

Wood Pellet Cast Iron Boiler MESys 4000 - 6000 Series Distributed by Maine Energy Systems



Caution!

Observe the safety instructions of this installation and maintenance manual before placing the boiler in operation.

Danger!

All installation, burner set-up and adjustment, and maintenance operations must be performed by a licensed service professional.

The directions of this installation and maintenance manual must be followed precisely.

Contact a qualified service company or service provider if support or additional information is required prior to installation, operating and service of the equipment. **SAVE THESE INSTRUCTIONS**

Caution!

The Installation and Servicing manual is a component of the technical documentation and must be handed over to the operator of the heating system.

Discuss the content of this manual with the owner or operator of the heating system to ensure that they are familiar with all information required for operation of the heating system.



For heating contractors. Please read carefully prior to installation and servicing.

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1 Safety Considerations and Symbol Descriptions

Below is an overview of the integrated safety features of the MESys 4000 - 6000 Series boiler:

- 1.) Honeywell manual reset high limit aquastat
- 2.) Safeguard manual reset low water cut out
- 3.) Drop shaft burn back sensor
- 4.) External Auger resettable overload
- 5.) 15 Amp fast acting fuse
- 6.) 10 Amp circuit breaker
- 7.) Fuseable pellet feed hose

1.1 Regarding this Manual

This document contains important information regarding safe and proper installation, operation and maintenance of the MESys 4000 - 6000 series pellet boiler system.

The high tech MESys 4000 - 6000 series pellet boiler system is designated as a hot water heating boiler.

The Installation and Service Manual is directed to the installing contractor who has professional knowledge regarding boiler installation and maintenance.

1.2 Explanation of symbols



Warnings are indicated by a warning triangle and a grey background.

Signal words are used to indicate the seriousness of the ensuing risk if measures for minimizing damage are not taken.

- **Caution** indicates that minor damage to property may occur.
- **Warning** indicates that minor personal injury or severe damage to property may occur.
- **Danger** means that severe personal injury may occur. Very serious cases may result in death.



Notes are identified in the text by this symbol. They are bounded by horizontal lines above and below the text.

Notes contain important additional information.

Notes do not contain any warnings or information about hazards or risks.

1.3 Observe the following Standards

All applicable local, state, and national standards, codes and regulations must be observed for the installation of the boiler:

- The local building code requirements regarding placement, combustion air, venting and chimney system must be followed.
- Follow applicable electrical code requirements.
- Follow the local code and standards regarding safe boiler operation.



NOTICE

Use only original boiler spare parts. MESys can not be held liable for damage caused by non-compliance.



NOTICE

The boiler installation must be performed by a qualified installer in accordance with regulations put forth in NFPA-31 Installation of Solid Fuel-Burning Equipment. The installation must comply with all local and national codes, regulations and authorities having jurisdiction regarding the installation of solid fuel fired boilers.

For the USA/Canada refer to the guidelines of UL391/CSA/CAN B366.1 regarding installation and operation of pellet fired equipment.

1.3.1 Installation Guidelines



Caution: DANGER TO LIFE
from electric shock.

- Do not work on electrical components unless you have the required qualifications.
- Prior to opening the burner door: follow Burner Installation Instructions, shut down the power supply by turning off the emergency shut-off switch or disengaging the heating system circuit breaker, to prevent from accidental reactivation.
- Observe all applicable installation guidelines.



Caution: FIRE DANGER
due to flammable or liquid materials.

- Make sure that flammable and liquid materials are not stored in the close vicinity of the boiler.
- DO NOT USE CHEMICALS OR FLUIDS TO START THE FIRE



Danger: Risk of Fire or Explosion:
DO NOT BURN GARBAGE, GASOLINE, NAPHTHA, ENGINE OIL, OR OTHER INAPPROPRIATE MATERIALS.

1.3.2 Boiler Room Guidelines



Caution: DANGER TO LIFE
from flue gas poisoning.

Always ensure adequate combustion air provisions as described in Appendix G of CAN/CSA-B365-M91.

Ensure adequate combustion air under all circumstances and, in case of exhaust fans installed in the boiler room or any adjacent areas, make sure that their installation does not produce a negative pressure or affect pellet boiler operation in any way.

- Please observe that combustion air openings are not reduced in size or closed.
- Make sure that no mechanical air openings or devices remove combustion air from the boiler room such as central vacuum systems, exhaust fans, dryers and air conditioning appliances.
- Make sure that the boiler is connected to a chimney or vertical venting system that is capable of handling and producing the negative breeching pressure.
- Each pellet fired boiler must have its own flue and cannot be connected to a chimney flue serving any other appliance.*
- If any of these problems have not been corrected, the boiler must not be operated.
- Make the end-user aware of these guidelines and their potential danger.



Warning: Risk of Fire

- Do not operate with flue draft exceeding 30 Pa draft (-.12 inches of WC) of the barometric damper.
- Do not operate with fuel loading door or ash removal doors open.
- Do not store fuel or other combustible material within marked installation clearances. (See pgs. 13 & 14 for clearance requirements).
- Inspect and clean flues and chimney regularly.



Caution: Hot Surfaces

- Keep children away.
- Do not touch equipment during operation.
- Maximum draft marked on name plate of boiler.

*A pellet boiler and an oil fired boiler can be flued only individually into an existing chimney provided the following conditions are met:

- 1.) Electrical interlocks are in place to prevent simultaneous operation.
- 2.) A mechanical lock-out mechanism must also be in place to prevent simultaneous operation.
- 3.) At any given time, only one boiler can be vented into the chimney flue. Allow either boiler to completely shut down and cool off before switching the venting system.
- 4.) The chimney flue must be of adequate size to handle the combustion products from either appliance.

Refer to Table 1 regarding wood pellet characteristics suitable for use with this pellet boiler system. Please check with your pellet fuel supplier regarding meeting these fuel requirements.

Characteristic	Premium Grade Only
Pellet diameter	1/4" - 3/8" (6 – 10 mm)
Pellet length	3/8" - 1" (10 – 25 mm)
Ash content	.2 – 1%
Energy content** (ENHV)	7290 – 7750 Btu/lbs
Moisture content	2 – 10 %

Table 1: Pellet fuel characteristic requirements

- Maintain at least 4 ft lateral clearance from the appliance on all sides to pellet fuel storage. Pellet fuel must be stored in a metallic, solid wood or heavy-duty woven air-tight plastic/linen type containment bin which either vents directly to the outside, or has a removable cover to avoid contamination of the pellet fuel.
- Carefully follow the Installation Instructions for the burner to avoid over-loading or over-firing of the boiler.



****Note:** Contact your pellet supplier regarding the dry matter energy value, or European Net Heat Value (ENHV), which is discounted for pellet moisture content as the Janfire NH burner requires this specific value. US PFI (Pellet Fuel Institute) pellet standards at this point do NOT record this value and the PFI energy content can not be used directly.

1.3.3 Ash Removal Guidelines

Pellet burner shut-down - Prior to ash removal and cleaning of the boiler, follow the Janfire NH burner shut-down instructions. Wait 15-20 minutes following burner shut-down before opening the boiler clean-out door and removal of ashes. Assure that the ash is sufficiently cooled down.

Disposal of ashes – Ashes should be placed in a metal container with a tight-fitting lid and moved outdoors. No other waste shall be kept in this container. If the ashes are disposed of by burial in soil or otherwise locally dispersed, they should be retained in the closed container until all cinders have thoroughly cooled.

1.4 Tools, Materials and Accessories

For the installation and maintenance of the boiler you will need typical tools used in this industry.

In addition, the following components are useful:

- Hand truck with strap.
- Wood blocking.
- Cleaning brushes and/or chemical cleaning agents for wet cleaning.
- Industrial grade high temperature resistant shop vac.

1.5 Disposal

- Please dispose of any trash in an environmentally friendly fashion.
- Please discard properly of any heating system related components.

2 Product description

This Installation and Service Manual contains important information for the safe and intended installation, initial start-up and maintenance of this boiler.

The wood pellet fired boiler MESys 4000 - 6000 Series is generally referred to below as a boiler.

The installation and maintenance manual is provided for technicians who have been trained and have experience in working with heating systems and wood pellet fired installations.

2.1 Intended use

The MESys 4000 - 6000 Series is designed for central heating and domestic hot water (DHW) systems, for instance in residential homes, apartment buildings, or small commercial applications.

2.2 Standards and regulations



Observe all standards and guidelines applicable to the installation and operation of this heating system in your jurisdiction.

2.3 Notes on installation and operation

When installing and operating the heating system, it is the installer's responsibility to meet all applicable federal, state, and local codes.

2.3.1 DHW heating with an indirect tank

The wood pellet fired boiler system can readily include an indirect fired hot water tank to provide a complete system solution which also includes the pellet fuel delivery system. The DHW tank serves 3 purposes here:

- (1) Generate domestic hot water using the boiler as heat source by circulating boiler water through the tank coil.
- (2) Act as thermal storage device by allowing the tank pump to run longer, extend the run time on the pellet burner at low modulation levels and increasing the DHW tank temperature.
- (3) Be an additional heat source of space heating purposes under high load conditions, see page 31 for system applications.

Detailed piping and wiring diagrams for most common installations are found in section 9. The absence of a flow control valve on the hot water tank loop allows for gravity circulation and energy dissipation of heated boiler water in case of a power outage. Also note the location of boiler relief valve and system check valves to avoid undue pressure formation in the system.

Key differentiating installation components are:

- (1) Required installation of a tempering valve on the DHW outlet connection of the tank; and
- (2) The indirect tank **MUST ALWAYS HAVE** its own designated pump for water flow through the tank coil and is activated by means of a Honeywell L4006A aquastat. Existing tank can be used in retro-fit applications.

2.3.2 Installation of pellet fuel delivery system

Please refer to the Installation Instructions for the burner for detailed electrical schematics regarding pellet fuel delivery.

- Pellet storage capacity for MESys 4000 boiler should not exceed 2.5 tons to match ash removal intervals with pellet delivery intervals.
- Maintain at least 4 feet lateral clearance from the boiler to the pellet storage facility.
- Properly support the feed auger from above so that it is positioned nearly above the drop shaft of the burner.
- Ensure to locate the bottom end of the feed auger at the lowest location in the storage facility.
- Always place the more compact end of the feed auger at the beginning of the auger to avoid possible "jamming" of pellets inside the auger piping.
- Always place the electric motor at the top end of the auger.
- Any extensions to the auger must be added to the motor end of the auger.
- Never touch the burner dosage auger or the feed auger when the external motor is connected.
- Place electrical interlock on access panel of pellet storage system and interlock with power supply to external auger operation to avoid operational hazard as applicable to your specific system.



Caution: Always use Janfire Auger feeding system. Do NOT use a vacuum feeder system to deliver pellets to the burner.

2.4 Heating system water quality

Poor water quality can damage heating systems due to scale formation and corrosion.

Please refer to Chapter 2.8.3, Tab. 6 for further details of the water quality.



Caution: Risk of system damage due to unsuitable boiler water.

- If oxygen-permeable pipes are used, e.g. for radiant heating systems, the systems must be separated from the boiler by a heat exchanger. Unsuitable heating system water promotes sludge formation and corrosion. This can result in heating system malfunction and boiler damage.

2.5 Product details

The boiler is a wood pellet fired appliance with modulating burner control for boiler water temperature control.

The boiler system consists of:

- Boiler heat exchanger
- Boiler jacket panels with insulation
- Manual Reset High-limit L4006E aquastat and piping accessories
- Set of flue baffles
- 8 ft long feed auger and 120V electric motor
- Janfire NH modulating pellet burner complete with:
 - 1 PT100 sensor to measure boiler water temperature
 - 1 PT100 sensor to measure outdoor temperature
 - Wiring whip to connect feed auger through pellet storage bin access interlock (if required) directly to burner.
 - Wiring whip
 - Flexible drop tube w/2 clamps
 - Low water cut off with manual reset capacity.

Detailed operational information regarding burner operation is included in the Installation and Maintenance Instructions for the Janfire NH pellet burner.

The boiler jacket prevents heat loss and acts as a noise insulator.

The boiler heat exchanger transfers the heat generated by the burner to the heating water. The insulation prevents energy loss.



Caution: Risk of system damage from use of incorrect burner.

- Only use Janfire NH pellet burners which meets the technical boiler requirements.



Fig. 1 Boiler and burner system

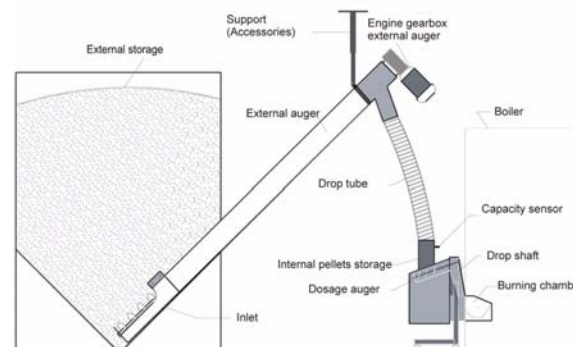


Fig. 2 Conceptual System Diagram

2.6 Delivery contents

Upon delivery, check that the packaging is complete and undamaged.

