Wood Boiler Plumbing Schematics

Solo Plus

Solo Innova

Froling FHG

Excel Multi-Fuel
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1.0 Introduction

Dear Valued Tarm Biomass Customer
Here at Tarm Biomass we want to make your installation as smooth as possible. This document includes a wide range of system designs that should meet your installation needs.

The systems shown in this document are only examples and they should not substitute for complete system planning.

We reserve the right to make technical changes without prior notice.

If more information is needed, please contact your local Tarm Biomass dealer or call us directly at 1-800-782-9927.

The Tarm Biomass Team
2.0 Plumbing Diagrams
2.1 Plumbing Example-Solo/Excel 1

Symbol Key

Note: Use Wire A for Excel Boiler

SYSTEM NOTES:

- Honeywell 4008 Overheat Aquastat Set to 200°F. Connected to the Largest Heating Circuit. Connected to the Solo Plus W/Analog Controller, Froling FHG, and Solo Innova.
- Note - Use Wire A for Excel Boiler

This is only a concept drawing. Final design, installation, and code compliance issues are the responsibility of the designer/installer responsible for the system.
This is only a concept drawing. Final design, installation and code compliance details are the responsibility of the designer/installer of the system.
2.3 Plumbing Example-Solo/Excel 1 w/Alpha Pump

SYSTEM NOTES:

- Honeywell L4008B Overheat Aquastat Set to 200°F. Connected to the Largest Heating Circuit.
- Emergency Gravity Flow Overheat Loop: Do not use with the Solo Plan W Analog Controller, Froling FHG, and Solo Innova.

Note - Use Wire A for Excel Boiler.

Auto Adapting Circulator (Alpha). Circulator is not wired to boiler.

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

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

**Symbol Key**

- Control Air Separator
- Bil Valve
- Strainer
- Pressure Reducing Valve
- Priming Valve
- Union
- Drain Valve
- Temperature/Pressure Gauge
- Zone Valve
- Pump Valve
- Weighted Check Valve
- Backflow Preventer
- Termovar Mixing Valve
- Weighted Check Valve
- Drain Valve
- Temperature/Pressure Gauge
- Zone Valve
- Central Air Separator

**Circulator w/Isolation Flanges**

**Ball Valve**

**Purging Valve**

**Weighted Check Valve**

**Backflow Preventer**

**Drain Valve**

**Union**

**Pressure Relief Valve**

**Pressure Reducing Valve**

**Zone Valve**

**Termovar Tempering Valve**

**Thermostat**

**Feed Temperature/Pressure Gauge**

**Check Valve Should be a Swing Check and not a Weighted Check Valve.**

**Auto Adapting Circulator (Alpha).** Circulator is not wired to boiler.

**Note:** Use Wire A for Excel Boiler.

**System Notes:**

Honeywell L4008B Overheat Aquastat Set to 200°F. Connected to the Largest Heating Circuit.

Emergency Gravity Flow Overheat Loop: Do not use with the Solo Plan W Analog Controller, Froling FHG, and Solo Innova.

Balancing Valve Required. Start with Valve Closed halfway, i.e., at 45 degrees.

Check Valve Should be a Swing Check and not a Weighted Check Valve.

Wood Boiler used as an ONLY BOILER.
This is only a concept drawing. Final design, installation and code compliance details are the responsibility of the designer/installer of the system.

SYSTEM NOTES:

A 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.

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) Option B includes pump and built in balancing valve. Do not install Pump labeled C-3A

E Balancing Valve Required. (Start with Valve Closed halfway, i.e., at 45 degrees)

F Antrol 60 or Equivalent Expansion Tank is Suitable for most Solo Plus Installations up to 86 gallons

G Check Valve Should be a Swing Check and not a Weighted

H Check Valve to Prevent Ghost Flow to Heating Circuits.

I Weighted check valve is needed to prevent ghost flow during fossil fuel operation.
2.5 Plumbing Example-Solo 3

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

**SYSTEM NOTES:**
- Honeywell L4008 Overheat Aquastat Set to 200°F (Connected to the Largest Heating Circuit). Use with Solo Plus W/Analog Controller, Froling FHG, and Solo Innova.
- “An aquastat can be used to switch on fossil fuel boiler. Honeywell L4008 is recommended (Part # L4008A) or equivalent.”
- Termovalve Mixing Valve (2 Options Available) Option B Includes pump and built-in balancing valve.
- Emergency Gravity Flow Overheat Loop: Needs to be 10% of Wood Boiler Output or equivalent (Part # L4008A).
- Backflow Preventer: Recommended, with manual operation required (Part # L4008A).
- Drains: Valves Required. Drain Valve Not Required. (See “Backflow Preventer”)
- An expansion tank is required. Honeywell's 60-Gallon Expansion Tank is Suitable for most Solo Plus Installations up to 85 gallons.
SYSTEM NOTES:

A 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.

