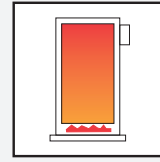


# tekmar® - Application

## One Stage Boiler & DHW Control 251

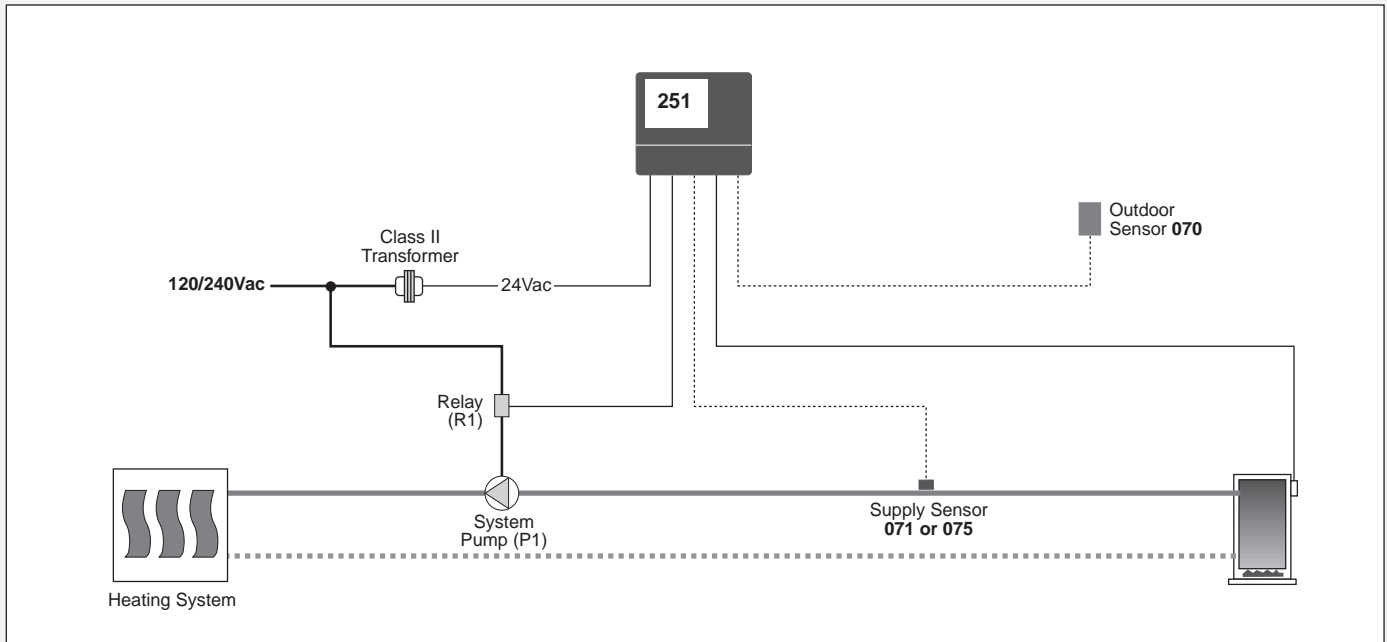


A 251-1

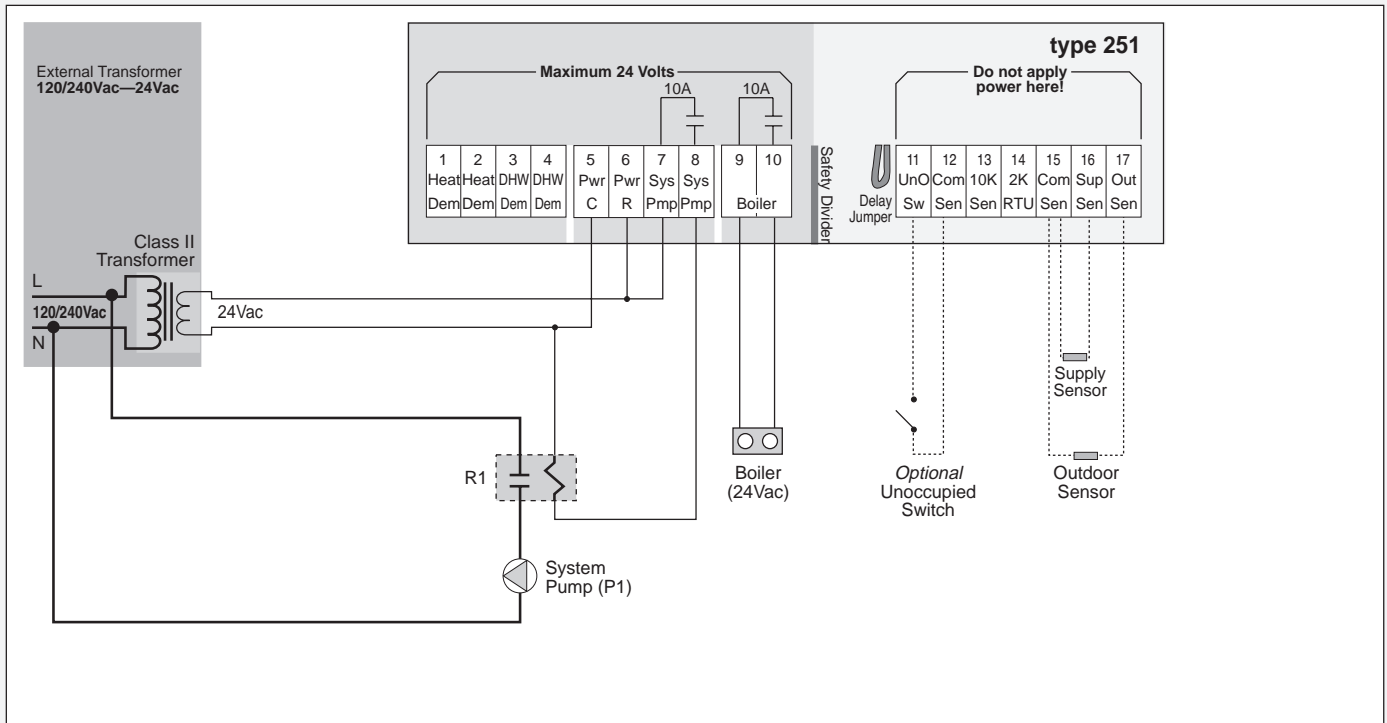
5/92

The One Stage Boiler & DHW Control 251 regulates the heating system supply water temperature based on the outdoor air temperature by cycling the boiler on and off. The system pump and boiler are turned off in warm weather.

### Mechanical



### Electrical



**Note:** This is only a concept drawing. Designers must determine whether this system will work in each application and must ensure compliance with code requirements. Necessary auxiliary equipment and safety devices must be added.

## Specifications

The following are minimum recommended specifications for the control in this application.

- The heating system supply water temperature shall be based on the outdoor air temperature and the control's Heating Curve (reset ratio) and Occupied or Unoccupied (when in setback) dial settings.
- The control shall have an Unoccupied (setback) switch or timer input to enable the control's Unoccupied temperature dial.
- The pump and the boiler shall be turned off whenever the outdoor air temperature is warmer than the control's Warm Weather Shut Down (WWSD) point.
- The Occupied or Unoccupied temperature dial setting shall be the control's WWSD point.
- During WWSD the system pump (P1) shall be operated a few minutes every 3 days to prevent seizure during longer idle periods.
- The control shall have an adjustable Minimum Supply water temperature setting to help prevent condensation of flue gases and subsequent corrosion and blockage of the boiler's heat exchanger and chimney.