Component	Qty	Packaging
Boiler heat exchanger block Burner door, top clean out door and burner door panel, factory-fitted to boiler heat exchanger block	1	1 pallet
Boiler casing	1	packaged separately
Technical documentation	1	foil package
Baffle plate set for MESys 4000 - 6000 series model Flue gas collector Flanges & gaskets Sealing material		packaged inside boiler block
B-kit components: – 1 1/4" Supply manifold – 1 1/4" x 3" black nipple – 1 1/4" black malleable elbow – 3/4" black malleable street 90 – 1" x 3/4" black bushing – 2 90 degree spacers & tension wafer & PT100 Sensor contact sleeve – boiler drain 3/4" – relief valve 3/4" x 3/4" 30PSI – temperature/pressure gauge – 6" barometric damper – L4006E manual reset high limit aquastat – LWCO Control w/manual reset capacity – auger support chain, lag and s-hook – MESys Logo plate – 120 V electrical auger motor	1	1 box
Janfire NH pellet burner (2 PT100 sensors and all wiring harnesses & technical documentation packaged inside burner box).	1	box
8 feet feed auger	1	box

Tab. 2 Package Contents

2.7 Dimensions Specifications for MESys 4000 - 6000 Series

No. of Sections	4	6
Approx. Output (kW)	14	20
Approx. Output (Btu/hr)	48,000	67,000
Vent Size (mm)	150	150
Nominal Vent Size (inches)	6	6
Boiler Length (mm)	515	715
Boiler Length (inches)	20 1/4	28 1/4
Size of Fire box (w x h) (mm x mm)	338 x 438	338 x 438
Size of Fire box (w x h) (in x in)	13 1/2 x 17 1/4	13 1/2 x 17 1/4
Depth of Firebox (mm)	450	650
Depth of Firebox (inch)	17 3/4	25 3/4
Dry weight (lbs)	530	710
Wet weight (lbs)	600	800
Water volume (gal)	7.5	10

Tab. 3 Connections and Dimensions

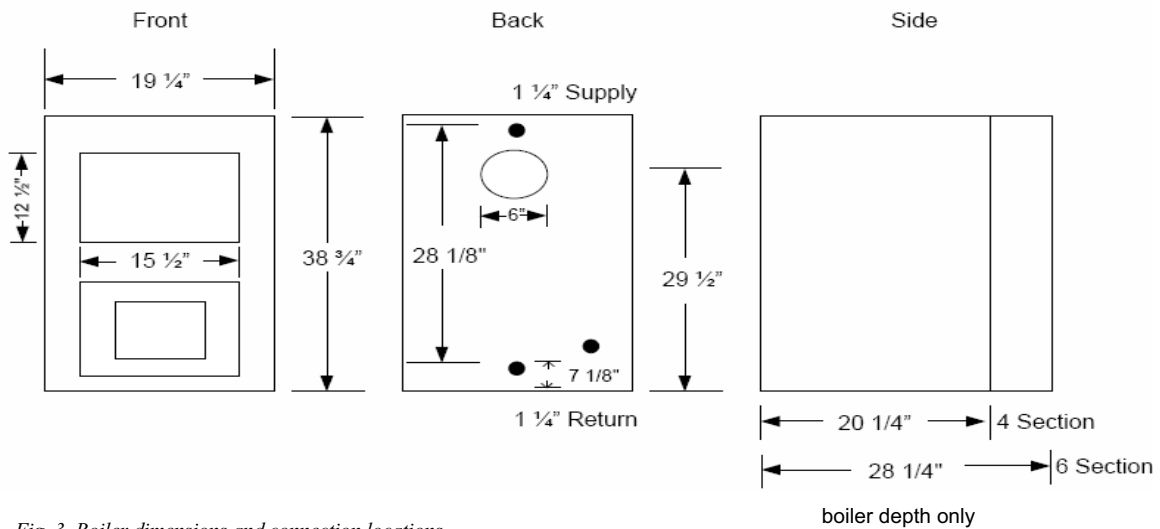


Fig. 3 Boiler dimensions and connection locations

2.8 Conditions for operation

Maintaining the specified operating conditions will enable the boiler to provide a high level of reliability and long service life.



Caution: Risk of system damage if operating conditions are not maintained.

Irreversible damage to individual components of the boiler as a whole or the heating system may occur.

- The information supplied in this boiler manual and burner manual is binding and must be observed.

2.8.1 General operating conditions

The boiler/burner system has not been tested for operation at altitudes above 2000 ft.

Operating conditions			
Min. boiler water temperature	Operating interruption (complete boiler shutdown)	heating circuit with heating circuit mixing valve ¹⁾	Min. return temperature
In combination with Janfire control for variable low-temperature operating modes.			
No requirements. The burner control will ensure a minimum 140°F water temperature.	Automatically by burner controls	not required but recommended with low-temperature heating system design. Required with: – Underfloor heating systems – Systems with high water content: > 115 gal/MBH (1 MBH = 100.000 Btu/hr)	Minimum boiler return temperature must be at least 122°F (50°C). External device such as a shunt pump and control are required as shown on page 36.

Tab. 4 General operating conditions

1) A heating circuit with a mixing valve improves controllability and is specifically recommended for systems with several heating zones.

2.8.2 Conditions power supply

Operating conditions		Notes – Requirement in greater detail
Power supply voltage	120 V AC nominal	Observe the voltage range of the burner and controls used. The outer casing/boiler must be grounded for safety reasons and in order to function correctly.
Circuit breaker	15 A	
Frequency	60 Hz	
Enclosure rating	–	IP 40 (protected against contact by entry of foreign objects > 0.04 inches Ø (> 1 mm Ø), no water proofing)

Tab. 5 Power supply

2.8.3 Conditions for hydraulic system and water quality

Operating conditions		Notes – Requirement in greater detail
Operating pressure (above atmospheric)	15 – 58 psi	Maximum 30 psi with the supplied safety valve.
Permissible site test pressure	45 – 75 psi	
Safety temperature limitation by Honeywell L4006E Aquastat	122 – 194 °F	
Water quality	–	The heating system may only be filled and topped up with water of domestic water quality. We recommend a pH value of 8.2 – 9.5.

Tab. 6 System configuration and water quality

2.8.4 Conditions for the boiler room and the environment

Operating conditions		Notes – Requirement in greater detail
Temperature in the boiler room	+40 to +104 °F	
relative humidity	max. 70 %	No condensation or precipitation inside the boiler room
Dust/airborne particles	–	<p>Excessive dust inside the boiler room must be avoided when the boiler is operating, e. g.:</p> <ul style="list-style-type: none"> – Dust from building work <p>Combustion air supplied from outside must not be excessively loaded with dust or air-borne particles; if necessary, air filters should be fitted in case:</p> <ul style="list-style-type: none"> – Air supply contaminated with dust from dirt roads and paths. – Air supply contaminated with dust from production and processing facilities, e. g. quarries, mines, etc. – Airborne particles from thistles and similar
Halogenated-hydrocarbon compounds	–	<p>The combustion air must be free from halogenated-hydrocarbon compounds.</p> <ul style="list-style-type: none"> – Identify the source of halogen-hydrocarbon compounds and seal it off. Where this is impossible, route combustion air from areas that are not contaminated by halogen-hydrocarbon compounds.
Fans that extract air from the boiler room.	–	<p>During burner operation, no mechanical air handling equipment may be operated that could extract combustion air from the boiler room, e.g.:</p> <ul style="list-style-type: none"> – Exhaust hoods – Tumble dryer – Ventilation equipment
Small animals	–	Prevent small animals from entering the boiler room, particularly through the air inlet vents – by fitting them with screens.
Fire safety	–	Maintain clearances between the boiler and flammable materials in accordance with local regulations. A minimum clearance of 4ft is required. Never store flammable materials or liquids in the vicinity of the boiler.
Flooding	–	In case of an acute risk of flooding, disconnect the boiler in time from its fuel and power supply before water enters the room. Any components or control equipment, which came in contact with flood water, must be replaced before re-commissioning.

Tab. 7 Boiler room and ambient conditions

2.8.5 Combustion air supply conditions

Operating conditions	Boiler output (in case of multi-boiler systems = total output)	Ventilation air cross-section in square inches (unrestricted aperture)
Air intake flow cross-section for combustion air drawn from outside (divided between max. 2 apertures)		Size free combustion air opening in sq. ft. equal to at least 3x the cross section area of the chimney.

Tab. 8 Observe national regulations for boilers which draw their air supply from the boiler room. **NFPA 31**

2.8.6 Conditions, Fuel

Operating conditions		Notes – Requirement in greater detail
Permissible fuels for boilers without integral burners	–	Only premium high quality wood pellets with known energy density, volume density and low ash content (0.2 - 1%).
Contamination	–	Free of contaminants (for example dust, mist, humidity),

Tab. 9 Fuels

3 Moving the boiler

This chapter details how to move the boiler safely.



Caution: Risk of system damage from impact. Fragile components could be damaged.

- Observe the transport instructions on the packaging.



WARNING: Risk of injury from carrying heavy loads.

- Always lift and move equipment with the help of another person



WARNING: Risk of injury if load is inadequately secured during transportation.

- Use suitable means of transportation e.g. hand trucks with straps.
- Secure load against falling.



Protect boiler connections from damage and dirt if the boiler is not installed immediately.



Dispose of packaging in an environmentally responsible manner.

3.1 Reducing boiler weight for transportation purposes

If required, you can reduce the weight of the boiler by removing the burner mounting and clean out doors.

- Unscrew the burner door-panel bolts.
- Unscrew top clean-out door and remove.

Note: Reinstall all components as part of the boiler installation.

4 Installing the boiler

This chapter details proper boiler installation. The individual steps involve:

- 4.1 Wall clearances.
- 4.2 Flue pipe installations.
- 4.3 Fitting the water connections.
- 4.4 Filling the heating system and checking for leaks.
- 4.5 Mounting the Janfire NH Burner.
- 4.6 Installing Boiler Jacket Panels.
- 4.7 Installing the aquastat and burner sensors.



Caution: Risk of system damage from freezing.

✓ Install the heating system in a frost-free room.



The boilers are designed for indoor use only.

4.1 Wall Clearances

The boiler is only approved for installation on non-combustible surfaces. In case of a combustible surface, one can use cinder blocks (minimum of 2" height), spaced tightly together, and then place the boiler on top.

In case of a placement on blocks on top of a combustible surface, heavy gauge sheet metal must be placed underneath the boiler, protrude the sheet metal at 16" (406 mm) to the front of the boiler, 8" (203 mm) to either side of the ash removal door and boiler access door and underneath the chimney connector and barometric damper extending at least 4" (100 mm) on either side of the chimney connector.

Position the boiler with the recommended wall clearances. Reducing the minimum clearances makes the boiler more difficult to access during installation, maintenance and cleaning.

The boiler base or foundation must be perfectly flat and level.

Floor must be able to support boiler gross weight.



The boilers are designed for a side clearance of 8".

Where applicable, allow extra wall clearances for additional components such as DHW tank, pipe connections.



Caution: Risk of fire from flammable materials or liquids

- Clearances less than 6" must comply with local and statutory codes.
- Make sure that there is a sufficient clearance between combustible materials and the chimney connection as specified by NFPA 31 (distance of 18")
- The floor must comply with the requirements of NFPA 31.

Dimension	Wall clearance	
	A	Recommended
minimum		40"
B	Recommended	27-1/2"
	minimum	16"
C	Recommended	16"
	minimum	8"

Tab. 10 Recommended and minimum wall clearances (dimensions in inches).

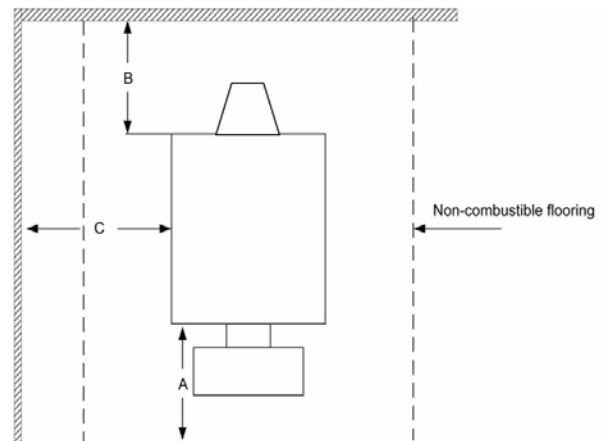


Fig. 4 Boiler room clearances (boiler positioned on the l.h. or r.h. side)

4.2 Burner door opening

To open the burner door, electrically disconnect the burner first if burner is already mounted on the boiler.

- Remove the 2 hex bolts (Fig. 4a, item 2) below the burner door opening.
- Swing the burner door open
- Now use top handle to open access door to flue passages.

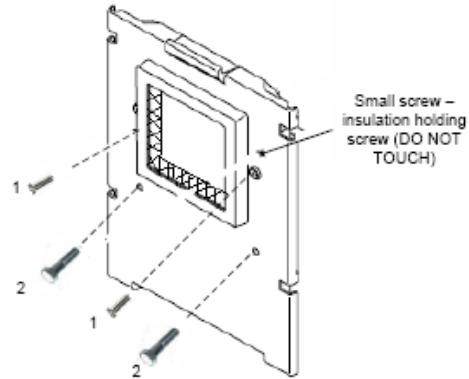


Fig. 4a Burner Door

- 1.) Eye screws for burner mounting
- 2.) Hex bolts for door closing

4.3 Flue gas collector installation

If not pre-assembled, install collector by following steps below:

- Loosen the mounting nuts.
- Apply supplied sealing material on rear boiler section to tighten the exhaust collector on the rear section properly (Fig. 4b).
- Mount the collector and tighten the nuts.
- Do not use excessive force to avoid cracking the collector

4.4 Flue pipe installation

4.4.1 Chimney venting

Refer to Table 11 to determine chimney size requirements based on boiler size, chimney height and internal flue chase.

Always use a stainless steel chimney liner and cap off at the top of the chimney in the space between chimney interior and outside of chimney liner per NFPA 211 Section 12.4.1.2.

Recommended chimney materials are Selkirk SureTemp or Supervent (JSC) venting materials, or Security Chimneys Secure Temp ASHT venting materials. All these materials are approved per UL-103HT.

- Use heavy gauge (26ga. or better) black smoke pipe to connect to existing chimney.
- Install factory supplied barometric near the boiler.

Inspecting and cleaning existing flue

- Remove blockages and dirt from chimney
- Clean chimney
- Repair or replace faulty sections
- If necessary repair mortar and joints

Minimum Size of Chimney

Follow guidelines below in terms of minimum chimney height as a function of chimney diameter

Chimney Size	Min. Height
6" x 6"	17 ft.
7" x 7"	16ft.
8" x 8"	16 ft.
6" round	19 ft.
7" round	17 ft.

Tab. 11 Minimum chimney height

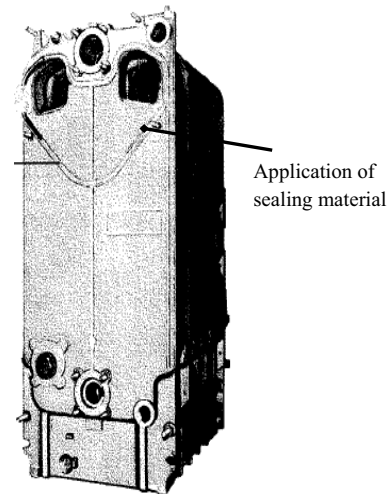


Fig. 4b Flue gas collector installation



To prevent down drafts extend chimney at least 3 feet above the roof opening and at least 2 feet above any part of the roof within a radius of 10 feet.

Flue pipe	Type	Minimum clearance
Double-wall	L	9"
Single-wall	26ga.	18"

Tab. 12 Minimum clearances to combustible objects for flue systems

Installing the flue pipe

Danger: Risk of death from escaping flue gases.

⚠ If the resistance to flue gas flow is too great and/or the flue pipe diameter is smaller than the recommended size and/or the flue pipe is too short.

- Install 6" vent pipe on flue collector and use high temperature sealant for air tight connection.

i Leakage leads to wrong CO2 measurement and wrong burner adjustment.

i Avoid long horizontal flue pipe runs and keep the number of elbows to a minimum.

