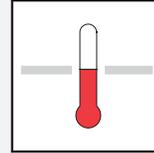


tekmar® - Application

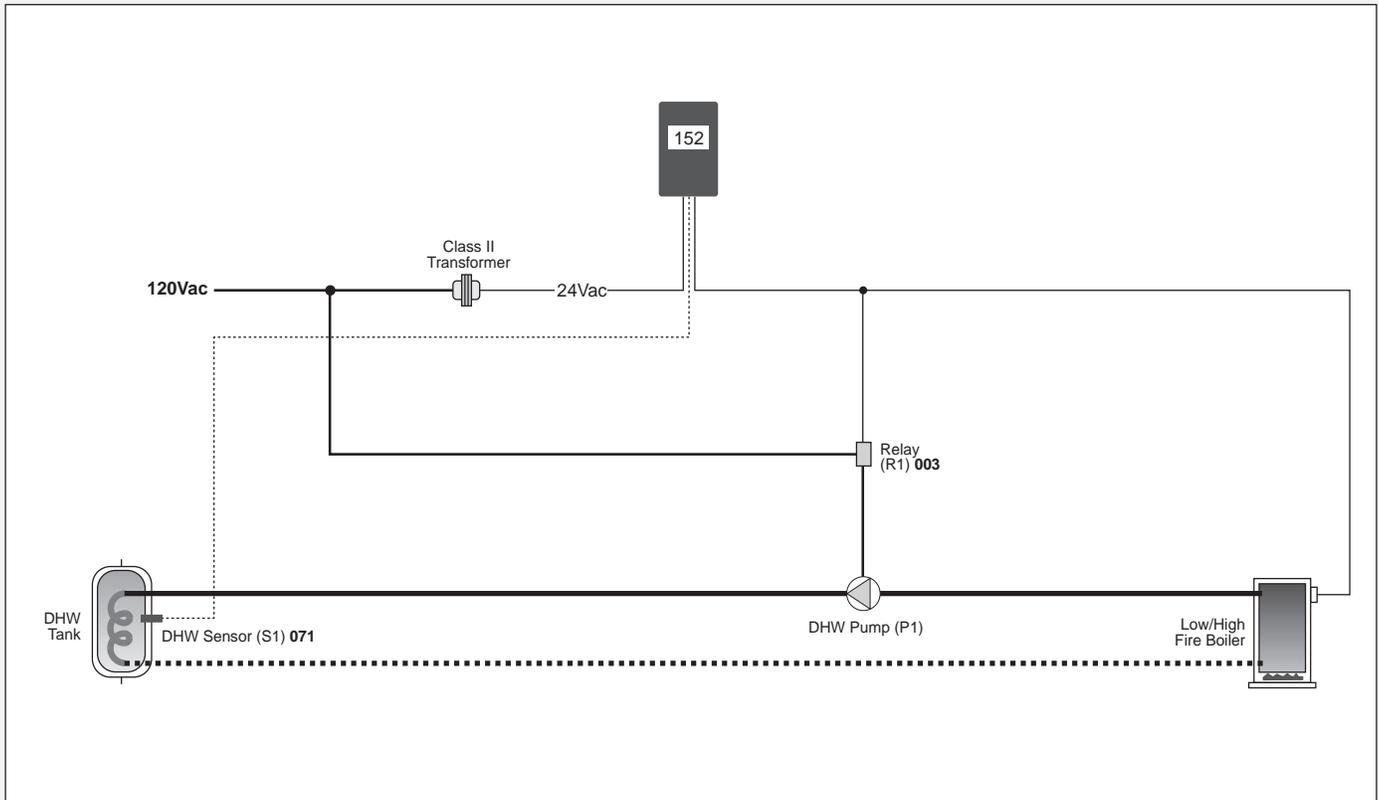
Two Stage Setpoint Control 152



A 152-1

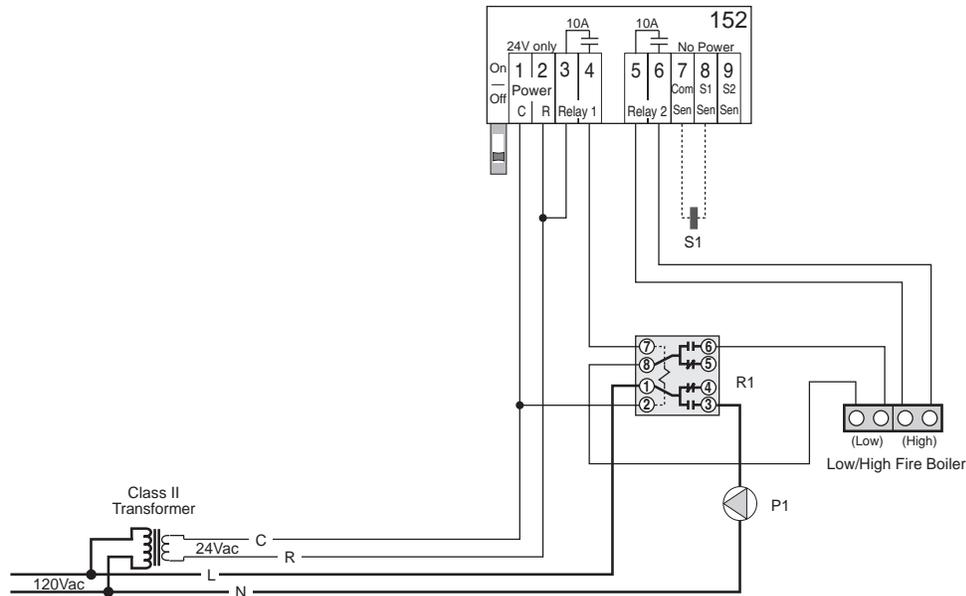
12/93

Mechanical



Electrical

P1 = DHW Pump
R1 = Relay 003
S1 = DHW Sensor 071



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 Two Stage Setpoint Control 152 maintains a selected domestic hot water (DHW) tank temperature by staging a low/high fire boiler. The target DHW temperature in this example is 140°F (60°C). The low fire burner and DHW pump are turned on when the water temperature drops below 137°F (58°C) — Setpoint 1 setting at 140°F, differential at 6°F. The high fire burner is turned on when the water temperature drops below 134°F (57°C) — Setpoint 2 setting at 137°F, differential at 6°F. (High fire off at 140°F, low fire off at 143°F)

Specifications

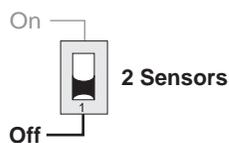
The following are minimum recommended specifications for the control in this application.

- The DHW temperature shall be maintained within the programmed differential range based on the programmed setpoint temperature.
- The DHW pump shall operate whenever there is a demand for hot water.
- The control shall be able to stage a low/high fire boiler to maintain DHW temperature.
- The control shall be able to display and adjust the setpoint temperature, differential and time delay of each stage.
- The control must be compatible with standard North American wiring hardware.
- The control shall be microprocessor-based and have two SPST internal relays with 10 amp (resistive) isolated contacts for outputs.
- The control shall be able to display the setpoint, differential and delay on either stage *while the device is operating*.
- The installation location must be maintained within the ambient temperature and humidity ranges specified in the D 152 Brochure for this application, with the installer ensuring that the control and its wiring are isolated and/or shielded from strong sources of electromagnetic noise.
- The control shall continuously monitor its sensor and provide an error message upon sensor or wiring failure.
- The control components required from tekmar are a Two Stage Setpoint Control 152 and one Relay 003.

