

BioHeat USA
4 Britton Lane
Lyme, NH 03768

BioHeat USA Piping Layout Concept Diagram

Wood Boiler used as an **ONLY BOILER**
No Thermal Storage

Drawn by: TSP

Date
3-30-2009

DWG NO
Solo/Excel 1

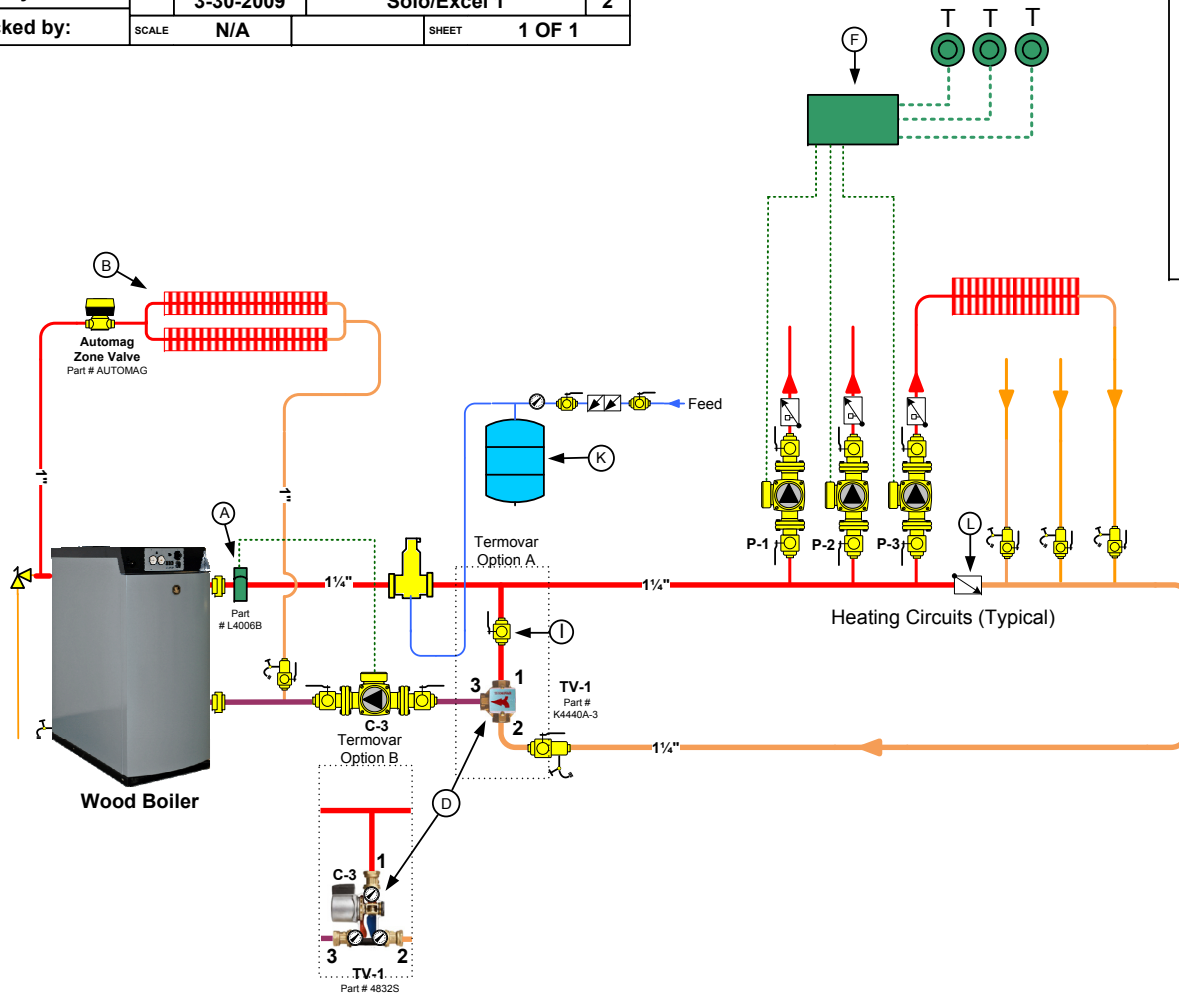
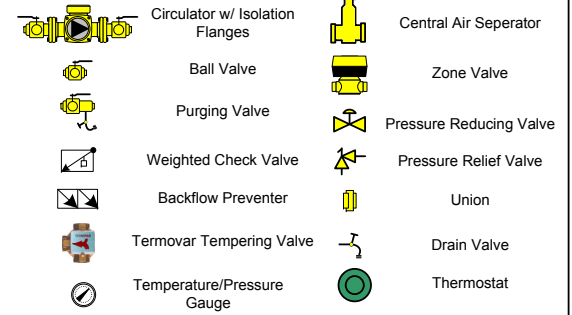
REV
2

Checked by:

SCALE
N/A

SHEET
1 OF 1

Symbol Key

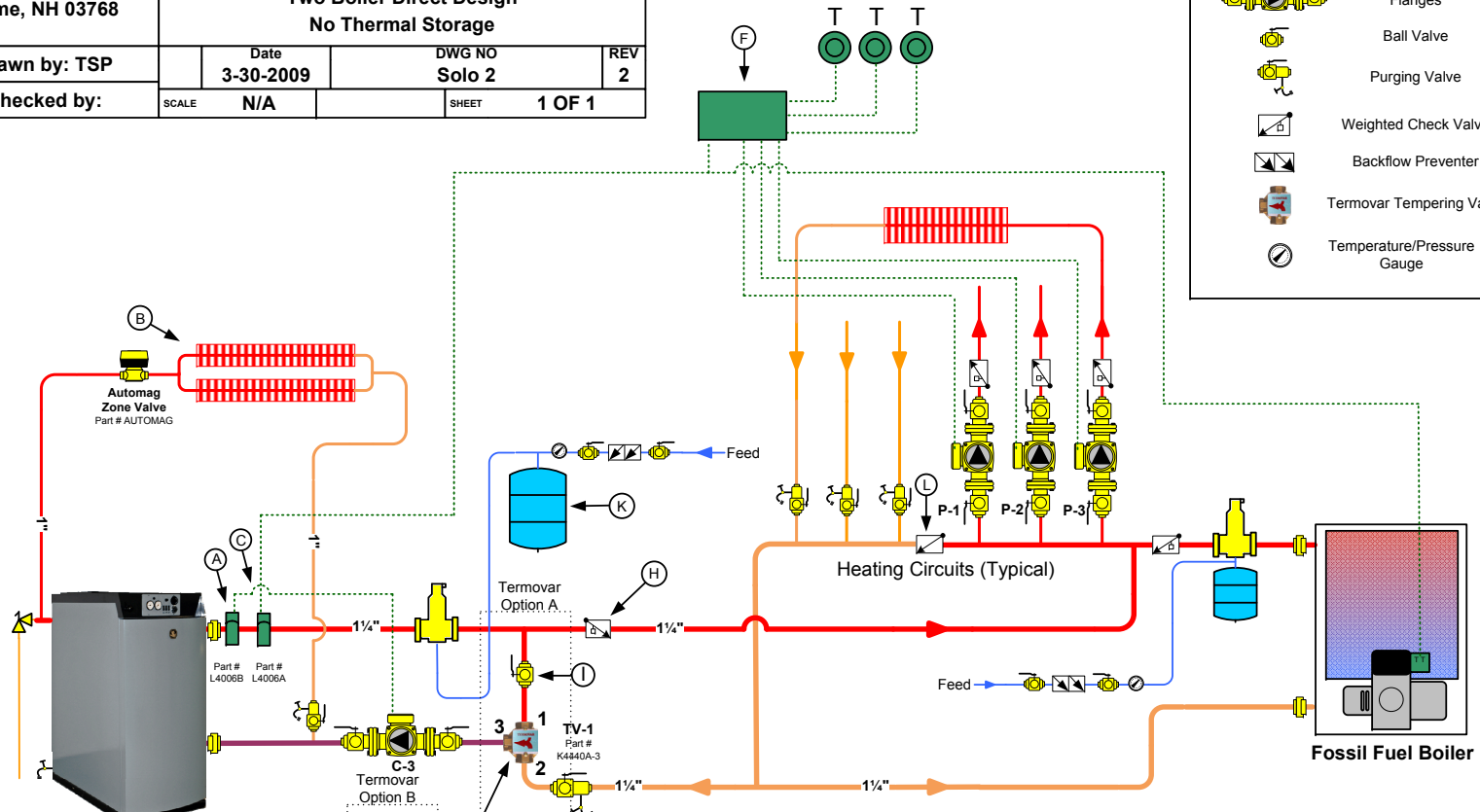
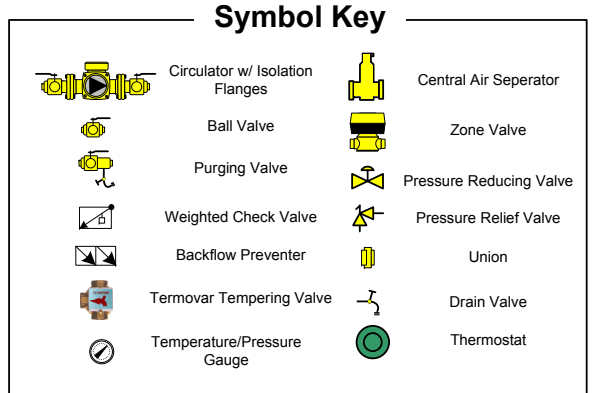