Inches of WC	4000 Series		6000 Series	
	Low fire	High fire	Low fire	High fire
Over fire draft	-.02 (-5)	-.03 (-7)	.02 (-5)	-.03 (-7)
Breeching draft	-.03 (-7)	-.04 (-10)	-.03 (-7)	-.04 (-10)

Tab. 13 Required Draft settings (inches of WC). Metric units in brackets (Pa).

- Install flue connections between boiler and chimney to slope up at least 1/4" per foot to the chimney.
- Connect the flue pipe to the chimney above the bottom of the chimney to prevent blockages.
- Install cleaning and service hatches.
- Always install the furnished barometric damper in the vertical position.
- Always maintain the chimney and flue pipe components in clean and good conditions.
- On lateral runs, support flue pipe every 4 ft; on vertical runs, support flue pipe every 8 ft with sufficiently strong brackets. Install cleaning and service hatches.

During full fire burner operation, use Table 13 for approximate draft settings at various locations in the venting system. Use a draft gauge to verify the indicated draft values. Adjust barometric damper as required. Use the small hole in breeching connector to measure draft at that location.

i Do not adjust barometric damper beyond its required setting as described above for any reason. The pellet burner, boiler and chimney combination is a balanced system that typically do not require additional adjustments following initial set-up.

4.4.2 Draft Inducers

In the case of a poorly drafting chimney (draft < .02 In WC) it will be necessary to install a draft inducer. Either a Fields #DI-1 in-line style or a Fields #6 "Type C" chimney-top style.

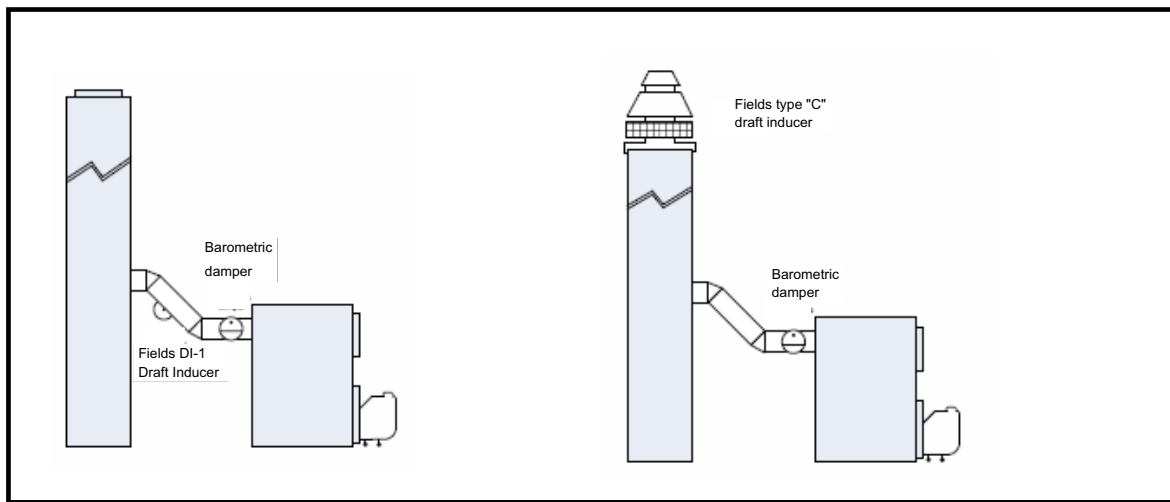


Fig. 4b Draft Inducers

4.5 Fitting the water connections



Caution: Risk of system damage from leaking connections.

- Support the pipes to the boiler to prevent them from being under stress.

4.5.1 Installing the B-kit

- Install the 1-1/4" x 3" nipple into the top rear connection with the parallel thread into the boiler.
- Install the 90° elbow into desired direction.
- Install supply manifold into the 90° elbow. (Fig. 5).
- Install the P&T gauge into the 1/4" manifold connection.
- Install 1" x 3/4" bushing into lower connection.
- Install 3/4" drain valve into bushing.
- Install LWCO above boiler in system piping.



Do not fit the safety valve until the leak test (Chapter 4.6, page 17) has been completed. The relief valve must be installed vertically.

4.5.2 Installing system components

See the installation diagram for installation of the heating system components (Fig. 6).



Do not remove the flow venturi (factory installed) at boiler return. Orient venturi with notch at the 6 o'clock position as shown in Fig. 7. The boiler may crack without this piece.

For more installation examples refer to Chapter 9, page 31.

4.5.3 Installing baffles

See Figs. 4C and 4D below.

- Open burner door.
- Look inside boiler, near top of opening in chamber, for hooks cast in to boiler.
- Slide two baffle plates into boiler at a 45 degree angle.
- Keeping front edges to the front of the boiler, drop down inside edges until the two plates nest together. Pull baffles in direction of front section.

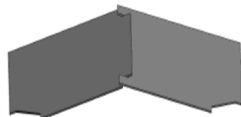


Fig. 4C Baffles

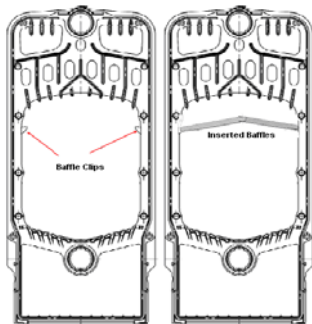


Fig. 4D Installing Baffles

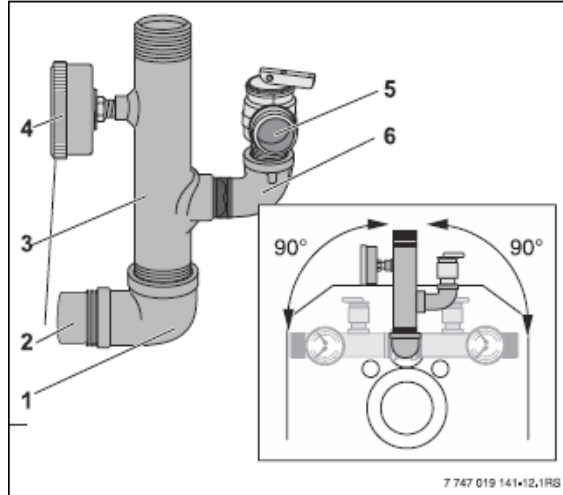


Fig. 5 Near boiler fitting (B-kit) installation

- 1 90° 1/4" NPT street elbow
- 2 NPT X NPT nipple
- 3 Supply manifold
- 4 Pressure/temperature gauge
- 5 Pressure relief valve
- 6 90° 3/4" NPT elbow

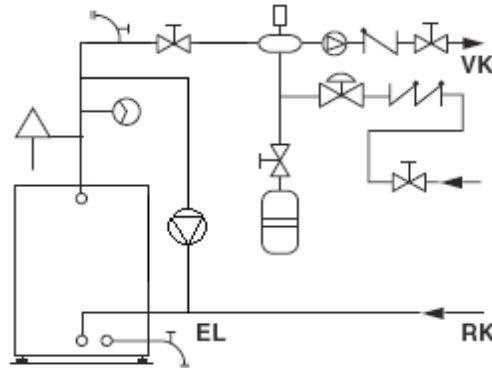


Fig. 6 Near boiler piping

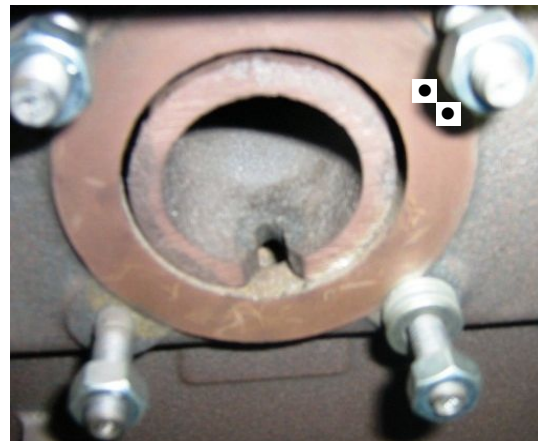




Fig. 7 Venturi orientation

4.6 Filling the heating system and checking for leaks

The boiler is tested for leaks at the factory. Before putting the heating system into operation, it must be checked to ensure that no leaks will occur during operation.

 **Caution:** Risk of system damage from excess pressure when testing for leaks. Pressure, control and safety equipment may be damaged by excessive pressure.

- When you carry out a leakage test, make sure that no pressure, control or safety equipment that cannot be isolated from the boiler water chamber is fitted.

 **Caution:** Risk of damage to system due to temperature stresses. If you fill the heating system when it is hot, the resulting temperature stresses can cause stress cracks. The boiler will then leak.

- Only fill the heating system when cold (the flow temperature should be no more than 100°F).
- Pay attention to the fill water quality as specified in the system configuration and water quality table (Table 6, pg. 10 and Commissioning Log, pg. 24), and record the volume and quality of the water.

Maximum operating pressure	Maximum on-site testing pressure
30 psi (with safety valve supplied)	45 psi

Tab. 14 Maximum testing pressure

Carry out the leak test at 1.5 times the standard operating pressure and in accordance with the codes.

- Seal pressure relief valve connection (Fig. 5 "Installing B-Kit", page 16) and all other open connection with blind plugs.
- Isolate the expansion tank from the system by closing the valve.
- Open the mixing and shut-off valves on the heating water (primary) side.
- Slowly fill the boiler with tap water.

- Slowly fill the heating system. Observe the pressure gauge while filling.
- Check the connections and pipework for leaks.
- Bleed the system via the radiator bleed valves if applicable.
- Top with water if the pressure drops as a result of bleeding the system.
- Installing pressure relief valve (Fig.5 "Installing B-Kit", page 16)

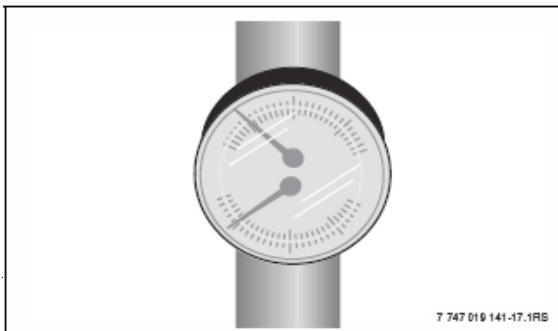



Fig. 8 Pressure/temperature gauge

 **Caution:** Health risk from contaminated domestic water.

✓ Always observe the regulations and standards applicable in your jurisdiction for the prevention of contamination of drinking water (e.g. by water from heating systems).

- Open the cap of the automatic air vent by one full turn to allow air to escape.

4.7 Mounting the Janfire NH burner

Remove the Janfire burner from its box and verify the following components:

- Janfire NH burner
- Wiring harness with plugs for feed auger operation.
- Power wiring harness with plug for power supply to burner.
- 3 pin connector with 2 sensors and corresponding wiring (labeled boiler and outdoor).
- Second 3 pin connector for communication is not used.
- Burner Installation and Service Manual.
- Drop shaft hose and 2 hose clamps



Caution: Risk of Fire.

Assure that upper auger opening is not positioned directly above drop shaft of the burner to prevent accidental falling of pellets into the shaft (in case of back burn).

Mounting of NH Burner

- Install the burner mounting rings, supplied with the burner, into the threaded tappings adjacent to the burner mounting opening in the lower boiler door. Screw in burner eye loops no more than 10mm (3/8") into burner door.
- Do not pierce the insulation on inside of door.
- Door's burner opening is slightly wider than burner. Adjust burner fit to site circumstances, centering if there is no need to align to one side or the other.
- Insert burner into mounting opening, ensure solid seal all around mounting opening and latch burner into mounting rings and tighten latches.
- Check that burner/boiler connection is tight.
- Follow Installation and Maintenance Instructions Manual for Janfire NH Burner for additional burner installation details. The NH burner has a door contact switch to ensure solid connection between burner and boiler door.
- **Note:** Route burner wiring cables to either side of the boiler away from front cast iron parts.

4.8 Installing Boiler Jacket Panels

Installation sequence, refer to Fig. 9:

- 1 Front top cross bar (3)
- 2 Rear top cross bar (5)
- 3 Right hand side panel (2)
- 4 Left hand side panel (10)
- 5 Rear panel (4)
- 6 Top insulation blanket (not shown; embedded in top panels)
- 7 Front top cover (7)
- 8 Rear top cover (8)
- 10 Front cover (90)

1) Installation of front cross bar:

- Remove counter nut and washer from boiler tie rod.
- Slide the top cross bracket on the boiler tie rod.
- Place washer either in front of, or behind the top cross bar to ensure even alignment with boiler front section.
- Secure top cross bar by tightening the second nut.

2) Installation of rear cross bar:

- Nuts are mounted at the bolts at the back of the burner. Remove first one and install Z profile in between.
- The cross bar has a Z profile and is equipped with strain relief provisions.
- Install nut onto threaded stud at proper location.
- Slide rear cross bar in place and secure slightly with second nut.
- After installation of side panels tighten nut securely.



Note: Tie bar with counter nut and place washer before/after the front top cross bar

3) Installation of right hand and left hand side panels:

- Hang into the lower tie bars using the inward bent holding corners.
- Support the top of each side panel directly from the top and rear cross bar.
- Secure side panels with furnished sheet metal screws.
- Repeat these instructions for left hand side panel.
- Adjust rear cross bar with nut & counter nut to ensure proper alignment of jacket panels.
- Secure rear top cross bar using nut and counter nut.

4) Installation of rear jacket panel:

- Hang the rear jacket panel in between the side panels.
- Secure with furnished sheet metal screws.

5) Installation of insulation pieces:

- Place the loose supplied insulation piece on top of the boiler.
- Make sure to extend the installed immersion wells through the insulation.

6) Installation of remaining cover panels.

- Slide the front top panel from the front with its tabs into the slots of the side panels.
- Secure the front top cover to the front cross bar with screws.
- Slide the top rear cover with its tabs into the slots.
- Make sure to remove the knock-out for the rear immersion well.
- Secure top rear cover with screws to the rear cross bar.
- Prior to installation of the front cover, install the supplied protective plate.
- Slide the front cover and protective plate between both side panels and secure with furnished screws.
- Install the MESys Logo plate (part of the B-kit) on the top front cover by removing the adhesive backing.

