

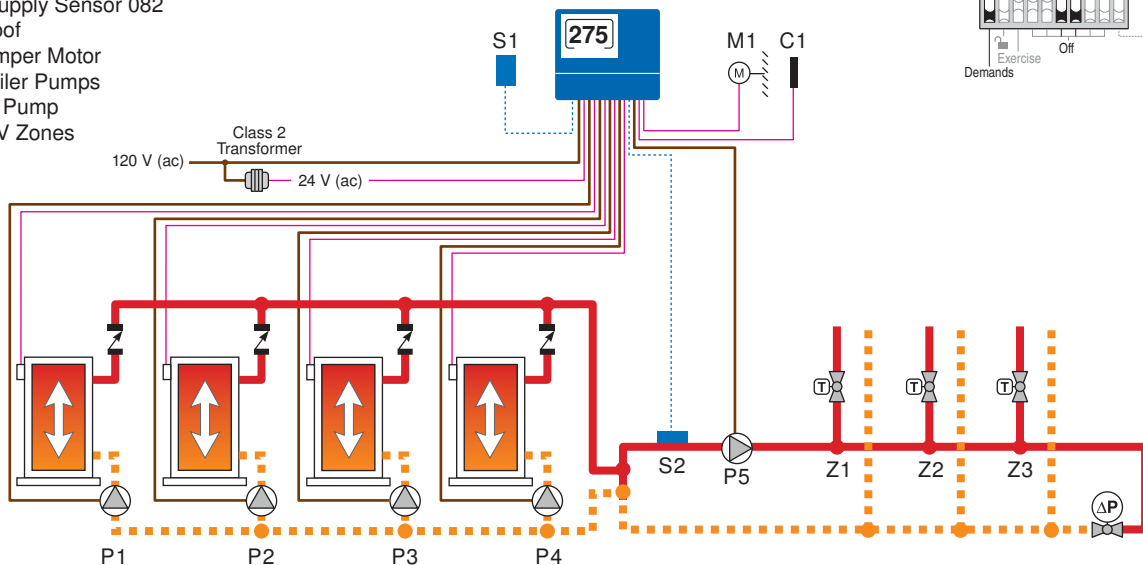
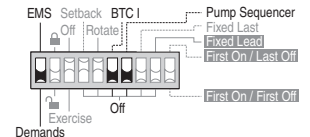
### Application A 275-1

**System Description:** The Boiler Control 275 modulates up to four modulating boilers to provide outdoor reset for the space heating zones. The boilers are piped in primary-secondary and the boiler pumps are controlled by the 275 to allow post purging of the boilers after they have shut off. The 275 has a combustion air contact which closes and opens a damper when a boiler is to fire. A combustion air (C.A.) proof ensures the damper is open before firing a boiler.

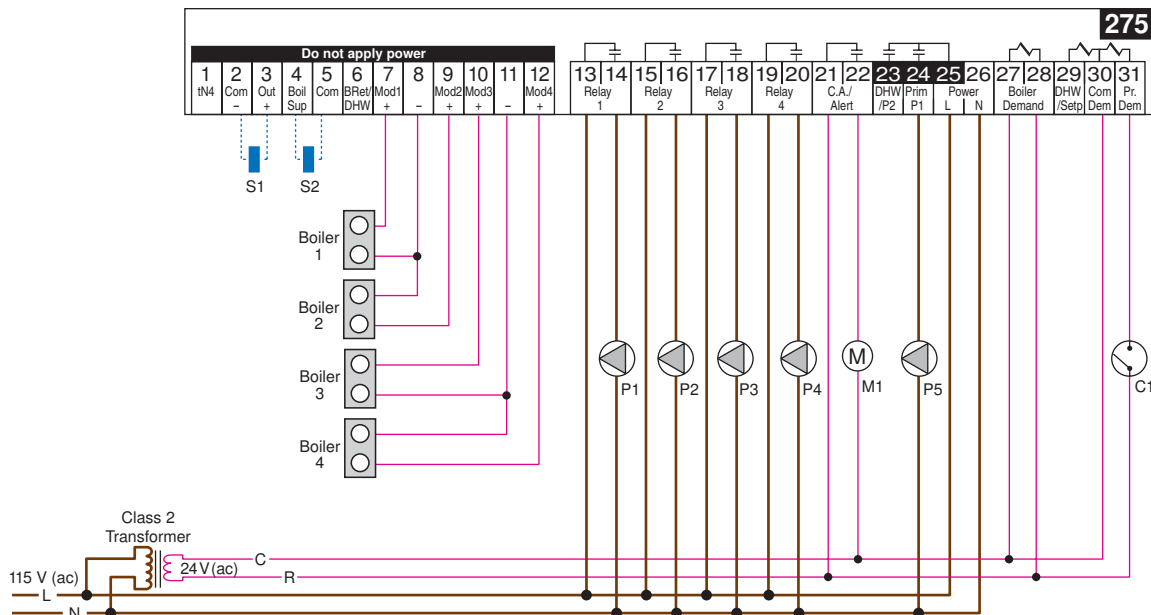
### Mechanical

- S1 = Outdoor Sensor 070
- S2 = Boiler Supply Sensor 082
- C1 = C.A. Proof
- M1 = C.A. Damper Motor
- P1 to P4 = Boiler Pumps
- P5 = Primary Pump
- Z1 to Z3 = TRV Zones

### 275 Switch Settings:



### Electrical



**Concept Drawing:** This is only a concept drawing, not an engineered drawing. It is not intended to describe a complete system, nor any particular system. It is up to the system designer to determine the necessary components for and configuration of the particular system being designed, including additional equipment, isolation relays (for loads greater than the control's specified output ratings), and any safety devices which in the judgement of the designer are appropriate, in order to properly size, configure and design that system and to ensure compliance with building and safety code requirements.