Settings

Two Stage Setpoint Control 152	Adjustment Range	Recommended Initial Setting
Temperature Display	-85 to 302°F (-65 to 150°C)	
Setpoint 1	-40 to 239°F (-40 to 115°C)	
Differential 1	1 to 40°F (1 to 22°C)	
Time Delay 1	0 to 19 min. 50 sec. (10 second increments)	
Operating Mode 1	Heating/Cooling	Heat
Setpoint 2	-40 to 239°F (-40 to 115°C)	
Differential 2	1 to 40°F (1 to 22°C)	
Time Delay 2	0 to 19 min. 50 sec. (10 second increments)	
Operating Mode 2	Heating/Cooling	Heat

Two Stage Setpoint Control 152 DIP switch setting for this application.



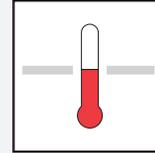
Additional Information

- For control installation and testing instructions see Brochures D 001 and D 152.
- For other control applications see Application Register A 000.
- For control theory and system integration details see Essays E 001 and E 002.

In North America:	tekmar Control Systems Ltd., Canada tekmar Control Systems, Inc., U.S.A. Head Office: 4611 - 23rd Street Vernon, B.C. Canada V1T 4K7 Tel. (604) 545-7749 Fax. (604) 545-0650	
--------------------------	--	--