- The control shall have an adjustable Boiler Differential and a selectable time delay between boiler cycles to prevent short operating cycles of the boiler.
- The control shall continuously monitor its temperature sensors and provide a LED error message when one is shorted or disconnected.
- The control shall be microprocessor-based, have 10 Amp relay contacts and have indicator lights for control function and status.
- The control shall have a test button which activates a pre-programmed test sequence to test all sensors and control outputs.
- The control enclosure shall be compatible with standard North American wiring hardware.
- The control shall be installed in an environment that is within the specified temperature and humidity ranges. The installer must ensure that the control and its wiring are isolated and/or shielded from strong sources of electromagnetic noise.
- The control system component required from tekmar is a One Stage Boiler & DHW Control 251.

## Settings

One Stage Boiler & DHW Control 251	Adjustment Range	Recommended Initial Settings
Occupied	35 to 105°F (2 to 41°C)	
Unoccupied	35 to 105°F (2 to 41°C)	
Heating Curve	0.4 to 3.6	
DHW Supply	100 to 200°F (38 to 93°C)	
Minimum Supply	Off, 80 to 170°F (27 to 77°C)	
Boiler Differential	2 to 42°F (1 to 23°C)	

One Stage Boiler & DHW Control 251 DIP switch settings for this application.



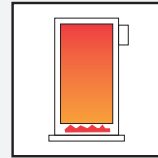
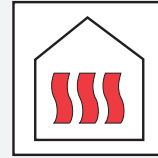
## Additional Information

- For control installation, testing and operating instructions see Brochure D 001 and D 251.
- For other control applications see Application Register A 000.
- For control theory and system integration details see E 001 and E 002.