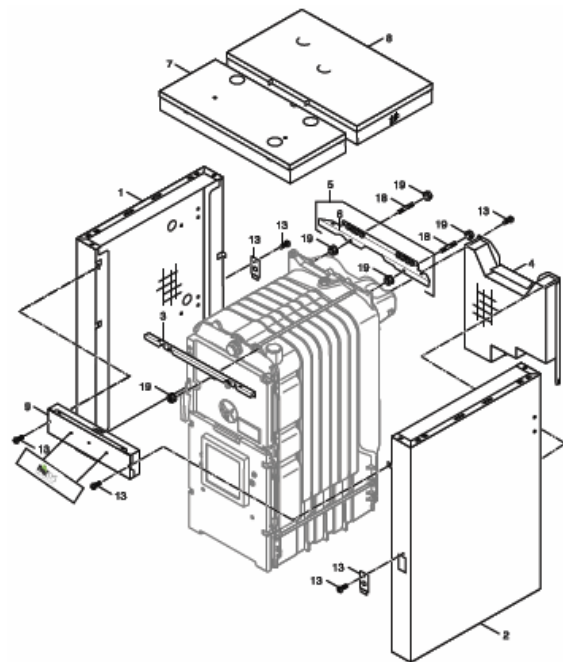


Fig. 9 Boiler Jacket Panel Installation

4.9 Installing the aquastat and burner sensors

This pellet boiler/burner system is equipped with an outdoor sensor to provide outdoor temperature control for system efficiency optimization. The boiler is equipped with a 3/4" well for boiler water sensing near the boiler supply tapping. A Honeywell L4006E aquastat (Fig. 10a) is supplied as a manual reset high limit control to shut down burner in case of a high temperature condition.



DANGER: Risk of fatal injury due to electric shock!

- Electrical work may only be carried out by qualified technicians.
- Before opening or working on any electrical equipment isolate it from the power supply and take steps to ensure it cannot be inadvertently reconnected.



Warning: Fire hazard from hot boiler components may damage electrical cables.

- Make sure that all cables are shielded in that way that they cannot come in to contact with hot boiler parts and are not placed in hot zones (ie. boiler front door).
- Make sure that the boiler is electrically grounded to NEC requirements.

- Identify the boiler sensor as part of the Janfire NH burner package. Slide contact sleeve (supplied in B-kit) around PT100 Sensor (Fig. 10b).
- Route and insert the boiler sensor under the jacket panels into the well. Ensure fit to bottom of well.
- Remove adapter clam off of aquastat. Use the two screws provided in B-kit to secure aquastat to top rear jacket panel.
- Uncoil the capillary of the Honeywell and insert into the well.
- Use 2 90 degree spacers furnished with the B-kit to carefully block in the capillary and sensor. Make sure that boiler sensor and capillary are fully inserted into the immersion well.
- Drill holes to fit the aquastat on the boiler jacket.
- Refer to page 42 in this manual for detailed wiring instructions of supplied safety components.



Fig. 10a: Aquastat bracket, aquastat and PT100 boiler sensor installation mounting.
Set L4006E at 200 degrees F.

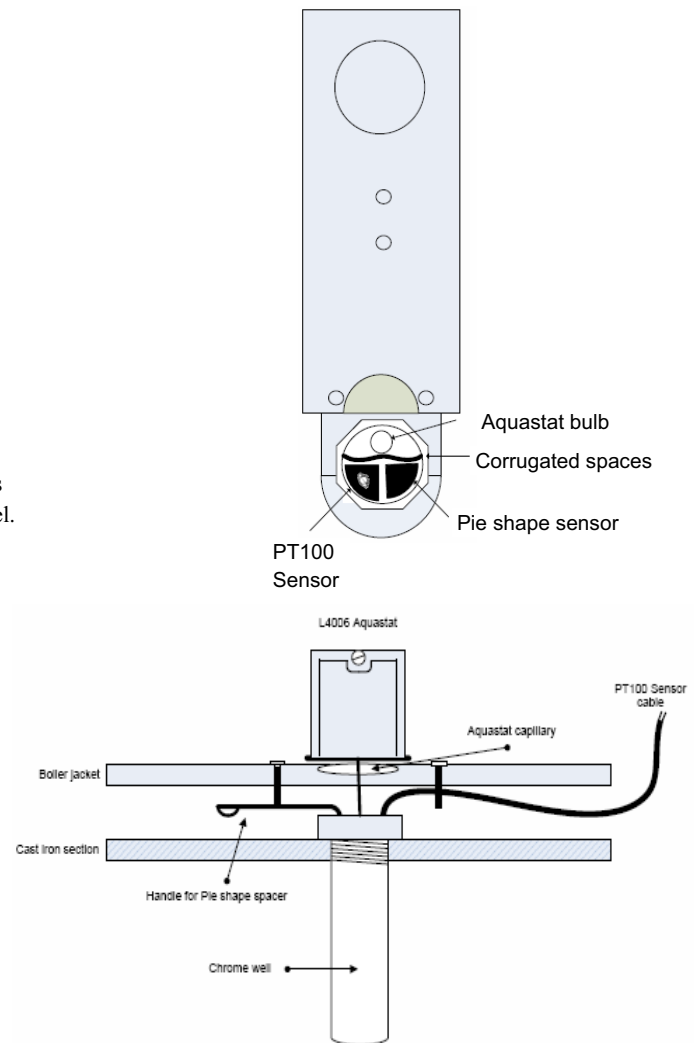


Fig. 10b: Sensor and capillary sensor details

5 Commissioning the heating system

This chapter describes the initial start-up procedure following burner and pellet fuel supply installation.

- Complete the start-up protocol during this process (Chapter 5.6, page 23).

Further information on boiler room layout and clearances, combustion air requirements and venting systems and boiler operational requirements can be found in Chapter 2.8, pg. 10.



Caution: Risk of boiler damage from excessive dust and airborne particle levels.

- Do not operate the boiler when there is a lot of dust in the boiler room, e.g. due to construction work.
- Install an air filter if the combustion air supply is very dusty (e.g. due to dirt roads and paths or dust-generating working environments such as quarries, mines etc.) or contains airborne seeds from plants.



Caution: Risk of boiler damage due to contaminated combustion air.

- Never use chloric cleaning agents and halogenated hydrocarbons (ie. spray bottles, solvents and cleaning agents, paints, glues).
- Do not store or use these substances in the boiler room.

5.1 Bringing system up to operating pressure

Bring the system up to the normal operating pressure before commissioning.



Caution: Risk of damage to system due to material stresses caused by temperature differentials.

- Only fill the heating system when cold (the flow temperature should be no more than 100 °F).



WARNING: Health risk from contaminated domestic water.

- Observe all national standards and regulations regarding prevention of domestic water contamination (e.g. by water from heating systems).

- Top up the heating water or drain via the boiler drain valve between expansion tank and air eliminator until the required operating pressure has been reached: minimum 15 psi, maximum 30 psi pressure.
- Bleed air from the heating system while filling.

5.2 Checking the safety valve

- Make sure that no persons are in the discharge area of the pressure relief valve.
- Raise the lever on the pressure relief valve.

The pressure relief valve must open and release pressure. If the pressure relief valve does not discharge, it must be replaced, because system components can be damaged by excessive pressure.

5.3 Preparing the heating system for operation

Adhere to all instructions contained in the Boiler Installation and Service Manual, Boiler Operating Manual and Burner Installation Manual. Specifically, adhere to all clearance requirements put forth in the Boiler Installation and Service Manual.

- Check for ample pellet supply in the pellet fuel storage bin.
- Check all pellet delivery system interlocks for proper operation as applicable to your system.
- Check for proper installation of the venting system components.
- Refer to the Pellet Fuel burner Installation Manual for electrical wiring diagram and interlocks on the pellet fuel delivery system.
- Switch on the boiler system emergency switch and/or appropriate system breaker.

5.4 Starting up the burner

For further start-up steps, follow the burner start-up sequence. To do so, it is essential that you consult the burner documentation.

Use the on/off switch on the boiler system to switch the heating system on. The burner starts up if the water temperature is below its setpoint.

5.5 Notes on commissioning the pellet burner

Allow burner to operate for 15 to 20 minutes before performing a combustion test. Earlier combustion tests can lead to incorrect readings as a result of burning off the sealing rope. We recommend rechecking the burner after a few weeks of operation.



Incorrect burner adjustment can cause contamination of the boiler (e.g. soot), leading to low efficiency, high emissions, and a greater risk of service calls.

- Always check combustion with the proper instruments.
- Never adjust burner visually.
- Once the pellet burner is set properly with combustion instruments, it automatically adjusts combustion air based on pellet fuel delivery rate ensuring good, clean combustion over entire modulation range.
- Make necessary corrections described below to ensure good combustion with the new pellets using volumetric pellet density and energy pellet density data. This avoids overloading of the combustion chamber and ensures good combustion

Required instruments:

- CO₂ measuring equipment
- Draft measuring equipment
- Pellet fuel density canister
- Pellet fuel energy density (Btu/lbs)
- Stack thermometer
- Smoke tester

- Create a steady heat demand in the house so that the burner operates on a continual basis at a consistent high output level.
- Record draft measurements in Table 16 below.

Date				
Volumetric measurement (lbs/ft ³)				
Energy Density (Btu/lbs) (see pg. 4)				
Burner set-up adjustment (yes/no)				
Signature of technician				

Tab. 15 Pellet Characteristic Values

Date				
Over fire draft (Inch W.C.)				
Breeching draft (Inch W.C.)				
Breeching: CO ₂ (%)				
Breeching: stack temperature (°F)				
Service Technician name/signature				

Tab. 16 Combustion Data

- Required burner output level should be at least 80% of the listed boiler output capacity. (4000 Series: 40,000 Btu/hr; 6000 Series: 60,000 Btu/hr).
- Boiler temperature must be at least 150°F at the start of the combustion test.
- Record the volumetric pellet density (lbs/ft³) as measured with the pellet density bucket in Table 15 below.
- Record the pellet energy density (Btu/lbs) as provided by the pellet supplier in the Table 15 below.
- Carefully open the over fire sensing port located in the top access door.
- Insert draft probe 3" into the fire box and seal the opening surrounding of the probe with a fire proof material.
- Read and record over fire pressure using the draft gauge.
- Remove draft probe and close and seal over fire sensing port.
- Drill a small pilot hole in the boiler breeching adapter.
- Insert probe, read draft breeching, CO₂ and flue gas temperature and record all data in Table 16 below.
- For CO₂ adjustments, refer to Burner Installation Manual, pg. 29.
- Adjust barometric damper to achieve listed values in Table 13 (page 15)
- Recheck over fire and breeching pressure until values in Table 13 are obtained.



Make sure that the chimney system can develop sufficient draft; also ensure that the barometric damper has sufficient capacity to provide draft relief. Excessive draft will affect system operation; correct this condition corrected immediately.

- Close pilot hole in breeching adapter and all other openings following draft measurement.

5.6 Commissioning log (Initial and date the commissioning steps carried out)

Commissioning operations		Page	Readings taken	Comments
1.	Fill heating system and check for leaks – Heating system pressure	17	<input type="checkbox"/> _____ psi	
2.	Bring the system up to 15 - 20 psi operating pressure ● Bleed heating system of air ● Test functioning of pressure relief valve ● Adjust expansion tank pressure (follow manufacturers' recommendations).	21	<input type="checkbox"/> _____ psi	
3.	Check for ample combustion air supply. ● Remove/eliminate effects of induced draft appliances such as gas water heaters, central vacuum systems, oven range, kitchen and bath fans. ● Ensure ample screened free combustion air openings ● Check venting system for blockages, safety and clean lines.	4	<input type="checkbox"/>	
4.	Checking position of baffle plates	16	<input type="checkbox"/>	
5.	Check burner operation (See Burner Installation & Servicing Manual) Verify correct sensor values of Janfire burner before turning boiler on. If necessary, calibrate sensors (Settings 71 - 75 Burner Installation & Servicing Instructions Manual chapter, "NH Burner Menu System")	22	<input type="checkbox"/>	
6.	Perform combustion readings. ● Measure over fire draft. ● Measure the breeching draft, CO2 and stack temperature. ● Record data in Table 16.	23 31	<input type="checkbox"/> _____ in WC _____ in WC, °F	
7.	Check operation of heating system components. ● Check Honeywell L4006E on boiler. Does burner shut off? ● Check L4006A on hot water tank (if present). Does DHW tank pump run? ● Check operation of system thermostats. Do the respective zone pumps/ valves operate?		<input type="checkbox"/>	
8.	Adjusting the burner settings to suit the customer's pellet fuel characteristics (burners' documentation)		<input type="checkbox"/>	
9.	Inform the end user and hand over technical documentation		<input type="checkbox"/>	
	Confirmation of properly completed commissioning		Company stamp/signature/date	



Inform the customer about the correct fuel and correct operating pressure. Enter the details in the table (boiler operating instructions).

6 Shutting down the heating system



Caution: Risk of system damage from freezing.

If the heating system has been turned off, it may freeze up in cold weather conditions.

- Leave the heating system switched on as long as possible.
- Protect a disabled heating system from freezing by draining the heating system and hot water pipes at the lowest point.
- Padlock shut the emergency switch to prevent accidental operation of the pellet feeder system.
- Shut off incoming water supply and padlock shut.
- Drain water from domestic hot water tank (if present) to prevent freeze-up.
- Open faucet at high location in the home to ensure complete draining of domestic water system.

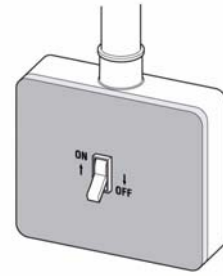


Fig. 11 Boiler System Emergency Switch

6.1 Shutting down the heating system in an emergency



Use the heating system emergency shut-off switch located outside the boiler room or the heating system circuit-breaker for emergency shutdown.

6.1.1 What to do in an emergency

Explain to the customer what to do in an emergency, e.g. a fire.

- Never put yourself at risk of fatal injury. Your own safety must always take the highest priority.
- Disconnect the heating system from the electrical power supply by means of the emergency shutoff switch or the heating system circuit-breaker.
- Exit the building and call your service contractor and local fire department.

7 Heating system servicing

7.1 Why is regular maintenance important?

Pellet heating systems should be maintained and inspected every 2 - 3 months for the following reasons:

- To ensure economical operation for maximum efficiency.
- To achieve and maintain a high level of system reliability.
- To maintain the best possible combustion for low ash, CO and particulate emissions.
- To ensure long life of all operating components.
- To detect early malfunction of components for long term reliable operation.

Service work may only be carried out by a qualified service technician or qualified pellet delivery driver. If parts are replaced, only MESys approved components may be used.

- Monitor burner and feeding auger operation daily to learn its behavior.
- Check pellets for lodging or bridging inside storage bin on a regular basis.
- Check boiler interior on a regular basis for creosote and ash build-up to determine suitable cleaning interval.



Use of premium pellets and modulation burner operation enhance combustion and minimize creosote build-up.

Creosote formation and need for removal:

If pellets burn slowly tar and other organic vapors when combined with moisture can result in creosote. Creosote vapors can condense in a cool chimney flue due to low fire input. The creosote residue accumulates inside the flue lining. When ignited it makes for a very hot fire. Chimney and chimney connector should be periodically inspected for creosote build-up and this residue must be removed due to risk of chimney fire.

- Results of regular service work must be recorded in the Servicing and Maintenance Log.