## Application A 275-2

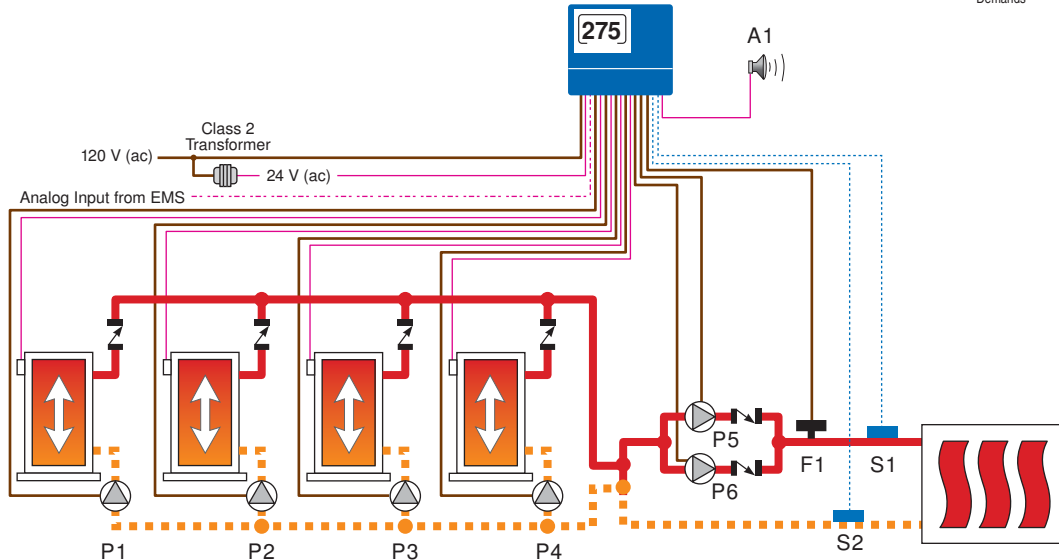
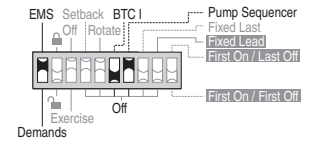
**System Description:** The Boiler Control 275 operates four modulating boilers to provide a target temperature to an Energy Management System (EMS). The EMS requests a temperature by using a 0 to 10 V (dc) or 2 to 10 V (dc) signal. The boilers are piped in primary-secondary and the boiler pumps are controlled by the 275 to allow post purging of the boilers after they have shut off. The 275 has an alert contact which closes when there is an error message. The proof demand is used as a flow proof for the primary pumps, P5 and P6. Pump sequencing is enabled by a DIP Switch.

### Mechanical

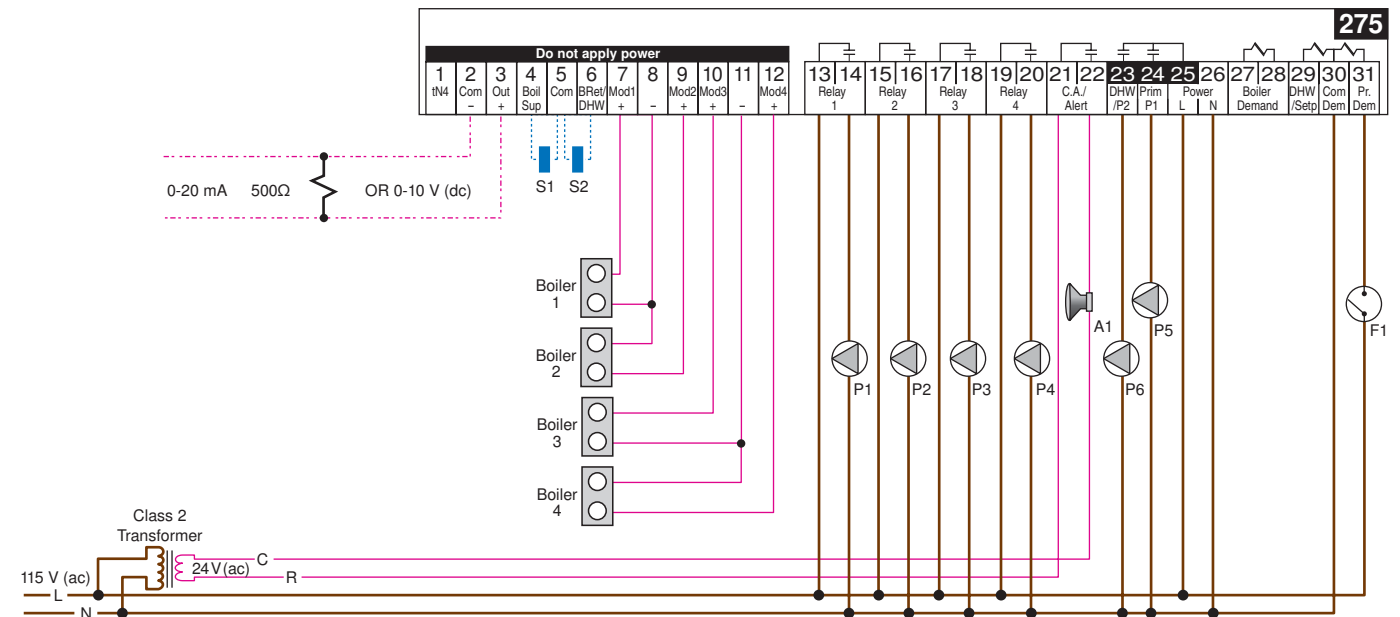
S1 = Boiler Supply Sensor 082  
S2 = Boiler Return Sensor 082  
A1 = Alert  
F1 = Flow Proof