tekmar® - Application

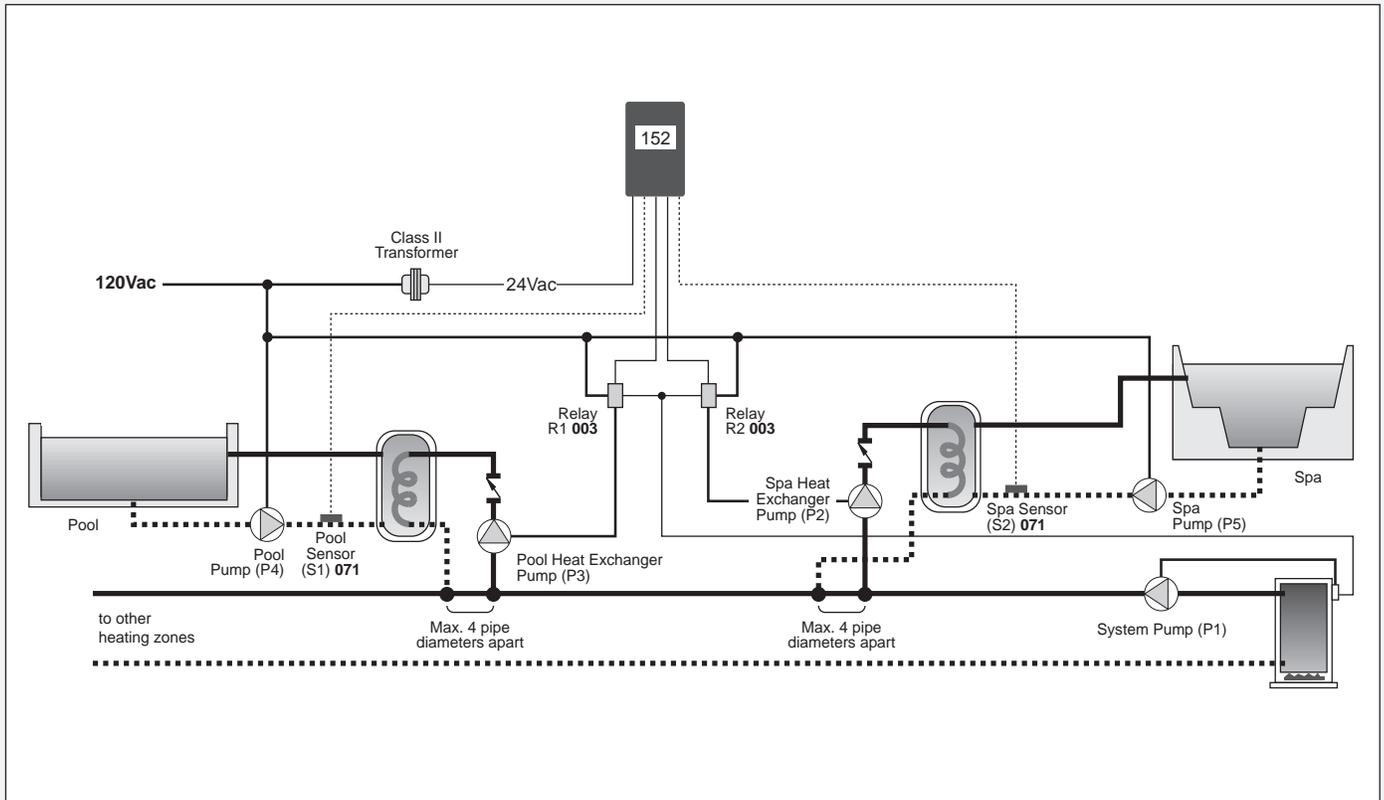
Two Stage Setpoint Control 152



A 152-2

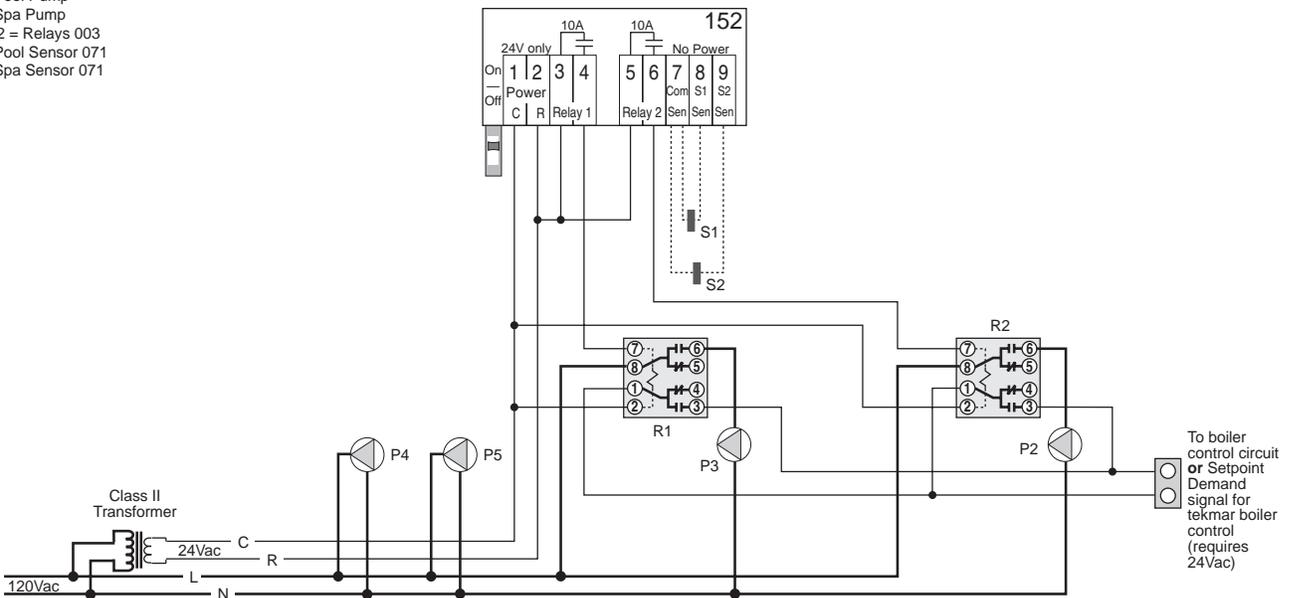
12/93

Mechanical



Electrical

- P1 = System Pump
- P2 = Spa Heat Exchanger Pump
- P3 = Pool Heat Exchanger Pump
- P4 = Pool Pump
- P5 = Spa Pump
- R1, R2 = Relays 003
- S1 = Pool Sensor 071
- S2 = Spa Sensor 071



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 Two Stage Setpoint Control 152 for the pool regulates the temperature of the pool water by turning its heat exchanger pump on or off to regulate the amount of heat transfer from the heat exchanger to the pool. The Two Stage Setpoint Control 152 for the spa regulates the temperature of the spa water by turning on or off the spa heat exchanger pump to control the heat transfer from the heat exchanger to the spa. In systems with adequate flow rates, spa and pool temperatures can be controlled to $\pm 1^\circ\text{F}$ of setpoint.

Specifications

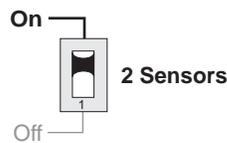
The following are minimum recommended specifications for the control in this application.

- The pool water temperature shall be maintained based on the programmed setpoint 1 temperature.
- The spa water temperature shall be maintained based on the programmed setpoint 2 temperature.
- The pool heat exchanger pump shall operate whenever there is a demand for pool hot water.
- The spa heat exchanger pump shall operate whenever there is a demand for spa hot water.
- The control shall be able to display and adjust the setpoint temperature, differential and time delay of each stage at all times.
- The control must be compatible with standard North American wiring hardware.
- The control shall be microprocessor-based and have two SPST internal relays with 10 amp (resistive) isolated contacts for outputs.
- The control shall be able to display the setpoint, differential and delay for either stage while the device is operating.
- The installation location must be maintained within the ambient temperature and humidity ranges specified in the D 152 Brochure for this application, with the installer ensuring that the control and its wiring are isolated and/or shielded from strong sources of electromagnetic noise.
- The control shall continuously monitor its temperature sensors and provide an error message upon sensor or wiring failure.
- The control components required from tekmar are a Two Stage Setpoint Control 152, one Universal Sensor 071 and two Relays 003.

Settings

Two Stage Setpoint Control 152	Adjustment Range	Recommended Initial Setting
Temperature Display	-85 to 302°F (-65 to 150°C)	
Setpoint 1	-40 to 239°F (-40 to 115°C)	
Differential 1	1 to 40°F (1 to 22°C)	
Time Delay 1	0 to 19 min. 50 sec. (10 second increments)	
Operating Mode 1	Heating/Cooling	Heat
Setpoint 2	-40 to 239°F (-40 to 115°C)	
Differential 2	1 to 40°F (1 to 22°C)	
Time Delay 2	0 to 19 min. 50 sec. (10 second increments)	
Operating Mode 2	Heating/Cooling	Heat

Two Stage Setpoint Control 152 DIP switch setting for this application.



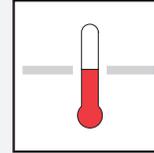
Additional Information

- For control installation and testing instructions see Brochures D 001 and D 152.
- For other control applications see Application Register A 000.
- For control theory and system integration details see Essays E 001 and E 002.

In North America: tekmar Control Systems Ltd., Canada
 tekmar Control Systems, Inc., U.S.A.
 Head Office: 4611 - 23rd Street
 Vernon, B.C. Canada V1T 4K7
 Tel. (604) 545-7749 Fax. (604) 545-0650

tekmar® - Application

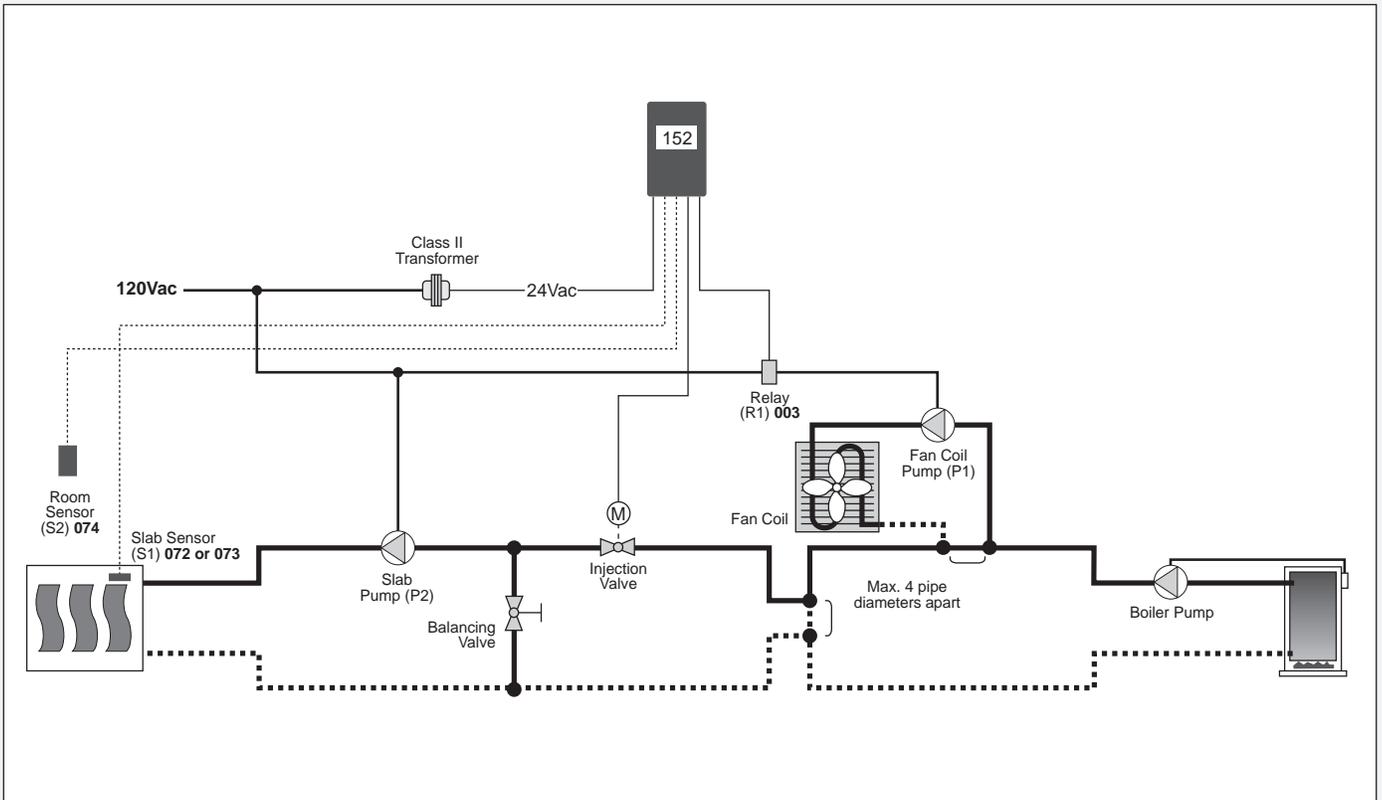
Two Stage Setpoint Control 152



A 152-4

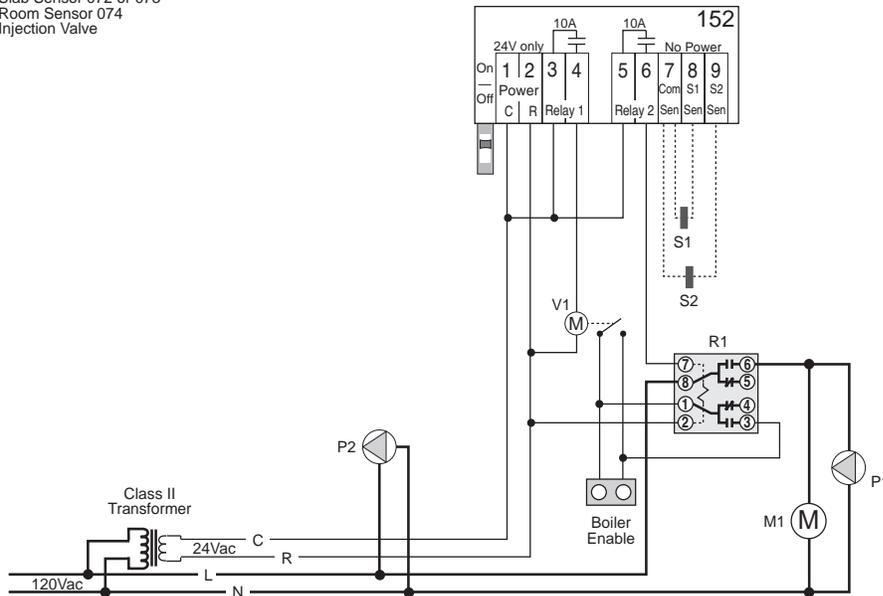
12/93

Mechanical



Electrical

- M1 = Fan Coil Blower Motor
- P1 = Fan Coil Pump
- P2 = Slab Pump
- R1 = Relay 003
- S1 = Slab Sensor 072 or 073
- S2 = Room Sensor 074
- V1 = Injection Valve



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 Two Stage Setpoint Control 152 maintains a separate setpoint temperature for each of two independent heating systems in a single area. Setpoint 1 uses the reading from its Slab Sensor 072 or 073 to maintain the slab at a fixed temperature setting. Setpoint 1 should be set lower than the desired air temperature, or air conditioning may be required in milder weather.

Setpoint 2 uses the reading from its Indoor Sensor 074 to operate the fan coil; providing fast air temperature recovery when required. Setpoint 2 should be set at the desired air temperature.

Specifications

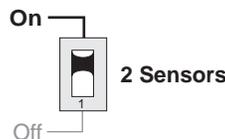
The following are minimum recommended specifications for the control in this application.

- The 2-way injection zone valve shall be closed if the HRF zone slab temperature increases above the Setpoint 1 setting.
- The fan coil pump and fan motor shall operate when the room's air temperature drops below the Setpoint 2 setting (room air temperature).
- The boiler shall operate on its own controls to maintain a temperature warm enough to ensure that the air temperature leaving the fan coil is at least 90°F (32°C) when operating.
- The control shall have an adjustable setpoint, differential and on time delay for each stage.
- The control must be compatible with standard North American wiring hardware.
