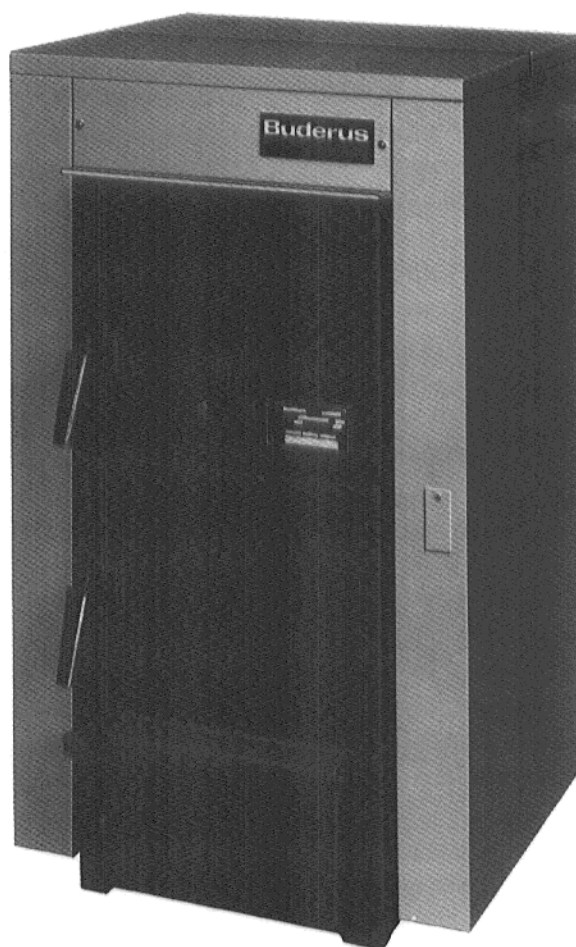


Convertible Boiler »Logana« 02.40

Operators Manual



CONTENTS

2	Specifications
3	Shipping Check List
4	Important Information
5	Safety Information (Installation)
6	Boiler Location
7	Chimney
8-17	Setting up Boiler
16-17	Piping Diagrams
18	Electrical Schematics
19	Wood Firing
20-21	Coal Firing
22	Maintenance
22	Operation/Power Failure
23	Optional Gas/Oil Conversion
24	Troubleshooting Wood Firing
25	Troubleshooting Coal Firing
26	Troubleshooting Chimneys
27	Parts List
28-30	Parts Illustrated
31-33	Service Record
34	Addresses

SHIPPING CHECK LIST

PALLET	Boiler Block with Doors	<input type="checkbox"/>
	and Hardware	<input type="checkbox"/>
	Ash Pan	<input type="checkbox"/>
	Cleaning Brushes (2)	<input type="checkbox"/>
	Smoke Hood	<input type="checkbox"/>
	Gaskets (2)	<input type="checkbox"/>
	Trim Piece (aluminum)	<input type="checkbox"/>
	Flanges (2)	<input type="checkbox"/>
Boiler Putty	<input type="checkbox"/>	
CARDBOARD BOX # 1	Boiler Jacket	<input type="checkbox"/>
	Front support	<input type="checkbox"/>
	Rear support with	<input type="checkbox"/>
	cable entry	<input type="checkbox"/>
	Right side wall panel	<input type="checkbox"/>
	Left side wall panel	<input type="checkbox"/>
	Boiler rear wall panel	<input type="checkbox"/>
	Insulating mat	<input type="checkbox"/>
	Front hood panel	<input type="checkbox"/>
	Rear hood panel	<input type="checkbox"/>
Protective strip	<input type="checkbox"/>	
Screen	<input type="checkbox"/>	
CARDBOARD BOX # 2	Installation Package	<input type="checkbox"/>
	Pressure Relief Valve	<input type="checkbox"/>
	Overheat Control	<input type="checkbox"/>
	Boiler Thermometer	<input type="checkbox"/>
	Pressure gauge	<input type="checkbox"/>
	Installation and Operating Instructions	<input type="checkbox"/>
	Warranty	<input type="checkbox"/>
	Firing Controller	<input type="checkbox"/>

IMPORTANT INFORMATION

This boiler is intended for wood or coal use only (An optional gas/oil conversion is available). Do not use boiler for burning garbage, gasoline or naphtha.

The boiler is to be installed by a qualified contractor familiar with state and local regulations.

No chemicals are to be used for igniting the fire **or** for cleaning the boiler.

NEVER operate with boiler door or cleaning door open or ajar.

The chimney and flue pipes of solid fuel burning units require frequent inspection and maintenance. Poor efficiency and the possibility of soot fire will occur if proper maintenance is not performed.

Adequate combustion air must be provided to maintain a clean fire and proper ventilation. Operating the boiler without an adequate supply of combustion air can be hazardous.

Do not use non-electric zone valves with this boiler.

This boiler is sealed with water soluble cement. If a smoke leak occurs between sections, boiler cement should be used.

The boiler normally operates at a maximum of 230°F and 58 PSI water. The relief valve should be set at 30 PSI and the overheat control should be set at 220°F maximum.

NEVER store ashes in a flammable container.

Inspect smoke pipe regularly for corrosion. If it is severely corroded; it should be replaced.

An automatic air eliminator (Amtrol No. 700) **MUST** be installed on or near the boiler. Failure to do so will cause damage to the Samson 5D control and possible cracking of the sections.

SAFETY INFORMATION

(INSTALLATION)

All instructions and schematics are provided for reference purposes. Your state or local regulators may dictate that alternate procedures be used. All local codes take precedence over these installation instructions.

The hot water distribution system is not covered by this manual. It is important that the condition of the system be checked to insure safe operation at the time of installation.

The overtemperature control provided **must** be used on this boiler.

The pressure relief valve should be vented to a drain to prevent damage to finished basements.

The fresh water makeup, pressure reducing (12 PSI) valve must be checked to be operational and must be left open.

Any leaks in the system should be sealed, no matter how small. Continuous feeding of fresh water into any heating system can damage or block the boiler water ways.

BOILER SIZING

The boiler outputs given are actual and not calculated. This equipment is designed for both whole house or add-on applications. Size the Buderus to the firing rate of the burner that you are replacing or adding on to. On standing radiation or gravity piped installations allow at least 25% piping loss. If burn times are critical on wood boilers, oversizing is acceptable.

Overloading during mild weather will cause heavier than normal creosote formation.

Creosote formation will occur in any wood burning appliance. A regular cleaning schedule is **MANDATORY!**

BOILER LOCATION

The boiler should be located as close to the chimney as possible and the smoke pipe should never exceed 10 feet in length. More frequent cleaning of the smoke pipe is necessary the longer it is. Use as few elbows and tees as possible as they act as ash and creosote traps.

The smoke pipe from a solid fuel unit must always rise from the unit to the chimney flue. A 1 inch-rise per 10 feet is minimum which must be maintained. **NEVER** slope the smoke pipe downward.

If used in conjunction with another heating unit, use as little piping as possible to minimize heat loss.

The boiler should be mounted on a raised pad (2 inch minimum) of non-combustible material. The front edge of the boiler should be aligned with the front edge of the pad so that ashed do not interfere with the operation of the air door.

A minimum clearance of 18 inches from the top, sides, and rear and 48 inches for cleaning and feeding is required.

NOTE: Local codes may require greater clearances and those requirements must be met.

For pad lengths, see the chart below.

BOILER SIZE 02.40	-14	-19	-27	-35	-40
•FOUNDATION LENGTH (in.)	15	19	23	27	35
••FOUNDATION WIDTH 23 (in.)					

CHIMNEY

The boiler must be connected to a chimney which is approved for solid fuel firing in your area.

Suggested guidelines for the chimney are that it be:

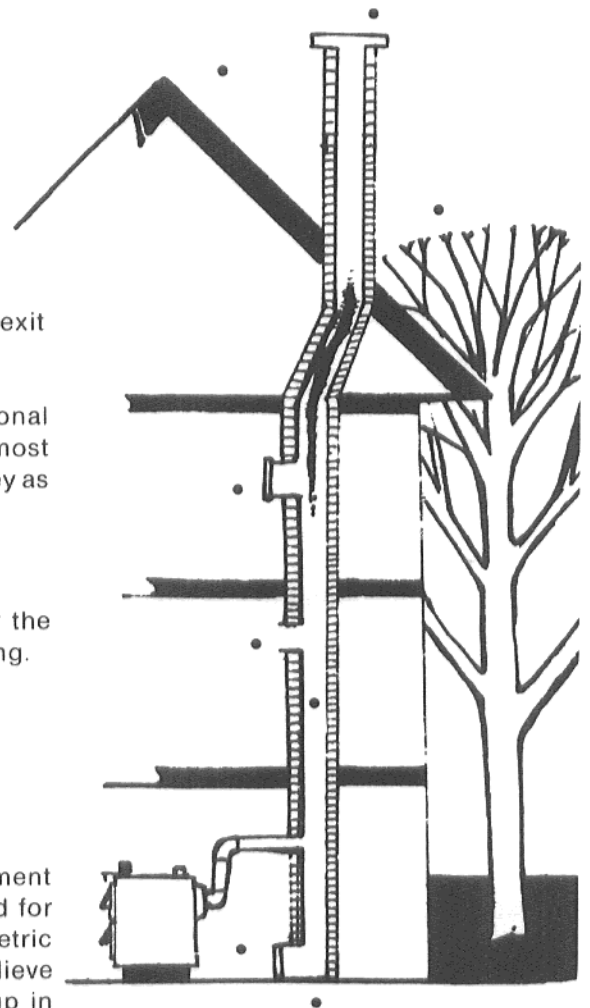
- Of greater size than the smoke pipe diameter
- Fully lined
- Higher than the peak of the house
- Unobstructed by overhanging trees
- Solid (not slit or cracked or settled at the base)
- Equipped with a cleanout
- Easily inspected visually from the cleanout up the flueway to the exit
- Free of protrusions in the flueway
- Not shared with fireplaces, stoves, or room heaters. An oil or additional solid fuel unit may be vented into the same flue in the basement. In most locations, a gas appliance may NOT be vented into the same chimney as a coal or wood burner.
- Open at the top (not screened).