NOTES:

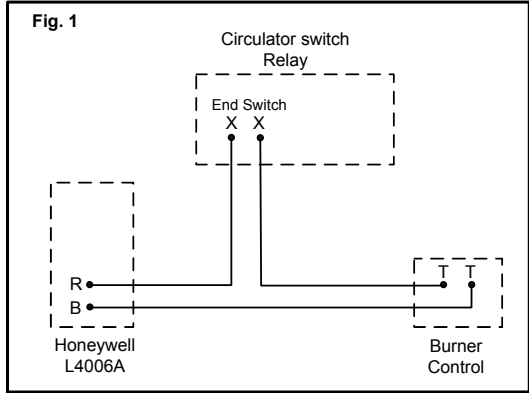
- (A) Aquastat-Honeywell L4006B or Equivalent
Part # L4006B (Not used with the Excel or Froling FHG)
- (B) Emergency Gravity Flow Overheat Loop
Needs to be 10% of Wood Boiler Output. Automag
needs to be installed in the **horizontal** position.
- (D) Termovar Mixing Valve (2 Options Available)
- (F) Circulator Switch Relay-Typical Controller
- (I) Balancing Valve Required. (Start with Valve Closed
halfway, i.e., at 45 degrees)
- (K) Amtrol 60 or Equivalent Expansion Tank is Suitable for
most Solo Plus Installations up to 86 gallons
- (L) Check Valve Should be a Swing Check and not a
Weighted Check Valve to Prevent Ghost Flow to Heating
Circuits.

This is only a **concept** drawing. Final design, installation and code compliance details are the responsibility of the designer/installer of the system.

BioHeat USA 4 Britton Lane Lyme, NH 03768	BioHeat USA Piping Layout Concept Diagram		
	Two Boiler Direct Design No Thermal Storage		
Drawn by: TSP	Date 3-30-2009	DWG NO Solo 2	REV 2
Checked by:	SCALE N/A	SHEET 1 OF 1	

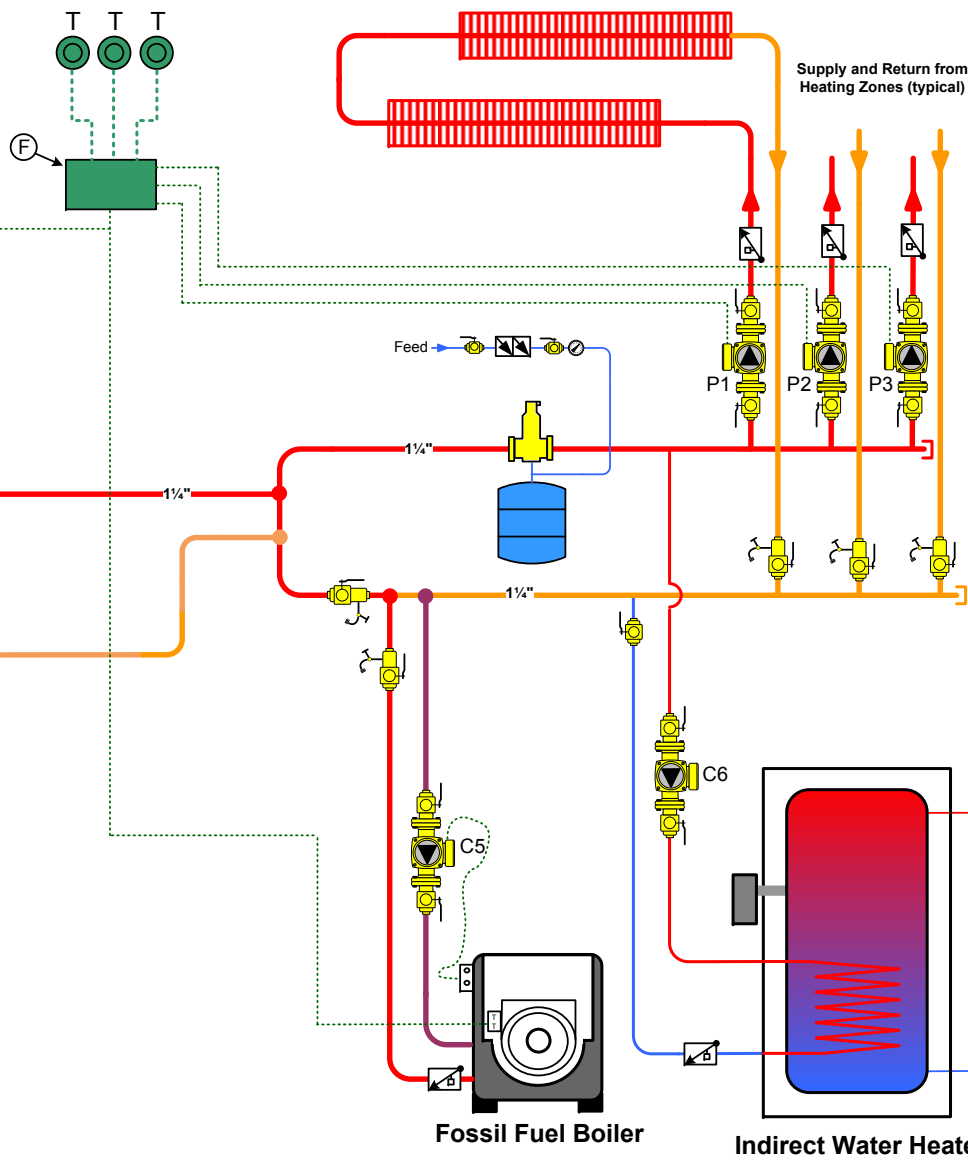


- NOTES:**
- (A) Aquastat-Honeywell L4006B or Equivalent Part # L4006B
 - (B) Emergency Gravity Flow Overheat Loop Needs to be 10% of Wood Boiler Output. Automag needs to be installed in the **horizontal** position.
 - (C) An aquastat can be used to switch on fossil fuel boiler. Honeywell aquastat L4006A or equivalent (see Fig. 1) (Part #L4006A)
 - (D) Termovar Mixing Valve (2 Options Available)
 - (F) Circulator Switch Relay-Typical Controller
 - (H) Weighted check valve is needed to prevent ghost flow during fossil fuel operation.
 - (I) Balancing Valve Required. (Start with Valve Closed halfway, i.e., at 45 degrees)
 - (K) Amtrol 60 or Equivalent Expansion Tank is Suitable for most Solo Plus Installations up to 80 gallons
 - (L) Check Valve Should be a Swing Check and not a Weighted Check Valve to Prevent Ghost Flow to Heating Circuits.



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BioHeat USA 4 Britton Lane Lyme, NH 03768	BioHeat USA Piping Layout Concept Diagram		
	Two Boiler Primary Secondary Design No Thermal Storage		
Drawn by: TSP	Date 8-11-2008	DWG NO Solo3	REV 1
Checked by:	SCALE N/A	SHEET 1 OF 1	

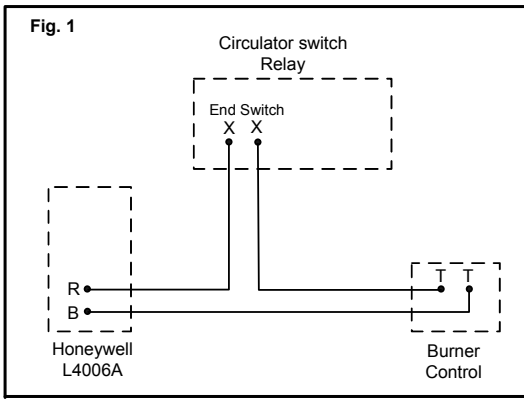


Symbol Key

	Circulator w/ Isolation Flanges		Central Air Separator
	Ball Valve		Zone Valve
	Purging Valve		Pressure Reducing Valve
	Weighted Check Valve		Pressure Relief Valve
	Backflow Preventer		Union
	Termovar Tempering Valve		Drain Valve
	Temperature/Pressure Gauge		Thermostat