Danger: Risk of death due to chimney fire.

- Call Fire Department immediately in case of a chimney fire.
- If possible, shut down pellet boiler, close off barometric damper and prevent combustion air from entering the venting system or chimney.
- Exit the building safely.



Spare parts can be ordered from MESys using the parts list.



Danger: Risk of death from electric shock.

- Before working on the boiler and prior to opening control panel:
Shut down the power supply by turning off the emergency shut-off switch or disengaging the heating system circuit breaker, and prevent from accidental reactivation.

7.2 Preparing the boiler for servicing

- Shut down the heating system. (Chapter 6, page 25)
- Disconnect electrical supply to burner.

7.3 Checking heating system operating pressure

The boiler system water pressure should be between 15 to 30 psi. (1 – 2 bars).

- Check system pressure on boiler P & T guage.
- If the system pressure is less than 15 psi, the pressure must be increased.
- Open automatic feed valve (if present) to increase pressure.
- Check P & T guage and shut off the automatic feed valve when completed.



Caution: Risk of system damage due to frequent topping up.

If you have to top up the heating water frequently, the heating system may suffer damage from corrosion or scaling, depending on the water quality.

- Ensure that your heating system is bled properly.
- Check the heating system for leaks and proper operation of the expansion vessel.



Caution: Risk of damage to system due to material stresses caused by temperature differentials.

- Only fill the system when cold (the flow temperature at the temperature/pressure gauge should be no more than 100 °F).

7.4 Testing relief valve

Verify proper functioning of the relief valve annually as per local code.

- Make sure that no persons are in the discharge area of the pressure relief valve.
- Raise the lever on the pressure relief valve.

The pressure relief valve must open and release pressure. If the pressure relief valve does not discharge, it must be replaced, because system components may be damaged by excessive pressure.

7.5 Cleaning the boiler

The boiler must be cleaned every 2 - 3 months periodically by brushing the heating surfaces and baffles, and removal of ashes from the ash compartment and main combustion chamber. The use of an industrial grade, high temperature resistant shop vac simplifies the removal of ashes from the ash compartment and primary heating surfaces.

Follow the Burner Installation and Maintenance Instructions for periodic service to the burner to ensure long, trouble free life.

Wait at least 15 to 20 minutes after system shut-down before opening the boiler. Visually check to ascertain that the pellets are completely burned out.



Caution: Risk of burning by touching hot boiler parts.

- Wear appropriate protective personal safety equipment.

- Open burner bulkhead by removing the two hexagon bolts below burner (see Fig. 11.a).

7.5.1 Cleaning the boiler with brushes

- Note the position of the flue baffles for later reference.
- Carefully remove the hot baffles plate with protective wear equipment.
- Clean off the baffles.
- Brush down the boiler from the top down. Use suitable brushes available from MESys or your pellet supplier.
- Brush the combustion chamber side with an up & down motion.
- Check venting system and clean as required.
- Remove all ashes from the combustion chamber.
- Place ashes into a metallic container with a metallic sealed lid.
- In case of vacuum extraction, make sure to use a high temperature resistant vacuum system. Make sure not to blow air into inner surroundings.
- Clean off the burner components and follow Burner Installation and Maintenance Instructions
- Insert baffle plates back into the boiler.
- Check integrity of bulkhead sealing gaskets and replace when necessary.
- Close and secure doors.
- Close burner bulkhead with the two hexagon bolts (approx. 90 inch-lbs). Tighten the hexagon bolts evenly.

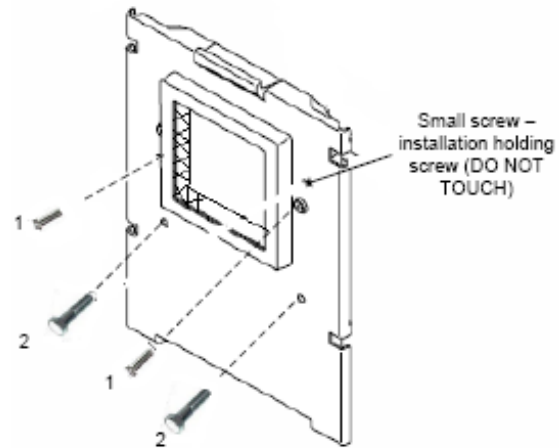


Fig. 11.a Burner Door

- 1.) Eye screws for burner mounting
- 2.) Hex bolts for door closing

7.6 Servicing and maintenance logs

- Initial and date the servicing operations completed.

The inspection and servicing logs can also be used as copy masters.

Service work	Page	Date: _____	Date: _____	Date: _____
1. Check general condition of heating system		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Visual inspection and function check of the heating system				
3. Checking pellet fuel and water-carrying components of the system for: <ul style="list-style-type: none"> – leaks during operation – leak test – visible signs of corrosion – signs of aging 		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Check the combustion chamber and the heating surface for contamination; shut down the system for this step	26	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Checking the burner (burner documentation)				
6. Check the combustion air supply and flue gas routing for function and safety		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Check the operating pressure, relief valve and expansion tank inlet pressure	26	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Checking function of DHW tank and sacrificial anode (DHW tank documentation)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Checking burner settings (burner documentation)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Record the final checks of the inspection work, incl. measurements and test results		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
On-demand maintenance procedures	Page	Date: _____	Date: _____	
1. Shutting down the heating system	25	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Removing and cleaning the heat exchanger baffles	27	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Cleaning heat exchanger heater flue (heating surfaces) and combustion chamber and afterwards refitting heat exchanger baffles in original positions	27	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Checking seals/cord gaskets on burner door and burner and replacing as necessary	27	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Commissioning the heating system	22	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Final check of the servicing work		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Checking safe and proper operation		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Confirmation of properly completed servicing		Company stamp/signature	Company stamp/signature	Company stamp/signature

	Date: _____	Date: _____	Date: _____	Date: _____	Date: _____	Date: _____	Date: _____
1.							
2.							
3.							
4.							
5.							
6.							
7.							
8.							
9.							
10.							
	Date: _____	Date: _____	Date: _____	Date: _____	Date: _____	Date: _____	Date: _____
1.							
2.							
3.							
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If any condition requiring maintenance work is identified in the course of servicing, that work must be carried out as necessary to ensure safe and proper operation.

8 Trouble Shooting

This Trouble shooting section is designed as an aid in identifying malfunctions of the system and provide corrective action steps. It is broken down by major system components

to assist in problem identification and correction. The list is not all inclusive but will cover most typical scenarios.

Malfunction	Possible observation	Potential causes
No space heating	No hot water flow through heat emitters	Defective room thermostat, pump or zone valve, reset aquastat
		Burner on lock-out, pellet storage empty/lodged pellets, system air bound
Cold DHW	Cold/luke warm domestic water	Defective tank aquastat, seized tank pump
		Burner on lock-out, pellet storage empty/lodged pellets, system air bound
Boiler remains very hot	Burner continues cycling operation	Check burner sensor wiring, incorrect burner software settings, check draft conditions, check room air conditions
		Seized control panel relay, check boiler aquastat.
Boiler remains cold	Burner does not run	Summer time, burner in lock-out: check control lights, check fuses, check pellet supply, check draft
Feed auger does not run	No burner operation	Check pellet supply, check pellet lodging, check electric motor, check shaft spindle

*Tab. 17 Note: During power outage periods, a small generator could be employed to power the pellet burner to provide heat. All pump flow or check valves and/or zone valves would need to be lifted manually to induce a thermal flow through the system. Its effectiveness will depend on the piping lay-out.
Note: For detailed burner trouble shooting see Janfire manuals.*

9 Installation examples

The MESys 4000 - 6000 Series system can be installed in new applications and existing hot water based heating systems. The boiler system can also be combined with an existing hot water based heating system where now the pellet boiler is the primary heat source. In addition to space heating, the pellet system is ideally suited to provide domestic hot water by means of an indirect hot water tank.

Watts 120°F domestic hot water tempering valve

9.1 Basic pellet burner operation

The pellet burner operates based on the outdoor temperature control provided with the Janfire burner to maintain a certain boiler water temperature range. The pellet boiler will operate in a temperature range from 140 – 194 °F (60 - 90°C) based on an outdoor temperature range of 68 – -40°F (20 - -40 °C). In addition, the pellet burner operates in a modulating fashion with an adjustable temperature differential along the heating curve. The burner increases heat output based on an integrated PID logic. **The pellet burner therefore operates fully independent from the heating system requirements and requires no input signals from the heat distribution system.**

The pellet burner measures outdoor and boiler water temperature. Other input signals include an internal hopper level sensor, a drop shaft temperature sensor, a burning cup temperature sensor, contact micro-switch and internal time clock. Output signals are: fan power and speed control, feeder auger, dosage auger, ash scrape motor w/ power sensing and ignition coil.

9.2 Heating system operation

As the result of complete integrated controls for the Janfire pellet burner, the heating system control components, such as thermostats, end switches, zone valves and pumps, do NOT connect back to the burner control. Water temperature in the boiler is fully controlled by the burner control system. Thermostats will simply turn on pumps, open zone valves and heat is readily available. Radiant systems and other complex sub-systems do not require integration into the burner control. The following examples demonstrate common system applications including existing oil boiler back-up systems.

9.3 DHW heating operation

Any indirect fired hot water tank can be integrated into the MESys 4000 - 6000 Series pellet boiler system. The indirect tank is used as a thermal storage zone to extend burner operation at low firing rates to minimize burner

cycling. The thermal storage will also assist the space heating demand under high load/low water temperature conditions. Therefore, a DHW TEMPERING VALVE MUST ALWAYS BE INSTALLED ON THE DOMESTIC OUTLET OF THE TANK. All piping and wiring diagrams clearly show this system aspect. THE DHW TANK PUMP MUST OPERATE OFF ITS OWN RELAY WHEN USED IN AN INDIRECT TANK APPLICATION.

Description: Piping and wiring

Application Descriptions

- Multiple zoning with pumps and separate DHW tank pump.
- Multiple zoning with zone valves and separate DHW tank pump.
- Radiant floor application along with separate DHW tank pump.

9.4 Summertime DHW

Since the boiler will be maintained at minimum temperature in summer months (130°F - 150°F) it may be necessary to install an outdoor temperature override timer for peak domestic loads (see Fig. 11.2). Timer to be placed in an easily accessed location.

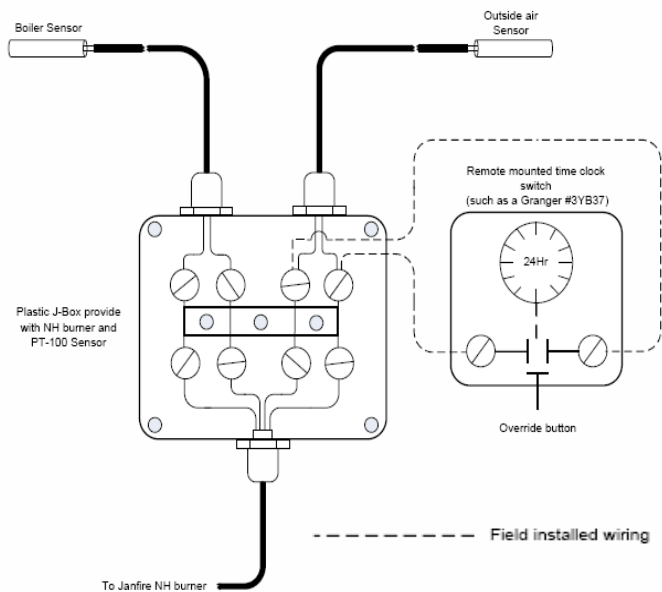


Fig. 11.2 Outside Air temperature bypass

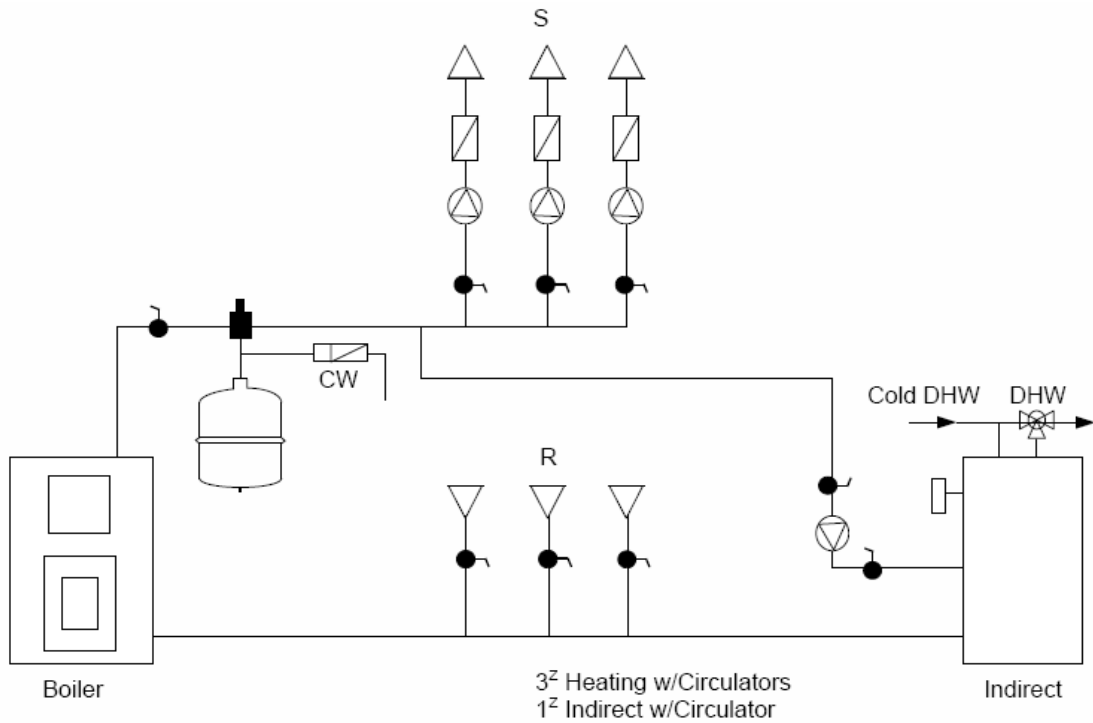


Fig. 12 Piping Diagram: Zoning w/pumps and dedicated DHW pump.