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) Option B Includes pump and built in balancing valve. Do not install Pump labeled C-3A

E Balancing Valve Required. (Start with Valve Closed halfway, i.e., at 45 degrees)

F Amtral 60 or Equivalent Expansion Tank is Suitable for most Solo Plus Installations up to 86 gallons

G Weighted check valve is needed to prevent ghost flow during fossil fuel operation.

This is only a concept drawing. Final design, installation and code compliance details are the responsibility of the designer/installer of the system.
2.7 Plumbing Example-F

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

SYSTEM NOTES:
- Weighted Check Valves Used as Heat Traps
- Termovar Mixing Valve (2 Options Available)
- Termovar Diverter Valve - Termovar Kit - Part # K6440
- Weighted Check Valves Used as Heat Traps
- Automag Zone Valve must be Mounted Horizontally
- Termovar Loading Unit - Part # 4832
- DHW Connections
- Honeywell L4008 B 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.
- Amtrol 60 or Equivalent Expansion Tank is Suitable for most Solo Plus Installations up to 86 gallons
- 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 line.
- Emergency Gravity Flow Overheat Loop - Needs to be 10% of Wood Boiler Output.
- Switch Control: Balancing Valve Required. (Start with Valve Closed halfway, i.e., at 45 degrees)
- Circulator Relay Control

Wood Boiler Piping Layout Concept Diagram

Symbol Key:
- Central Separator
- Bar valve
- Zone valve
- Pressure reducing valve
- Union
- Drain valve
- Union
- Pressure Relief Valve
- Pressure Reducing Valve
- Zone Valve
- Central Air Separator
- Weighted Check Valve
- Ball Valve
- Swing Check Valve
- Thermostat
- Heaters
- 1¼” x 1¼”

Switch Control: Balancing Valve Required. (Start with Valve Closed halfway, i.e., at 45 degrees)

Square Heat Storage Tank System

DHW Connections

Emergency Gravity Flow Overheat Loop - Needs to be 10% of Wood Boiler Output.

Automag Zone Valve must be Mounted Horizontally.

Honeywell L4008 B 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.

Amtrol 60 or Equivalent Expansion Tank is Suitable for most Solo Plus Installations up to 86 gallons

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 line.

Emergency Gravity Flow Overheat Loop - Needs to be 10% of Wood Boiler Output.

Switch Control: Balancing Valve Required. (Start with Valve Closed halfway, i.e., at 45 degrees)
This is only a concept drawing. Final design, installation and code compliance details are the responsibility of the designer/installer of the system.
2.9 Plumbing Example-D

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

Note: Use Wire C for Excel Boiler.

Termovar Diverter Valve - Termovar Kit - Part # K6440

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.

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.

Symbol Key:
- CV: Union
- SW: Swing Check Valve
- PN: Pressure Reducing Valve
- DR: Drain Valve
- P: Purging Valve
- LM: Loading Module
- M: Mixing Valve
- TP: Thermostat
- C: Weighted Check Valve
- A: Anti-Scald Valve
- F: Feed Valve
- R: Return Valve
- E: Emergency Gravity Flow Overheat Loop
- B: Ball Valve
- G: Circulator w/Isolation Flanges
- T: Termovar Option 2 (40 Kw boiler or smaller)
- D: Custom/Option Thermal Expansion Tanks
- O: Option

STSS Heat Storage Tank System

Amtrol 60 or Equivalent Expansion Tank is Suitable for most Solo Plus Installations up to 86 gallons.

