FLEX FUEL OWNERS MANUAL

Retain this manual

Wood Master®

Flex Fuel

European Technologies by SOLARFOCUS

c UL US LISTED

Flex Fuel Indoor - Outdoor Hydronic Furnace

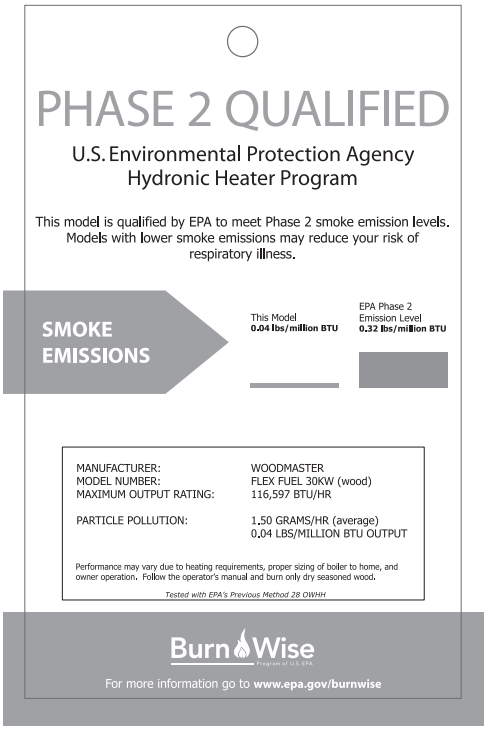
www.woodmaster.com / 800-932-3629 / Manual PN: 7994-300

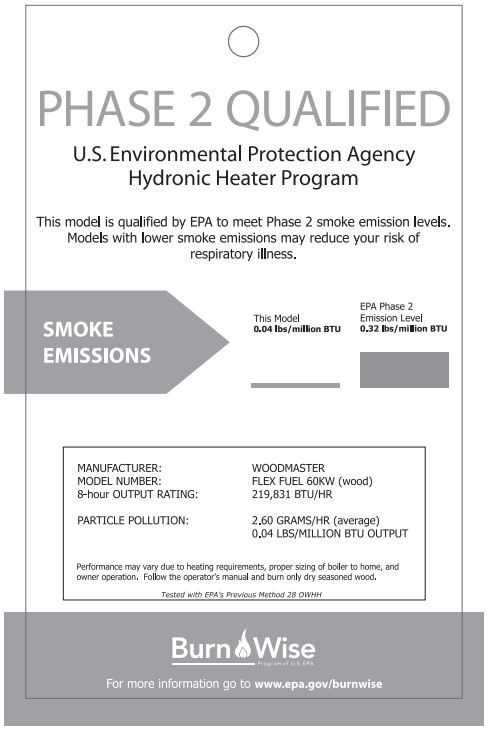
Northwest Manufacturing, Inc / 600 Polk Ave SW / Red Lake Falls, MN 56750

Rev: 14.11

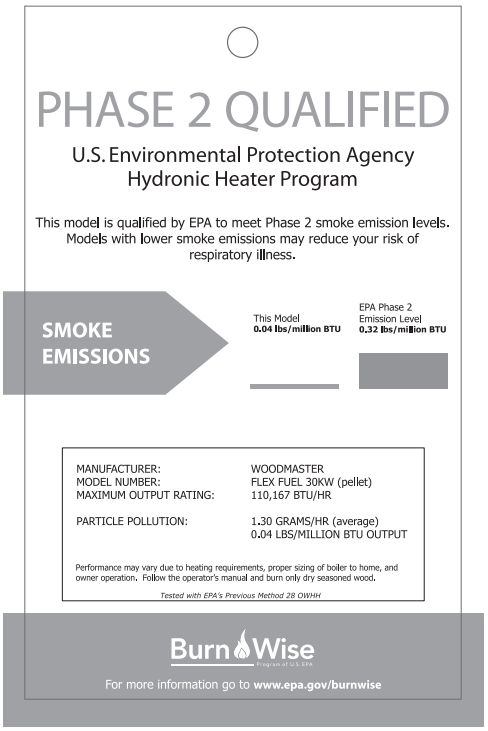
Congratulations on your decision to purchase the WoodMaster Flex fuel. You will be extremely pleased with this product, which stands out from the competition in terms of ease of use, furnace efficiency and low emissions.

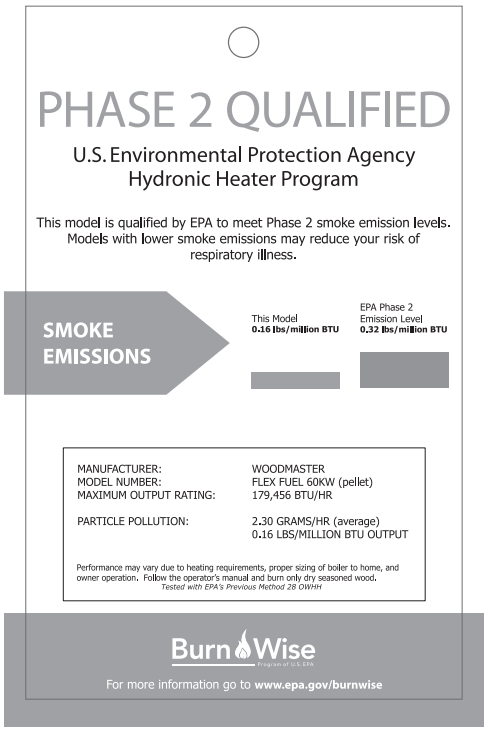
Burning Wood





Burning Pellets





1: Table of Contents

1: Table of Contents

2: Terms

Flex fuel - Hydronic heater designed to burn multiple wood fuel types

Furnace/Boiler AKA appliance, stove - An apparatus in which heat may be generated, as for heating homes, buildings, pools and radiant heat via water

Seasoned Wood - Wood that has dried to an internal moisture content of 25% or less

Cord Wood - Lengths of wood that are typically 8' long

Chunk Wood - Pieces cut from cord wood that have not been split or seasoned

Bulk Materials - Split, seasoned wood cut less that 26" long

Kindling - Small, easily combustible material for starting a fire

Green Wood - Wood that is recently cut and has a high moisture content

Pellets - Wood sawdust compressed into small cylinders to be used as fuel

Flue - AKA Chimney - Any duct or passage for air, gas, or exhaust

Air Factor - Indicator of oxygen level of the flue gas

Display - AKA Eco manager - screen for user to change settings and parameters

I/O Board - Input/output board that controls the furnace functions

Firebox - Chamber where fuel is loaded or conveyed

Water Jacket - Steel casing that surrounds the firebox and holds the water/antifreeze

Funnel - Casting located on the bottom of the firebox

Insert - Replaceable part designed for particular fuels located in the funnel grate

Refractory - Bricks of various shapes lining the ash chamber causing gasification

Turbulator - Cleaning mechanism located in heat exchangers that also increase efficiency

Draft Inducer - Fan that manages the combustion process

Igniter - Hot air blower for igniting fuel

Gasification - Extracting gas from the wood to be burnt to heat water

Buffer - AKA Thermal Storage - Tanks used to store hot water

2: Terms

Air Ratio - See air factor

ESC - Function on display controlled by the operator to move back

Fire Irons - Metal pokers and scrapers used for ash/wood cleaning & maintenance

Fault - An error that causes an alarm

Hopper - Storage container used to hold pellets

Fuel Shut Off - Metal gate used to isolate fuel storage from high temperatures and/or fire

Call for Heat - Heat demands from circuits utilized in heating system designs

Release - A demand set by the operator for the furnace to carry out a function

Blow Down - The process of removing sediment deposits from the furnace/buffer tank(s) by draining water from the bottom of the unit(s) until the water runs clean

Lambda - AKA Oxygen Sensor - A sensor that measures the amount of oxygen in the flue gas

Below are links to information to help ensure a clean burn.

EPA's Burnwise Program- http://www.epa.gov/burnwise.

How to Use a Moisture Meter Video- http://www.youtube.com/watch?v=jM2WGgRcnm0
EPA offers tips on how to properly use a moisture meter to test firewood before using in a wood-burning stove or fireplace. Wet wood can create excessive smoke which is wasted fuel.

Split, Stack, Cover and Store Video- http://www.youtube.com/watch?v=yo1--Zrh11s
EPA offers four simple steps to properly dry firewood before using in a wood-burning stove or fireplace. Wet wood can create excessive smoke which is wasted fuel. Burning dry, seasoned firewood with a moisture content of 20% or less can save money and help reduce harmful air pollution.

Wet Wood is a Waste brochure- http://www.epa.gov/burnwise/pdfs/wetwoodwastebrochure.pdf
This tri-fold brochure provides colorful illustrations of the four easy steps to dry firewood.

3: Safety

- All installation and operations must follow STATE and LOCAL CODES for wiring, plumbing, and firing of this unit. These CODES may differ from this manual. Installation must be performed by a qualified installer.
- All Flex fuel models operate at atmospheric pressure. DO NOT obstruct, block, or plug the overflow tank.
- Never open the ash door during operation!
- Anyone who is not familiar with and/or has not been trained to operate the Flex fuel may not operate the system. Only responsible adults should operate your furnace. If the furnace is not fired properly damage could result and the warranty may be voided.
- Never allow children to play near or tamper with the furnace, fuels, tanks or any other part of the system.
- Always keep the area around, and in front of fuel door clean and free from combustible materials.
- Keep animals away from the furnace.
- The operation may not be continued or restarted in the event of visible damages (for example, water leaks, thermal distortion, traces of smoke or fire, mechanical damages, etc.). Any damages must be repaired. In the event of any doubts, please contact your authorized WoodMaster Flex fuel Dealer.
- Freeze protection must be guaranteed in all water-bearing parts in the event of extensive idle periods of the system. **Note**: Your Flex fuel is not intended to be your only heat source. In the event that your existing heat source will not back up your Flex fuel antifreeze must be used.
- The Flex fuel system must not be exposed to external mechanical stress (for example, as storage, climbing support, brace, or similar). This also applies for single parts (doors, covers, etc.).
- Only touch the handles during the operation. Temperatures at other points (for example, chimney, ash door, buffer tank, lines…) can be very high.
- The Flex fuel must be operated exclusively according to the guidelines for planning, assembly, regulations, statutes and product related instructions. The manufacturer is not liable for damages and their results, if they occurred due to improper assembly, operation, application and also inadequate maintenance and cleaning.
- Do not connect this unit to a chimney flue serving another appliance. Follow all state/local codes.
- Load wood carefully to avoid injury to hands and fingers that may come into contact with furnace opening.
- Read and follow these directions carefully. Retain this manual for as long as you own your Flex fuel.
- The warranty can be voided by operating the furnace in a manner inconsistent with this manual.
- Remember to recycle the packaging your Flex fuel was shipped in. In the long term properly recycle the furnace if you replace your Flex fuel.

Northwest Manufacturing Inc.
600 Polk Ave S.W. Red Lake Falls, MN 56750

Model: 60KW

Minimum Ampacity (MCA): 20

Voltage: 120 VAC

Maximum Over current Protective Device: 20

AMPS: 15

REFER TO OWNERS MANUAL
for basic operating and maintenance instructions

Frequency: 60 Hz

All Flue connections must be installed with: A UL 103-HT/ULCS-629 Listed 8" chimney
In compliance with NFPA 211.

For use on non- combustible flooring.

Minimum Installation clearance: TOP: 11", FRONT: Open, SIDES: 14", REAR: 19.5".

Use all accessories provided with the unit-see installation manual for details.
See owner's manual for ventilation requirements of the heating room.
Burn solid wood pellets, or cord wood. Load fuel carefully or damage may result.
Unit will not operate without electrical power.

DANGER-RISK OF FIRE OR EXPLOSION

DO NOT use chemicals or fluids to start fire.
DO NOT burn garbage, gasoline, naphtha, engine oil, or other flammable liquids.
DO NOT store fuel or other combustible materials within marked installation clearances.
DO NOT connect this unit to a chimney flue serving another appliance.

WARNING- RISK OF FIRE

Unsafe to adjust draft higher than .04 inch w.c.
For safety keep fuel door and ash removal doors tightly closed during operation.
In the event of a runaway fire disconnect the power supply.
The heat exchanger pipes, flue pipe, and chimney must be cleaned regularly to remove accumulated creosote and ash, ensure that the heat exchanger pipes, flue pipe, and chimney are cleaned at the end of the heating season to minimize corrosion during the summer months. The appliance, flue pipe and chimney must be in good condition.

CAUTION-THE DOOR MAY BE HOT TO THE TOUCH:
KEEP CHILDREN AWAY!

TESTED TO CAN/CSA B366.1-M91 JUNE 1991 AND UL 2523 FIRST EDITION

PRODUCTION DATE CODE

Northwest Manufacturing Inc.
600 Polk Ave S.W. Red Lake Falls, MN 56750

Model: 30KW

Minimum Ampacity (MCA): 20

Voltage: 120 VAC

Maximum Over current Protective Device: 20

AMPS: 15

REFER TO OWNERS MANUAL
for basic operating and maintenance instructions

Frequency: 60 Hz

All Flue connections must be installed with: A UL 103-HT/ULCS-629 Listed 6" chimney
In compliance with NFPA 211.

For use on non- combustible flooring.

Minimum Installation clearance: TOP: 11", FRONT: Open, SIDES: 14", REAR: 19.5".

Use all accessories provided with the unit-see installation manual for details.
See owner's manual for ventilation requirements of the heating room.
Burn solid wood pellets, or cord wood. Load fuel carefully or damage may result.
Unit will not operate without electrical power.

DANGER-RISK OF FIRE OR EXPLOSION

DO NOT use chemicals or fluids to start fire.
DO NOT burn garbage, gasoline, naphtha, engine oil, or other flammable liquids.
DO NOT store fuel or other combustible materials within marked installation clearances.
DO NOT connect this unit to a chimney flue serving another appliance.

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TESTED TO CAN/CSA B366.1-M91 JUNE 1991 AND UL 2523 FIRST EDITION

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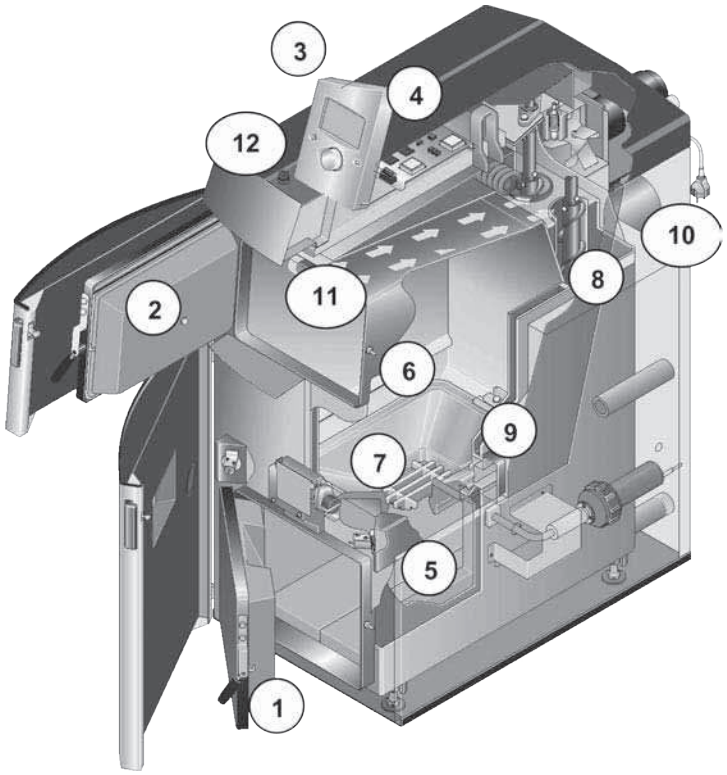
4: Features



1. Ash Door - A large opening to make cleaning the ash chamber simple and easy.

2. Firebox door - A large opening to make filling and cleaning the firebox simple and easy

3. Display for Controller - Designed for easy operation.

4. I/O Board - An input output board that controls the furnace as well as where optional accessories plug in.

5. Ash Chamber - A large compartment to reduce the amount of times the ash needs to be removed.

6. Firebox - Large volume to hold enough wood for up to a four hour burn at max burn rate.

7. Inserts for Pellets or Bulk Materials - Easily changed when switching operating mode. No tools required.

8. Heat Exchanger - Efficient transfer of heat and are self cleaning.

9. Flange for Automatic Loading (Both Sides) - Allows the optional pellet arm to be installed on either side.

10. Exhaust Pipe - Allows easy installation to both new and existing chimneys.

11. Smoldering Gas Duct - Prevents any exhaust from exiting the furnace when the firebox door is open.

12. STL (Safety Temp Limiter) - Safety switch that shuts down the furnace in the even of it overheating.

All photos in this manual represent the Flex fuel 30 kW unless otherwise noted

5: Installation

Your Flex fuel must be installed by a professional and should follow all local, state and federal laws and regulations. Any use of an unapproved installation may result in a voided warranty. It is recommended to have your installation approved by WoodMaster. The Owner/Operator is responsible for operating the furnace in a manner that does not create a nuisance condition. WoodMaster requirements, state and local laws may not be sufficient in all conditions to prevent nuisance conditions due to factors that vary at each location. Please plan your system accordingly.

5.1 Location

Your Flex fuel can only be installed indoors. The furnace may be installed inside the building that it serves or in an out building. Your Flex fuel must have protection against freezing. Your Flex fuel does not need to be installed in the same structure that it serves.

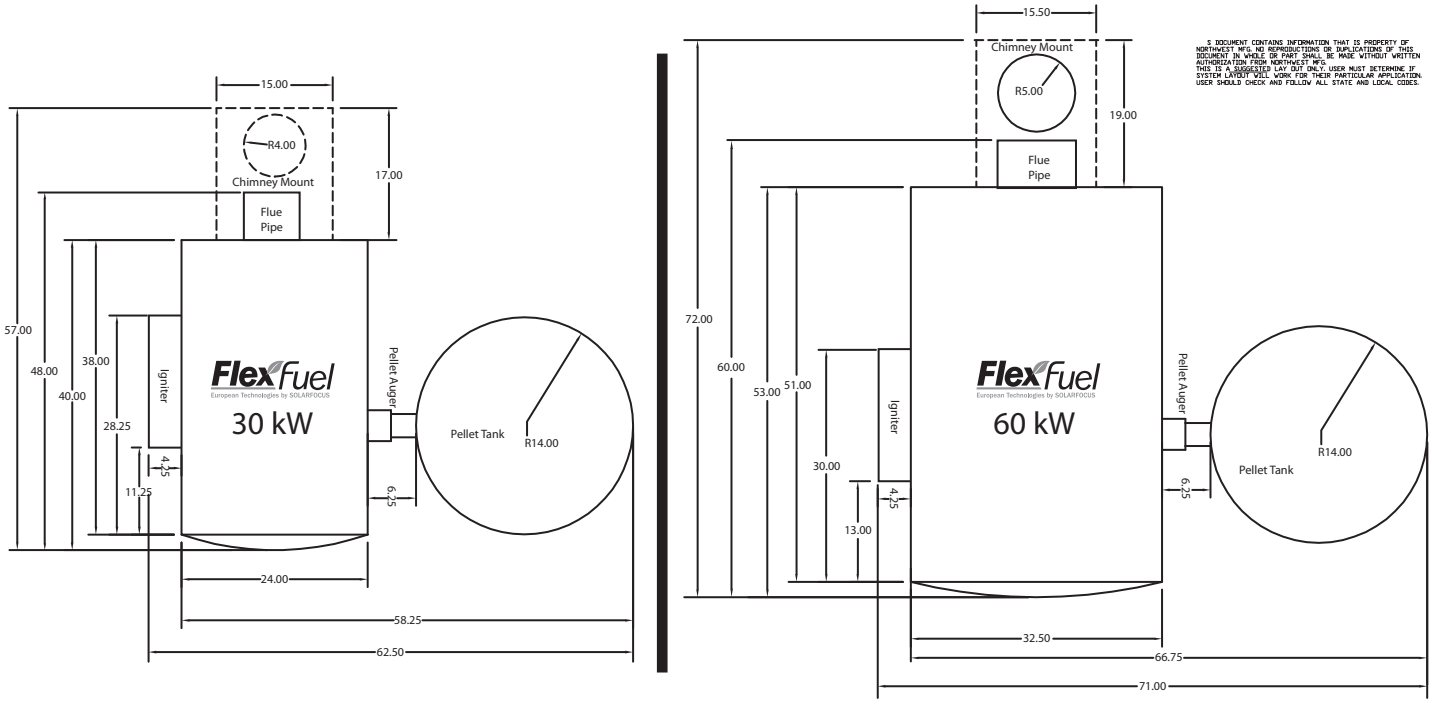
Ensure that the floor that the furnace is placed on is level and able to support the weight of the furnace plus the additional weight of the water and fuel.

There should be ample room around your Flex fuel to make loading and cleaning your furnace easier. This area should also be clear of any easily combustible materials. Minimum clearances requirements is 45 inches for the top, 14 inches for the sides, 19.5 inches for the back and open to the front.

The room where the furnace is placed should allow ample venting to ensure proper air flow to the furnace. The vent size requirements are 31 square inches for the Flex fuel 30 kW and 62 square inches for the Flex fuel 60 kW.

Ensure the feet are in the bottom of the furnace. adjust the feet so the furnace sits level and the feet are loaded evenly.