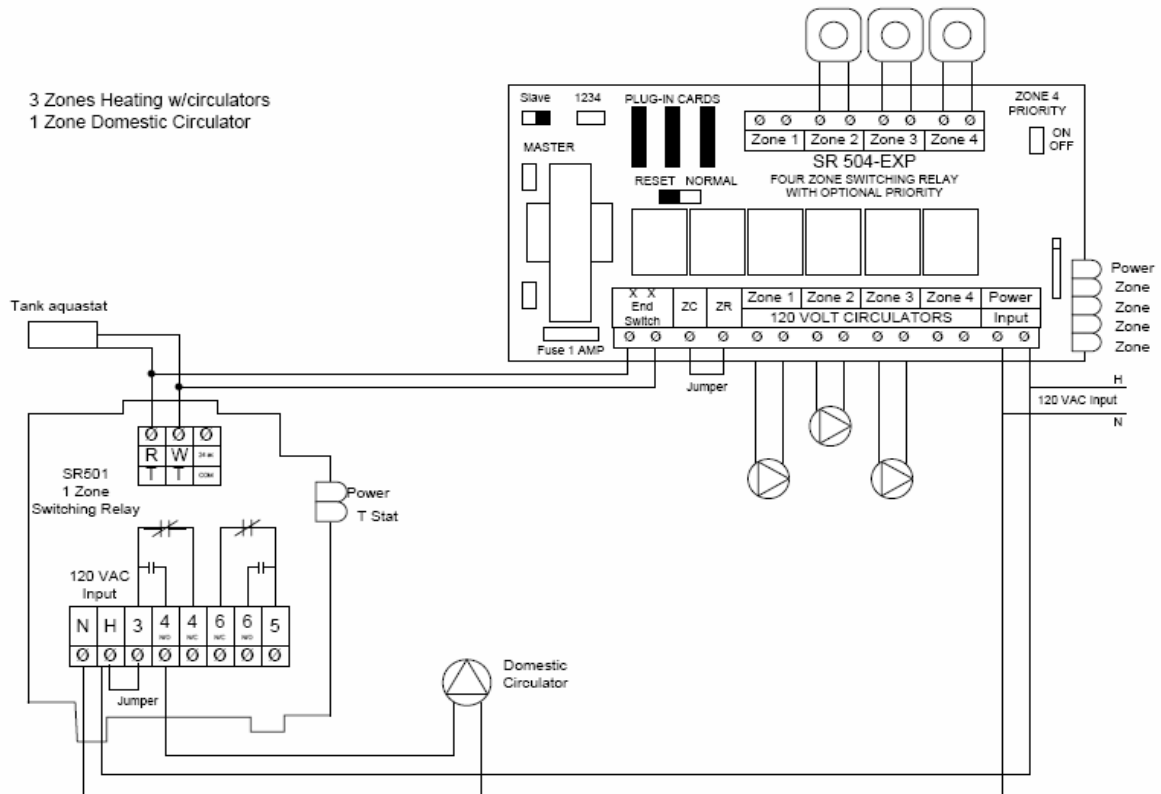


Fig. 13

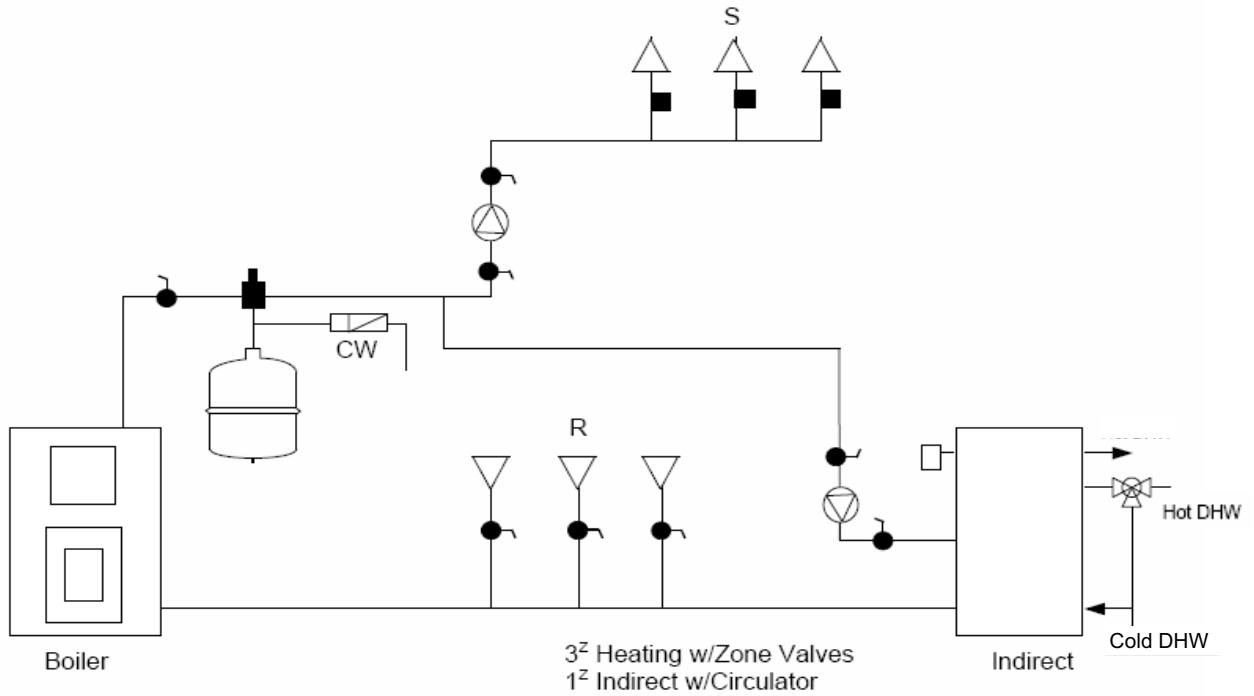


Fig. 14: Multiple zoning with zone valves.

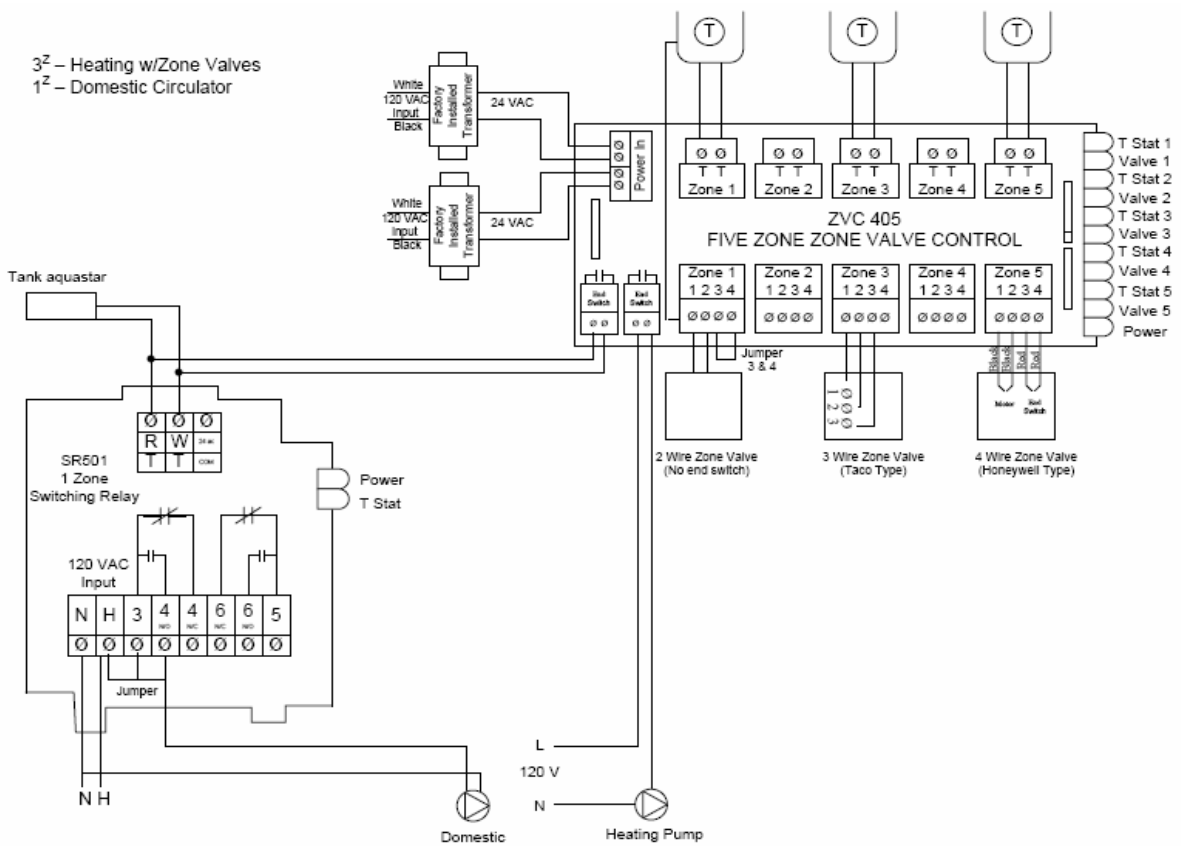


Fig. 15

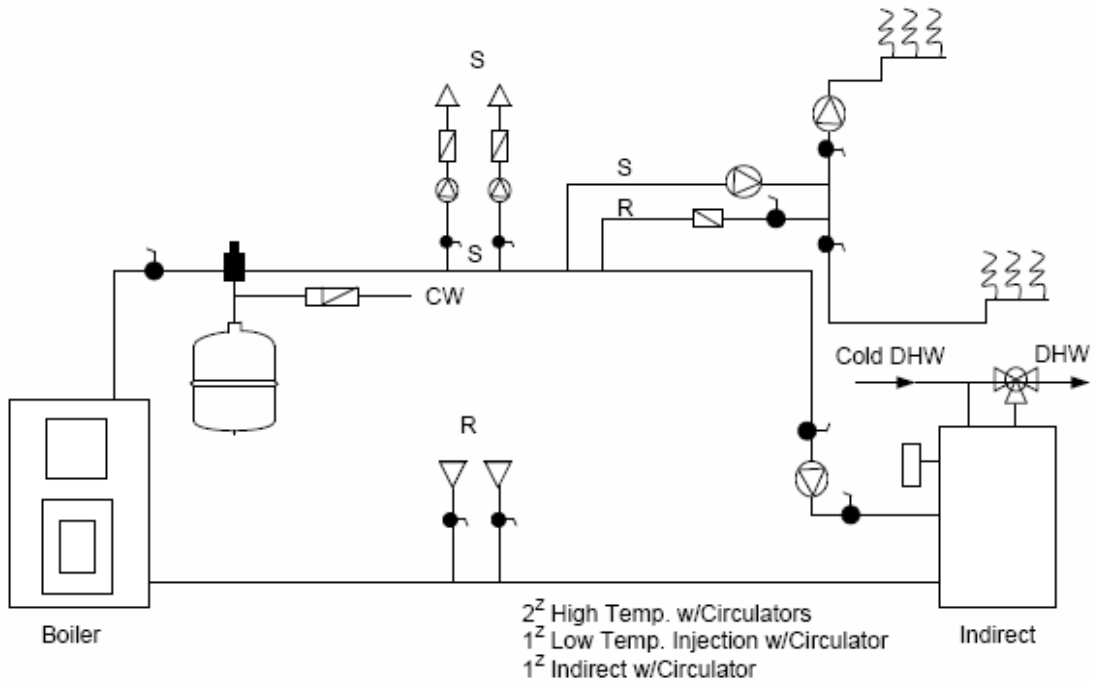


Fig. 16 : High and low temperature heating with injection loop.

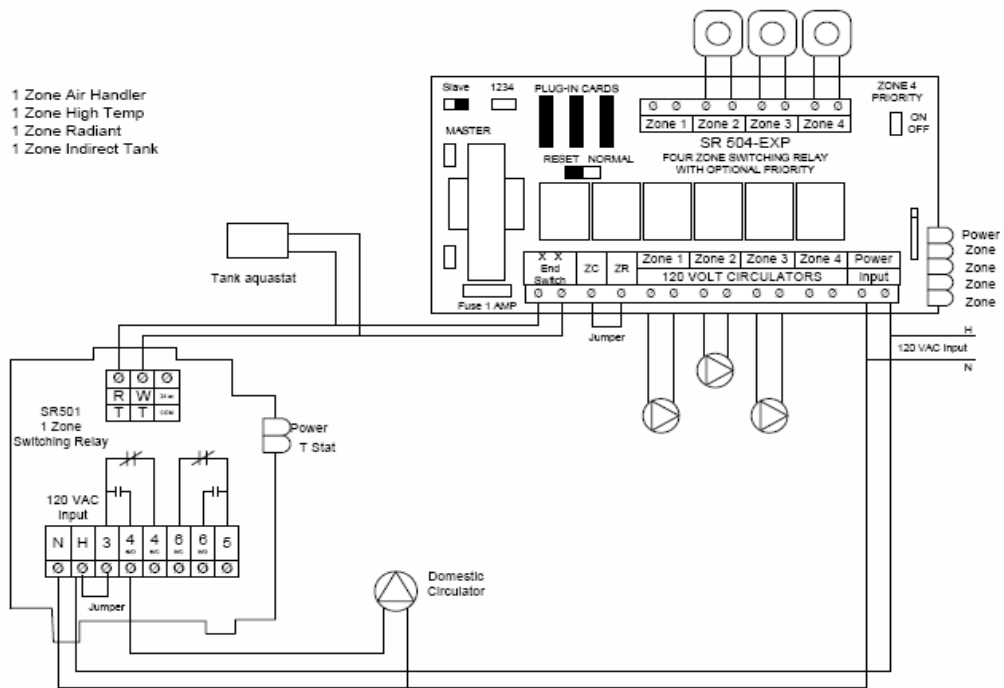


Fig. 17

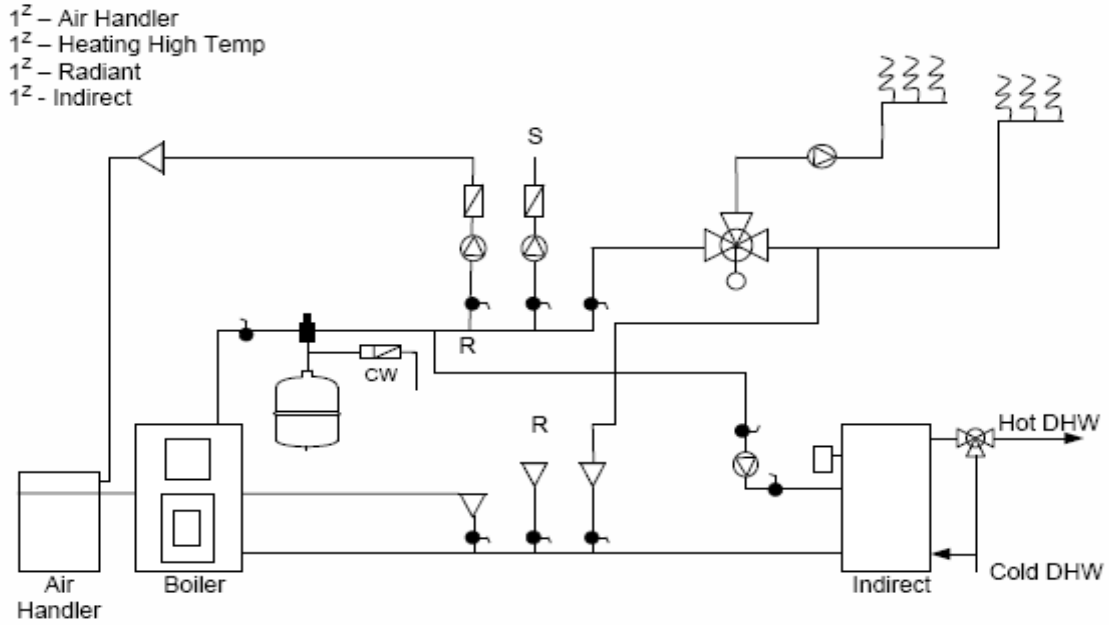


Fig. 18: Multiple high and low temp zones with mixing valve.