Part # Alpha

Check Valve Should be a Swing Check and not a weighted Check Valve.
Wood Boiler Piping Layout Concept Diagram

Tarm Biomass
4 Britton Lane
Lyme, NH 03768

Drawn by: TSP

Tarm Biomass Piping Layout Concept Diagram

Wood Boiler (Up to 140,000 Btu/h) with Fossil Fuel Boiler and STSS Bladder Type Tank

SYSTEM NOTES:
- Aquastat-Honeyl (L006 B-Heat part # L4006 B) Used Only for the Solo Plus Boiler with the Analog Controllers
- Emerging Gravity Flow Overhead Loop is not to be 10% of Wood boiler Output. The Automag Zone Valve must be Mounted Horizontally
- Weighted Check Valves Used as Heat Traps
- Termovar Mixing Valve (2 Options Available)
- Termovar Diverter Valve (2 Options Available)
- Circulator Switch Relay-Typical Controller
- Switch Control-Part # B10 1000 TR
- Backflow Boiler Control-Honeyl Aquastat L4006A or Equivalent
- Balancing Valve Required (Start with Valve Closed Fullway, i.e., at 45 degrees)
- Anti-Scald Valve needs to be installed below tank to prevent hot water from entering cold side
- STSS 100 or Equivalent Expansion Tank is Suitable for most Solo Plus Installations up to 8 gallons
- Honeywell L4008B Overhead Aquastat Set to 200°F
- Connected to the Largest Heating Circuit, 4-6 with the Solo Plus W Analog Controller, Finding FHC, and Solo Innova
- Check Valve Should be a Swing Check and not a Weighted Check Valve to Prevent Ghost Flow to Heating Circuits

Circulator Notes:
- 0-3 and 0-1 Circulator Staging
  - Start with Circulator Staging
  - 2-15 PSI closed-Tap 0.01 or Equivalent
  - 3-180 PSI closed-Tap 0.01 or Equivalent

This is only a concept drawing. Final design, installation and code compliance details are the responsibility of the designer/installer of the system.
2.12 Plumbing Example-Square Tank
This is only a concept drawing. Final design, installation and code compliance details are the responsibility of the designer/installer of the system.
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Automag Zone Valve
Part # AUTOMAG 1

Emergency Gravity Flow Overheat Loop
- Needs to be 10% of Wood Boiler Output.

The Automag Zone Valve Must be Mounted Horizontally.

SYSTEM NOTES:
Feed
Indirect Water Heater
Fossil Fuel Boiler

Part # L4008

Termovar Loading Unit
Part # 4832 S
(Loading Unit Recommended, but Termovar K440 A-3 could also be used).

Termovar Diverting Valve
Part # K6440 A 3

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

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.

Backup Boiler Control
Honeywell Aquastat L4008 A or Equivalent.
Mount sensor bulb on tank surface near top tapping with either tape or strap.

Circulator Relay Control
Part # BLTCONTROL

Circulator w/Isolation Flanges
Ball Valve
Purging Valve
Weighted Check Valve
Backflow Preventer
Drain Valve
Union
Pressure Relief Valve
Pressure Reducing Valve
Central Air Seperator

Symbol Key
Temperature Gauge
Swing Check Valve

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

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.

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

Check Valve Should be a Swing Check Valve.

Symbol Key

Wood Boiler Pressure Tank Thermal Storage System

Honeywell L4008 B Overheat Aquastat set to 200ºF.
Connected to the largest Heating Circuit
- Used with the Solo Plus w/Analog controller, Froling FHG, and Solo Innova.
This is only a concept drawing. Final design, installation and code compliance details are the responsibility of the designer/installer of the system.
**TANK NOTES:**

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

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.

**SYSTEM NOTES:**

- Honeywell L4008B Overheat Aquastat Set to 200°F. Connected to the Largest Heating Circuit. Used with the Solo Plus/Waterfall Controller, Froling FHG, and Solo Innova.
- Emergency Gravity Flow Overheat Loop Needs to be 10% of Wood Boiler Output. The Automag Zone Valve Must be Installed Horizontally.
- Termovar Loading Unit Part #4832S (Loading Unit recommended, but Termovar K440A-3 could also be used).
- Termovar Diverting Valve Part #K6440A3
- Expansion Tank Sizing: 2 Thermal Tanks-Amtrol SX90V or Equivalent. 3 Thermal Tanks-Amtrol SX130V or Equivalent.