- The control shall be microprocessor-based and have two SPST internal relays with 10 amp (resistive) isolated contacts for outputs.
- The control shall be able to display the setpoint, differential and delay for either stage while the device is operating.
- The installation location must be maintained within the ambient temperature and humidity ranges specified in the D 152 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 shall continuously monitor its sensors and provide an error message upon sensor or wiring failure.
- The control components required from tekmar are a Two Stage Setpoint Control 152, Slab Sensor 072 or 073, an Indoor Sensor 074 and one Relay 003. (The Supply Sensor 071 included with this control should not be used if the sensor is to be poured directly into a concrete slab without using conduit).

Settings

Two Stage Setpoint Control 152	Adjustment Range	Recommended Initial Setting
Temperature Display	-85 to 302°F (-65 to 150°C)	
Setpoint 1	-40 to 239°F (-40 to 115°C)	
Differential 1	1 to 40°F (1 to 22°C)	
Time Delay 1	0 to 19 min. 50 sec. (10 second increments)	
Operating Mode 1	Heating/Cooling	Heat
Setpoint 2	-40 to 239°F (-40 to 115°C)	
Differential 2	1 to 40°F (1 to 22°C)	
Time Delay 2	0 to 19 min. 50 sec. (10 second increments)	
Operating Mode 2	Heating/Cooling	Heat

Two Stage Setpoint Control 152 DIP switch setting for this application.



Additional Information

- For control installation and testing instructions see Brochures D 001 and D 152.
- For other control applications see Application Register A 000.
- For control theory and system integration details see Essays E 001 and E 002.

In North America: tekmar Control Systems Ltd., Canada
 tekmar Control Systems, Inc., U.S.A.
 Head Office: 4611 - 23rd Street
 Vernon, B.C. Canada V1T 4K7
 Tel. (604) 545-7749 Fax. (604) 545-0650