Below are the dimensions for both the Flex fuel 30 kW and Flex fuel 60 kW including all optional accessories and chimney. These dimensions are approximate.



5.2 Display

Remove the hood of the furnace by lifting it to access the displays mounting position.

Plug the display into the intended connector on the I/O board.

Screw the display to the furnace using the supplied hardware.

5.3 Chimney

The flue pipe is to be installed is a rising chimney, and must be 6 inches for the 30 kW and 8 inches for the 60 kW.

Elbows should not be used, T's are recommended to allow for the cleaning of the flue pipe.

For every one foot of horizontal pipe three feet of vertical pipe is required.

A barometric damper must be used to allow proper flow. The damper must be installed as close to the furnace as possible.

The chimney draw must be 0.1 mbars.

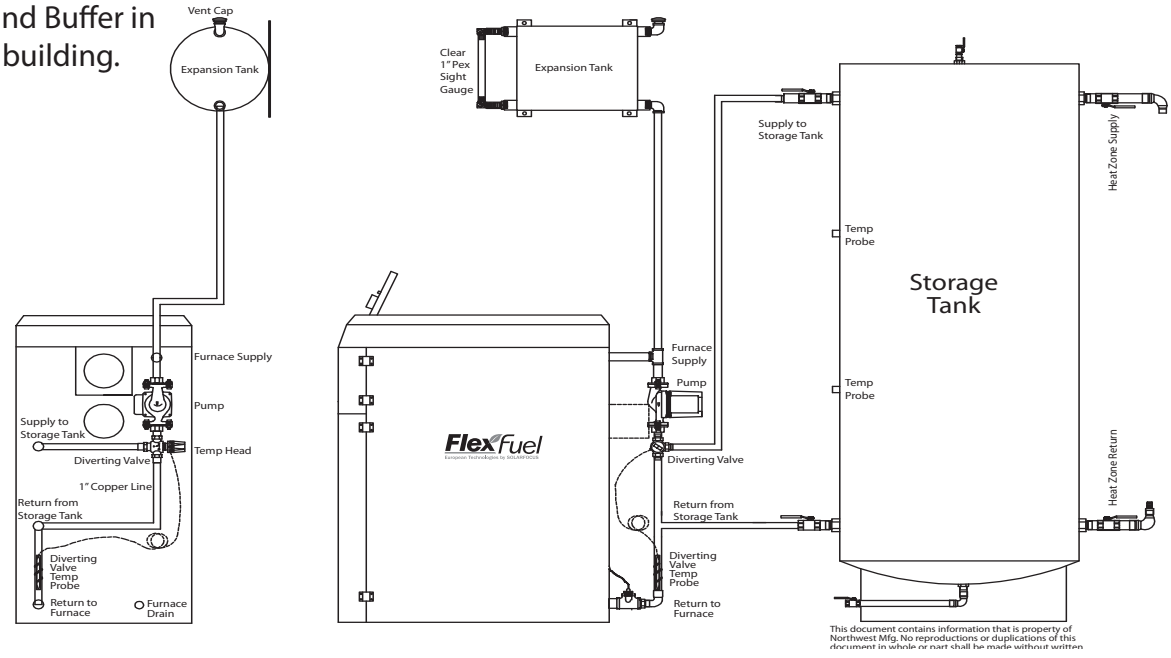
Chimneys must follow all state and local codes.

Your Flex fuel can be vented into an existing chimney as long as the chimney fits the necessary criteria.

5.4 Water Connections

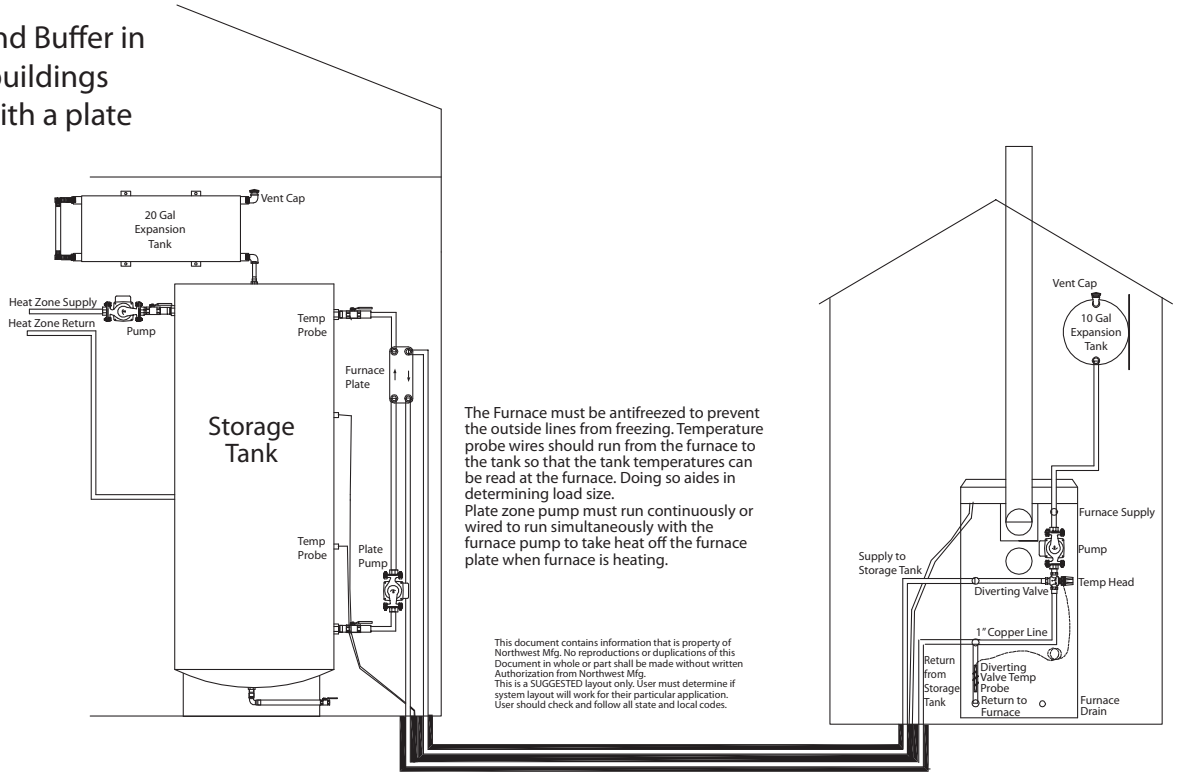
The following layouts are basic configuration for the furnace water connections. Contact your WoodMaster Flex fuel Dealer for additional layouts. Insulate the lines if desired to prevent heat loss. 1" line is recommended for the Flex fuel 30 kW and 1.25" line is recommended for the Flex fuel 60 kW.

Furnace and Buffer in the same building.



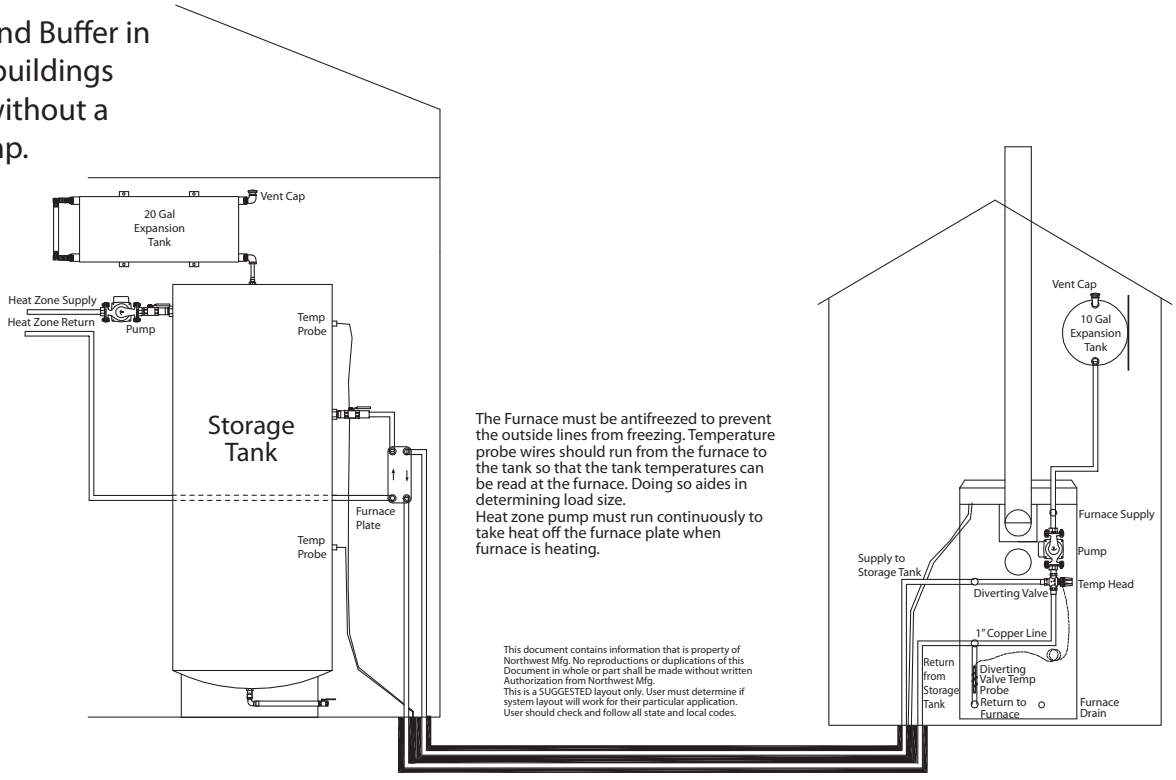
5: Installation

Furnace and Buffer in separate buildings running with a plate pump.



The Furnace must be antifreezed to prevent the outside lines from freezing. Temperature probe wires should run from the furnace to the tank so that the tank temperatures can be read at the furnace. Doing so aides in determining load size.
Plate zone pump must run continuously or wired to run simultaneously with the furnace pump to take heat off the furnace plate when furnace is heating.

Furnace and Buffer in separate buildings running without a plate pump.



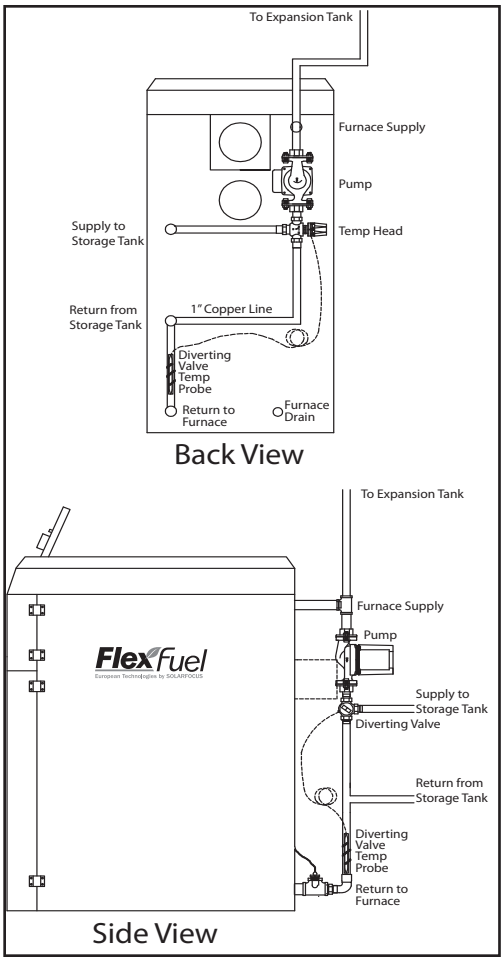
The Furnace must be antifreezed to prevent the outside lines from freezing. Temperature probe wires should run from the furnace to the tank so that the tank temperatures can be read at the furnace. Doing so aides in determining load size.
Heat zone pump must run continuously to take heat off the furnace plate when furnace is heating.

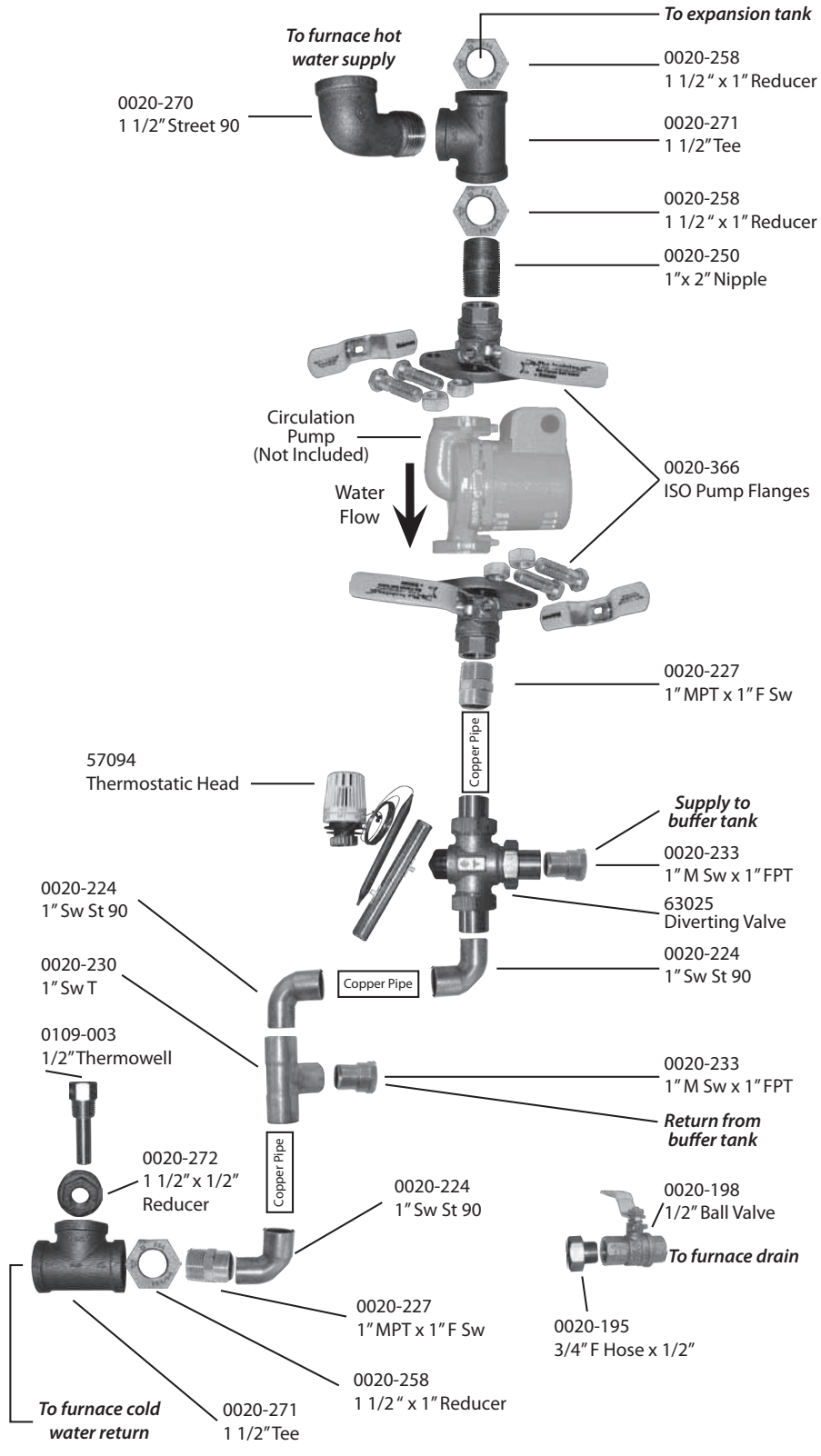
Plumbing the Rear of the Furnace

The images below show how to connect the pump to the back of your Flex fuel furnace using the installation kit. Please note that the circulation pump and copper lines are not included in the kit. All plumbing should be done by a qualified plumber. This kit is a 1" kit, a 1.25" kit (020-0010) is available.

1" Furnace Plumbing Kit (020-0006)

Part No.	Description
0030-195	3/4" F Hose x 1/2"
0020-198	1/2" Ball Valve
0020-224	1" Sw St 90 (3)
0020-227	1" MPT x 1" F Sw (2)
0020-230	1" Sw T
0020-233	1" M Sw x 1" FPT (2)
0020-250	1"x 2" Nipple
0020-258	1 1/2 " x 1" Reducer (3)
0020-270	1 1/2" Street 90
0020-271	1 1/2" Tee (2)
0020-272	1 1/2" x 1/2" Reducer
0020-366	ISO Pump Flanges
0109-003	1/2" Thermowell
63025	Diverting Valve
57094	Thermostatic Head





5: Installation

Expansion Tank

Since the Flex fuel is a non pressurized system, an expansion tank is needed to allow the water to expand when heated.

The Expansion tank should be connected to the furnace through 1" line and should be placed higher than the top of the furnace. (See Diagram On Page 11)

Your expansion tank should be sized according to the total amount of water in your system. for every 150 gallons of water in the system, there should be room for 5 gallons in the expansion tank. Do not over fill your expansion tank as it may overflow when the water in the system heats up and expands.

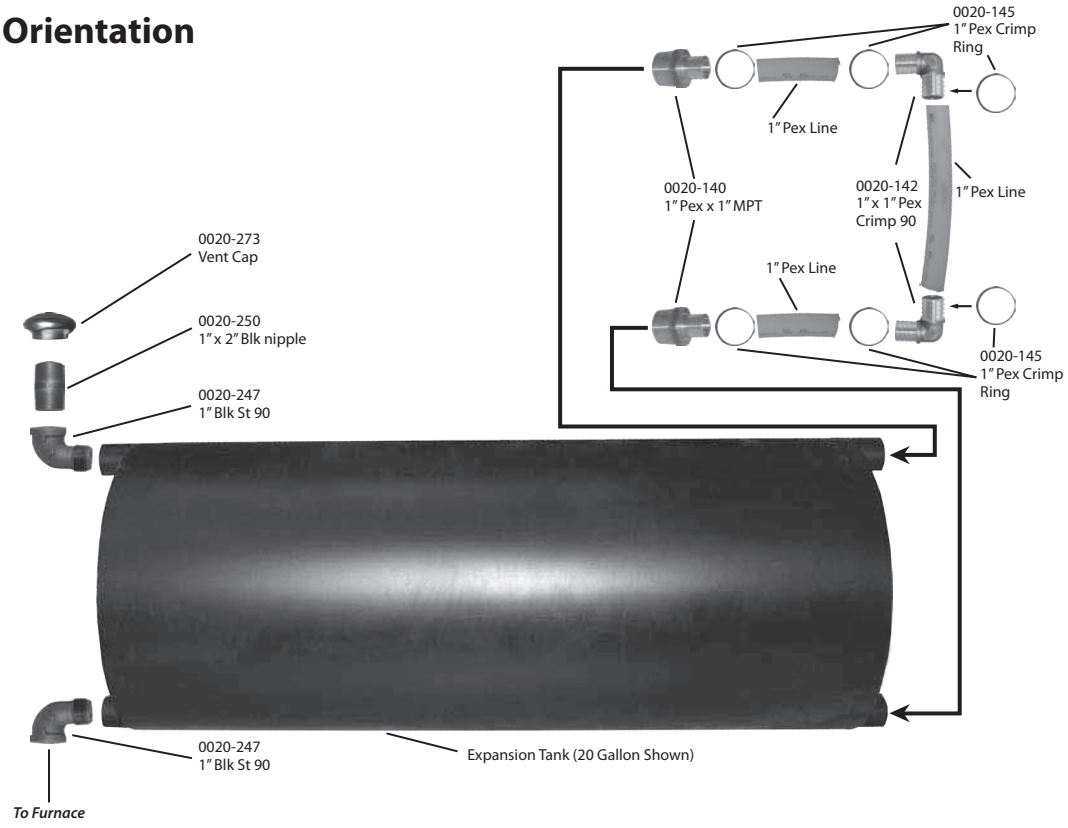
Note: The expansion tank must be vented so that the system will not become pressurized. There MUST NOT be a valve between the expansion tank and furnace. Failure to vent the furnace may result to damage to the furnace and/or severe injury or death.

Expansion Tank Kit

The following images shows the basic layout for attaching the site tube and vent cap to your expansion tank. Installation is the same for both the 10 and 20 gallon tanks. Ensure that the vent is properly used and that the system is not allowed to become pressurized.

The Expansion tank must be placed higher than the top of the furnace. Ensure that the mounting location is capable of supporting the weight of the tank plus the weight of the water when completely full. The sight tube can be on either the right or left side of the expansion tank.

