

A DIVISION OF  
W.R. BENJAMIN  
PRODUCTS LIMITED

# Benjamin

## HEATING PRODUCTS

### OWNERS MANUAL MODEL DO110 & DO180

IS CERTIFIED TO:



Unit Serial # \_\_\_\_\_

Purchased From \_\_\_\_\_

Company Address \_\_\_\_\_

Name of Installer \_\_\_\_\_

Installer Telephone # \_\_\_\_\_

Date Installed \_\_\_\_\_



#### IMPORTANT

This manual must be given to the homeowner. Please read the warranty and return the warranty card to initiate coverage.

**We Strongly Recommend The Use Of A Carbon Monoxide Detector When Using Any Product That Consumes Fossil Fuels.**

THIS BOILER IS TO BE INSTALLED AS AN ADD ON UNIT TO A PRIMARY HEATING BOILER ONLY. IT IS INTENDED TO BE INSTALLED ONLY WITHIN THE BUILDING THAT IT IS HEATING.

It is the responsibility of the person or company installing this boiler to **verify before the installation** that the boiler certifications shown on this page meet or exceed all local, state and regulatory requirements for installation and use of this boiler. Failure to do so voids all claims and warranties.

Mar. 2010

Aussi disponible en Francais.

KEEP THIS MANUAL FOR FUTURE REFERENCE. Follow all instructions carefully for installation, maintenance & operation of the DO110 & DO180 boilers.

## 👉 CAUTION 👈

**DO NOT TAMPER WITH THE UNIT OR CONTROLS - CALL A QUALIFIED SERVICE TECHNICIAN.**

**DO NOT LEAVE COMBUSTIBLE MATERIAL AROUND THE UNIT.**

**DO NOT** stack items on or around the unit - check required clearances on page 2.

**DO NOT** start a fire in the boiler until all installation requirements are complete and the operating instructions are understood.

**DO NOT** use automatic stoking or sawdust fueling with this unit.

**DO NOT BURN GARBAGE, PAPER** (except to start fire), **FLAMMABLE LIQUIDS, DRIFTWOOD, TREATED WOOD (CREOSOTE, PRESERVATIVES, PAINT, STAIN, ETC.) IN YOUR BOILER. DAMAGE WILL RESULT AND VOID YOUR WARRANTY.**

**DO NOT** allow anyone that is unfamiliar with the boiler, to attend it.

**DO NOT** load wood above the smoke flap inside the door, over-firing may result.

**DO NOT** adjust the draft regulator above - .05" W.C., if this setting is exceeded it could cause the fire to burn out of control.

**DO** know the location of the emergency disconnect switch for the unit.

**DO** contact a qualified service technician before remodeling, for annual service/maintenance, before extended periods of shutdown and before start-up.

## ~PRE INSTALLATION CONSIDERATIONS~

### FUEL

Burn only clean, untreated hardwood and softwood.

For the best performance, we recommend using seasoned (below 25% moisture) hardwood. Store the wood in neat, well supported piles, at least 4' from the boiler loading door.

### BOILER

In the firebox install ash or sand to within 1 ½" of the bottom door frame or burn softwood at first, which creates ash quickly. This will improve the air flow through the wood. The boiler must be installed by a qualified technician currently active in the heating trade. The installation should meet or exceed all local and national codes having jurisdiction, including C.S.A. B365, the Installation Code for Solid Fuel Burning Appliances & Equipment. The boiler has been thoroughly tested with modern baseboard radiation.

### UNDERFLOOR & CAST IRON RADIATORS

Special consideration must be taken when connecting the boiler to under floor systems without oxygen barrier pipe or when hooked to cast iron radiators, to prevent thermal shock or excess temperature water from entering under floor heating loops. Please consult with your system designer.