P1 to P4 = Boiler Pumps  
P5 = Primary Pump  
P6 = Stand-by Primary Pump

### 275 Switch Settings:



### Electrical



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## Application A 275-3

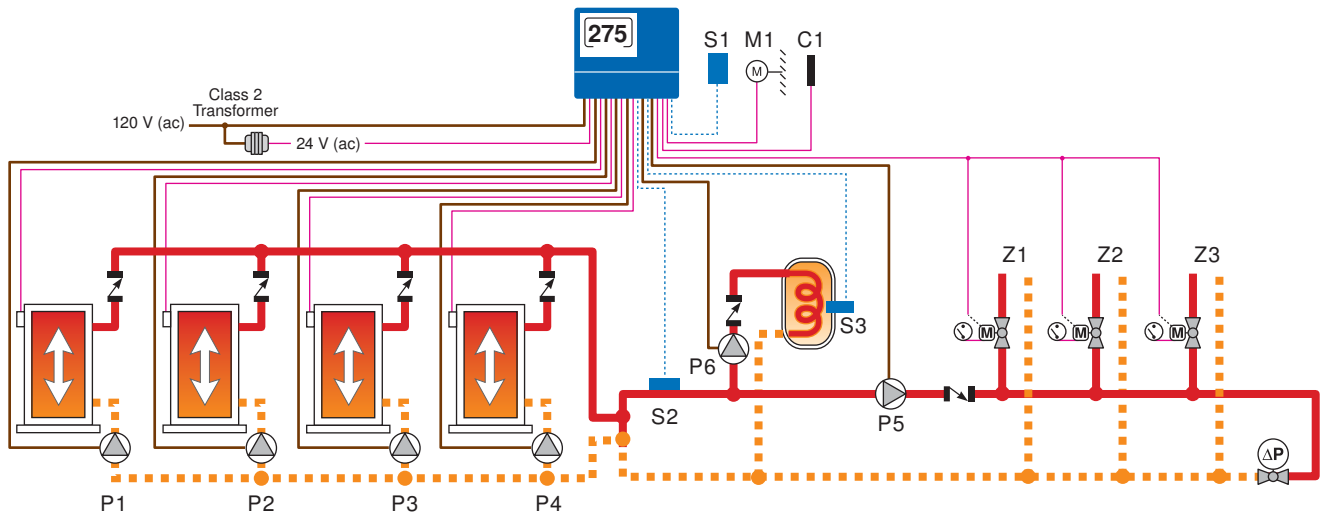
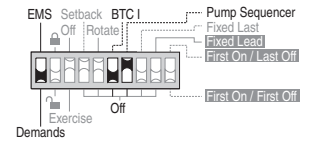
**System Description:** The Boiler Control 275 modulates up to four modulating boilers to provide DHW and outdoor reset operation for the space heating zones. When a call for DHW is present, the control overrides the outdoor reset and fires the boiler to maintain the required DHW temperature. The boilers are piped in primary-secondary and the boiler pumps are controlled by the 275 to allow post purging of the boilers after they have shut off. The 275 has a combustion air contact which closes and opens a damper when a boiler is to fire. A combustion air proof ensures the damper is open before firing a boiler.

### Mechanical

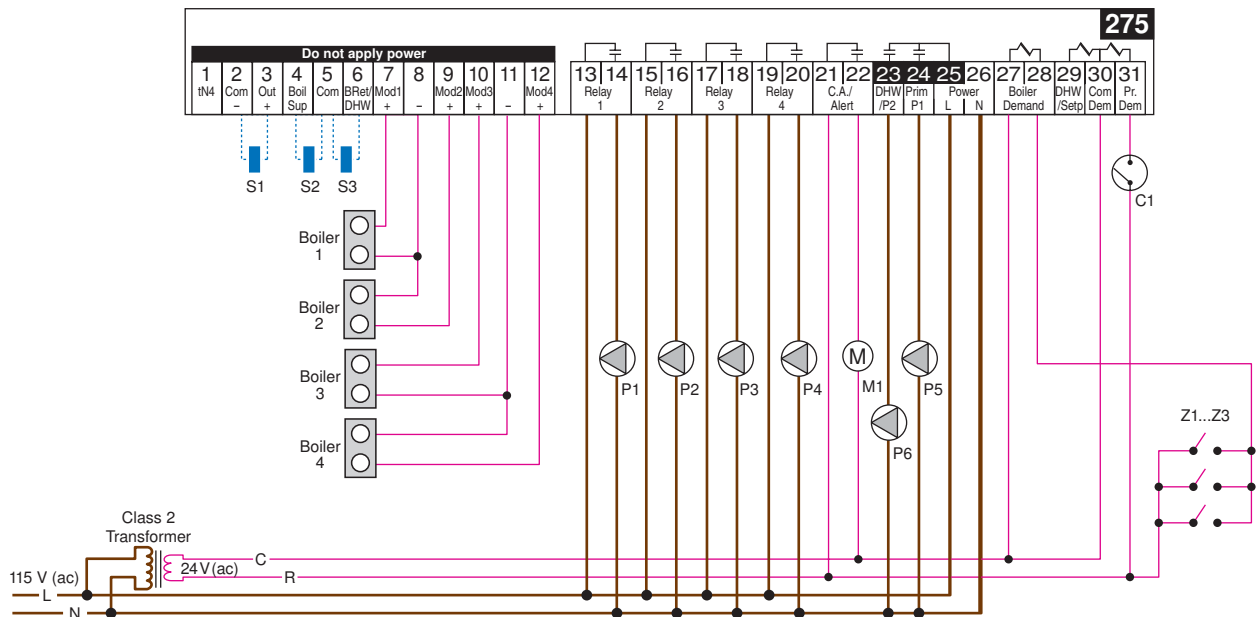
S1 = Outdoor Sensor 070  
 S2 = Boiler Supply Sensor 082  
 S3 = DHW Sensor 082  
 C1 = C.A. Proof  
 M1 = C.A. Damper Motor

P1 to P4 = Boiler Pumps  
 P5 = Primary Pump  
 P6 = DHW Pump  
 Z1 to Z3 = Zone Valves

### 275 Switch Settings:



### Electrical



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## Application A 275-4

**System Description:** The Boiler Control 275 modulates up to four modulating boilers to provide DHW and outdoor reset for the space heating zones. The boilers are piped in primary-secondary and the boiler pumps are controlled by the 275 to allow post purging of the boilers after they have shut off. The 275 has an alert contact which closes when there is an error message or pump failure. The proof demand is used as a flow proof for the primary pumps, P5 and P6. Pump sequencing is enabled by a DIP Switch. The 161 requests a DHW target from the 275 via tN4 communication.

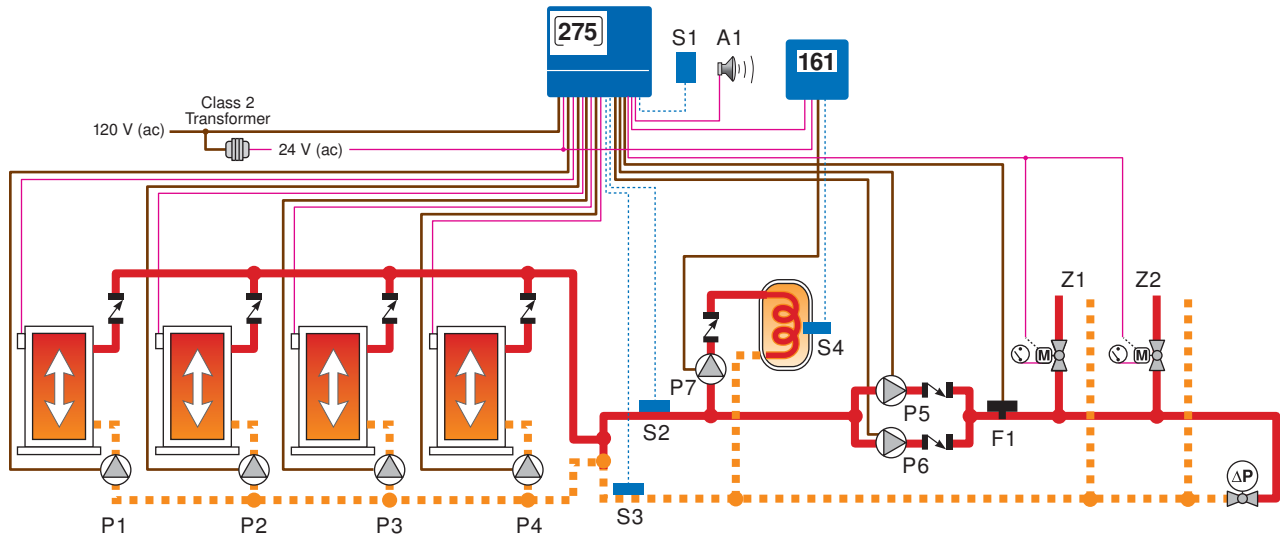
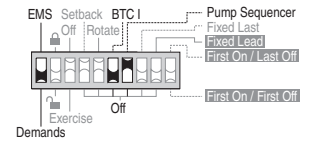
### Mechanical

S1 = Outdoor Sensor 070  
S2 = Boiler Supply Sensor 082  
S3 = Boiler Return Sensor 082  
S4 = DHW Sensor

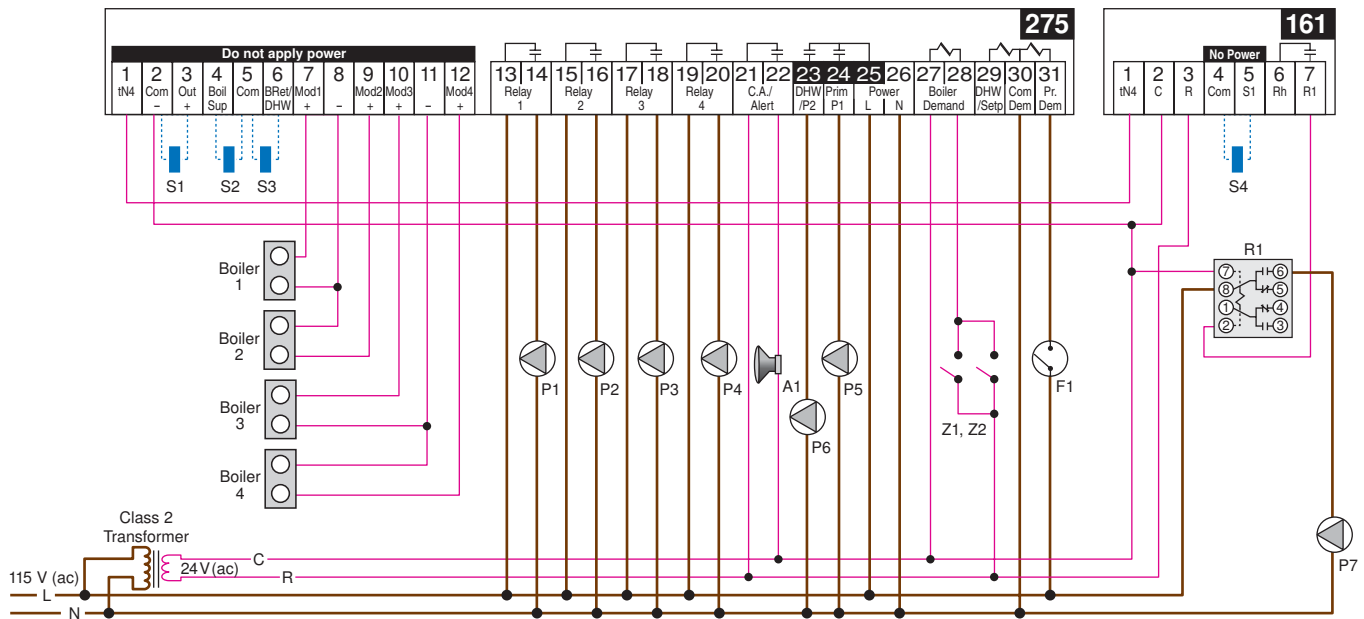
A1 = Alert  
F1 = Flow Proof  
R1 = Relay  
P1 to P4 = Boiler Pumps

P5 = Primary Pump  
P6 = Stand-by Primary Pump  
P7 = DHW Pump  
Z1, Z2 = Zone Valves

### 275 Switch Settings:



### Electrical



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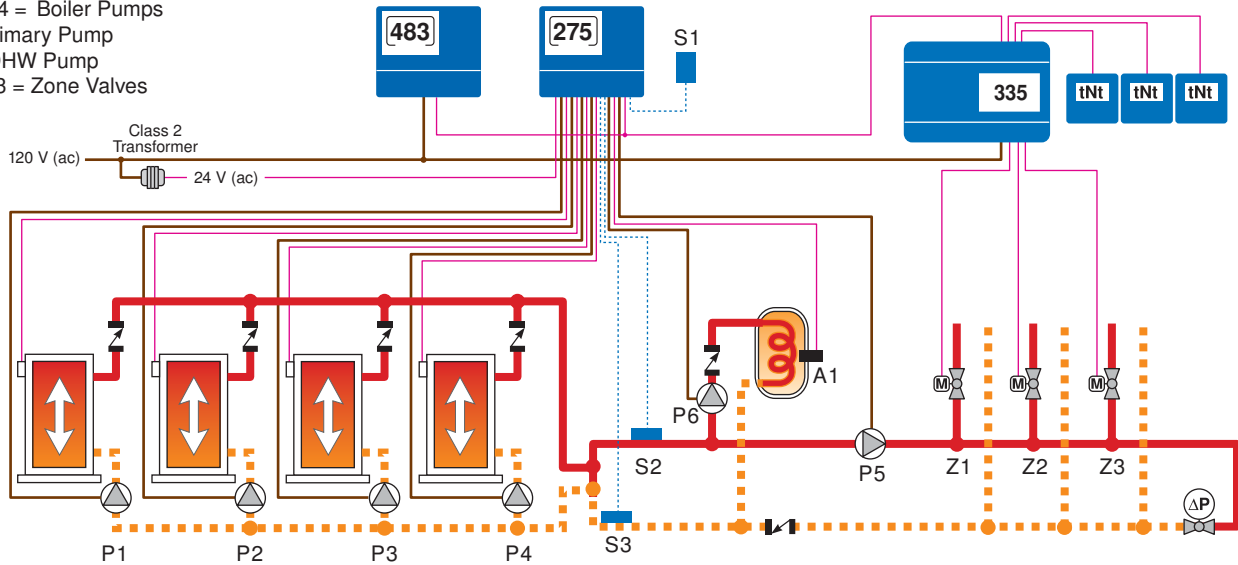
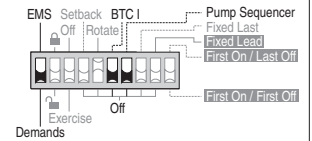
## Application A 275-5

**System Description:** The Boiler Control 275 modulates up to four modulating boilers to provide DHW and outdoor reset for the space heating zones. The tN4 Gateway 483 allows for remote monitoring of the 275 and access to the tN4 system through a web browser. The boilers are piped in primary-secondary and the boiler pumps are controlled by the 275 to allow post purging of the boilers after they have shut off. The 275 receives a boiler demand over the tN4 boiler bus from the tN4 thermostats.

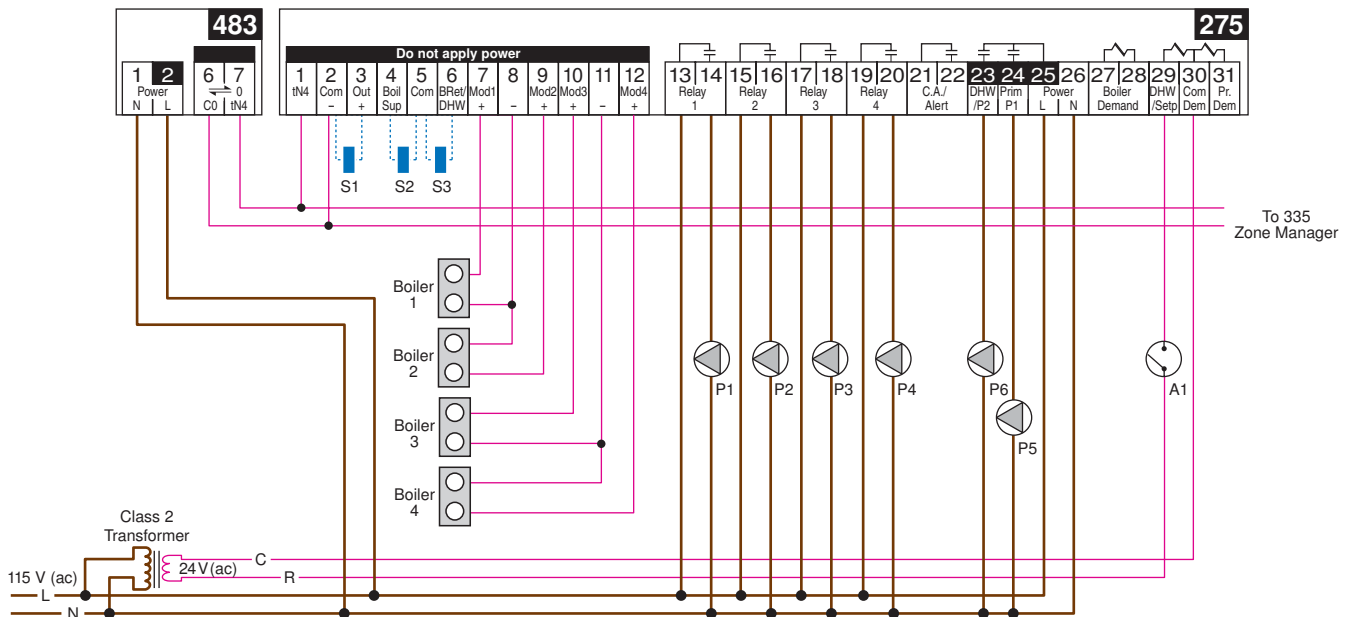
### Mechanical

- S1 = Outdoor Sensor 070
- S2 = Boiler Supply Sensor 082
- S3 = Boiler Return Sensor 082
- A1 = DHW Aquastat
- P1 to P4 = Boiler Pumps
- P5 = Primary Pump
- P6 = DHW Pump
- Z1 to Z3 = Zone Valves

### 275 Switch Settings:



### Electrical



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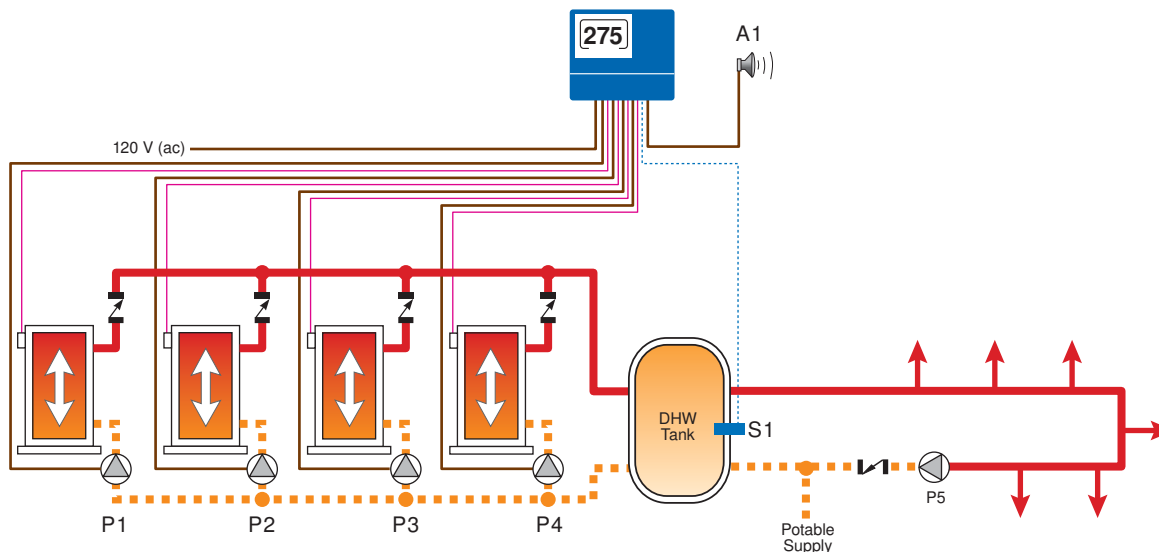
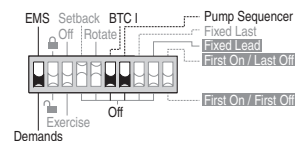
## Application A 275-6

**System Description:** The Boiler Control 275 modulates up to four modulating boilers to provide setpoint operation for the dedicated DHW tank. The boilers are piped in parallel and the boiler pumps are controlled by the 275 to allow for post purging of the boilers after they have shut off. When a valid DHW Demand is present from the DHW Sensor, the DHW pump relay turns on. The DHW relay in this mode is used as the DHW recirculation pump and operates continuously in the occupied period and cycles with the primary pump in the unoccupied period. The boilers are sequenced based only on the DHW Sensor. The Boiler supply sensor is not required. The Alert relay will close whenever there is an error message. DHW mode = 6

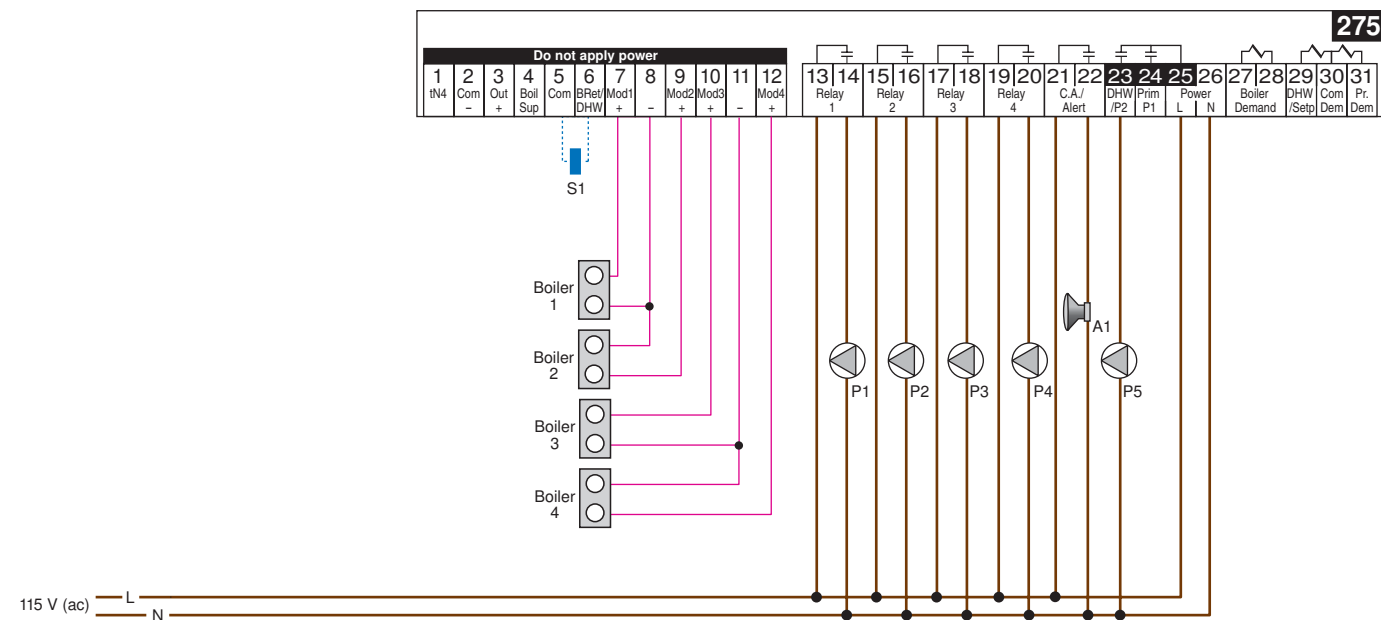
### Mechanical

S1 = DHW Sensor 082  
 A1 = Alert  
 P1 to P4 = Boiler Pumps  
 P5 = DHW Recirculation Pump

### 275 Switch Settings:



### Electrical



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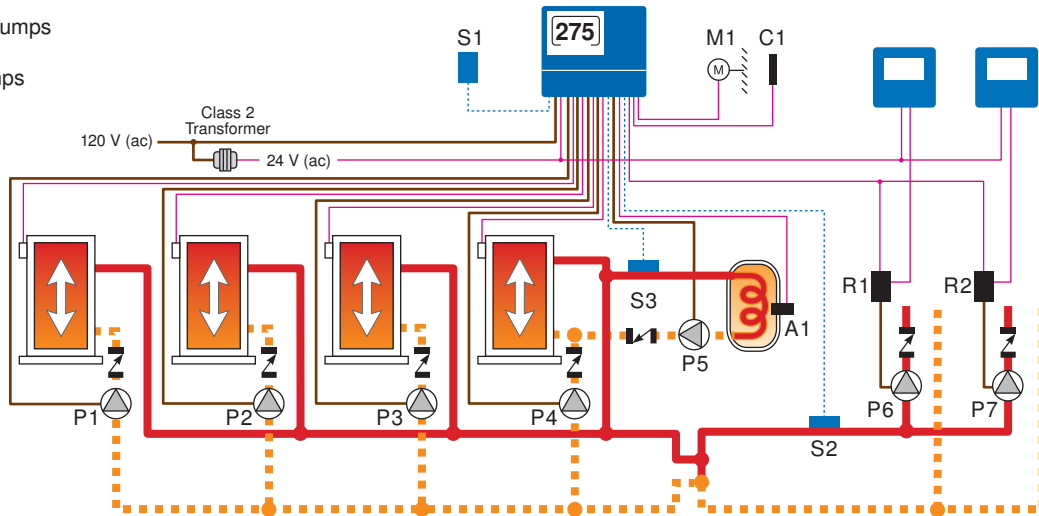
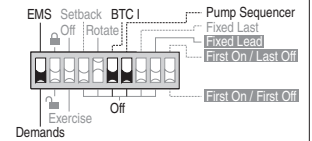
## Application A 275-7

**System Description:** The Boiler Control 275 operates four modulating boilers piped in primary-secondary, providing outdoor reset for the space heating zones. When a valid DHW Demand is present, the DHW pump P5 turns on. The boiler supply temperature for the indirect tank is measured by sensor S3. There are two boiler target temperatures, one for the heating system (Boil TARG) and one for the indirect DHW system (DHW TARG). DHW Demand is provided by an external aquastat or tN4 DHW control. The 275 has a combustion air contact which closes and opens a damper when a boiler is to fire. A combustion air proof ensures the damper is open before firing a boiler. The 275 receives a boiler demand from the regular thermostats through the external relays. DHW mode = 5