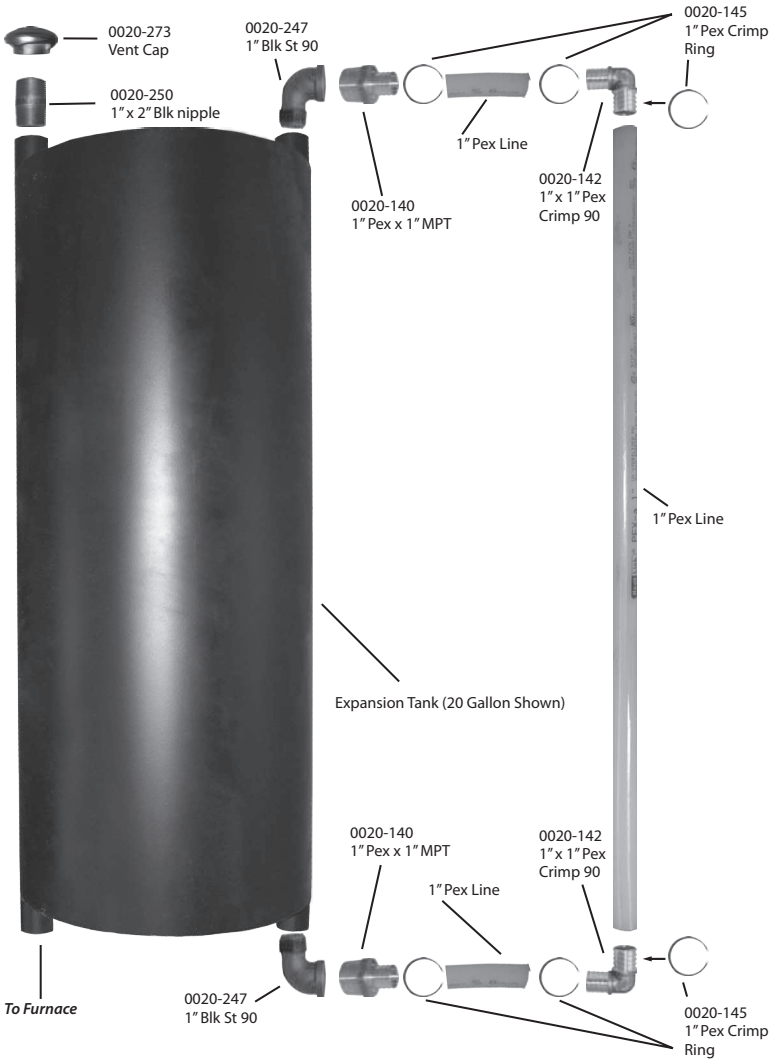
Horizontal Orientation



Vertical Orientation

Expansion Tank Kit (020-0008)

Part No.	Description
0020-273	Vent Cap
0020-250	1″ x 2″ Blk nipple
0020-247	1″ Blk St 90 (2)
0020-140	1″ Pex x 1″ MPT (2)
0020-142	1″ x 1″ Pex Crimp 90 (2)
0020-145	1″ Pex Crimp Ring (6)
020-0044	44″ of Clear 1″ Pex



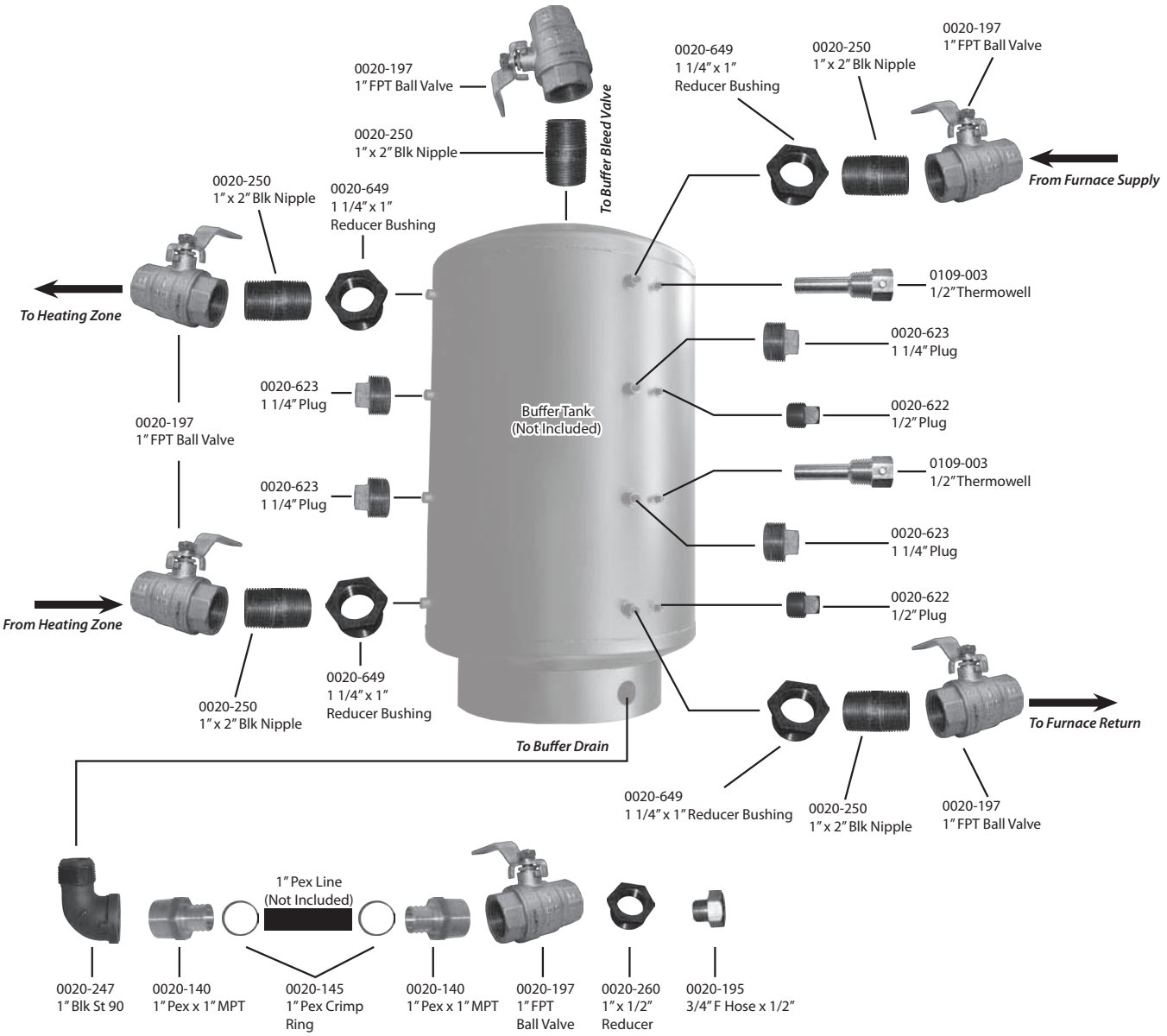
Note: Contents are the same for both horizontal and vertical layouts.

Buffer Tank

The size of the buffer tank is determined by the size of the furnace. Recommended buffer tank capacities are approximately 165 gallons for the Flex fuel 30 kW running only on pellets, and approximately 300 gallons if bulk materials are to be used. Approximately 285 gallons is recommended for the Flex fuel 60 kW running only on pellets and approximately 600 gallons if bulk materials are to be used. Different configurations are available depending on your application. Tanks are available in 165, 220, 285 and 550 gallon sizes. Please contact your WoodMaster Flex fuel Dealer for further assistance. Additional water storage will increase time between fills if you are running bulk materials. Your buffer tank should be insulated.

Buffer Tank Kit

The following images shows the basic layout for attaching the Buffer Tank Kit to a buffer tank. This process remains the same for all buffer tank sizes. Each buffer tank will require its own Buffer Tank Kit. The kit supplies all necessary attachments to properly set up your buffer tank as well as proper venting and draining. Additional line may be required to extend the drain. Adapters may be purchased through your WoodMaster Flex fuel Dealer for using this buffer tank with 1" Pex line or 1" copper line. The tank should be installed by a qualified plumber. All Threaded fittings require the used of thread seal tape or pipe dope.



Buffer Tank Kit (020-0009)

Part No.	Description	Part No.	Description	Part No.	Description
0020-140	1" Pex x 1" MPT (2)	0020-247	1" Blk St 90	0020-623	1 1/4" Plug (4)
0020-145	1" Pex Crimp Ring (2)	0020-250	1" x 2" Blk Nipple (5)	0020-649	1 1/4" x 1"Reducer (4)
0020-195	3/4" F Hose x 1/2"	0020-260	1" x 1/2' Reducer	0109-003	1/2" Thermowell (2)
0020-197	1" FPT Ball Valve (6)	0020-622	1/2" Plug (2)		

Filling the Furnace and Buffer With Water

Your Flex fuel furnace should be filled with clean drinking water that has minimal water impurities. Do not fill your furnace with water from lakes, rivers, ponds, etc.

Your Flex fuel furnace can be filled with water by adding water to the expansion tank above the furnace. Ensure that you leave enough room in the expansion tank for when the water is heated to avoid water from spilling over.

The buffer tank(s) should be filled from the bottom of the tank. while filling the tank the valve on the top should be open to vent the air out of the system. Once all the air is out of the tank close the top valve.

It is necessary to monitor and bleed off any excess air that may be in the system once the furnace is operational. However do not try to bleed the buffer tank while the pumps are running. Any air in the furnace will self bleed into the expansion tank.

Boiler treatment must be used with all water types and system configurations. Antifreeze can be added to systems that have components that may be subject to freezing if the furnace is not run for an extended period of time. Boiler treatment must still be used even when antifreeze is present in the system.

Setting the Diverting Valve

Your furnace requires a return water temperature minimum of 140°F during operating. Adjusting the valve is a one time process during the initial firing. Start the process by having the valve at the maximum setting. Start adjusting when the bottom of your buffer tank is below 130°F and the furnace is above 150°F. Adjust the valve down and monitor the water temperature on the display. Once the furnace display reads between 140°F and 150°F for the return water temperature the valve is adjusted properly.

5.5 Electrical Connections

Note: Be sure to follow all local, state and federal guidelines. Wiring installation should be preformed by a qualified electrician.

Main Power Connection

Your Flex fuel needs a 120 V connection with a 20 amp circuit for the basic unit.

The unit must be properly grounded to ensure proper operation. Failure to properly ground the unit will result in a voided warranty.

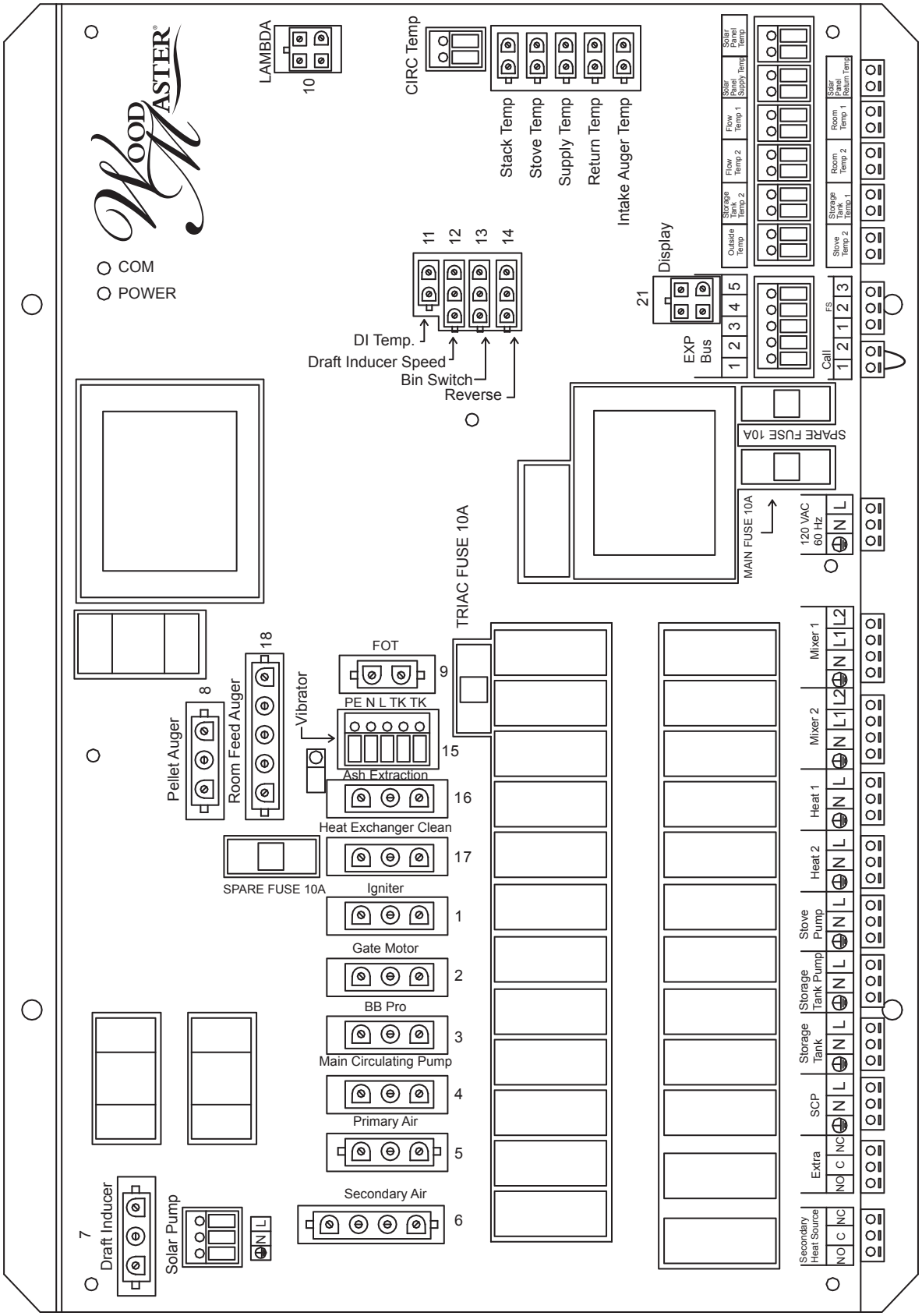
Secondary Power Connections

Secondary power connections include a pump, igniter (optional) and the pellet arm (optional).

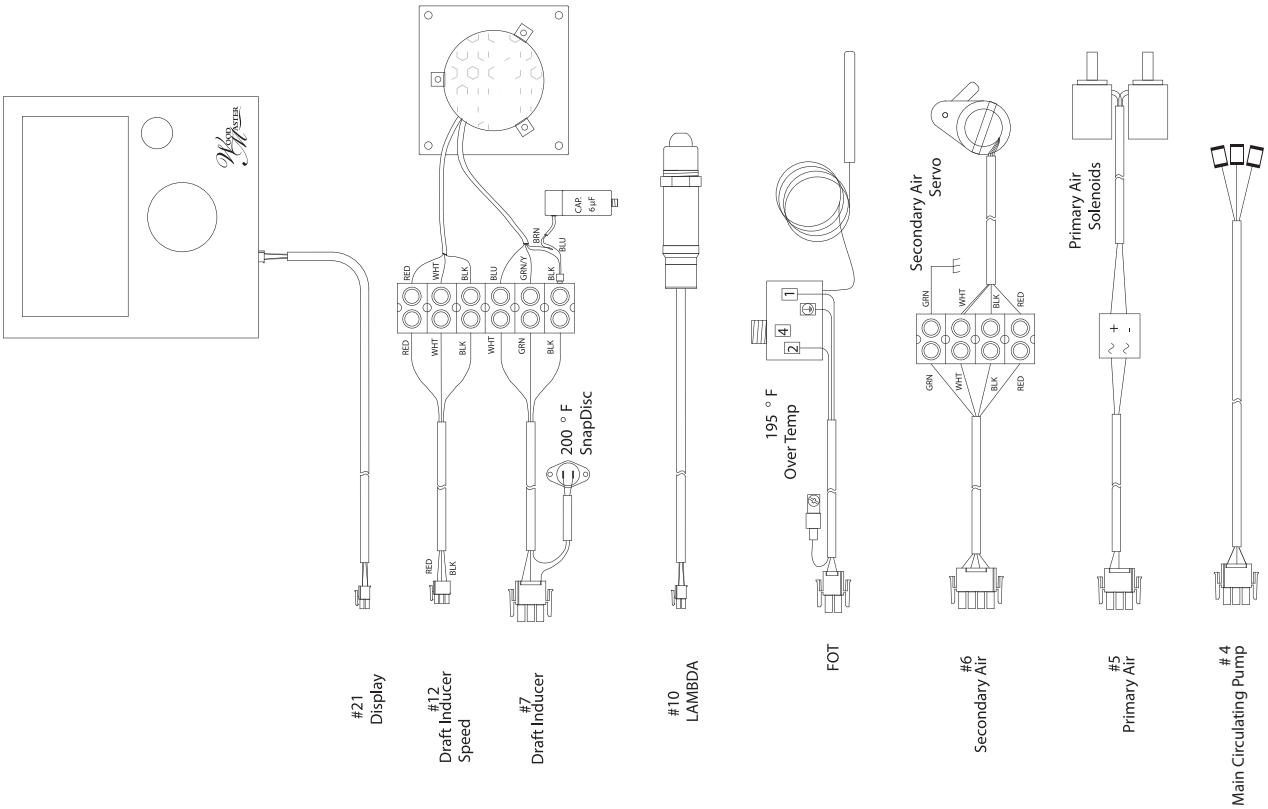
Main Circulating Pump

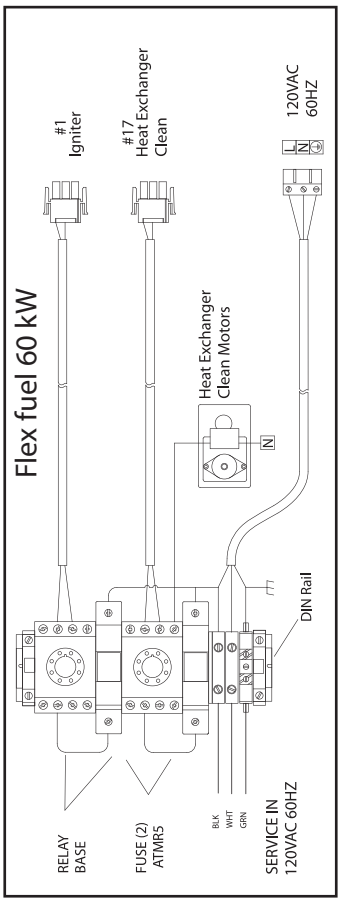
Your Flex fuel comes with the proper wiring harness and connections to power a pump at the rear of the furnace. Pump wiring must be done by a qualified electrician.

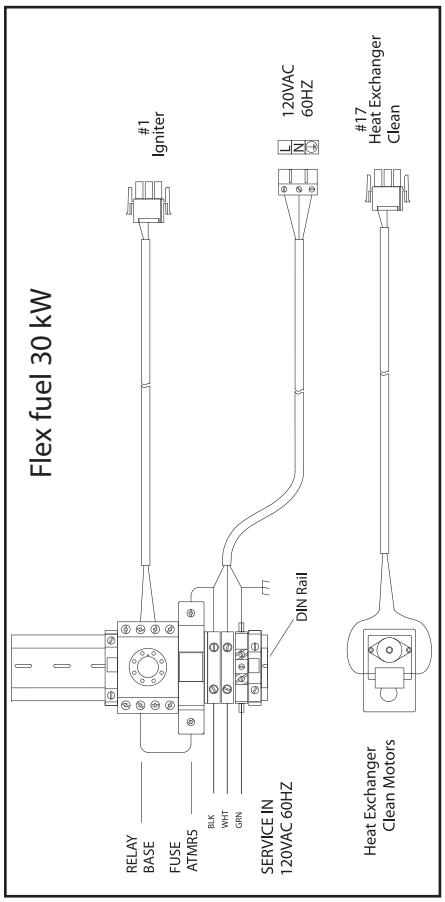
5.6 I/O Board

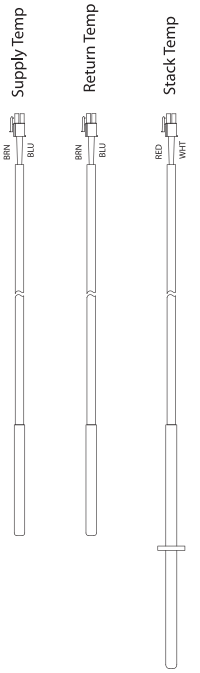

LAMBDA
10
CIRC Temp
Stack Temp
Stove Temp
Supply Temp
Return Temp
Intake Auger Temp
Outside Temp
Storage Tank Temp 2
Flow Temp 2
Solar Panel Supply Temp
Flow Temp 1
Solar Panel Temp
Stove Temp 2
Storage Tank Temp 1
Room Temp 2
Room Temp 1
Solar Panel Return Temp
COM
POWER
11
12
13
14
DI Temp.
Draft Inducer Speed
Bin Switch
Reverse
21
Display
EXP Bus
1 2 3 4 5
Call
FS
1 2 1 2 3
SPARE FUSE 10A
MAIN FUSE 10A
120 VAC 60 Hz
N L
TRIAC FUSE 10A
18
Room Feed Auger
8
Pellet Auger
FOT
9
PE N L TK TK
Vibrator
15
Ash Extraction
16
Heat Exchanger Clean
17
SPARE FUSE 10A
Igniter
1
Gate Motor
2
BB Pro
3
Main Circulating Pump
4
Primary Air
5
Secondary Air
6
7
Draft Inducer
Solar Pump
N L
Mixer 1
N L1 L2
Mixer 2
N L1 L2
Heat 1
N L
Heat 2
N L
Stove Pump
N L
Storage Tank Pump
N L
Storage Tank
N L
SCP
N L
Extra
NO C NC
Secondary Heat Source
NO C NC

Connections







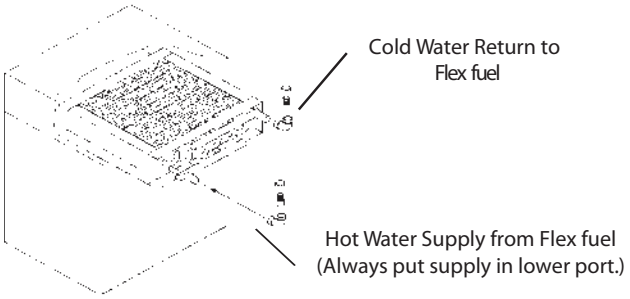


5.7 Connecting to Heating System

Existing Forced Air

A water to air heat exchanger is inserted in the existing plenum. In most cases the heat exchanger is placed in a horizontal position, keeping all four sides level. The air must be forced through the finned area of the heat exchanger evenly. The hot water line coming from the hot-water tube enters the bottom fitting of the heat exchanger and exits the top fitting, which returns to the furnace. If the plenum is too large or too small, it must be altered to fit the heat exchanger properly.