### CHIMNEY SYSTEM

The specification of the chimney to be used complies with the requirement that, other than solid-fuel/oil combinations and add-ons, wood burning appliances shall not be connected to a venting system serving an appliance vented by another type of fuel. Connect the furnace to an approved solid fuel factory-built chimney (**CANADA-CAN/ULC S629** standard for 650° chimney, **UNITED STATES-UL103** Chimneys for Residential Type and Building Heating Appliances, Factory Built) or a safe, clean, sound condition, masonry chimney equipped with an approved liner (**CANADA-CAN/ULC-S635-M90** Standard for Lining Systems for existing masonry or Factory Built Chimneys and Vents, **UNITED STATES-UL1777** Chimney Liners)(e.g., stainless steel, clay, etc.) The chimney must be capable of maintaining a negative updraft at all times and in all conditions. Carefully inspect the chimney for safety before making a connection. Locate the boiler as close to the chimney as possible. **DO NOT** pass the smoke pipe through the ceiling, wall or floor to reach the chimney. Installation of this equipment shall be in accordance with regulations of authorities having jurisdiction and (**in Canada**) CSA Standard B139 "Installation Code for Oil Burning Equipment" and CSA B365 Installation Code for Solid Fuel Burning Appliances and Equipment, (**in United States**) UL 391 Solid Fuel and Combination Fuel Central and Supplementary Furnaces.

## ELECTRICAL

Ensure the boiler disconnect switch is installed within easy reach.

Ensure wiring cables are protected from hot surfaces.

**DO NOT** install wiring cables or controls where it is possible for water to drip on them.

The electrical installation must conform to all local and national codes standards as their jurisdiction may apply. When connecting to an oil fired boiler, the wiring should conform to our drawing on page 6.

## PLUMBING

A 10 gallon or larger expansion tank is required for this system.

The circulator pump shall have a minimum capacity of 7.5 imperial GPM flow rate.

A safety power failure loop or dump zone and piping shall conform to the enclosed drawing on page 4 and also to local and national codes having authority.

## EQUIPMENT *(all controls may not be supplied for your system)*

The following is the minimum parts that are provided with the boiler:

1 - Triple Aquastat	1 - Single Aquastat	1 - Interlock Relay
2 - 24 Volt Transformers	1 - J Box & Cover	
1 - Damper Motor & Chain	2 - Wells (for aquastats)	
1 - 30 PSI Pressure Relief Valve	1 - Zone Valve (normally open)	
1 - ½" N.P. Drain Valve	1 - Tridicator (pressure & temperature gauge)	

## INSTALLATION INSTRUCTIONS

### CLEARANCES

Observe the minimum clearances to combustible materials.

Front --- 48"	Smoke pipe – 18"
Rear ---- 24"	Side 1 ----- 24"
Above --- 48"	Side 2 ----- 6"

**The boiler may be placed on a combustible floor** by using 9/32" noncombustible cover, extending 18" in front, 18" at the rear & 6" on each side.

## ELECTRICAL

### Wood Boiler Triple Aquastat Settings:

High Setting ▶ 200°F

Low Setting ▶ 180°F

### Oil Boiler Aquastat Settings:

High Setting ▶ 170° to 180° F.

Low Setting ▶ 150° to 160° F.

**Wood Boiler Single Aquastat Setting ▶ 170° F.**

When the wood boiler is not in use, and a coil in the oil boiler supplies the domestic hot water, change the oil boiler aquastat to High 200° and Low 180° (*this is to ensure an adequate supply of domestic hot water*).

The electrical connections to the oil fired boiler should conform to our drawing on page 6 .

## COMBUSTION AIR

To achieve satisfactory combustion, an adequate supply of fresh air is required. In confined areas, a grilled opening shall be provided. The minimum total area of openings is 1 square foot per gallon of oil burnt per hour. With combination units this area should be doubled. Where fans are used in the fuel storage area, they should be installed so as not to create negative pressures in the room where the boiler(s) are installed.