*This is only a concept drawing. Final design, installation and code compliance details are the responsibility of the designer/installer of the system.*
2.19 Plumbing Example-Automix Single Tank

Symbol Key:
- Tarm Biomass
- 4 Britton Lane
- Lyme, NH 03768
- Drawn by: TSP
- Tarm Biomass Piping Layout Concept Diagram
- Wood Boiler (Up to 200,000 Btuh) with Fossil Fuel Boiler and Pressure Tank Thermal Storage
- Date: DWG NO REV 6-7-2010
- Scale: N/A Sheet 1 of 3

Options:
- Option A
- Option B
- Option C

Materials:
- Automix Single Tank
- Motorized Mixing Valve
- Termomix D and Automix
- Indirect Hot Water Tank
- Auto Adapting Circulator
- Motorized Mixing Valve
- Termomix D and Automix
- Supply
- Return
- Outside Sensor
- Motorized Mixing Valve
- Termomix D and Automix
- Swing Check
- Over/Isolation Flanges
- Ball Valve
- Weighted Check Valve
- Backflow Preventer
- Drain Valve
- Pressure Relief Valve
- Pressure Reducing Valve
- Central Air Separator

Thermostat and Temperature Gauge:
- Swing Check
- T
- F
- G
- X
- X
- X
- X
- T
- End Switch
- End Switch
- T
- T
2.20 Plumbing Example-Automix Multi-Tank


### System Notes

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
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<tbody>
<tr>
<td>A</td>
<td>Open Expansion option. The tank sizing is 10% of system water volume. The tank needs to be at least 10° above the highest point in the system. There cannot be any isolation valves between the tank and system. The tank should be run to a drain.</td>
</tr>
<tr>
<td>B</td>
<td>Expansion tank sizing (tank not needed with open expansion) 400 gallons needs an Amtrol SX90V or equal valent. 600 gallons needs an Amtrol SX110 or equivalent.</td>
</tr>
<tr>
<td>C</td>
<td>Emergency Gravity Flow Overheat Loop-Needs to be 10% of Wood Boiler Output. The Automix Zone Valve Must be Mounted Horizontally.</td>
</tr>
<tr>
<td>D</td>
<td>Open on riser cap to lock-out back-up boiler (One with 395T Recommended). Unial setting of 140-150 °F. Mount sensor built on tank surface (or in well tapping, if available) near top tapping with either tape or snap</td>
</tr>
<tr>
<td>E</td>
<td>Thermal storage tank sizing-Min. 400 gallons/100,000Btuh. The tanks should be installed close to each other and to the boiler to take advantage of self-circulation during a power outage. The return pipe should be run low to the ground and a loading unit must be installed with the backflow preventer installed.</td>
</tr>
<tr>
<td>F</td>
<td>Typical Zone Valve control or Multiple Circulator relay.</td>
</tr>
<tr>
<td>G</td>
<td>Typical Dual zone switching relay.</td>
</tr>
<tr>
<td>H</td>
<td>LK Acaso Automix 10 outdoor reset control.</td>
</tr>
<tr>
<td>I</td>
<td>Connect the boiler connections to the tanks diagonally, X-X.</td>
</tr>
<tr>
<td>J</td>
<td>Motorized zone valve or Ball Valve sized to system piping.</td>
</tr>
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</table>

### Heating System Notes

**Option A**

This option takes full advantage of the Acaso C10 control and Grundfos Alpha pump. The C10 control will automatically adjust supply water temperature to reflect outside temperature. The Alpha pump continuously fine tunes power consumption and flow rates to the needs of the heating system. This combination will save you energy and money. The high temperature zones are controlled by zone valves.

If there are Lo-Temperature zones (radiant); a second C10 control can be utilized to control supply temperature. An Alpha pump is not needed in this application.

**Option B**

Hi-Temperature zones with circulators. An Alpha pump is not needed in this application.

**Option C**

Lo-Temperature zones (radiant) with circulators. An Alpha pump is not needed in this application.

- All three options utilizing the C10 control will extend the heat out-put from the storage tank system because the heating system is only taking energy required from the storage tank system.
- If installed properly, storage tank system can be utilized as a power-out dump zone.
- Solar can easily be integrated.

### C10 Control Settings

**Graph Setting**

The regulating graph for a certain house is dependent on dimensions, location, insulation, etc. Therefore it is not possible to decide on a graph in advance. There is a trial and error process. The graph is set with knobs D and F.

**Initial Setting**

Regulating graph for hi-temperature heating (baseboard), set knob D to 5.

Regulating graph for lo-temperature heating (radiant), set knob D to 2.

**Room temperature setting/parallel displacement**

For parallel displacement to obtain the desired room temperature use knob F. The supply water temperature can be raised or lowered by in 10°C steps from setting 0. A supply water temperature of 2.5°C is equivalent to 1°C in room temperature.

