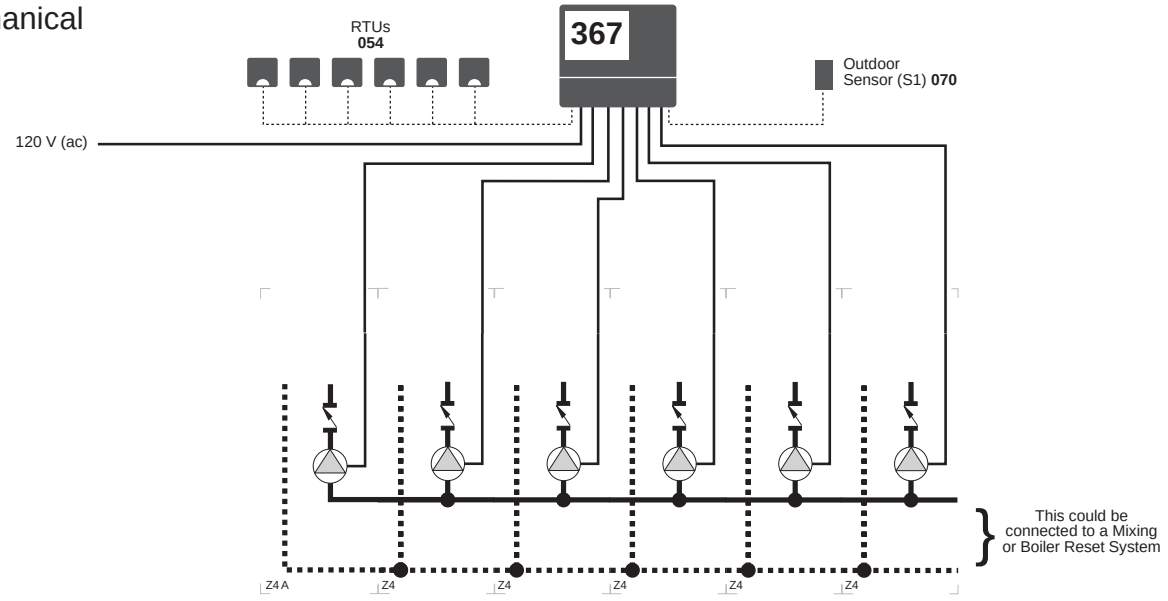
tekmar® - Application

Zone Control 367

A 367-1

07/95

Mechanical

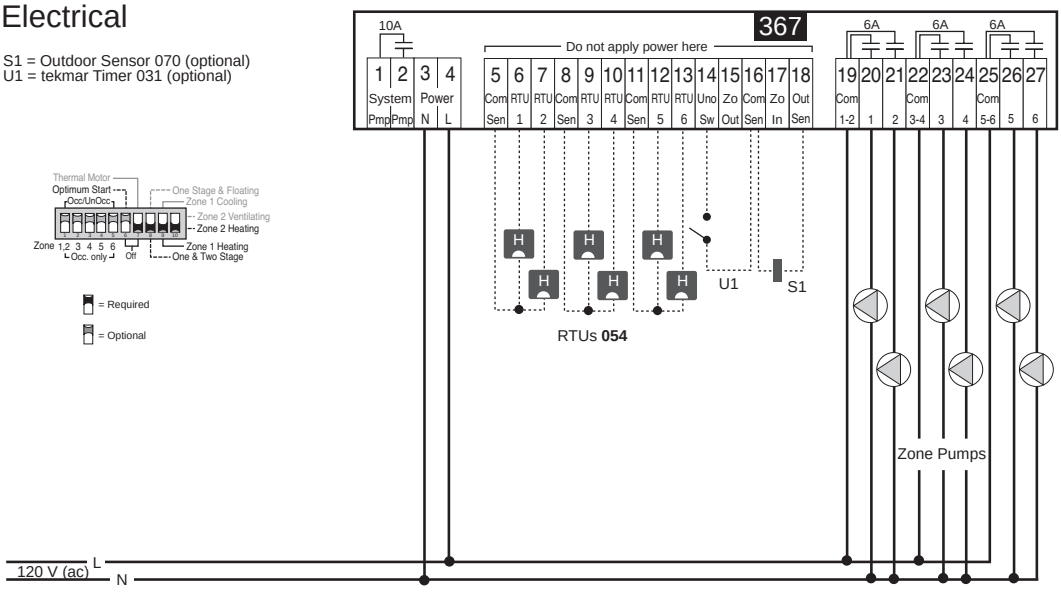


Electrical

S1 = Outdoor Sensor 070 (optional)
U1 = tekmar Timer 031 (optional)

= Required

= Optional

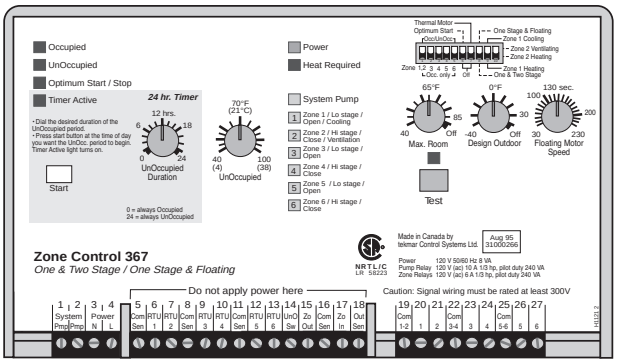


Note: This is only a concept drawing. The designer must determine whether this application will work in his system and must ensure compliance with code requirements. Necessary auxiliary equipment, isolation relays (for loads greater than the specified tekmar internal relay ratings), and other safety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