# INSTALLATION INSTRUCTIONS (cont'd)

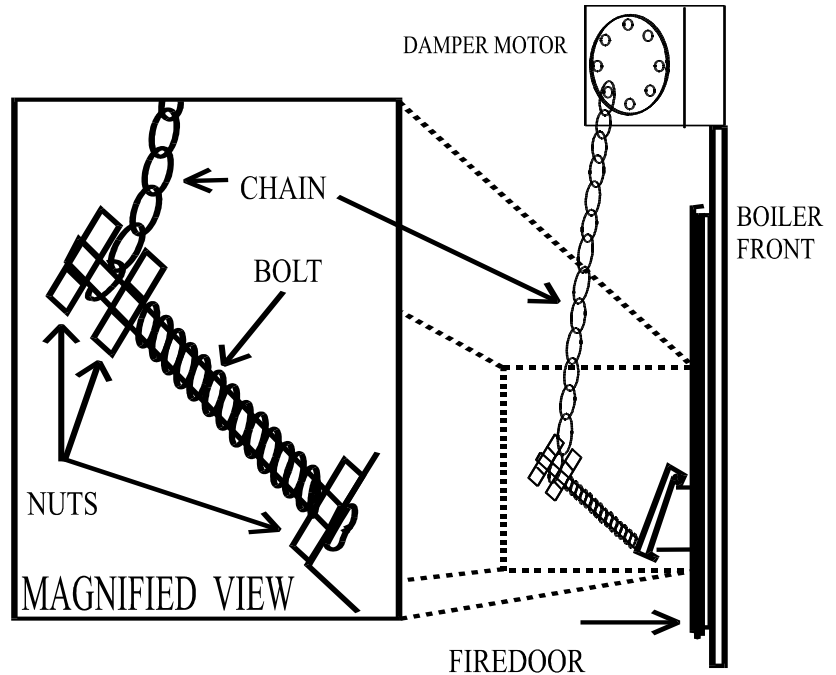
## Adjustments of damper motor and chain:

Damper chain should be adjusted when the damper door is in the down position. In this position the chain should be adjusted so there is a small amount of slack.

The amount of lift or opening of the damper door is adjusted by moving the two pinch nuts on the stove bolt thread closer or further away from the lift strap.

After proper adjustment of the draft chain and damper door the thermostat and limit controls will keep the fire within safe limits.

**CAUTION:** This setting should not be altered for increased firing for any reason.



## CHIMNEY SYSTEM

The chimney inner size should be the equivalent to 7" round min. or 8" round max.

The wood boiler pipe and the oil boiler pipe should enter the chimney separately.

If more than one opening is in the chimney, install oil on top and wood on the bottom.

A minimum of 4" of masonry (vertically) shall be left between each opening. The smoke pipe should be blue or black steel, 24 ga. or heavier. Use as few turns as possible between the boiler and the chimney, each 90° elbow adds 10' of restriction and a 45° elbow adds 5' of restriction. The draft regulator set at -.05" W.C. maximum. Install the regulator a minimum of 18" and a maximum of 24" from the boiler breech. Maintain a minimum of 1/2" rise per foot of pipe from the boiler to the chimney.

**DO NOT** run the pipe downhill from the boiler to the chimney. Confirm that the installation clearances are met or exceeded. All pipe joints should fit relatively gas tight, as on low fires, carbon monoxide is formed. Secure all smoke pipe joints with three sheet metal screws.

## NORMAL OPERATION

The oil burner will start if the system temperature is below the settings on the oil boiler aquastat.

The damper motor will open the damper when the temperature of the wood boiler falls below 170°F.

The thermostats operate the n.c. zone valves.

When any n.c. zone valve is open or when the thermostat calls for heat, the circulator starts.

Should the temperature reach the high limit (200°F), the damper motor will close the damper and the circulator starts (*if the normally open zone valve end switch wires are connected*). The oil burner will not run if the high limit is reached.

# PLUMBING

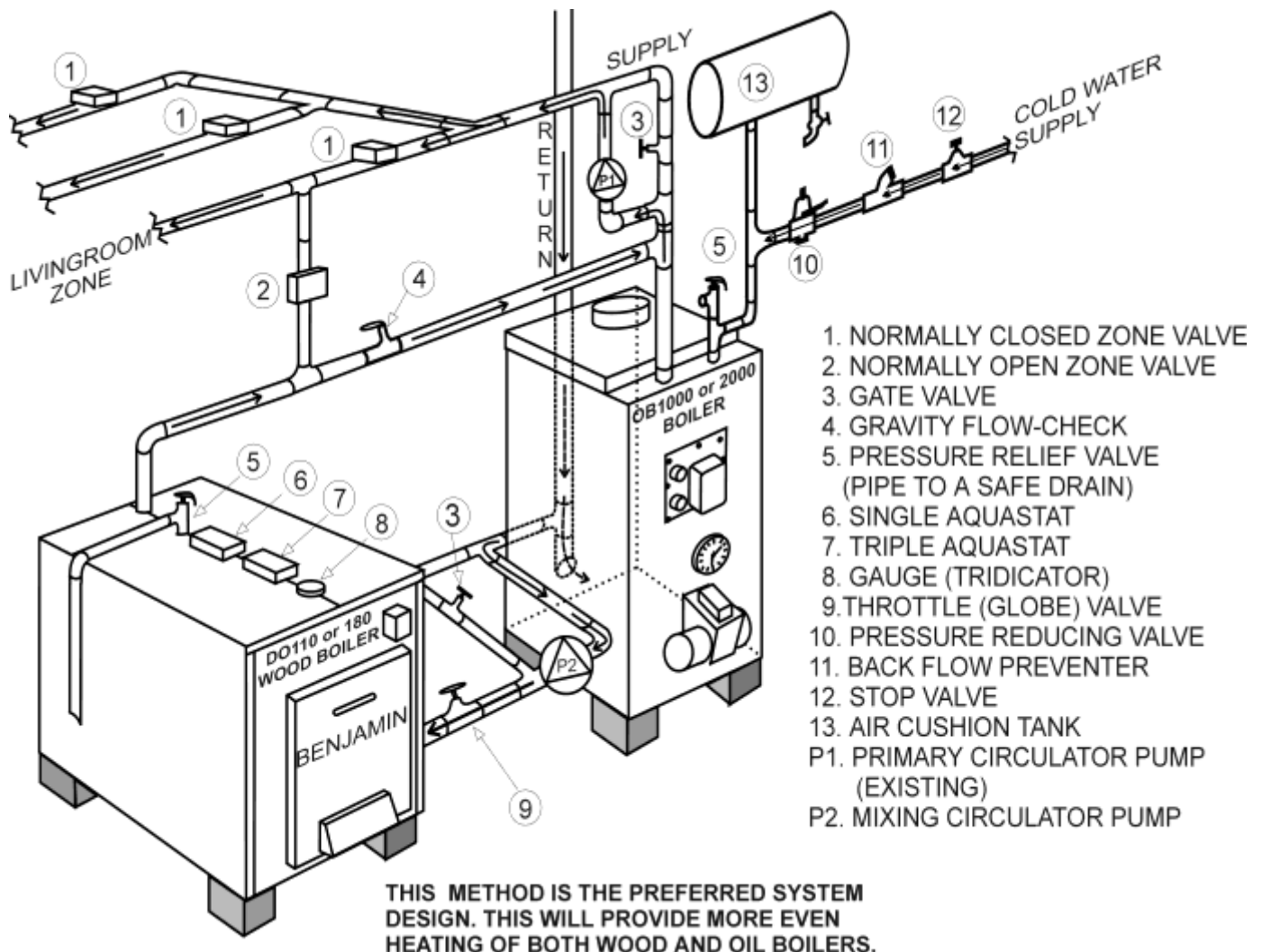
The piping shall conform to the enclosed drawing below and also to local and national codes having authority.

The dump zone should be your existing largest zone (*that has all piping above the boiler.-eg. Living room or master bedroom*). With a home built on slab or heating with an under floor radiant system, a separate zone should be added above the boiler. This zone would be of adequate size to dissipate at least 10,000 btu/hr on the DO110 & 15,000 btu/hr on the DO180. The piping must be a minimum of 3/4" (18mm) diameter & able to withstand a minimum temperature of 225°F (107°C). This loop shall be such that it can only be made inoperative by a deliberate manual action.

Please ensure that the pressure relief valve and the boiler drain valve are piped to a safe drain (*water discharging from either could be extremely hot and dangerous*).

All piping will be such that excessive pressure will not be developed in any portion of the boiler or system.

## DO110 & DO180 WOOD-FIRED BOILERS PARALLEL PIPING



## CARE OF THE BOILER WHEN NOT IN USE

When the boiler is going to be out of service for an extended period of time, carefully and thoroughly clean the smoke pipe, chimney, firebox and any part which has been in contact with hot gases. This is extremely important as rusting and corrosion occur when the boiler is idle.

## REPLACING THE HOT WATER COIL

The rear casing panel of your boiler must be removed to gain access to the hot water coil mounting plate. It is necessary to remove the smoke pipe before removing the rear panel. (ENSURE THAT NO FIRE IS PRESENT AND POWER DISCONNECTS ARE OFF BEFORE REMOVING SMOKE PIPE). The water must be drained from the boiler before removing coil mounting plate, ensure the water supply to the coil is off before removing.

## CLEANING AND SERVICING

It is necessary to remove ash and occasionally brush the inner surfaces with a wire brush and check the smoke pipe for ash or creosote as necessary. Leave 2" of ash in the wood firebox when cleaning, to aid in combustion.

**IMPORTANT:** Fire can be caused by improper storage of ashes containing dormant hot coals. Store ashes in a tightly covered metal container. DO NOT place other waste in this container.

**VERY IMPORTANT:** Replace all damaged or worn gaskets before reassembling. Fire door gaskets and seals must be maintained in good condition for safe operation.

## SPECIAL PROCEDURES

### ELECTRICAL POWER FAILURE

**PLEASE NOTE:** Consult with your installer at the time of installation, to verify how to operate your system without electricity.

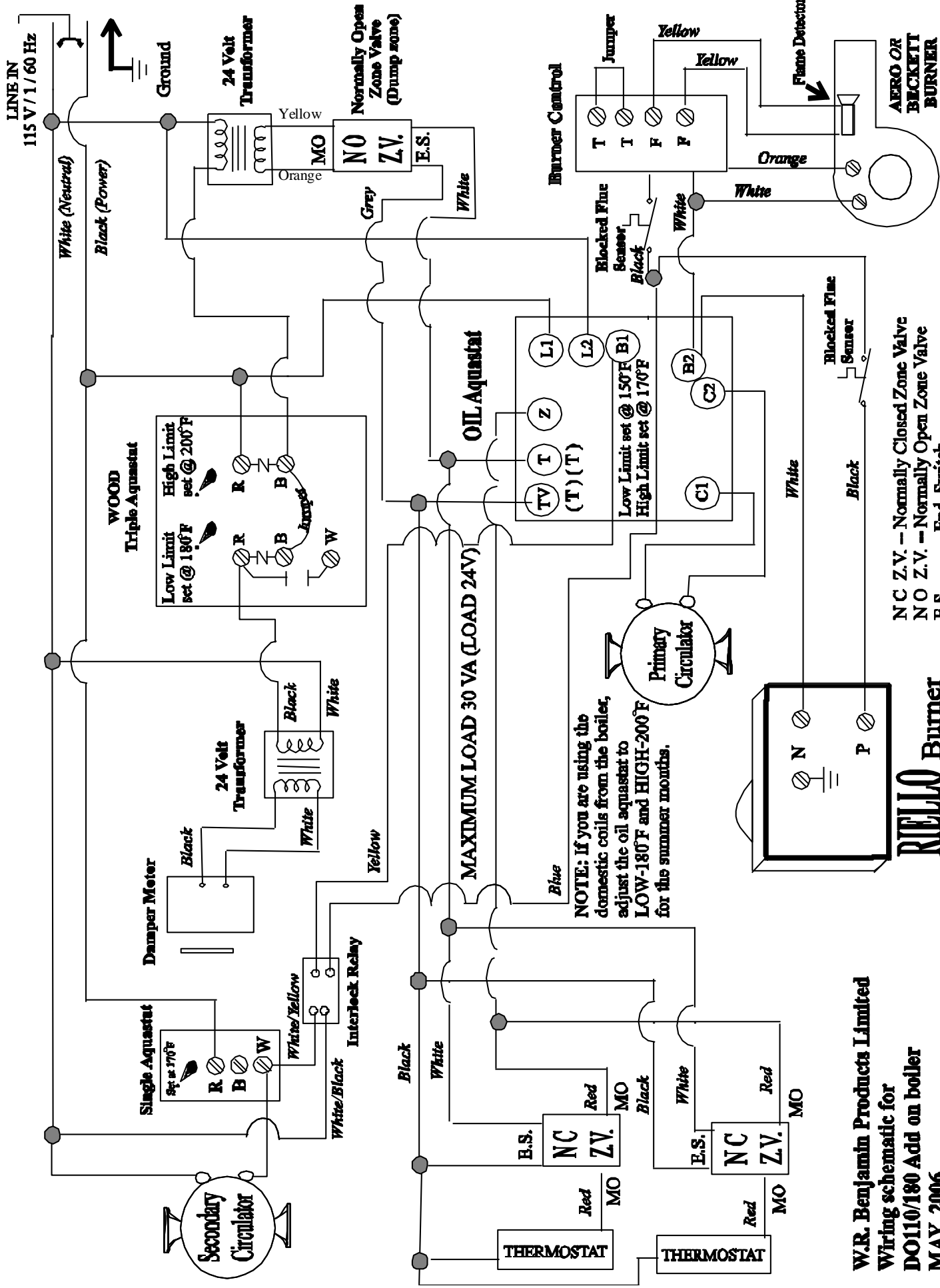
1. Maintain ½ the normal fire load.
2. The damper door must be manually operated. **DO NOT** prop or tie open.
3. Be careful when firing the boiler at this point. In a no power situation, extreme care must be used until a safe firing rate is known for your system. Remember you are now on thermal circulation only. It may be necessary to manually open zone valves (if used). Each system is different. **NOTE:** If you have an underfloor radiant system, you likely cannot use the wood boiler without electricity.

### EXTREME WOOD FIRE (Due to improper operation)

1. Disconnect the damper chain to prevent the damper door from opening.
2. Block the over-fire draft slot in the door.
3. Increase all thermostats to maximum.
4. Excessive heat may cause safety relief valve to open. (*Ensure it is piped to a safe drain.*)
5. **DO NOT** shut power off.

### FLUE FIRE

1. Call the Fire Department.
2. Shut off the main power switch to the boiler.
3. Diminish the fire in the boiler by closing all combustion air openings.
4. **DO NOT** remove the flue pipes until the fire is completely out.
5. Prepare to evacuate the house.
6. Have the chimney inspected and repair the flue if necessary before using it again.



MAXIMUM LOAD 30 VA (LOAD 24V)

NOTE: If you are using the domestic coils from the boiler, adjust the oil aquastat to LOW-180°F and HIGH-200°F for the summer months.

**W.R. Benjamin Products Limited**  
 Wiring schematic for  
**DO110/180 Add on boiler**  
**MAY 2006**

NC Z.V. - Normally Closed Zone Valve  
 NO Z.V. - Normally Open Zone Valve  
 E.S. - End Switch  
 MO - Motor  
 - - 120 Volts 60 HZ  
 - - 24 Volts

**RELO Burner**



**A division of W.R BENJAMIN PRODUCTS LIMITED**  
**P.O. Box 2079, Springhill, Nova Scotia**  
**Canada B0M 1X0**  
**Phone: (902) 597-3796**  
**Fax: (902) 597-3797**  
**E-mail: [info@benjaminheating.com](mailto:info@benjaminheating.com)**  
**Web site: [www.benjaminheating.com](http://www.benjaminheating.com)**