With multiple appliances sharing a common flue, it is common for the BUDERUS to smoke lightly out through the feed door during loading.

Refer to page 22 for trouble shooting problems.

DRAFT CONTROL

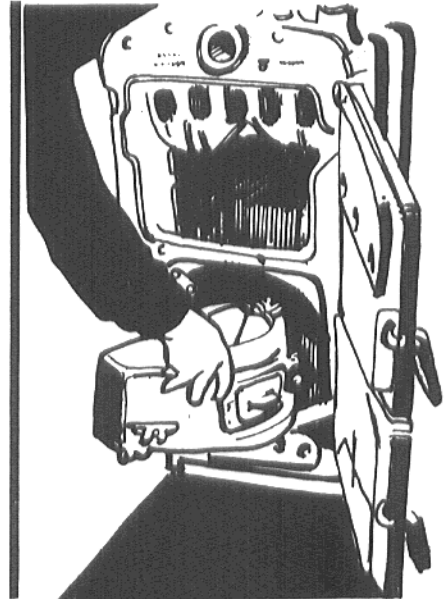
An approved draft control device may be used on coal burning equipment to prevent overdrafting. A solid fuel draft device should not be used for wood firing except on extremely severe overdraft chimneys. The barometric draft device allows cooled basement air to enter the smoke pipe to relieve excess draft. This cooler air will greatly increase creosote build-up in wood-burning chimneys.



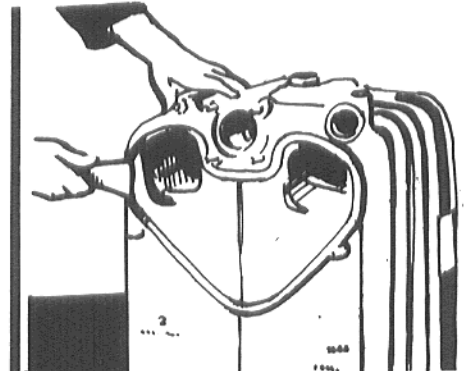
SETTING UP BOILER

1. Unpack the items from the boiler body and cartons. NOTE: The smoke hood is shipped in the boiler body from boiler size 19. Care should be taken when removing it from the boiler. It is recommended that the smoke hood be removed by sliding it through the opening where the vertical grate and the segment plate are located. Position the hood such that round flue opening is up and the clean out is toward the hinge side of the door.

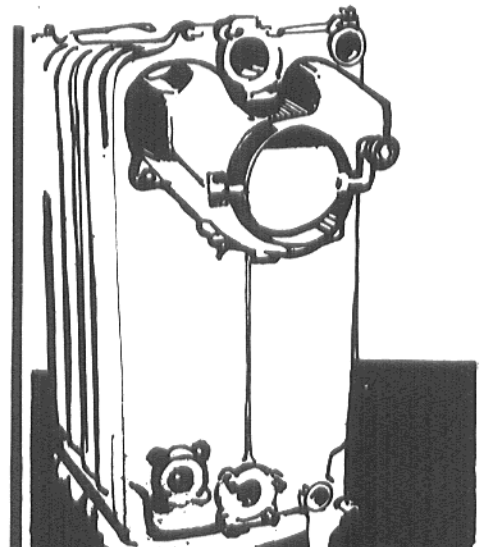
Use the checklist on page 3 to ensure that all parts have been received undamaged.



2. Place the boiler body on the foundation as described in the boiler location section (page 6). The ash door must be flush with the front edge at the foundation. Level the boiler from side to side and front to rear using metal chocks or shims as required before any piping is installed. Inspect the cement between the sections. Replace with furnace cement any section where the cement has cracked or fallen out. Work boiler cement into the grooves for the smoke hood.



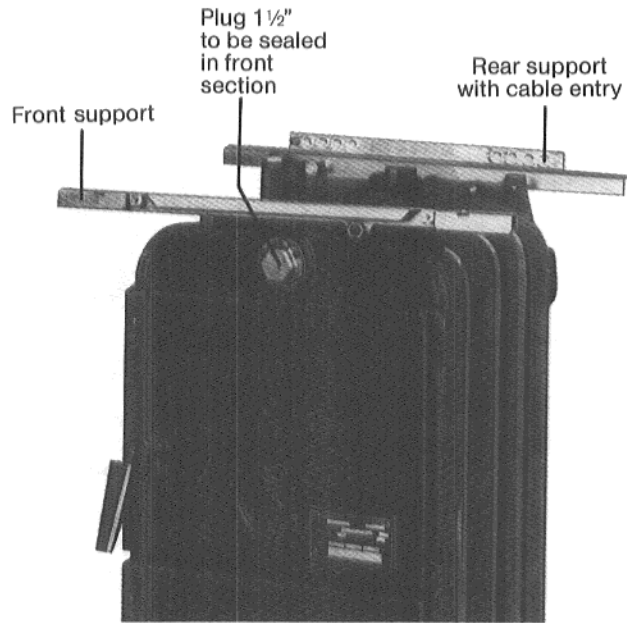
3. Install the smoke hood by following the steps below:
 - Loosen the mounting nuts.
 - Mount the smoke hood and tighten nuts.
 - Use care as excessive force can crack the hood.



SETTING UP BOILER

4. Assembly of boiler jacket

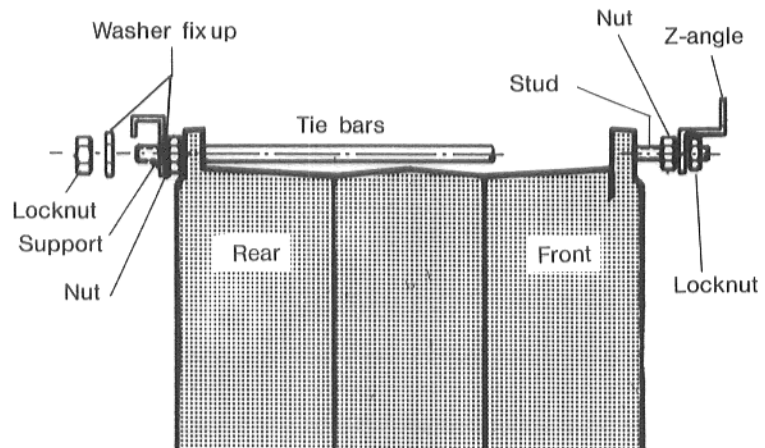
Fix front support to the upper tie bar and bolt the rear support (Z-angle) onto the studs.



Nuts for studs are packed in despatch wallet with boiler jacket. Fit front and rear supports as shown in opposite figure.

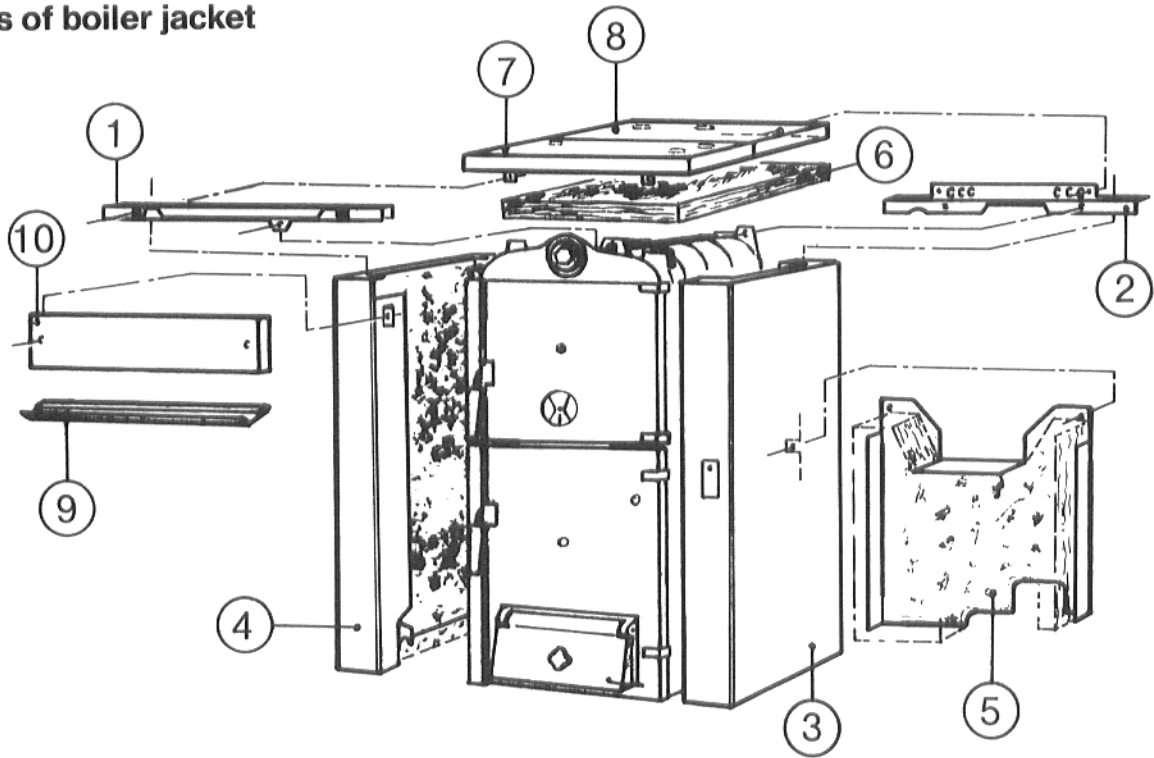
If support is intended to be installed in sloping arrangement, fix front spacing washer.

After having installed side wall panels, lock in position nuts and locknuts.