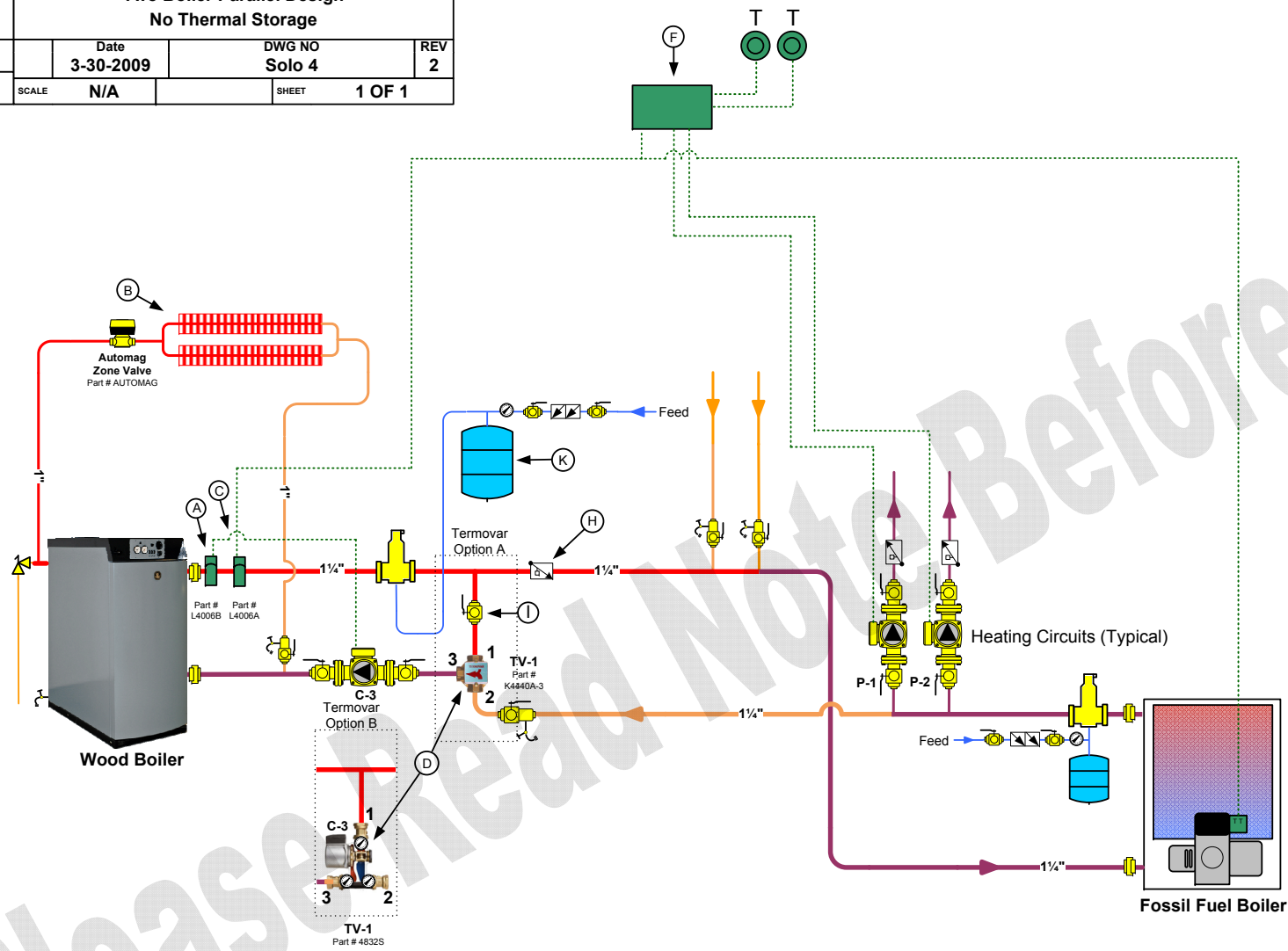
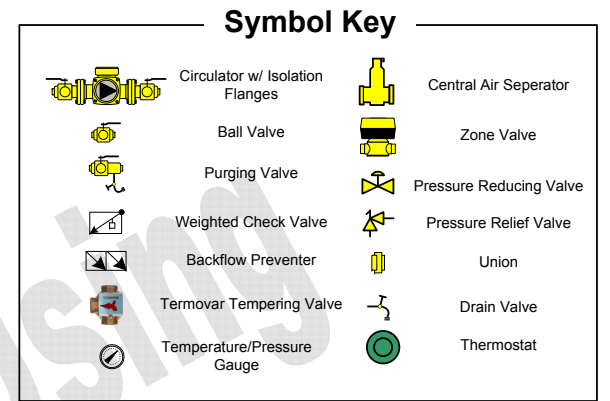
NOTES:

- (A) Aquastat-Honeywell L4006B or Equivalent Part # L4006B
- (B) Emergency Gravity Flow Overheat Loop Needs to be 10% of Wood Boiler Output. Automag needs to be installed in the **horizontal** position.
- (C) An aquastat can be used to switch on fossil fuel boiler. Honeywell aquastat L4006A or equivalent (see Fig. 1) (Part #L4006A)
- (D) Termovar Mixing Valve (2 Options Available)
- (F) Circulator Switch Relay-Typical Controller
- (H) Weighted check valve is needed to prevent ghost flow during fossil fuel operation.
- (I) Balancing Valve Required. (Start with Valve Closed halfway, i.e., at 45 degrees)
- (K) Amtrol 60 or Equivalent Expansion Tank is Suitable for most Solo Plus Installations up to 86 gallons

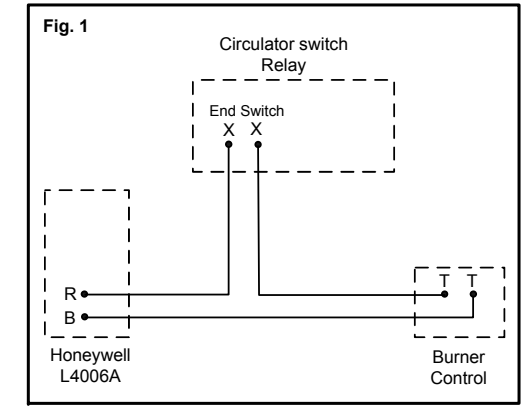


Note: This is only a concept drawing. Final design, installation and code compliance details are the responsibility of the designer/installer of the system.

BioHeat USA 4 Britton Lane Lyme, NH 03768	BioHeat USA Piping Layout Concept Diagram		
	Two Boiler Parallel Design No Thermal Storage		
Drawn by: TSP	Date 3-30-2009	DWG NO Solo 4	REV 2
Checked by:	SCALE N/A	SHEET 1 OF 1	



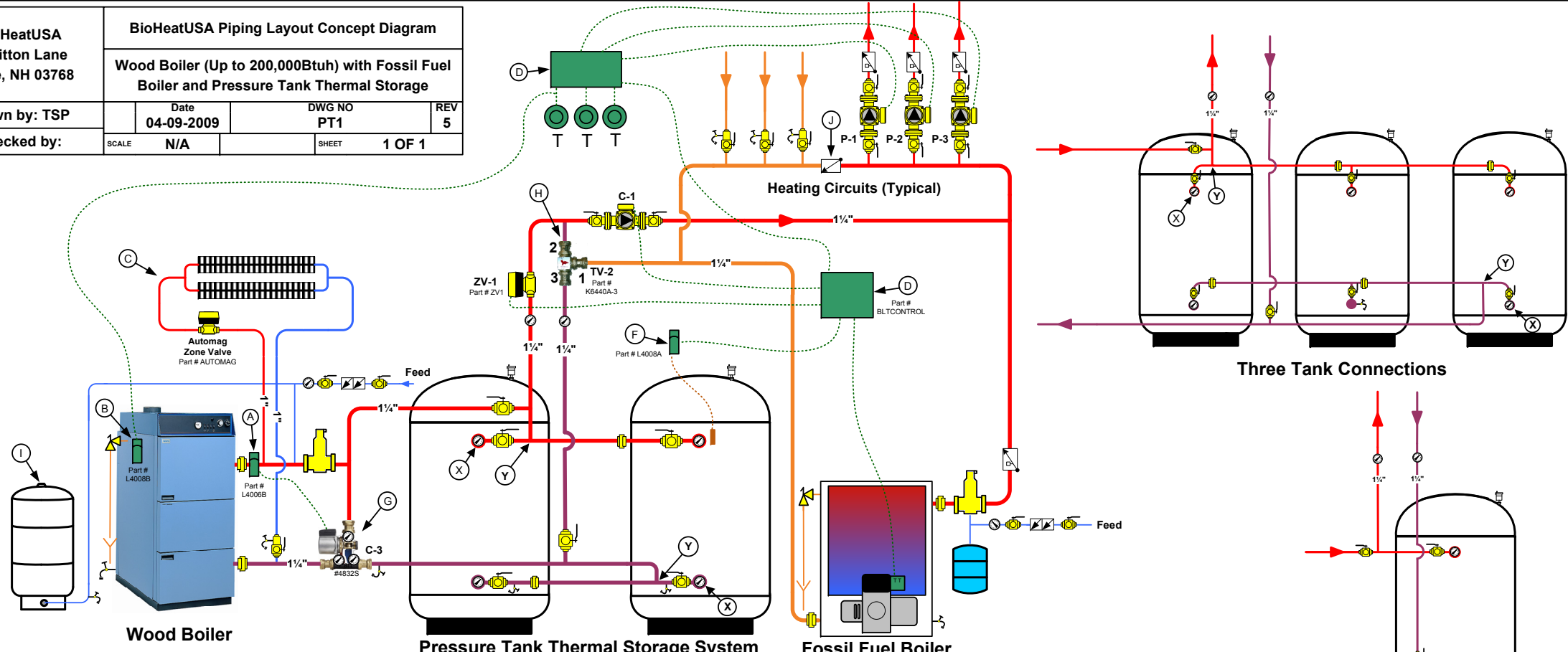
- ### NOTES:
- (A) Aquastat-Honeywell L4006B or Equivalent Part # L4006B
 - (B) Emergency Gravity Flow Overheat Loop Needs to be 10% of Wood Boiler Output. Automag needs to be installed in the **horizontal** position.
 - (C) An aquastat can be used to switch on fossil fuel boiler. Honeywell aquastat L4006A or equivalent (see Fig. 1) (Part #L4006A)
 - (D) Termovar Mixing Valve (2 Options Available)
 - (F) Circulator Switch Relay-Typical Controller
 - (H) Weighted check valve is needed to prevent ghost flow during fossil fuel operation.
 - (I) Balancing Valve Required. (Start with Valve Closed halfway, i.e., at 45 degrees)
 - (K) Amtrol 60 or Equivalent Expansion Tank is Suitable for most Solo Plus Installations up to 86 gallons



Note: Diagram is best suited for homes with less than three heating circuits and/or the Fossil Fuel boiler needs to be kept hot. The returns from the heating circuits are mixing with the hot supply from the wood boiler. This could cause colder water temperatures at the heating circuits and the fossil fuel boiler.

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BioHeatUSA 4 Britton Lane Lyme, NH 03768	BioHeatUSA Piping Layout Concept Diagram		
	Wood Boiler (Up to 200,000Btuh) with Fossil Fuel Boiler and Pressure Tank Thermal Storage		
Drawn by: TSP	Date 04-09-2009	DWG NO PT1	REV 5
Checked by:	SCALE N/A	SHEET 1 OF 1	



Symbol Key

	Circulator w/ Isolation Flanges		Central Air Separator
	Ball Valve		Pressure Reducing Valve
	Purging Valve		Pressure Relief Valve
	Weighted Check Valve		Union
	Swing Check Valve		Drain Valve
	Backflow Preventer		Temperature Gauge
			Thermostat

SYSTEM NOTES:

- (A) Honeywell Aquastat L4006B BioHeat Part # L4006B-Used Only for the Solo Plus Boiler with the Analog Controller.
- (B) Honeywell L4008B Overheat Aquastat Set to 200°F. Connected to the Largest Heating Circuit.-Used with the Solo Plus W/Analog Controller, Froling FHG, and Solo Innova.
- (C) Emergency Gravity Flow Overheat Loop-Needs to be 10% of Wood Boiler Output. The Automag Zone Valve Must be Mounted Horizontally.
- (D) BioHeat USA Switch Control Part # BLTCONTROL
- (E) Circulator Switch Relay-Typical Controller
- (F) Backup Boiler Control Honeywell Aquastat L4008A or Equivalent. Mount sensor bulb on tank surface near top tapping with either tape or strap.
- (G) Termovar Loading Unit Part # 4832S (Loading Unit recommended, but Termovar K440A-3 could also be Used).
- (H) Termovar Diverting Valve-Part # K6440A3
- (I) Expansion Tank Sizing-2 Thermal Tanks-Amtrol SX90V or Equivalent
3 Thermal Tanks-Amtrol SX110V or Equivalent
- (J) Check Valve Should be a Swing Check and not a Weighted Check Valve to Prevent Ghost Flow to Heating Circuits.

TANK NOTES:

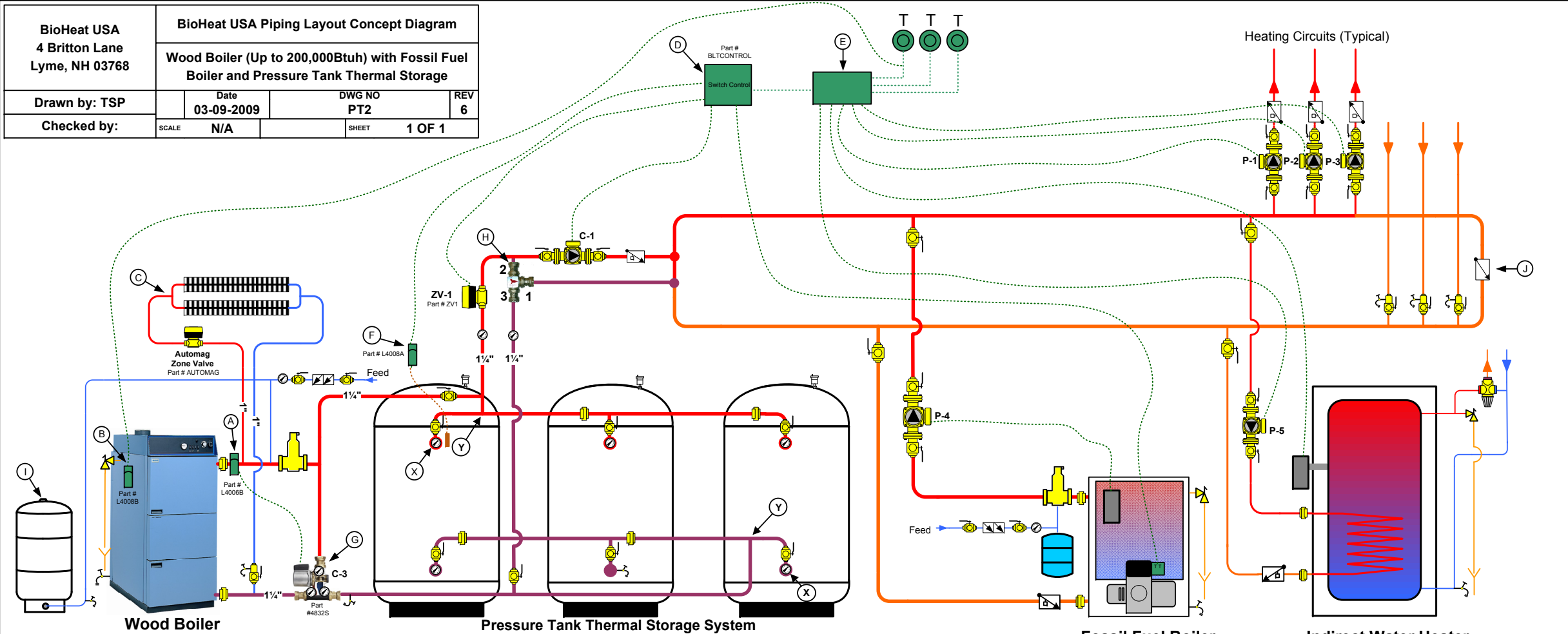
Sizing: 2 Tanks for boilers up to 140,000Btuh
 3 Tanks for Boilers 175,000-200,000Btuh

The Tanks should be located next to each other and as close as possible to the boiler. Connections to the tanks must use approximately the same length pipe. This is accomplished by:

1. Connect the boiler connections diagonally, X-X.
2. Connect the radiator connections diagonally, Y-Y.

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BioHeat USA 4 Britton Lane Lyme, NH 03768	BioHeat USA Piping Layout Concept Diagram		
	Wood Boiler (Up to 200,000Btuh) with Fossil Fuel Boiler and Pressure Tank Thermal Storage		
Drawn by: TSP	Date 03-09-2009	DWG NO PT2	REV 6
Checked by:	SCALE N/A	SHEET 1 OF 1	



Wood Boiler

Pressure Tank Thermal Storage System

Fossil Fuel Boiler

Indirect Water Heater

Symbol Key

	Circulator w/ Isolation Flanges		Central Air Separator
	Ball Valve		Pressure Reducing Valve
	Purging Valve		Pressure Relief Valve
	Weighted Check Valve		Union
	Swing Check Valve		Drain Valve
	Backflow Preventer		Temperature Gauge
			Thermostat

SYSTEM NOTES:

- (A) Honeywell Aquastat L4006B BioHeat Part # L4006B-Used Only for the Solo Plus Boiler with the Analog Controller.
- (B) Honeywell L4008B Overheat Aquastat set to 200°F. Connected to the largest Heating Circuit-Used with the Solo Plus w/Analog controller, Froling FHG, and Solo Innova.
- (C) Emergency Gravity Flow Overheat Loop-Needs to be 10% of Wood Boiler Output. The Automag Zone Valve Must be Mounted Horizontally.
- (D) BioHeat USA Switch Control Part # BLTCONTROL
- (E) Circulator Switch Relay-Typical Controller
- (F) Backup Boiler Control Honeywell Aquastat L4008A or Equivalent. Mount sensor bulb on tank surface near top tapping with either tape or strap.
- (G) Termovar Loading Unit Part # 4832S (Loading Unit Recommended, but Termovar K440A-3 could also be used).
- (H) Termovar Diverting Valve-Part # K6440A3
- (I) Expansion Tank Sizing-2 Thermal Tanks-Amtrol SX90V or Equivalent
3 Thermal Tanks-Amtrol SX110V or Equivalent
- (J) Check Valve Should be a Swing Check Valve.

TANK NOTES:

- Sizing: 2 Tanks for boilers up to 140,000Btuh
3 Tanks for Boilers 175,000-200,000Btuh
- The Tanks should be located next to each other and as close as possible to the boiler. Connections to the tanks must use approximately the same length pipe. This is accomplished by:
1. Connect the boiler connections diagonally, X-X.
 2. Connect the radiator connections diagonally, Y-Y.
- Follow the same guidelines for a single or two tank configuration.

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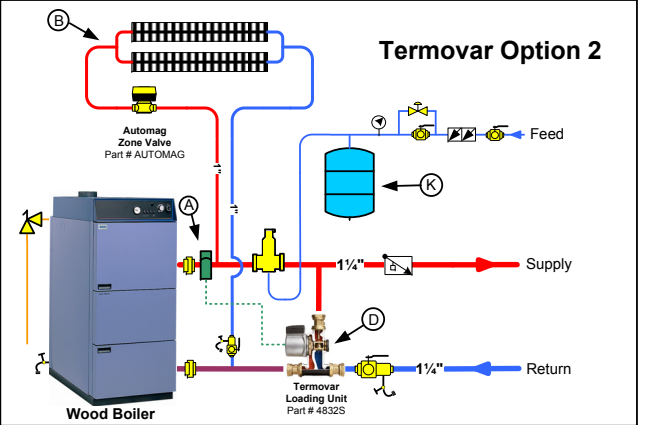
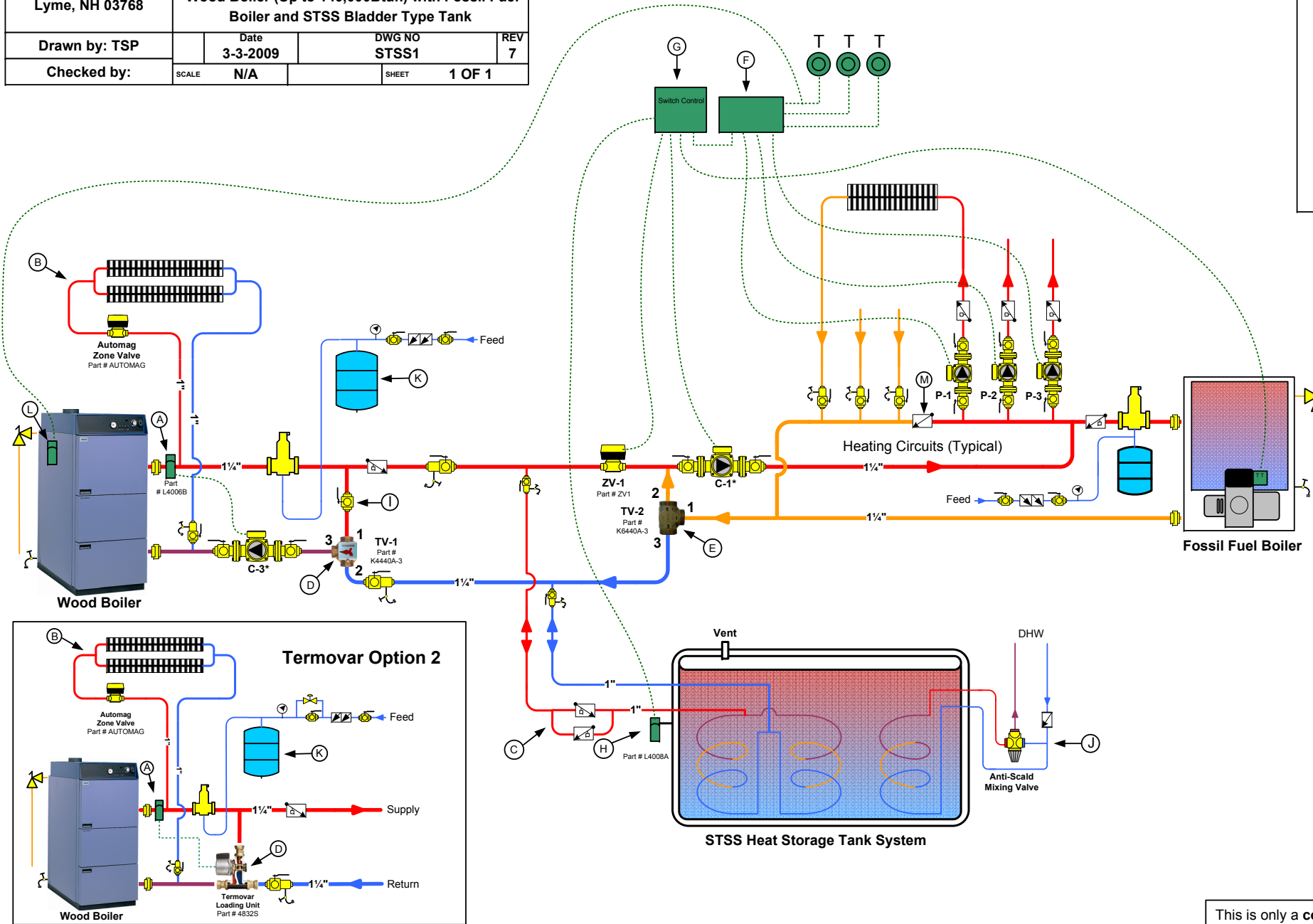
BioHeat USA 4 Britton Lane Lyme, NH 03768	BioHeat USA Piping Layout Concept Diagram		
	Wood Boiler (Up to 140,000Btuh) with Fossil Fuel Boiler and STSS Bladder Type Tank		
Drawn by: TSP	Date 3-3-2009	DWG NO STSS1	REV 7
Checked by:	SCALE N/A	SHEET 1 OF 1	

Symbol Key

	Circulator w/ Isolation Flanges		Central Air Separator
	Ball Valve		Zone Valve
	Purging Valve		Pressure Reducing Valve
	Swing Check Valve		Pressure Relief Valve
	Weighted Check Valve		Union
	Backflow Preventer		Drain Valve
	Thermostat		

- ### NOTES:
- (A) Aquastat-Honeywell L4006B BioHeat part #L4006B- **Used Only for the Solo Plus Boiler with the Analog Controller.**
 - (B) Emergency Gravity Flow Overheat Loop-Needs to be 10% of Wood Boiler Output. The Automag Zone Valve must be Mounted Horizontally.
 - (C) Weighted Check Valves Used as Heat Traps
 - (D) Termovar Mixing Valve (2 Options Available)
 - (E) Termovar Diverter Valve-Termovar Kit-Part #K6440AF
 - (F) Circulator Switch Relay-Typical Controller
 - (G) BioHeat USA Switch Control-Part # BLTCONTROL
 - (H) Backup Boiler Control-Honeywell Aquastat L4008A or Equivalent
 - (I) Balancing Valve Required. (Start with Valve Closed halfway, i.e., at 45 degrees)
 - (J) Anti-Scald Valve needs to be installed below tank's water line or swing check installed on cold water line to prevent hot water from entering cold water
 - (K) Amtrol 60 or Equivalent Expansion Tank is Suitable for most Solo Plus Installations up to 86 gallons
Honeywell L4008B Overheat Aquastat Set to 200°F.
 - (L) Connected to the Largest Heating Circuit.-**Used with the Solo Plus W/Analog Controller, Froling FHG, and Solo Innova.**
 - (M) Check Valve Should be a Swing Check and not a Weighted Check Valve to Prevent Ghost Flow to Heating Circuits.

***Circulator Notes:**
 C-3 and C-1 Circulator Sizing:
 (Multi-Speed Circulator Recommended)
 2-120' coils-Taco 007 or Equivalent.
 2-180' coils-Taco 010 or Equivalent.
 3-180' coils-Taco 010 or Equivalent.



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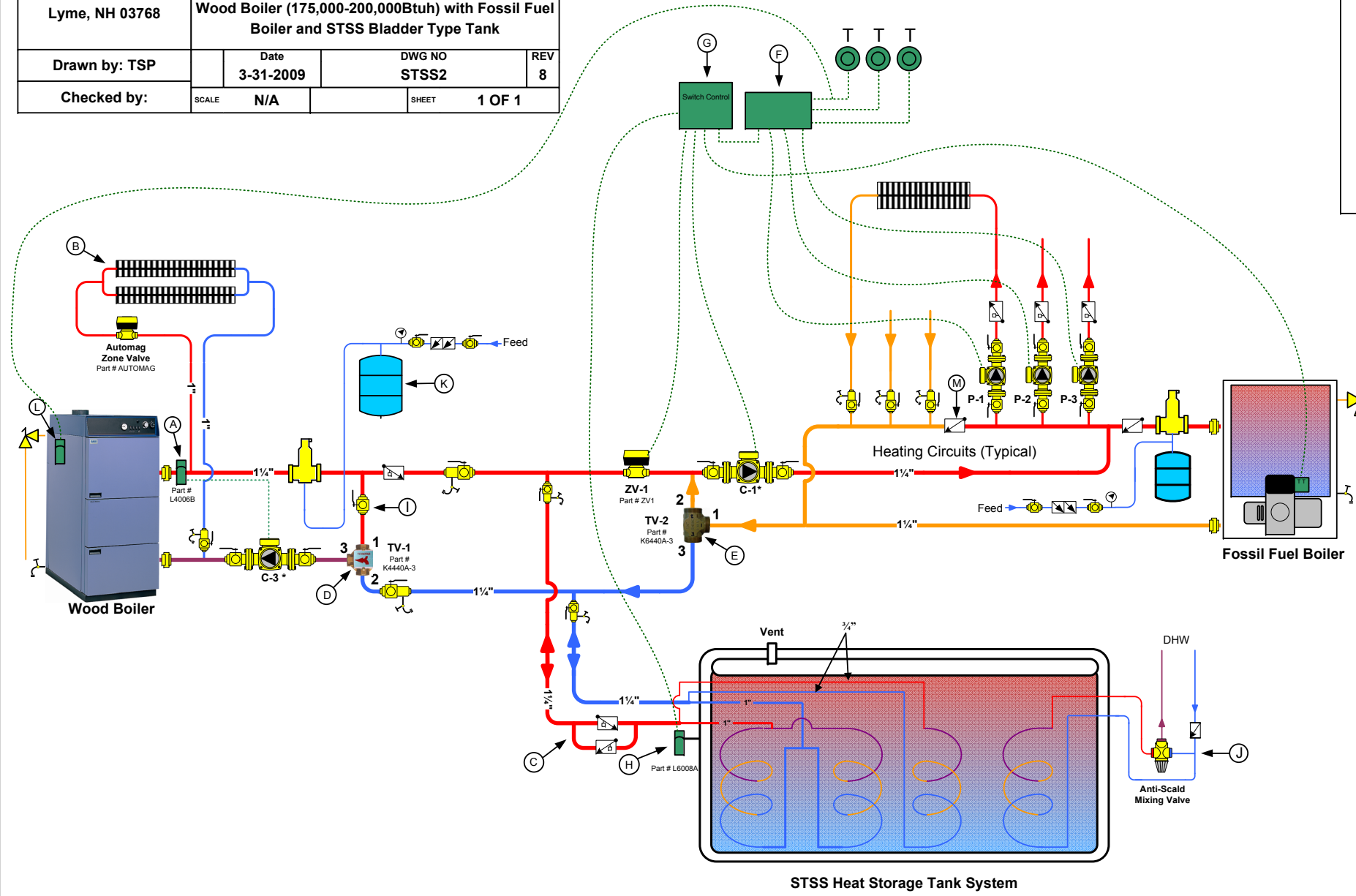
BioHeatUSA 4 Britton Lane Lyme, NH 03768	BioHeatUSA Piping Layout Concept Diagram		
	Wood Boiler (175,000-200,000Btuh) with Fossil Fuel Boiler and STSS Bladder Type Tank		
Drawn by: TSP	Date 3-31-2009	DWG NO STSS2	REV 8
Checked by:	SCALE N/A	SHEET 1 OF 1	

Symbol Key

	Circulator w/ Isolation Flanges		Central Air Separator
	Ball Valve		Zone Valve
	Purging Valve		Pressure Reducing Valve
	Swing Check Valve		Pressure Relief Valve
	Weighted Check Valve		Union
	Backflow Preventer		Drain Valve
	Thermostat		

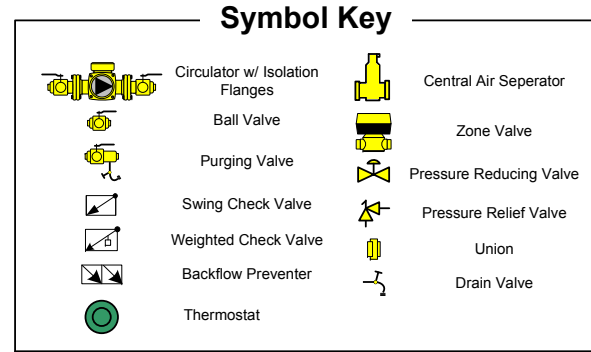
- NOTES:**
- (A) Aquastat-Honeywell L4006B BioHeat part #L4006B- **Used Only for the Solo Plus Boiler with the Analog Controller.**
 - (B) Emergency Gravity Flow Overheat Loop-Needs to be 10% of Wood Boiler Output. The Automag Zone Valve must be Mounted Horizontally.
 - (C) Weighted Check Valves Used as Heat Traps
 - (D) Termovar Mixing Valve
 - (E) Termovar Diverter Valve-Termovar Kit-Part #K6440AF
 - (F) Circulator Switch Relay-Typical Controller
 - (G) BioHeatUSA Switch Control-Part # BLTCONTROL
 - (H) Backup Boiler Control-Honeywell Aquastat L4008A or Equivalent
 - (I) Balancing Valve Required. (Start with Valve Closed halfway, i.e., at 45 degrees)
 - (J) Anti-Scald Valve needs to be installed below tank's water line or swing check installed on cold water line to prevent hot water from entering cold water
 - (K) Amtrol 60 or Equivalent Expansion Tank is Suitable for most Solo Plus Installations up to 86 gallons
Honeywell L4008B Overheat Aquastat Set to 200°F.
 - (L) Connected to the Largest Heating Circuit.-**Used with the Solo Plus W/Analog Controller, Froling FHG, and Solo Innova.**
 - (M) Check Valve Should be a Swing Check and not a Weighted Check Valve to Prevent Ghost Flow to Heating Circuits.

***Circulator Notes:**
 C-3 and C-1 Circulator Sizing:
 (Multi-Speed Circulator Recommended)
 2-120' coils-Taco 007 or Equivalent.
 2-180' coils-Taco 010 or Equivalent.
 3-180' coils-Taco 010 or Equivalent.