**Adjustments**

- Should the room temperature rise with falling outdoor temperature: lower knob D raise knob F
- Should the room temperature fall with falling outdoor temperature: raise knob D lower knob F

Make only minor changes with knobs D and F. When the house has an even room temperature despite fluctuating outdoor temperature, the correct regulating graph has been obtained.

**Regulating Graphs**

![Regulating Graphs](image)

**Setting Min. and Max. Supply Water Temperature**

Min. supply water temperature can be set between 15°C-35°C and max. supply water temperature between 40°C-90°C. When min. supply water temperature is set to 30°C or below, the max. supply water temperature will automatically be 40°C. When min. supply water temperature is set above 30°C, the max. supply water temperature is automatically 45°C.

Setting of min. supply water temperature is used in radiant floor heating applications to obtain a comfortable floor temperature.

Min. supply water temperature is selected with knob C.

In the example graph 3 has been selected and the min. supply water temperature is set to 22°C. Max. supply water temperature will automatically be 40°C.

Setting of max. supply water temperature is used in hydronic radiator heating systems. Max. supply water temperature is selected with knob C.

In the example graph 6 has been selected. Max. supply water temperature is set to 45°C.
Appendix B-Overheat Loop: No Electricity

The piping and controls must be connected to the boiler in such a way that in the event of a power failure there is one loop of radiation available for gravity circulation. This loop must not be obstructed by any valves or other accessories which would prevent gravity circulation during a power failure. The piping is plumbed in such a way that excessive pressure will not be developed in any portion of the boiler or system. The loop must be large enough to dissipate at least 10% of the boiler’s maximum rated heat output, assuming an ambient temperature of 65 °F (18 ºC) and a mean water temperature of 180 °F (82 ºC).

The minimum pipe size for this loop is ¾” and if possible, the loop should be located and pitched to maximize natural thermal convection of the water. The loop must be positioned above the boiler. The design of the loop must be such that it can be made inoperative only in a deliberate manual action. If large enough, an existing heating radiation zone may be used for the over-heat loop. The loop must be equipped with zone valves which will open automatically during a power failure. We recommend AUTOMAG zone valves for this application (offered as an accessory).

<table>
<thead>
<tr>
<th>Boiler Output</th>
<th>Recommended Minimum Baseboard Length¹</th>
</tr>
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<tbody>
<tr>
<td>30kW (100,000Btuh)</td>
<td>18’</td>
</tr>
<tr>
<td>40kW (140,000Btuh)</td>
<td>26’</td>
</tr>
<tr>
<td>50kW (170,000Btuh)</td>
<td>32’</td>
</tr>
<tr>
<td>60kW (200,000Btuh)</td>
<td>36’</td>
</tr>
</tbody>
</table>

¹ Overheat Example
Appendix C-Thermostatic Mixing Valve

A Thermostatic Mixing Valve or Loading Unit must be incorporated into the heating system piping as shown in the figure below. When the Mixing Valve is used a ball valve (I) (not provided) must be installed upstream of Port 1 of valve **TV-1**. The valve should be set at half open (and the handle removed after it is set), in order for the tempering loop to function correctly. If there are unions included with the Mixing Valve or the Loading Unit, the internal valves must be fully open. A circulator is integrated into the Loading Unit, so a circulator is not required.
Appendix D-Overheat and Circulator Aquastat Wiring Connections

For boilers without connections for the overheat aquastat or boiler circulator, please use the connections below:

**Overheat Aquastat Connections***

![Diagram](image)

*Used for older boilers or the Solo Plus with the Analog control, Froling FHG, and the Solo Innova.

**C-3 Circulator Connections**

![Diagram](image)

**Used for older boilers or the Solo Plus with the Analog control.
NOTE:
All wiring must comply with current National Electrical Code and any other applicable codes. Refer to schematic included with panel or page 25 in the installation manual.
120 volt line voltage wiring shall be a code-approved type 14 gauge minimum. Low voltage wiring shall be 18 or 20 gauge thermostat wire.

120 VOLT TERMINAL STRIP (IN PANEL)

PLEASE NOTE!!!
FOLLOW WIRING INSTRUCTIONS INCLUDED WITH MULTIZONE RELAY PANEL.
NOTE:
All wiring must comply with current National Electrical Code and any other applicable codes. Refer to schematic included with panel or page 25 in the installation manual. 120 volt line voltage wiring shall be a code-approved type 14 gauge minimum. Low voltage wiring shall be 18 or 20 gauge thermostat wire.