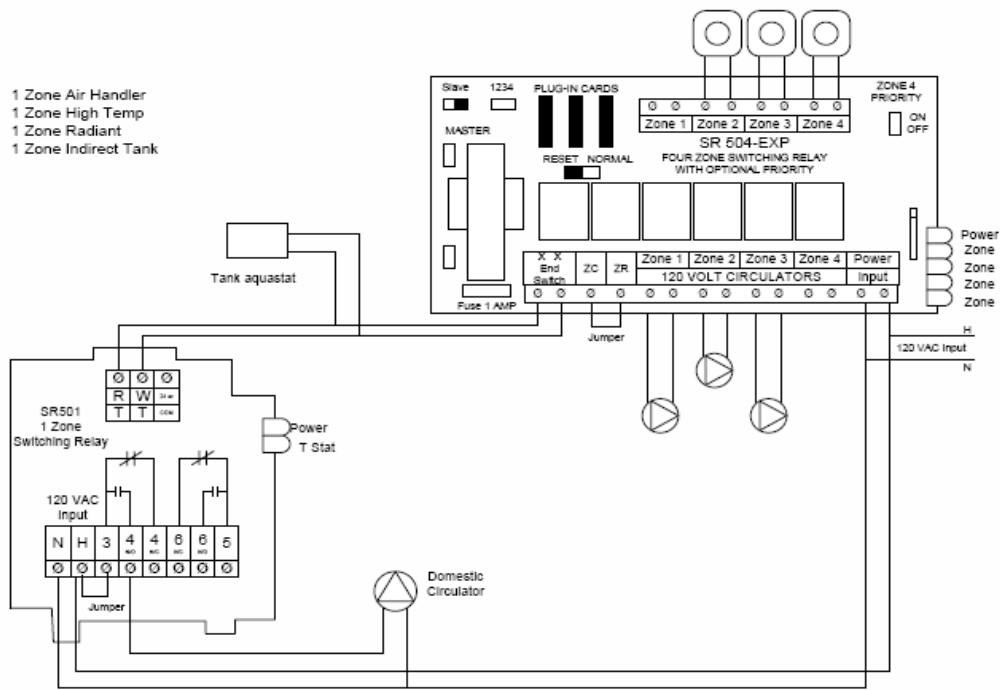
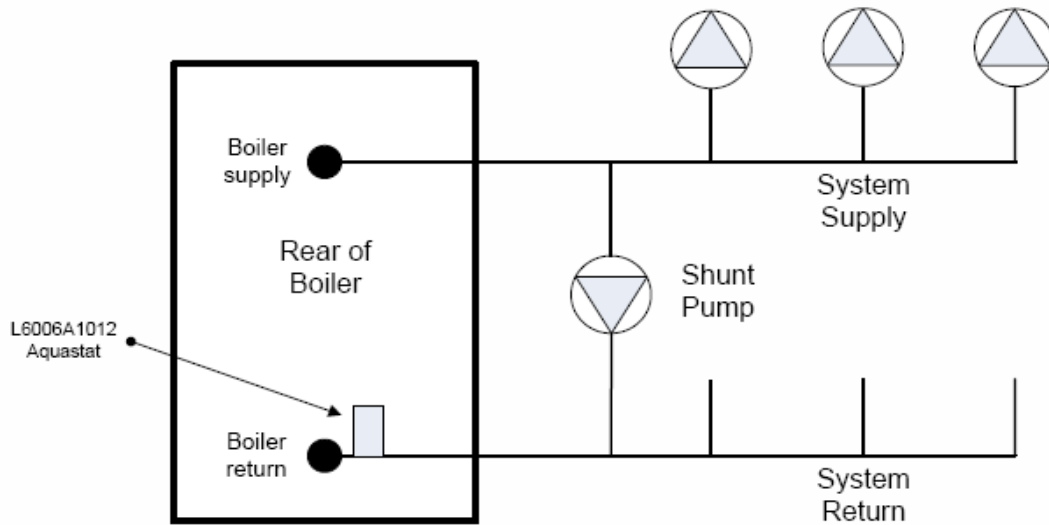


Fig. 19

Condensate Protection

Shunt pump installation

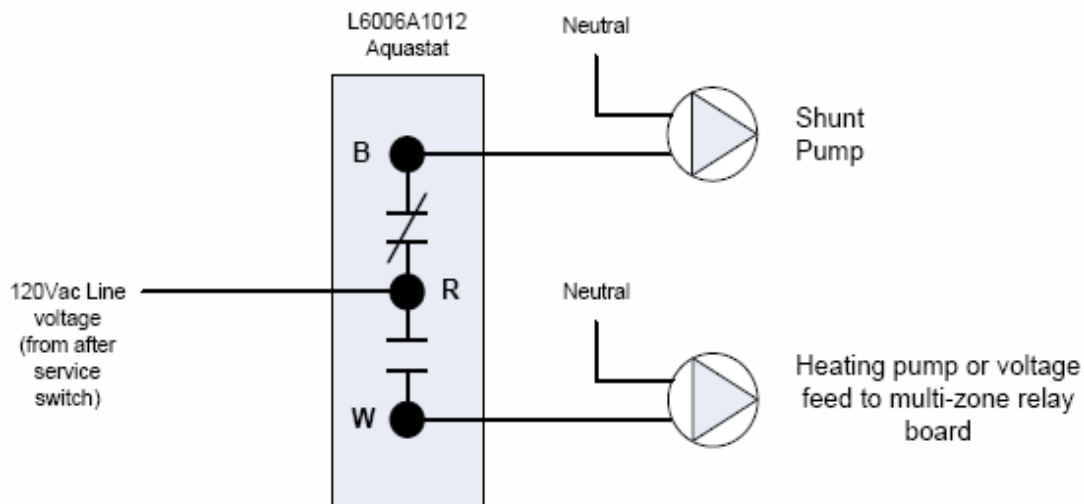
Required in every system



*Note -May be applied anytime condensate and scaling are present in the boiler

Fig. 20 Condensate protection piping

Electrical

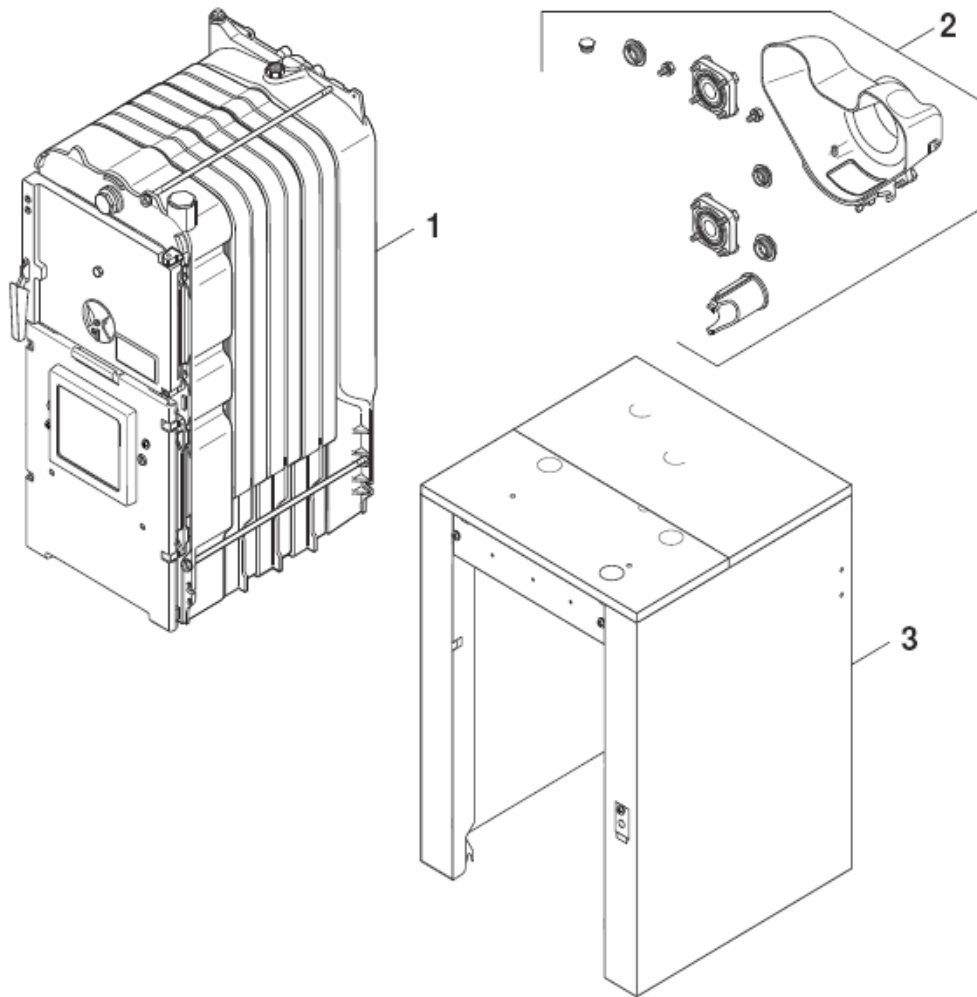


*Note -Suggested aquastat setting 120 degrees F or above.

-When return water is below 120 F – shunt pump activated.

-When return water is above 120 F (+10 differential) heating pump/feed to multi-zone relay board active.

Fig. 21 Condensate protection wiring



- 1 - Boiler block
- 2 - Flue collector assembly
- 3 - Boiler jacket

10 Parts lists

The following parts are available from MESys. If there are several article numbers for one item number, the numbers for the various models are listed in the relevant columns. Otherwise the table shows the number of components for each model.

Boiler Block and Burner Door

Item No.	Description	Part Number	4000	6000
1	Boilerblock 18/4	7 747 030 482	■	
1	Boilerblock 23/6	7 747 030 483		■
2	Front section	5461230	■	■
3	Dummy plug G 1 1/2"	5317544	■	■
4	Gasket D48x63x1,5mm C 4400 Klinger Sil	2528162	■	■
5	Centre section	5461320	■	■
6	Push Nipple	7 747 024 963	■	■
7	Rear section	5461180	■	■
8	sealant linseed oil graphit 225g box	7 747 030 179	■	■
9	Boiler kit WM-W009, box a 1,85kg	2037022	■	■
10	Blanking piece for 1/4 circuit sensor	7060110	■	■
11	Compensating spring	5446800	■	■
14	Sensor well R3/4"x100mm	5446065	■	■
15	Tie rod m12x665	5426080		■
15	Tie rod m12x465	5426305	■	
16	Plug G 3/4	5317714	■	■
17	Sealing D26,5x34x2	5959550	■	■
24	Hinge strip	5327132	■	■
25	Hex bolt M8x30, kit 10 Piece	63027500	■	■
29	Washer DIN125 A8,4 A3K	5883290	■	■
30	Hinge pin 7x36	5327356	■	■
31	Closing hinge	7 747 030 508	■	■
32	Fill and clean-out door	63015189	■	■
33	Thermal insulation filling and clean	63021944	■	■
34	Protective plate for filling door	5356150	■	■
35	Insulating plate for fill and clean-out	5356065	■	■
36	sealing rope D12x3100 CS,	63031770	■	■
37	Viewing hole cover for filling door	5438090	■	■
38	Door closer m. plastic handle	5328040	■	■
39	Cyl-head screw DIN84 M6x20 10x	7 747 030 825	■	■
40	Split pin DIN1481 10x40 10x	7 747 030 826	■	■
41	Hex bolt M8x30, kit 10 Piece	63027500	■	■
42	Hex nut DIN6923 M8-A3K with locking gear	5834410	■	■
45	Burnerdoor cpl	7 747 030 468	■	■
46	Thermal insul b-door cpl	7 747 030 499	■	■
47	sealing rope D12x3100 CS,	63031770	■	■
48	Hex-screw ISO4014 M8x70 A2, 2x	7 747 030 509	■	■
49	Disk 6,4x20x1,25 A3K 10x	7 747 030 742	■	■
50	Baffles 4sect cpl	7 747 030 497	■	
50	Baffles 6sect cpl	7 747 030 498		■
	Sealing material brown (cartridge 310ml)	63014361	■	■

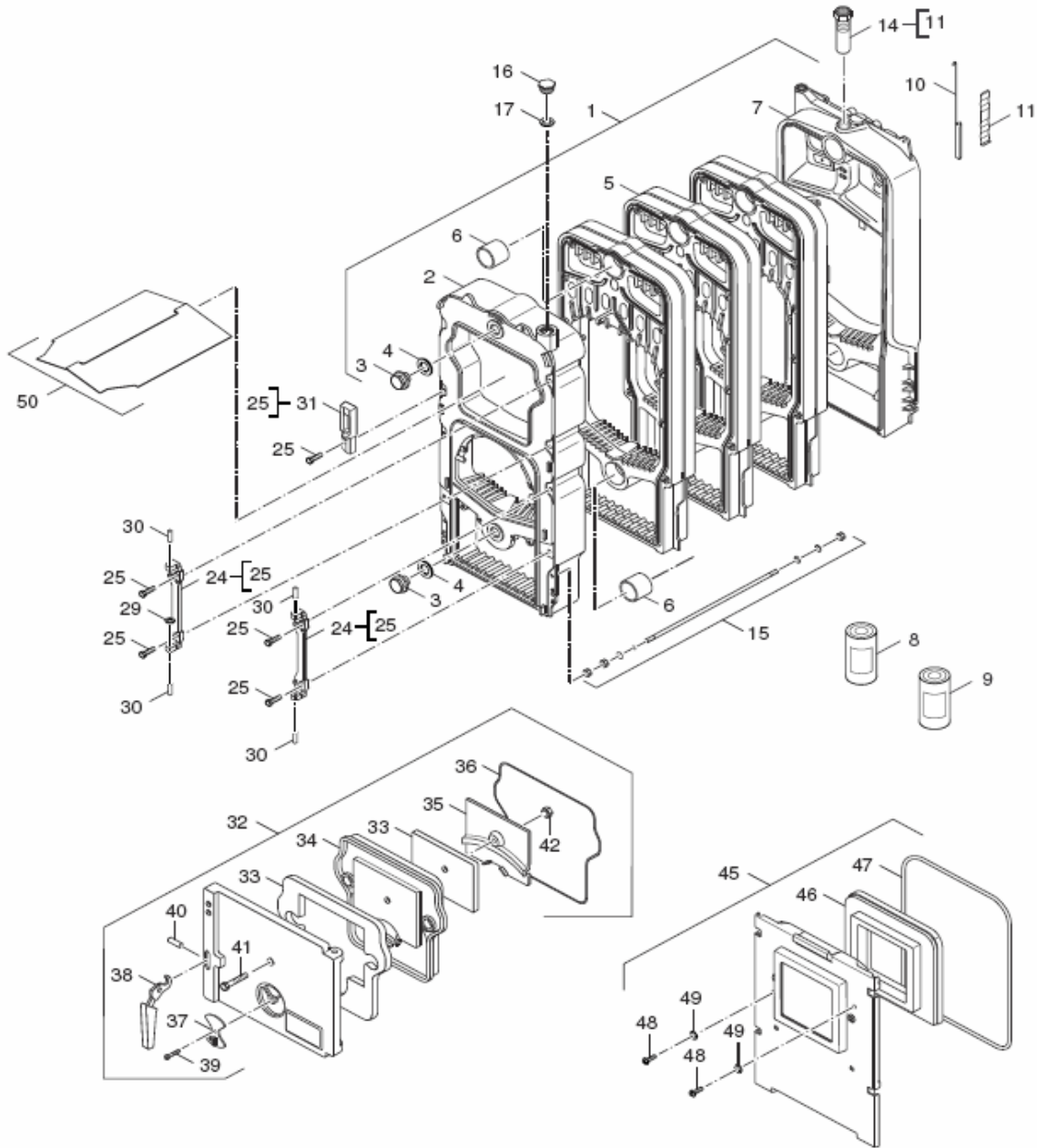


Fig. 22

Boiler Jacket

Item No.	Description	Part Number	4000	6000
1	Side panel L.h. 515 long	63021708	■	
1	Side panel L.h. 715 long	63021710		■
2	Side panel R.h. 515 long	63021703	■	
2	Side panel R.h. 715 long	63021705		■
3	Tie-bar front	63024310	■	■
4	Rear panel	63021712	■	■
5	Tie-bar rear	63021713	■	■
6	Single membrane nipple S4-390	5317684	■	■
7	Hood front 3-8 Sections	63021714	■	■
8	Hood rear 257 long 4 Sections	63021716	■	
8	Hood rear 457 long 6 Sections	63021718		■
9	Screen	7 747 030 507	■	■
13	Installation material for Casing	9523818	■	■
18	Stud DIN939 M10x40 5.6	3719128	■	■
19	Hexagon nut DIN6923 M10 8,8 A3K SW16mm	5834414	■	■
	Insulating felt 40mm/2qm RG15	63020656	■	■
	Insulating felt 60mm/1qm RG18	63020657	■	■
	Insulating felt 80mm/1qm RG18	63020659	■	■
	Insulating felt 80mm/2qm RG18	63020660	■	■

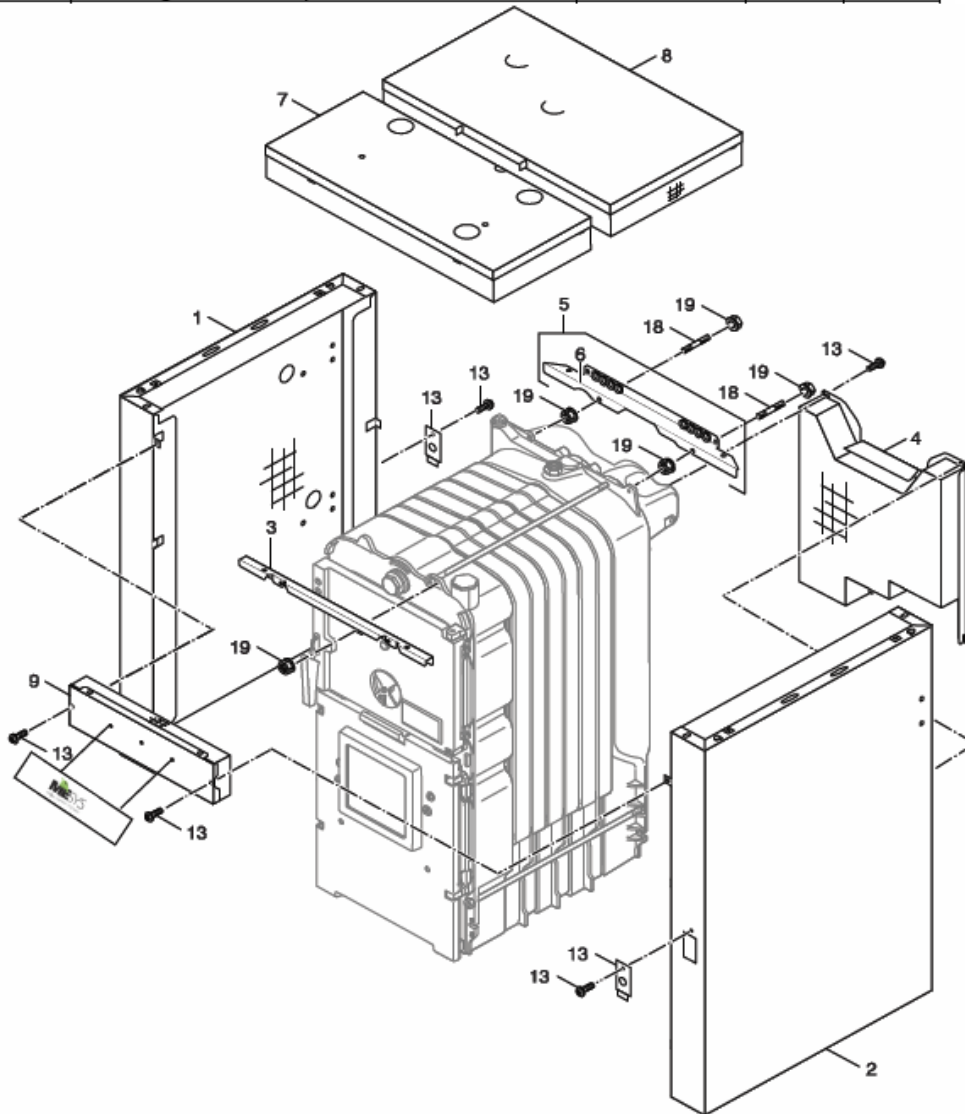


Fig. 23

Accessories

Item No.	Description	Part Number	4000	6000
1	Exhaust collector cpl	7 747 030 471	■	■
2	Clean-out cover	5371220	■	■
3	Wing nut DIN315-C M8 CUZn	2 915 190 407	■	■
4	Washer DIN125 A8,4 A3K	5883290	■	■
5	Packing cords GP 7x1000	63020960	■	■
6	Stud DIN939-M8x25-5.6	3719060	■	■
7	Hexagon nut DIN6923 M10 8,8 A3K SW16mm	5834414	■	■
10	Packing cords GP 7x2000	7 747 031 101	■	■
13	Flange 1 1/4 NPT square110	7 747 030 510	■	■
14	Gasket D 72x96x1.5mm	2515124	■	■
15	Stud DIN939 M10x35 5.6	5555060	■	■
20	Blind plug G1 1/4 rh, forged version	6073312	■	■
21	Sealing d41,7x55x1,5 4x	7 747 030 780	■	■
25	Plug 1/2" 2x	7 747 030 774	■	■
26	Reducing nipple G1"xG3/4"	7 747 030 786	■	■
27	Gasket D33x44x2mm	63005462	■	■
29	Feed pipe	5436050	■	■

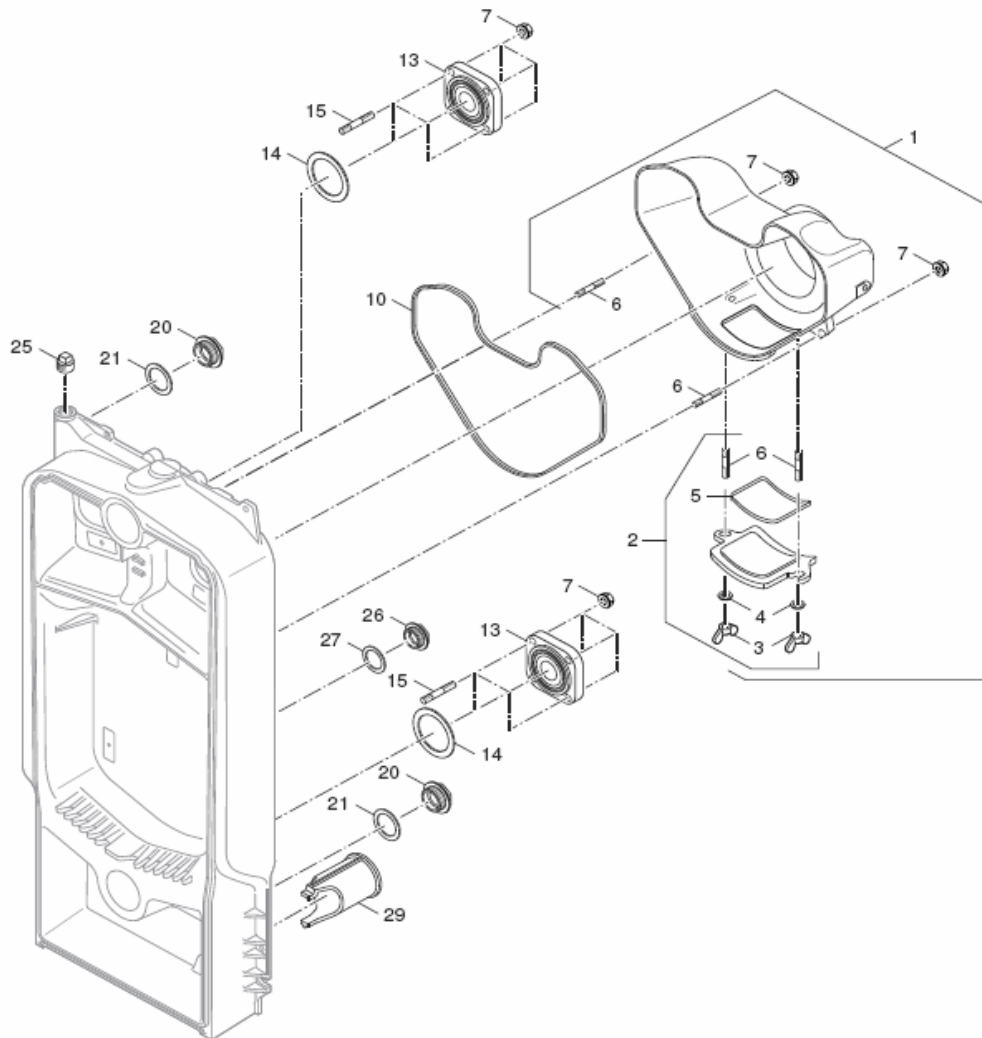


Fig. 24 - Accessories

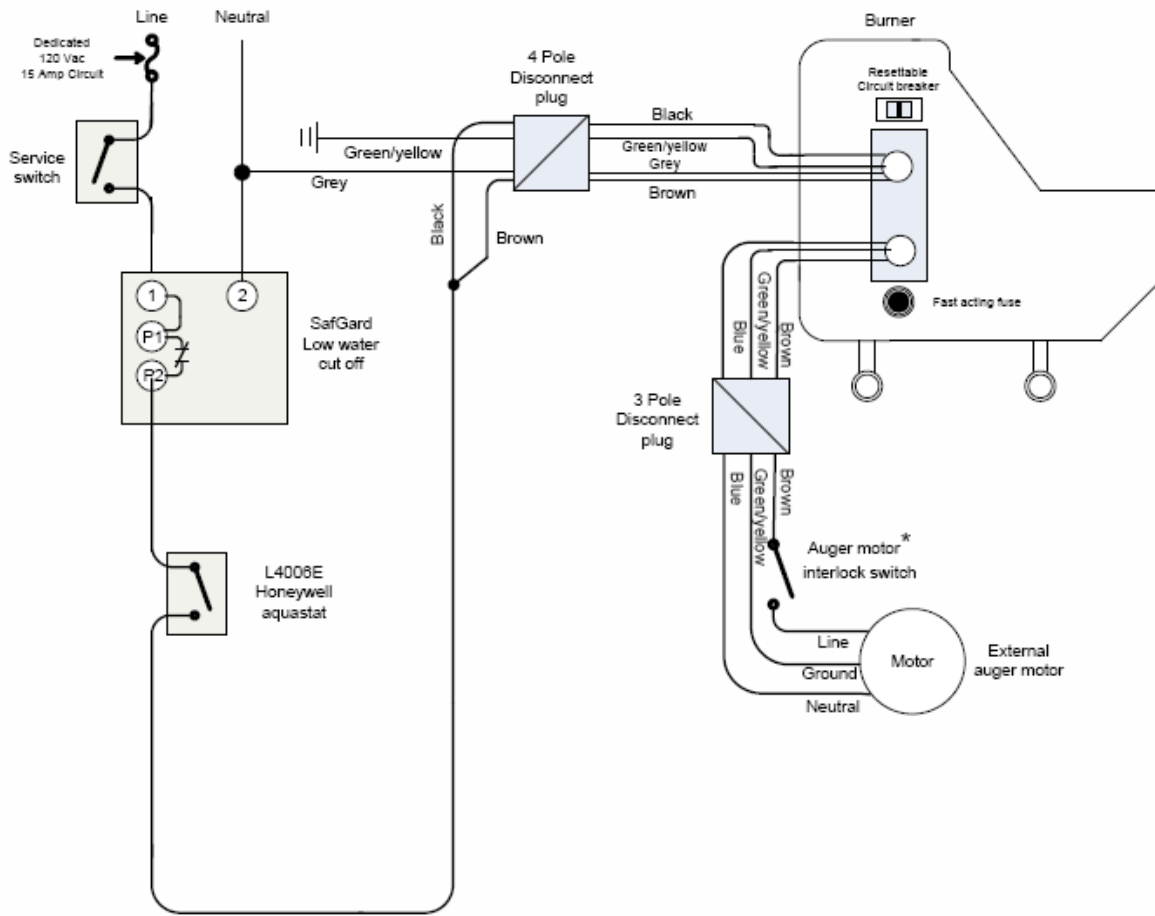


Fig. 25 - Safety Component Wiring Instructions

*Required for storage bins with service access panels.

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