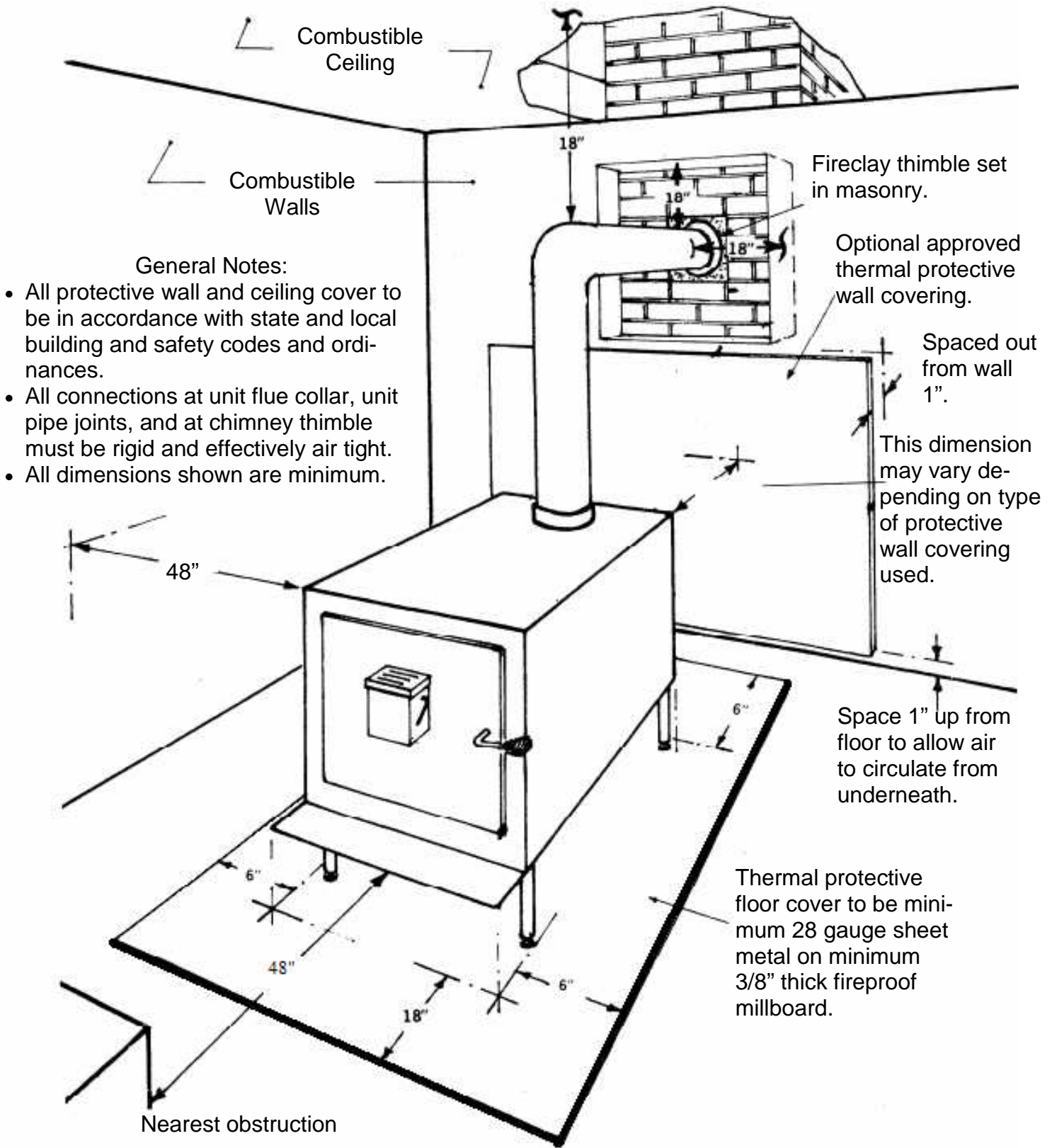
There are 2 exceptions however:

1. A damper should be installed if your chimney has an unusually strong natural draft.
2. A stovepipe damper must be installed if required by State or Local Codes or Ordinances.

If a damper is to be used, it should be of heavy thickness or gauge, Specifically Designed for Use With Wood-Burning Appliances. It should be placed within the stovepipe, close to the unit, and where it is readily accessible for easy adjustment.

For additional information regarding installation, especially with regard to clearances to combustible surfaces and use of protective wall and floor coverings, see NFPA Publications NFPA No. 89M (Heat Producing Appliance Clearances) and NFPA No. 211 (Chimneys, Fireplaces, and Vents - 1977).

INSTALLING THE UNIT AND CHIMNEY CONNECTOR



V. WOOD HEATING SYSTEMS

Thermo-Control wood-burning products have been designed to be extremely versatile. Most models can be equipped with water heating coils. Models 200, 400, 500, and 2000 may be ordered with water coils for heating your domestic water and/or your boiler water. Stainless steel coils are also available for heating swimming pools. In addition, hot air hoods are available for models making them easily adaptable for use as forced hot air units.

Heating systems may be designed to utilize Thermo-Control hot water or hot air models as a sole source of heat. They may also be installed as a primary heat source “in-tandem” with an existing heating system. For example, a Thermo-Control hot air model may be installed with ductwork, a blower fan, and thermostatic controls to provide adequate central heat to an entire house as the only source of heat. This type of central heat system can be installed very inexpensively. With this type of installation the unit would have to be tended to on a daily basis to assure constant heating.

On the other hand, the same hot air model may be installed “in-tandem” with your present central hot air system. With minimum controls added, the Thermo-Control unit could now be used as the primary source of heat and your existing (oil or gas fired) furnace would automatically “take-over” to supply additional or “backup” heat whenever needed. As another example, a Thermo-Control model equipped with a hydronic (hot water) heat coil could easily be installed “in-tandem” with an existing boiler and hot water baseboard radiation system.

The types of heating systems in use are so numerous and the arrangements in which they are installed are so varied that it would be impossible to list and describe in this manual enough sets of instructions to adequately cover all the necessary information for every specific installation. Therefore, we have chosen to provide only sample installations of popular “tandem” or “add-on” hookups. The illustrations and accompanying descriptions are to be used only as general guidelines. Information on other types of sample installations is available through your Thermo-Control dealer.

It should be noted that if you have already purchased a Thermo-Control wood-heating product without water coils, the coils are available through your Thermo-Control dealer and may be added to your unit at any time. Hot air jackets may be fitted only to models which have been ordered as hot air units.

Using a model 500 unit as an example, we have listed below various combinations which are available:

500 W - with hydronic (hot water) heat coils

500 A - with hot air hood

500 D - with domestic hot water coil

500 AW - with hot air hood and hydronic heat coils

500 WD - with hydronic heat coils and domestic hot water coil

500 AD - with hot air hood and domestic hot water coil

500 WAD - with all three accessories - hydronic heat coils, hot air hood, and domestic hot water coil.

Some northern rural home owners are taking total advantage of their Thermo-Control 500 WAD models by using the **D** coil to heat their domestic water, the **W** coil to heat their boiler water (which in turn heats their entire house). In addition, they are using **hot air** heat from the unit by ducting it to supply additional heat to a “most-used” area of the house such as a large kitchen or family room.

With Thermo-Control models 200, 400, and 500 the heating systems arrangements are virtually unlimited. Be sure that the person(s) who designs and/or installs your particular system is well qualified to do so.

NOTE: Specific hot water and hot air model installations should be designed by a qualified plumbing or heating contractor or specialist who is familiar with both your house and your heating requirements. All installations should be done by persons knowledgeable in the layout and installation of heating systems. Tandem or “add-on” hookups should be done by persons who are specifically knowledgeable of your present heating system and its furnace or boiler. All installations must be done in accordance with all applicable state, municipal, and local building and safety codes and ordinances.

If you or your contractor have any questions regarding your specific installation, you should contact your Thermo-Control dealer.

A. DOMESTIC HOT WATER MODEL:

SAMPLE INSTALLATION NOTES AND ILLUSTRATION

The hook-up illustrated below demonstrates how simply the Thermo-Control domestic hot water model can be installed. A 3/4" line is run from the bottom outlet of the existing water heater or storage tank to the bottom of a Thermo-Control side coil, hereafter referred to as the D coil. A 3/4" line is then run from the top of the D coil to the top of the hot water tank. With proper fittings and controls installed as shown, the unit will safely heat the water from the tank as it passes through the pipe loop by thermo-convection. Should the water temperature in the storage tank drop below the temperature setting, the existing water heater will act as a backup unit by automatically "switching-on" and bringing the water up to temperature. Following are the guidelines for this sample installation:

- The Thermo-Control domestic hot water coil must always be installed with a storage tank or storage-type hot water heater (electric/gas or oil fired).
- The storage tank or existing water heater should have a minimum storage capacity of 30 gals. It should be well constructed and insulated to prevent corrosion and heat loss. It must be rated for a minimum of 150 lbs./sq/ in/ working pressure.
- All pipes, tubing, and fittings should be non-corrosive and of minimum 3/4" inside diameter.
- Relief valve outlets should be piped to safe areas of discharge using minimum 3/4" pipe.
- Ball valves should be used as they clearly indicate open/closed state. - DO NOT use "partially restrictive" valves .
- Install the wood-burning unit as close to the existing water heater as is possible, leaving enough room to safely service the system. Keep length of pipe runs and number of elbows and fittings at a minimum.

CAUTION:

- If the unit is located above the hot water storage tank (so that heated water from the stove must travel "downhill" to reach the tank) a circulation pump must be installed.
- The ball valves (items 4 in illustration) must always be fully opened when the unit is in use and should be tagged with instructions stating such. These ball valves may be closed off during summer months (when the unit is not in use) to prevent "back-siphoning" and loss of heat through the pipe loop.
- PEX-type piping is NOT recommended for installation between Thermo-Control unit and hot water heater.

ITEMS ILLUSTRATED AND NUMBERED:

1. COLD WATER SUPPLY LINE
2. HOT WATER SUPPLY TO HOUSE FIXTURES
3. EXISTING TEMPERATURE/PRESSURE RELIEF VALVE set in 6" long pipe nipple above new T. Its outlet should be piped to a safe area of discharge using minimum 3/4" pipe (NOTE: This valve should be tested and replaced if not in working order.)
4. 3/4" BRASS BALL VALVES (ASME APPROVED) - IMPORTANT NOTE: These should be tagged as noted above.
5. BRASS OR COPPER UNIONS
6. 3/4" TEMPERATURE/PRESSURE RELIEF VALVE (ASME APPROVED AND RATED FOR 210° F/150 lbs.) This should be set in 6" lg. pipe nipple and 3/4" T and its outlet should be piped to a safe area of discharge.
7. (OPTIONAL) CIRCULATION PUMP may be installed to compensate for poor circulation due to a long pipe loop, excessive elbows, or "downhill" travel of heated water (as stated above). The pump should have a two-speed motor and variable head adjustment and must be capable of producing flow rate of 2 GPM or LESS. It may be connected to line voltage with an "off/on" switch and should be run continuously whenever the wood stove is in operation.
8. PIPING from Temperature/Pressure Relief Valves to AREAS OF SAFE DISCHARGE. Use minimum 3/4" pipe.

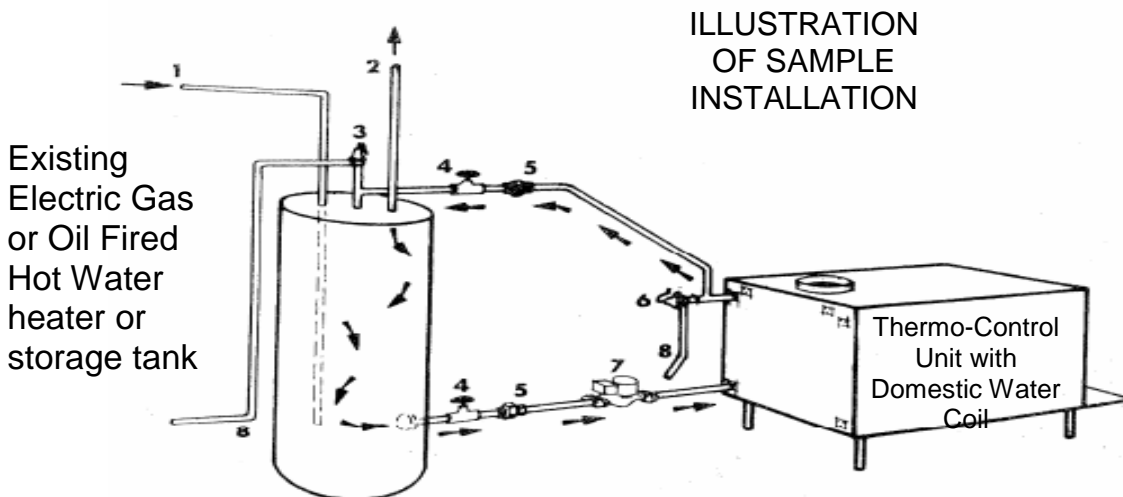


ILLUSTRATION
OF SAMPLE
INSTALLATION

In the event of a power failure (especially when circulating pump is required) - the thermostatic control handle on the unit should be kept at or lowered to a setting which will prevent discharge at the temperature/pressure relief valve.

B. HOT WATER HOME HEATING MODEL: (HYDRONIC HEATING)

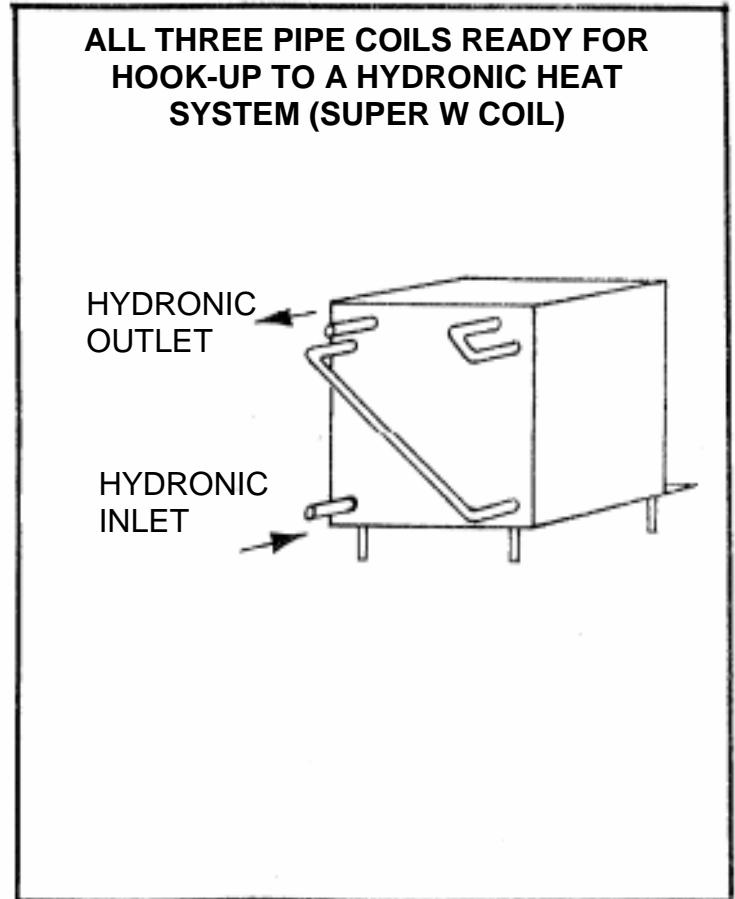
SAMPLE INSTALLATION NOTES AND ILLUSTRATION

Most Thermo-Control units are easily adaptable for use in heating the water in an existing hot water or low pressure steam radiation system. Up to three (3) pipe coils may be installed in the stove - two (2) vertically placed side coils and one (1) horizontally placed top coil. Instructions for installing these are furnished with the coils.

A hydronic coil (hereafter referred to as the **W** coil) consists of two side coils and the top coil, field connector together at the rear of the unit. See illustration below.

First connect top leg of one side coil to the bottom leg of the second side coil using 3/4" copper adapters, elbows and pipe (long diagonal). Then connect the top leg of the second side coil to the nearest leg of the horizontal top coil using 3/4" copper adapters, elbows and nipple (short diagonal).

Do NOT use PEX-type piping for coil hook-ups.



Following are descriptions and illustrations for two of the ways in which a Thermo-Control wood-burning unit equipped with a **W** coil can be installed "in-tandem" with an existing boiler. Bear in mind that these are only two examples of many possible applications. For illustration purposes we have shown two of the more common existing heating systems.

1.) A large wet base boiler with a water jacket capacity of at least 30 gallons, which serves either an old gravity feed system or a thermostatically controlled hot water baseboard radiation system with a system pump that operated on demand.

2.) A small modern dry base or wet base boiler with or without a tankless domestic coil which serves a thermostatically controlled baseboard radiation system.

Before going any further we would like to reemphasize a point which was covered at the introduction to section V of this manual. Your particular hook-up, even if it would not appear to vary from those illustrated here, should be designed and installed by a qualified person who is knowledgeable of your existing system. If you have questions regarding your installation contact your Thermo-Control dealer.

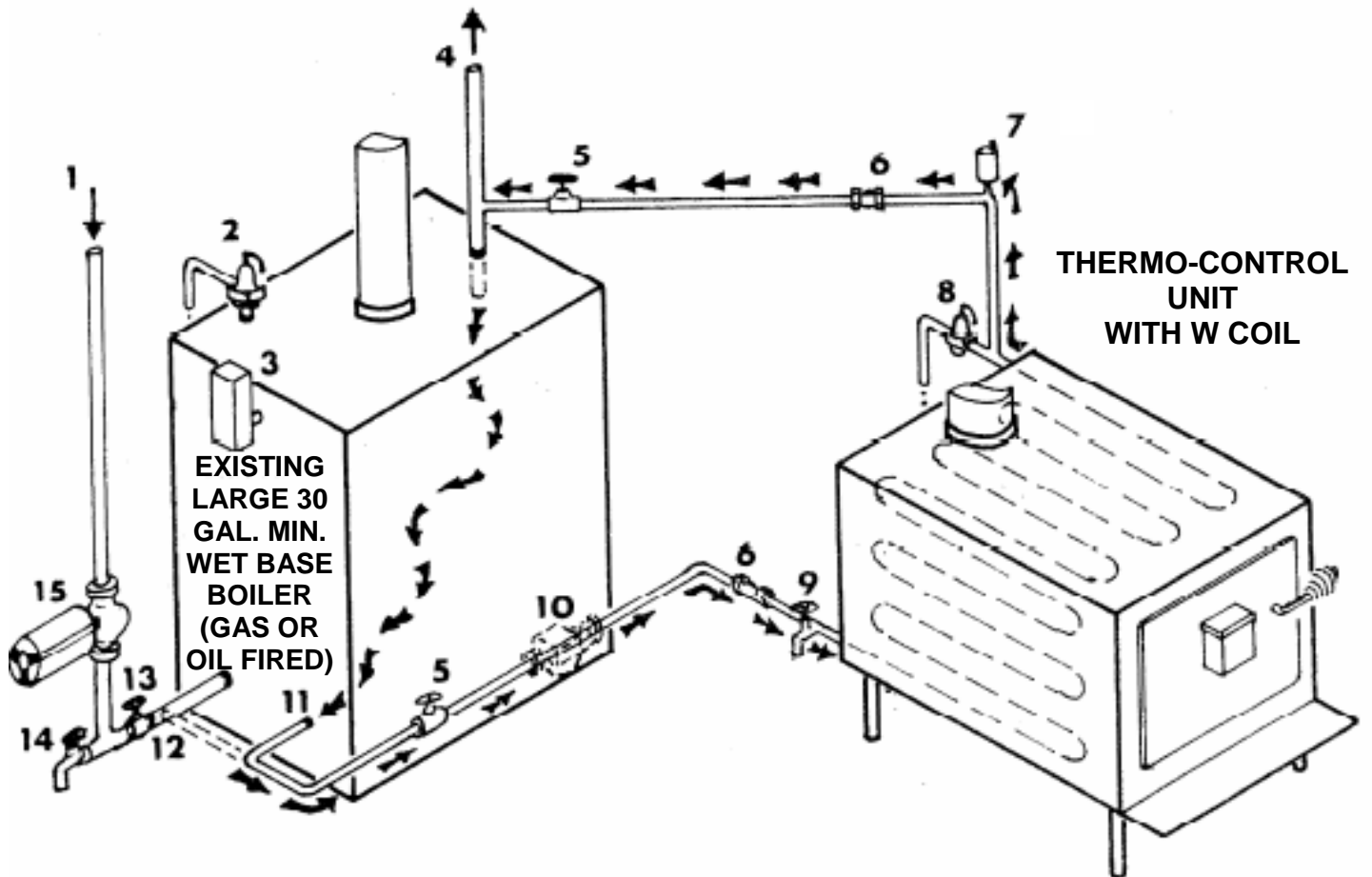
FOLLOWING ARE THE GUIDELINES FOR SAMPLE INSTALLATION NO. 1 (With Wet Base, Large Water Volume Capacity Boiler)

A minimum 3/4" pipe is run from the bottom of the existing boiler to the bottom leg of the Thermo-Control **W** coil. A minimum 3/4" pipe is then run from the top leg of the **W** coil to the top of the boiler. With proper fittings and controls installed as shown, the unit will safely heat the boiler water as it passes through the pipe loop. Should the water temperature in the boiler fall below the temperature setting on the boiler aqua stat, the boiler burner will automatically "switch-on" and act as a backup unit to bring the water up to temperature. See illustration on the following page.

In most cases the restriction to the flow of water in the pipe loop can be kept minimal and the water will flow by thermal-convection as it is heated in the unit. However, for reasons of efficiency we recommend the installation and use of a small circulation pump as per item 10.

- Locate the Thermo-Control wood-burning product as close to the existing boiler as is practical, leaving enough room to safely service the system. Keep length of pipe runs and number of elbows and fittings at a minimum.
- All pipes and fittings must be of minimum 3/4" inside diameter.
- To connect the return leg of the loop from the boiler, locate a tapping on the boiler near the point at which the return main from the baseboard system (item 1.) enters the boiler. Be sure the tapping is of 3/4" minimum size. If a tapping can not be found, tee into the return main as described in item 12.
- The supply leg of the loop from the unit may be teed, as shown, directly into the existing system supply main (item 4.) between the boiler and the nearest fixture or control in the main. Or, the supply leg may be connected directly to the boiler by using a tapping (3/4" minimum) located near the point at which the system supply main is tapped to the boiler.
- Only ball valves outlets should be used in the pipe loop - do not use globe valves or any other "complete-shutoff" type valves.
- Relief valve outlets should be piped to a safe area of discharge using minimum 3/4" pipe.
- The ball valves (items 5.) must always be fully open when the unit is in use and should be tagged with instructions stating such. These ball valves may be closed off only if the unit is not being used. This will prevent "back-siphoning" and loss of heat to the cellar through the pipe loop if the existing boiler is still operating.
- If the wood boiler is located above the existing boiler (so that heated water from the unit must travel "downhill" to reach the boiler) a circulation pump must be installed as per item 10.
- Depending on the particular system, it is sometimes advantageous to lower the aqua stat settings on the existing boiler. They are generally reset at $\pm 140^{\circ}$ F and $\pm 160^{\circ}$ F respectively. This may cause the system's circulation pump(s) to run for longer periods of time but will generally utilize more efficiently the heat being constant produced by the unit.
- **Note: Do NOT use PEX-type piping for hook-up of Thermo-Control unit to existing boiler.**

**SEE ILLUSTRATION AND DESCRIPTION OF
NUMBERED ITEMS ON NEXT PAGE.**



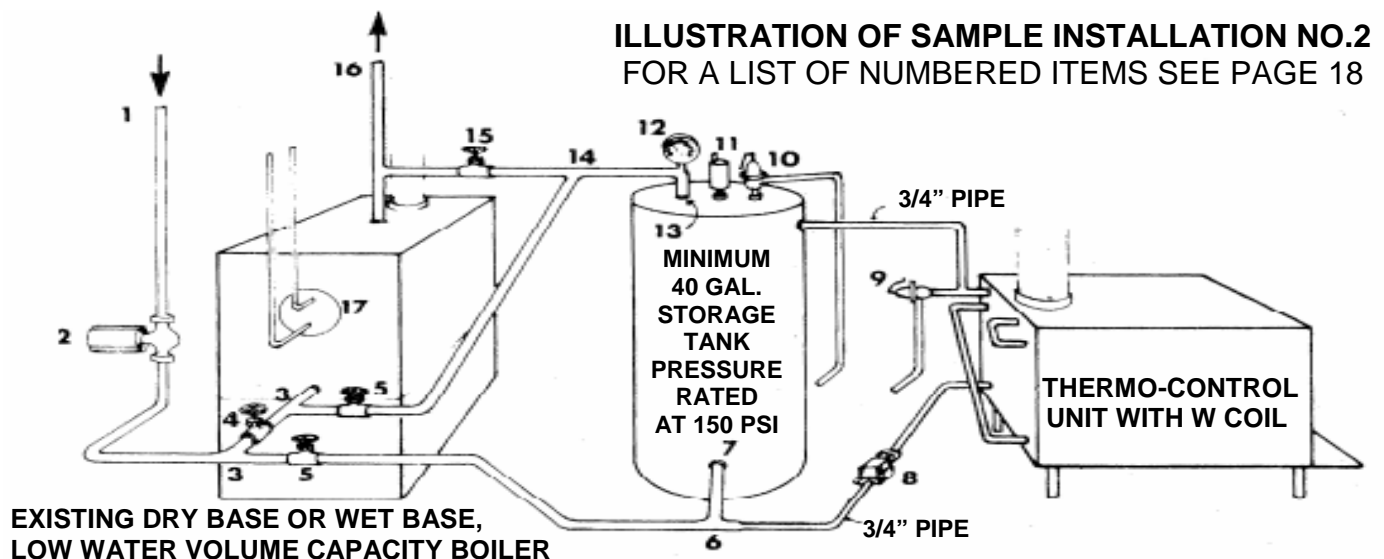
1. Return Main From Baseboard Radiation
2. Existing System Pressure Relief Valve
3. Existing System Aquastat
4. Hot Water Supply Main to baseboard radiation
5. 3/4" Ball Valves (A.S.M.E. Approved)
6. 3/4" Unions
7. Automatic "Float-Type" Air Vent (A.S.M.E. Approved) — Installed at the high point of the line from the unit to the boiler.
8. 3/4" 30lb. Pressure Valve (A.S.M.E. Approved) — This must be installed within 24" of the unit and its outlet must be piped to a safe area of discharge using minimum 3/4" pipe.
9. 3/4" T and Boiler Drain
10. Circulation Pump (Optional But Recommended) may be installed to compensate for poor circulation of water due to long pipe loop runs, excessive fittings, restrictive boilers, etc. The pump must be properly sized for correct head pressure and flow rate. It should have a 2 speed motor and variable head control so that the flow can be regulated to fit the application. It may be connected to line voltage with an "off/on" switch and should be run continuously whenever the unit is in operation. Install according to manufacturers instructions.
11. Minimum 3/4" Boiler Tapping (if available)
12. T and Pipe Loop (Optional) may be connected directly to the existing return main if boiler plug is not available. The T must be placed between the boiler and the nearest purge valve or fixture in the main.
13. Existing System Purge Valve
14. Existing System Boiler Drain
15. Existing System Circulation Pump

FOLLOWING ARE THE GUIDELINES FOR SAMPLE INSTALLATION NO. 2 (With Dry Base or Wet Base, Low Water Volume Capacity Boiler)

A minimum 40 gallons storage tank is installed with the Thermo-Control wood-burning product. A minimum 3/4" pipe is run from the bottom of the storage tank to the bottom leg of the Thermo-Control **W** coil. A minimum 3/4" pipe is run from the top leg of the **W** coil to the top side of the storage tank. With proper fittings and controls installed as shown, the unit will safely heat the water in the loop and this heated water will be "dumped" into the storage tank where it will "stack" - hot water at the top of the tank/cooler water at the bottom of the tank. Now, by installing another loop from the system return main, through the storage tank, and back to the return main, the cool return water from the house can be "dumped" into the bottom of the tank and only heated water (stacked at the top of the tank) will be drawn into the boiler - thus your existing boiler aqua stat will be satisfied and prevent the burner from kicking on. Should the water temperature in the storage tank or the boiler fall below the temperature setting on the boiler aqua stat the boiler burner will automatically "kick on" and act as a backup unit to bring the water up to temperature.

If the restrictions to the flow of water in the unit-to-storage tank loop can be kept minimal, the water will flow through this loop by thermal convection as it is heated by the Thermo-Control unit.

- Locate the Thermo-Control unit and the storage tank as close to the existing boiler as is practical, leaving enough room to safely service the system. Keep length of pipes runs and number of elbows at a minimum.
- All pipes and fittings must be of minimum 3/4" inside diameter.
- Only ball valves should be used in the pipe loop - do not use globe valves or any other "complete-shutoff" type valves.
- Relief valve outlets should be piped to a safe area of discharge using minimum 3/4" pipe.
- Two ball valves (items 5.) must always be fully open when the unit is in use and should be tagged with instructions stating such. These ball valves may be closed off only if the unit is not being used. This will prevent "back-siphoning" and loss of heat to the cellar through the pipe loop if the existing boiler is still operating.
- The ball valve (item 4.) which is installed within the existing return main, is closed whenever the unit in operation, but must be opened whenever item 5. ball valves are closed. This valve should be tagged with instructions stating such.
- Generally, by tending to the Thermo-Control wood boiler the temperature in the storage tank can be maintained at or near 180° F. Therefore, for this type of installation, the high and low limits on the existing boiler aquastat are not reset.
- If the unit is located above the storage tank (so that heated water from the unit must travel "downhill" to reach the tank) a circulation pump must be installed as per item 8.



ITEMS ILLUSTRATED AND NUMBERED ON PREVIOUS PAGE:

1. Return Main From Baseboard Radiation
2. Existing System Circulation Pump
3. Tees, sized to match existing return main, usually 1 1/4"
- 4.&5. Ball Valves (A.S.M.E. Approved) sized to match existing main, usually 1 1/4"
6. Reducing Tee (ex - 1 1/4" X 3/4" X 3/4")
7. Minimum 3/4" Tapping at storage tank
8. Circulation Pump (Optional) may be installed to compensate for poor circulation of water due to long pipe loop runs or excessive number of elbows and fittings. This pump must be properly sized. We recommend a pump with a 2-speed motor and variable head adjustment so that it can be fine tuned to a flow rate of ± 2 GPM. The pump can be connected to line voltage with an "off/on" switch and should be run continuously whenever the unit is in operation. Install according to manufacturer's instructions. **NOTE:** Some states or municipalities may require the use of a pump - check your local codes.
- 9.&10. 3/4" 30lb. Pressure Relief Valve (A.S.M.E. Approved) - These must be installed as shown and their outlets must be piped to a safe area of discharge using minimum 3/4" pipe.
11. Automatic "Float-Type" Air Vent (A.S.M.E. Approved) - install at the highest tapping at the top of the storage tank.
12. Temperature and Pressure Gauge
13. Minimum 3/4" Tapping at storage tank.
14. Tee, sized to match pipes, (ex. - 1 1/4")
15. Ball Valve, sized to match existing hot water supply main, usually 1 1/4". **NOTE:** This valve is closed under normal operating conditions, but may be opened in the event of a power failure to allow gravity flow from the unit and tank to the house.
16. Hot Water Supply Main to baseboard radiation
17. Tankless Domestic Hot Water Coil (may or may not be present in the existing boiler)

PROCEDURE IN THE EVENT OF POWER FAILURE:

The following steps should be taken in the event of an electrical power failure of some duration.

- Locate any flow-control valves or zone control valves in the system and manually open them completely.
- If any of the circulation pumps have a variable flow adjustment, open them to their maximum setting.
- If a storage tank has been installed, open the ball valve (item 15.) as described in illustration No. 2.

NOTE:

Do NOT use PEX-type piping for hook-up of Thermo-Control unit to existing boiler.

ADDITIONAL NOTE:

After installing the wood-burning unit and the new pipe loop and water is added to fill the system, it is important to be sure to vent any air in the system.

IMPORTANT NOTE:

Since water expands rapidly as it is heated, it is very important that the expansion tank on the existing system be carefully checked to make sure it is functioning properly. An "older" style air cushion tank may have to be drained and refilled; a more modern "diaphragm" type may have to be pressurized with air; or if necessary the tank may have to be replaced before the Thermo-Control hot water model is fired. If the expansion tank is NOT in good working order when the unit is fired, knocking or pounding may occur in the pipe and the pressure relief valve may discharge.

C. HOT AIR MODEL:

SAMPLE INSTALLATION NOTES AND ILLUSTRATION

Your Thermo-Control hot air model can be used as a sole source of heat in a gravity feed or forced hot air system or it can be hooked-up “in tandem” to be used as a second source of heat with an existing hot air system. We have chosen to illustrate a sample of the latter in this manual. The following description and illustration is an example of how simply the Thermo-Control hot air model can be installed with an existing gas or oil fired forced hot air system.

The unit is placed as close to the existing furnace as is practical, in order to keep the length of connecting ductwork minimal. This will in turn keep the air friction through the new “loop” at a minimum. The hot air jacket is installed according to the instructions provided with the jacket. By installing a return and supply duct “loop” to and from the wood furnace along with proper dampers and controls, as described, the Thermo-Control wood furnace will safely and efficiently supply heat to your house via the existing forced hot air system.

CAUTION: Do not fire the unit until adequate supply and return air holes have been cut in the top and near the bottom of the hot air jacket.

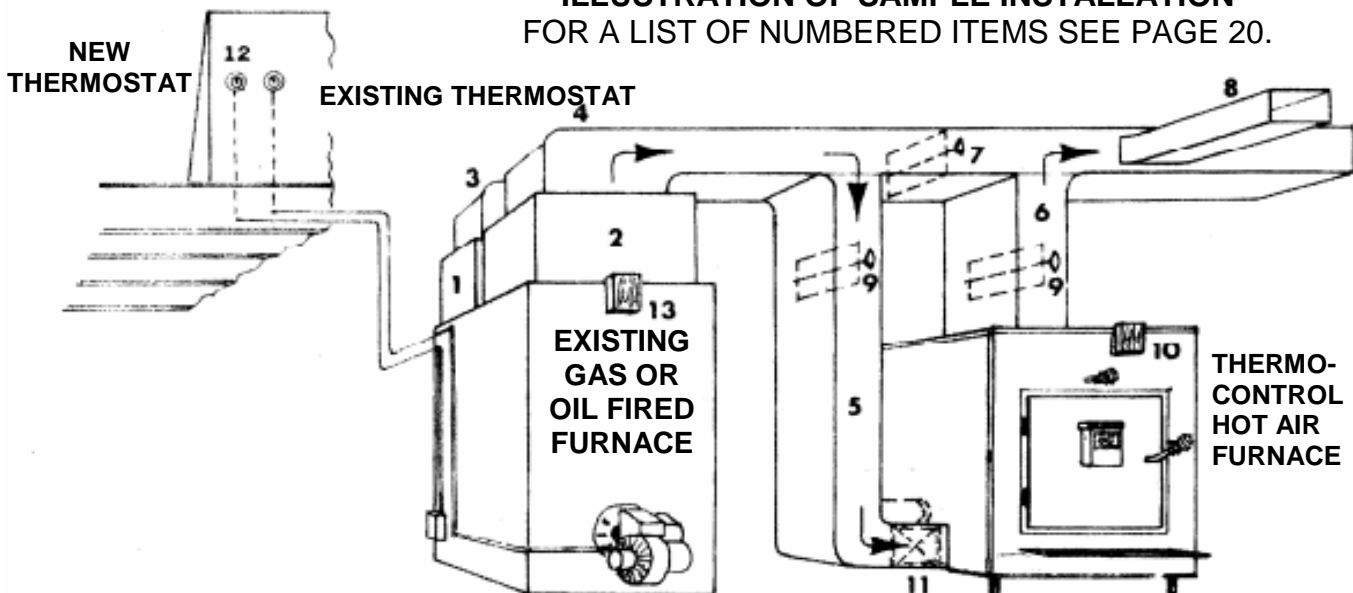
See guidelines below:

The following are used for this sample installation:

- The number of “loop” ductwork elbows and bends should be kept minimal and should be rounded and smooth to enhance air flow.
- All hot air ducts within six (6) feet of the wood furnace must be located a minimum of eighteen (18”) inches from all combustible ceilings, walls, or materials.
- The minimum clearance from the top, sides, or rear of the wood furnace to any combustible wall, ceiling, or material is eighteen (18”) inches when measured from the hot air jacket. The minimum clearance from the front of the furnace to any combustible material is 48 inches.
- To connect the return air duct to the wood furnace, cut an opening along the bottom of the jacket, equal in size to the cross sectional area of the duct. The hole may be cut in the top of the jacket. This hole must be equal to the cross sectional area of the duct.
- All ducts must be rigidly connected and must be installed according to accepted standards of practice.
- The hot air supply duct from the wood furnace should be level or pitch upward from the wood furnace - it should never pitch down from the wood furnace.

IMPORTANT: All fan control switches and thermostats should be wired so that the existing fan blower will operate on demand from any of these control switches or thermostats.

ILLUSTRATION OF SAMPLE INSTALLATION FOR A LIST OF NUMBERED ITEMS SEE PAGE 20.



ITEMS ILLUSTRATED AND NUMBERED ON PREVIOUS PAGE:

1. Existing cool air return plenum.
2. Existing hot air supply plenum
3. Existing cool air return duct main
4. Existing hot air supply duct main
5. New return air duct to unit - **NOTE:** The cross sectional area should be equal to that of the existing hot air supply duct main.
6. New supply hot air duct from unit - **NOTE:** The cross sectional area should be equal to that of the existing hot air supply duct main.
7. Sheet metal diverter damper - This must be placed within the existing hot air supply duct main and should be located between the existing furnace and the first hot air supply branch duct. The diverter damper should be retractable or adjustable so that it can be opened to allow direct flow of hot air from the existing furnace if the unit is not being used. It may also be partially opened to allow mixing of cooler return air with hot air supplied by the wood furnace.
8. Existing hot air supply branch duct
9. (Optional) Manual open/close duct dampers - These must be in the fully opened position when ever the unit is in operation. They may be closed (only when the unit is not being fired) to prevent loss of heat to the basement when the existing furnace is running.
10. Automatic Fan Control Switch (U.L. Approved for 100° to 350° range) - Install within top eight (8) inches of stoves hot air jacket and wire to existing furnace fan blower. This control must be wired so that it operates the blower whenever the temperature of the air within the stove jacket reaches the high fan "on" setting. As an example, the control could be set at $\pm 120^{\circ}\text{F}$ so that the fan would operate on a continual or almost continual basis and thus circulate the heat which is constantly being given off by the unit. Should the unit not satisfy a room thermostat, the existing furnace will still automatically "kick-on" to supply the heat needed. **CAUTION:** Although this control is rated up to 350°F range it should never be set above 200°F. This switch is a safety control which limits the amount of heat allowed to build up in the plenum and therefore must be installed. Installation must be in accordance with manufacturer's instructions.
11. (Optional) In-Line Duct Blower - may be installed to augment air circulation when added duct loop is particularly long or otherwise too restrictive to air flow within the system for the existing furnace fan to handle. If required, this blower should be properly sized and designed into the system by a qualified person knowledgeable of your existing heating system.
12. (Optional) New Room Thermostats (U.L. Approved) - Install according to manufacturer's instructions, wire to optional electric damper control and set at desired temperature, for example 72° F. When the house temperature drops below 72° F, the electric damper control will open and allow unit to produce more heat. The existing room thermostat(s) operates the existing furnace blower and/or burner. Set it a few degrees lower than the new thermostat(s), for example 68° F. If the wood furnace does not provide enough heat to satisfy this setting, the existing burner will automatically "kick-on" to supply the needed heat.
13. Existing Fan Control and Limit Switch - Do not alter operation of this control when installing new fan switch (item 10.) on wood furnace.

PROCEDURE IN THE EVENT OF POWER FAILURE:

Should an electrical power failure occur, the Thermo-Control wood furnace will continue to heat the house somewhat by thermal-convection (gravity feed) through the ductwork. However, to guard against overheating at or near the furnace, the thermostatic control should be set to maintain a low fire until power is restored.

IN SUMMARY:

Again, bear in mind that this is just one example, illustrating one of many types of installation. For more information regarding your specific hook-up, contact your Thermo-Control dealer.

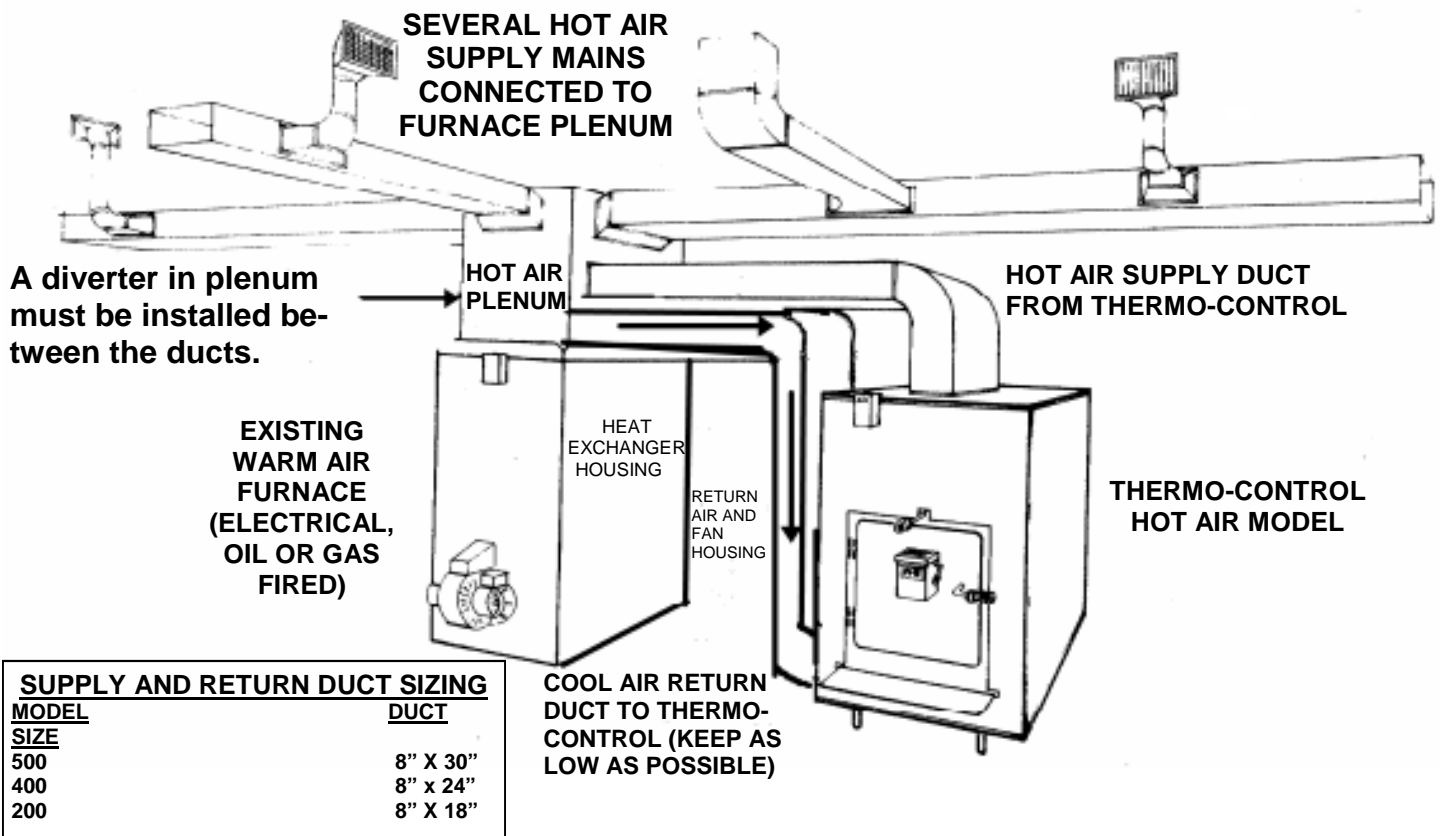
Your particular system should be designed and installed by a qualified person who is knowledgeable of your existing heating system. It must also be installed in accordance with all state and local codes and ordinances.

Note: See next page for optional hot air hookup.

SAMPLE ILLUSTRATION OF OPTIONAL HOOK-UP:

When an existing furnace has more than one hot air supply duct connected to its hot air plenum, it is advantageous to connect the hot air supply duct from the Thermo-Control hot air model directly to the hot air plenum of the existing furnace. The return duct to the Thermo-Control hot air model is then connected directly to the bottom of the jacket of the existing furnace, adjacent to its heat exchanger. To help divert return air from the furnace into the bottom of the Thermo-Control, an air diverter may be fashioned out of sheet metal and fastened to the inside of the existing furnace at the point where the return duct is connected to the furnace jacket. The return duct is installed as low to both the furnace and to the Thermo-Control hot air jacket as possible.

See illustration below:



NOTE:

- Diverter - Recommend installing a sheet of metal that slides into the plenum so that it is easily removed if necessary.
- Be sure the opening for the return duct is cut within the heat exchanger half of the existing furnace jacket and not in any portion of the fan or return air housing.

VI. OPERATING PROCEDURES

Your Thermo-Control wood-burning product and heat assembly is now ready for operation. Since your Thermo-Control unit is new and has never been used it should be broken in slowly. For the first few days, the unit should be fired at low to moderate rates. It is a good idea to do this on a weekend if possible so that you can tend to the fire often and familiarize yourself with stoking procedures and operation of the thermostatic control.

During this break-in period, fumes may be given off as the heat resistant paint on your unit takes its initial cure. This is perfectly normal but proper ventilation will be necessary.

Your Thermo-Control unit has been designed to burn wood only. The best type of wood for use in your Thermo-Control could be described as good, seasoned, dry and properly sized hardwood.

Good hardwood = wood with combustion characteristics similar to that of maple, oak, and ash for example.

Seasoned = air dried outdoors but under cover for a minimum of six to eighteen months.

Dry = free of surface moisture or punky wood or bark.

Properly sized = of various diameters or split to various sizes and cut in lengths not to exceed the maximum log length listed in the specification's section.

If you live in an area where hardwoods are not available, the general rule of thumb is to avoid the use of softwoods which have a high resin content.

THE BAFFLE AND BAFFLE BYPASS:

Whenever you tend to the fire, whether to reload, remove ashes, or simply to stir up the coals, you should always push in the Baffle Control Rod before you open the loading door. (See illustration below). This will allow the smoke to vent directly to the flue collar and prevent the smoke from back drafting into the room.

The baffle control rod operates the bypass damper at the top of the baffle. The baffle, located at the rear of the firebox, serves the following purpose:

The volatile gases given off by wood are combustible, but only in the presence of high temperature and oxygen. The baffle is physically designed to retard the exit of these gases and force them back over the fire bed to be mixed thoroughly with the primary air supply. This, together with the high temperatures at the fire bed, causes these gases to burn, thus yielding many more useable BTU's per pound of wood.

After you have tended the fire and have closed the loading door, always be sure to pull out the baffle control rod for more efficient combustion.

- 1 BAFFLE
- 2 BAFFLE BYPASS DAMPER
- 3 BAFFLE CONTROL ROD HANDLE
- 4 PRIMARY AIR SUPPLY
- 5 PRIMARY COMBUSTION CHAMBER
- 6 SECONDARY AIR SUPPLY
- 7 SECONDARY COMBUSTION CHAMBER
- 8 VOLATILE GASES FORCED BACK OVER FIREBED TO BE BURNED
- 9 DIRECT VENTING WHEN BYPASS DAMPER IS OPENED



CROSS SECTION ILLUSTRATING FUNCTION OF BAFFLE AND BAFFLE BYPASS

IMPORTANT NOTE:

Keep area below and around baffle free of coals and ash by raking to front.

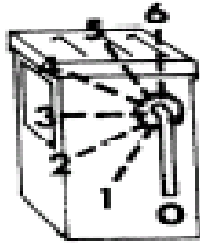
As an added feature of safety and efficiency, secondary combustion takes place behind the baffle. Fresh air, rich with oxygen, is preheated and supplied through the secondary air tubes to the rear of the baffle. Here any combustible gases, which might otherwise escape, will be burned. The results are two-fold - near total combustion for optimum efficiency - and increased flue temperatures to increase draft and decrease chances of creosote buildup.

It is important to keep hot coals and ashes from building up at the base of the baffle. A long handled ash rake should be used.

THE THERMOSTATIC CONTROL:

The Thermostatic control on your Thermo-Control unit is encased in a protective box and mounted on the front of the door. The control consists of a manual adjustment handle, a bi-metallic coil which senses the radiant and convective heat of the unit, and a primary air control damper (referred to as the flapper). This control has several operational features with which you should familiarize yourself:

THERMOSTATIC CONTROL BOX



5 & 6—High Settings

3 & 4—Moderate Settings

1 & 2—Low Settings

0—Down or Closed Position

1. When the handle is placed in the down (or closed) position the flapper will close and cut off the primary air supply. (The only exception to this would be if the stove temperature is below 72 degrees F). This is a safety feature which can be utilized to quickly help “snuff” combustion in the stove in the event of a chimney fire or simple overheating.
2. At low fire temperatures as the handle is moved up through positions 1 through 6, the flapper opens wider letting respectively larger volumes of primary air into the combustion chamber. The increased air will cause the fire to build up. As this happens and the unit begins to radiate more heat, the bi-metallic coil senses the rise in temperature and automatically closes the flapper back to lessen the air supply and reduce the heat.
3. As the handle is moved down through positions 6 through 1, the flapper closes down letting respectively lesser volumes of air into the combustion chamber, The decreased air will cause the fire to dampen and the unit to cool. The bi-metallic coil now senses the loss in temperature and automatically opens the flapper to allow more supply air in and again increase the temperature.
4. The flapper will shut down if the unit gets too hot. Remember however, that the higher the setting, the longer the reaction time, i.e., the longer it will take for the flapper to cycle closed.

Since each home is different because of the many variables (type of wood used, natural draft differences, etc.) the settings will vary with each installation. You may find that you may want to change settings as the outside temperatures change.

A WORD OF CAUTION:

Your new Thermo-Control wood-burning unit is capable of putting out a lot of heat. Don't fully load your firebox or open the thermostatic control to its high settings until you have become thoroughly familiar with the operation of the unit.

IMPORTANT NOTE:

If for any reason your unit overheats to a point where it may be hazardous, immediately close the flapper by putting the thermostatic handle in the “down” position. If a chimney fire should occur, follow the same procedure - immediately close the flapper, then call your local fire department.

FINE TUNING YOUR THERMOSTAT:

Some owners may find it to their advantage to fine tune their thermostats so that when the flapper cycles to the closed position it still allows a small amount of primary air to feed the fire. To fine tune:

1. Remove the louvered cover plate so as to expose the bi-metallic coil and the flapper. Proceed carefully so as not to bend any parts.
2. At the bottom outside edge of the flapper is a fixed nut and adjustable screw. For normal operation the screw should be backed-off (turned counter-clockwise) so that when the handle is in the down position the flapper closes flush to the door.
3. If you find it to your advantage to always allow a slight supply of air to the combustion chamber, simply turn the screw clockwise until it holds the flapper the desired distance from the floor.
4. Always replace the louvered cover plate.

CAUTION:

Never replace the adjustment screw with a longer one - it could cause your fire to run out of control!

STARTING A FIRE:

1. Push the baffle bypass rod in and open the door. Place several pieces of crumpled newspaper in the center of the firebox. Crisscross a couple of handfuls of dry kindling wood (3/4" thickness or smaller) on top of the paper. Then stack several small dry pieces of firewood over the kindling.
2. Ignite the paper and close the door. Set the thermostat handle to the horizontal setting or higher. Leave the baffle bypass handle in. This will allow hot gases to vent directly to the chimney flue and quickly create draft necessary for combustion.
3. It will take a few minutes for the fire to establish itself. When it has, add larger pieces of wood. After you close the door, pull out the baffle bypass rod for normal operation. Lower the thermostat handle to desired setting.

To start a fire from just a few hot coals, simply rake the remaining hot coals toward the front of the stove (fairly close to the primary air supply) and add logs so that they rest on the hot coals. If your thermostat has been on a low setting, open it a notch or two and the logs should begin burning in just a few minutes.

LOADING YOUR UNIT:

One of the great features of your Thermo-Control wood-burning product is that you can fully load it, set the thermostat, and walk away knowing that the full load of wood will be efficiently burned over the next several hours, without further tending. There are, nevertheless, ways in which you can load your unit to give you maximum efficiency and reduced maintenance.

- Your unit is capable of holding very large logs. Do not, however, try to add a log that is larger than what you can easily place in the unit.
- Do not add more wood than is necessary. You will get the best efficiency when you add only the amount of wood needed until the next time you are available to stoke the fire.
- Don't be afraid to use wood of various shape, diameters, and length. Do not, however, exceed the maximum log length for your model. (See Specifications Chart - section III)
- Always try to place the logs so air can flow between them. This will enhance combustion considerably.

ASH REMOVAL:

- Removal of ashes from your Thermo-Control unit should be necessary only once a week or less often. By burning properly seasoned hardwood, many 500 model owners have been able to run their units continuously for three to four weeks before having to remove ashes.
- The best time to remove ashes without letting the fire first go out, is when the wood has burned down to a small bed of hot coals, as after a long overnight burn. Simply rake the coals to one side and remove the underlying ashes. Repeat the same simple procedure for the other side.

ASH DISPOSAL:

Ashes should be placed in a metal container with a tight fitting lid. The closed container of ashes should be placed on a noncombustible floor or on the ground, well way from all combustible materials, pending final disposal. If the ashes are disposed of by burial in soil or otherwise locally dispersed, they should be retained in the closed container until all cinders have been thoroughly cooled.

TOOLS REQUIRED:

There are four basic tools which you will need to safely tend to your fire and remove and dispose of ashes. They are (1) a long handled ash or coal rake, (2) an ash shovel, (3) a poker, and (4) a covered metal ash pan.

DO'S & DON'T'S:

- Do not use your unit for burning trash - it is not an incinerator. Trash can burn too hot and it can also cause dangerous soot buildup.
- Do not ignite large masses of paper or similar light weight material in your unit.
- Do not use charcoal lighter, gasoline, kerosene, or any other liquid to start a fire. Use only the procedures described in this manual.
- Do not allow children to play with or near the unit. It is not a toy and its surface can get very hot!
- Do add only the amount of wood necessary to heat your house comfortably between stokings for best efficiency. Especially important during mild weather operation.
- Do be careful when tending your unit. Always open the door slowly and watch out for sparks.
- Do not leave your unit unattended with the loading door open - ever.
- Do not run your unit too hot!

REMEMBER:

- Combustible walls, floors, ceilings, and materials should never be heated to a point where you cannot rest your hand on it indefinitely.

DOOR GASKET:

- Should the gasket material around the door wear out to a point where it allows air to readily enter the unit at the edge of the door, it should be replaced immediately. Gasket kits and replacement instructions are available through your Thermo-Control dealer.

HEAT RESISTANT FINISH:

- Should paint become marred or scratched it can easily be touched up or refinished. Touch-up paint is available through your Thermo-Control Dealer.

**If you have any questions on
the installation or operation
of your Thermo-Control
Wood-Burning Product
contact your dealer.**

VII. CREOSOTE AND CHIMNEY MAINTENANCE

Creosote is a natural by-product of the incomplete combustion of wood. It usually forms inside a stovepipe or chimney as a black or dark brown liquid substance. In this state it is sticky and has an acrid odor somewhat similar to that of burnt popcorn. It may bake into a hard, shellac-like coating or it may build up in dry flakes to considerable thickness. If exposed to high temperatures it can ignite and burn off at tremendous intensity - thus commonly known chimney fire.

Since creosote can be potentially hazardous, it is important to understand how it is formed, and what measures to take to eliminate or minimize its formation and subsequent buildup.

When wood burns a combination of water vapor, carbon, and volatile gases and acids are given off. In a Thermo-Control wood-burning product, under proper burning conditions, the water vapor is driven off harmlessly and most of the other by-products are themselves burned off and converted to useable heat. Under certain conditions however, the by-products of wood combustion may not be burned or driven off efficiently, and they may collect within the heat assembly in the form of creosote.

Several factors may affect wood combustion to form creosote:

1. The use of wet, cold, or unseasoned wood.
2. The use of soft woods, particularly those of high resin content.
3. Poor natural draft or an obstruction in the stovepipe or chimney flue.
4. Inadequate amount of oxygen (primary air) supplied to the combustion chamber of the unit.

All of these factors contribute to poor combustion, or more specifically, low fire temperatures. It is under these conditions of low fire temperatures that the volatile gases and moisture given off can combine to form creosote.

If creosote vapors come in contact with relatively low temperature surfaces within the heat assembly, they will condense (or collect) on those surfaces and begin to build up. As a general rule, creosote will condense on the interior surface of a stovepipe or chimney flue if the temperature of that surface is 250 degrees F or less.

Several factors may cause the cooling of interior surfaces to temperatures which will collect creosote:

1. Low fire or flue gas temperatures.
2. Un-insulated stovepipe or chimney flues, especially if constructed exterior to the house
3. Air leaks in the stove pipe or chimney.

DETECTING CREOSOTE:

After you have installed your unit, but before you begin using it, tap the stove pipe several times with your fingernail or a pencil. Not carefully the "ping" or sharp metallic sound to remember it. Then, after you have begun using your unit, test for creosote buildup by tapping the stovepipe in the same manner. This should be done once a week. If you hear a "thud" or dull sound, a buildup should be suspected and you should disassemble the stovepipe and clean it. The chimney flue should be visually inspected and cleaned at the same time.

If, for no apparent reason, you notice that your draft is becoming poor and/or you begin to get back drafting at the unit, creosote buildup should again be suspected and the system should be cleaned.

PREVENTIVE MEASURES:

The following are steps to be taken, or guidelines to be used, to eliminate or minimize the formation and buildup of creosote:

1. Be sure your chimney is airtight, properly constructed, and sized to provide adequate draft. Also be sure the flue and the stovepipe are clean and unobstructed.
2. If the chimney flue to which your unit is attached also serves another unit or appliance, that unit or appliance and its connector must be air tight and its damper(s) must be closed when it is not in use.
3. Never use un-insulated stovepipe as a chimney, especially if the chimney is to be constructed outside of the building. This type of chimney would be sure to remain relatively cool, thus reducing flue gas temperatures and causing condensation, poor draft, and eventual creosote buildup.

4. Your wood-burning assembly may be particularly susceptible to creosote buildup during mild weather conditions as in the spring or fall of the year. Some people have a tendency to fully load their unit and then set the thermostat control to its lowest setting, allowing the logs to “smolder” for several hours at a time. This practice will almost always cause creosote to form. From both a standpoint of creosote prevention and wood burning economics, it is far better to build smaller fires and allow them to burn hotter by setting the thermostatic control at a higher setting
5. Do not use cold, green, wet or highly resinous wood. Much of the heat produced would be used to drive off water than aid in the combustion of volatile gases or help maintain proper stack temperatures. Instead use dry, well-seasoned hardwood.
6. As a general rule, at least for the beginner, even if it is not apparent that creosote exists, it is a good policy to clean your stovepipe at least twice during the heating season - once just before you begin burning and again at mid winter. Your chimney should be cleaned at least once a year just before the season begins.
7. Under average conditions, when wood burns properly in a Thermo-Control unit, the flue gas temperatures will range between 300° and 600° F. At the owners choice, a stack thermometer may be installed in the stovepipe. By observing the thermometer the unit can be regulated to help maintain these proper temperatures.

By maintaining a briskly burning fire with dry well seasoned wood you will have little or no creosote problem in your properly installed Thermo-Control unit.

VIII. FIREWOOD

It is important to acquire some basic knowledge of wood as a fuel. Whether experienced or not, here are just a few things which you may find useful.

AVAILABILITY:

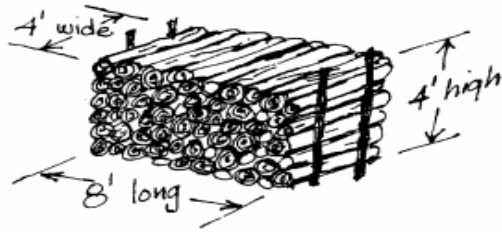
Contrary to popular opinion, the natural supply of wood available in the United States and Canada for use as fuel is not dwindling, as are other major fuel sources such as gas and oil. Wood is naturally renewable and its supply is in fact on the increase in most areas. The eastern United States especially has seen a great resurgence of forest growth in its overgrown pastures and vacated farmlands. Wood's abundance in the United States alone is measured in **hundreds of millions of cords per year!**

By combining this resurgence in the natural growth of wood with the modern forest management practices widely being used and the fact that the average person is becoming increasingly more knowledgeable regarding the sensible use of wood and woodlot management, it is apparent that there is “more than enough wood to go around” and that there will be for many, many years to come.

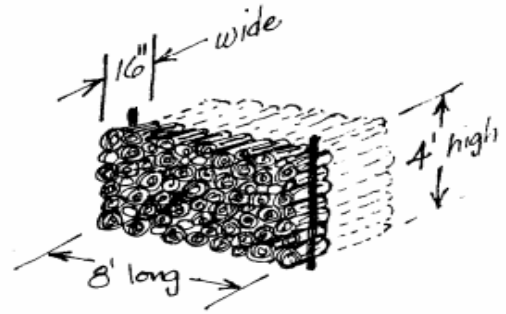
For you as a user, firewood is available in many ways. Land and woodlot owners can obtain wood by cutting it themselves or hiring a professional woodcutter do the job. The tress may be forest culls, storm blow downs, commonly seen “dead elms”, etc. If you do not own land, fire wood can be purchased already cut, split and dried from local fire wood dealers, tree surgeons, or farmers who cut wood in their spare time. Many state forestry departments provide programs whereby you can purchase at nominal cost the right to cut and remove hardwood cull trees from state lands. In addition, many times wood can be “obtained for the asking” from leftover logging operations, construction clearing operations, and state and local roadside tree removal projects.

MEASUREMENT:

Fuel wood is usually measured and sold by the standard **cord** or a fraction of a cord. A standard cord is a stack of wood 4 feet high x 4 feet wide x 8 feet long. This is equal to 128 cubic feet of wood and air space or approximately 85 cubic feet of solid wood. A **face cord** is the most commonly sold fraction of a standard cord. A face cord measurement however, may vary, since it is a stack of wood 4 feet high x 8 feet long but varying in depth anywhere from 12 inches to 24 inches. When buying wood by the face cord, be sure to find out what the width of the stack (or length of the logs) actually is so you can make an accurate cost comparison.



**Standard Cord
(full cord)**



**Face Cord
(1/3 of a cord)**

HEATING VALVE AND MOISTURE CONTENT:

Each type of wood has a specific gravity or density. Generally, the harder the wood, the more dense it will be and the greater its energy content (or heating capacity) will be. Because hardwoods are denser than softwoods and therefore possess more heat value, they are preferred over softwoods for use as fire wood. Hardwoods are also preferred because they possess less creosote-forming resins than softwoods.

All wood contains a certain amount of water within their structure. The amount of moisture in the wood directly affects the way in which the wood burns and the heat producing efficiency of the wood. All firewood should be air dried (or seasoned) for a minimum of six (6) months. Some firewood, depending on the type of wood and the way in which it is cut, split, and stacked may take 12 to 18 months or more to season properly.

Uncut trees, depending on the type, contain varying amounts of water. An uncut or **green** hardwood may have a 100% moisture content - i.e.. equal amounts of wood fiber and water by weight.

Properly seasoned firewood is wood which has been cut and split to convenient sizes and stacked neatly outdoors (but under cover) with ample air circulation provided and left to dry until it has a moisture content of approximately 20%.

The following is an explanation which will emphasize the sensible use of wood with regard to moisture content:

Naturally when wood is heated, the water in it is evaporated or driven off. Up to 80% of this water can be evaporated out by simply seasoning the wood outdoors during the relatively warm months of spring, summer and fall, leaving a 20% moisture content.

By burning green wood, this process of evaporation is simply speeded up. Within a few hours virtually all of the water can be evaporated out, but only at the expense of losing many BTU's of heat given up by the wood as it burns.

One pound of dry wood contains approximately 8500 BTU's of energy. Approximately 1100 BTU's are required to drive off 1 pound of water. Imagine the heat energy wasted (given off to the atmosphere through the chimney) in trying to burn green wood that has a 100% moisture content. Can you calculate how many BTU's would be wasted if 100 pounds of such green wood was burned?

In addition "green wood" fires are sometimes difficult to maintain and are sure to create creosote problems.

Therefore, it makes sense to always be sure to use wood that is properly cured and as dry as possible.

Many books, periodicals, and articles have been written on the use of wood as a fuel. Your local library or book store may be helpful in obtaining information regarding characteristic of wood, wood combustion, what price to pay for wood in your area, cost comparisons for wood heat versus oil/gas/coal or electricity, how to cut your own wood and what tools are needed, etc.

Your **State Agricultural Extension Service** would likely be able to supply you with excellent material covering these and similar subjects regarding wood. Or you may write to the National Solid Fuel Trades Association, P O Box 6369, Syracuse, N.Y. 13217.

IX. TROUBLESHOOTING GUIDE

QUESTIONS and ANSWERS

Q. - What would cause a large amount of water to collect in the chimney?

A. - Your chimney cap is too restrictive. Change to a cap that will allow proper venting of vapors as well as smoke.

Q. - I have difficulty in attaching the stove-pipe to the unit.

A. - You may be trying to fit the wrong end of the pipe to the stove flue collar. Place the crimped end of the pipe **inside** the collar as described in section IV.

Q. - I can't get a fire started.

A. - You are using kindling wood that is too large or wet (see section VI - **Starting a Fire**).
A. - You have left the baffle bypass closed. Open the bypass to allow direct exhaust of hot gases and quick heating of flue to initiate proper draft.
A. - The primary air damper is closed. Raise the thermostat handle to the horizontal position.

Q. - The wood burns too fast. Why?

A. - The primary air damper is opened too far for your particular draft conditions. Run at lower thermostat setting.
A. - There may be an air leak at the door due to a worn or damaged gasket. Replace the gasket - kit is available through your dealer.

Q. - What type of wood should I burn in my Thermo-Control?

A. - Dry seasoned hardwood is best. See "Firewood" in this manual.

Q. - What do I do if my Thermo-Control smokes when I open the door for loading?

A. - This problem should **NOT** HAPPEN. If it does check the following:
(1) Baffle control rod should be pushed in as per operating instructions.
(2) Any and all stove pipe dampers are in open position.

If problem persists after checking the above, you probably have a chimney problem.

Q. - The pressure relief valve on my hot water model opens regularly and discharges water.

A. - If connected to your heating boiler, the

system may have air in the lines. Bleed air from the system.

A. - The system has poor circulation. Add a properly sized circulating pump.

A. - A valve may be closed or an obstruction may exist in the line. Open the valve or remove the obstruction or restriction.

Q. - Can my Thermo-Control Wood-Burning product burn out of control like some of the old cast iron stoves?

A. - No. The automatic thermostat will not allow this to happen if the unit is properly installed.

Q. - My unit burns too hot and I believe I have installed it properly.

A. - Your chimney's natural draft is probably **too** strong. You should install a stovepipe damper as instructed in section IV of this manual - see Installation of Stovepipe.

Q. - I need help or have a question with my Thermo-Control. Who do I call or see?

A. - Go to your Thermo-Control dealer where you purchased the unit.

Q. - How much wood do I put in my Thermo-Control unit?

A. - This will depend on your own life-style. You may load your Thermo-Control unit full for long burning time. Or in early fall or late spring you may want to just put on a few logs for a little heat. Either way, your Thermo-Control will give steady even heat.

Q. - What happens if my Thermo-Control "hot water or air heat" unit fire runs out of wood and goes out?

A. - Your furnace will automatically take over. However, if you keep wood in your Thermo-Control this should not happen.

Q. - What happens if the power fails and my fan or circulating pumps stops?

A. - The Thermo-Control hot water and hot air unit will still operate. You should open up your zone valves or check flow valve or both. This will allow water to circulate by thermo convection. The forced hot air will also heat via convection through your ducts to provide heat without power.

IX. TROUBLESHOOTING GUIDE (cont.)

QUESTIONS and ANSWERS

Q. - How close should my unit be to a wall or combustible material?

A. - No closer than 48". See Installation Diagram in this book.

Q. - There is creosote on the water pipe inside the unit.

A. - **This is not a problem. The temperature of the water pipes is lower than the rest of the unit.** Therefore, creosote may form on the pipes. This will not restrict heating the water in the pipes.

Q. - Water will not circulate in water pipes on Thermo-Control "hot water heat" unit.

Q. - The water in the existing boiler is not made hot enough by the Thermo-Control unit to heat the house.

A. - Pipes are installed incorrectly. Refer to installation in this book.

A. - There is air in the lines. Bleed the air out and add air vents if necessary.

A. - The installation needs a water circulating pump.

A. - Thermostat needs to be at higher setting to produce hotter fire, therefore making hotter water.

Q. - The water at our faucet is too hot.

A. - Lower the thermostat setting on the unit or add a circulating pump to the loop.

Q. - We don't get enough hot water from our Thermo-Control domestic hot water model.

A. - Set the thermostat on the unit at a higher setting.

Q. - My Thermo-Control burns the wood, but will not heat.

A. - You may be using wet or poor wood. Hard wood that is well seasoned and dry should be used for best heat.

Q. - How do I get the ashes out of my Thermo-Control unit?

A. - Ash removal is **not** done every day. Thermo-Control's combustion system is almost 100% so that you use much less wood and remove very few ashes, about once a week or less. This can be done easily by removing the ash with a shovel. This permits you to remove ashes while the fire is still burning. See Ash Removal in section VI.

X. GLOSSARY OF TERMS

Air tight stove - A unit in which the only air that enters it is the primary and secondary supply air to the combustion chamber(s). More efficient and controllable than non-airtight units. The door fits very tightly and the steel fire box is continuously welded along every seam.

BTU - British Thermal Unit - is the amount of heat necessary to raise the temperature of one pound of water one degree Fahrenheit.

Charcoal - Formed when all the moisture and volatile gases are driven out of wood. High in carbon content and capable of giving off intense heat when burned.

Chimney - A vertical tube, masonry or metal, used to evacuate smoke and gases from a combustion appliance and designed to provide adequate draft to and from the appliance.

Condensation - Process that takes place as a vapor changes to liquid when it contact a cool surface.

Convection - Transfer of heat involved when air is warmed and moved through a space or room by gravity only.

Draft - The flow of air created by the difference in air pressure outside the chimney and that inside the unit.

Firebrick - Brick which is capable of withstanding extremely high temperature without breaking down structurally.

Flue Collar - That part of the unit to which the stovepipe or chimney connects. Function is to "funnel" the smoke and exhaust gases to the stovepipe or chimney

Flue Gases - The products of wood combustion (or any solid fuel combustion) which pass through the flue in the form of a gas.

Primary Combustion - The burning of solid wood and volatile gases which takes place in the firebox as primary air is supplied through the front of the unit.

Radiant Heat - Heat which is transferred directly from the unit to other surfaces without directly affecting the temperature of the air it passes through.

Secondary Combustion - The burning of volatile gases which takes place behind the baffle as pre-heated secondary air supplied at the rear of the unit.

Thimble - Metal or fireclay sleeves or tubes. Can be built into the unit of a metal or masonry chimney to receive a smoke pipe.

XI. WARRANTY

- ◇ Thermo-Control Heating Systems LTD. warrants to the original owner that the fire-box be free of defects in material and workmanship for a period of twenty (20) years from the date of purchase.
- ◇ Factory installed water heating coils are warranted for the lifetime of the original unit.
- ◇ All other parts in the unit to be free from defects in material under normal use for a period of one year from date of purchase.
- ◇ The unit must be operated during each heating season according to manufacturer's instructions, within its listed capacity and with proper controls and adjustments. Note that over-firing of your Thermo-Control unit is contrary to manufacturer's instructions and may cause damage not covered by this warranty.
- ◇ Our obligation under these warranties is limited to exchange or repair of any defective part at the option of Thermo-Control Heating Systems LTD.
- ◇ The replaced/repaired parts carry a warranty for the balance of the unit's applicable period of warranty.
- ◇ Transportation charges are not included in this warranty and are to be paid by the owner.
- ◇ Manufacturer is unable to refund any expenses paid by the owner unless prior authorization has been received from the manufacturer.
- ◇ This warranty is void as to any unit which has been subjected to misuse, accident or negligent damage, damage in transit or if unit has been altered or repaired in any way that affects the reliability or detracts from the performance of the unit.
- ◇ This warranty is void in all events where installation has not been made by a qualified professional plumbing and heating contractor according to commonly accepted customs and practices for the industry, and in total compliance will all applicable statutes, ordinances, regulations, and codes.
- ◇ This warranty is in lieu of all other guarantees expressed or implied, and all warranties expressed or implied, including the warranty of merchantability or fitness for a particular purpose and all other obligations and liability on the part of Thermo-Control Heating Systems LTD. Manufacturer neither assumes nor authorizes any other person to assume for manufacturer any other liability in connection with the sale of its' products.

THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE TO STATE.

**Manufactured by THERMO-CONTROL HEATING SYSTEMS, LTD.
P.O. Box 640 Cobleskill, NY 12043**

Fill in for your records:

Model # _____

Serial # _____

Date of Purchase _____

To place warranty in effect, detach and mail immediately to:
THERMO-CONTROL HEATING SYSTEMS, LTD.
P. O. BOX 640 COBLESKILL, NY 12043

PLEASE PRINT OR TYPE ALL INFORMATION:

Purchaser's Name: _____

Address: _____

City: _____ Zip: _____

Phone # : _____

Date Purchased: _____ UNIT Serial # : _____

UNIT Model # : _____