SETTING UP BOILER

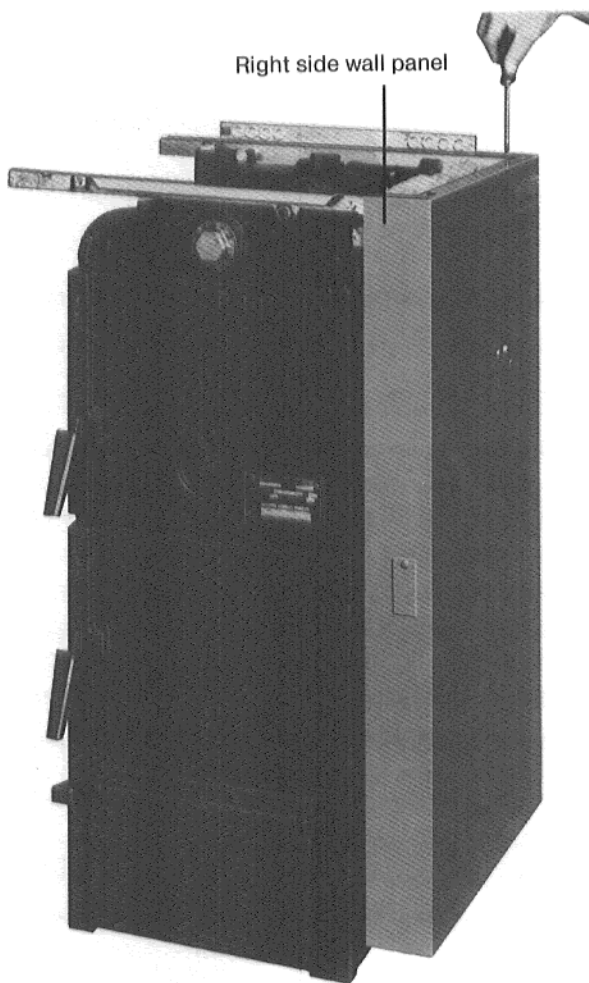
Components of boiler jacket



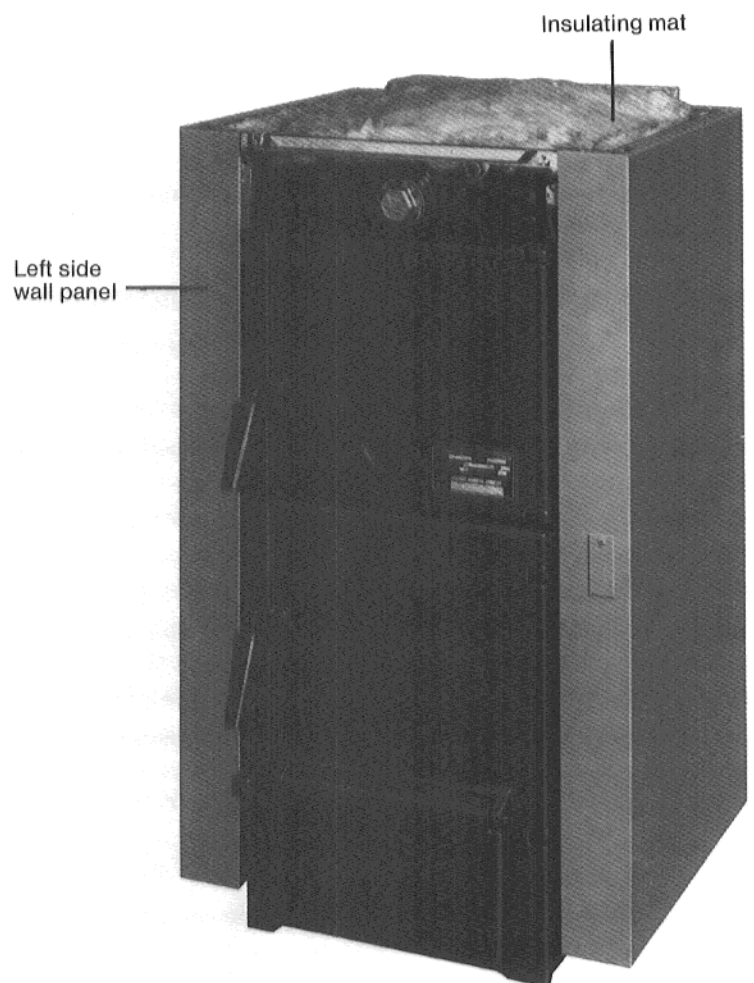
Sequence of assembly:

1. Front support
2. Rear support with cable entry
3. Right side wall panel
4. Left side wall panel
5. Boiler rear wall panel
6. Insulating mat
7. Front hood panel
8. Rear hood panel
9. Protective strip
10. Screen

SETTING UP BOILER

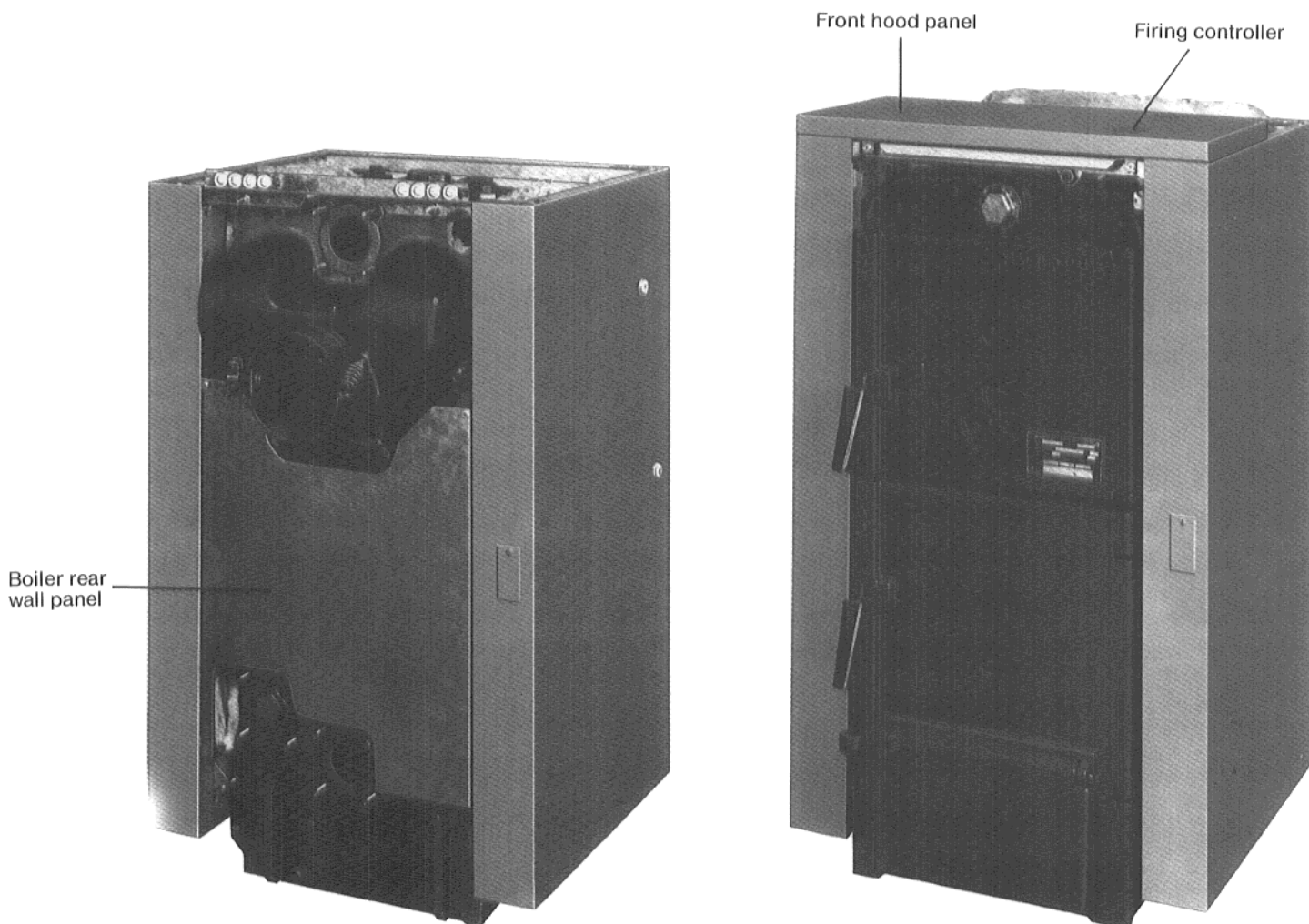


Put right hand side wall with the brackets onto the lower tie bar and screw on front and rear support.



Do same with left-hand boiler side wall. Adjust rear support into correct position (if necessary).

SETTING UP BOILER



Insert rear wall into side wall and bolt down.

Place insulating mat on top of boiler.

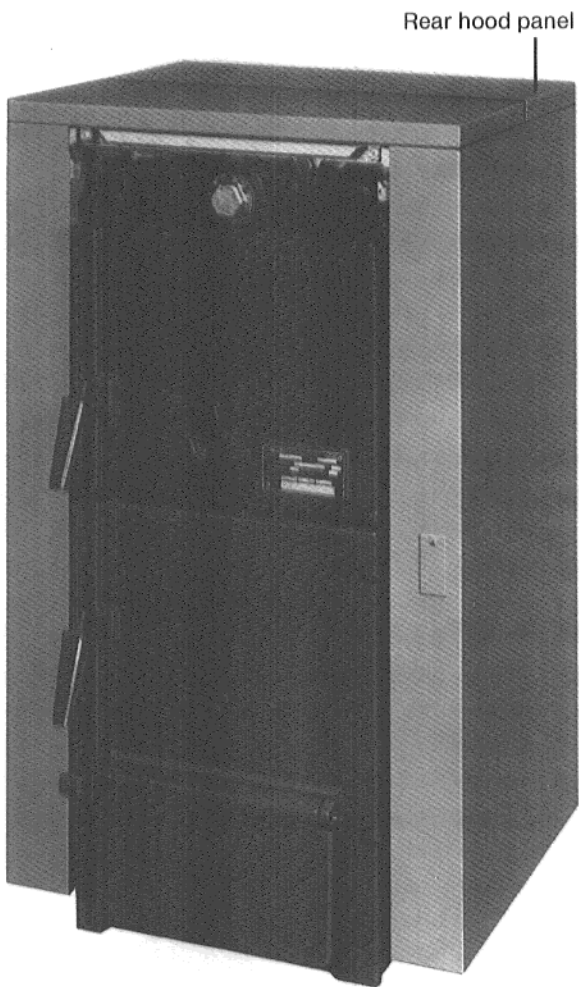
Insert front hood panel with side hook into slot in side walls and screw onto front support.

Before installing the firing controller, break off clear part from hood.

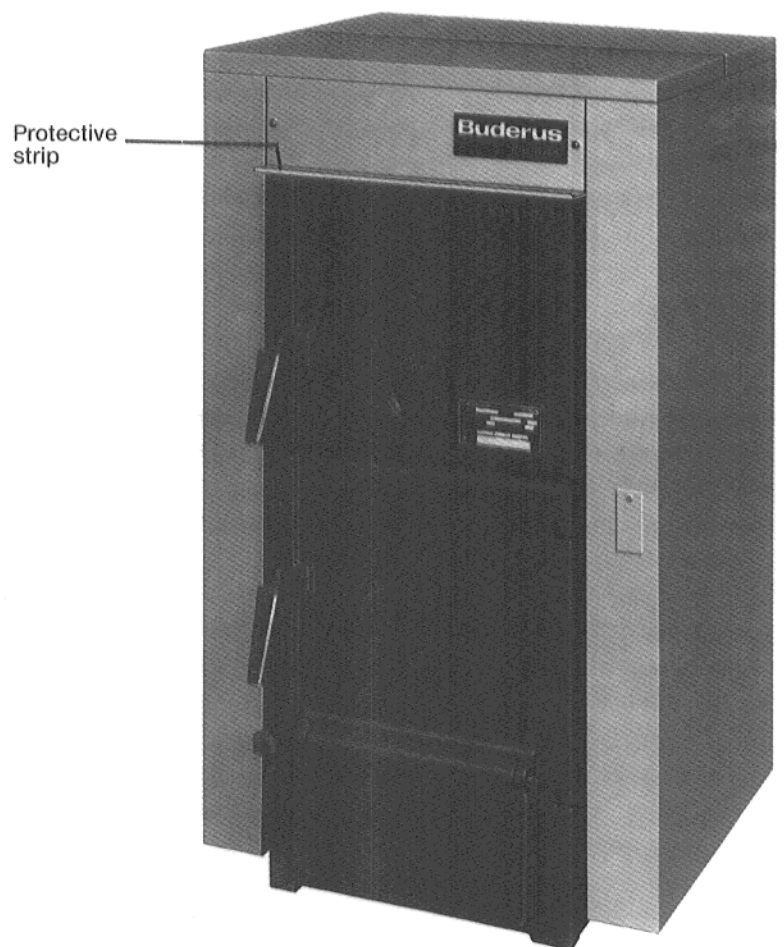
Installation of firing controller as per attached instructions.

Bolt on burner cable cover on the right side wall.

SETTING UP BOILER



Fit rear hood panel to the front hood panel and screw onto rear support.



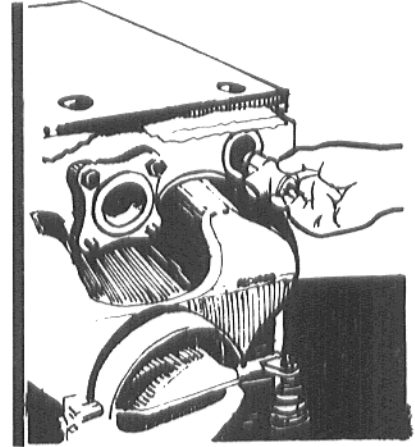
Before fixing on the screen the protective strip should be attached.

Put screen with protection strip between side wall panels and screw on.

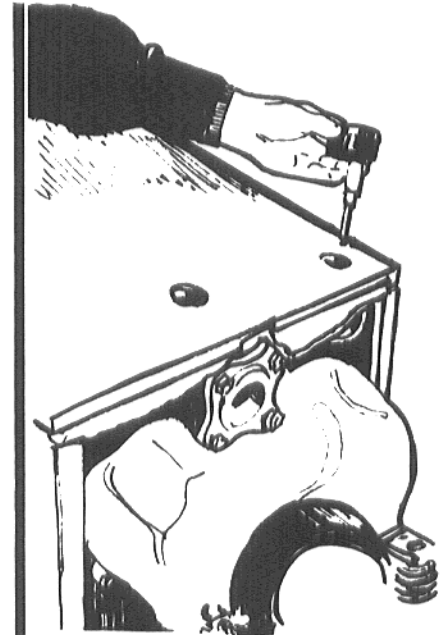
SETTING UP BOILER

5. (The $\frac{1}{4}$ x $\frac{3}{4}$ inch bushing is not supplied). Connect the pressure relief valve to a drain to prevent steam damage to basement.

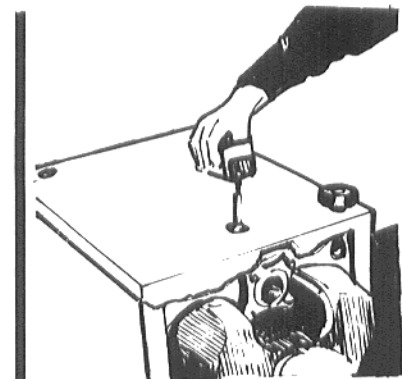
Do not over tighten and use pipe joint compound as required.



6. Mount the pressure/temperature gauge in the hole in the top left rear of the unit. (The bushing is not supplied.) Do not overtighten and use pipe joint compound as required.



7. Install the immersion well for the Honeywell 4006B or equivalent hot water controller in the top of the unit. Do not over tighten. Slip the sensing bulb into the well carefully. Do not kink or bend the small copper tube. Lock on ring by tightening the screws.



SETTING UP BOILER

8. Put the Samson firing controller into the front tapping on top of the unit.

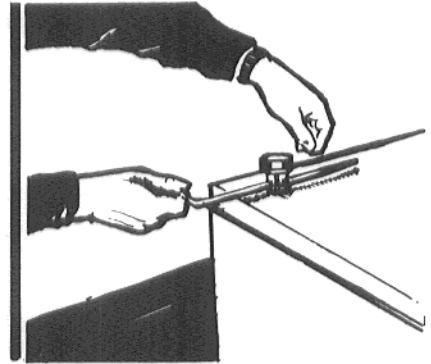
NOTE: This tapping is not tapered and will require oakum, hemp or teflon tape to seat.

Position the controller such that the set screw is to the rear of the boiler.

Loosen the set screw, remove the wood plug, and insert the long end of the large "L" bracket into the Samson controller.

Keep the short end of the "L" as near to level as possible and tighten the set screw.

Thread the small "L" into the air door, tighten until the "L" is horizontal, and tighten the lock nut which should be on the outside of the door.



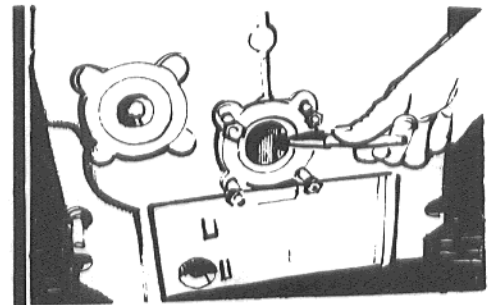
9. Connect the boiler into the hot water piping system. The correct placement and use of valves, unions, flow control valves, air vents, and fittings are the responsibility of the contractor.

NOTE: If a new 12 PSI automatic fill valve is installed, it should be connected to the piping. **Never** put cold water directly into a hot boiler.

Check the system expansion tank to ensure adequate size. Another small tank may be required if the present tank has no extra capacity left. A test may be made by running the original boiler to limit. If the pressure increases a new tank will be needed.

IMPORTANT

Do not remove the flow venturi (loose piece) from lower flange opening. (It assists return water flow through the unit.) Without this piece, the boiler may crack. This item comes installed.



10. Connect the smoke pipe to the chimney. Do not let it contact the piping system. Screws or bolts should be installed to "lock" the smoke pipe sections together. **NEVER** tape the smoke pipe to seal.

SETTING UP BOILER

11. Calibrate the Samson Firing Controller as follows:

Water must be in the boiler.

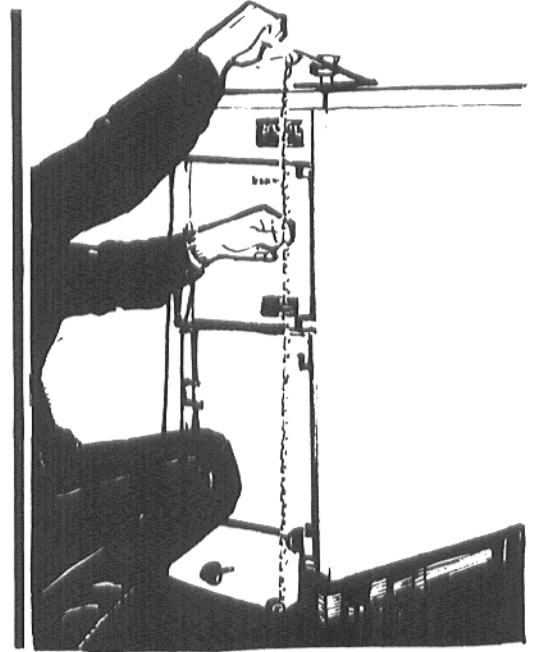
Start a fire in the boiler.

Connect the chain from the "L" on Samson controller to the arm on the air door. Connect the figure-8 hook to the Samson controller arm and the circle hook to the draft door arm.

Using the white numbers on the Samson controller, set it at 90° C.

When the boiler thermometer indicate 192° F, (90° C) the air door should be closed and the chain should be taut. Adjust the chain to this condition.

This calibration should never need to be rechecked.

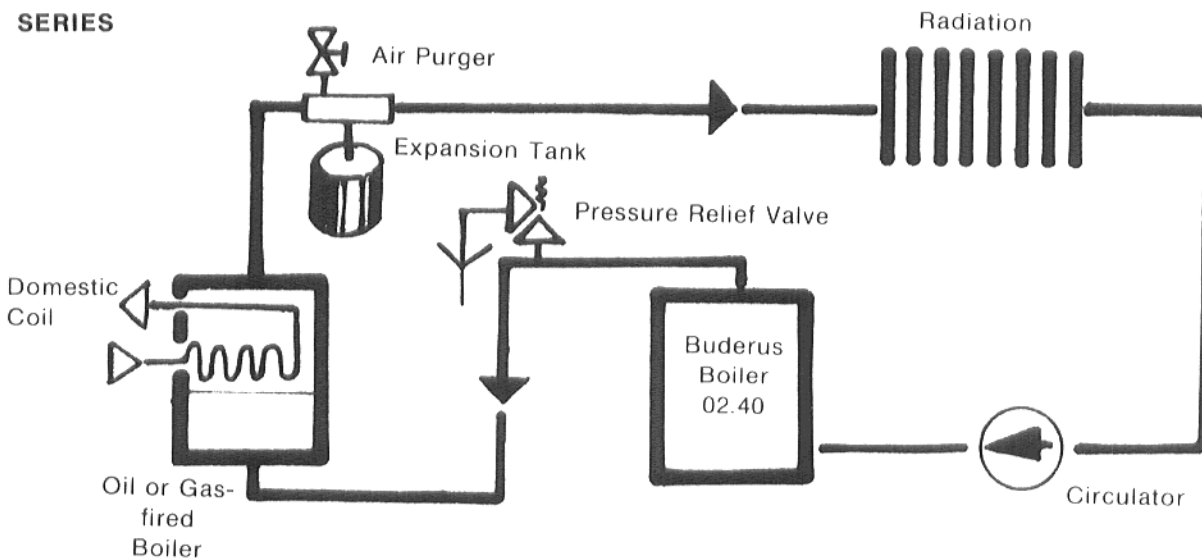


PIPING DIAGRAM SERIES HOOK-UP

The series hook-up is the easiest and least expensive, the parallel hook-up the most efficient. With series hook-up, if the room thermostat does not call for heat, the circulator will not run, allowing the temperature in the oil boiler to drop to the level of its own internal aquastat which may not provide adequate domestic hot water from the boiler's coil.

Everything required for the series hook-up is supplied.

SERIES



SETTING UP BOILER

PIPING DIAGRAM PARALLEL HOOK-UP

For parallel hook-up, an additional aquastat and circulator are required. A smaller type circulator (Grundfoss, Taco 007 or equivalent) is recommended. The controlling aquastat should be a Honeywell L6006C (strap-on, make on temperature rise) mounted on the boiler flow and set at 165°F.

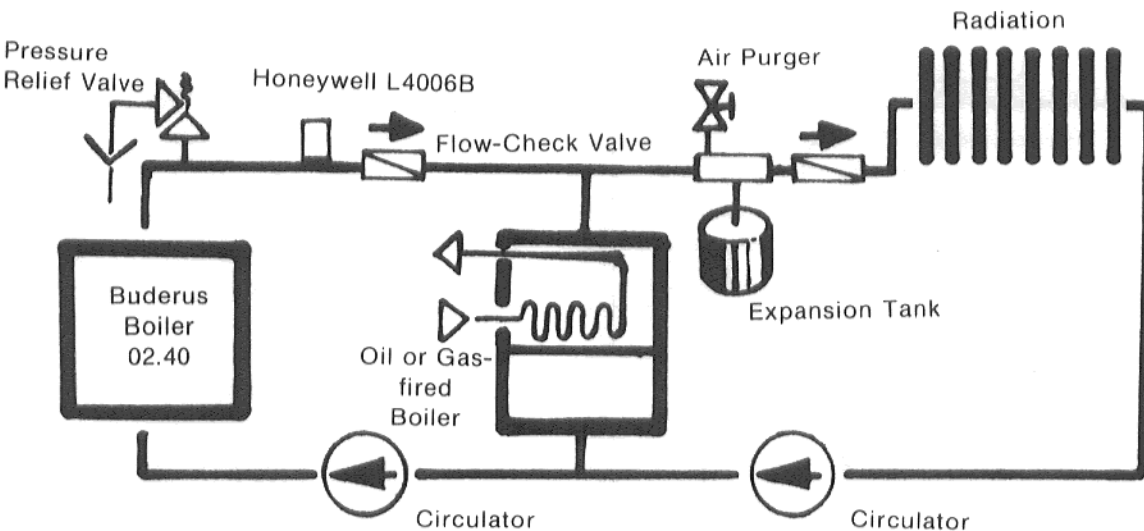
NOTE: In parallel, the L6006C should be used as the overheat control, the L4006B becomes the circulator control.

The parallel hook-up calls for a strap-on aquastat (not provided) to be placed on the outlet side of "LOGANA". Upon attaining temperature (recommended setting 165°F), this control will turn on the circulator (not provided) between the boilers assuring adequate output from the coil on the oil-gas boiler. Some oil/gas firing will occur during large demand for heat or domestic hot water.

In the parallel hook-up, if the circulator between the boilers is large, the flow check valves should be spring loaded to prevent overheating the home due to flow through the primary circulator.

A Multi speed circulator is useful here to modulate the water flow through the BUDERUS to match the size of the fire.

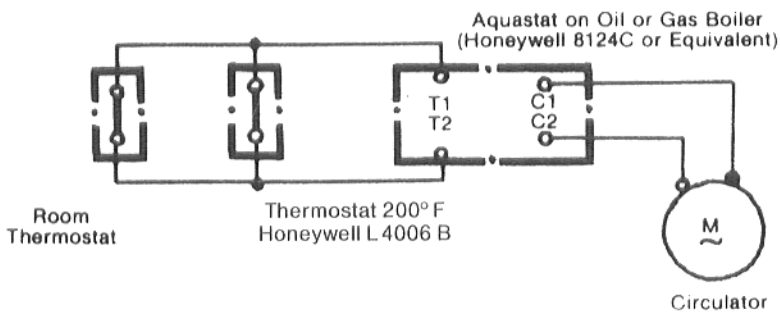
BUDERUS BOILER ONLY



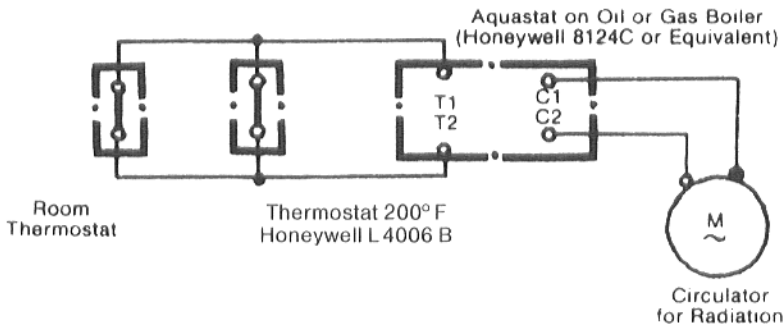
ELECTRICAL SCHEMATICS

ELECTRICAL SCHEMATICS

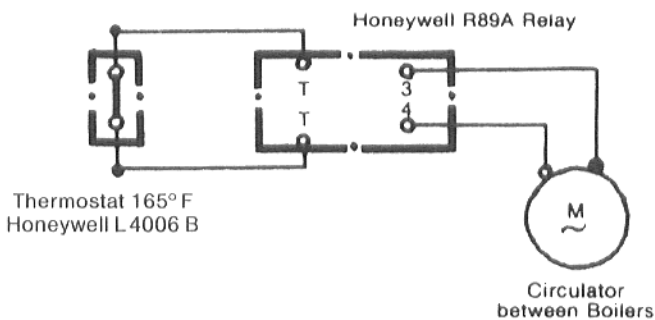
Both series and parallel connections are acceptable if the "LOGANA" is to be used in conjunction with an existing oil or gas fired boiler.



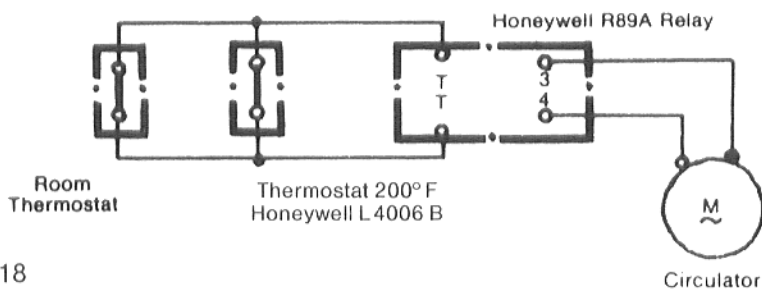
Series Hookup



Parallel Hookup



Boiler Only



WOOD FIRING

For maximum burn times, the wood should be cut to length to utilize the entire length of the chamber.

A small hot fire is most efficient and hardwood provides the maximum heat for a given amount of wood. The table below compares common woods and gives fuel oil equivalency.

WOOD	WEIGHT PER CORD	MILLION BTU'S PER CORD AIR DRIED WOOD	EQUIVALENT VALUE #2 Fuel Oil, Gals.
White Pine	1800	17,000,000	120
Aspen	1900	17,500,000	125
Spruce	2100	18,000,000	130
Ash	2900	22,500,000	160
Tamarack	2500	24,000,000	170
Soft Maple	2500	26,000,000	170
Yellow Birch	3000	24,000,000	185
Red Oak	3250	26,000,000	195
Hard Maple	3000	29,000,000	200
Hickory	3600	30,500,000	215

It is not recommended to burn wood when the outside temperature is above 30°F.

Always start a fire on a clean grate using kindling. Keep the boiler water temperature at 190°F. minimum to help reduce creosote build-up. The secondary air rosette should always be closed and tightened when burning wood.

To ensure proper combustion, ashes must never be allowed to build up to the level of the grate. This condition could overheat the wet grate.

BEST OPERATION WILL OCCUR AFTER EXPERIMENTATION

COAL FIRING

Burning times with coal are vastly superior to wood. For best results, it is recommended to burn anthracite (hard) coal of nut size. Bituminous coal will result in shorter burn times and reduced output.

A proper coal fire takes between one and one and one-half hours to build from scratch. A very hot wood fire must first be prepared on a clean grate. As hot coals form in the wood fire, a small amount of coal (about one gallon) should be added. When this coal has ignited (about ten minutes), additional coal can be added at the rate of one to three gallons every five to ten minutes. **NEVER ADD FRESH COAL UNLESS FLAME HAS COME UP THROUGH THE PRIOR LOADING.** Coal should be added until a depth of twelve inches is reached. The best condition for a coal fire is to be as deep as it is wide. Fill the chamber to the bottom of the top loading door every time.

When removing ashes from burning coal, it is very important to follow the correct procedure. As this boiler is suitable for firing a variety of fuels, the coal riddling tool is not supplied, but is available from your Buderus dealer or importer. Do not poke the fire unnecessarily as it will cause ashes to plug the grate, reducing output and efficiency. The fire should be tended twice a day typically and three times in very cold weather.

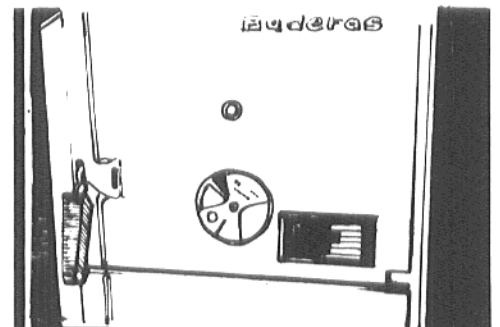
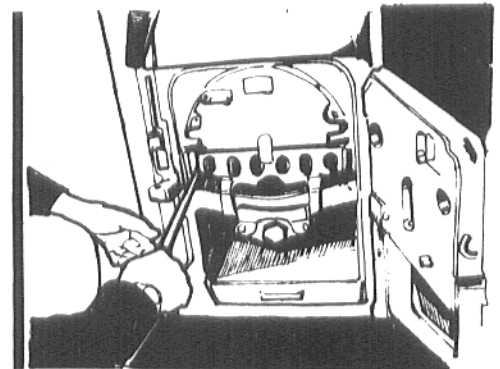
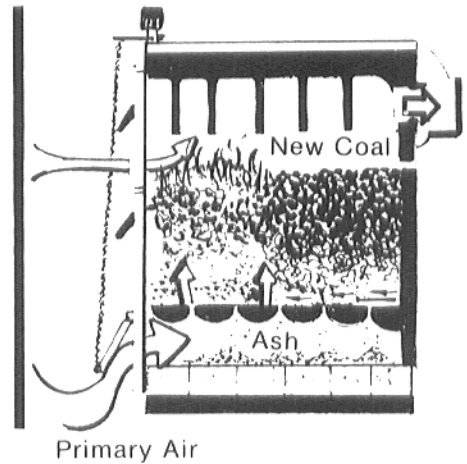
To remove ashes first open the bottom cleaning door and pull out ash pan several inches to catch spillage. Next insert the coal riddling tool along the outside edges first. In this position, the surface of the tool is the verticle position (as shown in the drawing) Draw the tool in and out of the boiler using care not to jab the rear wall as it could cause a crack and leak. After poking both outside edges, begin to work towards the center of the grate. Continue drawing in and out until live red coals begin to fall into the ash pan. It is very important to be sure that all dead ashes are removed from the rear of the boiler. The most common mistakes are: poking or loading the fire too frequently, or leaving dead ashes on the rear section.

Approximately 30 percent of the chamber should still have live coals when refueling to prevent smothering the fire.

The secondary air opening on the feed door should be open about three-quarters inch (approximately 20°).

For coal firing only, adjust the water temperature dependent on the outside temperature according to the following table.

Outside Temperature	+5	14	23	32	41	50	50°F
Boiler Water Temperature	194	180	167	152	135	117	97°F
Setting on Samson	90	80	75	65	60	45	40°C



COAL FIRING

STORAGE

Coal may be stored indoors or outdoors providing proper safety precautions are taken. The following guidelines will result in safe storage and maximum efficiency.

- 1 The storage area should be free of all flammable materials or materials that burn easily.
- 2 The storage area should be cool (75° F or lower) as excessive heat will drive some of the fuel content of the coal out in gas form.
- 3 The storage area should be protected from rain and snow. Alternate wetting and drying of coal will reduce the heating efficiency of the coal. Do not place wet coal on top of dry. For this reason, coal deliveries should be scheduled when the coal bin is almost empty. If this is not possible, move all dry coal to one side of the bin and place the new, wet coal on the other side.
- 4 Chestnut coal weighs approximately 58 pounds per cubic foot. You should allow 20% excess storage capacity for ease of handling.
Example: A 4 x 4 x 10 foot area will hold 4 tons.

The boiler must be connected to a chimney which is approved for solid fuel firing in your area.

MAINTENANCE

Inspect the flue pipe and chimney monthly or as required and clean as needed. The smoke hood is provided with a cleanout cover to simplify cleaning.

Visually inspect the door gaskets. A coating of light grease will help prevent sticking to the boiler caused by creosote formation.

Creosote build up in the boiler can be prevented by having hot fires, but periodic cleaning is required. Using the brushes provided, and using a clockwise rotation, clean the burner unit when it is cool.

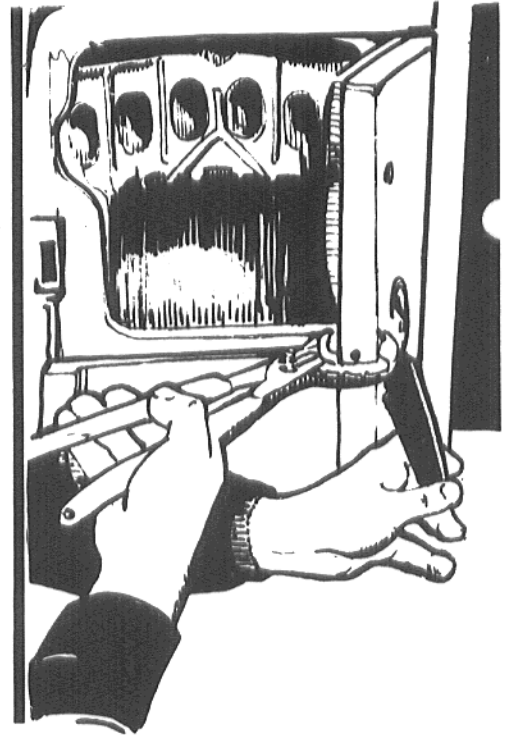
The door handles are made of soft metal and must be checked regularly to assure that the doors close tightly. If the doors do not fit securely, the handles are to be heated with a torch and squeezed together with pliers until the door is tight. Care must be taken not to squeeze too much.

OPERATION IN THE EVENT OF POWER FAILURE

In the event of a power failure during the heating season, special operation must be followed:

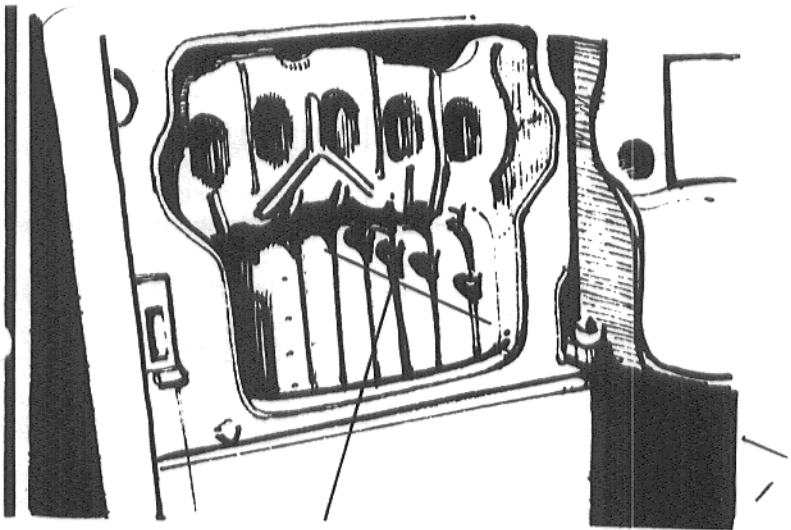
The flow check valves in the system should be opened to allow some heated water to circulate through the system by convection (have installer demonstrate). This will partially heat the house, prevent frozen pipes and remove some heat from the boiler.

The Samson firing controller will still regulate the fire to some extent. However, without the circulator running, the boiler can not dispose of the heat as rapidly as normal. Therefore, the boiler should be fired conservatively and watched carefully. The temperature of the boiler water should not exceed 230°F.



OPTIONAL GAS/OIL CONVERSION

The "LOGANA" can be equipped with an optional gas or oil burner conversion. The conversion consists of a second door that accepts an oil or gas-burner (not supplied). Operation of the boiler is either gas/oil or wood/coal depending on which door is closed. The conversion kit is available with a safety switch which prevents oil/gas burner operation if the door is not secured. Installation consists of mounting the door on existing hardware, drilling a hole for the safety switch and mounting the switch. When the oil/gas boiler is in operation, the door is bolted in position. This prevents rapid conversion from one fuel to the other. The stainless steel "crown sheet" (provided) must be installed as shown during boiler operation. The manual damper in the smoke hood should be open and it may be necessary to install a barometric draft control.



Crown Sheet
mounting tabs

TROUBLESHOOTING WOOD FIRING

PROBLEM	CAUSE	SOLUTION
Lack of heat	insufficient draft	Check operation of Samson Controller and position of rear damper
	improper water circulation	Check directional arrows on circulator pumps Check position of main circulator must be mounted <i>between</i> radiation and "T" to boilers). Check for siphon "jet" (must be behind return water flange as supplied by factory).
	excessive ash build-up	Clean out
Too much heat	too much draft	Check operation of Samson Controller (refer to page 16 and pos. of rear damper).
	overheat control not functioning	Set at 210°F and make sure main circulator comes on at this setting.
	flow controls opening	Use smaller pump between boilers Use spring loaded check valves
Short burn times	too much draft (check with instruments)	Check manual damper on smoke hood Install barometric control
	not enough wood	Cut wood so as to completely fill chamber Use higher quality seasoned wood
Smoke out the door	Inadequate draft (check with instruments)	Construct 8" x 10" (or larger) separate flu for BUDERUS Increase height of existing chimney Adjust barometric control on oil/gas boiler Check chimney for obstructions Install draft inducer
Feed door gasket sticks to boiler	creosote formation on boiler	Burn wood with 15% moisture content (never more than 20%) Burn hotter fires to burn off creosote Raise boiler water temperature Increase draft (see above) Burn coal during mild weather Apply grease to gasket.

TROUBLESHOOTING COAL FIRING

PROBLEM	CAUSE	SOLUTION
Fire goes out after 3-4 hours	not enough coal	Fill chamber <i>at least</i> 10-12" deep (to bottom of feed door)
	too much draft	check rear damper
Fire goes out after 2-3 days	Insufficient ash removal	At least twice each day remove all ashes from boiler (refer to coal firing page 20/21).
Insufficient heat	too much draft	close damper on rear of boiler
	insufficient secondary air	open secondary air port more
	not enough coal	keep boiler full
	too much ash	keep grate clean from ash build up. (especially in the rear)

TROUBLESHOOTING CHIMNEYS

If a condition described in the wood or coal firing troubleshooting sections has insufficient draft as a possible cause, but the recommended remedies fail to solve the problem, the following illustration shows some chimney conditions which could be causing insufficient draft.

Top of chimney should be higher than all objects within 30 feet and 3 feet higher than all objects within 10 feet.

Avoid obstructions of the flue caused by the chimney cap being pushed over the flue or by a ventilator.

Remove accumulations of soot and debris in offsets.

Eliminate air leaks* by sealing with cement.

Close leaks* caused by a rusty flue cap.

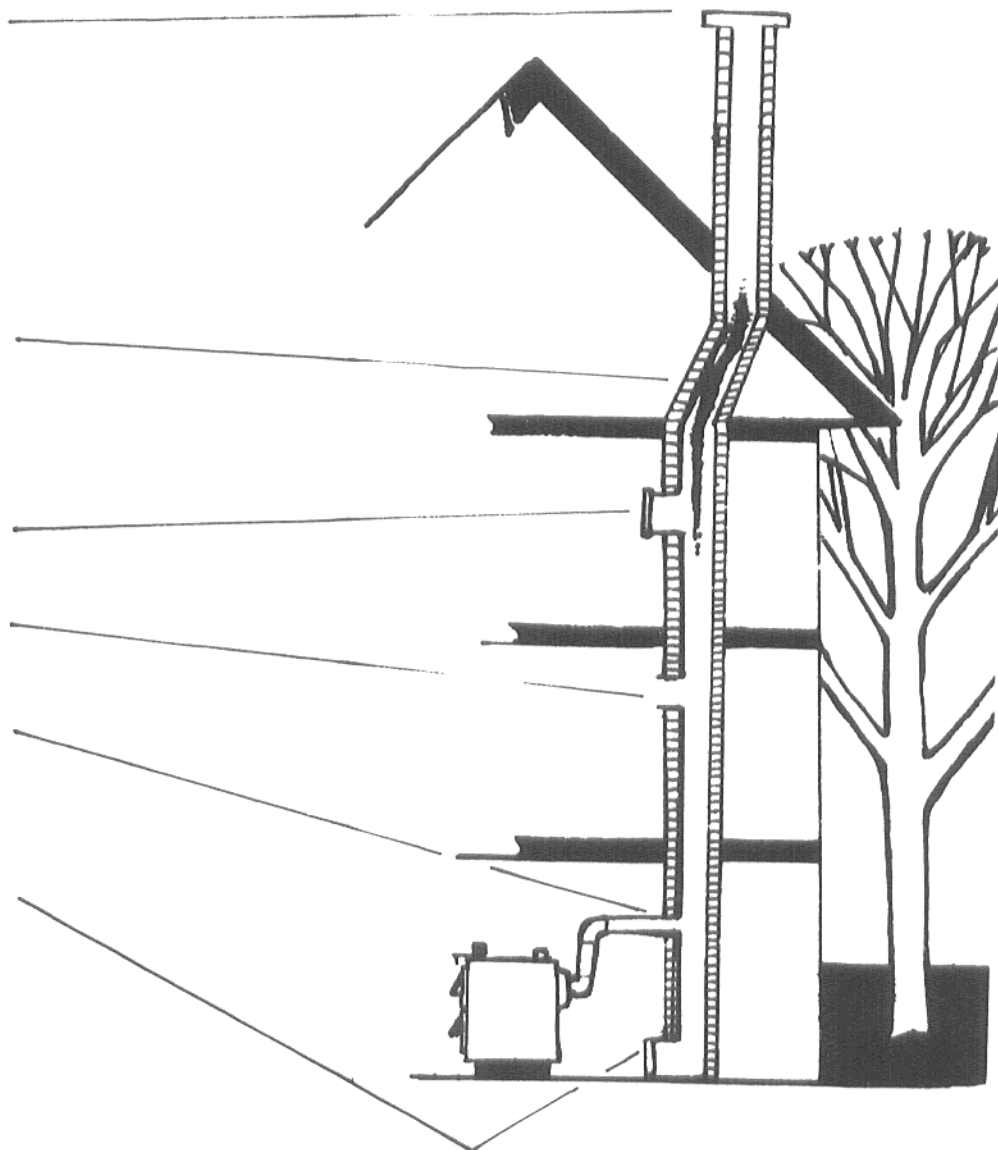
Avoid connecting a second stove or heater into the same flue.

Take precaution to ensure that the vent pipe is tight fitting and that the end is flush with the inside of the flue.

Close leaks* caused by a loose fitting clean out door.

Close any openings* between flues.

*Leaks may be detected by a smoke test performed by using a special smoke bomb and closing the top of the chimney.



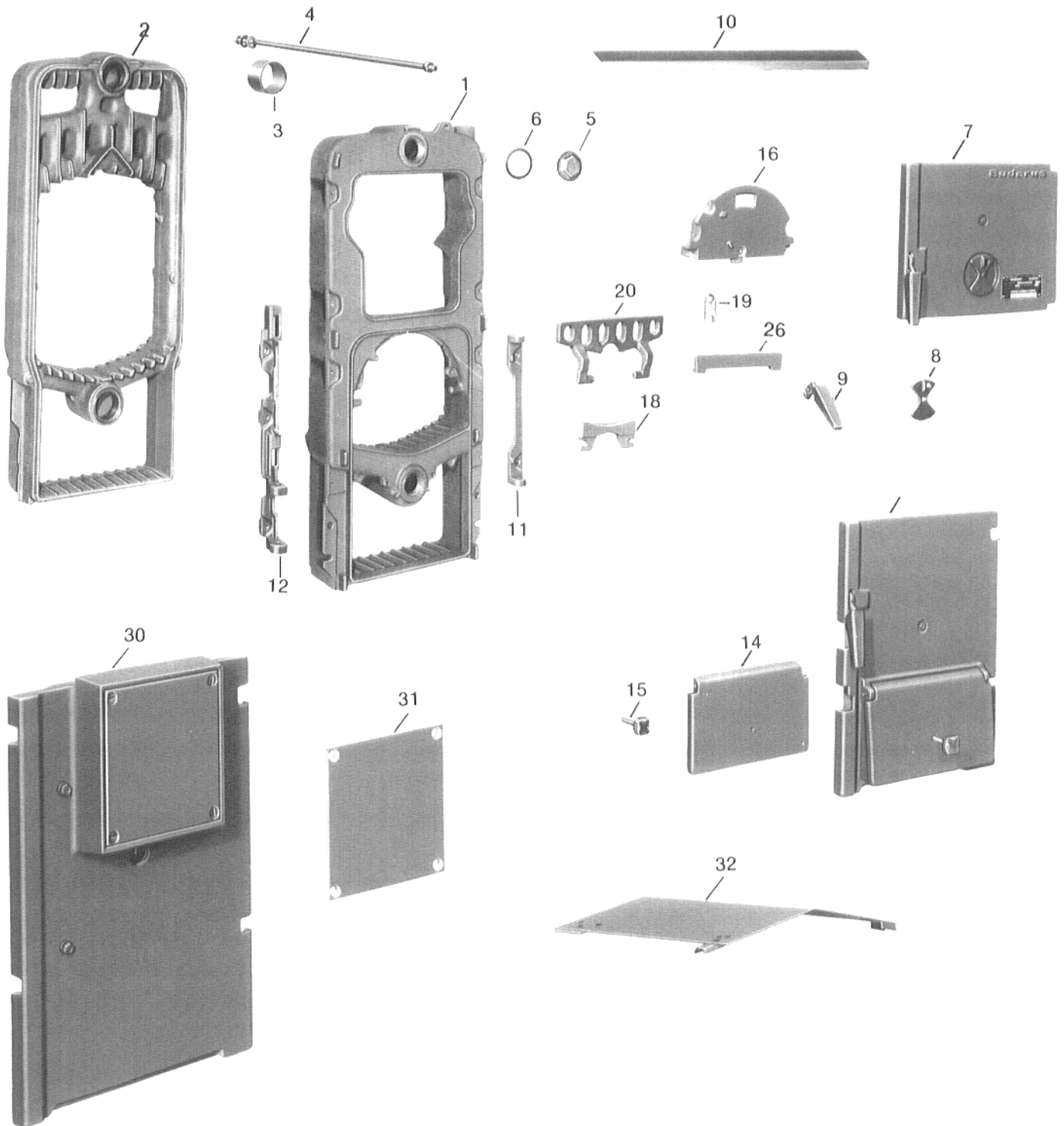
PARTS LIST

No.	Description
1	Front Section
2	Center Section
3	Nipple
4	Threaded Rod (specify model)
5	1½" Plug
6	Gasket
7	Top Door (complete)
8	Secondary Air Plate
9	Door Handle
10	Aluminum Shield
11	Lower Door Hinge (right side)
12	Lower Door Hinge (left side)
13	Lower Door (complete)
14	Draft Flap
15	Knob (for draft flap)
16	Front Solid Fuel Protector (complete)
17	N.A.
18	Stopper
19	Latch
20	Solid Rod Grate
21	Stopper
22	Rear Section
23	Draft Hood (complete)
24	Clean-Out Door
25	Draft Damper
26	Stopper
27	Water Jet
28	Screw
29	Ash Pan (specify model)
30	Burner Door (complete)
31	Burner Plate
32	Crown Shield (specify model)
33	Right Side Jacket (specify model)
34	Left Side Jacket (specify model)
35	Front support
35	Rear support
36	Front Jacket Panel
37	Top of Jacket (specify model)
38	Rear Jacket Panel

ITEMS LISTED BELOW NOT SHOWN
Samson (or equiv.) Draft Control
Rake
Poker
Nuts
Studs
Pipe Flange
Sealing Rope (per inch)
Metal cleaning brushes
Safety Switch for "double door"

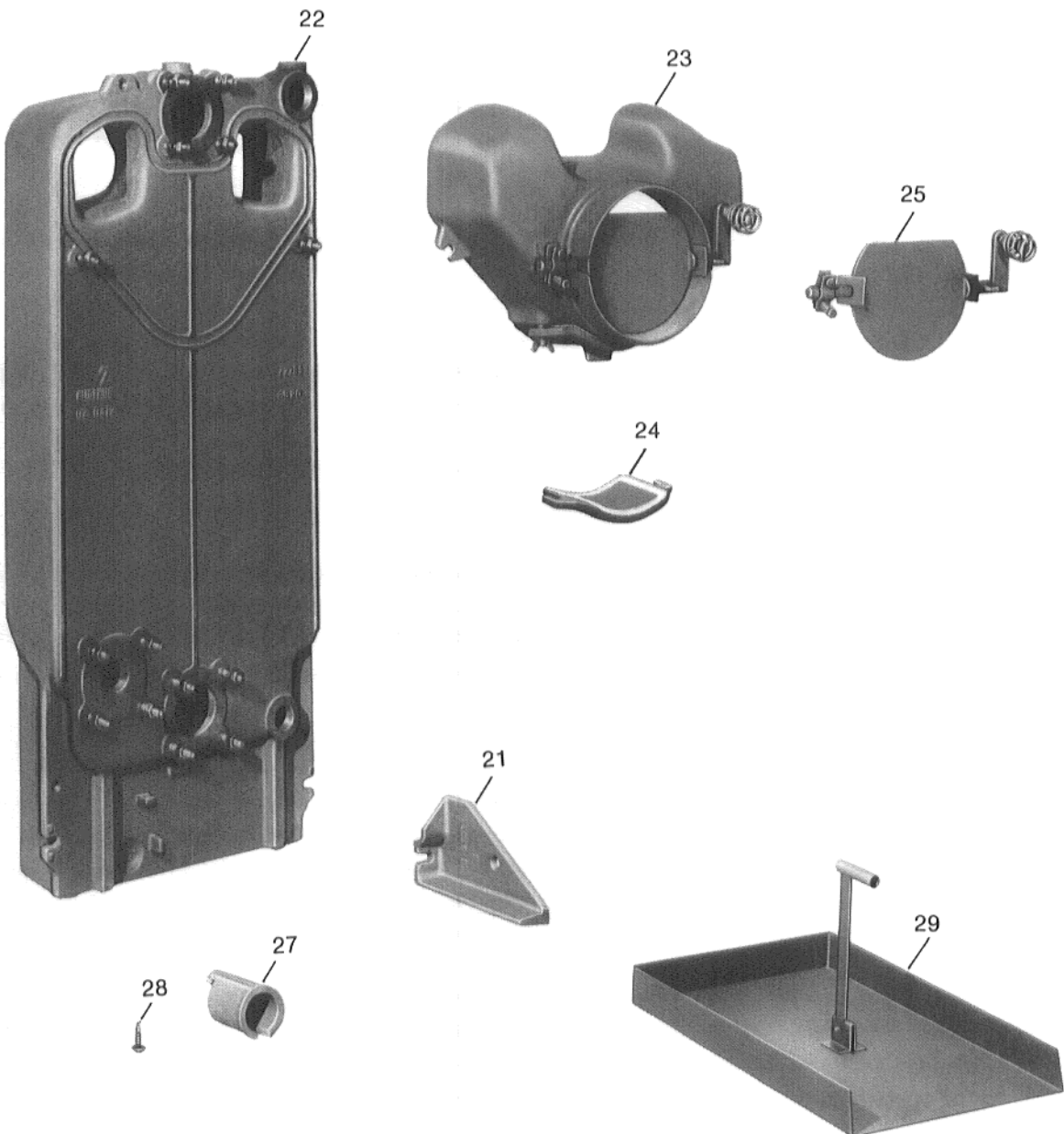
PARTS

FRONT VIEW



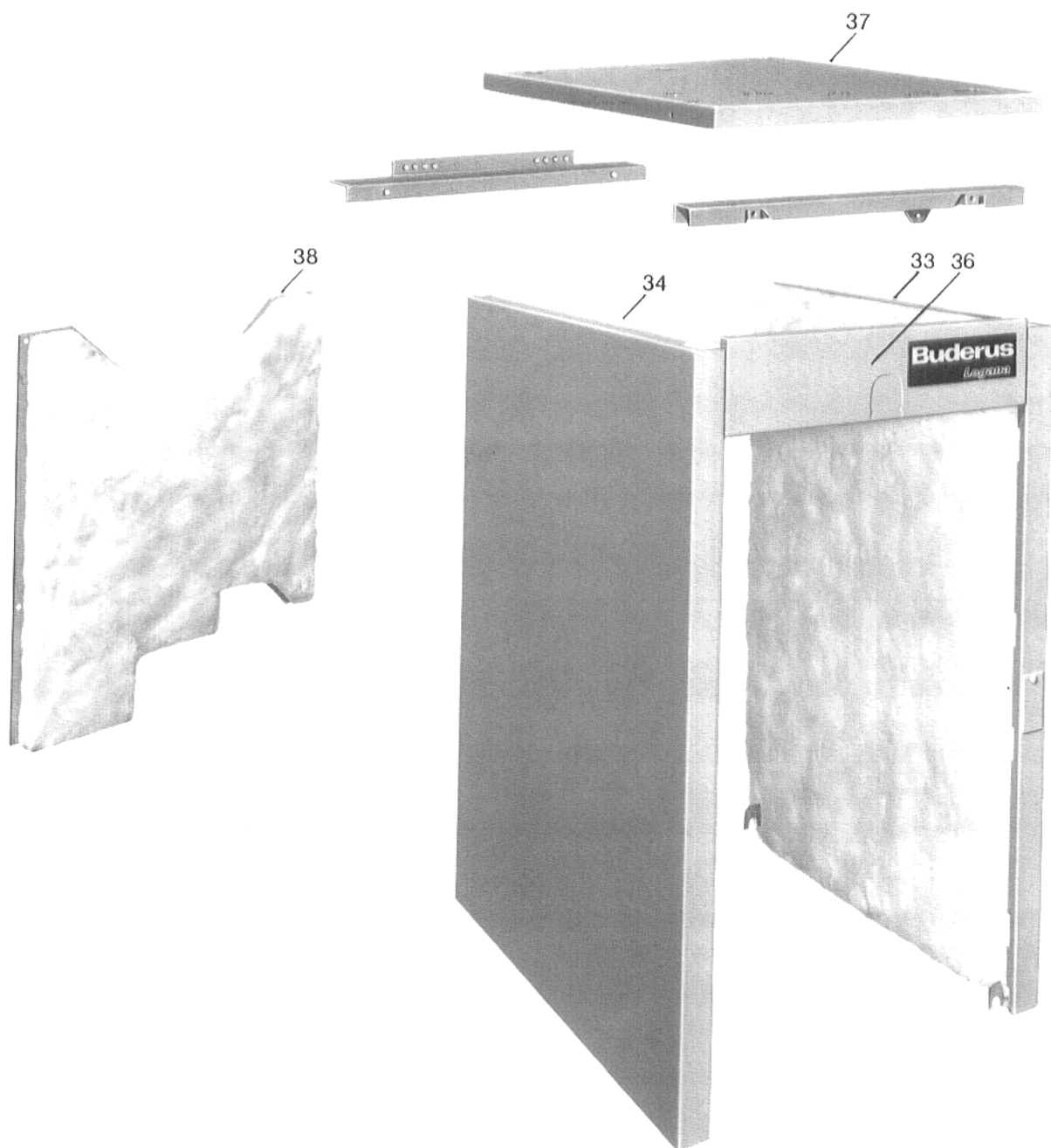
PARTS

REAR VIEW



PARTS

JACKET



Addresses

Importer:

Contractor:

Manufacturer: