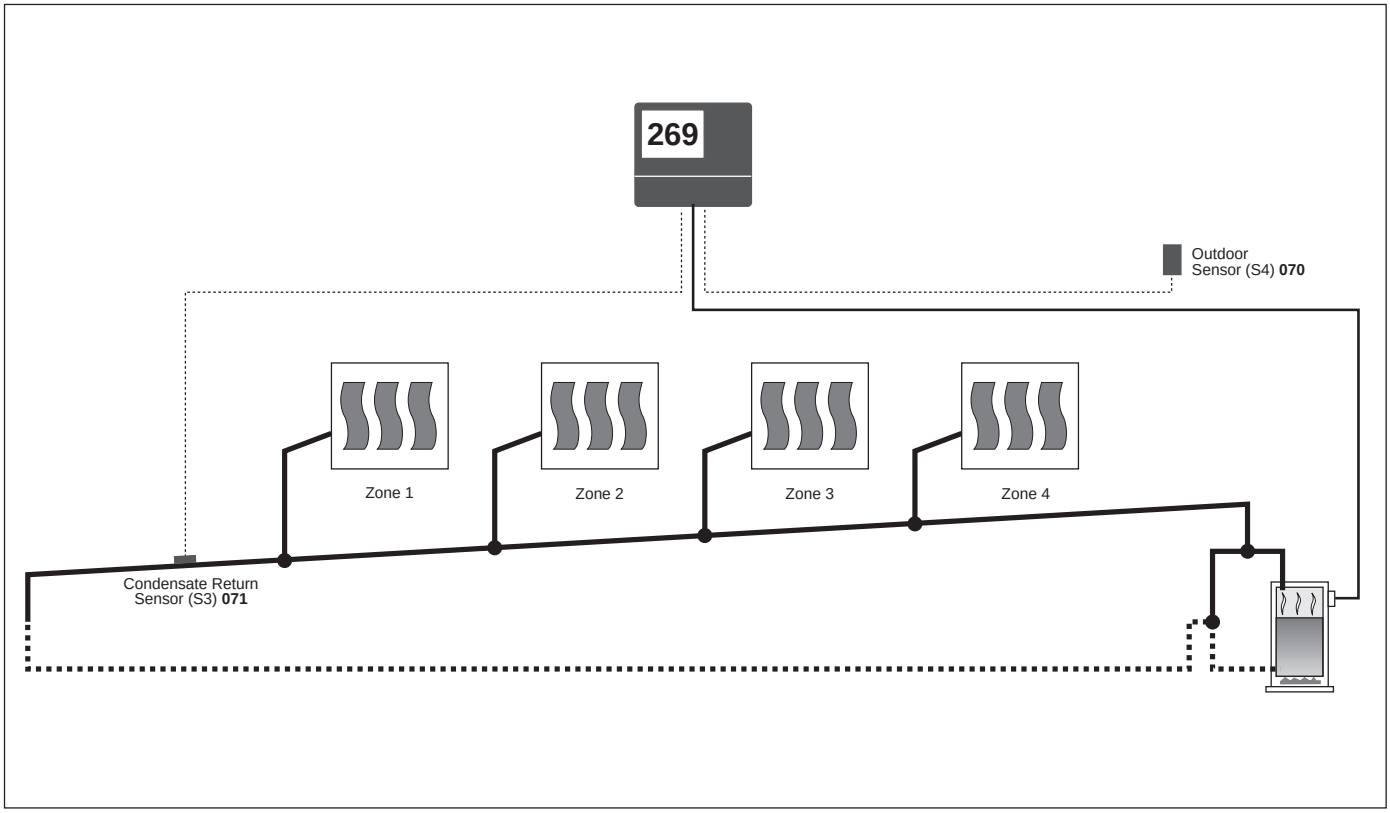
tekmar® - Application

One Stage Steam Control 269

A 269-1

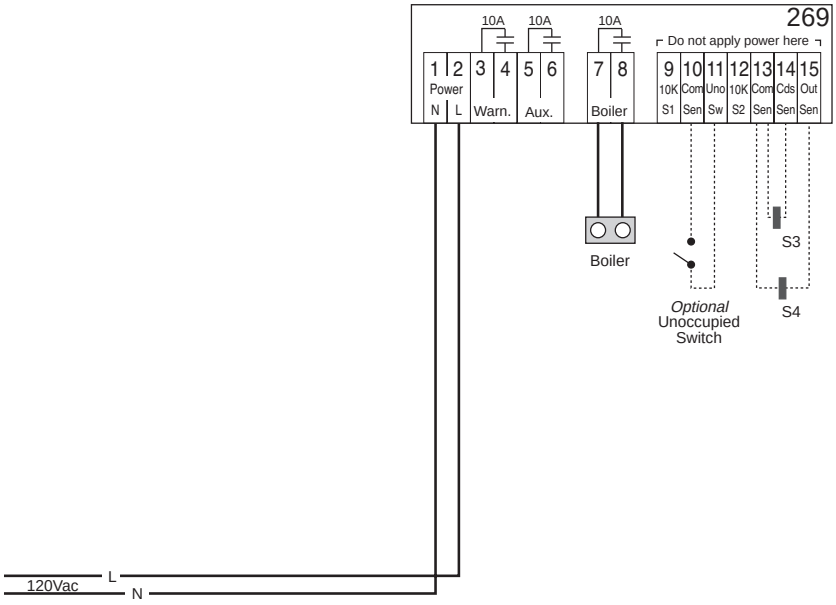
12/93

Mechanical



Electrical

S3 = Condensate Return Sensor 071
S4 = Outdoor Sensor 070



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.

Operation

The One Stage Steam Control 269 regulates the indoor temperature based on firing time of the steam boiler. The firing time of the steam boiler is based on outdoor temperature, condensate return temperature and user control settings. On an one pipe steam system, the control may be set to run in a manual mode (ie. maintaining a constant heat input with a fixed boiler cycle length and a fixed boiler on time during the boiler Cycle Length). The control may also be set to run in auto mode using the outdoor temperature to determine the percent boiler on time within a set boiler cycle length. The condensate return sensor provides information to the control to determine when the boiler has produced enough heat to start the percent boiler on time.

Specifications

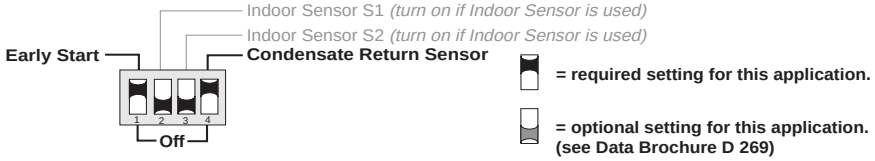
The following are minimum recommended specifications for the control in this application.

- In automatic operating mode, the boiler firing time within a set Cycle Length setting shall be based on outdoor temperature.
- The control shall have an adjustable "steam established" temperature setting (function available when condensate return sensor is connected).
- The control shall have an adjustable "lockout differential" setting (function available when condensate return sensor is connected).
- In manual operating mode, the boiler firing time within a set cycle length shall be based on the manual override setting.
- In automatic mode, 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 must be able to accept up to two Indoor Sensor inputs to limit maximum allowable indoor temperature.
- The control shall continuously monitor its temperature sensors and provide an LED error message and warning output contact if a sensor is shorted or disconnected.
- The control must have the ability to adjust the boiler % on time during the lead-up to a temperature transition from occupied to unoccupied or vice versa. Up to a four hour lead-up time shall be provided.
- The control shall be microprocessor-based and have 3 SPST internal relays with 10 amp (resistive) isolated contacts for outputs and have indicator lights for control functions and status.
- The control shall have a test button which activates a preprogrammed test sequence to test all control inputs and outputs.
- The control shall be compatible with standard North American wiring hardware.
- The control shall have CSA (Canadian Standards Association) and UL (Underwriters Laboratory) approval.
- The installation location must be maintained within the ambient temperature and humidity ranges specified in the D 269 Brochure for this control, with the installer ensuring that the control and its wiring are isolated and/or shielded from strong sources of electromagnetic noise.
- The control component required from tekmar is a One Stage Steam Control 269.

Settings

One Stage Steam Control 269 Settings	Adjustment Range	Recommended Initial
Manual Override	Auto, 0 to 100% of boiler on time (during heating cycle)	
Design Out	-40 to 40°F (-40 to 4°C)	
Cycle Length	1 to 100 minutes	
Min. On Time (%) / Lockout Diff'l (°F)	Off, 1 to 50% on; Off, 1 to 50°F (0.6 to 28°C)	
Occupied	40 to 100°F (4 to 38°C)	
Unoccupied	40 to 100°F (4 to 38°C)	
Steam Established	130 to 230°F (54 to 110°C) (from condensate return reading)	

One Stage Steam Control 269 DIP switch settings for this application.



Additional Information

- For control installation and testing instructions see Brochures D 001 and D 269.
- For other control applications see Application Register A 000.
- For control theory and system integration details see Essays E 001 and E 002.

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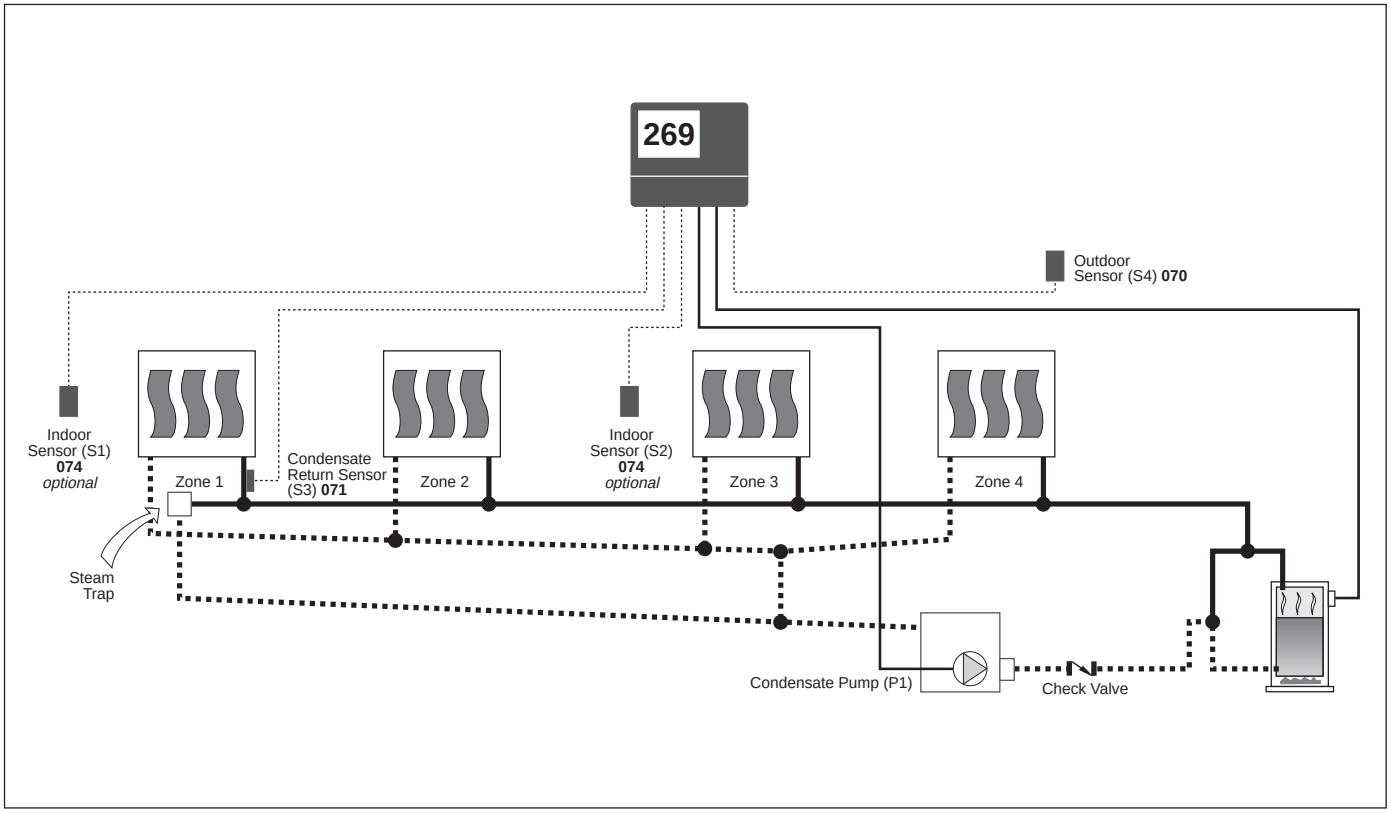
tekmar® - Application

One Stage Steam Control 269

A 269-2

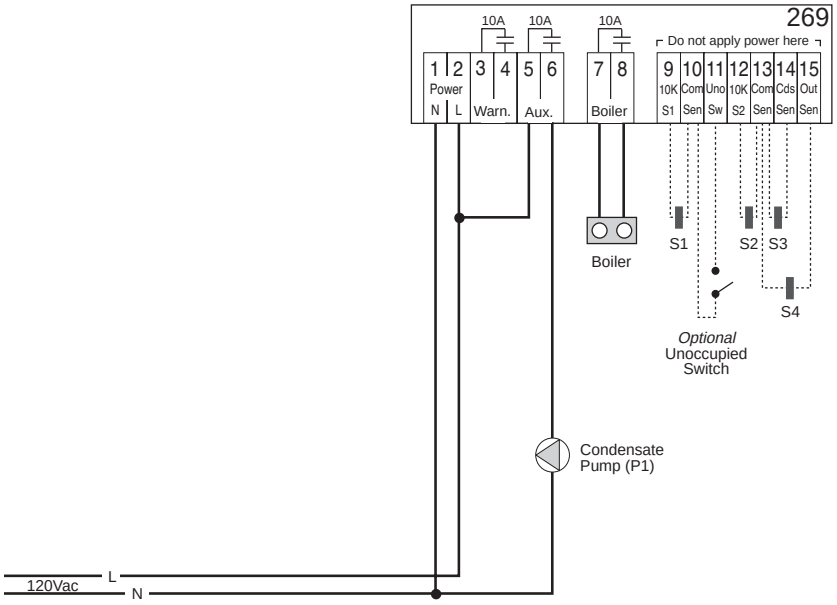
12/93

Mechanical



Electrical

P1 = Condensate Pump
S1, S2 = Indoor Sensors 074
S3 = Condensate Return Sensor 071
S4 = Outdoor Sensor 070



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.

Operation

The One Stage Steam Control 269 regulates the indoor temperature based on firing time of the steam boiler. The firing time of the steam boiler is based on outdoor temperature, user control settings and optional Indoor and Condensate Sensors. On a two pipe steam system, with temperature control at the terminal units, the control may be set to run in a manual mode (ie. maintaining a constant heat input with a fixed boiler cycle length and a fixed boiler on time during the boiler cycle length). The control may also be set to run in auto mode using the outdoor temperature and indoor temperatures to alter the percent boiler on time within a set boiler cycle length. The condensate return sensor provides information to the control to determine at what time the boiler has to produce enough heat to start the percent boiler on time.

Specifications

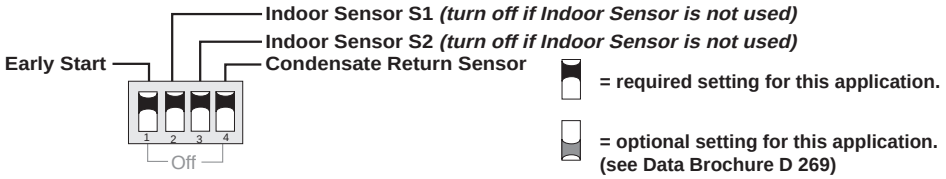
The following are minimum recommended specifications for the control in this application.

- In automatic operating mode, the boiler firing time within a set cycle length setting shall be based on outdoor temperature and indoor room temperatures.
- The control shall have an adjustable steam established temperature setting (function available when condensate return sensor is connected).
- The control shall have an adjustable lockout differential setting (function available when condensate return sensor is connected).
- In manual operating mode, the boiler firing time within a set cycle length shall be based on the manual override setting.
- In automatic mode, 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 must be able to accept up to two Indoor Sensor inputs to limit maximum allowable indoor temperature.
- The control shall continuously monitor its temperature sensors and provide an LED error message and warning output contact if a sensor is shorted or disconnected.
- The control must have the ability to adjust the boiler % on time during the lead-up to a temperature transition from occupied to unoccupied or vice versa. Up to a four hour lead-up time shall be provided.
- The control must have the ability to supply a running interlock to the condensate return pump. The running interlock does not allow the condensate return pump to operate during WWSD.
- The control shall be microprocessor-based and have 3 SPST internal relays with 10 amp (resistive) isolated contacts for outputs and have indicator lights for control functions and status.
- The control shall have a test button which activates a preprogrammed test sequence to test all control inputs and outputs.
- The control shall be compatible with standard North American wiring hardware.
- The control shall have CSA (Canadian Standards Association) and UL (Underwriters Laboratory) approval.
- The installation location must be maintained within the ambient temperature and humidity ranges specified in the D 269 Brochure for this control, with the installer ensuring that the control and its wiring are isolated and/or shielded from strong sources of electromagnetic noise.
- The control components required from tekmar are a One Stage Steam Control 269 and two Indoor Sensors 074 *optional* .

Settings

One Stage Steam Control 269 Settings	**Adjustment Range**	**Recommended**	**Initial**
Manual Override	Auto, 0 to 100% of boiler on time (during heating cycle)		
Design Out	-40 to 40°F (-40 to 4°C)		
Cycle Length	1 to 100 minutes		
Min. On Time (%) / Lockout Diff'l (°F)	Off, 1 to 50% on; Off, 1 to 50°F (0.6 to 28°C)		
Occupied	40 to 100°F (4 to 38°C)		
Unoccupied	40 to 100°F (4 to 38°C)		
Steam Established	130 to 230°F (54 to 110°C) (from condensate return reading)		

One Stage Steam Control 269 DIP switch settings for this application.



Additional Information

- For control installation and testing instructions see Brochures D 001 and D 269.
- For other control applications see Application Register A 000.
- For control theory and system integration details see Essays E 001 and E 002.

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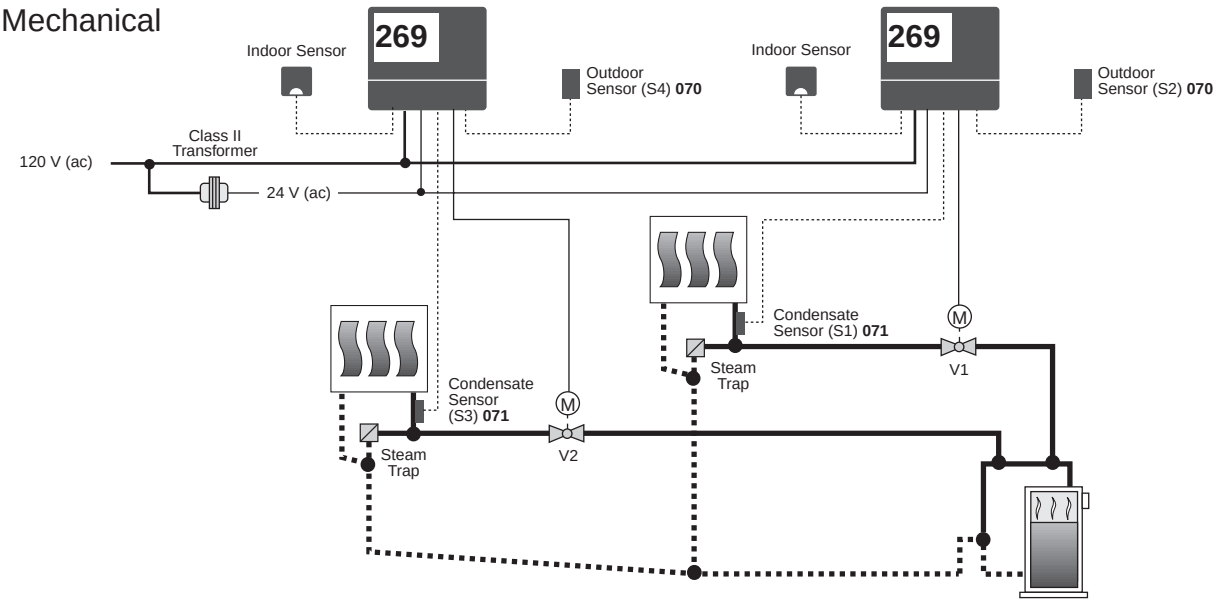
tekmar® - Application

One Stage Steam Control 269

A 269-3

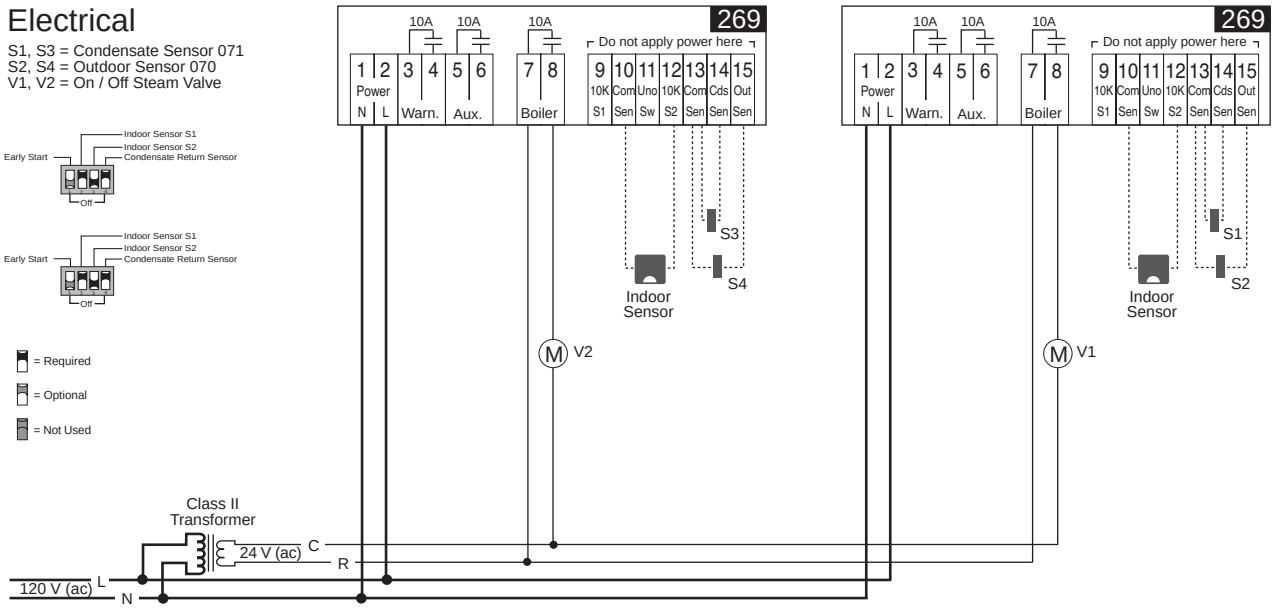
12/96

Mechanical



Electrical

S1, S3 = Condensate Sensor 071
S2, S4 = Outdoor Sensor 070
V1, V2 = On / Off Steam Valve

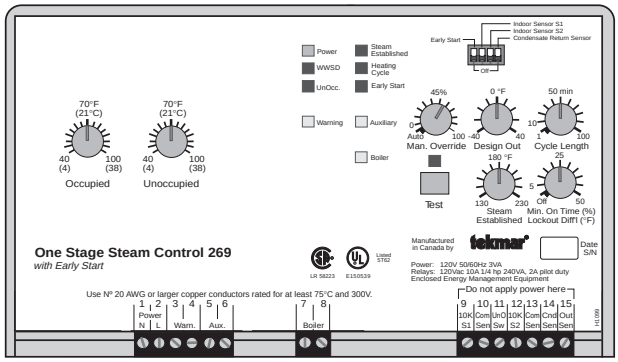


Note: This is only a concept drawing. The designer must determine whether this application will work in his system and must ensure compliance with code requirements. Necessary auxiliary equipment, isolation relays (for loads greater than the specified tekmar internal relay ratings), and other safety and limit devices must be added.

Technical Data

One Stage Steam Control 269

Literature	—	A 000, A 269's, D 269, D 001, D 070, D 074
Control	—	Microprocessor control; This is **not a safety (limit) control**.
Packaged weight	—	3.1 lb. (1400 g), Enclosure A, PVC plastic
Dimensions	—	6-5/8" H x 7-9/16" W x 2-13/16" D (170 x 193 x 72 mm)
Approvals	—	CSA, UL listed, meets ICES & FCC regulations for EMI/RFI.
Ambient conditions	—	Indoor use only, 30 to 120°F (0 to 50°C), < 95% RH non-condensing.
Power supply	—	120 V (ac) ±10% 50/60 Hz 3 VA
Relay capacity	—	120 V (ac) 10 A 1/4 hp, pilot duty 240 VA 2 A
Sensors	—	NTC thermistor, 10 kΩ @ 77°F (25°C ±0.2°C) ß=3892
included:		Outdoor Sensor 070 and Universal Sensor 071.
optional:		Two 10k Indoor Sensors.
Occupied	—	40 to 100°F (4 to 38°C)
Unoccupied	—	40 to 100°F (4 to 38°C)
Manual Override	—	Auto, 0 to 100% of boiler on time during Heating Cycle
Design Out	—	-40 to 40°F (-40 to 4°C)
Cycle Length	—	1 to 100 minutes
Steam Established	—	130 to 230°F (54 to 110°C)
Min. On Time (%)	—	Off, 5 to 50% on
Lockout Diff'l (°F)	—	Off, 1 to 50°F (Off, 3 to 28°C)



System Operation & Specifications

Two One Stage Steam Control 269's control a two zone steam system with Indoor Temperature Feedback.

Piping and Heating Source Details The system is piped in a two pipe arrangement. The 269's operate on / off zone valves in order to provide steam to their terminal units.

Warm Weather Shut Down (WWSD) When the outdoor air temperature rises above the starting point of the Heating Curve, the controls enter the Warm Weather Shut Down mode of operation. In this mode of operation, the controls continue to monitor their sensors but do not operate the heating system until the outdoor temperature falls below the WWSD point.

System Operation The boiler manufacturer's control operates the steam boiler in order to maintain steam in the system. The 269's use the input from the Outdoor Sensors 070 (S2 and S4) and the Indoor Sensors to modulate the length of the "On Time" of their zone valves. With the addition of the optional Indoor Sensors, the 269's receive Indoor Temperature Feedback and are able to fine adjust the zone valve "On Times" by shifting the Heating Curve for more accurate control of the space temperature.

Additional Functions Additional functions are listed in the table in the Boiler / DHW Controls section of the Product Catalog I 000 and the Application Catalog A 000.

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