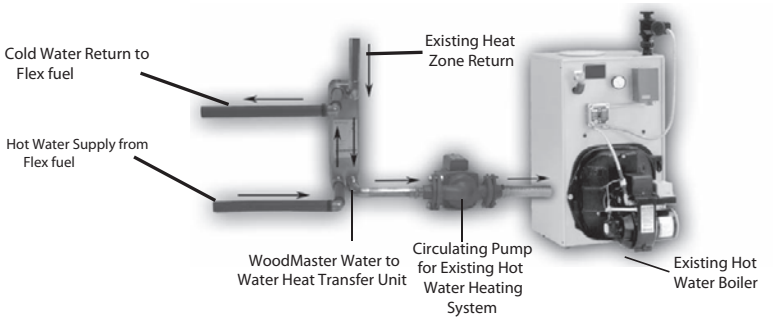
Note: The Water to Air Heat Exchanger must be installed below any existing Off-Peak electric coils already in the plenum.



After the installation of the WoodMaster add-on water to air exchanger, the air flow may need to be increased to fuel furnaces, electric furnaces, and electric/gas furnaces. Contact your dealer for assistance.

Existing Hot Water Heat

A Water to Water Heat Transfer Unit is used to connect to an existing hot water boiler system.



Note: Any changes that are made to an existing boiler should be done by a qualified plumber and follow all state and local codes.

6: Fuels

All fuels must conform to certain quality standards to ensure trouble free operation of the furnace. Use of unapproved fuels may result in faulty operation and a voided warranty. Never use the following: trash, household garbage, plastics, gasoline, rubber, naphtha, leaves and materials treated with petroleum products (ie: particleboard, railroad ties & pressure treated wood). Newspaper and plain, unprinted cardboard should only be used as kindling, not as fuel. Other paper products should not be used. Please contact your WoodMaster Flex fuel dealer for any questions on fuel use.

6.1 Pellets

Only premium pellets certified by the Pellet Fuels Institute may be used and must follow these guidelines:

- Bulk density per cubic foot must be a minimum of 40 pounds
- The diameter is between 1/4 inch to 5/16 inch
- Maximum length is 1.5 inches
- Fines (dust) of not more than 0.5% by weight
- Sodium content shall be less than 300 parts per million
- Ash content of 1% or less
- Moisture content of 10% or less

Note: Pellets should be stored in a dry area and should not be allowed to get wet. Handle pellets with care.

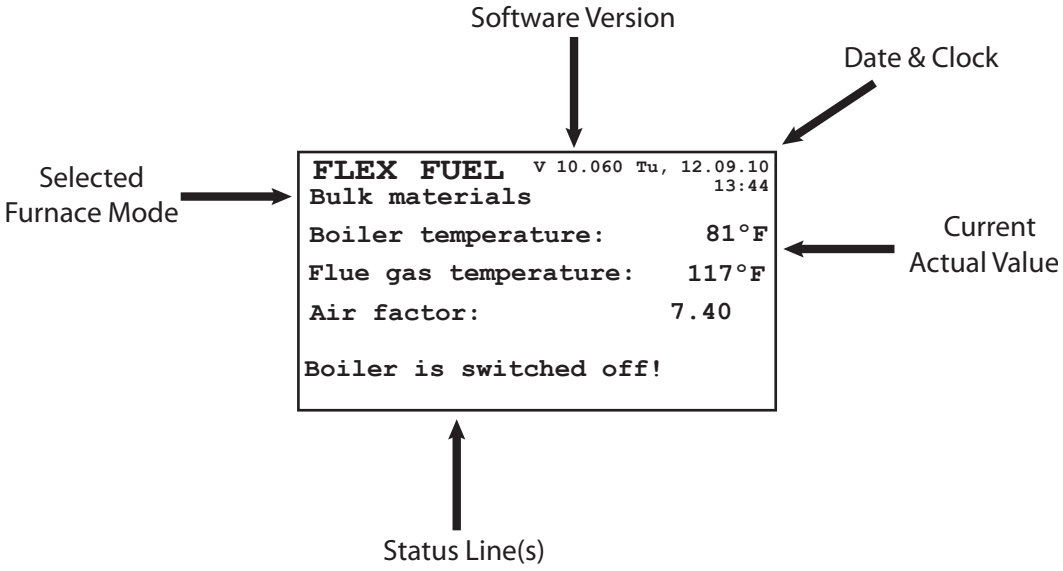
6.2 Bulk Material

Only cut, split, seasoned wood with a internal moisture content of 25% or less may be used. Wood can be cut to a maximum length of 21 inches for the Flex fuel 30 and a maximum of 26 inches for the Flex fuel 60. The wood should always be placed horizontally and parallel to the firebox wall. The pieces of wood should be stacked as tightly as possible whereby the face of the wood should NOT touch the firebox wall. This ensures that it slides correctly. DO NOT burn any large, round pieces of wood. DO NOT burn any "green wood", or any wood that is above the 25% moisture limit.

Water Content
The maximum permitted water content is 25%.
Bark Content
The maximum permitted bark content is 20%.

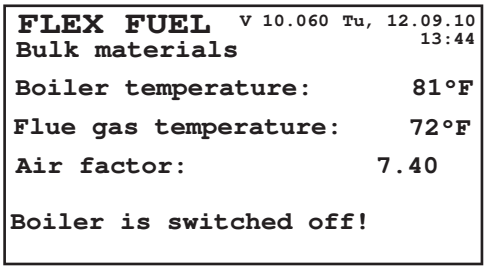
7: Switching the Furnace On & Off

It is only possible to switch the furnace on and off from the start screen. The currently selected operating mode is indicated on the line "Selected furnace mode" (in this example "Bulk materials"). The status line "Boiler is switched off!" indicates that the furnace is switched off. Automatic furnace start-up is only possible when the furnace is switched on.



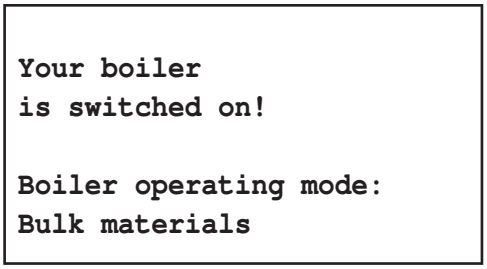
7.1 Switching the Furnace On

The following picture shows a furnace currently running in operating mode "Bulk materials" with current operating status "Boiler is switched off!".



To switch on the furnace, press and hold the control knob for 3 – 4 seconds.

The following confirmation message appears on the display for several seconds:



The furnace is then switched on and you are returned to the start screen. The status line indicates the current operational status of the furnace.

The significance of the status lines are best described in sections

- Section 11.6: Status lines during furnace operating mode "Bulk materials"
- Section 12.6: Status lines during furnace operating mode "Bulk materials auto control"
- Section 13.6: Status lines during furnace operating mode "Pellets auto control"

Note: The furnace switch-on procedure is the same in all furnace operating modes ("Pellets auto control", "Bulk materials" and "Bulk materials auto control").

7.2 Switching the Furnace Off

To switch the furnace off, press and hold the ESC button when the start screen is being displayed. A switch-off message is displayed for several seconds before returning to the start screen.

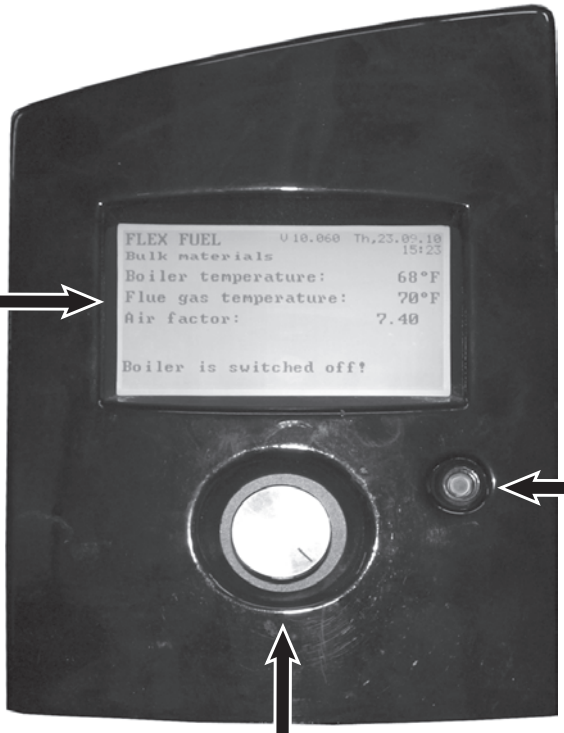
```
Your boiler
is switched off!

Boiler operating mode:
Bulk materials
```

The status line then indicates **"Boiler is switched off!"**

If the furnace is running in Bulk materials or Bulk materials auto control mode, it is only possible to switch off the furnace when the following conditions are met:

- Low flue gas temperature (Below factory default)
- Air factor is above 2.50
- Lambda sensor pre-heat time has elapsed (duration 150 seconds)

8: Display



Back lit Display

ESC Button

Control Knob and Operating/Start Button

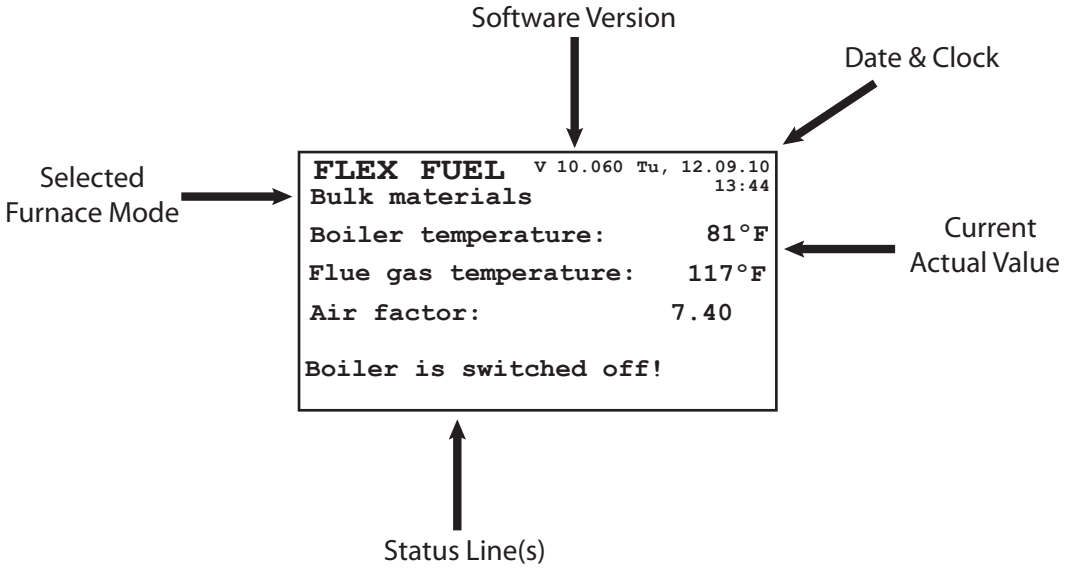
Overview:

All settings are changed using the Control Knob in the center of the operating unit. Turn the wheel to scroll through the various menus, move the cursor to the settings or increase/decrease the values. Press the control knob to access the menus, select the settings, confirm a modified setting. The control knob is also used to start up the furnace and activate the smoldering gas extraction.

The ESC button to the right of the rotary button may be used at any time to quit a particular sub-menu. Pressing this button several times will return you to the start screen. Press and hold the ESC button for 3 seconds when the start screen is displayed to switch off the furnace. Smoldering gas extraction can also be deactivated by pressing the ESC button for 3 seconds. When making changes in a screen, pressing the ESC button will NOT save the changes.

8.1 The Starting Screen

The displayed values are current actual values. The boiler temperature, the flue gas temperature and the air factor are displayed.



The lowest line(s) of the starting screen is/are the status line(s). The status line shows the operating status of the furnace.

Note: This furnace runs on DD/MM/YY date format and on military time format.

The currently selected furnace operating mode is displayed. Depending on the furnace model, the following furnace operating modes are available:

- **Bulk materials**
- **Bulk materials auto control**
- **Pellets auto control**

Read further in this section to gain a better understanding of menu navigation, otherwise proceed to the next section.

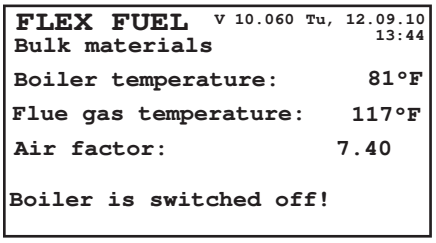
8.2 Menu Navigation

Scrolling Through the System Components

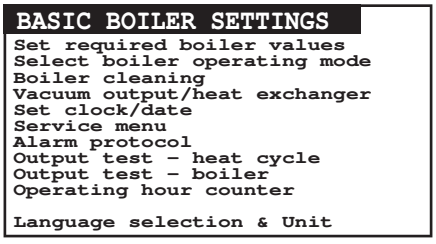
On the starting screen, turn the control knob to the right or left; the actual values and conditions of the existing system components are displayed by this method. By pressing the control knob you will bring up the settings menu of the system components. Pressing the ESC button will bring you back to the starting screen. An example is shown below.

- From the start screen (Screen 1) press the control knob to bring up screen 2.
- Press the control knob again and turn it clockwise to scroll down to "Set clock/date" and press the control knob to select. (Screen 3)
- This will bring up the Set CLOCK/DATE screen. (Screen 4) Press the control knob to select "Date". (Screen 5)
- By pressing the control knob again the cursor will move to the date values. (Screen 6)
- You may either turn the control knob to change the value and press on the control knob to set it or press the ESC button to not change the value and return to the screen heading. (Screen 7)
- Press ESC again to return to the BASIC BOILER SETTINGS screen. (Screen 8)
- Press ESC one more time to return to the start screen. (Screen 1)

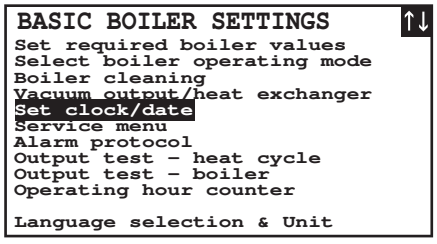
Screen 1



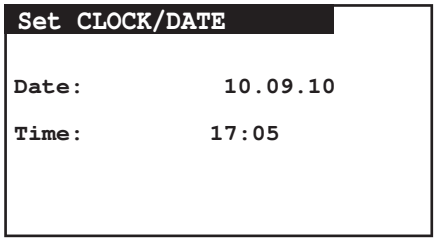
Screen 2



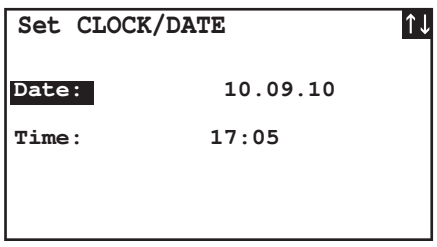
Screen 3



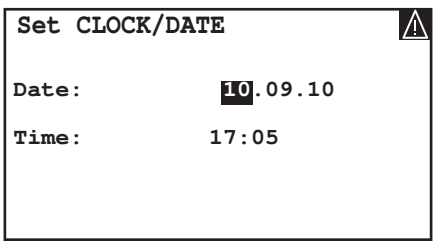
Screen 4



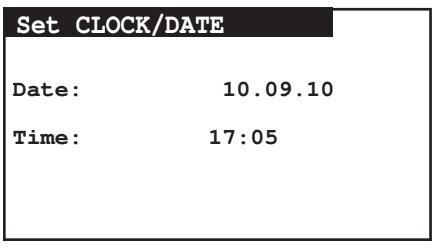
Screen 5



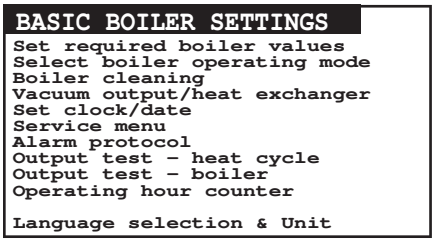
Screen 6



Screen 7



Screen 8



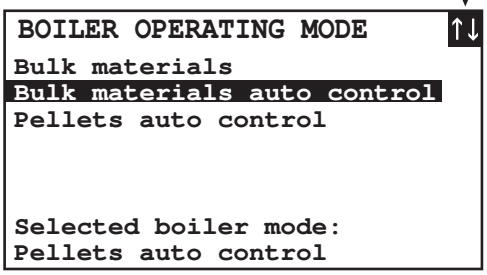
Changing/Viewing Individual Settings

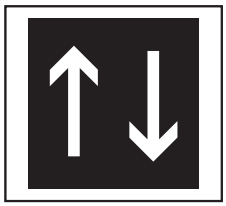
By turning the control knob, you can:

- Navigate between various main menu levels,
- Navigate within a menu,
- View or change individual settings.

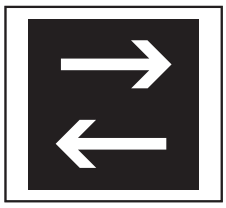
A symbol appears in the upper right hand corner of the screen, which will show you at which level you currently are.

Symbol example





UP/DOWN SYMBOL
If this symbol appears, navigate within the just displayed menu by turning the control knob.



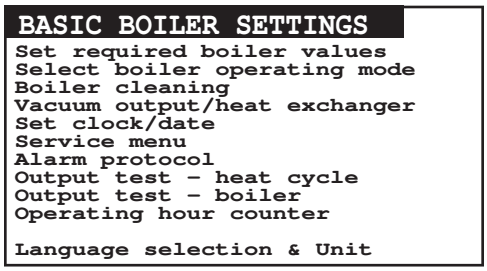
RIGHT/LEFT SYMBOL
If this symbol appears, scroll between various main menus by turning the control knob.

CHANGE SYMBOL
If this symbol appears on the screen, you will change a single setting by turning the control knob. If you turn the knob clockwise, the value increases; if you turn it to the counterclockwise, the value is reduced.

Note: By pressing the ESC key, you will always move back one level, no matter where you are. You will always return to the starting screen. Data WILL NOT be changed by using the ESC key.

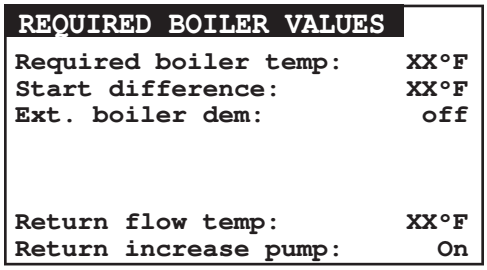
9: Basic Furnace Settings

If you press the control knob on the starting screen, the menu "BASIC BOILER SETTINGS" will appear (Shown Below). Press the control knob again and the cursor moves to the first menu item. By turning the control knob to the right, the cursor moves to the available menu selection items.



9.1 Set Required Boiler Values

In order to set the required boiler values, select "Set required boiler values". The screen shows following figure:



The return flow temperature shown on the screen is the actual temperature of the return. In addition, the status of the return increase pump is displayed.

Start Difference

If the furnace operating mode is set to "Pellets auto control" or "Bulk materials auto control" and heat is being demanded by a system component, the furnace will first start when the furnace temperature is lower than the set "required boiler temperature" less the set "start difference".

9.2 Select Furnace Operating Mode

Please refer to section 10 "Operating Modes" if you want to change the operating mode.

9.3 Boiler Cleaning

In this menu you can select to start the furnace cleaning manually by pressing the control knob.

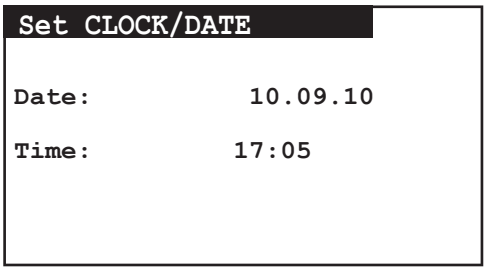
9.4 Vacuum Output/Heat Exchanger

The heat exchanger cleaning cycle activates within the set release period depending on the furnace operating period. It is recommended that a continuous release period is specified (00:00 – 24.00), otherwise a situation may occur where the furnace is not released to start even though there is a call for heat (status line "Heat exchanger cleaning waiting to be released!").

9.5 Setting the Clock/Date

Note: There is no automatic conversion for daylight saving time.
Note: This furnace runs on DD/MM/YY date format and on military time format.

Once you have selected this menu item, the clock stops and the following figure appears on the screen.

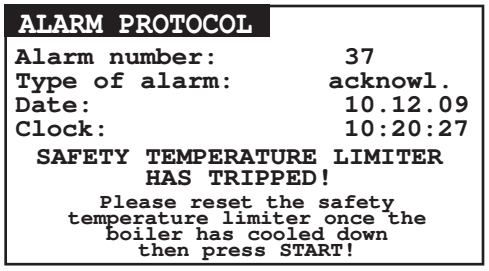


9.6 Service Menu

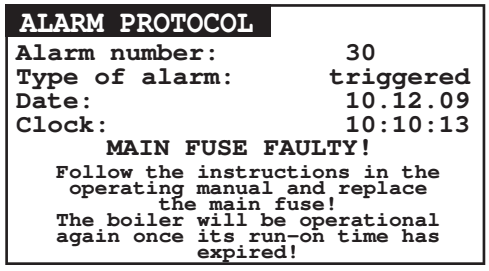
The service menu includes factory settings designed to provide ideal combustion characteristics. These settings have already been optimized in the factory. Access to these settings can only be obtained by your dealer. Please contact your WoodMaster Flex fuel Dealer for assistance.

9.7 Alarm Protocol

All malfunctions are chronologically listed in the alarm protocol. The alarm protocol menu can be found in the service menu main page and selecting it will bring up the following screen:



When pressing the control knob on the alarm protocol screen, the symbol LEFT/RIGHT appears in the upper right hand corner and all previous alarms can be scrolled through.



Note: 40 entries are stored. After the 40th entry (alarm number 39), the oldest entry with alarm number 0 is deleted. It will store when the error message was triggered and when it was cancelled. Therefore, there are 2 entries in the alarm protocol per error message.

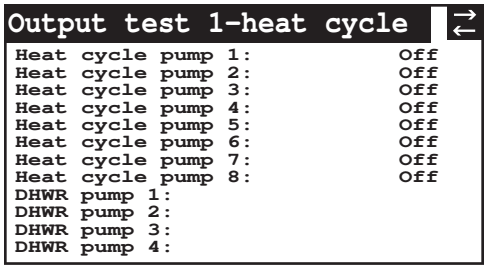
9.8 Output Test – Heating Cycle

Note: Output tests may be preformed by the owner, however, damage can occur if preformed incorrectly. Please contact your WoodMaster Flex fuel dealer for assistance.

An output test of all connected pumps and mixers can be performed in this menu, in order to be able to test the correct operating method.

Note: The heating cycle program is interrupted, as long as the output test is performed. The heating cycle output test should only be controlled by a professional.

Move the curser by turning the control knob to the output test – heating cycle line and press the control knob. Following figure will appear on the screen:



You can now press the control knob to scroll through the items to select one to change. If the control knob is turned to the right while the cursor is in the heading, then the menu "Output Test 2-heat cycle" appears for more options. You may turn the control knob again to bring up the "Output Test 3-heat cycle" menu.

Switching on the Outputs

Press the control knob and the cursor moves from the header to the first menu item mixer 1. By turning the control knob, select the output that you would like to activate and press the control knob. The cursor changes to the entry field. You can switch the output on and/or off by turning the control knob. The input options change from Off to Open to Close in the entry fields of mixer 1 and mixer 2.
Press the control knob in order to save the selection and/or to leave the input field. The cursor now changes back to the respective menu item. You can now switch another output on and/or off or exit the menu by pressing the ESC key.

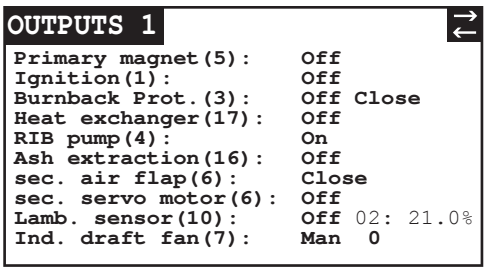
9.9 Output Test – Boiler

Note: Damages may occur to the furnace, for which the manufacturer is not liable, in the event of an incorrect use of "Output test – boiler". The outputs should never be activated too long, since this may result in blocking the screw and therefore in blocking the respective motor. Please contact your WoodMaster Flex fuel dealer for assistance.

Note: This menu is only visible when the status line is "Boiler is switched off!".

All functions of important components of the furnace can be tested in this menu.

Move the curser by turning the control knob to the output test – boiler line and press the control knob. The menu "OUTPUTS 1" appears on the screen.



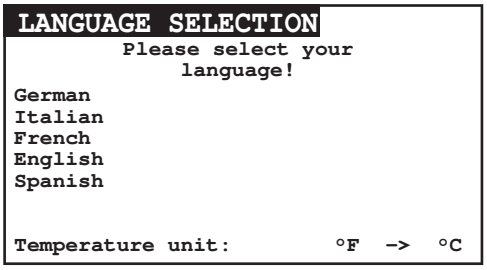
You can now press the control knob to scroll through the items to select one to change. If the control knob is turned to the right while the cursor is in the heading, then the menu "OUTPUTS 2" appears for more options. You may turn the control knob again to bring up the "OUTPUTS 3" menu.

Switching on the Outputs

In order to test an output, press the control knob in the header. The cursor moves back to the first menu item. By turning the control knob, select the system components that you would like to test and press the control knob again. The cursor now moves to the respective setting parameter, which you can change by turning the control knob. Confirm your entry with the control knob and verify that the respective system component is really activated.

Press the ESC key to exit this menu. The cursor now moves to the header and you will exit this menu by pressing the ESC key. All activated components are automatically switched off.

9.10 Language Selection/Temperature Scale Selection



In this menu you can select your desired language and temperature scale.

9: Basic Furnace Settings

9.11 Hour Meter

OPERATING HOUR COUNTER	
Feed:	8
Lambda sensor:	6
Ind. dr.fan PE/SM:	12
Ind. draft fan BM:	0
Vacuum turbine:	^^^^^^
Second. air motor:	0
Ignition:	0
Heat exchanger:	0
Storage room:	^^^^^^
"Bulk materials!":	0
"BM part load":	0
"Pellet mode!":	0
Starts BM:	42
Starts PE/BM:	9

The following operating hours are also logged:

- Feed runtime (in hours)
- Lambda sensor heating time (in hours)
- Induced draft fan runtime, during which the furnace operating mode was set to pellets (in hours)
- Induced draft fan runtime, during which the furnace operating mode was set to either Bulk materials or Bulk materials - automatic (in hours)
- Secondary air motor runtime (in hours)
- Igniter runtime (in hours)
- Heat exchanger cleaning runtime (in hours)
- Furnace runtime during which the Operating status was "Bulk materials!" (in hours)
- Furnace runtime during which the Operating status was "Bulk materials! Part load mode!" (in hours)
- Furnace runtime during which the Operating status was "Pellets mode!" (in hours)
- Number of furnace starts (applies to furnace operating modes "Bulk materials" or "Bulk materials - automatic") The counter always increases by 1 if the operating status changes either from "Please ignite!" to "Bulk materials!" (for furnace operating mode "Bulk materials" or from "Automatic ignition!" to "Bulk materials!" (for furnace operating mode "Bulk materials - automatic")
- Number of furnace starts (applies to furnace operating mode "Pellets" ") The counter is always increased by 1, if the operating status changes from "Ignition phase!" to "Start phase"

10.1 View of the Selected Operating Mode

When booting up the display, the set operating mode is automatically displayed for approximately 3 seconds. All Flex fuel systems contain "Bulk materials" operating mode. The following modes are possible:

Operating mode - "Bulk materials"

Your furnace has the operating mode "Bulk materials" selected. This mode is available on all units.

Operating mode - "Bulk material auto control"

If your furnace has the optional igniter connected, then the operating mode "Bulk materials-automatic" is enabled during commissioning or upon installation of an igniter by your dealer.

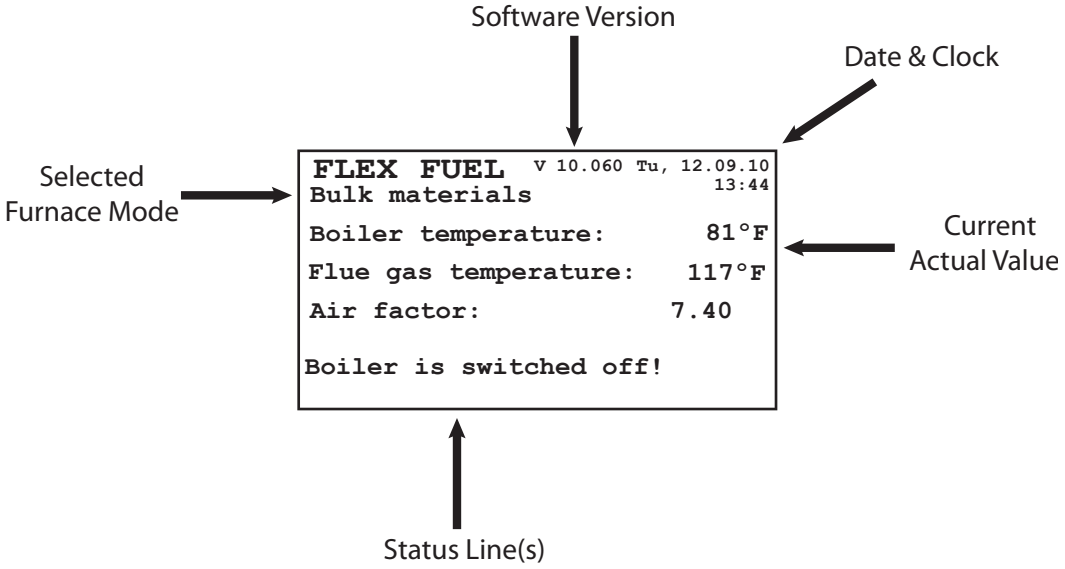
Operating Mode -"Pellets – Manual Filling"

Your Furnace can be loaded with wood pellets. Next to the furnace is a hopper that the furnace auto feeds from. The hopper is manually refilled by the operator of the unit. The pellets are automatically ignited by the igniter.

Note: Your Flex fuel furnace may not have the igniter or pellet option installed. If this is the case the system will not let you select " Bulk materials - auto control" or "Pellets - Manual Filling".

10.2: Setting the Furnace Operating Mode

The currently selected furnace operating mode is shown on the line "selected boiler operating mode" on the start screen.



Depending on the installed options, up to three furnace operating modes are available:

- **Bulk materials**
  The furnace is operated using bulk material fuel. This must be manually ignited.
- **Bulk materials auto control**
  The furnace is operated using bulk material fuel. This is automatically ignited by the igniter.
- **Pellets auto control**
  The furnace is operated using pellets for fuel. This is automatically ignited and automatically fed.

Note: Always ensure that the insert corresponding to the furnace operating mode is fitted in the firebox.

10.3 Changing the Furnace Operating Mode

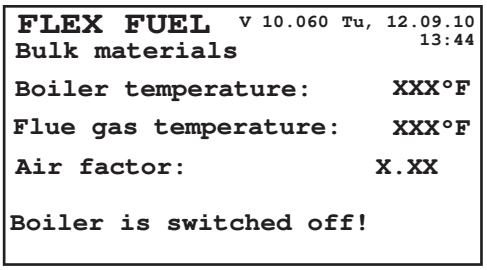
You have verified that the correct insert for the required furnace operating mode is fitted in the firebox and want to switch to another furnace operating mode. First check the current operating status of your furnace since it is not always possible to change the operating mode (bulk material combustion is in progress and you want to change to operating mode "Pellets auto control"). In this case, changeover is not possible and the following message is shown on the display for several seconds:

Changeover in status "bulk materials!" not possible!

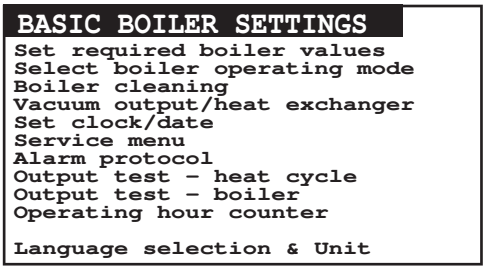
The following table summarizes the operational states which permit a change of furnace operating mode:

Change-over from	Possible Operating Status			
Pellets - auto control to Bulk materials	**Change-over possible for any operational status!**			
Bulk materials to Pellets - auto control	"Furnace is switched off!"	"Stop system!"	"Heat exchanger cleaning is active!"	"Heat exchanger cleaning waiting to be released!"
Pellets - auto control to Bulk materials auto control	"Furnace is switched off!"	"Availability!"	"Heat exchanger cleaning is active!"	"Heat exchanger cleaning waiting to be released!"
Bulk materials auto control to Pellets - auto control	"Furnace is switched off!"	"Stop system!"	"Heat exchanger cleaning is active!"	"Heat exchanger cleaning waiting to be released!"
Bulk materials to Bulk materials auto control	"Furnace is switched off!"	"Stop system!"	"Heat exchanger cleaning is active!"	"Heat exchanger cleaning waiting to be released!"
Bulk materials auto control to Bulk materials	**Change-over possible for any operational status!**			

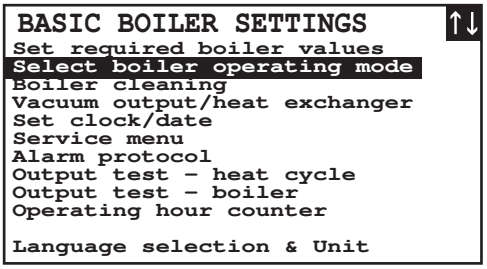
Once you have verified that a change-over is possible, press the control knob when the start screen is displayed.



After the control knob is pressed, the selection menu "BASIC BOILER SETTINGS" is displayed.

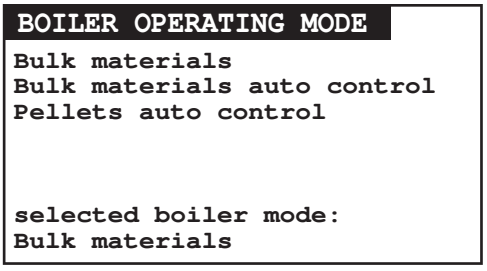


Press the control knob and then turn it to scroll down until "Select boiler operating mode" is selected.

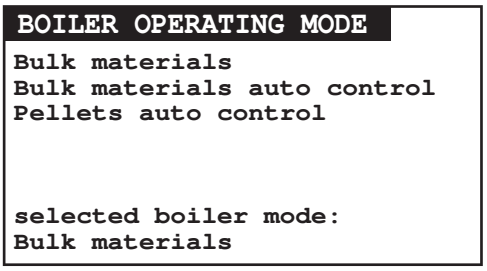


Now press the control knob; this opens sub-menu "BOILER OPERATING MODE"

Note: The display can vary depending on the installation. Not all furnace operating modes may be available.

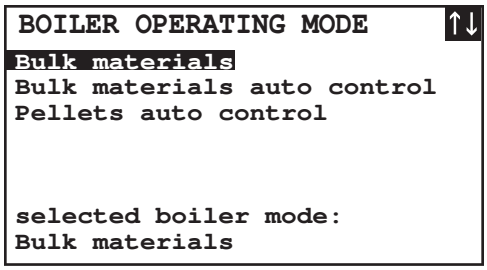


The actual display image depicts a combination furnace for bulk material/pellets. The current furnace operating mode is "Bulk materials".

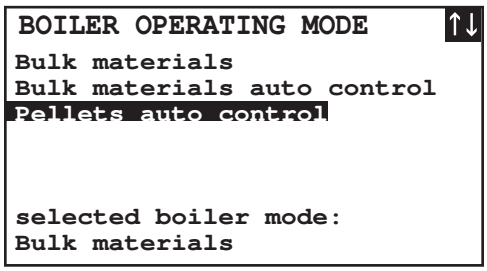


10: OPERATING MODES

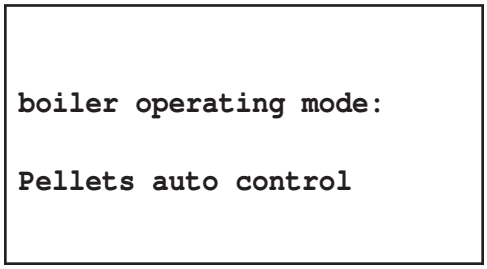
To change the furnace setting from "Bulk materials" to "Pellets auto control" follow these directions:
Press the control knob and the line of the current furnace operating mode will be highlighted (in this case "Bulk materials").



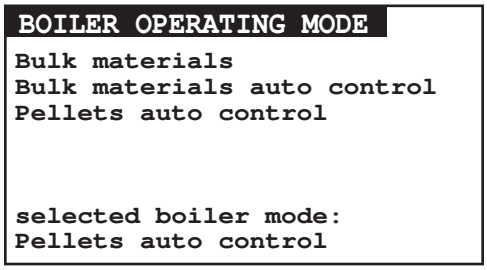
Turn the control knob to move the cursor to the line of the desired operating mode. For example, the following picture illustrates the selection of operating mode "Pellets auto control" .



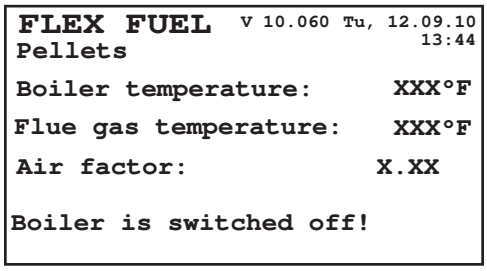
Confirm the operation by pressing the control knob. If you do not want to make any changes, press the ESC button to exit the sub-menu. A confirmation message is displayed once the control knob is pressed to confirm the change. The following picture illustrates the confirmation of a successful change to operating mode "Pellets auto control" .



You will then be returned to the menu "BOILER OPERATING MODE". The line "selected furnace operating mode" also indicates that the change-over has been successful.



Press the ESC button to navigate backwards until you are returned to the start screen.



The line displaying the current furnace operating mode will also indicate the successful change to operating mode "Pellets" . If the furnace indicates the status "Boiler switched off!" and you wish to start the furnace with the selected furnace operating mode, switch on the furnace by pressing the control knob for three seconds, as described in section 7.

11: Bulk Materials Mode

Note: Always ensure that the insert corresponding to the furnace operating mode is fitted and the pellet slide and flap (if installed, section 13.3) are in the correct position for the selected mode. If the furnace operating mode is changed from "Pellets auto control" to "Bulk materials" or "Bulk materials auto control", the pellet feeder will empty (takes approximately 250 seconds). Open the swivel flap during the emptying process and only close it again once the feeder is empty. Ensure that the diverting valve has been properly set. (Section 5.4)

11.1 General Information

Bulk Materials is the default mode of your furnace. The start screen always indicates the furnace operating mode which is currently set. If this is not set to "Bulk materials", change the furnace operating mode as described in section 10.2.

11.2 Pre-Firing Checks

Check the Firebox

Check that there are no foreign objects in the firebox and place the insert for Bulk Materials Mode is in the firebox. Ensure also that ash residues are removed from the firebox. In particular the insert should be free from residues so that a down-draft can be guaranteed. The ash residues can be guided into the ash chamber through the insert using the fire irons. (Section 15)

Check the Primary Air Feed

To guarantee that your Flex fuel receives the oxygen feed necessary for ensuring clean burning, the two air deflectors which are located on the right and left furnace side walls in the firebox must be checked or cleaned with the fire irons. (Section 15)

Check the Ash Chamber

Check that there are no foreign objects inside the ash chamber and that the refractory is not damaged. Any accessories such as ash trays, furnace utensils, etc. should not be in the ash chamber or firebox during operation. Remove ash build up if needed. Close the ash door and ensure that it seals properly. (Section 15)

Check the Pellet Slide

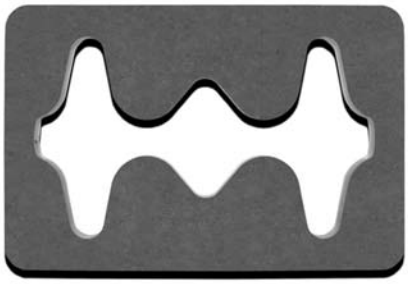
If the optional Pellet Arm is installed you must also verify that the pellet slide is removed and the flap is closed. (Section 13.3) If your furnace does not have this installed you will not see this feature.

Check the Status Line(s)

Check the current operating status which is displayed on the status line. It is only possible to start the furnace in operating mode "Bulk materials" when the operational status is "Boiler is switched off!", "Stop system!" or "Stop system! Fire bed monitoring!". Further details on the status lines are given in section 11.6.

Check the Insert

Check that the correct insert is installed in the firebox, and that the insert is free from any buildup that may block air flow. Remove and clean the insert if needed. Below is the correct insert for this operating mode.



11.3 Firing

General Instructions

It is necessary to configure the firing process so that a full-area fire bed can form. The purpose of this section is to clarify bulk material heating with the Flex fuel in a visual manner.
In general your bulk material should correspond to the specification described in section 6.2. It is particularly important that you determine whether sufficient power demand is available prior to the firing process. First check the temperatures in your buffer tank(s). If the temperature is still sufficient, you should postpone the firing process until later.