120 VOLT TERMINAL STRIP (IN PANEL)

GAS SPILLAGE
SAFETY SWITCH
FOR GAS FIRED
BACK-UP BURNERS

C1-C3
CIRCULATOR
120 VOLT

DRAFT FAN
120 VOLT

120 VOLTS 60 HZ
AC POWER
FROM 15 AMP
NEUTRAL
CIRCUIT BREAKER
GROUND
OR FUSE.

T1
T2
T3
T4
T5
T6
T7
T8

Jumper Wire

THERMOSTAT FOR
LARGEST HEATING
ZONE (HEAT DUMP ZONE)

MULTIZONE RELAY
PANEL FOR A ZONE
VALVE SYSTEM OR
CIRCULATOR SYSTEM

PLEASE NOTE!!!
FOLLOW WIRING INSTRUCTIONS INCLUDED WITH MULTIZONE RELAY PANEL.
For TARM EXCEL boiler control panel when heat storage tank is being used.

NOTE:
All wiring must comply with current National Electrical Code and any other applicable codes. Refer to schematic included with panel or page 25 in the installation manual. 120 volt line voltage wiring shall be a code-approved type 14 gauge minimum. Low voltage wiring shall be 18 or 20 gauge thermostat wire.

120 VOLT TERMINAL STRIP (IN PANEL)

PLEASE NOTE!!!
FOLLOW WIRING INSTRUCTIONS INCLUDED WITH MULTIZONE RELAY PANEL.
Termovar Loading Unit

TERMOMAR LOADING UNIT is a pre-fabricated, automatic, thermally operated valve unit for solid-fuel boiler/storage tank installations, where heating and domestic hot water are taken from the storage tank. TERMOMAR LOADING UNIT ensures a minimum return-water temperature into the solid-fuel boiler, which increases the boiler efficiency, prevents tarring and considerably prolongs the lifetime of the solid-fuel boiler. TERMOMAR eliminates the risk of destructive thermal shock caused by surges of cold water return water. TERMOMAR renders a more effective burning and is therefore a necessary part of a solid fuel installation with a storage tank.

**Termovar Includes:**
1. Thermally operated loading valve
2. Backflow preventer
3. Circulator pump
4. Three thermometers
5. Three ball valves
6. Insulation EPP

---

**Technical Data**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
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<tbody>
<tr>
<td>Voltage</td>
<td>115 VAC 60HZ</td>
</tr>
<tr>
<td>Power Consumption</td>
<td>Pump speed I 60W</td>
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<tr>
<td>Thermostatic Element</td>
<td>140 ºF (60 ºC)</td>
</tr>
<tr>
<td>Max. Boiler Capacity</td>
<td>256,000Btuh (75kW)</td>
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<tr>
<td>Max. Operating Temperature</td>
<td>230ºF (110ºC)</td>
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<tr>
<td>Max. Operating Pressure</td>
<td>145 psi (10 bar)</td>
</tr>
<tr>
<td>Circulation Pump</td>
<td>Grundfos UPS 15-58U</td>
</tr>
<tr>
<td>Max. Flow</td>
<td>740 gal/h (2800 l/h)</td>
</tr>
<tr>
<td>Sizes</td>
<td>NPT 1¼”</td>
</tr>
<tr>
<td>Body</td>
<td>Brass EN 12165 CW617N</td>
</tr>
<tr>
<td>Dimensions</td>
<td>8¼” X 8¼ X 4¼” (210 X 210 X 110mm)</td>
</tr>
<tr>
<td>Weight</td>
<td>10.58 lbs (4.8kg)</td>
</tr>
</tbody>
</table>

Termovar Loading Unit has several advantages:
- The pre-fabricated unit saves time and provides a quick and trouble-free installation.
- The loading unit provides a constant loading temperature to the storage tank.
- It can be installed on the right-hand or left-hand side of the boiler.
- The loading unit is installed on the return pipe which means that the supply pipe is free for expansion and the unit is never affected by steam in case of an overheated boiler.
- Service friendly. All parts can be changed without draining the system.
AUTOMIX 10

AUTOMIX 10 is an advanced, compact outdoor reset control for hydronic baseboard, radiator, and radiant floor heating applications. AUTOMIX 10 works continuously and proportionally. Through impulses from the sensors the control adjusts the supply water temperature as the outdoor temperature changes. AUTOMIX 10 includes a min. and max. limiter for the supply water temperature and a freeze protection feature. AUTOMIX 10 is delivered factory wired which minimizes installation problems in the field. The main supply and all sensors have plug-in connections. The quick and easy do-it-yourself installation saves on labor charges.