# tekmar® - Application

## One Stage Boiler & DHW Control 251

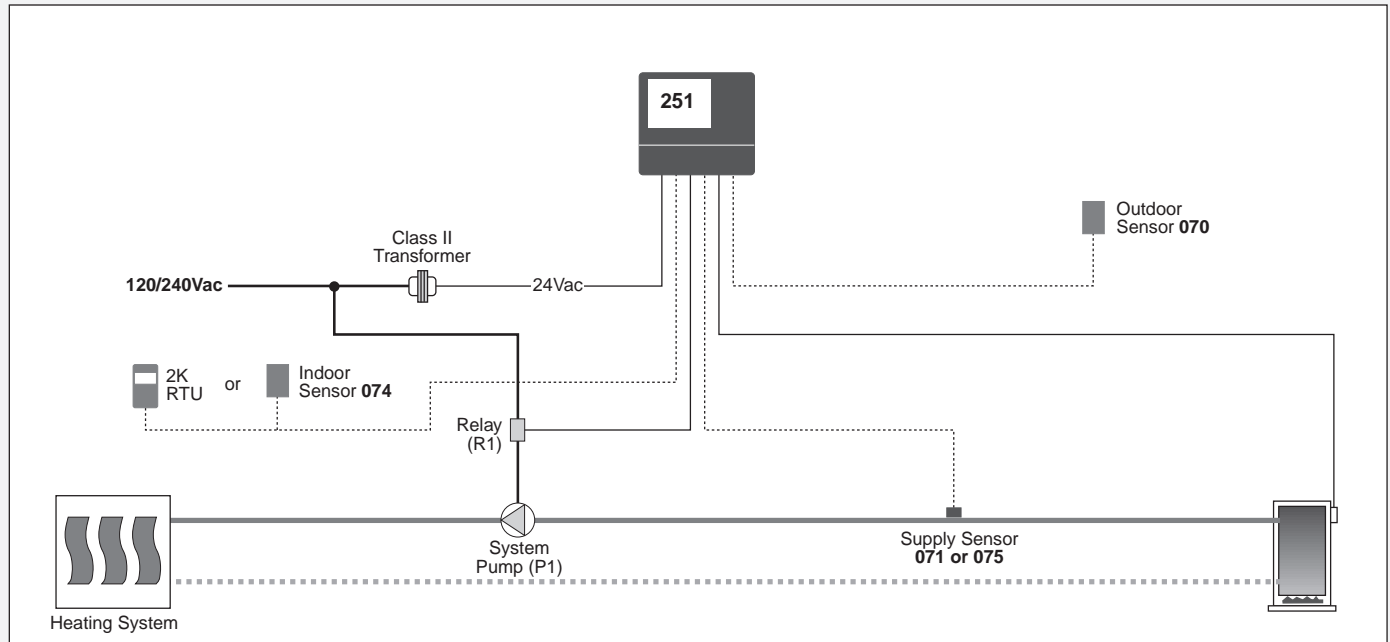


A 251-2

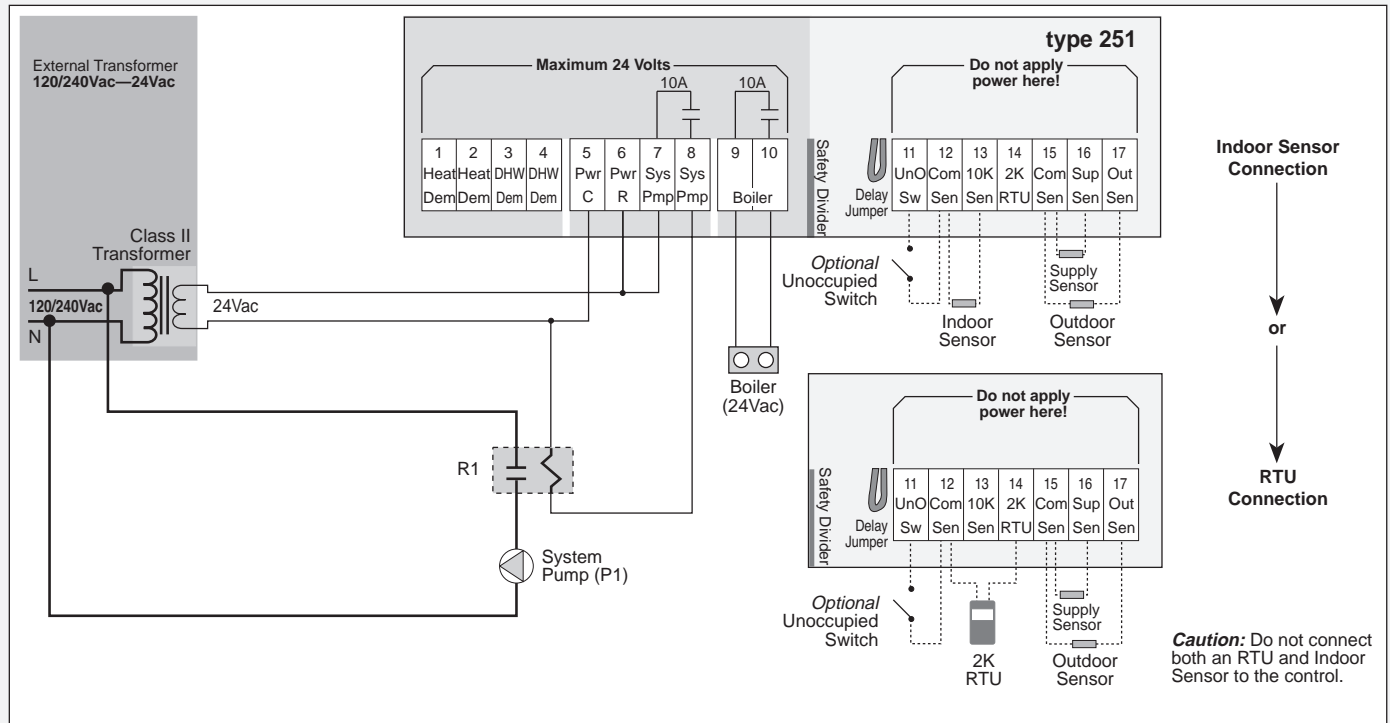
5/92

The One Stage Boiler & DHW Control 251 regulates the heating system supply water temperature based on the outdoor and indoor air temperatures by cycling the boiler on and off. The system pump and boiler are turned off in warm weather.

### Mechanical



### Electrical



**Note:** This is only a concept drawing. Designers must determine whether this system will work in each application and must ensure compliance with code requirements. Necessary auxiliary equipment and safety devices must be added.

## Specifications

The following are minimum recommended specifications for the control in this application.

- The heating system supply water temperature shall be based on the outdoor and indoor air temperatures and the control's Heating Curve (reset ratio) and Occupied or Unoccupied (when in setback) dial settings.
- The indoor air temperature shall be measured by an Indoor Sensor 074 and be adjusted at the control's Occupied and Unoccupied dials or measured and adjusted by a Room Temperature Unit (RTU).
- The control shall have an Unoccupied (setback) switch or timer input to enable the control's Unoccupied temperature dial.
- The pump and the boiler shall be turned off whenever the outdoor air temperature is warmer than the control's Warm Weather Shut Down (WWSD) point.
- The control's WWSD point shall be based on the Occupied and Unoccupied temperature setting and the measured indoor air temperature.
- If the indoor air temperature is rising above its setpoint, the WWSD temperature shall be lowered and if the indoor air temperature is falling below its setpoint, the WWSD temperature shall rise.
- During WWSD, the system pump (P1) shall be operated a few minutes every 3 days to prevent seizure during longer idle periods.
- The control shall have an adjustable Minimum Supply water temperature setting to help prevent condensation of flue gases and subsequent corrosion and blockage of the boiler's heat exchanger and chimney.
- In warmer weather the boiler shall be cycled at the Minimum Supply temperature in order to maintain the selected indoor air temperature.
- The control shall have an adjustable Boiler Differential and a selectable time delay between boiler cycles to prevent short operating cycles of the boiler.
- The control shall continuously monitor its temperature sensors and provide a LED error message when one is shorted or disconnected.
- The control shall be microprocessor-based, have 10 Amp relay contacts and have indicator lights for control function and status.
- The control shall have a test button which activates a pre-programmed test sequence to test all sensors and control outputs.
- The control enclosure shall be compatible with standard North American wiring hardware.
- The control shall be installed in an environment that is within the specified temperature and humidity ranges. The installer must ensure that the control and its wiring are isolated and/or shielded from strong sources of electromagnetic noise.
- The control system components required from tekmar are; One Stage Boiler & DHW Control 251, an Indoor Sensor 074 or a tekmar RTU 305, 307, 308 or 310.

## Settings

### One Stage Boiler & DHW Control 251

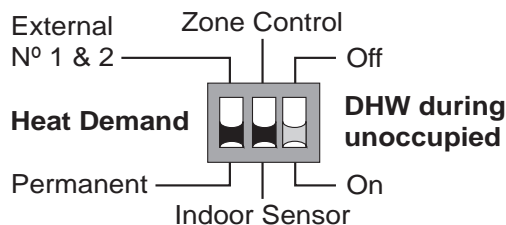
Occupied  
Unoccupied  
Heating Curve  
DHW Supply  
Minimum Supply  
Boiler Differential

### Adjustment Range

35 to 105°F (2 to 41°C)  
35 to 105°F (2 to 41°C)  
0.4 to 3.6  
100 to 200°F (38 to 93°C)  
Off, 80 to 170°F (27 to 77°C)  
2 to 42°F (1 to 23°C)

### Recommended Initial Settings

One Stage Boiler & DHW Control 251 DIP switch settings for this application.



■ = required setting

□ = optional setting (see D 251)

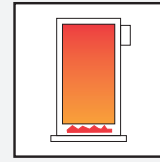
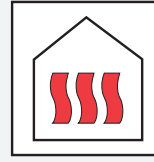
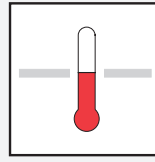
## Additional Information

- For control installation, testing and operating instructions see Brochure D 001 and D 251.
- For other control applications see Application Register A 000.
- For control theory and system integration details see E 001 and E 002.



# tekmar® - Application

## One Stage Boiler & DHW Control 251

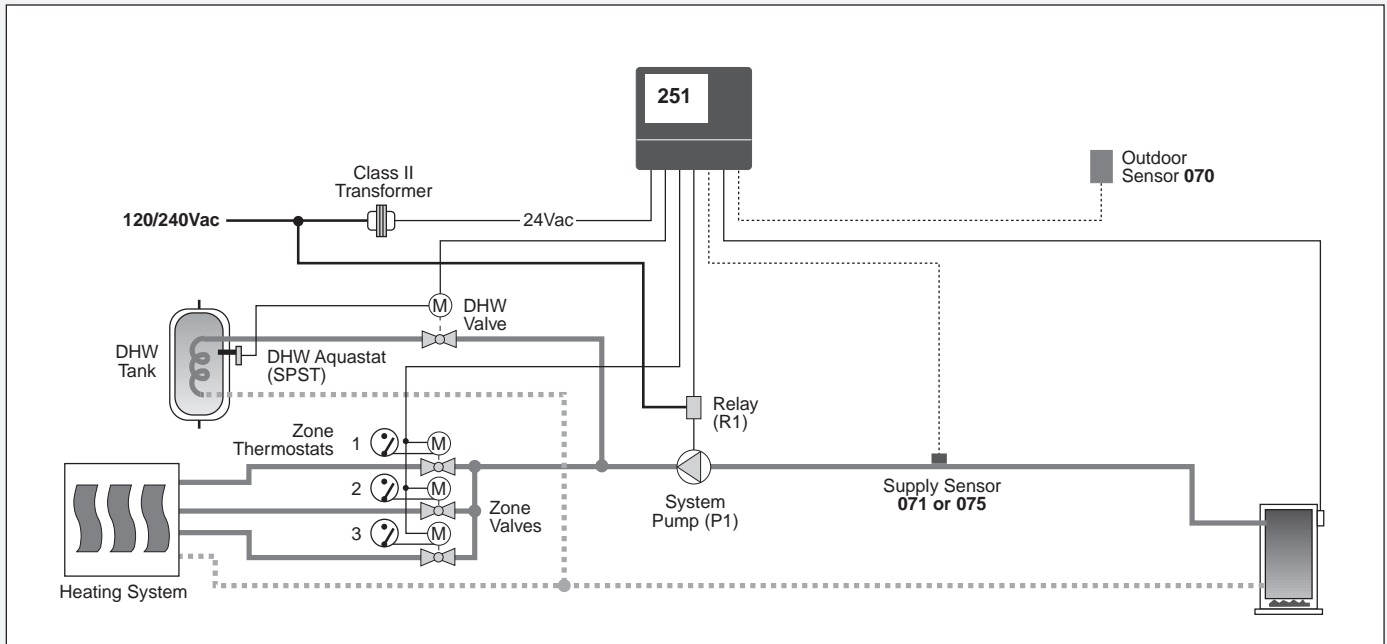


A 251-3

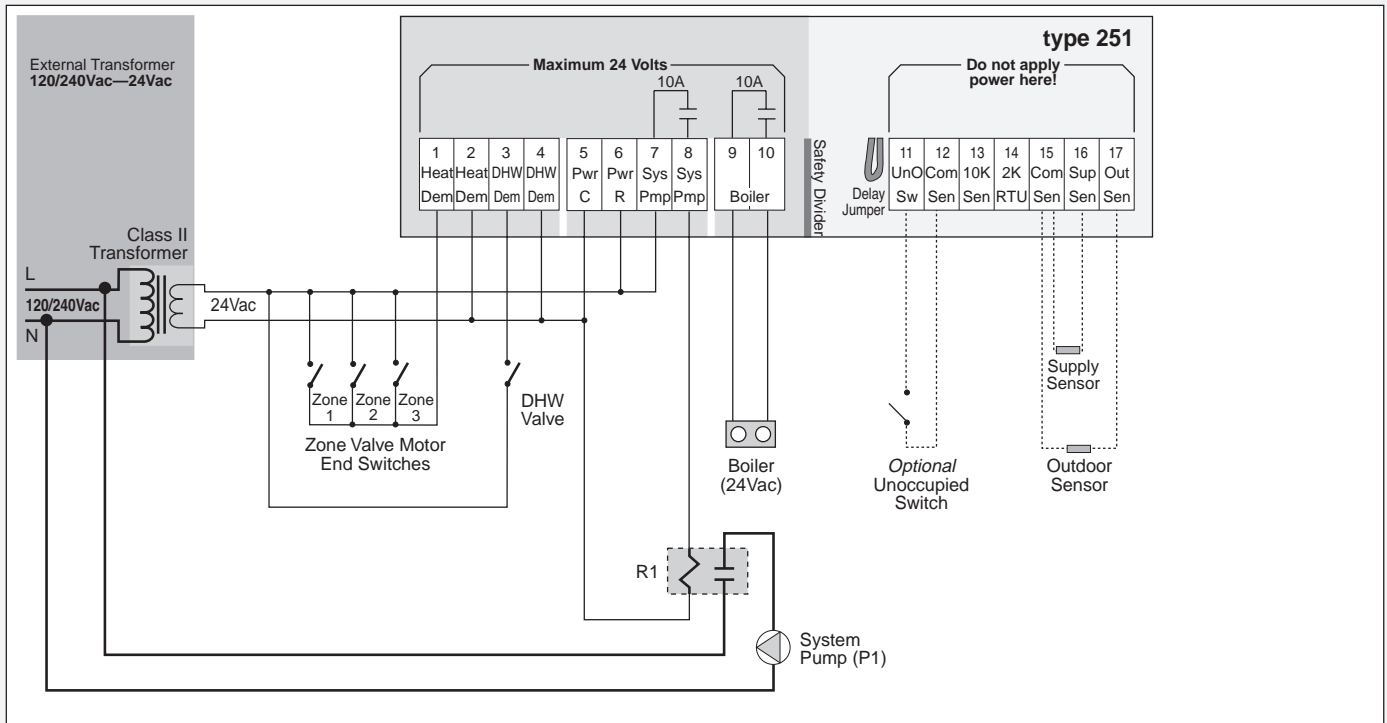
5/92

The One Stage Boiler & DHW Control 251 regulates the heating system supply water temperature based on the outdoor air temperature by cycling the boiler on and off. The heating system is zoned with zone valves and Domestic Hot Water (DHW) is generated using a 2-way DHW valve.

### Mechanical



### Electrical



**Note:** This is only a concept drawing. Designers must determine whether this system will work in each application and must ensure compliance with code requirements. Necessary auxiliary equipment and safety devices must be added.

## Specifications

The following are minimum recommended specifications for the control in this application.

- The heating system supply water temperature shall be based on the outdoor air temperature and the control's Heating Curve (reset ratio) and Occupied or Unoccupied (when in setback) dial settings.
- The control shall have an Unoccupied (setback) switch or timer input to enable the control's Unoccupied temperature dial.
- The pump and the boiler shall be turned off until there is a "call for heat" from the zone valve motor end switches and the outdoor air temperature is colder than the control's Warm Weather Shut Down (WWSD) point or there is a "call for DHW" from the DHW valve end switch.
- The Occupied or Unoccupied temperature dial setting shall be the control's WWSD point.
- During WWSD, the system pump (P1) shall be operated a few minutes every 3 days to prevent seizure during longer idle periods.
- The control shall have an adjustable Minimum Supply water temperature setting to help prevent condensation of flue gases and subsequent corrosion and blockage of the boiler's heat exchanger and chimney.
- The control shall have an adjustable Boiler Differential and a selectable time delay between boiler cycles to prevent short operating cycles of the boiler.
- On a "call for DHW" the system pump (P1) shall be turned on, the DHW valve shall be opened and the boiler controlled to provide supply water at the DHW temperature. The DHW supply water temperature shall be adjusted by a DHW Supply dial on the control.
- The control shall have a switch to select whether or not DHW is to be generated during the Unoccupied time period.
- The control shall continuously monitor its temperature sensors and provide a LED error message when one is shorted or disconnected.
- The control shall be microprocessor-based, have 10 Amp relay contacts and have indicator lights for control function and status.
- The control shall have a test button which activates a pre-programmed test sequence to test all sensors and control outputs.
- The control enclosure shall be compatible with standard North American wiring hardware.
- The control shall be installed in an environment that is within the specified temperature and humidity ranges. The installer must ensure that the control and its wiring are isolated and/or shielded from strong sources of electromagnetic noise.
- The control system component required from tekmar is a One Stage Boiler & DHW Control 251.

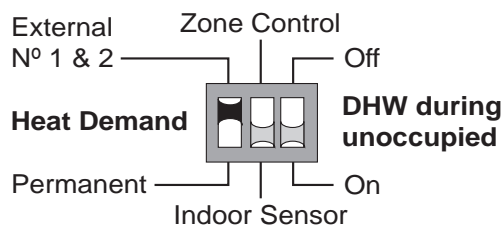
## Settings

### One Stage Boiler & DHW Control 251

Occupied	Adjustment Range
Unoccupied	35 to 105°F (2 to 41°C)
Heating Curve	35 to 105°F (2 to 41°C)
DHW Supply	0.4 to 3.6
Minimum Supply	100 to 200°F (38 to 93°C)
Boiler Differential	Off, 80 to 170°F (27 to 77°C)
	2 to 42°F (1 to 23°C)

### Recommended Initial Settings

One Stage Boiler & DHW Control 251 DIP switch settings for this application.



■ = required setting  
□ = optional setting (see D 251)

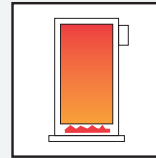
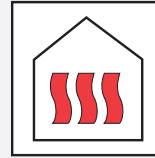
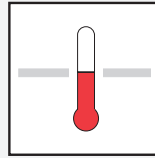
## Additional Information

- For control installation, testing and operating instructions see Brochure D 001 and D 251.
- For other control applications see Application Register A 000.
- For control theory and system integration details see E 001 and E 002.



# tekmar® - Application

## One Stage Boiler & DHW Control 251

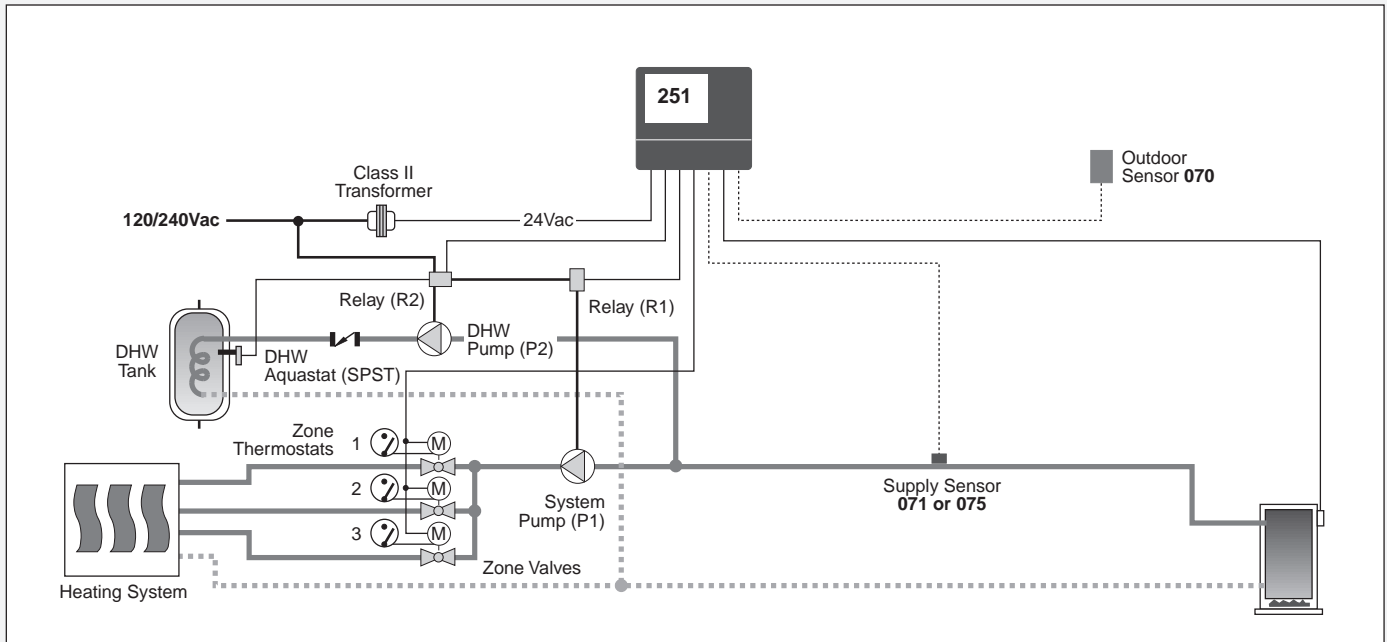


A 251-4

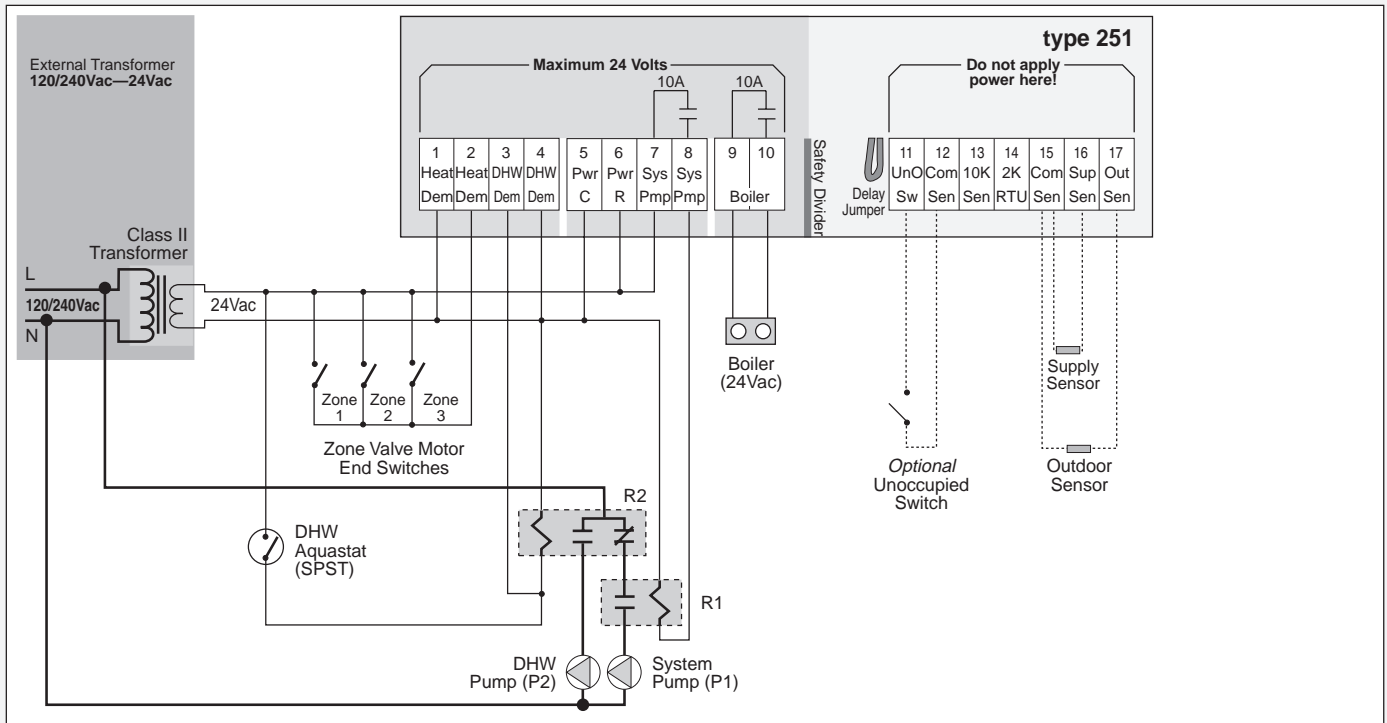
5/92

The One Stage Boiler & DHW Control 251 regulates the heating system supply water temperature based on the outdoor air temperature by cycling the boiler on and off. The heating system is zoned using zone valves. Domestic Hot Water (DHW) generation uses a pump, and has priority over space heating.

### Mechanical



### Electrical



**Note:** This is only a concept drawing. Designers must determine whether this system will work in each application and must ensure compliance with code requirements. Necessary auxiliary equipment and safety devices must be added.

## Specifications

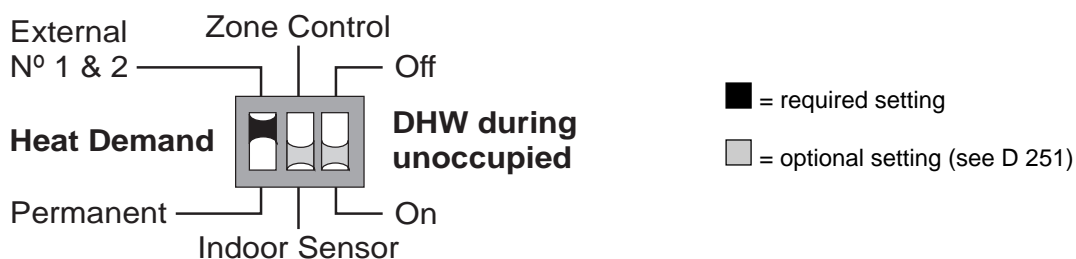
The following are minimum recommended specifications for the control in this application.

- The heating system supply water temperature shall be based on the outdoor air temperature and the control's Heating Curve (reset ratio) and Occupied or Unoccupied (when in setback) dial settings.
- The control shall have an Unoccupied (setback) switch or timer input to enable the control's Unoccupied temperature dial.
- The pump and the boiler shall be turned off until there is a "call for heat" from the zone valve motor end switches and the outdoor air temperature is colder than the control's Warm Weather Shut Down (WWSD) point or there is a "call for DHW" from the DHW pump relay (R2).
- The Occupied or Unoccupied temperature dial setting shall be the control's WWSD point.
- During WWSD the system pump (P1) shall be operated a few minutes every 3 days to prevent seizure during longer idle periods.
- The control shall have an adjustable Minimum Supply water temperature setting to help prevent condensation of flue gases and subsequent corrosion and blockage of the boiler's heat exchanger and chimney.
- The control shall have an adjustable Boiler Differential and a selectable time delay between boiler cycles to prevent short operating cycles of the boiler.
- On a "call for DHW" the system pump (P1) shall be turned off, the DHW pump (P2) shall be turned on and the boiler controlled to provide supply water at the DHW temperature. The DHW supply water temperature shall be adjustable by a DHW Supply dial on the control.
- The control shall have a switch to select whether or not DHW is to be generated during the Unoccupied time period.
- The control shall continuously monitor its temperature sensors and provide a LED error message when one is shorted or disconnected.
- The control shall be microprocessor-based, have 10 Amp relay contacts and have indicator lights for control function and status.
- The control shall have a test button which activates a pre-programmed test sequence to test all sensors and control outputs.
- The control enclosure shall be compatible with standard North American wiring hardware.
- The control shall be installed in an environment that is within the specified temperature and humidity ranges. The installer must ensure that the control and its wiring are isolated and/or shielded from strong sources of electromagnetic noise.
- The control system component required from tekmar is a One Stage Boiler & DHW Control 251.

## Settings

One Stage Boiler & DHW Control 251	Adjustment Range	Recommended Initial Settings
Occupied	35 to 105°F (2 to 41°C)	
Unoccupied	35 to 105°F (2 to 41°C)	
Heating Curve	0.4 to 3.6	
DHW Supply	100 to 200°F (38 to 93°C)	
Minimum Supply	Off, 80 to 170°F (27 to 77°C)	
Boiler Differential	2 to 42°F (1 to 23°C)	

One Stage Boiler & DHW Control 251 DIP switch settings for this application.



## Additional Information

- For control installation, testing and operating instructions see Brochure D 001 and D 251.
- For other control applications see Application Register A 000.
- For control theory and system integration details see E 001 and E 002.

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