Technical Data

Zone Control 367 *One & Two Stage / One Stage & Floating*

Literature	—	A 000, A 367's, D 367, D 001, D 054, D 055, D 070, D 074
Control	—	Microprocessor PID 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 NRTL / C, meets ICES & FCC regulations for EMI/RFI.
Ambient conditions	—	Indoor use only, 32 to 122°F (0 to 50°C), < 90% RH non-condensing.
Power supply	—	120 V ±10% 50/60 Hz 8 VA
Pump Relay	—	120 V (ac) 10 A 1/3 hp, pilot duty 240 VA
Zone Relays	—	120 V (ac) 6 A 1/3 hp, pilot duty 240 VA
Maximum linkage	—	Up to 6 Zone Controls can be linked to a tekmar reset control.
Sensors	—	NTC thermistor, 10 kΩ @ 77°F (25°C ±0.2°C) ß=3892
included:		None.
required:		10K RTU or 10K Indoor Sensor for each active zone. (Order separately)
optional:		Outdoor Sensor 070.
Timer	—	24 hour, 1 event / day, 3 minute backup
UnOcc. Duration	—	0 to 24 hours
Unoccupied	—	40 to 100°F (4 to 38°C)
Max. Room	—	40 to 86°F, Off (4 to 30°C, Off)
Design Outdoor	—	-40 to 32°F, Off (-40 to 0°C, Off)
Floating Motor Speed	—	30 to 230 seconds



System Operation & Specifications

The Zone Control 367 controls the space temperature of six heating zones.

Piping and Heat Source Details The system is plumbed with six zone pumps. A check valve is required in each zone to prevent reverse flow through the zone when it is turned off. This zoning system could either be connected to a boiler reset or a mixing reset system.

Warm Weather Shut Down (WWSD) When the outdoor temperature rises above the highest RTU dial setting and the heating zones are satisfied, the 367 shuts down the heating system.

Zoning Operation The 367 varies the on time of each zone pump based on a 15 minute cycle. The control staggers the operating times of the zones in order to achieve a steady load on the boiler and prevent boiler short cycling.

UnOccupied (Night Setback) Selected zones can be switched into an UnOccupied (Night Setback) mode through either the built-in 24 hr. Timer or by closing an external UnOccupied switch (U1). When the control is switched into UnOccupied mode, an UnOccupied dial is used to set the desired indoor temperature. An Optimum Start / Stop feature can be used to ensure the zones are returned to their Occupied temperatures as the UnOccupied period ends.

Other features Additional control features are listed in the table in the Heating Controls section of the Product Catalog I 000.

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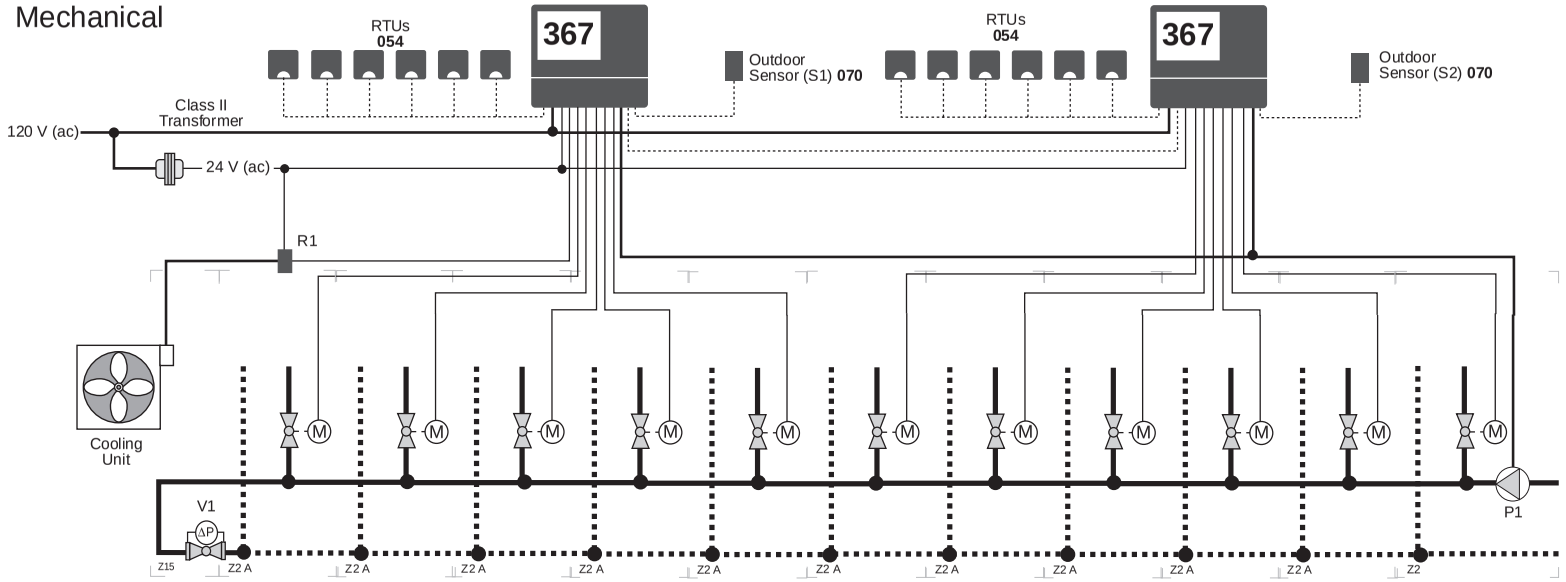
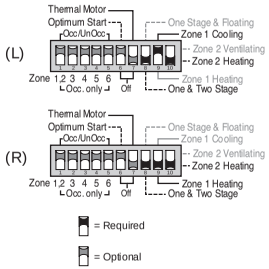
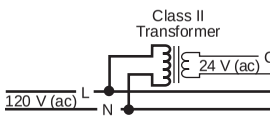
Mechanical