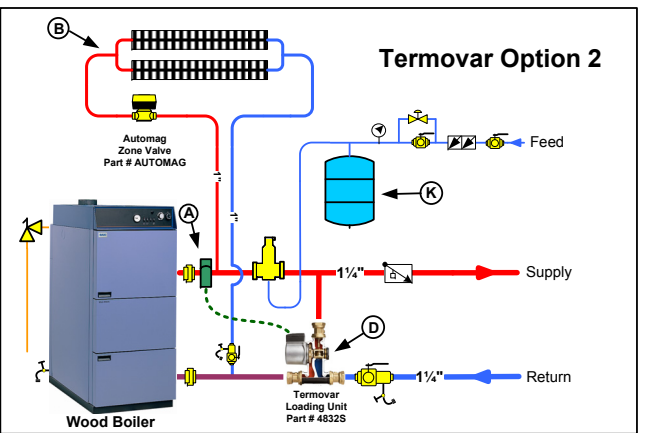
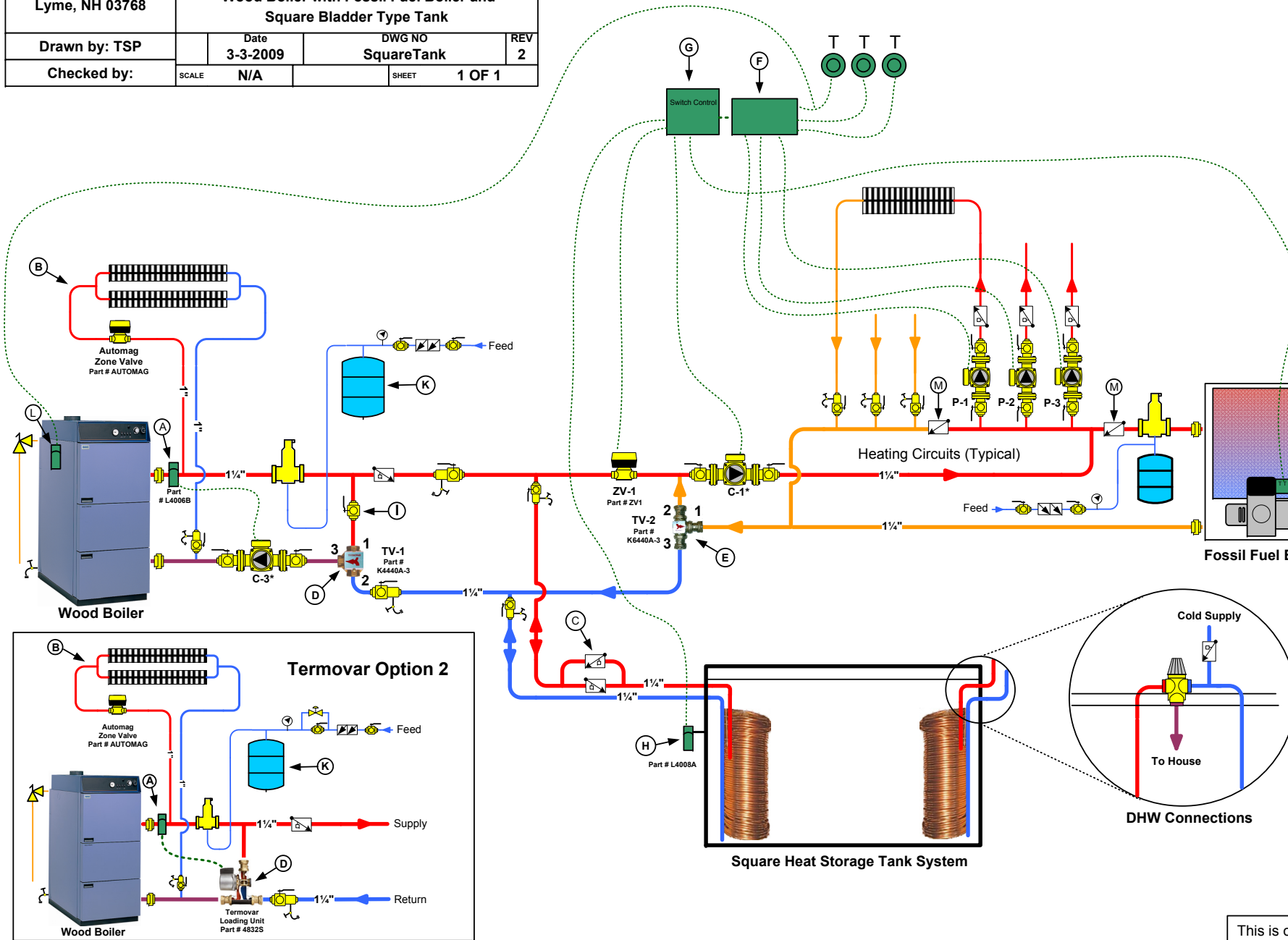
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BioHeat USA 4 Britton Lane Lyme, NH 03768	BioHeat USA Piping Layout Concept Diagram		
	Wood Boiler with Fossil Fuel Boiler and Square Bladder Type Tank		
Drawn by: TSP	Date 3-3-2009	DWG NO SquareTank	REV 2
Checked by:	SCALE N/A	SHEET 1 OF 1	



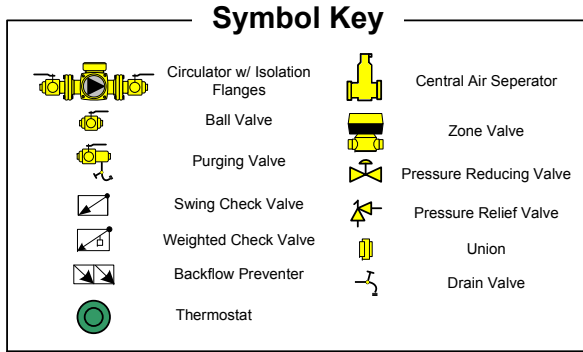
NOTES:

- (A) Aquastat-Honeywell L4006B BioHeat part #L4006B- **Used Only for the Solo Plus Boiler with the Analog Controller.**
- (B) Emergency Gravity Flow Overheat Loop-Needs to be 10% of Wood Boiler Output. The Automag Zone Valve must be Mounted Horizontally.
- (C) Weighted Check Valves Used as Heat Traps
- (D) Termovar Mixing Valve (2 Options Available)
- (E) Termovar Diverter Valve-Termovar Kit-Part #K6440AF
- (F) Circulator Switch Relay-Typical Controller
- (G) BioHeat USA Switch Control-Part # BLTCONTROL
- (H) Backup Boiler Control-Honeywell Aquastat L4008A or Equivalent
- (I) Balancing Valve Required. (Start with Valve Closed halfway, i.e., at 45 degrees)
- (J) Anti-Scald Valve needs to be installed below tank's water line or swing check installed on cold water line to prevent hot water from entering cold water
- (K) Amtrol 60 or Equivalent Expansion Tank is Suitable for most Solo Plus Installations up to 86 gallons
- (L) Honeywell L4008B Overheat Aquastat Set to 200°F.
- (M) Connected to the Largest Heating Circuit.-**Used with the Solo Plus W/Analog Controller, Froling FHG, and Solo Innova.**
- (N) Check Valve Should be a Swing Check and not a Weighted Check Valve to Prevent Ghost Flow to Heating Circuits.



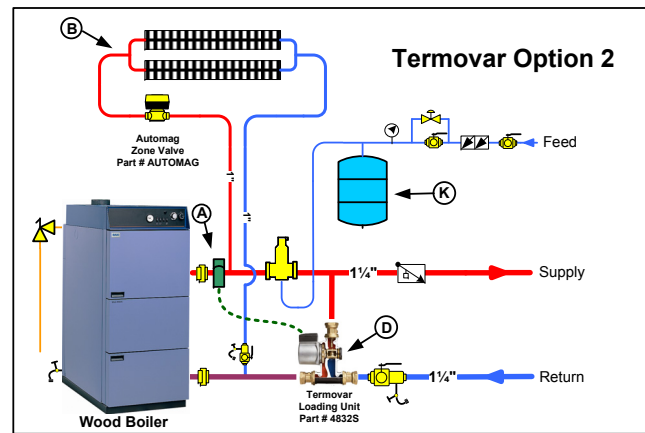
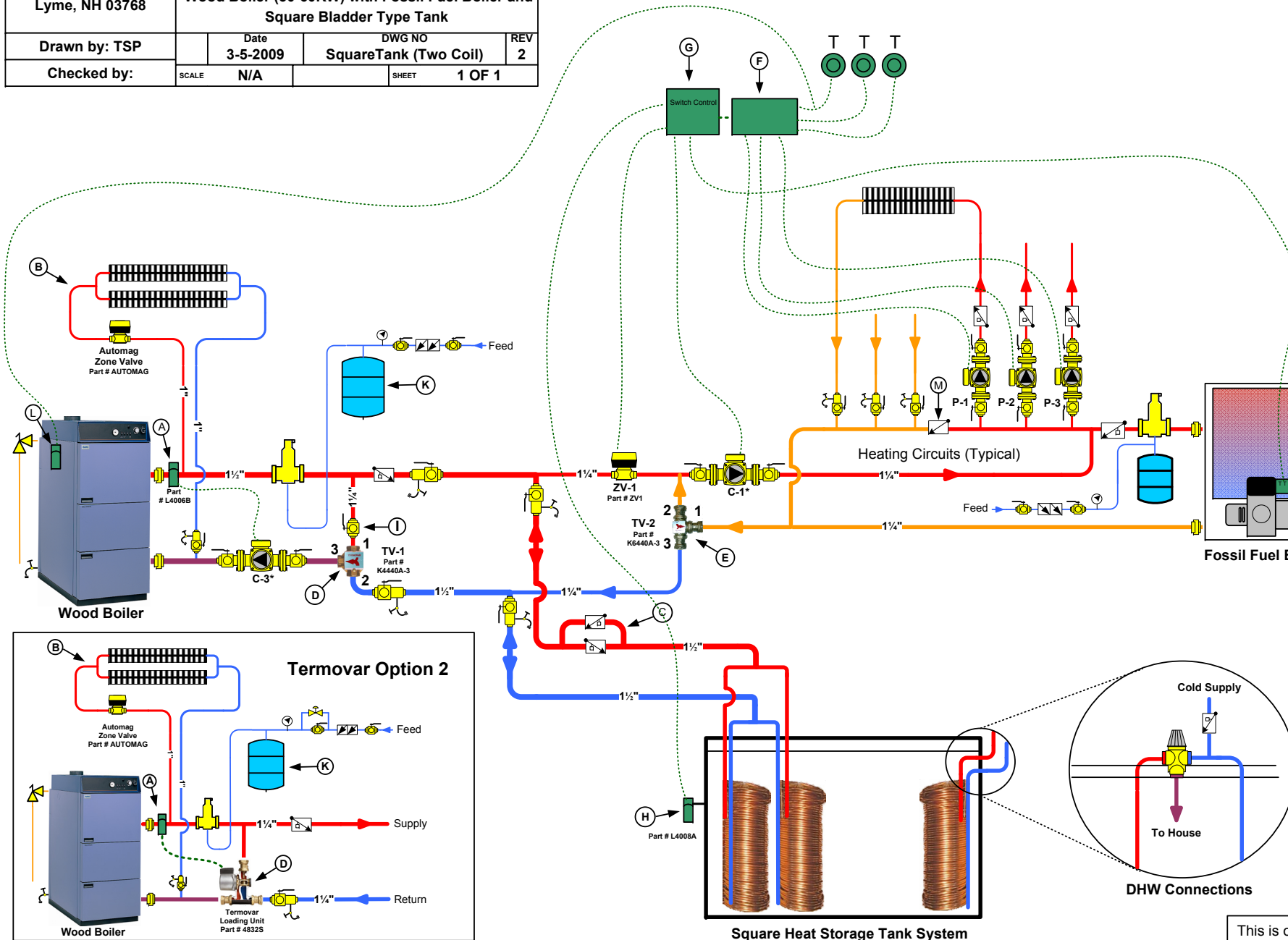
This is only a **concept** drawing. Final design, installation and code compliance details are the responsibility of the designer/installer of the system.