**Termovar Includes:**
1. Valve motor with built-in electronics
2. Mounting Kit
3. Power adaptor
4. Supply water sensor T1 with 1 m wire
5. Outdoor sensor T2 with 15 m wire

### Technical Data

<table>
<thead>
<tr>
<th>Technical Data</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Control</td>
<td>PI-control with microprocessor</td>
</tr>
<tr>
<td>Voltage</td>
<td>18 VAC 50/60HZ</td>
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<tr>
<td>Power Consumption</td>
<td>3VA</td>
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<tr>
<td>Torque</td>
<td>5Nm</td>
</tr>
<tr>
<td>Angle of Rotation</td>
<td>90º, electrically limited</td>
</tr>
<tr>
<td>Heating Curve</td>
<td>1-9, stepless</td>
</tr>
<tr>
<td>Parallel Displacement</td>
<td>±10ºC supply water temperature, stepless</td>
</tr>
<tr>
<td>Min. supply water limiter</td>
<td>+15ºC - +35ºC supply water temperature</td>
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<tr>
<td>Max. supply water limiter</td>
<td>+40ºC - +90ºC supply water temperature</td>
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<tr>
<td>Freeze Protection</td>
<td>+15ºC - +35ºC supply water temperature</td>
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<tr>
<td>Manual operation</td>
<td>Yes, when necessary</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP 40</td>
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<tr>
<td>Dimensions</td>
<td>3.15” x 3.54” x 3.66”</td>
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<tr>
<td>Weight</td>
<td>2.17lbs (0.6Kg)</td>
</tr>
</tbody>
</table>
**Termovar Loading Valve**

The TERMOVAR TEMPERING VALVE is an automatic thermally operated tempering valve for solid-fuel boiler installations with or without a storage tank.

The TERMOVAR ensures a minimum return water temperature to the heating boiler, which increases combustion efficiency, prevents tarring and considerably prolongs the lifetime for the solid-fuel boiler. The TERMOVAR eliminates the risk of destructive thermal shock to both steel and cast iron boilers. The TERMOVAR thermally operated tempering valves render a more effective burning and are therefore a necessary part of a solid-fuel boiler installation.

### Technical Data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
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</thead>
<tbody>
<tr>
<td>Opening Temperature</td>
<td>162ºF (72ºC)</td>
</tr>
<tr>
<td>Max. Operating Temperature</td>
<td>230º (110ºC)</td>
</tr>
<tr>
<td>Max. Operating Pressure</td>
<td>1.0 MPa (10bar)</td>
</tr>
<tr>
<td>Size</td>
<td>1¼”</td>
</tr>
<tr>
<td>Flow Coefficient</td>
<td>12 Kvs</td>
</tr>
<tr>
<td>Weight</td>
<td>1.54lbs (0.7Kg)</td>
</tr>
<tr>
<td>Valve Body</td>
<td>Brass TV 15 - TV 40</td>
</tr>
</tbody>
</table>
Appendix I-Termovar AF Bypass Valve Information Sheet

Termovar AF Bypass Valve

Termovar AF thermostatic 3-way bypass valves are designed to change the direction of flow in hydronic heating applications.

The Termovar Bypass (diverting) valve is an automatic thermally operated diverting valve for solid-fuel boiler installations with storage tank.

Having a Termovar AF valve installed in your system will improve overall efficiency and improve the effectiveness of the heat storage tank system.

<table>
<thead>
<tr>
<th>Technical Data</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Opening Temperature</td>
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<tr>
<td>Max. Operating Temperature</td>
<td>230°C (110°C)</td>
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<tr>
<td>Max. Operating Pressure</td>
<td>1.0 MPa (10bar)</td>
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<tr>
<td>Size</td>
<td>1/4”</td>
</tr>
<tr>
<td>Flow Coefficient</td>
<td>12 Kvs</td>
</tr>
<tr>
<td>Weight</td>
<td>1.54lbs (0.7Kg)</td>
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<tr>
<td>Valve Body</td>
<td>Brass TV 15 - TV 40</td>
</tr>
</tbody>
</table>
Notes: