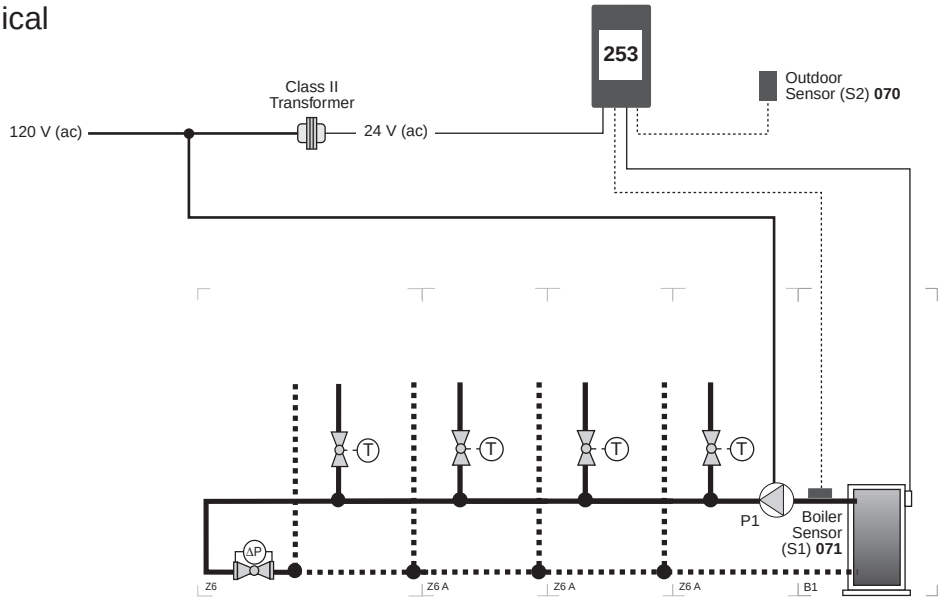
tekmar® - Application

One Stage Boiler Control 253

A 253-1

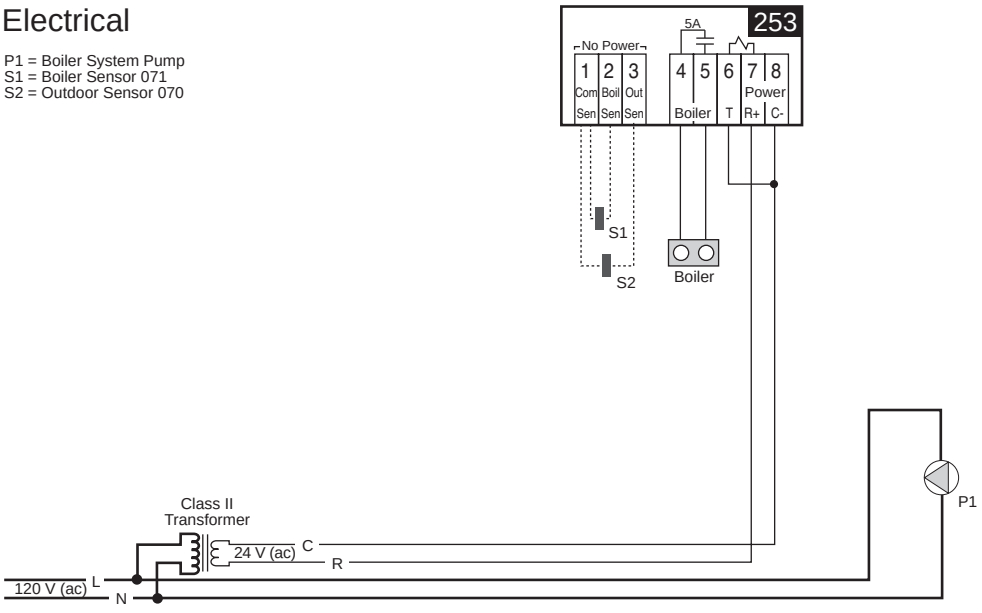
05/97

Mechanical



Electrical

P1 = Boiler System Pump
S1 = Boiler Sensor 071
S2 = Outdoor Sensor 070

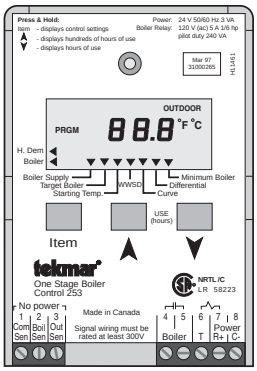


Note: This is only a concept drawing. The designer must determine whether this application will work in his system and must ensure compliance with code requirements. Necessary auxiliary equipment, isolation relays (for loads greater than the specified tekmar internal relay ratings), and other safety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

Technical Data

One Stage Boiler Control 253

Literature	—	A 000, A 253's, D 253, D 001, D 070
Control	—	Microprocessor PI control; This is **not a safety (limit) control**.
Packaged weight	—	1.1 lb. (500 g), Enclosure C, PVC plastic
Dimensions	—	4-3/4" H x 2-7/8" W x 7/8" D (120 x 74 x 22 mm)
Approvals	—	CSA NRTL /C; Meets ICES & FCC regulations for EMI/RFI.
Ambient conditions	—	Indoor use only, 15 to 120°F (-10 to 50°C), < 90% RH non-condensing.
Power supply	—	Class 2, 24 V ±10% 50/60 Hz 3 VA
Relays	—	120 V (ac) 5 A 1/6 hp, pilot duty 240 VA 2 A
Sensors included:	—	NTC thermistor, 10 kW @ 77°F (25°C ±0.2°C) ß=3892 Outdoor Sensor 070 and Universal Sensor 071.
Starting Temp.	—	35 to 150°F (2 to 66°C)
WWSD	—	35 to 85°F (2 to 29°C)
Curve	—	0.2 to 3.6
Differential	—	Auto, 2 to 42°F (Auto, 1 to 24°C)
Minimum Boiler	—	Off, 70 to 170°F (Off, 21 to 77°C)



System Operation & Specifications

The One Stage Boiler Control 253 operates a single boiler in order to provide a reset water temperature to a multiple zone system.

Piping and Heat Source Details This system is piped using parallel zones controlled by thermostatic radiator valves. The boiler can be either a non-condensing or a condensing boiler. The system pump provides constant circulation through the system with the use of a pressure bypass valve.

Warm Weather Shut Down (WWSD) When the outdoor air temperature rises above the WWSD setting, the control enters the Warm Weather Shut Down mode of operation. In this mode the control continues to monitor its sensors but does not operate the *Boiler* contact.

Starting Water Temperature The control features an adjustable starting water temperature setting. This allows the control to accommodate heating terminals that require elevated starting water temperatures, such as fan coil units, while maintaining a reasonable Warm Weather Shut Down temperature.

Boiler Operation In order to maintain a desired supply water temperature, the control operates the boiler based on a differential. This differential can either be fixed or the control can utilize an Auto Differential function. The Auto Differential function increases overall system efficiency by allowing the control to accommodate changing loads and prevent short cycling of the boiler. In this application the control requires a permanent heat demand. A permanent heat demand is generated by wiring the *C-* side of the transformer to *T(6)*.

Note: The boiler's operating aquastat must be set approximately 20°F higher than the system's design operating temperature.

Caution: The C- side of the same transformer used to power up the control must be used to provide the heat demand.

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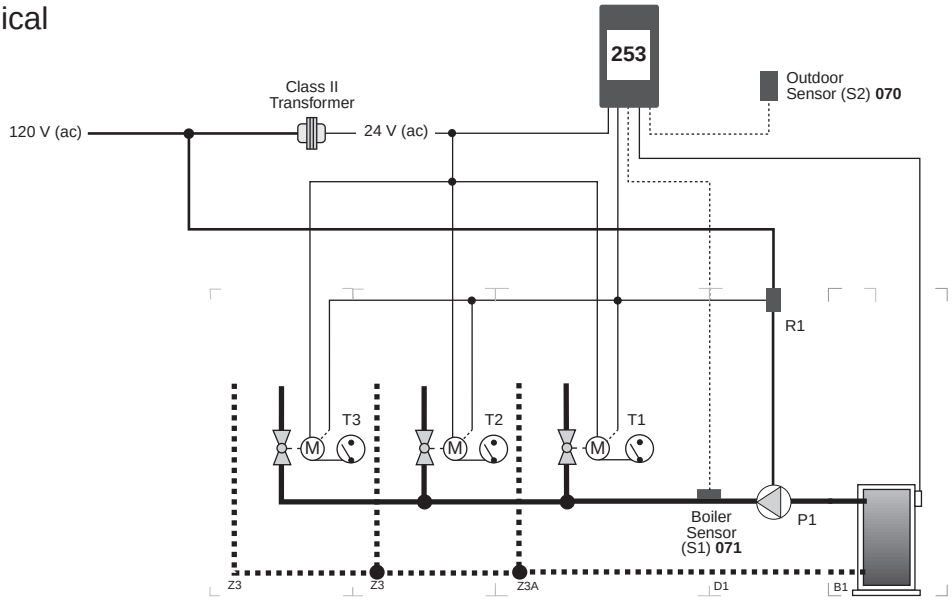
tekmar® - Application

One Stage Boiler Control 253

A 253-2

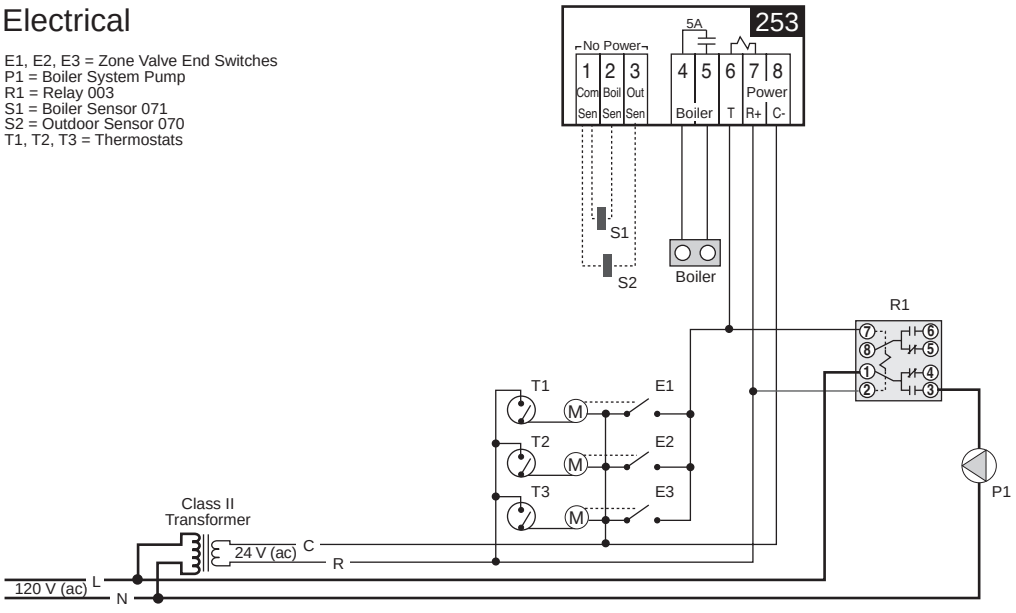
05/97

Mechanical



Electrical

E1, E2, E3 = Zone Valve End Switches
P1 = Boiler System Pump
R1 = Relay 003
S1 = Boiler Sensor 071
S2 = Outdoor Sensor 070
T1, T2, T3 = Thermostats

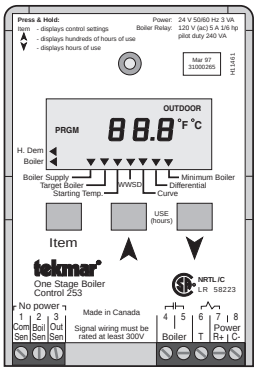


Note: This is only a concept drawing. The designer must determine whether this application will work in his system and must ensure compliance with code requirements. Necessary auxiliary equipment, isolation relays (for loads greater than the specified tekmar internal relay ratings), and other safety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

Technical Data

One Stage Boiler Control 253

Literature	—	A 000, A 253's, D 253, D 001, D 070
Control	—	Microprocessor PI control; This is **not a safety (limit) control**.
Packaged weight	—	1.1 lb. (500 g), Enclosure C, PVC plastic
Dimensions	—	4-3/4" H x 2-7/8" W x 7/8" D (120 x 74 x 22 mm)
Approvals	—	CSA NRTL /C; Meets ICES & FCC regulations for EMI/RFI.
Ambient conditions	—	Indoor use only, 15 to 120°F (-10 to 50°C), < 90% RH non-condensing.
Power supply	—	Class 2, 24 V ±10% 50/60 Hz 3 VA
Relays	—	120 V (ac) 5 A 1/6 hp, pilot duty 240 VA 2 A
Sensors included:	—	NTC thermistor, 10 kW @ 77°F (25°C ±0.2°C) ß=3892 Outdoor Sensor 070 and Universal Sensor 071.
Starting Temp.	—	35 to 150°F (2 to 66°C)
WWSD	—	35 to 85°F (2 to 29°C)
Curve	—	0.2 to 3.6
Differential	—	Auto, 2 to 42°F (Auto, 1 to 24°C)
Minimum Boiler	—	Off, 70 to 170°F (Off, 21 to 77°C)



System Operation & Specifications

The One Stage Boiler Control 253 operates a single boiler in order to provide a reset water temperature to a multiple zone system.

Piping and Heat Source Details This system is piped using parallel zones controlled by thermostats and zone valves with end switches. The boiler can be either a non-condensing or a condensing boiler. The system pump provides circulation through the system only when one or more of the zone valves is open.

Warm Weather Shut Down (WWSD) When the outdoor air temperature rises above the WWSD setting, the control enters the Warm Weather Shut Down mode of operation. In this mode the control continues to monitor its sensors but does not operate the *Boiler* contact.

Starting Water Temperature The control features an adjustable starting water temperature setting. This allows the control to accommodate heating terminals that require elevated starting water temperatures, such as fan coil units, while maintaining a reasonable Warm Weather Shut Down temperature.

Boiler Operation In order to maintain a desired supply water temperature, the control operates the boiler based on a differential. This differential can either be fixed or the control can utilize an Auto Differential function. The Auto Differential function increases overall system efficiency by allowing the control to accommodate changing loads and prevent short cycling of the boiler.

Note: The boiler's operating aquastat must be set approximately 20°F higher than the system's design operating temperature.

Zoning Operation A heat demand is generated by connecting the *C-* side of the transformer to terminal *T(6)* through a switching device. This provides a heat demand to the control. The zone valve end switches are used as the switching device. Once the control receives the heat demand, it operates the boiler in order to provide the reset supply water temperature.

Caution: The C- side of the same transformer used to power up the control must be used to provide the heat demand.

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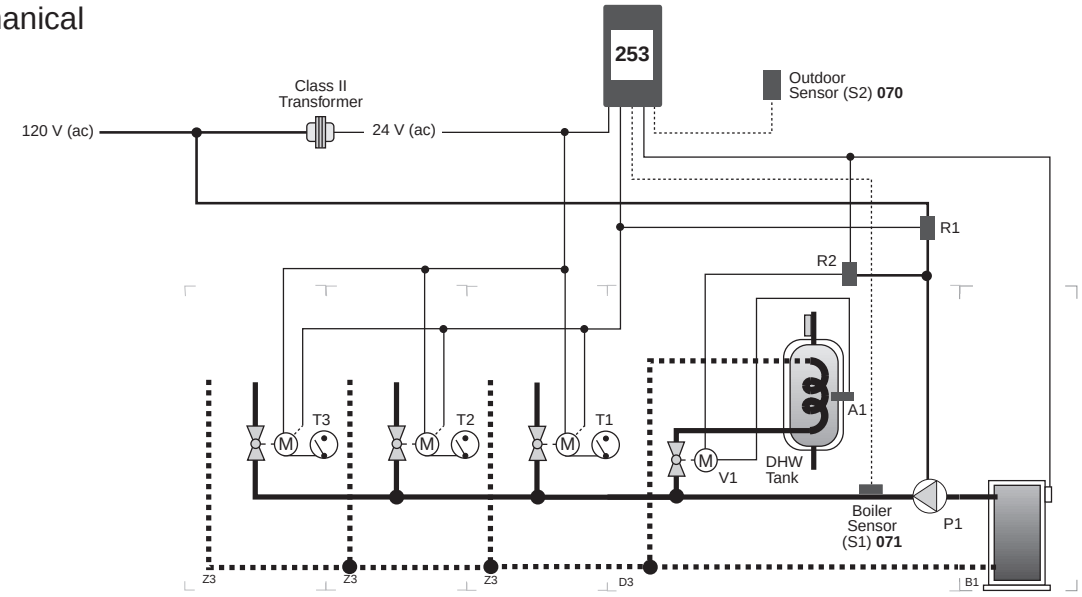
tekmar® - Application

One Stage Boiler Control 253

A 253-3

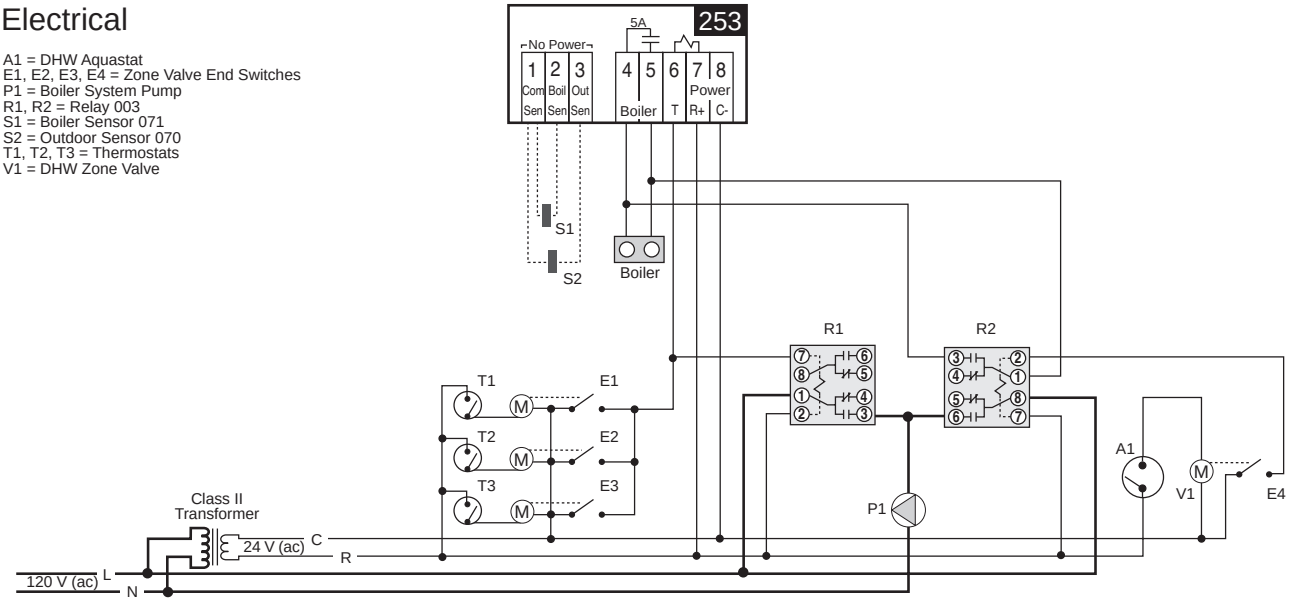
05/97

Mechanical



Electrical

A1 = DHW Aquastat
E1, E2, E3, E4 = Zone Valve End Switches
P1 = Boiler System Pump
R1, R2 = Relay 003
S1 = Boiler Sensor 071
S2 = Outdoor Sensor 070
T1, T2, T3 = Thermostats
V1 = DHW Zone Valve



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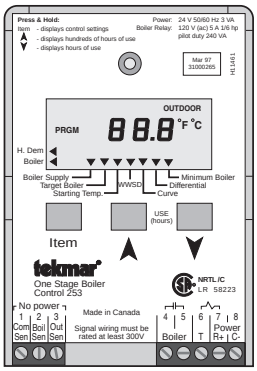
Technical Data

One Stage Boiler Control 253

Literature	—	A 000, A 253's, D 253, D 001, D 070
Control	—	Microprocessor PI control; This is **not a safety (limit) control**.
Packaged weight	—	1.1 lb. (500 g), Enclosure C, PVC plastic
Dimensions	—	4-3/4" H x 2-7/8" W x 7/8" D (120 x 74 x 22 mm)
Approvals	—	CSA NRTL /C; Meets ICES & FCC regulations for EMI/RFI.
Ambient conditions	—	Indoor use only, 15 to 120°F (-10 to 50°C), < 90% RH non-condensing.
Power supply	—	Class 2, 24 V ±10% 50/60 Hz 3 VA
Relays	—	120 V (ac) 5 A 1/6 hp, pilot duty 240 VA 2 A
Sensors included:	—	NTC thermistor, 10 kW @ 77°F (25°C ±0.2°C) ß=3892 Outdoor Sensor 070 and Universal Sensor 071.
Starting Temp.	—	35 to 150°F (2 to 66°C)
WWSD	—	35 to 85°F (2 to 29°C)
Curve	—	0.2 to 3.6
Differential	—	Auto, 2 to 42°F (Auto, 1 to 24°C)
Minimum Boiler	—	Off, 70 to 170°F (Off, 21 to 77°C)



System Operation & Specifications

The One Stage Boiler Control 253 operates a single boiler in order to provide a reset water temperature to a multiple zone system with domestic hot water.

Piping and Heat Source Details This system is piped using parallel zones controlled by thermostats and zone valves with end switches. The boiler can be either a non-condensing or a condensing boiler. The system pump provides circulation through the system only when one or more of the zone valves is open. The system pump also provides circulation for the indirect DHW tank.

Warm Weather Shut Down (WWSD) When the outdoor air temperature rises above the WWSD setting, the control enters the Warm Weather Shut Down mode of operation. In this mode the control continues to monitor its sensors but does not operate the *Boiler* contact.

Starting Water Temperature The control features an adjustable starting water temperature setting. This allows the control to accommodate heating terminals that require elevated starting water temperatures, such as fan coil units, while maintaining a reasonable Warm Weather Shut Down temperature.

Boiler Operation In order to maintain a desired supply water temperature, the control operates the boiler based on a differential. This differential can either be fixed or the control can utilize an Auto Differential function. The Auto Differential function increases overall system efficiency by allowing the control to accommodate changing loads and prevent short cycling of the boiler.

Note: The boiler's operating aquastat must be set higher than the system's design operating temperature. (typically 190°F (88°C))

Domestic Hot Water (DHW) When the DHW tank requires heat, the DHW aquastat (A1) energizes the DHW zone valve (V1). Relay R2 ensures that the system pump is operating and enables the boiler directly. The boiler is then allowed to operate at its aquastat setting, which must be high enough (typically 190°F (88°C)) to generate domestic hot water.

Zoning Operation A heat demand is generated by connecting the *C-* side of the transformer to terminal *T(6)* through a switching device. This provides a heat demand to the control. The zone valve end switches are used as the switching device. Once the control receives the heat demand, it operates the boiler in order to provide the reset supply water temperature.

Caution: The C- side of the same transformer used to power up the control must be used to provide the heat demand.

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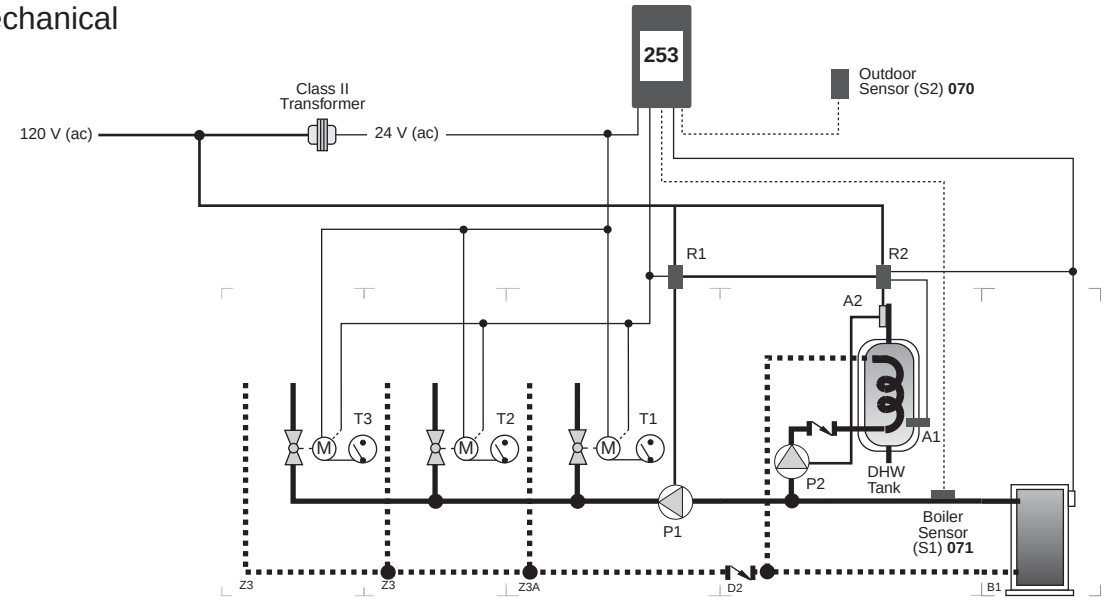
tekmar® - Application

One Stage Boiler Control 253

A 253-4

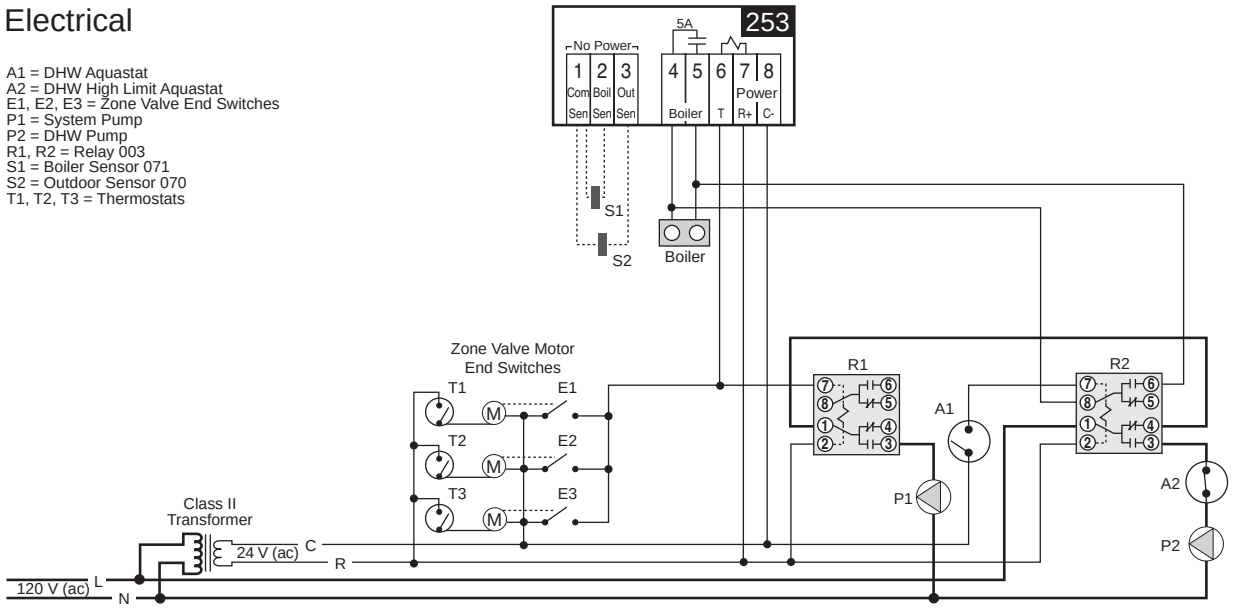
05/97

Mechanical



Electrical

A1 = DHW Aquastat
A2 = DHW High Limit Aquastat
E1, E2, E3 = Zone Valve End Switches
P1 = System Pump
P2 = DHW Pump
R1, R2 = Relay 003
S1 = Boiler Sensor 071
S2 = Outdoor Sensor 070
T1, T2, T3 = Thermostats



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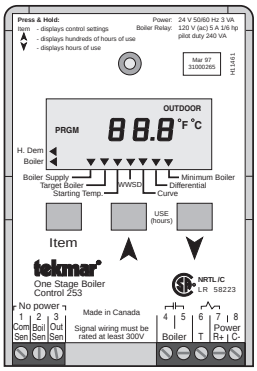
Technical Data

One Stage Boiler Control 253

Literature	—	A 000, A 253's, D 253, D 001, D 070
Control	—	Microprocessor PI control; This is **not a safety (limit) control**.
Packaged weight	—	1.1 lb. (500 g), Enclosure C, PVC plastic
Dimensions	—	4-3/4" H x 2-7/8" W x 7/8" D (120 x 74 x 22 mm)
Approvals	—	CSA NRTL /C; Meets ICES & FCC regulations for EMI/RFI.
Ambient conditions	—	Indoor use only, 15 to 120°F (-10 to 50°C), < 90% RH non-condensing.
Power supply	—	Class 2, 24 V ±10% 50/60 Hz 3 VA
Relays	—	120 V (ac) 5 A 1/6 hp, pilot duty 240 VA 2 A
Sensors included:	—	NTC thermistor, 10 kW @ 77°F (25°C ±0.2°C) ß=3892 Outdoor Sensor 070 and Universal Sensor 071.
Starting Temp.	—	35 to 150°F (2 to 66°C)
WWSD	—	35 to 85°F (2 to 29°C)
Curve	—	0.2 to 3.6
Differential	—	Auto, 2 to 42°F (Auto, 1 to 24°C)
Minimum Boiler	—	Off, 70 to 170°F (Off, 21 to 77°C)



System Operation & Specifications

The One Stage Boiler Control 253 operates a single boiler in order to provide a reset water temperature to a multiple zone system with domestic hot water priority.

Piping and Heat Source Details This system is piped using parallel zones controlled by thermostats and zone valves with end switches. The boiler can be either a non-condensing or a condensing boiler. The system pump (P1) provides circulation through the heating system only when one or more of the zone valves is open. Circulation for the DHW tank is provided by a separate DHW pump (P2).

Warm Weather Shut Down (WWSD) When the outdoor air temperature rises above the WWSD setting, the control enters the Warm Weather Shut Down mode of operation. In this mode the control continues to monitor its sensors but does not operate the *Boiler* contact.

Starting Water Temperature The control features an adjustable starting water temperature setting. This allows the control to accommodate heating terminals that require elevated starting water temperatures, such as fan coil units, while maintaining a reasonable Warm Weather Shut Down temperature.

Boiler Operation In order to maintain a desired supply water temperature, the control operates the boiler based on a differential. This differential can either be fixed or the control can utilize an Auto Differential function. The Auto Differential function increases overall system efficiency by allowing the control to accommodate changing loads and prevent short cycling of the boiler.

Note: The boiler's operating aquastat must be set higher than the system's design operating temperature. (typically 190°F (88°C))

Domestic Hot Water (DHW) When the DHW tank requires heat, the DHW aquastat (A1) energizes relay R2. Relay R2 provides power to the DHW pump (P2) in order to provide circulation through the DHW and removes power to the system pump (P1). By removing power to the system pump (P1), DHW priority is achieved. Once energized, relay R2 also enables the boiler. The boiler is then allowed to operate up to the operating aquastat's setting.

Zoning Operation A heat demand is generated by connecting the *C-* side of the transformer to terminal *T(6)* through a switching device. This provides a heat demand to the control. The zone valve end switches are used as the switching device. Once the control receives the heat demand, it operates the boiler in order to provide the reset supply water temperature.

Caution: The C- side of the same transformer used to power up the control must be used to provide the heat demand.

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