BioHeat USA 4 Britton Lane Lyme, NH 03768	BioHeat USA Piping Layout Concept Diagram		
	Wood Boiler (50-60KW) with Fossil Fuel Boiler and Square Bladder Type Tank		
Drawn by: TSP	Date 3-5-2009	DWG NO SquareTank (Two Coil)	REV 2
Checked by:	SCALE N/A	SHEET 1 OF 1	



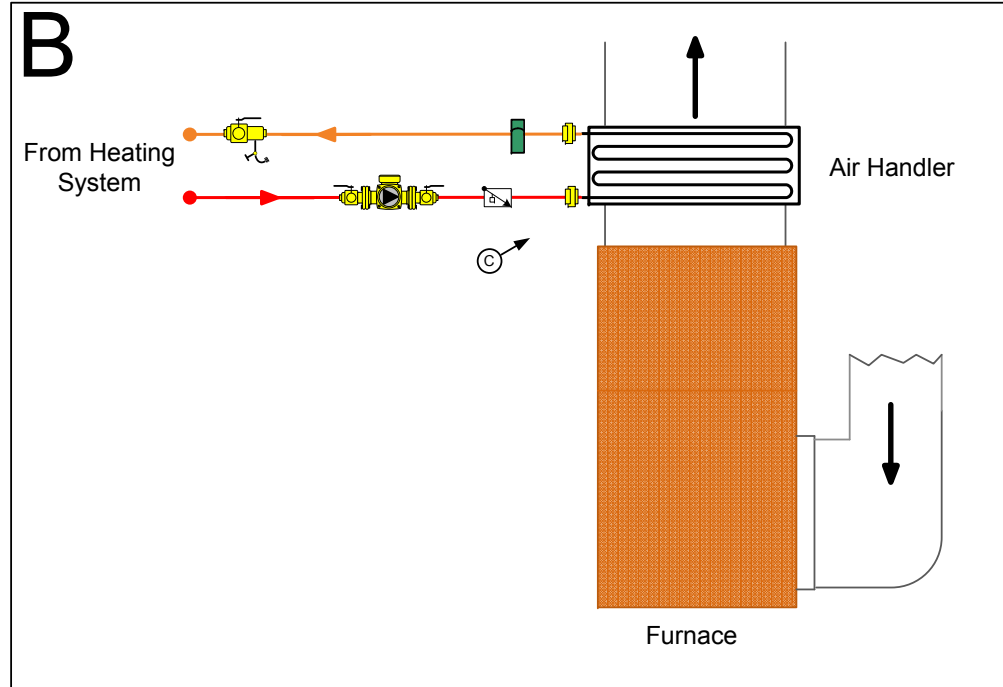
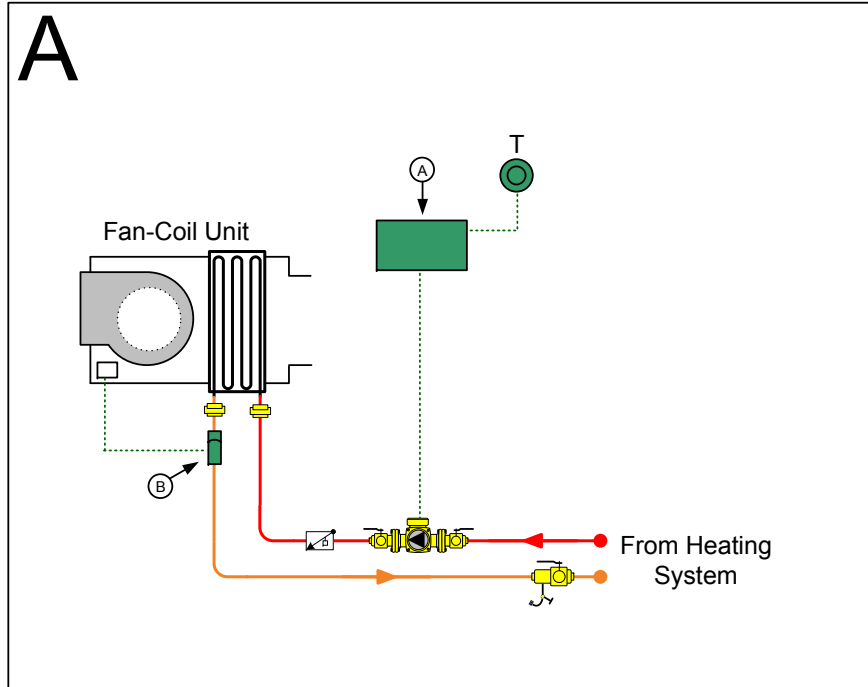
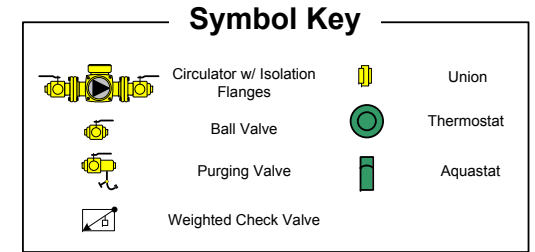
NOTES:

- (A) Aquastat-Honeywell L4006B BioHeat part #L4006B- **Used Only for the Solo Plus Boiler with the Analog Controller.**
- (B) Emergency Gravity Flow Overheat Loop-Needs to be 10% of Wood Boiler Output. The Automag Zone Valve must be Mounted Horizontally.
- (C) Weighted Check Valves Used as Heat Traps
- (D) Termovar Mixing Valve (2 Options Available)
- (E) Termovar Diverter Valve-Termovar Kit-Part #K6440AF
- (F) Circulator Switch Relay-Typical Controller
- (G) BioHeat USA Switch Control-Part # BLTCONTROL
- (H) Backup Boiler Control-Honeywell Aquastat L4008A or Equivalent
- (I) Balancing Valve Required. (Start with Valve Closed halfway, i.e., at 45 degrees)
- (J) Anti-Scald Valve needs to be installed below tank's water line or swing check installed on cold water line to prevent hot water from entering cold water
- (K) Amtrol 60 or Equivalent Expansion Tank is Suitable for most Solo Plus Installations up to 86 gallons
- (L) Honeywell L4008B Overheat Aquastat Set to 200°F.
- (M) Check Valve Should be a Swing Check and not a Weighted Check Valve to Prevent Ghost Flow to Heating Circuits.



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BioHeat USA 4 Britton Lane Lyme, NH 03768	BioHeat USA Piping Layout Concept Diagram		
	Fan-Coil/Air Handler Supplemental Plumbing Diagram		
Drawn by: TSP	Date 9-25-2008	DWG NO FanCoil	REV 1
Checked by:	SCALE N/A	SHEET 1 OF 1	



NOTES:

- (A) Circulator Switch Relay-Typical Controller
- (B) An aquastat (Honeywell L6006 or equivalent) can be used to switch on the Fan Coil's Fan. Typically set to 140 °F (60 °C).
- (C) Example B Notes: Due to the many variables of furnace manufacturers, heating systems, and air handlers, control wiring and set-up needs to be installed by a qualified HVAC professional.

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