

BW *Wood fired boilers*

Models BW24 et BW36

USE & CARE MANUAL

With installation instructions for the contractor



Your BW *Wood fired Boiler* has been carefully assembled and factory tested to provide years of trouble-free service. The following information and safety measures are provided to enable proper installation, operation, and maintenance of this product.

It is imperative that all persons who are expected to install, operate or adjust this boiler should read these instructions carefully.

Any questions regarding the operation, maintenance, service or warranty of this electric boiler should be directed to the supplier.

When all installation steps have been completed, insert this installation manual in its original envelope, and keep in a safe place (close to the boiler) for future reference.

THERMO 2000 INCORPORATED

Printed in Canada

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Section 1 : Accessory parts list for models BW-24 and BW-36

Table 1

Quantity	Description	Part number	Manufacturer
1	Damper motor	2070 005S1	White-Rodger
2	Dual aquastat	11C61 014B1	White-Rodger
1	120V – 24V transformer	S82A-310	White-Rodger
1	Pressure relief valve	10-407-05	Conbraco
1	Temperature & Pressure gauge	WP80LM-T2	Basco

Important notes :

- All wiring must clear the boiler casing by one inch minimum.
- For line voltage wiring use 14 gauge wire rated at 105°C minimum.
- For low voltage wiring use 18 gauge wire rated at 105°C minimum.
- Only a chimney suitable for wood burning shall be used.
- This appliance is not designed to be used with an automatic stoker.

SAVE THIS MANUAL



General Safety Precautions

Be sure to read and understand the entire Use & Care Manual before attempting to install or to operate this electric boiler. Pay particular attention to the following General Safety Precautions. Failure to follow these warnings could cause property damage, bodily injury or death. Should you have any problems understanding the instructions in this manual, STOP, and get help from a qualified installer or technician.

Section 2 : Introduction

2.0 Introduction

The wood fired boilers models BW-24 and BW-36 are designed to be set up in parallel to an existing hot water heating system. If the existing system incorporates a tubular coil to heat domestic water, the wood fired boiler can be set up in series with the existing system.

Section 3 : INSTALLATION



WARNING

The manufacturer's warranty does not cover any damage or defect caused by installation, or attachment, or use of any special attachment other than those authorized by the manufacturer into, onto, or in conjunction with the boiler. The use of such unauthorized devices may shorten the life of the boiler may endanger life and property. The manufacturer disclaims any responsibility for such loss or injury resulting from the use of such unauthorized devices

3.1 SECURITY REQUIREMENTS

- This boiler shall be connected to a chimney in good working order.
- Only a chimney and smoke pipe suitable for wood burning shall be used..
- The boiler and smoke pipe must be set up maintaining safe clearance from all combustible material as defined in table 2.
- A safety valve that can be opened manually in case of power failure is a must.
- The reducing (water makeup) valve must have a maximum setting of 18 psi.
- A draft regulator must be installed and adjusted to 0.05 inches water column maximum. A higher setting could cause the fire to burn out of control.

3.2 LOCATION

The boiler should be located close to the chimney base to ensure a short path for the smoke pipe from the boiler to the chimney with a minimum number of bends.

The boiler must rest on a **non-combustible surface**, mounted on hollow clay tiles not less than four inches thick covered with a steel sheet. The tiles ends should be unsealed to allow venting. The base must extend to minimum installation clearances.

3.3 CLEARANCES

The following minimum clearances from combustible surfaces must be observed :

Table 2 : Minimum clearances

Front	48 pouces
Rear	18 pouces
Sides	6 pouces
Top	36 pouces
Smoke pipe	18 pouces

The installation shall comply with the applicable requirements of CSA standard B 365 (Installation code for solid fuel burning appliances and equipment).

It is very important that installation clearances and restrictions be followed carefully to ensure a safe setup.

3.4 CHIMNEY

In order to ensure safe and effective operation, the chimney must be checked and repaired prior to boiler installation.

The chimney must be suitable for wood burning appliances. Insulated chimneys are best for airtight appliances. They should be installed according to the manufacturer's instructions.

3.4.1 Smoke Pipe

- Minimum thickness: 24 gauge.
- Pipe size should be 8 inches in diameter.
- Black smoke pipe should be used. DO NOT use galvanized flue pipe.
- There should be no more than a ten foot horizontal run of smoke pipe to the chimney breeching.
- Smoke pipe must slope upward toward chimney 1/4" inch per foot minimum.
- Crimped end of smoke pipe must face furnace in order for condensation to run back inside the firebox.
- Smoke pipe should be inserted into furnace outlet and secured using three screws.
- All smoke pipe connections should be mechanically secured using not less than three sheet metal screws.
- Smoke pipe or chimney breeching shall not pass through an attic, roof space, closet or similar concealed space nor through a floor, ceiling, wall or partition made of combustible material. Please refer to table 2 for minimum clearances.
- The minimum clearance between the smoke pipe or chimney breeching and combustible material shall be 18 inches.
- The draft regulator must be installed and the draft set no higher than 0.05 inches water column.



WARNING

If this setting is exceeded, it could cause the fire to burn out of control.

3.5 WIRING CONNECTIONS



WARNING

All electrical wiring must be performed by a qualified electrician.

The electrical system MUST be powered from a single branch circuit.

For the electrical connection between the boiler and the circuit breaker use one run of 14-2 BX wire with a minimum temperature rating of 105°C. All wiring must be set at least one (1") inch off furnace casing. Avoid routing wire near smoke pipe or fire door.

Low voltage wiring: use 18 gauge wire with a minimum temperature rating of 105°C into a BX armed shield. Set wire at least one (1") inch off furnace casing.

3.5.1 Damper motor mounting

- Mount the damper motor on its base with screws provided.
- Connect the damper motor according to the damper motor command system wiring diagram.
- Do not force the damper motor, it must move very slowly or damage may result.
- When the damper motor is off, the damper should be closed and the damper motor chain provided, linking the motor to the damper, should not be taut. (See mounting diagram)

3.5.2 Dual aquastat setup

- Insert well into furnace.
- Remove the aquastat cap. .
- Introduce the sensor into the well. Affix the aquastat to the well with the fasteners located under the aquastat.

3.5.3 Command transformer setup

- Pull off the protection seal from one of the aquastat extremities.
- Set the command transformer into the KO plug.
- Please refer to the damper motor command system wiring diagram to connect the dual aquastat and the command transformer. Protect terminals in order to avoid a short-circuit.

3.5.4 Dual aquastat adjustment

- Set the high limit control of the dual aquastat and the low limit control according section 4: control sequences
- Replace the dual aquastat cap.

3.6 PLUMBING CONNECTIONS

The boiler should be set up in parallel to an existing hot water heating system. If the existing boiler has an built-in domestic hot water heating tubular coil, the boilers shall be set up in series. When a parallel setup is used: The boiler inlet circuit must have a dedicated pump.

- The reducing (makeup) valve must have a maximum setting of 18 psi.
- A safety valve that can be opened manually must be installed on the outlet circuit of the boiler.

- See plumbing diagram for further information.

Provide a hot water circulation loop that will dissipate at least 10% of the rated heat output of the boiler in the event that circulation is reduced because of an electrical power failure.

- This loop shall be set up so that it can only be made inoperative by deliberate manual action.
- Parameters for sizing the heat dissipation loop are:
 - Minimum pipe size 3/4";
 - room temperature of 65°F
 - mean boiler water temperature of 180°F.
- The loop shall be installed above the boiler to promote natural thermal circulation.

The piping shall not cause excessive pressure or stress on the boiler.

Section 4.0 : Control Sequences

4.1 Adjusting the aquastats

4.1.1 CONTROL # 1

Maximum temperature control that cuts electrical current to the air damper motor upon failure of control # 2.

N.B. : Always adjust at least 20 F higher than control # 2

Adjustment type : **180F.**

4.1.2 CONTROL # 2

Air damper motor control that controls the water temperature in the boiler by opening and closing the air damper.

Adjustment type : **140F à 165F.**

4.1.3 CONTROL # 3

Temperature control that deactivates the heat circulating pump when the boiler temperature drops low enough to cause condensation and consequently the formation of creosote. By preventing the circulation of the water heat is built up and condensation is prevented.

Adjustment type : **135F.**

4.1.3 CONTROL # 4

Security control that simulates an increased heat request from the central home thermostat when the maximum boiler temperature has been reached

N.B. : Must always be adjusted at least 30 F higher than control # 2.

Ajustement type : **195 F.**

4.2 Stand alone Wood fired boiler (without zone valve)

The thermostat activates the pump relay which starts up the pump if water temperature is higher than that indicated on control #3.

Follow figure 2 for the electrical installation and figure 1 for the plumbing installation.

4.3 Stand alone Wood fired boiler with zone valve

Connect the low voltage thermostat to the zone valve. Connections must be made such that when one thermostat issues a request for heat only its corresponding zone valve is affected which in turn sets off the corresponding relay for the circulating pump (RA-89A) which then turns

on the circulating pump if the correct temperature has been reached on control # 3.

In the event the boiler overheats connect control 4 to a zone valve to simulate a request for heat.

Follow figure 4 for the electrical installation and figure 3 for the plumbing installation.

4.4 Wood fired boiler with auxiliary boiler (without zone valve)

The boiler's thermostat activates the pump relay which starts up the pump of the BW boiler or the auxiliary heating

If control #3 is closed(temperature higher than 135F) the relay coil SPDT (not included) is activated and the pump of the BW boiler begins operating. If control #3 is open(temperature lower than 135F) the relay coil SPDT (not included) is not activated and the auxiliary heating circuit is supply with 120V.

Follow figure 7 for electrical installation and figure 5 or 6 for plumbing installation.