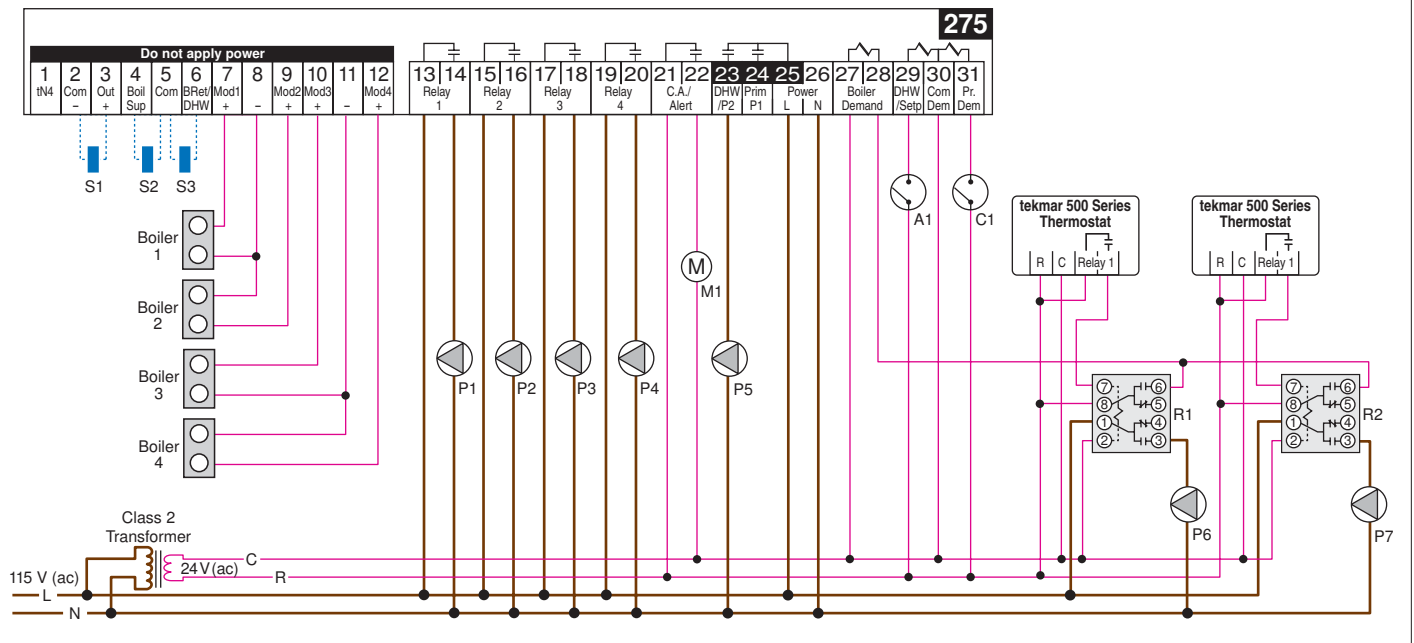
### Mechanical

- S1 = Outdoor Sensor 070
- S2 = Boiler Supply Sensor 082
- S3 = DHW Exchange Supply Sensor 082
- C1 = C.A. Proof
- M1 = C.A. Damper Motor
- R1, R2 = Relays
- P1 to P4 = Boiler Pumps
- P5 = DHW Pump
- P6, P7 = Zone Pumps

### 275 Switch Settings:



### Electrical



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## Specifications:

### The following are the recommended specifications for the Boiler Control 275

- The control shall be capable of sequencing up to four modulating boilers or boilers equipped with BTC series I controls.
- The control shall be able to adjust the number of boilers required to operate during a call for domestic hot water heating.
- The control shall have the ability to calculate the boiler's target temperature based on outdoor reset.
- The control shall have the ability to set the boiler's target temperature using an adjustable setpoint.
- The control shall have an adjustable warm weather shut down applied to outdoor reset operation.
- The control shall be able to operate two primary pumps in standby mode.
- The control shall have a proof demand input to proof flow for the primary pump or prove the combustion air damper is open.
- The control shall be able to operate one primary pump and one domestic hot water pump during a domestic hot water call.
- The control shall have the ability to display the current temperature difference between the return temperature and the supply temperature,  $\Delta T$ .
- The control shall have an option to rotate the boilers and optionally, the primary pumps based on the accumulated running hours.
- The control shall display the run time of the boilers and optionally, primary pumps.
- The control shall use proportional, integral and derivative (PID) logic when modulating the boilers.
- The control shall have the option to modulate the boilers sequentially or in parallel.
- 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 the option of an automatic differential calculation in order to prevent short cycling of the boilers.
- The control shall have the ability to operate either individual boiler pumps or give a boiler enable using the dry relay contacts.
- The control shall have two separate adjustable post purge settings that allow the primary and boiler pumps to run for a set period after the boiler has been shut off.
- The control shall have the option for a fixed lead rotation and when this option is selected, the control shall have an option for either a first on / first off, or first on / last off modulating sequence.
- The control shall have the option for either an alarm output or a combustion air damper output.
- The control shall have an adjustable minimum inter-stage delay that can be set manually or calculated by the control.
- The control shall have the option of accepting a 0 – 10 V(dc) or 2 – 10 V(dc) input signal from an energy management system with an adjustable offset.
- The control shall have three separate lockable access levels (Advanced, Installer, User) to limit the number of setting adjustments available to various users.
- The control shall have a test button that activates a pre-programmed test sequence testing all the control's outputs.
- The control shall have the ability to show the current outdoor, boiler supply, and boiler return temperatures.
- The control shall continually monitor the temperature sensors and provide an error message upon a control or sensor failure.
- During extended periods of inactivity, all pumps shall be periodically exercised to prevent seizure during long idle periods.
- The control shall include a setback schedule that can be used by the control itself or shared with other tN4 devices.
- The control shall have the option to operate as a tN4 system control with a tN4 boiler bus.
- The control shall display the current % modulation of each boiler, or the number of stages fired for BTC I boilers.
- The control shall be able to adjust the amount of time Boost will take place to increase the supply water temperature when coming out of setback.
- The control shall be able to disable Zone Load Shedding if that feature is not desirable.
- The control shall include an adjustment for the cycle length if connected to a tN4 network.



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