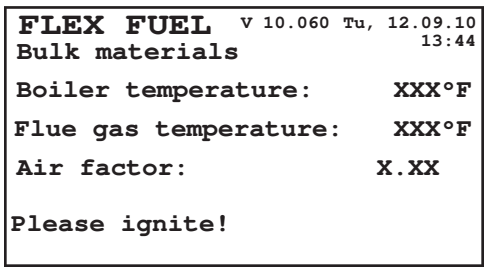
Fuels

The fuel used should have the following characteristics:

- Small-sized, non-coated, easily combustible igniting material (cardboard, newspaper,…)
- Kindling, aka dry, small-sized, easily combustible material (small chopped bulk material, shavings and shredded material, sticks, krumbs …)
- Dry, medium sized, split bulk materials
- Dry, split bulk materials

Starting the Furnace

Check that the furnace operating mode is set to "Bulk materials", and press the control knob for 3 seconds. Then the induced draft fan starts to run and "Please Ignite" will appear on the screen.

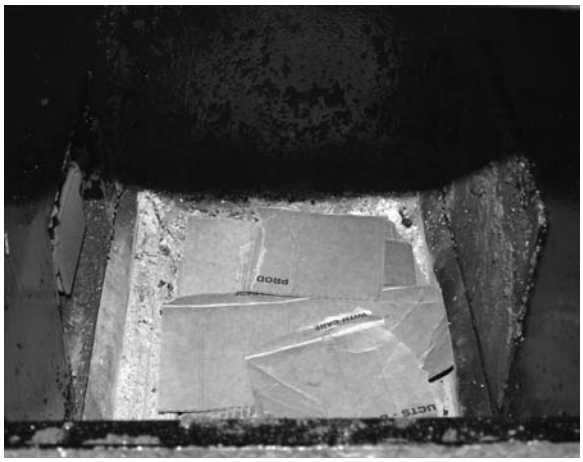


Firing

First take the dry, small-sized and easily combustible material and arrange it parallel to the firebox side wall up to the height of the air deflectors, making sure to fully cover the bottom of the chamber.

Then spread your firing material in the firebox making sure that it covers the entire bottom of the firebox.

Note: A cardboard and newspaper combination works best at starting the fire.



Now ignite the material making sure that it is ignited in several positions.

11: Bulk Materials Mode

Now close the firebox door and wait unit the status line changes from "Please ignite" to "Bulk materials". This changeover indicates that the kindling has ignited across its surface and there is sufficient flame to add wood. The change from "Please ignite" to "Bulk materials" occurs when the flue gas temperature exceeds the flue gas start temperature. The induced draft fan will now regulate according to the furnace temperature.

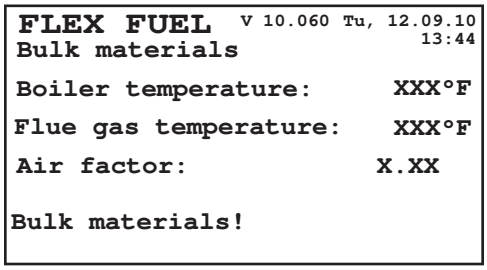
Now you can begin to lay a layer of the medium sized bulk material in the firebox. It is recommended to activate smoldering gas extraction while filling the furnace. (section 11.4) Again, you must ensure that this is parallel to the walls with no cavities and that the wood will not bind on the walls of the chamber.

Now wait 1 to 2 minutes until a clean, full-area fire bed has formed.

11: Bulk Materials Mode

Now you can completely fill the firebox right to the top with bulk material for a full burn, or a part load, depending on demand for heat.

Then close the firebox door and deactivate Smoldering Gas Extraction. It is easiest to detect that firing has been successful by monitoring the air factor. After closing the firebox door this should quickly drop to less than 2.00.



11.4 Smoldering Gas Extraction and Adding Fuel

More fuel may be added by activating the smoldering gas extraction function when the operational status of the furnace is "Bulk materials". **First ensure there is sufficient demand for more heat.**

Activating Smoldering Gas Extraction

Smoldering gas extraction is activated by pressing the control knob on the start screen (3 - 4 seconds). A short activation message appears. "Smoldering gas extraction! SAF reference run!" is then displayed on the status line.

The Secondary Air Flap (SAF) is now closed, the induced draft fan runs at maximum speed and the primary air feed is interrupted. The text "Smoldering gas extraction! Please add more!" will appear on the status line after several seconds! **Carefully** open the firebox door and start the filling process.

Deactivating Smoldering Gas Extraction

After filling is completed, close the fuel door and deactivate smoldering gas extraction by pressing the ESC button for 3 - 4 seconds. A deactivation message briefly appears and the furnace switches back to regulated operation. **Smoldering gas extraction is automatically deactivated after several minutes.**

11.5 Combustion Completed

Furnace combustion is completed when:

- the flue gas temperature drops below the factory default flue gas switch-off temperature and;
- the air factor is above 2.50 for a longer period of time (10 - 20 minutes).

The message "Stop system!" appears on the status line.

Note: The furnace may reignite if conditions permit.

11: Bulk Materials Mode

11.6 Status Lines During Furnace Operating Mode "Bulk materials"

Boiler is switched off!

The furnace is switched off. Press and hold the Control Knob for 3 - 4 seconds if you now want to start the furnace using bulk materials.

Stop system!

The furnace has just fully completed the combustion cycle for bulk materials; furnace operating mode "Bulk materials auto control" may be selected at any time.

Stop system! Fire bed monitoring!

The last combustion cycle for bulk materials has just been completed; however the flue gas temperature is still too high which means that the controller continues to monitor the fire bed.

Please ignite!

The heating procedure can now start. The operating status changes to "Bulk materials!" once the flue gas temperature exceeds the factory default flue gas start temperature.

Bulk materials!

The combustion of bulk materials is still in progress. If you want to add more material, please start smoldering gas extraction. The combustion of bulk materials has finished (status "Stop system!") when the flue gas temperature drops below the factory default switch-off temperature and the air factor is above 2.50 for several minutes (factory default setting 10 – 20 minutes).

Bulk materials! Part load!

When the furnace is in "Bulk Materials" mode and there is no call for heat, the furnace may enter "Bulk materials! part load" to avoid overheating. So that it does not overheat, the furnace is controlled based on the required furnace temperature (factory setting) with its speed adjusted down. This occurs if the demand for heat is too low, or the buffer has already been completely loaded and there is still bulk material in the firebox. If this status line is displayed, you should not fill up with any more fuel. **However if you still continue to fill with fuel, this can lead to overheating of the furnace or reduced combustion. Which may cause sooting of the chimney or heat exchanger.**

Smoldering gas extraction! SAF reference run!

You have activated smoldering gas extraction. Wait until the reference run of the secondary air flap has completed before adding more bulk material (maximum duration 50 seconds).

Heat exchanger cleaner is waiting to be released!

Heat exchanger cleaning is released if:

- a time release is set (section 9)
- the furnace is cooled (below factory default)
- the flue gas temperature is low

Heat exchanger cleaning is active!

The furnace immediately carries out its heat exchanger cleaning. The duration of the cleaning impulse is system specific and can vary between 3 and 20 minutes.

Smoldering gas extraction! Please add more!

Smoldering gas extraction is activated. You can now add more bulk material. Press the ESC button for 3 – 4 seconds to deactivate smoldering gas extraction. Smoldering gas extraction is automatically deactivated after several minutes.

Fan lag! Please wait!

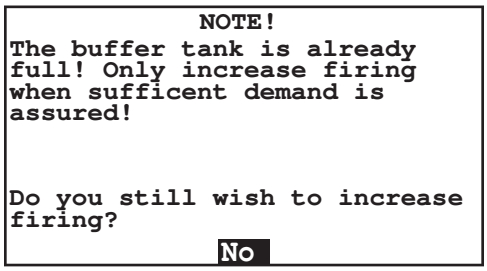
Fan lag is activated for approximately 20 minutes after a power outage or when the safety temperature limiter (STL) has been reset. The status will immediately change to "Bulk materials!" if any active combustion is detected in the firebox during this lag period. Detection is based on the flue gas temperature or air factor. **You cannot abort Fan Lag.**

11.7 Indications

Your WoodMaster dealer can undertake pre settings so that the system operator receives various instructions at the display. These instructions are not to be understood as a furnace malfunction or fault. The instructions are solely to alert the system operator of possible erratic behavior.

The following instructions are possible:

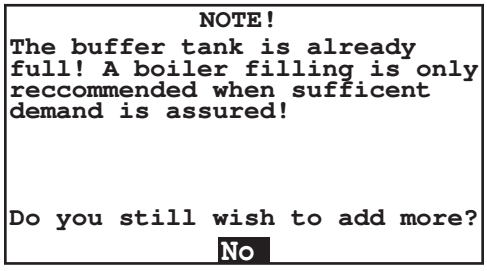
When firing is not necessary



This instruction is displayed if the system operator wants to ignite the furnace and the buffer tank(s) is (are) already full. Before firing, it is recommended that the buffer temperatures are checked. If the temperature is still sufficient, it is recommended you postpone firing until later.

When filling is not necessary

(smoldering gas extraction is activated by the system operator)



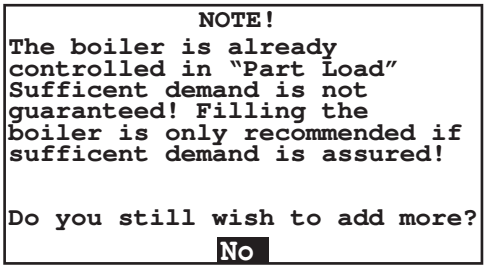
This instruction is displayed if the system operator wants to activate smoldering gas extraction and the buffer tank(s) is (are) already full.

11: Bulk Materials Mode

Before filling, it is recommended that the buffer temperatures are checked. If the existing temperature is already sufficient, furnace filling is not recommended, rather the furnace should be allowed to burn out.

When filling is not necessary

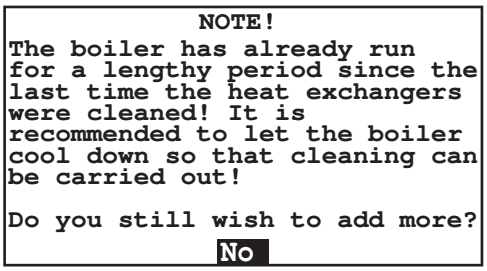
(Smoldering gas extraction is activated by the system operator)



This instruction is displayed if the system operator wants to activate smoldering gas extraction and the furnace is currently in part load mode. Currently sufficient demand is not guaranteed, the furnace is already being operated at reduced power. Only add more fuel if there is sufficient demand. If this is not the case, it is recommended that adding fuel is not carried out and the furnace is allowed to burn out.

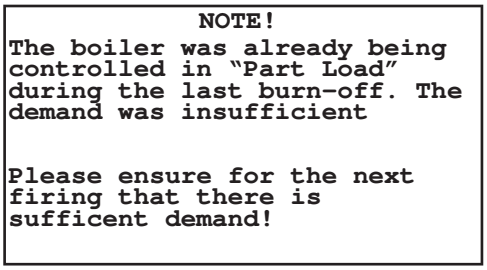
When filling not is necessary

(Smoldering gas extraction is activated by the system operator)



This instruction is displayed if the system operator wants to activate smoldering gas extraction and the furnace has already run for a long time since the heat exchangers were cleaned. Only add fuel if more heat is required. If this is not the case, please let the furnace burn out, so that automatic heat exchanger cleaning can be carried out.

Upon completion of the burn-off



This instruction is displayed if the burn-off has ended and the furnace was already being operated in part load mode. This instruction provides information to the system operator. At the end of the last burn-off the furnace had little demand and had to be operated with reduced power. Ensure that at the next firing there is sufficient demand.

12: Bulk Materials Auto Mode

Note: Always ensure that the insert corresponding to the furnace operating mode is fitted and the pellet slide and flap (if installed, section 13.3) are in the correct position for the selected mode. If the furnace operating mode is changed from "Pellets auto control" to "Bulk materials" or "Bulk materials auto control", the pellet feeder will empty (takes approximately 250 seconds). Open the swivel flap during the emptying process and only close it again once the feeder is empty. Ensure that the diverting valve has been properly set. (Section 5.4)

12.1 General Information

This mode is only available if an igniter has been installed. If you do not have this option and would like it, please contact your WoodMaster Flex fuel Dealer for information. In this operating mode the bulk material is automatically ignited by the igniter. This ignition procedure begins when a heating demand is present, a time release (section 12.4) has been set and the furnace operating mode has been set to "Bulk materials auto control". The start screen always indicates the furnace operating mode which is currently set. If this is not set to "Bulk materials auto control", change the furnace operating mode as described in section 10.

12.2 Pre-Firing Checks

Check the Firebox

Check that there are no foreign objects in the firebox and place the insert for Bulk Materials Mode is in the firebox. Ensure also that ash residues are removed from the firebox. In particular the insert should be free from residues so that a down-draft can be guaranteed. The ash residues can be guided into the ash chamber through the insert using the fire irons. (Section 15)

Check the Primary Air Feed

To guarantee that your Flex fuel receives the oxygen feed necessary for ensuring clean burning, the two air deflectors which are located on the right and left furnace side walls in the firebox must be checked or cleaned with the fire irons. (Section 15)

Check the Ash Chamber

Check that there are no foreign objects inside the ash chamber and that the refractory is not damaged. Any accessories such as ash trays, furnace utensils, etc. should not be in the ash chamber or firebox during operation. Remove ash build up if needed. Close the ash door and ensure that it seals properly. (Section 15)

Check the Pellet Slide

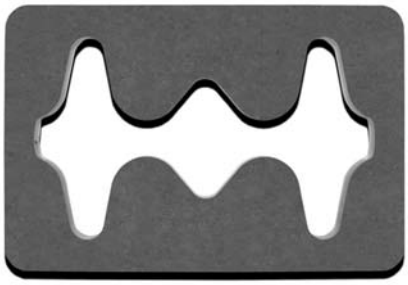
If the optional Pellet Arm is installed you must also verify that the pellet slide is removed and the flap is closed. (Section 13.3) If your furnace does not have this installed you will not see this feature.

Check the Status Line(s)

Always monitor the current operating status which is displayed on the status line. It is only possible to start the furnace in operating mode "Bulk materials auto control" when the operational status is "Boiler is switched off!", "Stop system!", "Stop system! Fire bed monitoring!", "Availability", "Heat exchanger cleaner waiting to be released!", or "Heat exchanger cleaning is active!". Further details on the status lines are given in section 12.7 .

Check the Insert

Check that the correct insert is installed in the firebox, and that the insert is free from any buildup that may block air flow. Remove and clean the insert if needed. Below is the correct insert for this operating mode.



12.3 Filling the Furnace

Note: Smoldering Gas Extraction is not available at this time. To vent the furnace to prevent ash from exiting through the firebox door it is possible to turn on the fans via Output Tests - Boiler (Section 9) and switch the draft fan on (Outputs 1 screen) while you load the furnace, then switch it off.

The filling procedure can begin providing change-over is permitted.

Note: The furnace will ALWAYS switch to "Bulk materials" after a successful ignition process. It is necessary to switch back to "Bulk materials - auto control" every time it is to be used. Caution should be used to ensure the furnace is cool enough to reload. If the furnace is not allowed to cool the materials may self combust before the set time release.

First, place a few small pieces of kindling directly on the insert.

Note: Ensure that the igniter tube is not blocked by kindling. The igniter tube is located in the bottom of the firebox right next to the insert on the right side.

Next cover the small pieces with a layer of newspaper. Covered the paper with another small layer of bulk materials. Ensure that there is paper close to the igniter tube.

Then begin to cover with a layer of newspaper, making sure that the newspaper is spread across the entire bottom of the firebox.

Cover the layer of paper with a layer of cardboard, again making sure to cover the entire bottom of the firebox.

12: Bulk Materials Auto Mode

Cover the cardboard with a layer of small bulk materials that covers the entire bottom of the firebox.

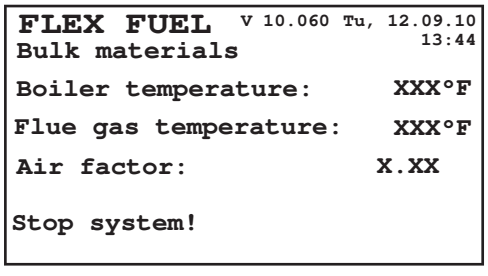
Now you can fill the entire firebox with medium to large size bulk materials for a full load, or fill as needed. Ensure the fuels is in a tightly packed group that is parallel to the firebox walls. Ensure that the fuel will not bind on the walls and can move freely.

12.4 Setting the Release Period

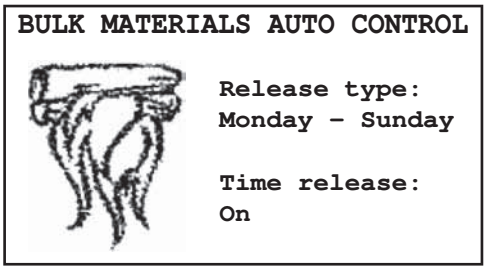
Note: It is particularly important that you determine whether sufficient power demand is available prior to the firing process. First check the temperatures in your buffer tank(s) to allow you to determine when to set the release periods.

Note: The draft inducer fan must be switch off before the release period can be set.

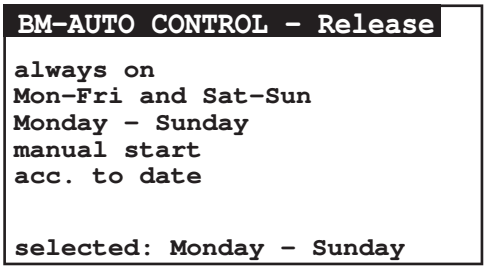
Once the furnace has been filled, it is possible to set a release period during which automatic ignition should take place. If the start screen is not displayed, press the ESC button until it appears.



Then turn the control knob to scroll to the screen "BULK MATERIALS AUTO CONTROL".



The release mode currently set and current time release status (on/off) can now be seen. Press the control knob to change the release mode. The screen "BM AUTO CONTROL – Release" will appear.



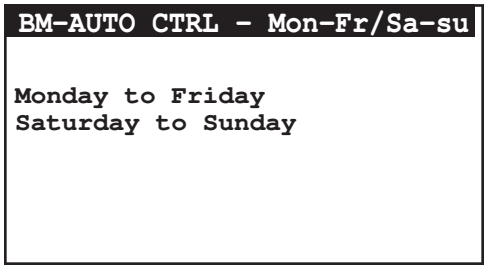
Release Mode "always On"

Select release mode "always On" and then switch the furnace operating mode to "Bulk materials auto control". The furnace will start as soon as there is a call for heat.

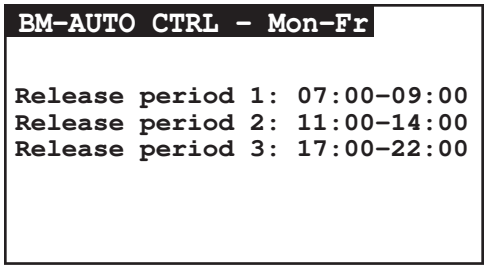
Release Mode "Mo – Fr and Sa – Su"

Select release mode "Mo – Fr and Sa – Su"; operating mode "Bulk materials auto control" can now be adjusted so that the ignition process only starts at certain times providing a heating circuit demand is present.

The screen "BM AUTO CONTROL – Mo-Fr/ Sa-Su" is shown on the display.



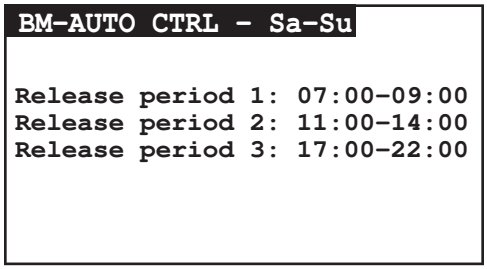
Now you can select whether you wish to modify the release periods for "Monday to Friday…" or "Saturday to Sunday…". For example, select "Monday to Friday" and the screen "BM AUTO CONTROL – Mo-Fr" is shown on the display.



12: Bulk Materials Auto Mode

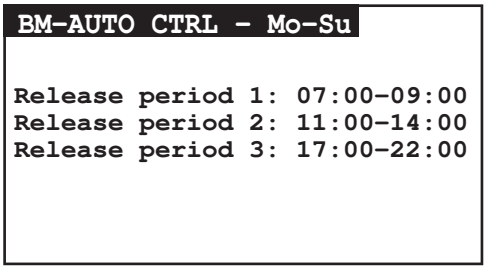
You can now enter up to three release periods for the weekdays Monday to Friday. If furnace operating mode "Bulk materials auto control" is set, the furnace will only start on weekdays if a heating circuit demand is present and a time release is given.

Once you have entered the desired release periods, briefly press the ESC button to quit the menu. The selection menu "BM AUTO CONTROL – Mo-Fr/ Sa-Su" is shown on the display. The release periods for Saturday and Sunday are set in the same manner.



Release Mode "Monday -Sunday"

Select release mode "Monday – Sunday" if you want to enter identical release periods for every day. The screen "BM AUTO CONTROL – Mo-Su" is shown on the display:



You can now select up to three release periods. If furnace operating mode "Bulk materials auto control" is selected and there is a call for heat, the furnace will start as soon as a time window becomes active.

Release Mode "manual start"

If release mode "manual start" is selected, the ignition process is started immediately if the furnace operating mode is set to "Bulk materials auto control". This release mode does not require the presence of a heating circuit demand. One should therefore ensure that there is sufficient demand. The only condition for ignition is that the current furnace temperature is lower than the set "boiler target temperature" less the set "starting difference".

Release Mode "acc. to date"

Select release mode "acc. to date" if the furnace should be started on a particular day. The screen "BM AUTO CONTROL – acc. to date" is shown on the display:

```
BM-AUTO CTRL - acc.to date

Release period 1: 00:00-00:00
Release period 2: 00:00-00:00
Release period 3: 00:00-00:00
Date:             10.11.10

current date:     Tu 7.9.10
```

One can now set the exact date and time on which the ignition process should start. The ignition process always requires a heating circuit demand to be present.

12.5 Activating "Bulk materials auto control"

Once you have filled the furnace with bulk materials and set the required release mode, furnace operating mode "Bulk materials auto control" can be activated by following the instruction in section 10.

12.6 Status Lines for Operating Mode "Bulk materials auto control"

Boiler is switched off!

Furnace operating mode "Bulk materials auto control" has been set, however the furnace is still switched off. Press and hold the control knob for 3 – 4 seconds to switch on the furnace.

Bulk materials auto control waiting for time release!

Automatic ignition of the furnace is delayed until the preset time window is active. If the time release is active, the furnace will automatically start up (automatic ignition).

Availability!

The furnace automatically starts when there is a call for heat and the furnace temperature is lower than the set "furnace target temperature" less the set "starting difference".

Automatic ignition!

The furnace will automatically start up (automatic ignition) as soon as a heating circuit demand is present and a time release has been issued. This will continue until the flue gas temperature exceeds the factory default flue gas start temperature.

12.7 Automatic Change-Over of Furnace Operating Mode From "Bulk materials auto control" to "Bulk materials"

The furnace operating mode is automatically changed from "Bulk materials auto control" to "Bulk materials" when the factory default flue gas start temperature is exceeded. Re-activate operating mode "Bulk materials auto control" if the material has fully burned and you want to recommence heating in this furnace operating mode.

Combustion has been completed when the flue gas temperature falls below the factory default switch-off temperature and the air factor value is above the factory default setting over a long period (factory default setting 10 minutes). The status then switches to "Stop system!".

13: Pellets Auto Control

Note: Always ensure that the insert corresponding to the furnace operating mode is fitted and the pellet slide and flap (sections 13.3) are in the correct position for the selected mode. Ensure that the diverting valve has been properly set. (Section 5.4)

13.1 General Information

In operating mode "Pellets auto control" your furnace automatically runs on pellets fuel. The furnace automatically starts when there is a call for heat. Once the call for heat has been met, the feed of pellets is stopped and the furnace switches to standby mode. The start screen always indicates the furnace operating mode which is currently set. If this is not set to "Pellets", change the furnace operating mode as described in section 10.

13.2 Pre-Firing Checks

Check the Firebox

Check that there are no foreign objects in the firebox and place the insert for Pellets Mode is in the firebox. Ensure also that ash residues are removed from the firebox. In particular the insert should be free from residues so that a down-draft can be guaranteed. The ash residues can be guided into the ash chamber through the insert using the fire irons. (Section 15)

Check the Primary Air Feed

To guarantee that your Flex fuel receives the oxygen feed necessary for ensuring clean burning, the two air deflectors which are located on the right and left furnace side walls in the firebox must be checked or cleaned with the fire irons. (Section 15)

Check the Ash Chamber

Check that there are no foreign objects inside the ash chamber and that the refractory is not damaged. Any accessories such as ash trays, furnace utensils, etc. should not be in the ash chamber or firebox during operation. Remove ash build up if needed. Close the ash door and ensure that it seals properly. (Section 15)

Check the Pellet Slide

In pellets mode the slide must be installed and can be adjusted with an adjustment screw (section 13.3). The feeder also has a swivel flap, which must be open for pellet operation.

Swivel Flap Closed
Pellet Slide Removed

Swivel Flap Open
Pellet Slide Attached

Pellet Slide

Check Status Line(s)

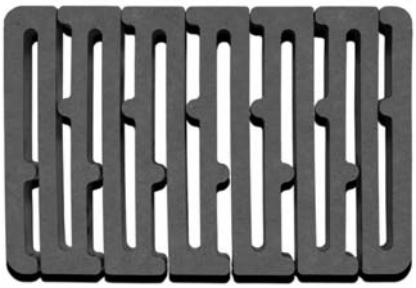
Before starting the furnace in "Pellets Auto control" the furnace should be switched off.

Check Pellet supply

Your furnace operating mode is "Pellets - Manual Filling" meaning the operator must fill the hopper manually. Open the cover of the pellet hopper and check the level of the pellets. Fill the hopper if needed. Remember to check the level of the pellets daily under normal operating conditions.

Check the Insert

Check that the correct insert is installed in the firebox, and that the insert is free from any buildup that may block air flow. Remove and clean the insert if needed. Below is the correct insert for this operating mode.



13.3 Adjusting the Pellet Slide

The furnace must be running in "Pellets" mode to preform these adjustments. It is recommended that there is a call for heat so the furnace will run continuously for an extended period to correctly adjust the slide. This is intended to be a one time adjustment.

The pellet slide is used to guide the pellets fall into the center of the insert. The slope of the pellets slide may be set using an adjustment screw which is accessible from the outside wall of the furnace. The lower panel cover of the pellet feeder must first be removed to access the bolt. Undo the counter nut of the adjustment bolt (Fig. 1) and then turn the screw to adjust the slope of the pellet slide. **Note: The adjustment bolt may be hot!**

While the furnace is doing its initial fill adjust the slide so that the pellets fall into the center of the grate. Then close the door to allow the ignition process to start.

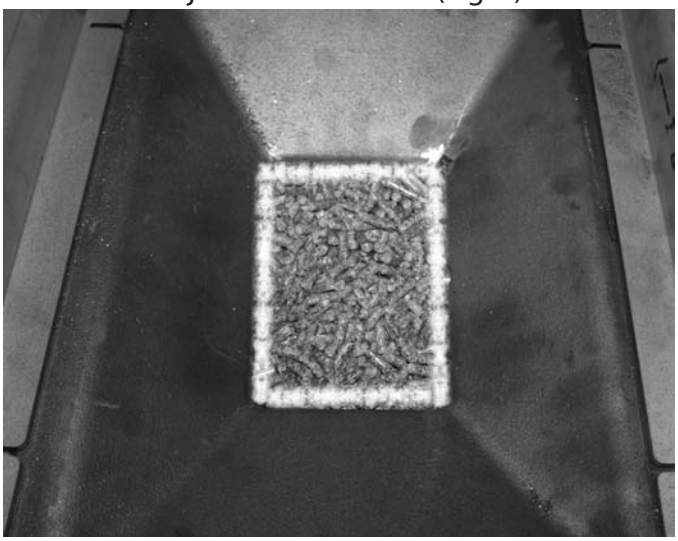
Let the furnace run in Pellets mode for one hour and check the pile in the firebox. Do not leave the firebox door open for an extended period or fan lag may be activated. If it looks like Fig. 2 with a nice even burn around all the edges of the pile then no further adjustments are needed. If it does not adjust the adjustment bolt in or out using fig. 3 and 4 as references.

Note: Monitoring can be activated and deactivated the same way Smoldering Gas Extraction (section 11.4) is activated to prevent the furnace from shutting down and to vent the furnace.

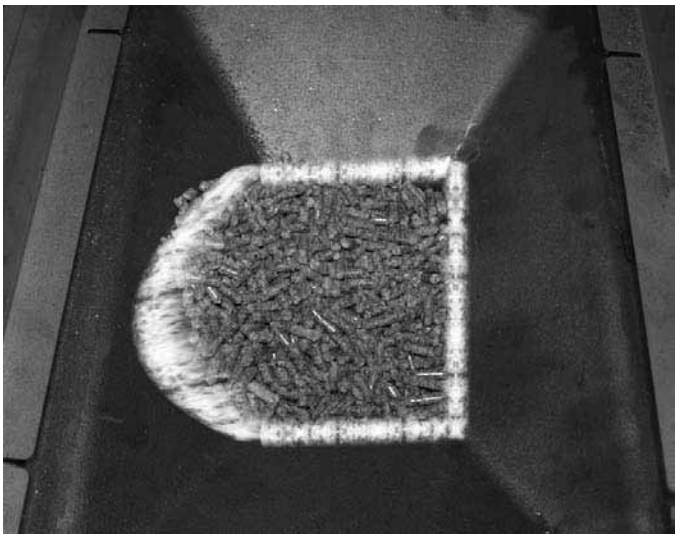
13: Pellets Auto Control

Adjustment Bolt (Fig. 1)

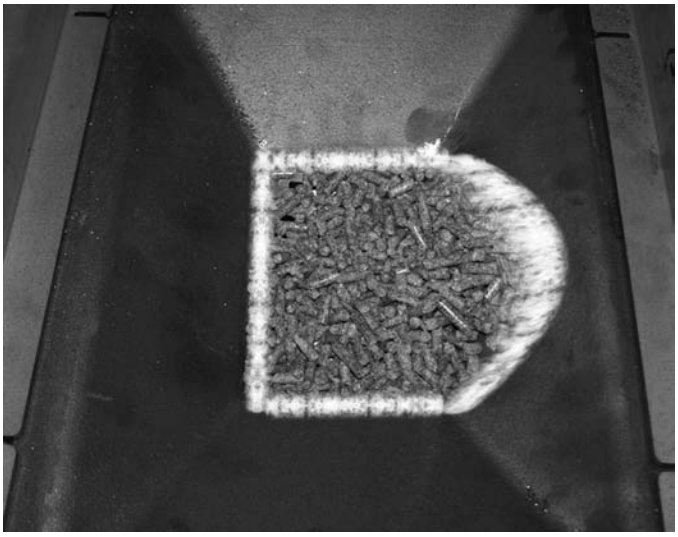
Correct Burn: no further adjustments needed (Fig. 2)



Incorrect Burn: bolt is too far out. (Fig. 3)



Incorrect Burn: bolt is too far in. (Fig. 4)



Allow the furnace to burn for another 45 minutes and check the pile again. If it is still not burning in the center adjust again. Repeat this process until the pile is evenly centered on the insert. Once this is achieved lock the counter nut and replace the panel.

Check the slide adjustment once a month to ensure a proper burn.

Note: Adjusting the slide is a time consuming process.
Allow yourself at least 2.5 hours to correctly adjust the slide.

13.4 Starting the Furnace in Operating Mode "Pellets auto control"

Setting the Furnace Operating Mode

Verify that the furnace operating mode is currently set to "Pellets auto control" . The operating mode line must read "Pellets". If it is in "Bulk materials" , change the furnace operating mode as described on section 10.

Switching the Furnace On

Switch on the furnace as described in section 7. The status line may be used at any time to verify the current operating status. The furnace will now fire when there is a demand for heat.

13.5 Opening the Firebox Door During the "Start phase!" or in "Pellets mode"

Normally one should avoid opening the firebox doors for any length of time during the "Start phase!" or in "Pellets mode!" since this alters measurements of the air factor or flue gas temperature and will not guarantee correct regulation characteristics. The air factor and flue gas temperature are therefore constantly monitored; the furnace will shut down if these values deviate from their expected values. (status line "FGT-drop or air factor too high") This monitoring function can be deactivated as it is occasionally necessary to open the firebox doors and look inside the firebox. The monitoring function is only active in operational states "Start phase!" or "Pellets mode!".

If the start screen is shown on the display, press and hold the control knob for 3 to 4 seconds; the following is then displayed: Flue gas and air factor monitoring has been de-activated!

The start screen is then displayed again. The user is also notified by the information message "Monitoring deactivated!" above the usual status line.

The firebox doors can now be opened during operation without the furnace shutting itself down. The monitoring function is manually activated by pressing and holding the ESC button or automatically reactivated after 5 minutes.

The following message appears on the display for several seconds:
Flue gas and air monitoring has been re-activated!

The monitoring function has now been reactivated; do not re-open the doors during operation (otherwise "FGT-drop or air factor too high! Fan lag!").

13.6 Status Lines for Operating Mode "Pellets auto control"

Boiler is switched off!

The furnace is switched off. If you want to start the furnace, switch it on as described in section 7.

Availability!

The furnace is in standby mode. All calls for heat have been met. The furnace will automatically start if:

- A demand is present for heat.
- the current furnace temperature is lower than the set "furnace target temperature" less the set "starting difference".

Slider gate opens!

The furnace begins a pellets start. First the fuel shut off gate is opened. This takes approximately 3 minutes.

Lambda sensor heated!

The furnace starts up with a pellet start. First the Lambda sensor is heated. This process lasts for 80 seconds.

Boiler being filled!

As soon as the fuel shut off gate is opened and the Lambda sensor has been heated, the feed starts to run and transports the fuel into the firebox. The duration of this first feeder pulse can vary between 30 and 200 seconds.

Note: Do not open the firebox door after this point. Doing so will cause the air factor to rise and the furnace may auto shut down. You should not need to open the firebox door during any point of operation under "Pellets auto control"

Ignition phase!

Once the insert is covered with pellets, the pellets are ignited by the igniter. The ignition pulse is activated as soon as the air factor exceeds the factory default. This pulse is switched off after a set time will completely shut off once the air factor falls to its factory default setting. The number of ignition pulses can vary between 3 and 20. In addition new pellets are periodically fed into the firebox. The ignition phase is complete when the re-calculated flue gas start temperature at every start is exceeded and the air factor has remained lower that the factory default for approximately 2 minutes.

Start phase!

When all the ignition conditions have been fulfilled (flue gas has risen, low air factor), the furnace switches to the "Start phase!". The duration of the "Start phase!" is limited to 10 - 20 minutes. The speed of the induced draft fan increases during the start phase and the pellet fill level in the firebox is regulated depending on the measured air factor. Once the "Start phase!" has finished, the operating status switches to "Pellets mode!".

Pellets mode!

The furnace regulates in "Pellets mode!" as long as there is a call for heat and the furnace temperature is lower than the set "boiler target temperature". The speed of the induced draft fan and the pellets fill level in the firebox will vary depending on the measured furnace temperature, flue gas temperature and air factor. Once the call for heat has been met, the furnace switches off and outputs the message "No request! Fan lag!".

No request! Fan lag!

All calls for heat has been met; the furnace completes "Pellets mode!" by initiating "Fan lag!". Fan lag ends when the flue gas temperature falls below the factory default switch-off threshold and the preset run-on time has elapsed. The furnace then switches to standby mode ("Availability!") and automatically restarts when there is a call for heat.

Required boiler temperature is reached! Fan lag!

The set furnace target temperature has been reached. The furnace completes "Pellets mode!" by initiating "Fan lag!". Fan lag ends when the flue gas temperature falls below a preset threshold and the subsequent run-on time has elapsed. The furnace then switches to standby mode ("Availability!") and automatically restarts when there is a call for heat.

Boiler is switched off! Fan lag!

The furnace was switched off in operational state "Ignition phase", "Start phase!" or "Pellets mode!". The furnace completes pellets operation by initiating "Fan lag!". Fan lag ends when the flue gas temperature falls below the switch-off threshold and the run-on time has elapsed. The furnace then switches to operational status "Boiler is switched off!". Only when the operational status "Boiler is switched off!" has been reached is it possible to switch the furnace back on in operating mode "Pellets auto control".

Heat exchanger cleaning required! Fan lag!

The furnace will quit pellets mode to perform the heat exchanger cleaning. Fan lag ends when the flue gas temperature falls below the switch-off threshold and the run-on time has elapsed. The furnace then automatically cleans its heat exchanger and automatically restarts if a heating circuit demand is present.

Heat exchanger cleaner waiting to be released!

The furnace requires heat exchanger cleaning, before it can start but is still waiting for a release.

Heat exchanger cleaning is released if:

- a time release is set
- the furnace has cooled
- the flue gas temperature is below the factory default release point

Heat exchanger cleaning is active!

The furnace is carrying out its heat exchanger cleaning. The duration of the cleaning impulse is system specific and can vary between 3 and 20 minutes. After the end of cleaning, the furnace starts automatically once a heating circuit demand exists.

13: Pellets Auto Control

FGT-drop or AR too high! Fan lag!

The flue gas temperature during the "Start phase!" or in "Pellets mode!" has noticeably dropped or the measured air factor was noticeably high.

Possible reasons for these noticeable effects could be:

- The firebox door or ash door was opened during the "Start phase!" or in "Pellets mode!" without deactivating the "Flue gas and air factor monitoring" function.
- The pellet hopper is empty. Check whether there are sufficient pellets.
- The ash chamber or flue pipe is full of ash. Switch off and clean the furnace as soon as operating status "Boiler is switched off!" is displayed.
- The pellets insert is covered with ash or foreign objects and should be cleaned. Switch off the furnace and wait until operating status "Boiler is switched off!" is displayed. Then clean the pellets insert.

The furnace completes "Pellets mode!" by initiating "Fan lag!". Fan lag ends when the flue gas temperature falls below the factory default switch-off threshold and the run-on time has elapsed. The furnace then switches to standby mode ("Availability!") and automatically restarts when a heating circuit demand is present.

Flue gas temperature too low! Fan lag!

In automatic mode (pellets) the flue gas temperature has not exceeded a necessary threshold or has fallen below the threshold for a long time. The furnace turns off after a fan lag. Wait until the lag period expires (the duration is system dependent and varies between 10 and 40 minutes). At the end of this lag, an error message appears on the display:

```
FLUEGASTEMPERATURE TOO LOW!
Wait till the boiler is
cooled down! Please clean
the combustion chamber, the
boiler plate, the flue pipe
and switch the boiler on
again!

Boiler temperature:     XX°F
Flue gas temperature:   XX°F
Air factor              X.XX
```

The most probable cause of this error message may be a faulty air supply. Wait until the furnace has cooled down and is switched off. Then clean the firebox, primary air deflectors, insert, ash chamber and the flue pipe. Press the control knob to restart the furnace.

Feeder temperature too high! Fan lag!

The temperature monitor in the feeder has measured an over temperature. Fan lag is activated and the feeder is emptied. The fan lag cycle (duration 10 – 30 minutes) is completed even if the feeder temperature drops again.

The furnace starts automatically if the feeder temperature has dropped when the fan lag cycle has completed. If the feeder temperature remains too high, fan lag is activated and the feeder is emptied.

Air factor too high! Fan lag!

The status line "Air factor too high! Fan lag!" occurs if the air factor remains above 5.00 for approximately 1 minute in "Pellets mode" or during the start phase.

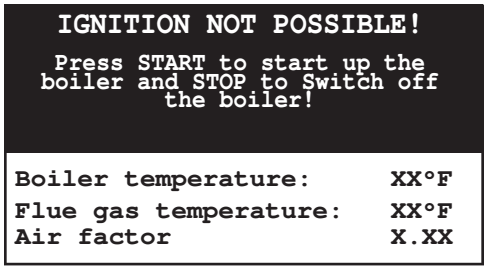
Possible reasons as to why the air factor increases in "Pellets mode" or during the start phase:

- You have opened the firebox door or the ash door either in the start phase, or in "Pellets mode" without deactivating the "Flue gas and air factor monitoring".
- The pellet reservoir is empty. Check that sufficient fuel is available.
- The feed runs slowly and is blocked.
- The insert is worn or the fuel has a very high dust fraction so that a lot unburned material falls through the insert.
- The insert is clogged with ash, foreign bodies, etc, and should be cleaned. Switch the furnace off, wait until the operating status "Boiler off" is displayed and the furnace to cool, then clean the insert.

The furnace completes "Pellets mode!" by initiating "Fan lag!". Fan lag ends when the flue gas temperature falls below the factory default switch-off threshold and the run-on time has elapsed. The furnace then switches to standby mode ("Availability!") and automatically restarts when a heating circuit demand is present.

Ignition time elapsed! Fan lag!

The furnace could not be ignited in the required time (factory default setting 50 minutes). The furnace completes pellets mode by initiating fan lag. Fan lag ends when the flue gas temperature falls below the factory default switch-off threshold and the run-on time has elapsed.
A fault message is then shown on the display. Check possible causes of the ignition fault before acknowledging the message and restarting the furnace.



Possible reasons why an ignition fault may be caused:

- The ash chamber or flue pipe is covered in ash.
- The ash door and/or firebox door are not fully closed.
- The pellets insert is contaminated with dirt and should be cleaned.
- The igniter is defective.
- One (or more) conveyor screws are defective (pellet arm, hopper screw).
- The installation was not approved by WoodMaster. The commissioning procedure should be per formed to ensure optimum system operation.

Before restarting the furnace after the ignition fault has been rectified, ensure there are no unburned pellets in the insert. If this is the case, clean the grate before restarting the furnace.

Feed blocked or overloaded!

The furnace is currently in automatic mode (Pellets) and the feed is blocked (current draw too high) or is overloaded (no current draw). If this error is detected more than once, the furnace turns off.

Fan lag! Please wait!

Fan lag has been activated for no apparent reason. Possible causes:

- Power outage
- The safety temperature limiter tripped and has just been reset.

Wait for the run-on cycle to finish (10 – 30 minutes), the furnace will automatically start afterwards.

Note: Fan lag cannot be aborted! The run-on timer is restarted after every power outage. It can therefore not be shortened by unplugging the mains connector.

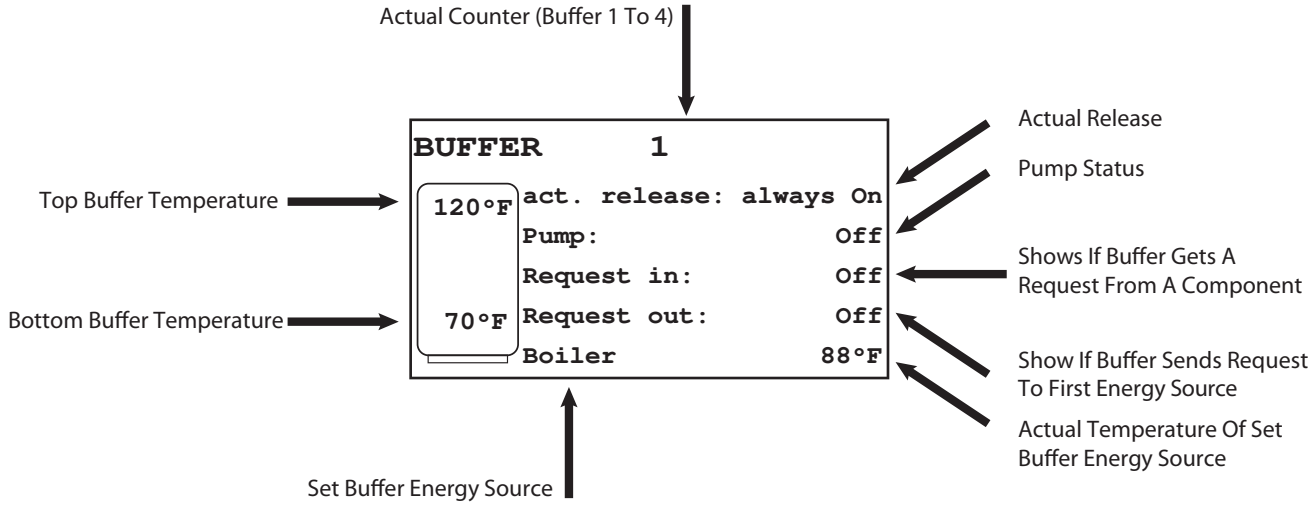
Monitoring deactivated!

Flue gas and air factor monitoring was deactivated in "Pellets mode!" or during the "Start phase!". The firebox doors can now be opened during operation without the furnace shutting itself down. The monitoring function is automatically reactivated after 5 minutes or manually activated by pressing and holding the ESC button.

Safety chain is open!

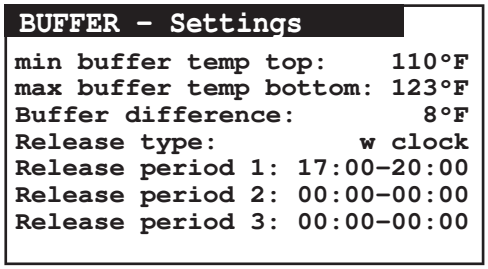
Your furnace is fitted with a safety chain that is currently open. This safety chain is attached to sensor input "Circulation sensor" on the I/O Board (section 5.6). Close the safety chain and the furnace will automatically start.

If a buffer is available, the following figure appears on the screen of the actual values of individual system components. To access the buffer settings turn the control knob while on the start screen until the following screen appears.



If you would like to check and/or change your buffer settings, press the control knob. The menu "BUFFER - Settings" will appear on the screen.

14.1 Buffer Settings



Minimum Buffer Temperature: Top

(The temperature can be adjusted from 0 - 131 °F)

If the buffer is released chronologically and if the "buffer temperature, top" is less than the minimum buffer temperature, the furnace is started and the buffer is loaded. If the heater is active, the heating cycle pumps are switched on as soon as the buffer temperature is greater on the top than the set "min. buffer temperature, top".

Maximum Buffer Temperature: Bottom

(The temperature can be adjusted from 0 - 194 °F)

The buffer is charged until the "buffer temperature bottom" is greater than the set "max. buffer temperature, bottom", if the buffer has a chronological release.

Buffer Difference

(The temperature can be adjusted from 0 - 68°F)

The buffer difference temperature is the temperature by which the buffer temperature, top may be less than the required flow temperature before the furnace is started (with furnace operating modes "Pellets-auto control" and "bulk material auto control").

14: Buffer - Thermal Storage

Release Method

You may select 3 different types of releases for the buffer. Likewise, the release type only has an affect in the furnace operating modes "Pellets automatic", and "Bulk materials-automatic".

Always Off

If you select always off, the buffer is not charged to its required temperature. The buffer is maintained above 50 °F in the freeze protection mode (outside temperature is lower than auto freeze protection temp. Refer to general heating cycle 1 settings).

Always On

The buffer temperature is recharged if the buffer temperature top has dropped below the set minimum buffer temperature top.

With Clock

The buffer is only recharged within the set release periods, if its buffer temperature top has dropped below the set minimum buffer temperature top.

Release Period 1 to 3

You can set 3 different release periods for the buffer from 0:00 to 24:00 hours. If you do not require all release period, set the starting and ending value to the same setting value in order to deactivate this release period.

15.1 General Information

Note: The Owner/Operator must follow any local and state codes/laws concerning the operation of a wood fired furnace.

The operator must follow the guidelines for furnace operation as stated in this Owners Manual.

The Correct function of the safety devices should be checked before every heating period and after a system fault.

Your Flex fuel should be serviced by your dealer once every three years or following any faults.

The water in your furnace must be tested every year, and treated or replaced if necessary.

Weekly visual inspections for any leaks, corrosion or ash build up should be preformed. All air passages and exhaust should be checked for debris that could restrict air flow.

15.2 Cleaning the Furnace

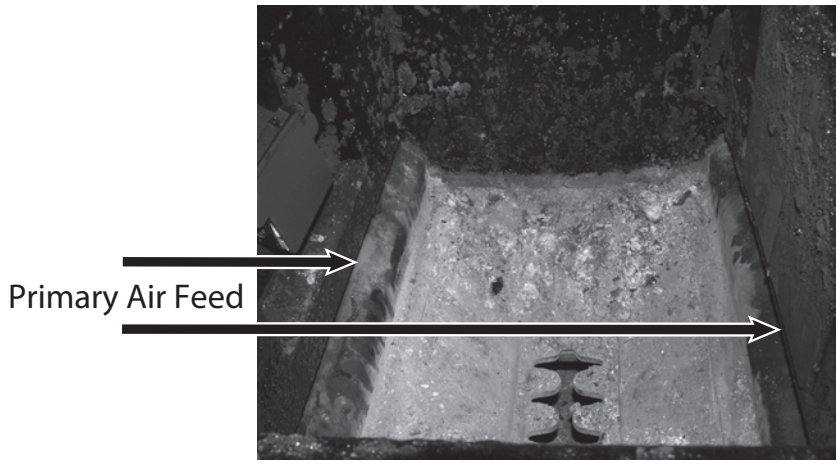
- **Disconnect the power source prior to cleaning. Never clean your furnace during operation.**
- **Wait for the furnace to cool before cleaning the furnace.**
- **Correctly dispose of the ashes in a sealed metal container away from flammable materials.**
- **Cleaning intervals will vary depending on the quality of the fuel being used.**

Cleaning Intervals

- Air Feed: As required following visual inspections
- Ash Chamber: Every 2 weeks
- Heat Exchanger: Automatic

Cleaning the Air Passages

Before firing the furnace, check that all the air openings above the grate are free of ash. It may be necessary to use the ash scraper to open them. Regularly check that the air openings are not clogged with tar or other debris. Manually clean the turbulators every 4000 hours. If necessary scrape the primary air feed openings inside the firebox with the ash scraper to maintain air flow.



15: Maintenance

Cleaning the Ash Chamber

- Check that the furnace is not operational and is cool
- Open the outer enclosure door
- Open the ash chamber door
- Push the ash tray onto the bottom door frame
- Use the ash scraper to carefully pull the ash onto the ash tray. Leave approximately .5 in of ash in the entire bottom of ash chamber to extend the life of the refractory
- Carefully remove the filled ash try and empty it into a metal container for final disposal
- Clean the area around the door seal to ensure the door closes properly
- Close the ash door, making sure the door is closed tight
- Check to ensure that both doors seal properly

Cleaning the Heat Exchanger

Heat exchanger cleaning is automatically activated by the Eco manager. The heat exchanger cleaning can be manually activated in the Output Test screen. (section 9)

Cleaning the Furnace Surface

Only use a damp cloth to clean the surface of the furnace. A mild soap may be used if needed. DO NOT use harsh chemicals or abrasive material.

Cleaning the Flue Pipe

Ash should be removed from the flue pipe through the cleaning openings approximately 2 times a year.

Annual Buffer Tank Blow Down

Water should be drained from the bottom of the buffer tank to remove any sediment buildup. The water should drain until it runs clear, approximately 2 gallons, depending on tank size. A sample of water should be tested to determine if the water should be replaced.

Annual Furnace Water Jacket Blow Down

Water should also be drained from the bottom of the furnace to remove any sediment buildup. The water should drain until it runs clear, approximately 2 gallons. You can also completely drain and flush your furnace separate from the rest of the system.

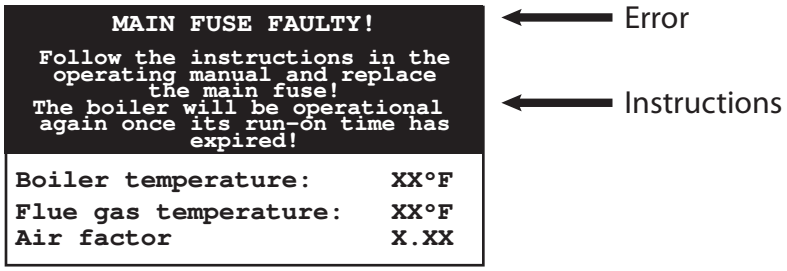
Annual Water Testing

After the Blow Down procedure is preformed on the furnace, a sample of water is to be taken from the bottom of the furnace. A water testing kit and mailing instructions is available at your dealer. Failure to preform this test annually will result in a voided warranty.

Notes:

16: Error Messages

If a malfunction occurs, the error message is directly displayed on the screen. The red LED of the ESC key is switched on.



The following error messages can appear:

Main fuse faulty!

The I/O Board is fitted with a fuse (10A slow-blow) to protect the controller. If this is faulty, replace the fuse with the spare fuse located immediately next to the mains fuse on the I/O Board (section 5.6). Additional replacement fuses can be obtained at your Woodmaster Flex Fuel Dealer.

Disconnect the furnace from the main power supply before replacing the main fuse (unplug the main connector or switch off the main circuit breaker for the heating system).

Reconnect the furnace to the main after the mains fuse has been replaced. The error message will disappear and the furnace is operational again after the run-on time has elapsed.

Triac fuse faulty!

The I/O Board is fitted with a fuse (10A FF) to protect the triac outputs. If this is faulty, replace the fuse with the spare fuse located above and to the side of the triac fuse on the I/O Board (section 5.6). Additional replacement fuses can be obtained at your Woodmaster Flex Fuel Dealer.

Disconnect the furnace from the main power supply before replacing the triac fuse (unplug the main connector or switch off the main circuit breaker for the heating system).

Reconnect the furnace to the main power supply after the triac fuse has been replaced. The error message will disappear and the furnace is operational again after the run-on time has elapsed.

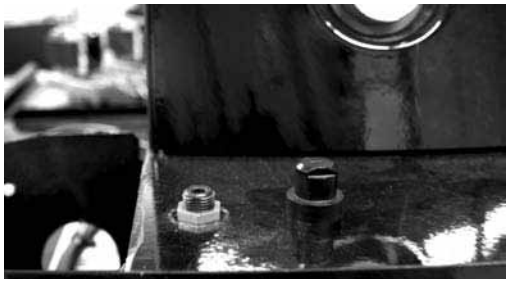
Ignition fault BM auto control!

The bulk materials auto control function could not fulfill the change-over conditions for bulk materials within the specified time (factory setting 45 minutes).

Press any button to acknowledge the error message and observe the current furnace status on the status line. Since the furnace operating mode changes to bulk materials when the fault occurs, it may be that the material had already started to burn and that combustion was successfully completed or is still ongoing.

Safety temperature limiter has tripped!

The furnace temperature can rise above 194 °F if there is a sudden reduction in heat demand. In this case the built-in safety temperature limiter will trigger a fast shutdown of the furnace.



Fault rectification

1. Wait until the furnace temperature falls below 158 °F.
2. Unscrew the screw cap on the safety temperature limiter (located in front of the display) and briefly press the reset button with a small, pointed object to reset the safety temperature limiter. Screw the screw cap back onto the safety temperature limiter.
3. Press the control knob on the display. The induced draft fan runs down ("Fan lag! Please wait!").
4. Press and hold the control knob for three seconds. The furnace will then be operational again.

Induced draft fan fault!

The induced draft fan has caused an error.
The following potential causes could result in this error message:

- Fault or loose cabling on fan motor
- The induced draft fan is jammed
- The induced draft fan is faulty

Press Start to activate the fan run-on time (approximately 20 minutes). If combustion is still in progress, the furnace automatically switches to "Bulk materials" mode, otherwise the fan completes its fan lag cycle and the furnace shuts down. Press the ESC button to switch off the furnace!

Feed blocked or overloaded!

The causes for this error message could be:

- the feed motor is defective or blocked
- the insert is dirty
- the firebox is overfilled
- the feed motor is incorrectly connected or not connected at all
- blockage at the transfer station between the pellet arm and hopper

If the cause of the feed motor blockage is overfilling of the firebox, then let the furnace burn out. After the furnace has cooled, check the insert for contamination (cinders, unburned pellets …) and clean if necessary. After the control knob is pressed, the furnace starts as soon as a system component makes a request. If the error message occurs again upon the next start attempt, then press the ESC key and inform an authorized WoodMaster Flex fuel Dealer.

16: Error Messages

Burn back damper blocked!

The burn back damper could not be fully opened during pellets start.
Possible causes of this error message:

- Functional fault of the burn back damper (mechanical or electrical)
- Blockage near the burn back damper

If it was possible to clear the cause of the fault, press the Control Knob, otherwise switch off the furnace using the ESC button and notify your WoodMaster Flex fuel Dealer.

Ignition not possible!

The ignition procedure in pellets operation could not be completed in the specified time! The furnace will shut itself down after the fan lag time has elapsed. The error message "IGNITION NOT POSSIBLE" will be shown on the display.

Causes of this error message:

- No pellets in hopper
- Incorrect or slag-covered insert in firebox
- Furnace not adequately cleaned (ash, heat exchanger)
- Mechanical or electrical causes (conveyor motors, igniter)

If it was possible to clear the cause of the fault, press the Control Knob, otherwise switch off the furnace using the STOP button and notify your WoodMaster Flex fuel Dealer.

Break of feed sensor!

The selected furnace operating mode is set to "Pellets-automatic" and the feed sensor has been retracted or has a break. The furnace operating mode is automatically reset to "Bulk materials".

Check whether the feed sensor is correctly connected to the I/O Board (section 5.6) of the Flex fuel. If you have checked that the cabling is correct, please contact your WoodMaster Flex fuel Dealer.

Flue gas temperature too low!

In automatic mode (pellets) the flue gas temperature has not exceeded a necessary threshold or has fallen below the threshold for a factory set amount of time. The furnace then turns off after a fan lag.

At the end of this lag, this error message appears on the display:
The most probable cause of this error message is a faulty air supply.

Wait until the furnace has cooled down and clean the firebox (primary air deflectors, insert), ash chamber and flue pipe.

To restart the furnace, please press the control knob.

17: Troubleshooting

Note: Most problems can be resolved by following the on screen instructions. If you encounter a problem that is not resolved on screen or by the owners manual, please contact your WoodMaster Flex fuel dealer.

Problem	Cause/Solution
Heating system is not working	Check power connection Furnace emergency switch is deactivated Refer to section 23 Activate furnace
Furnace is producing excessive smoke	Furnace is in part load mode. Do not add more wood until there is sufficient demand for a full burn. Furnace is loaded with green wood. Check the moisture content of the wood that is being used. It must be under 25%.
Bulk materials cavitate in the firebox	The fuel may be binding on the sides of the firebox. Check that the fuel used is within the recommended length and is not contacting the walls with the cut ends. The furnace has operated in Part Load for an extended period of time. This can cause the fuel to burn unevenly and can cause pockets to form. Only fill and fire the furnace when a full burn can occur.
Furnace is not producing the desired BTU output.	Different types of wood contain different amounts of stored energy. Higher quality woods such as oak will yield a higher output. If the furnace is being operated on pellets, different grades and brands of pellets will produce more/less heat. Please contact your WoodMaster Flex fuel Dealer for different pellet options.
The furnace does not completely burn all the fuel in Bulk Materials Mode	The size of bulk material pieces is to large. Medium sized seasoned wood burns the most complete. Reduce the size of the pieces if necessary. Round, unsplit wood may also not burn completely. Used only split wood for future burns.

18: Specifications

	Flex fuel 30 kW	Flex fuel 60 kW
Maximum Current Draw	15 Amps @ 120v 60hz. Note: only happens when all components are running, which rarely occurs	
Average Daily Power Consumption	2.8 kilowatts per day = less than 1 amp	
Max Heat Capacities	100,000 btu/h	200,000 btu/h
Overall Furnace Size	24"W x 48"L x 54"T (W/O Display)	32.5"W x 60"L x 60"T(W/O Display)
Firebox Dimensions	22.5"L x 14"W x 25"T	26.5"L x 22"W x 28"T
Firebox Door Frame	13.5"W x 9.5"T	21.5"W x 10"T
Shipping Weight	1225lbs.	1800lbs.
Water Capacity	24 Gallons	50 Gallons
Hopper Capacity (Optional)	350 pounds (Max)	
Fuel Types	Bulk Materials (Wood); Pellets (Optional)	
Refueling	Bulk Materials: Manual; Pellets Auto feed from hopper	
Core Furnace Material Thickness	1/4" Firebox, 1/8" Water Jacket	
Draft Control	Fan Induced	
Water Temperature Control	Eco manager - Digital Display	

Measurements and capacities are approximate due to tolerances.

Serial Numbers for Furnace and Accessories	
Furnace	
Buffer Tank(s)	
Expansion Tank	
Pellet Accessory	
Igniter Accessory	

WoodMaster FLEX FUEL Warranty

NORTHWEST MANUFACTURING, INC.
600 Polk Ave. SW – Red Lake Falls, MN 56750
Toll free (800) 932-3629 or (218) 253-4328

Ten-Year Warranty on Firebox and Water Jacket

Northwest Manufacturing, Inc. of Red Lake Falls, MN 56750 warrants material and labor on any defects in workmanship on the firebox and water jacket for a period of ten (10) years from the purchase date to the original owner only. If there is a leak in your properly delivered and installed WoodMaster Flex Fuel furnace in the first year, WoodMaster will replace the furnace at no cost to the original owner. (A leak means; a leak in the firebox or water jacket.) Northwest Manufacturing, Inc. will not be responsible for environmental conditions we cannot control. Therefore, Northwest Manufacturing, Inc. will only pay these percentages of costs of warranty work per year, years two (2) through five (5) – 100% of warranty work, the sixth (6) year – 70% of warranty work, the seventh (7) year – 60% of warranty work, the eight (8) year – 40% of warranty work, the ninth (9) year – 20% of warranty work, the tenth (10) year – 10% of warranty work. After the tenth year Northwest Manufacturing, Inc. provides no other warranty.

A blow down of the furnace and tank must be performed yearly after each heating season and every six months if the furnace is used year round. After the furnace has had a blow down performed, an annual water test must be taken and immediately treat and refill the furnace. **Failure to send in a water sample annually will void the warranty.**

This warranty is limited to defective parts – repair and/or replacement only, and excludes any incidental and consequential damages connected therewith. Northwest Manufacturing, Inc. is not responsible for replacement of water, water treatment, antifreeze, costs of transportation, or shipping charges.

WoodMaster will not cover any construction or modification costs due to the furnace being in a non-accessible area. Any construction or modification costs are the customer's responsibility. (Example: We will not pay to remove the furnace out of a basement or crawl space.)

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Antifreeze – Only nontoxic antifreeze is acceptable. Antifreeze will break down over a period of time and therefore should be tested annually. Always dispose of antifreeze by state and local codes. Loss of antifreeze under any condition will not be covered.

How to file a claim – ANY CLAIM UNDER THIS WARRANTY MUST BE MADE TO YOUR DEALER.

Customer's Name _____ Dealer's Name _____

Customer's Signature _____ Dealer's Signature _____

OWNER'S REGISTRATION CARD

Name _____

Address _____

_____

Phone _____

Email _____

Date of Purchase _____

Model No. _____

Serial No. _____

(Model and serial numbers are located on the decal on furnace.)

Dealer's Name _____

Installed by: ☐ Dealer ☐ Customer

If customer, was installation explained to you?

☐ Yes ☐ No

Type of Installation:

☐ House/Garage ☐ Shop/Shed
☐ Greenhouse ☐ Kiln
☐ Other _____

Purchased:

☐ With Pellet Arm ☐ Without Pellet Arm

☐ With Igniter ☐ Without Igniter

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Red Lake Falls, MN 56750

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www.woodmaster.com / 800-932-3629 / Manual PN: 7994-300
Northwest Manufacturing, Inc / 600 Polk Ave SW / Red Lake Falls, MN 56750