4.5 Wood fired boiler with auxiliary boiler and zone valve

Connect the low-voltage thermostat to the zone valve. Connections should be connected such that when the thermostat creates a demand for heat only the corresponding zone valve responds and in turn activates the circulating pump relay (RA-89A) which then starts up the pump of the BW boiler or the auxiliary heating.

If control 3 is closed (temperature higher than 135F) the relay coil SPDT (not included) is activated and the pump of the BW boiler begins operating. If control 3 is open (temperature lower than 135F) the relay coil SPDT la bobine du relais SPDT (not included) is not activated and the auxiliary circuit boiler is supply to 120V.

The transformer used to supply the zone valves must be power enough to support the requests of all of the zone valves of the system. In the

event the boiler overheats connect control 4 to a zone valve to simulate a heating request.

Follow figure 8 for the electrical installation and figure 5 or 6 for the plumbing installation.

4.6 Wood fired boiler with auxiliary boiler and control « CTA-BE »

The optional control « CTA-BE » is an automated transfer control system which includes an electronically controlled transfer box and a 3-way power-actuated valve. This option facilitates electrical connection, optimizes performance, avoids the addition of a second pump and automatically selects the appropriate energy source.

The « CTA-BE »'s thermostat activates the pump's relay (RA-89A) which starts the pump.??

If control 3 is closed (temperature higher than 135F) the « CTA-BE » control directs the 3-way valve to SIDE B and either the burner of the oil or gas burning boiler is stopped or the power to the electric boiler is cut .

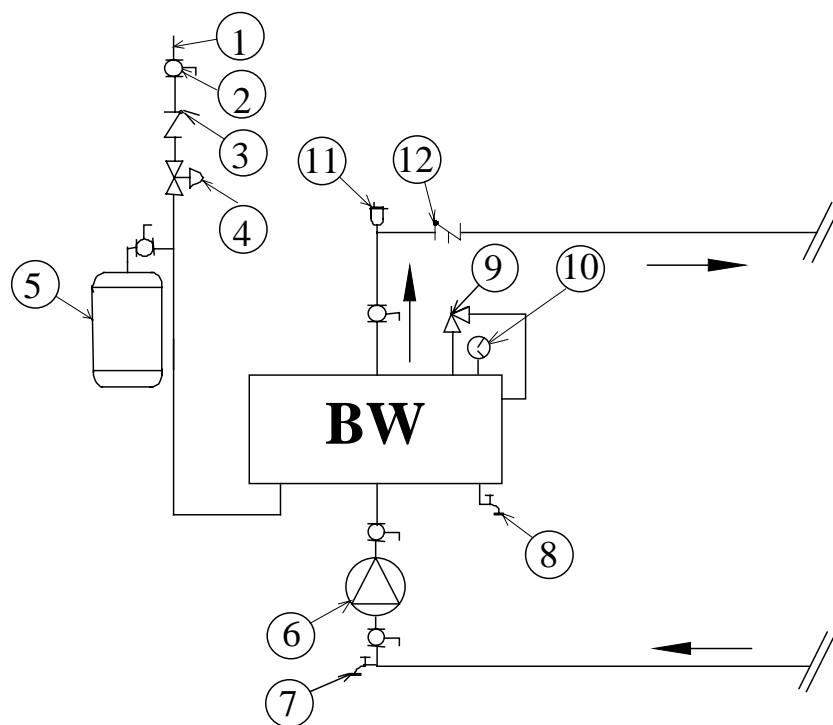
If control 3 is open(temperature lower than 135F) the « CTA-BE » control directs the 3-way valve to SIDE A and either the burner of the oil or gas burning boiler comes on or the power to the electric boiler is supplied .

Follow figure 9 for the electrical and plumbing installation.

Figure 1: System piping layout, single zone

**SYSTEM PIPING LAYOUT:/
SCHEMA D'INSTALLATION GÉNÉRAL:**

**SIMPLE ZONE/
SINGLE ZONE**

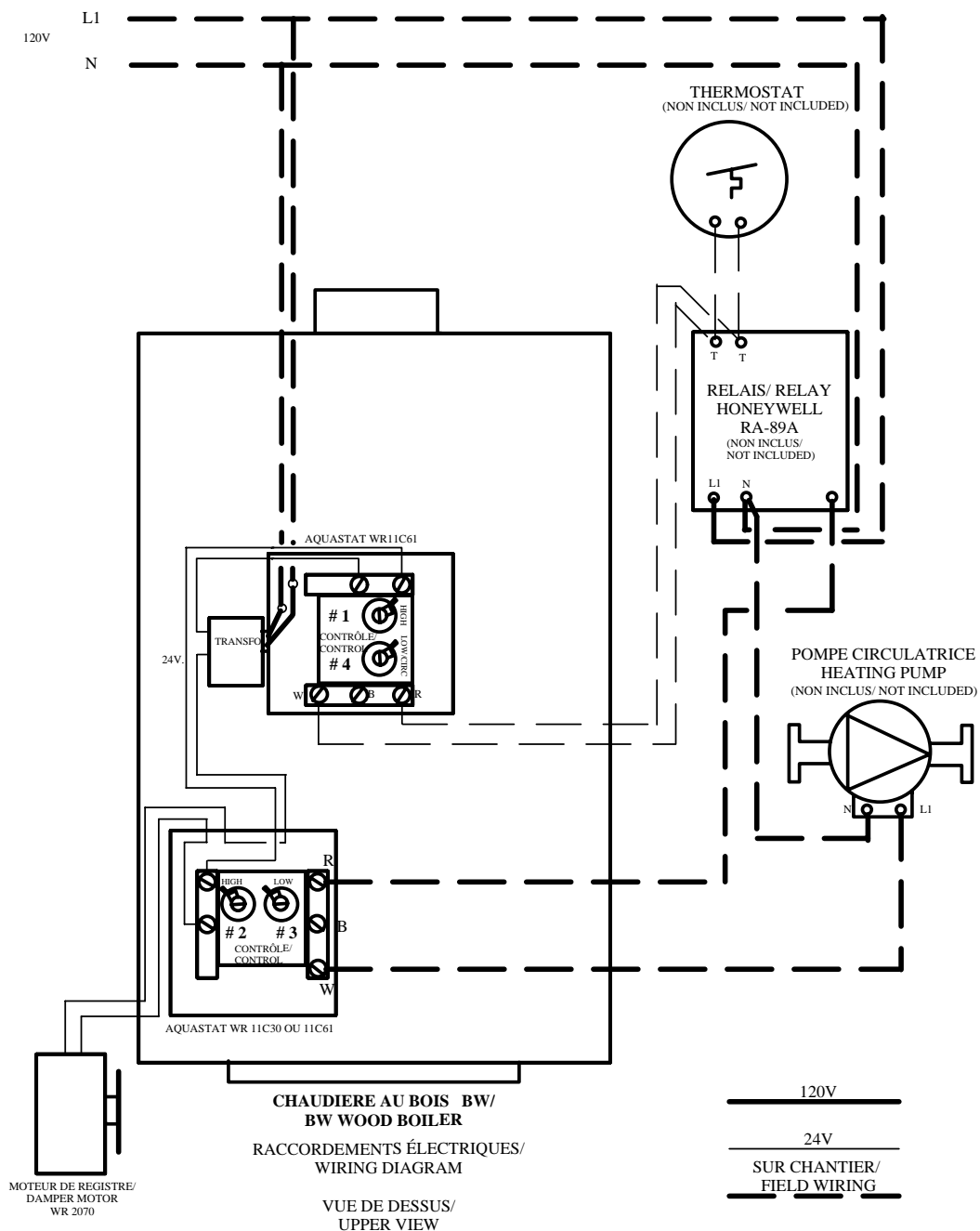


LEGEND/ LÉGENDE :

- 1- MAIN WATER SUPPLY/ ALIMENTATION D'EAU
- 2-MAINTENANCE VALVE/ VALVE D'ENTRETIEN
- 3-CHECK VALVE/ CLAPET ANTI-RETOUR
- 4-PRESSURE REDUCER/ RÉDUCTEUR DE PRESSION
- 5-EXPANSION TANK/ RÉSERVOIR DE DILATATION
- 6-CIRCULATING PUMP/ POMPE CIRCULATRICE
- 7-PURGE VALVE/ ROBINET D'ÉLIMINATION D'AIR

- 8-DRAIN VALVE/ VALVE DRAINAGE
- 9-SAFETY VALVE/ SOUPE DE SÛRETÉ
- 10-TEMPERATURE AND PRESSURE GAUGE/
THERMOMANOMÈTRE
- 11-AUTOMATIC AIR VENT/ PURGEUR D'AIR
- 12-FLOW CHECK VALVE (REQUIRED ON SYSTEMS
WITHOUT MOTORIZED ZONE VALVES)/
CLAPET ANTI-GRAVITÉ (REQUIS SUR SYSTÈME
N'AYANT PAS DE ROBINETS MOTORISÉS)

Figure 2



CONTRÔLE # 1: Maximum temperature control that cuts electrical current to the air damper motor upon failure of control # 2.
 N.B. : Always adjust at least 20 F higher than control # 2
 Adjustment type : 180 F.

CONTRÔLE # 2: Air damper motor control that controls the water temperature in the boiler by opening and closing the air damper.
 Adjustment type : 140 To 165F.

CONTRÔLE # 3: Temperature control that deactivates the heat circulating pump when the boiler temperature drops low enough to cause condensation and consequently the formation of creosote. By preventing the circulation of the water heat is built up and condensation is prevented.
 Adjustment type : 135 F.

CONTRÔLE # 4: Security control that simulates an increased heat request from the central home thermostat when the maximum boiler temperature has been reached.
 N.B. : Must always be adjusted at least 30 F higher than control # 2.
 Adjustment type : 195 F.

ADJUSTING THE TEMPERATURE:
 Controls #1 & 2 (HI limit) : The aluminum dial has been factory-adjusted to maximum operating temperature for normal operating conditions (i.e. the temperature at which operation will stop). Set the brass dial to the temperature at which operation will start.
 Controls #3 & 4 (Lo/Circ Terminals R & W) : Set the aluminum dial to the temperature at which operation will start. Set the brass dial to the temperature at which operation will stop.

CONTRÔLE # 1: Contrôle de haute limite maximale ayant comme fonction de coupler l'alimentation électrique du moteur d'entrée d'air dans un cas de défaillance du contrôle # 2.
 N.B. : Il doit toujours être ajusté au moins 20F plus haut que le contrôle # 2
 Ajustement type : 180F.

CONTRÔLE # 2 : Ce contrôle a comme fonction de contrôler la température d'eau de la chaudière par l'opération (ouvert ou fermé) du moteur du volet d'alimentation d'air.
 Ajustement type : 140F à 165F.

CONTRÔLE # 3 : Ce contrôle a comme fonction d'empêcher la pompe circulatrice de fonctionner lorsque la température de l'eau de la chaudière est en dessous d'une température suffisante pour limiter la formation de créosote dans la chaudière
 Ajustement type : 135F.

CONTRÔLE # 4 : Contrôle de sécurité ayant comme fonction de simuler une demande de chauffage du thermostat de la maison si la température de la chaudière est en dessous d'une température suffisante pour limiter la formation de créosote dans la chaudière.
 N.B. : Doit toujours être ajusté 30F. plus haut que le contrôle # 2.
 Ajustement type : 195 F.

AJUSTEMENT DES TEMPÉRATURES:
 Contrôles #1 & 2 (HI limit) : Déplacer le curseur mobile en aluminium à la température à laquelle vous désirez que l'opération désirée s'arrête. Déplacer le curseur mobile en laiton à la température à laquelle vous désirez que l'opération désirée soit exécutée.
 Contrôles #3 & 4 (Lo/Circ Terminals R & W) : Déplacer le curseur mobile en aluminium à la température à laquelle vous désirez que l'opération désirée soit exécutée. Éplacer le curseur mobile en laiton à la température à laquelle vous désirez que l'opération désirée soit s'arrête.


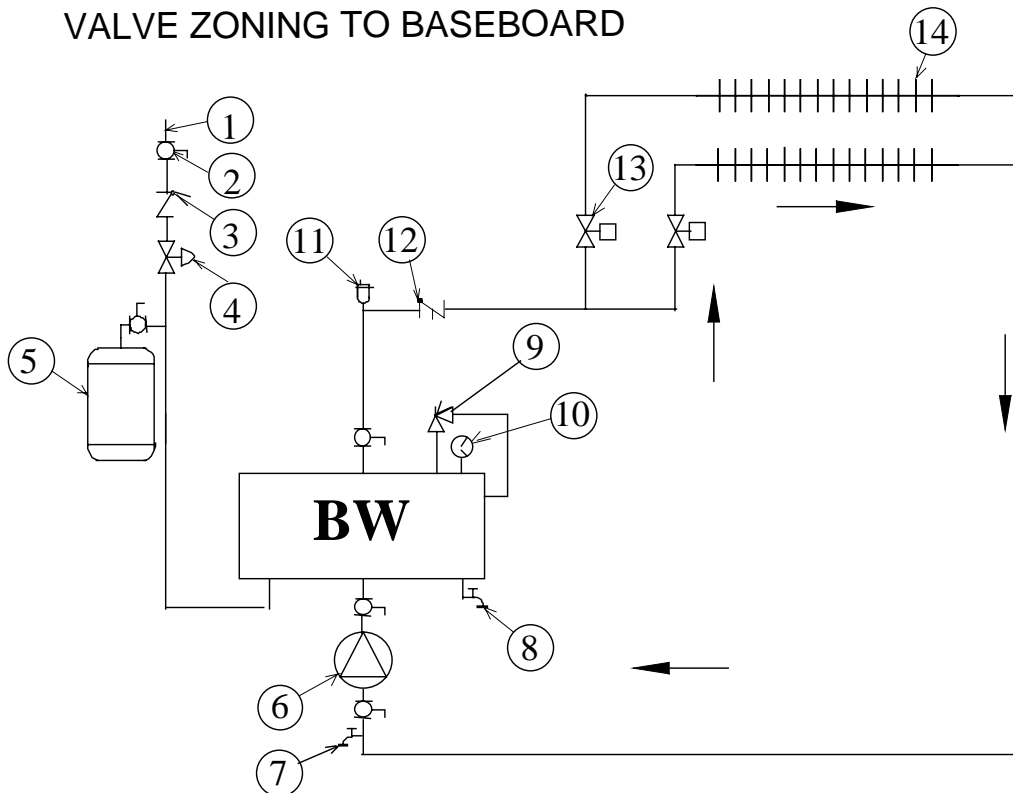
CHAUDIÈRE À BOIS SEULE WOOD FIRED BOILER ONLY	
	RACCORDEMENT ÉLECTRIQUE/ WIRING DIAGRAM CHAUDIÈRE AU BOIS "BW"/ "BW" WOOD BOILER
DATE: NOV 2005	

Figure 3: System piping layout, zoning valve

SYSTEM PIPING LAYOUT:/
SCHEMA D'INSTALLATION GÉNÉRAL:

ZONAGE PAR ROBINETS MOTORISÉS/
VALVE ZONING TO BASEBOARD

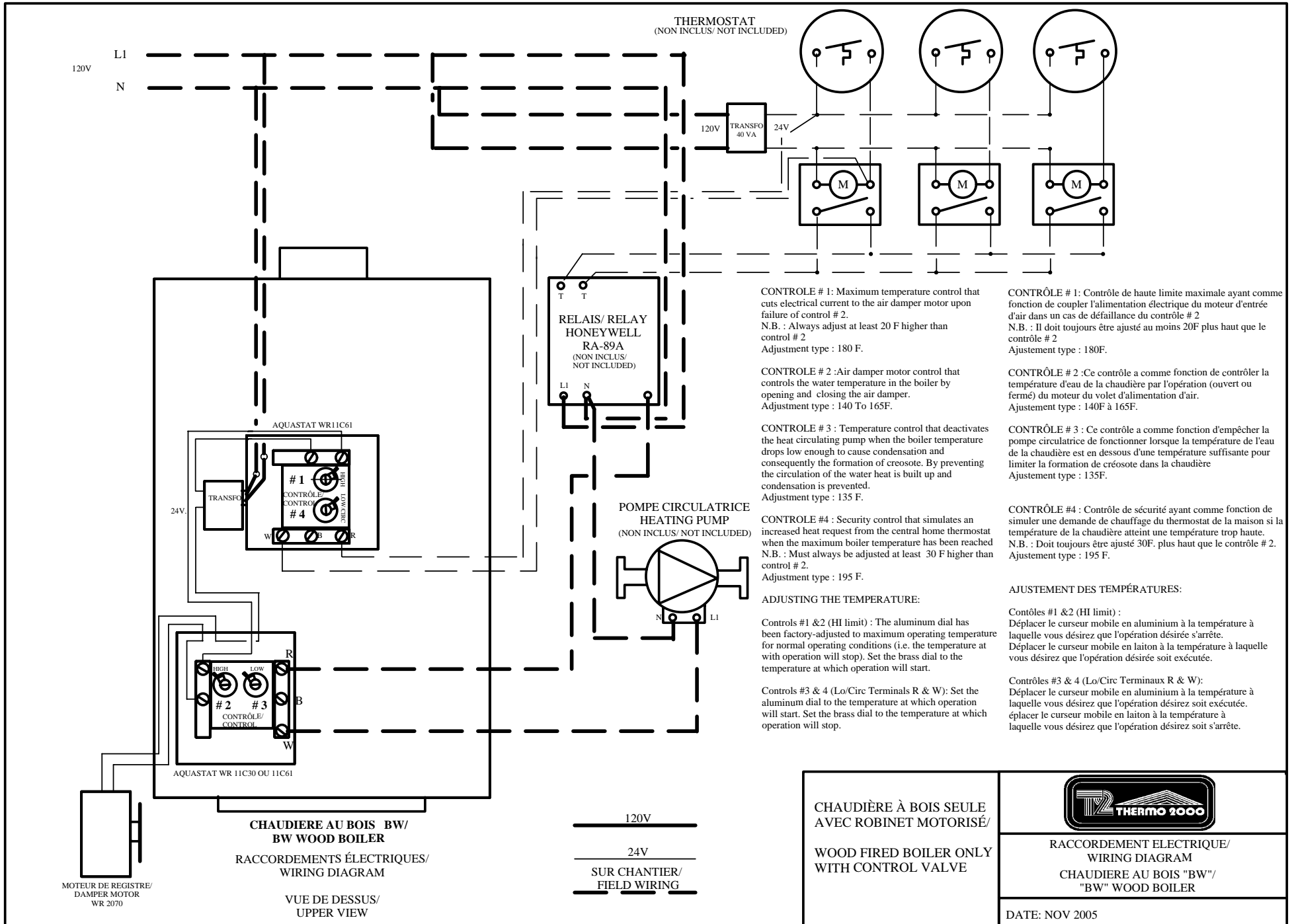


LEGEND/ LÉGENDE :

- 1- MAIN WATER SUPPLY/ ALIMENTATION D'EAU
- 2-MAINTENANCE VALVE/ VALVE D'ENTRETIEN
- 3-CHECK VALVE/ CLAPET ANTI-RETOUR
- 4-PRESSURE REDUCER/ RÉDUCTEUR DE PRESSION
- 5-EXPANSION TANK/ RÉSERVOIR DE DILATATION
- 6-CIRCULATING PUMP/ POMPE CIRCULATRICE
- 7-PURGE VALVE/ ROBINET D'ÉLIMINATION D'AIR

- 8-DRAIN VALVE/ VALVE DRAINAGE
- 9-SAFETY VALVE/ SOUPAPE DE SÛRETÉ
- 10-TEMPERATURE AND PRESSURE GAUGE/
THERMOMANOMÈTRE
- 11-AUTOMATIC AIR VENT/ PURGEUR D'AIR
- 12-FLOW CHECK VALVE (REQUIRED ON SYSTEMS
WITHOUT MOTORIZED ZONE VALVES)/
CLAPET ANTI-GRAVITÉ (REQUIS SUR SYSTÈME
N'AYANT PAS DE ROBINETS MOTORISÉS)
- 13-MOTORIZED ZONE VALVE/ ROBINETS MOTORISÉS
- 14-HOT WATER BASEBOARD/ PLINTHES CHAUFFAGES

Figure 4




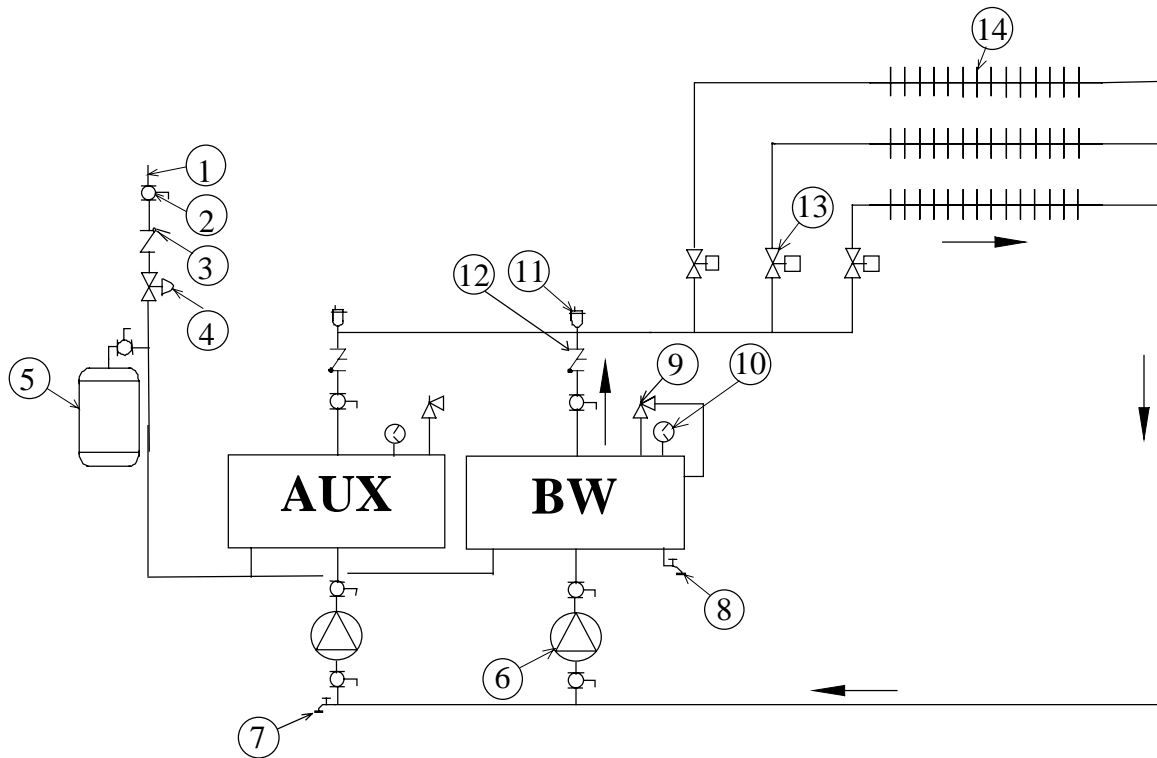
<p>CHAUDIÈRE À BOIS SEULE AVEC ROBINET MOTORISÉ/</p> <p>WOOD FIRED BOILER ONLY WITH CONTROL VALVE</p>	 <p>RACCORDEMENT ÉLECTRIQUE/ WIRING DIAGRAM</p> <p>CHAUDIÈRE AU BOIS "BW"/ "BW" WOOD BOILER</p>
<p>DATE: NOV 2005</p>	

Figure 5: System piping layout, parallel installation

SYSTEM PIPING LAYOUT:/
SCHEMA D'INSTALLATION GÉNÉRAL:

RACCORDEMENT EN PARALLÈLE/
PARALLEL INSTALLATION



LEGEND/ LÉGENDE :

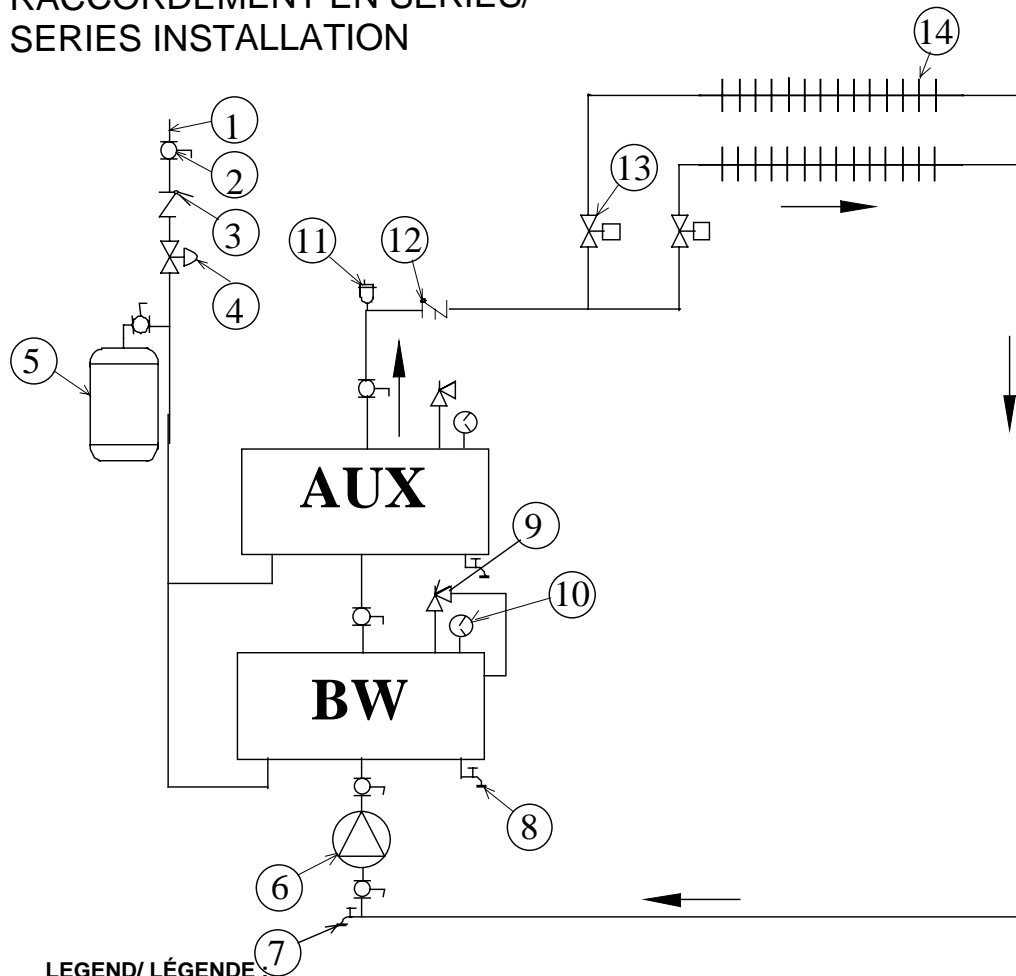
- 1- MAIN WATER SUPPLY/ ALIMENTATION D'EAU
- 2- MAINTENANCE VALVE/ VALVE D'ENTRETIEN
- 3- CHECK VALVE/ CLAPET ANTI-RETOUR
- 4- PRESSURE REDUCER/ RÉDUCTEUR DE PRESSION
- 5- EXPANSION TANK/ RÉSERVOIR DE DILATATION
- 6- CIRCULATING PUMP/ POMPE CIRCULATRICE
- 7- PURGE VALVE/ ROBINET D'ÉLIMINATION D'AIR

- 8- DRAIN VALVE/ VALVE DRAINAGE
- 9- SAFETY VALVE/ SOUPAPE DE SÛRETÉ
- 10- TEMPERATURE AND PRESSURE GAUGE/
THERMOMANOMÈTRE
- 11- AUTOMATIC AIR VENT/ PURGEUR D'AIR
- 12- FLOW CHECK VALVE (REQUIRED ON SYSTEMS
WITHOUT MOTORIZED ZONE VALVES)/
CLAPET ANTI-GRAVITÉ (REQUIS SUR SYSTÈME
N'AYANT PAS DE ROBINETS MOTORISÉS)
- 13- MOTORIZED ZONE VALVE/ ROBINETS MOTORISÉS
- 14- HOT WATER BASEBOARD/ PLINTHES CHAUFFAGES

Figure 6: System piping layout, series installation

SYSTEM PIPING LAYOUT:/
SCHEMA D'INSTALLATION GÉNÉRAL:

RACCORDEMENT EN SÉRIES/
SERIES INSTALLATION



LEGEND/ LÉGENDE:

- 1- MAIN WATER SUPPLY/ ALIMENTATION D'EAU
- 2-MAINTENANCE VALVE/ VALVE D'ENTRETIEN
- 3-CHECK VALVE/ CLAPET ANTI-RETOUR
- 4-PRESSURE REDUCER/ RÉDUCTEUR DE PRESSION
- 5-EXPANSION TANK/ RÉSERVOIR DE DILATATION
- 6-CIRCULATING PUMP/ POMPE CIRCULATRICE
- 7-PURGE VALVE/ ROBINET D'ÉLIMINATION D'AIR

- 8-DRAIN VALVE/ VALVE DRAINAGE
- 9-SAFETY VALVE/ SOUPAPE DE SÛRETÉ
- 10-TEMPERATURE AND PRESSURE GAUGE/
THERMOMANOMÈTRE
- 11-AUTOMATIC AIR VENT/ PURGEUR D'AIR
- 12-FLOW CHECK VALVE (REQUIRED ON SYSTEMS
WITHOUT MOTORIZED ZONE VALVES)/
CLAPET ANTI-GRAVITÉ (REQUIS SUR SYSTÈME
N'AYANT PAS DE ROBINETS MOTORIZÉS)
- 13-MOTORIZED ZONE VALVE/ ROBINETS MOTORIZÉS
- 14-HOT WATER BASEBOARD/ PLINTHES CHAUFFAGES

Figure 7

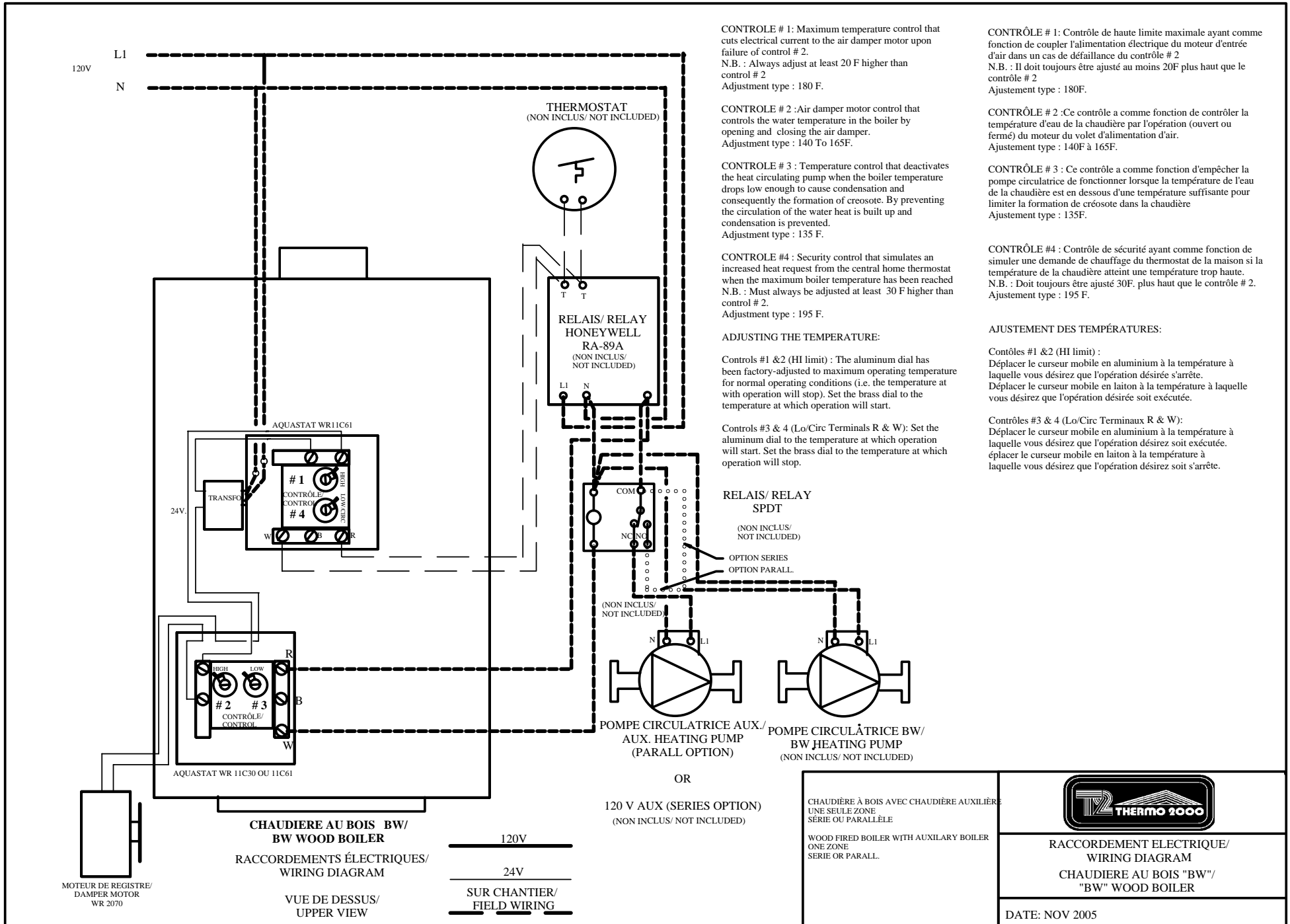
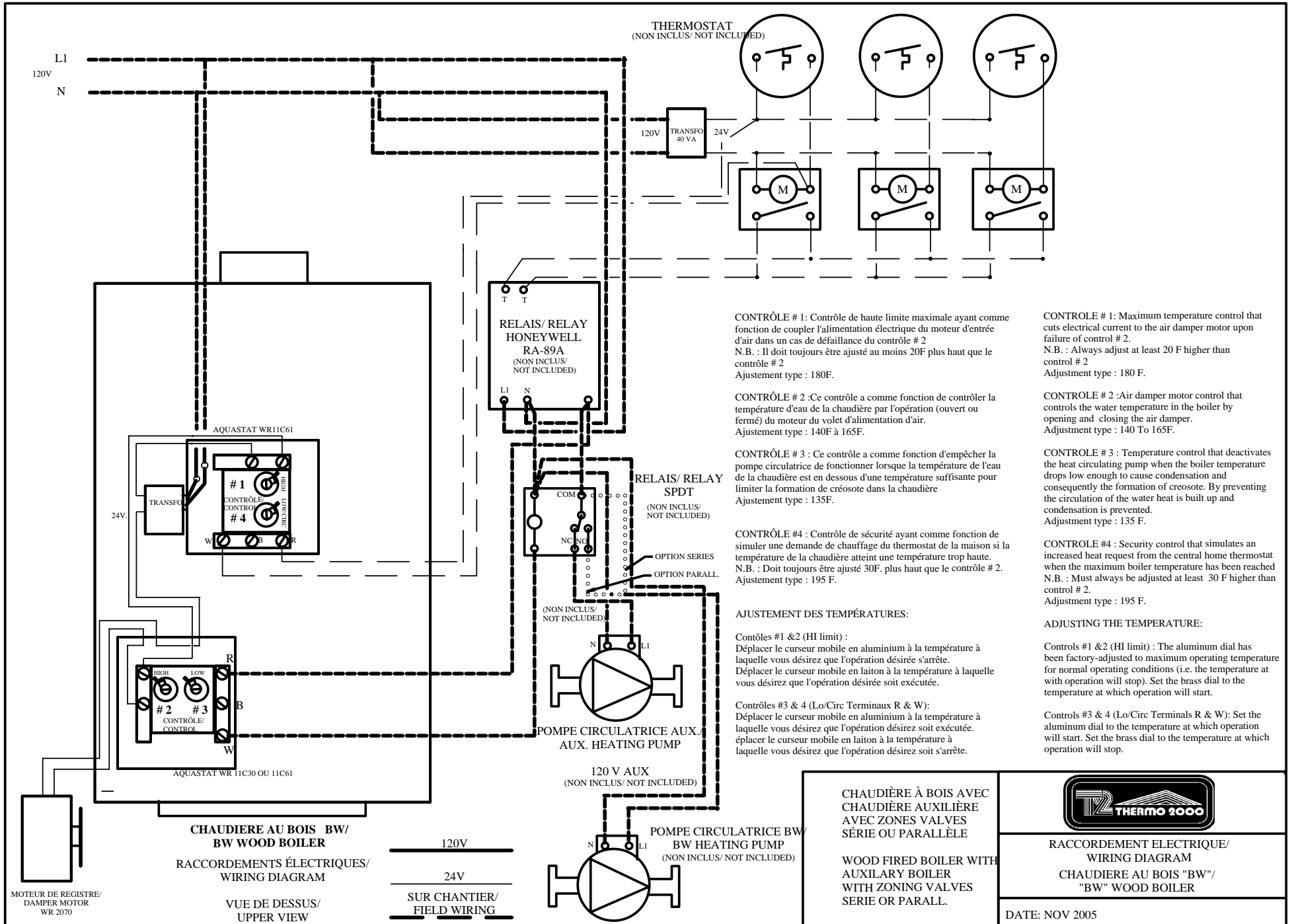
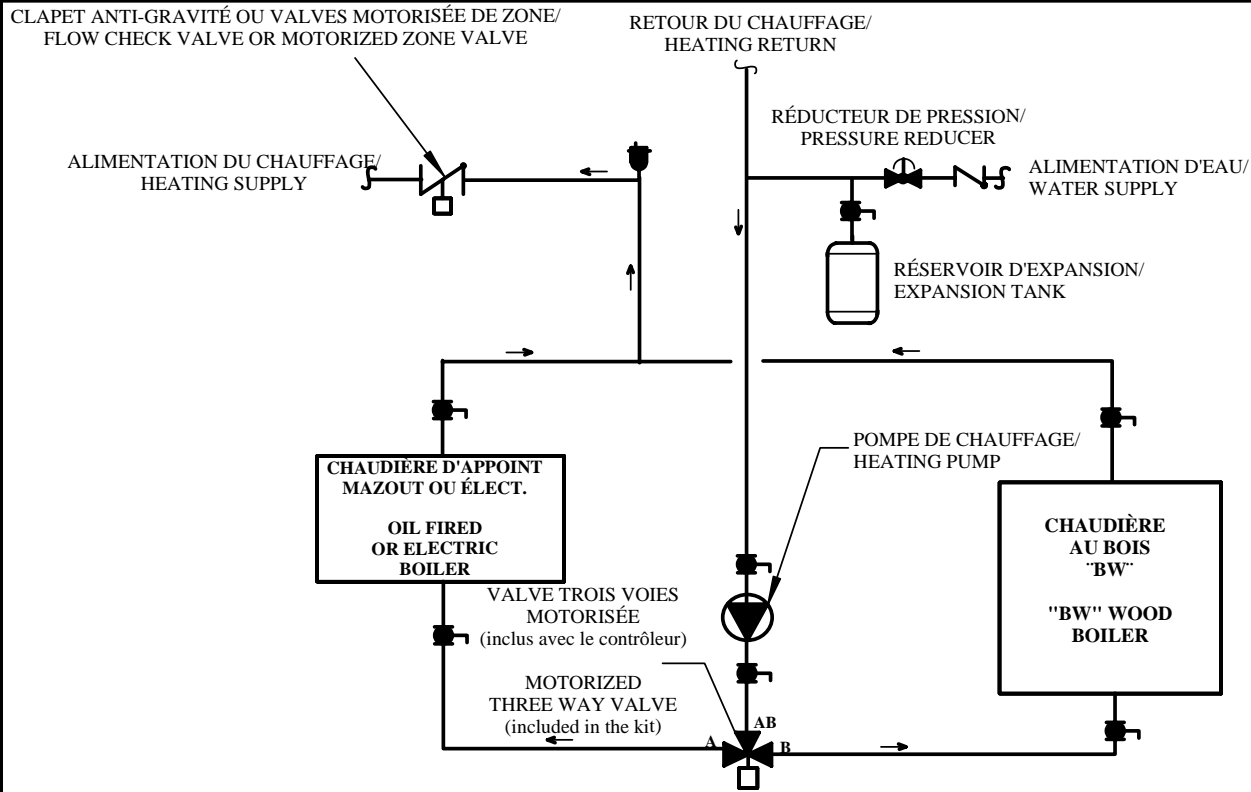


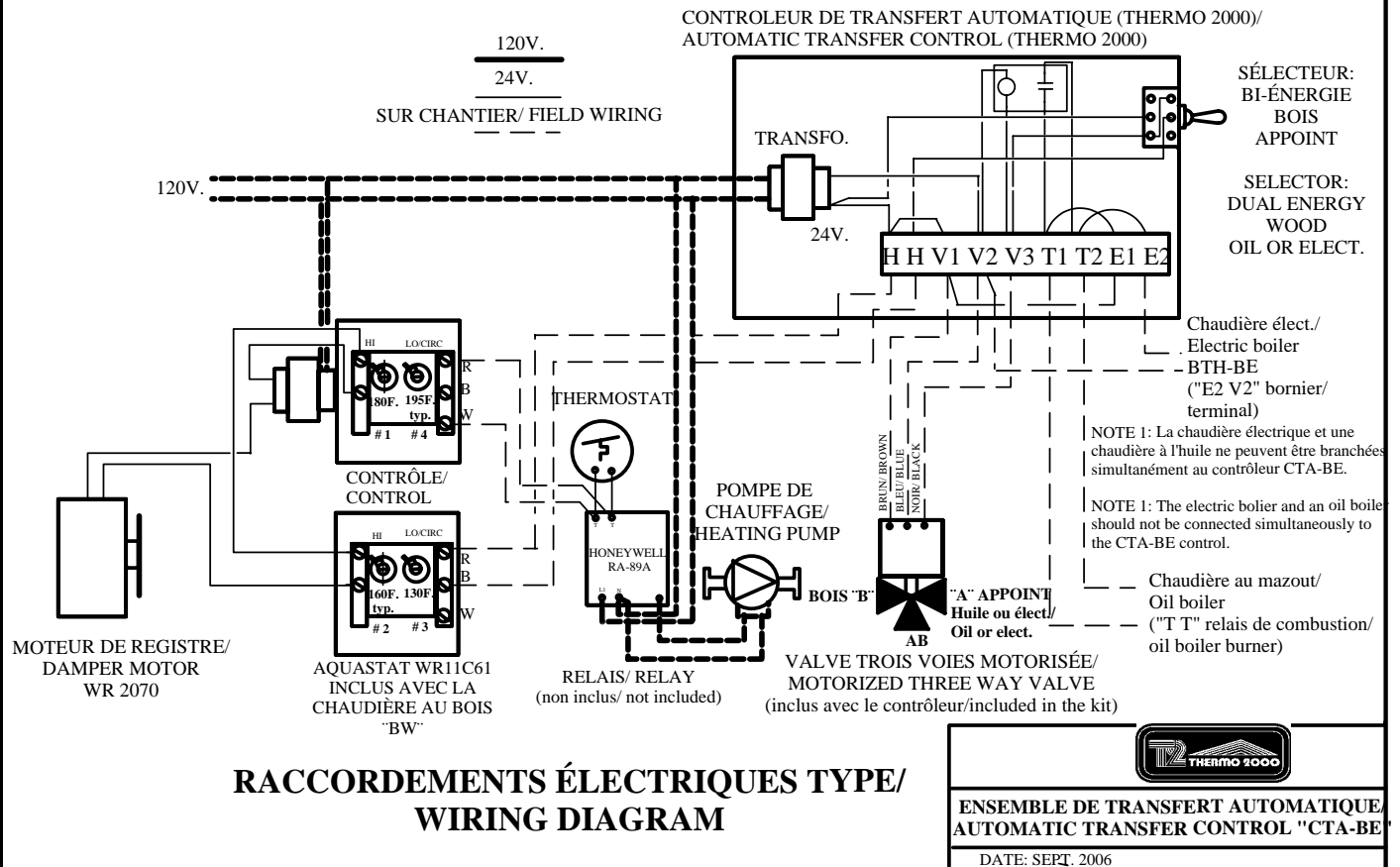
Figure 8

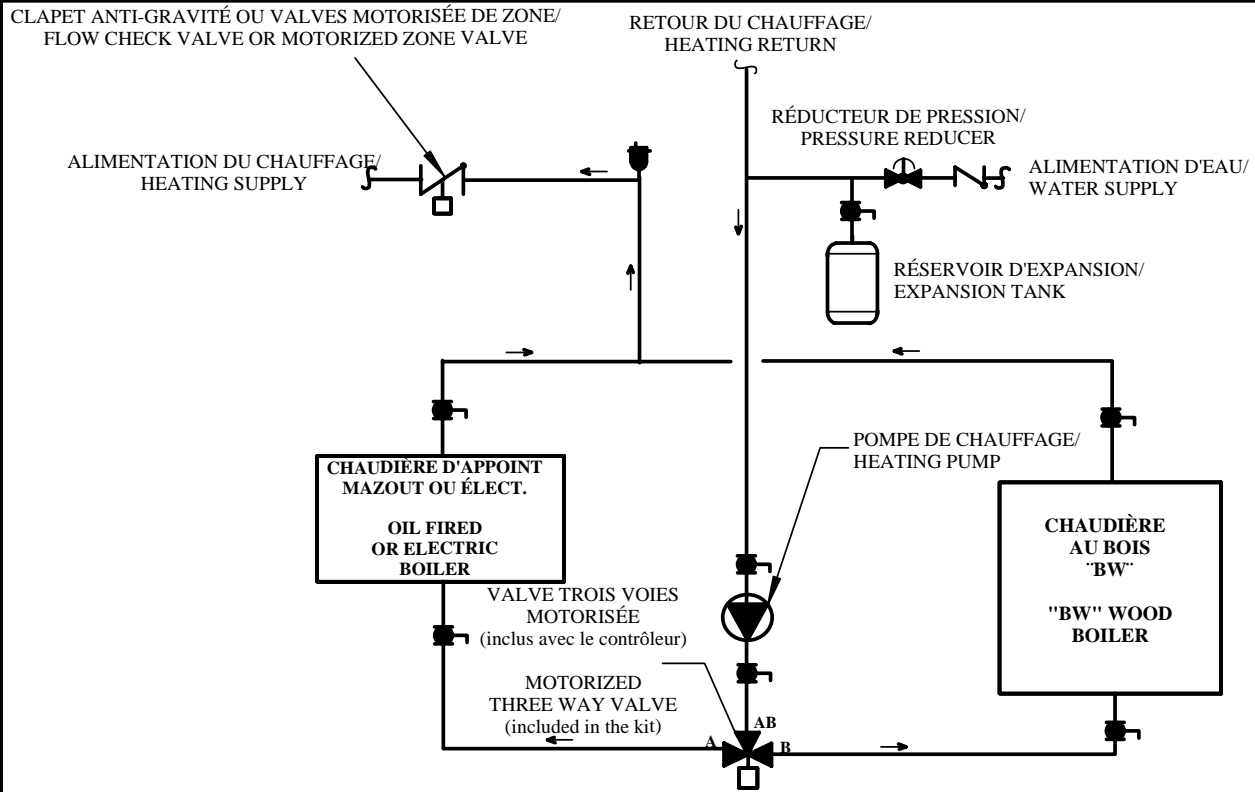




**SCHEMA DE TUYAUTERIE TYPE/
TYPICAL PIPING DIAGRAM**

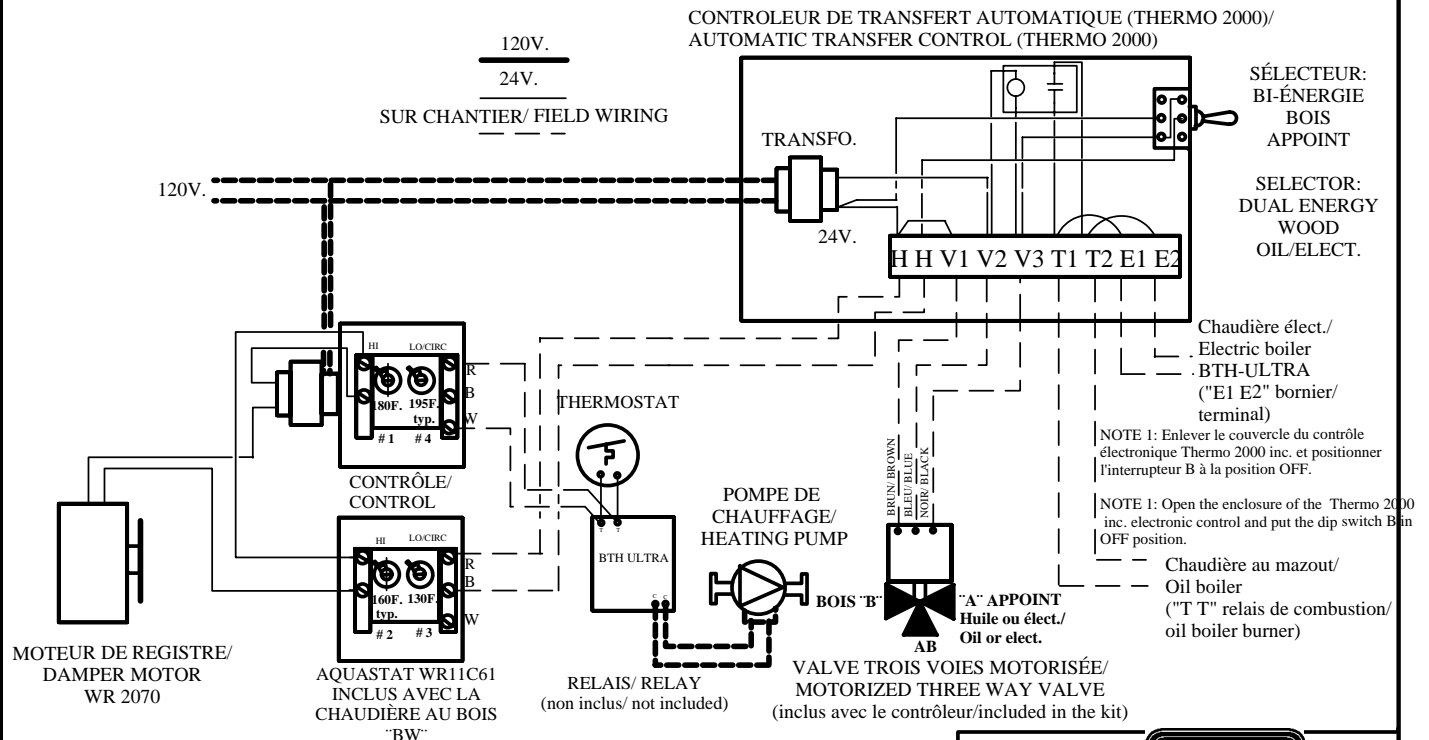
**CTA-BE AVEC BTH-BE, DTH-BE OU COMBOMAX/
CTA-BE WITH BTH-BE, DTH-BE OR COMBOMAX**





**SCHEMA DE TUYAUTERIE TYPE/
TYPICAL PIPING DIAGRAM**

**CTA-BE AVEC BTH ULTRA/
CTA-BE WITH BTH ULTRA**



**RACCORDEMENTS ÉLECTRIQUES TYPE/
WIRING DIAGRAM**



ENSEMBLE DE TRANSFERT AUTOMATIQUE/
AUTOMATIC TRANSFER CONTROL "CTA-BE"

DATE: SEPT. 2006

Section 5 : OPERATION



AVERTISSEMENT

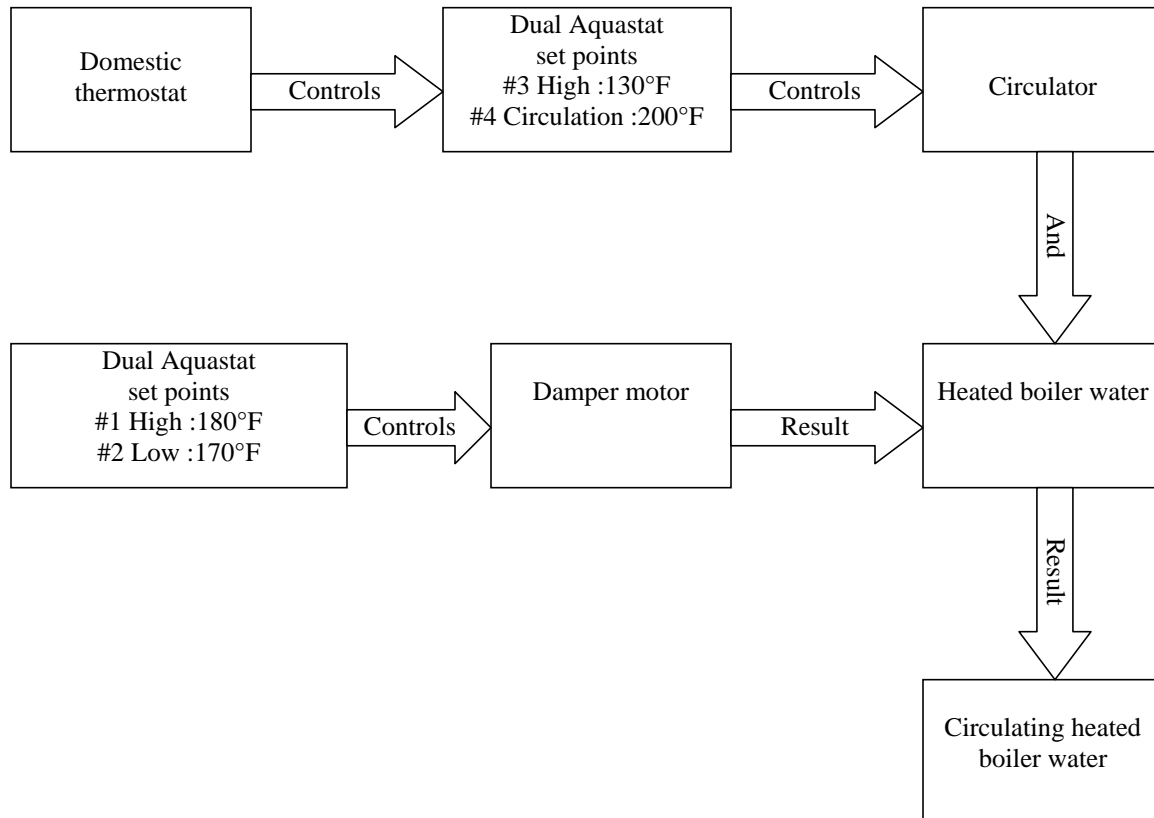
Before operating this boiler, be sure to read and follow these instructions, as well as the warnings printed in this manual. Failure to do so can result in unsafe operation of the boiler resulting in property damage, bodily injury, or death. Should you have any problems reading, following or difficulty in understanding the instructions in this manual, STOP, and get help from a qualified person.

Do not turn on the boiler unless it is filled with water. Do not turn on the boiler if the cold water supply shut-off valve is closed.

5.1 REMINDERS

- Establish a routine for the wood storage, care of the appliance and firing techniques.
- Check daily for creosote build-up until experience shows how often cleaning is necessary.
- Be aware that the hotter the fire, the less creosote accumulates. Weekly cleanings may be necessary in mild weather even though monthly cleanings may be sufficient during the coldest months.
- Have a clearly understood plan to handle a chimney fire.

5.2 THEORY OF OPERATION



5.3 FUEL AND COMBUSTION BY-PRODUCTS

5.3.1 Creosote

Creosote is a tar deposit mainly caused by the incomplete combustion of wood. The amount of creosote produced will depend upon the type of wood, its moisture content, and air humidity. Creosote is produced in large quantities by slow burning and smoldering fires.

The BW-24 and BW-36 models control accumulation by first crystallizing, then sublimating the creosote crystallized on the upper surface of the firebox, instead of letting it accumulate in the smoke pipe and chimney.

A leaky door or damper can hinder the proper extinction of the fire. It is therefore important that the fire door gasket and damper be kept in good shape.

Creosote build-up in the chimney will reduce the draft. This in turn reduces the firing rate which results in greater creosote production. To prevent this vicious circle from occurring, regular cleaning is highly recommended for safety as well as efficiency.

The creosote build-up should be checked daily until experience shows how often cleaning is required. Weekly cleanings may be required in milder weather though monthly cleaning may be enough during the coldest months.

Remember, it is better to build smaller fires during mild spells. A small intense fire will produce less creosote than a large smoldering one.

5.3.2 Condensation

During the furnace's OFF cycle, because of the air-tightness of the loading door and damper, the flue gas temperature will not fall below 200°F in the smoke pipe. Inside the chimney, the flue gas temperature can drop below the dew point of water or 150°F.

This causes water vapour condensation; given a sufficient volume, it will run down the inside of the chimney and leak into the smoke pipe. This is an undesirable condition because of the odour that water with dissolved creosote tars creates.

The primary cause of the problem is inadequately seasoned wood. In addition to causing the condensation problem, this will also reduce the overall efficiency because of the considerable energy used to heat and evaporate this water.

If the wood is well seasoned, the problem is air humidity which may be caused by:

- Wet clothing hanging in basement to dry.
- Large quantities of wood stacked to dry.
- Unvented clothes dryer.
- Humidifier on high setting.
- New construction lumber drying out.
- High humidity outdoors.

Any of the internal causes can be dealt with by eliminating it or reducing its effect by opening a basement window near the furnace. Unfortunately, there is no good solution to high outside air humidity other than to ventilate the building to cause the heating system to run more often.

The degree of insulation of the chimney also has an effect on condensation. Fully exposed masonry chimneys can be at fault especially if improperly maintained. Factory built stainless steel chimneys are usually better in this respect because they have so little mass to heat up and are relatively well insulated.

5.3.3 Recommended fuel

Your boiler will operate efficiently with most types of wood. Seasoned hardwood or softwood both make good fuel, however hardwood is longer burning.

Seasoned wood is cut and split in early spring for use during the following winter.

The table below lists several wood types, their heating value and equivalent heating oil value.

Table 3

Type	Millions of BTU per cord of seasoned wood	Equivalent number of gallons of heating oil
Sugar maple	29	207
Beech	28	200
Oak	27	193
Birch	26	186
Soft maple	24	171
Elm	24	171
Ash	23	164
Tamarack	23	164
Spruce	18	129
Pine	17	121

Fuel should be stacked in a dry location, preferably under protective cover to reduce moisture accumulation. Sufficient fuel for immediate use may be stacked in the vicinity of the boiler but under no circumstances should it be stored within the boiler installation clearances or within the space required for loading and ash removal.



WARNING

- Do not use chemicals or fluids to start fire.
- Do not burn garbage, gasoline, naphta or used oil.
- Do not burn densified wood or chemically treated wood products.
- Burn wood only. Not suitable for coal.

5.3.4 Stoking

New design concepts built into the BW-24 and BW-36 models increase their efficiency and reduce creosote buildup. These innovations cause logs to burn from the front end of fire box to the rear.

The first fire may be built directly on the steel firebox bottom. It is not necessary to leave a bed of ashes on the bottom of the firebox.

The ideal log length is 18 inches for the BW-24 and 24 inches for the BW-36. When reloading the boiler, rake the live coals forward from the rear of the firebox to the front, near the door frame and without obstructing the air inlets. Place logs behind these coals so they will ignite from the front end. The highest efficiency is achieved by allowing the fire to burn down as much as possible before reloading. The coal bed thus transfers most of its heat to the boiler water before igniting a new load. Only a small amount of kindling is required to ignite the fresh load.

Avoid placing short logs toward the back of the firebox; they are unlikely to ignite during mild spells. Remember: long logs are best for this boiler.

5.4 CLEANING AND MAINTENANCE



WARNING

Fire hazard! Excessive amounts of creosote in the boiler, smoke pipe and chimney could result in a potentially dangerous fire hazard. The boiler, smoke pipe and chimney should be cleaned every two weeks until the level of creosote production is determined.

5.4.1 Ash removal

Note: Ashes should be placed in a steel container with a tightly fitting lid and moved outdoors. Other waste should not be placed in this container.

When the fire has burnt down and is ready to be reloaded, the live coals will be found at the back of the firebox due to the effect of the baffle. There may still be live coals buried under the ashes in the middle of the firebox. It is best to stir these up, pull them slightly forward, close the door, and let the boiler run half an hour or until there is no longer enough heat to activate the circulator. The ashes can now be removed from the front half of the firebox without disturbing the remaining coal bed.

Set the metal ash container immediately in front of the door and shovel the ashes gently into it. Any dust created will be drawn back through the opening. It is better to remove a relatively small amount of ashes regularly, (once or twice a week) rather than attempting to empty all the ashes at once.

5.4.2 Boiler

To clean the boiler, allow the fire to die out completely. Disconnect smoke pipe and use a clean-out tool (metallic brush) to remove creosote deposits from the firebox and loading door.

5.4.3 Smoke pipe

Remove the smoke pipe, unscrewing each length of pipe if necessary and stand it vertically in a metal container. Tap the outside of the pipe from top to bottom to loosen creosote deposits. It may be necessary to use a brush to loosen heavy deposits.

Re-assemble pipe components as they were originally set up, making sure that all joints are secured using sheet metal screws. It will be necessary to clean the smoke pipe frequently until creosote production can be determined.

5.4.4 Chimney

The chimney should also be inspected and cleaned frequently until creosote production can be determined. There are various chimney brushes available to accomplish this task. If you do not have the tools or experience with this type of work, you should contact a chimney sweep.

5.5 IN CASE OF EMERGENCY

5.5.1 Chimney fire

In case of a chimney fire :

- Shut off the main boiler breaker or close the damper manually.
- Lock draft regulator(s) closed.
- Do not open fire door.
- Keep an eye on the boiler, smoke pipe and chimney - Call the fire department.
- Be prepared to vacate premises.
- Check chimney and flue pipe thoroughly before putting boiler back into service.

5.5.2 Power failure

If the power outage is short, make sure the damper is closed.

If the power outage is extended :

- Monitor boiler temperature and pressure and do not allow them to exceed 180°F or 20 psi.
- Restoke boiler to half the regular level.
- Keep temperature and pressure balanced by adjusting the restoking.
- Open all zone valves.
- Ensure adequate air flow around the boiler.
- Warn other occupants not to touch any part of the boiler as it will be running hotter than usual.
- Check boiler at least every half hour.

BW LIMITED WARRANTY

Warranty Coverage for Residential Installation.

Thermo 2000 Inc. hereby warrants to the original residential purchaser that the BW tank installed in a residential setting shall be free of leaks during normal use and service for a period of ten (10) years from the date of purchase as long as the original residential purchaser owns the home in which the unit was originally installed, the first (5) years in full and years six (6) through ten (10) prorated 20% each year at suggested retail price. Residential setting shall mean usage in a single-family dwelling in which the consumer resides on a permanent basis. Also, residential setting shall mean use in multiple family dwellings in which one (1) BW tank is to be used in only one (1) dwelling. In the event that a leak should develop and occur within this limited warranty period due to defective material or workmanship, such leak having been verified by an authorized company representative, Thermo 2000 Inc. will repair or replace at our sole option the failed unit with the nearest comparable model at the time of replacement.

The original residential purchaser is responsible for all costs associated with the removal and reinstallation, shipping and handling to and from manufacturing plant. The replacement unit will be warranted for the remaining portion of the original Warranty.

Warranty Coverage for Commercial Installation.

Thermo 2000 Inc. warrants to the original purchaser that the BW tank installed in a commercial setting for ten years, the first (5) years in full and years six (6) through ten (10) prorated 20% each year at suggested retail price

Commercial setting shall mean use in other than residential setting stated above in the residential setting definition. In the event that a leak should develop and occur within this limited warranty period due to defective material or workmanship, such leak having been verified by an authorized company representative, Thermo 2000 Inc. will repair or replace at our sole option the failed unit with the nearest comparable model at the time of replacement.

The original purchaser is responsible for all costs associated with the removal and reinstallation, shipping and handling to and from Manufacturer. The replacement unit will be warranted for the remaining portion of the original Warranty.

Limited one year warranty on all BW components & parts

All other BW components & parts are warranted for a period of one (1) year against defects due to defective material or workmanship. The original purchaser is responsible for all costs associated with the removal and reinstallation, shipping and handling to and from Manufacturer. The components, repaired or replaced are warranted for the residual period of the initial warranty on the unit.

Exclusions.

This warranty is void and shall not apply if:

1. Defects or malfunctions resulting from installation, repair, maintenance and/or usage that are not done in conformity with the manufacturer's installation manual; or
 2. Defects or malfunctions resulting from installation, maintenance, or repair that are not done in accordance with regulations in force; or
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3. Defects or malfunctions resulting from improper installation, maintenance or repair done carelessly or resulting from consumer damage (improper maintenance, misuse, abuse, accident or alteration); or
4. Installation in which a relief valve (pressure) is not installed or if it is not functioning properly, or when it is not connected to a drain to avoid damage to the property; or
5. Installation in which liquid circulating in the tank does not remain in closed circuit or installation in which piping is leaking; or
6. A polybutylene pipe or radiant panel installation without an oxygen absorption barrier is used; or
7. Installation where the acidity of water is not within the normal Environmental Protection Agency (EPA) (between pH 6.5 – 8.5) guidelines or the domestic water contains abnormal levels of particulate matter or water exceeding 10.5 gpg; or
8. Your home contains any type of water softener system and the unit is not installed and maintained in accordance with the manufacturer specifications; or
9. The BW unit is being subject to non authorized modifications; or
10. Defects or malfunction resulting of storing or handling done elsewhere than Thermo 2000's manufacturing plant; or
11. Units on which the serial number is removed or obliterated.

Limitations.

Thermo 2000 shall not be responsible for any damage, loss, and inconvenience of any nature whatsoever, directly or indirectly, relating to the breakdown or malfunction of the unit. This warranty limits its beneficiary's rights. Nevertheless, the beneficiary may have other rights, which vary from state to state.

This warranty replaces any other expressed or implicit warranty and constitutes the sole obligation of Thermo 2000 towards the consumer. The warranty does not cover cost of removal, reinstallation or shipping to repair or replace the unit, nor administration fees incurred by the original consumer purchaser.

Thermo 2000 reserves its rights to make changes in the details of design, construction, or material, as shall in its judgment constitute an improvement of former practices.

This warranty is valid only for installations made within the territorial limits of Canada and the United States.

In order to receive the benefit of this warranty, the original consumer purchaser must fill in and return the attached registration card within thirty (30) days of date of purchase.

Warranty service procedure

Only authorized BW dealers are permitted to perform warranty obligations. The owner or its contractor must provide Thermo 2000's head office or authorized depot with defect unit together with the following information: BW model and serial number, copy of the original sales receipt and owner's identification certificate.



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