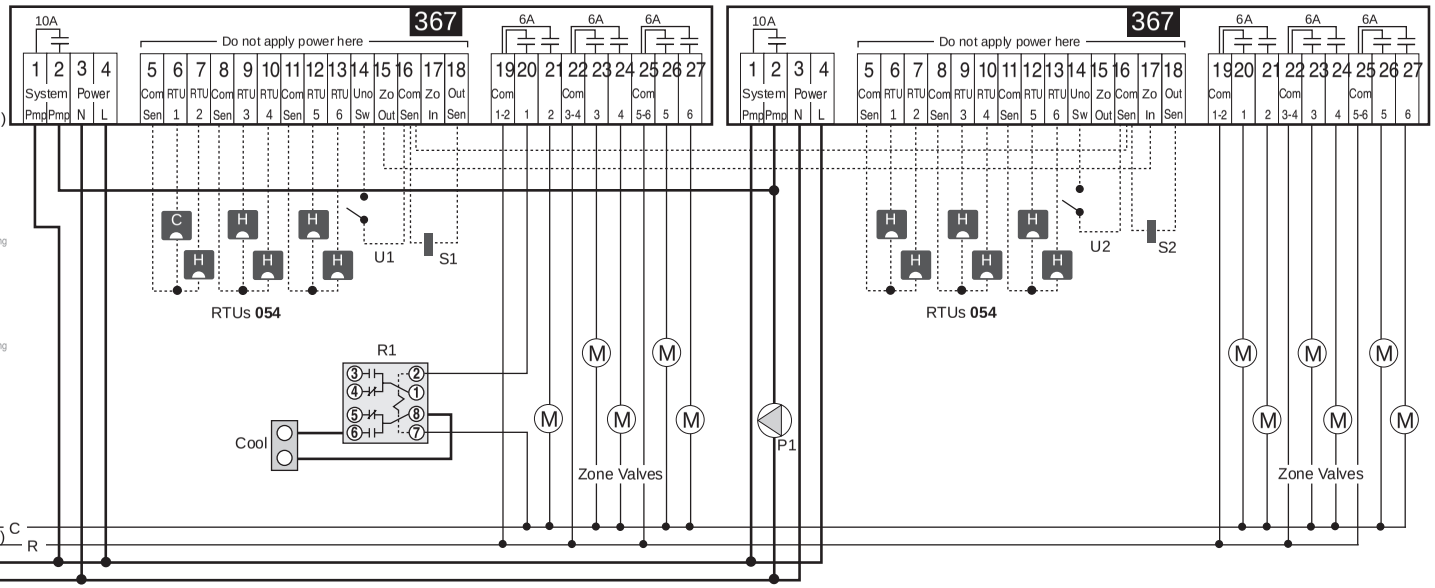


Electrical

P1 = System Pump
R1 = Relay 003
S1 = Outdoor Sensor 070 (optional)
S2 = Outdoor Sensor 070 (optional)
U1, U2 = tekmar Timer 031 (optional)
V1 = Pressure Bypass Valve, or
Balancing Valve, or
Globe Valve





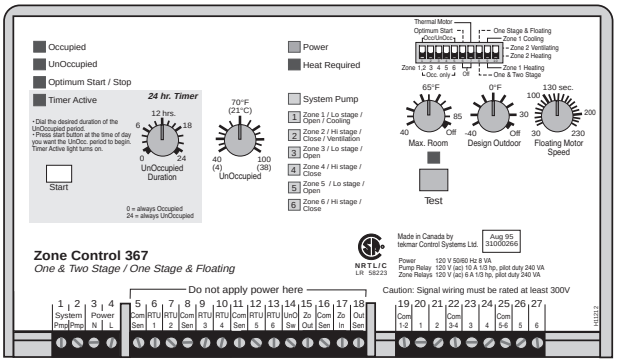


Note: This is only a concept drawing. The designer must determine whether this application will work in his system and must ensure compliance with code requirements. Necessary auxiliary equipment, isolation relays (for loads greater than the specified tekmar internal relay ratings), and other safety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

Technical Data

Zone Control 367 *One & Two Stage / One Stage & Floating*

Literature	—	A 000, A 367's, D 367, D 001, D 054, D 055, D 070, D 074
Control	—	Microprocessor PID 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 NRTL / C, meets ICES & FCC regulations for EMI/RFI.
Ambient conditions	—	Indoor use only, 32 to 122°F (0 to 50°C), < 90% RH non-condensing.
Power supply	—	120 V ±10% 50/60 Hz 8 VA
Pump Relay	—	120 V (ac) 10 A 1/3 hp, pilot duty 240 VA
Zone Relays	—	120 V (ac) 6 A 1/3 hp, pilot duty 240 VA
Maximum linkage	—	Up to 6 Zone Controls can be linked to a tekmar reset control.
Sensors	—	NTC thermistor, 10 kΩ @ 77°F (25°C ±0.2°C) ß=3892
included:		None.
required:		10K RTU or 10K Indoor Sensor for each active zone. (Order separately)
optional:		Outdoor Sensor 070.
Timer	—	24 hour, 1 event / day, 3 minute backup
UnOcc. Duration	—	0 to 24 hours
Unoccupied	—	40 to 100°F (4 to 38°C)
Max. Room	—	40 to 86°F, Off (4 to 30°C, Off)
Design Outdoor	—	-40 to 32°F, Off (-40 to 0°C, Off)
Floating Motor Speed	—	30 to 230 seconds



System Operation & Specifications

Two Zone Controls 367 control the space temperature of eleven heating zones. When cooling is required, one of the 367s operates a mechanical cooling unit.

Piping and Heat Source Details The system is plumbed with eleven zone valves and one system pump. The zones valves are plumbed in a parallel piping arrangement. Due to the number of zones used, a pressure bypass valve or globe valve (V1) is required to maintain a relatively constant system flowrate. This zoning system could either be connected to a boiler reset or a mixing reset system.

Warm Weather Shut Down (WWSD) When the outdoor temperature rises above the highest RTU dial setting and the heating zones are satisfied, the 367 shuts down the heating system.

Zoning Operation The 367s vary the on time of each zone valve based on a 15 minute cycle. The controls stagger the operating times of the zones in order to achieve a steady load on the boiler and prevent boiler short cycling. Each 367 synchronizes its zoning operation with the zoning operation of the other 367.

UnOccupied (Night Setback) Selected zones can be switched into an UnOccupied (Night Setback) mode through either the built-in 24 hr. Timers or by closing external UnOccupied switches (U1 and U2). When a control is switched into UnOccupied mode, the UnOccupied dial is used to set the desired indoor temperature. An Optimum Start / Stop feature can be used to ensure the zones are returned to their Occupied temperatures as the UnOccupied period ends.

Cooling Operation Once the heating system is shut down, the 367 provides a 45 minute interlock before cooling is allowed. During cooling operation, the 367 varies the on time of the mechanical cooling unit over a 30 minute cycle.

Other features Additional control features are listed in the table in the Heating Controls section of the Product Catalog I 000.

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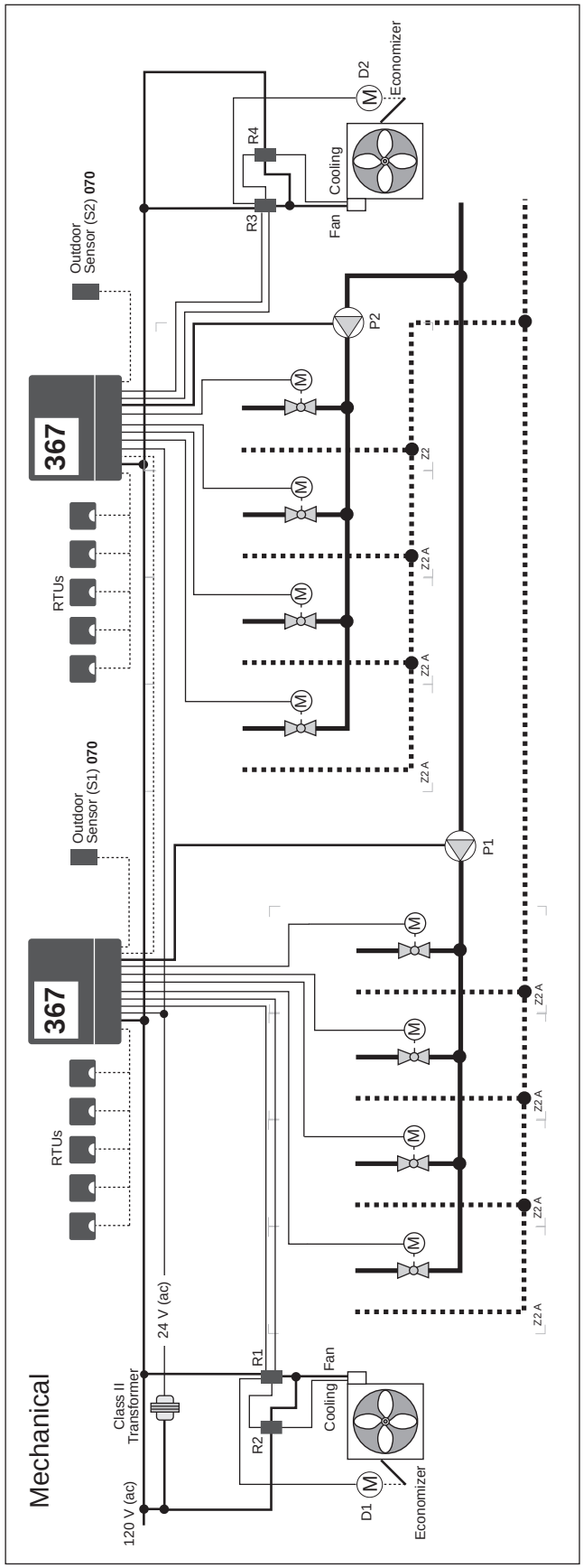
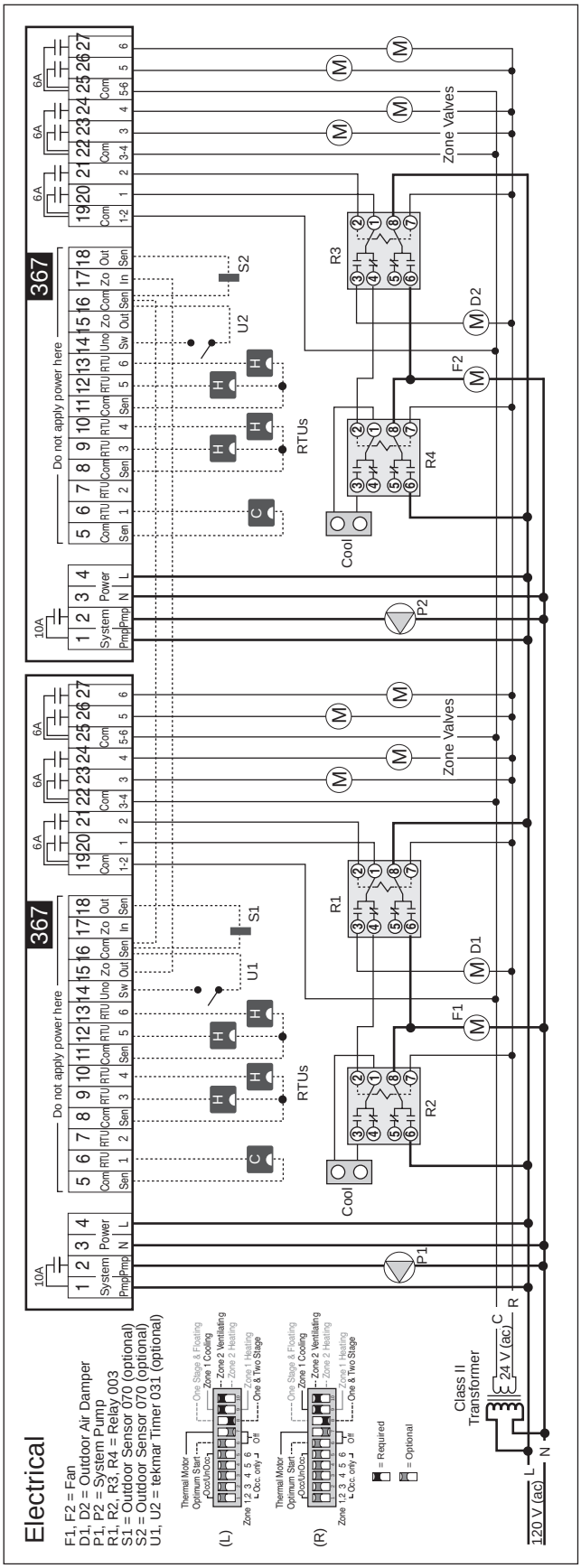
tekmar® - Application

Zone Control 367

A 367-6

12/96



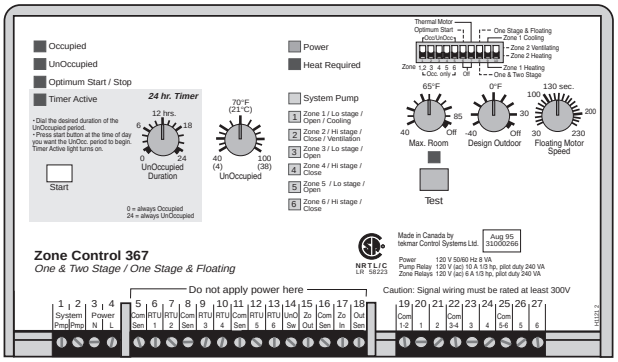


Note: This is only a concept drawing. The designer must determine whether this application will work in his system and must ensure compliance with code requirements. Necessary auxiliary equipment, isolation relays (for loads greater than the specified tekmar internal relay ratings), and other safety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

Technical Data

Zone Control 367 *One & Two Stage / One Stage & Floating*

Literature	—	A 000, A 367's, D 367, D 001, D 054, D 055, D 070, D 074
Control	—	Microprocessor PID 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 NRTL / C, meets ICES & FCC regulations for EMI/RFI.
Ambient conditions	—	Indoor use only, 32 to 122°F (0 to 50°C), < 90% RH non-condensing.
Power supply	—	120 V ±10% 50/60 Hz 8 VA
Pump Relay	—	120 V (ac) 10 A 1/3 hp, pilot duty 240 VA
Zone Relays	—	120 V (ac) 6 A 1/3 hp, pilot duty 240 VA
Maximum linkage	—	Up to 6 Zone Controls can be linked to a tekmar reset control.
Sensors	—	NTC thermistor, 10 kΩ @ 77°F (25°C ±0.2°C) ß=3892
included:		None.
required:		10K RTU or 10K Indoor Sensor for each active zone. (Order separately)
optional:		Outdoor Sensor 070.
Timer	—	24 hour, 1 event / day, 3 minute backup
UnOcc. Duration	—	0 to 24 hours
Unoccupied	—	40 to 100°F (4 to 38°C)
Max. Room	—	40 to 86°F, Off (4 to 30°C, Off)
Design Outdoor	—	-40 to 32°F, Off (-40 to 0°C, Off)
Floating Motor Speed	—	30 to 230 seconds



System Operation & Specifications

Two Zone Control 367's combine to provide ten zones of heating with Indoor Temperature Feedback as well as controlling two cooling or ventilation units.

Piping and Heat Source Details The system is piped using a two pipe direct return method. The heating system is broken into two sections and each 367 controls a system pump (P1 and P2) and five zone valves. This zoning system could either be connected to a boiler reset or a mixing reset system.

Warm Weather Shut Down (WWSD) When the outdoor temperature rises above the highest RTU dial setting and the heating zones are satisfied, each 367 shuts down its portion of the heating system.

Zoning Operation The 367's vary the on time of each zone valve based on a 15 minute cycle. The controls stagger the operating times of the zones in order to achieve a steady load on the boiler and prevent boiler short cycling. Each 367 synchronizes its zoning operation with the zoning operation of the other 367.

UnOccupied (Night Setback) Selected zones can be switched into an UnOccupied (Night Setback) mode through either the built-in 24 hr. Timers or by closing external UnOccupied switches (U1 and U2). When a control is switched into UnOccupied mode, the *UnOccupied* dial is used to set the desired indoor temperature. An Optimum Start / Stop feature can be used to ensure that the zones are returned to their Occupied temperatures as the UnOccupied period ends.

Ventilation Operation During the Occupied period, output relay *2* is closed. During the UnOccupied period, output relay *2* is open. The ventilation system is therefore only operated during occupied periods in order to conserve energy. If *Optimum Start* is selected, the 367 starts the ventilation system one hour before the Occupied period begins. This allows sufficient time to purge the air for normal occupancy.

Free Cooling Operation Whenever cooling is required and the heating zones have been satisfied for at least 45 minutes and the outdoor air temperature is below the desired indoor temperature, the 367 turns on output relays *1* and *2* together. The 367 varies the on time of output relays *1* and *2* over a 30 minute period. As the cooling load increases, the on time of the output relays increases.

Mechanical Cooling Operation Whenever cooling is required and the heating zones have been satisfied for at least 45 minutes and the outdoor air temperature is warmer than the desired indoor temperature, the 367 turns off output relay *2* and turns on output relay *1* in order to run the mechanical cooling system.

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

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Zone Control 367 & Boiler Control 262

A 367-7

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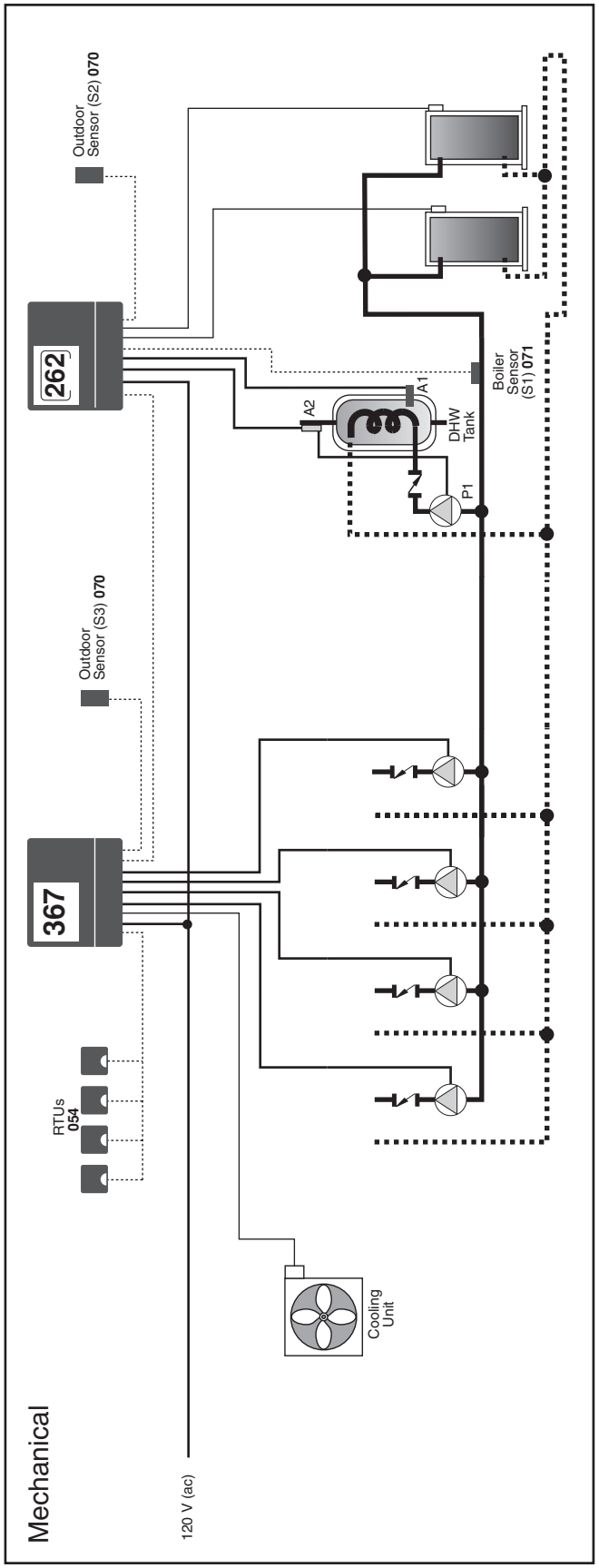

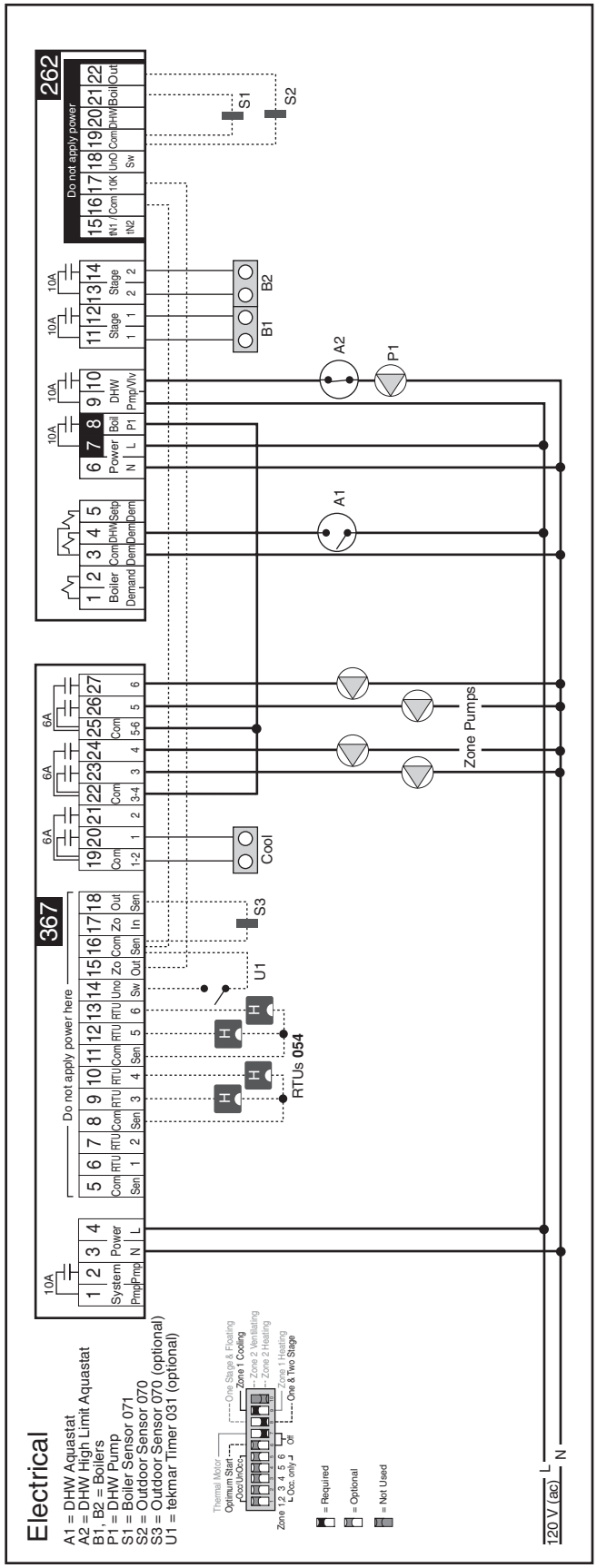

Note: This is only a concept drawing. The designer must determine whether this application will work in his system and must ensure compliance with code requirements. Necessary auxiliary equipment, isolation relays (for loads greater than the specified tekmar internal relay ratings), and other safety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

System Operation

The Boiler Control 262 and the Zone Control 367 combine to provide either full or partial outdoor reset to four zones of heating using Room Temperature Units (RTU's). The system also includes Domestic Hot Water (DHW) operation, staging and rotation of two boilers, and a central cooling unit.

Heat Source Details The heat source can be either high mass or low mass non-condensing or low temperature boilers. If using a low temperature boiler, refer to sections C3 and D1 of the Data Brochure D 262 for additional information.

Piping Details RTU controlled zone pumps are piped into the boiler loop. Heat is supplied to the DHW tank through a DHW pump (P1).

Heating Zones The air temperatures in the boiler zones are controlled using RTU's. The Zone Control 367 uses PID (proportional, integral, derivative) air temperature control and synchronizes the operation of the zones to provide more even loading of the boiler system. The 367 uses its Zo Out terminal to send an internal Boiler Demand to the 262 when the boiler zones require heat. The same Zo Out terminal provides an indoor temperature feedback signal from the 367 to the 262. This signal allows the 262 to provide more accurate control of the boiler supply water temperature.

DHW Demand When the DHW aquastat (A1) calls for heat, the 262 turns on the DHW pump (P1) and raises the boiler water temperature to at least the DHW XCHG setting. The control can provide DHW priority (refer to section C2 and C3 of the Data Brochure D 262) by turning off the *Boil P1* contact and removing power to the zone pumps. Once the DHW demand is removed, the 262 performs a DHW Post Purge and possibly a Mixing Purge.

Boiler Demand When heat is required in the boiler zones, the Zone Control 367 provides an internal Boiler Demand (through the Zo Out / 10K connection) to the 262. The boiler supply temperature is based on the *Characterized Heating Curve* settings and indoor temperature feedback from the Zone Control 367.

Cooling Interlock Before the Zone Control 367 enables the cooling system, all of the heating zones must be satisfied for 45 minutes. After this period, the zone 1 contact is closed to enable the central cooling system. The cooling system is then controlled by a thermostat.

All control functions and specifications are listed in the Product Catalog I 000 and the Data Brochures D 262 & D 367.

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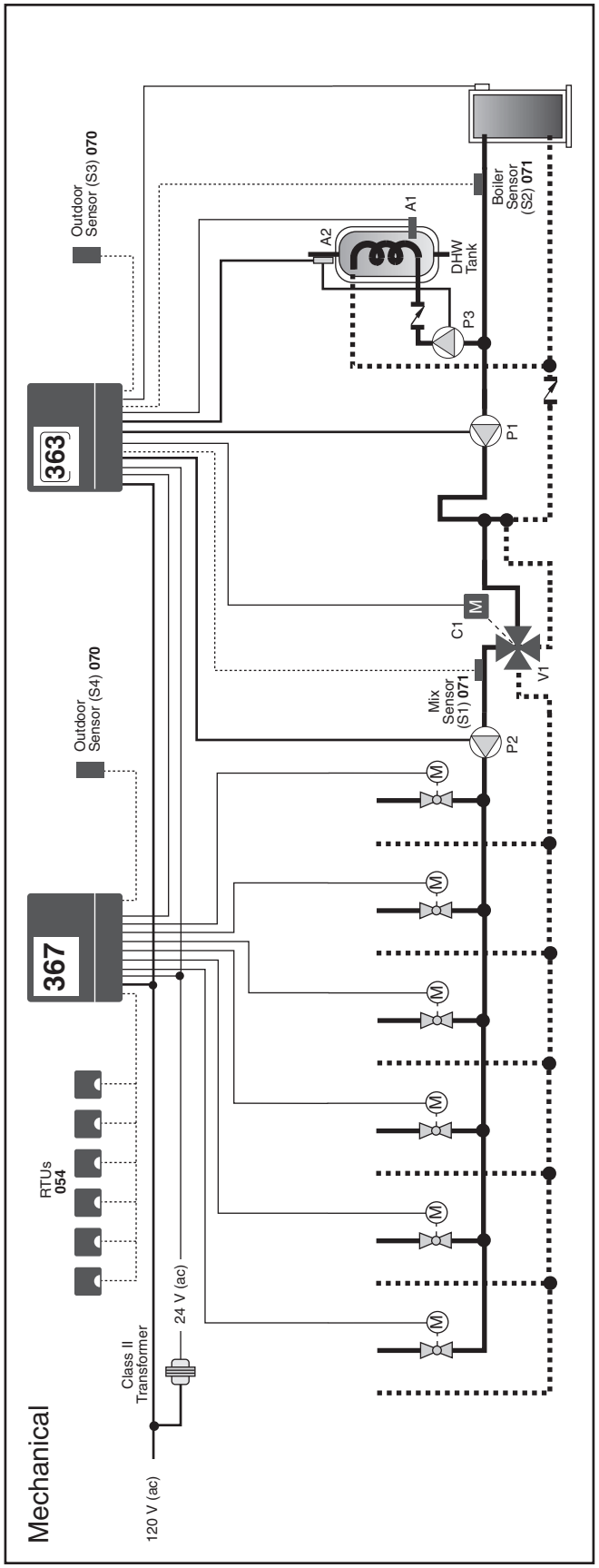
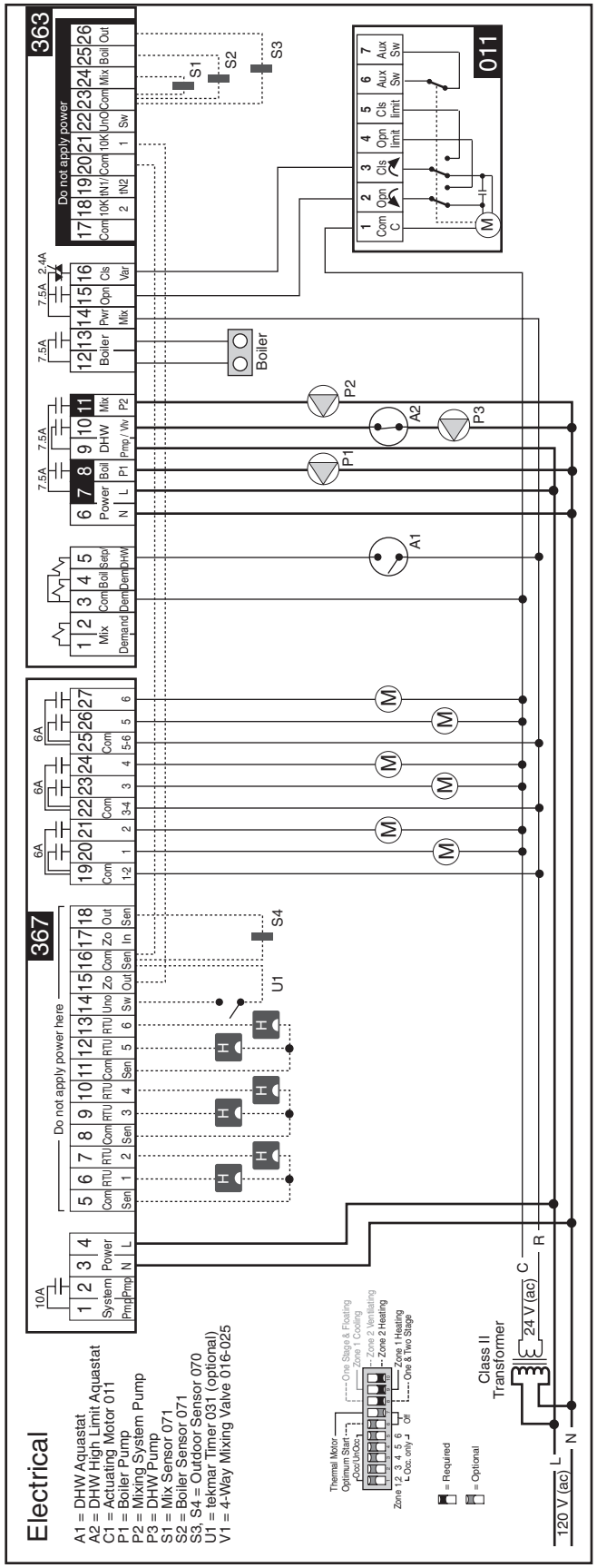
Zone Control 367 & Universal Reset Control 363

A 367-8

04/00





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.

System Operation

The Universal Reset Control 363 and the Zone Control 367 combine to provide full outdoor reset to six mixed zones. The output of the mixing valve is modulated to mix down the boiler supply water temperature to the mixed zones and protect the boiler from flue gas condensation. The boiler operates at the required temperature in order to satisfy all loads. The 363 also controls the supply of heat to an indirect Domestic Hot Water (DHW) tank.

Heat Source Details The heat source can be either a high mass or low mass non-condensing boiler.

Piping Details Room Temperature Unit (RTU) controlled zone valves are piped into the mixed loop. The mixing valve is piped in primary / secondary in order to isolate the boiler loop flow rate from the mixed loop flow rate. Heat is supplied to the DHW tank through a DHW pump. The boiler pump (P1) ensures flow past the mixing valve take-off.

Heating Zones The air temperatures in the mixed zones are controlled using RTU's. The Zone Control 367 uses PID (proportional, integral, derivative) air temperature control and synchronizes the operation of the zones to provide more even loading of the mixed system. The 367 uses its Zo Out terminal to send an internal Mix Demand to the 363 when the mixed zones require heat. The same Zo Out terminal provides an indoor temperature feedback signal from the 367 to the 363. This signal allows the 363 to provide more accurate control of the mixed supply water temperature.

DHW Demand When the DHW aquastat (A1) calls for heat, The 363 turns on the DHW pump (P3) and raises the boiler water temperature to at least the DHW XCHG temperature setting. The control can provide DHW Priority (refer to C2 of the Data Brochure D 363) by turning off the boiler pump (P1). Once the DHW demand is removed, the 363 performs a DHW Post Purge and possibly a Mixing Purge.

Mixing Demand When heat is required in the mixed zones, The Zone Control 367 provides an internal Mix Demand (through the Zo Out / 10K 1 connection) to the 363. The 363 turns on the mixing pump (P2) and the boiler pump (P1). The mix supply water temperature is based on the *Characterized Heating Curve* settings and indoor temperature feedback from the Zone Control 367. The mixing valve is then controlled to supply the required mixed supply water temperature. As the mixing valve opens up and requires more heat from the boiler, the boiler is fired to a temperature that is sufficient to satisfy the requirements of the mixing valve. Whenever the boiler is firing, the mixing valve is also modulated to protect the boiler from excessively low water temperatures.

All control functions and specifications are listed in the Product Catalog I 000 and Data Brochure D 363 & D 367.

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