

DESCRIPTION OF OPERATION:

1. SPACE HEATING: Upon a call for heat from any of the 10 thermostats, the zoning controls apply 24VAC to the necessary valve actuators. A dry contact in one or both of the zone controls passes a 24VAC signal to the heating demand terminals of the tekmar 261 boiler control to signal a heat demand. The 261 control fires the boilers based on outdoor reset schedule. The 261 control will also turn on the primary loop circulator (P3) whenever it receives a space heating demand. A 24 VAC signal is also sent to the tekmar 356 injection mixing control that operates the injection pump (P7) as necessary to control supply water temperature to the floor circuits. A second isolated relay contact in one or both of the zone controllers applies 120 VAC to circulator (P8) to circulate water through the distribution system. With the 356 control properly set for mixing reset, the zone thermostats should be on a higher percentage of the time during the heating season.

If the return temperature to the boiler drops below 130 °F the tekmar 356 control will reduce the speed of the injection pump (P7) as necessary to prevent a further drop in boiler temperature.

2. SNOW MELTING: Snowmelting can be initiated either manually or automatically depending on the setting of the mode switch.

If set to the manual on position, 24VAC is passed to the setpoint demand terminals of the tekmar 261 boiler controller. The 261 will target its setpoint temperature of 180 °F. The primary circulator (P3) DOES NOT operate when the control is receiving only a setpoint demand.

Snow melting can also be initiated automatically using the ET1 snow sensor. When this device detects precipitation and the outdoor temperature is below 34 °F it closes its contacts to provide a 24 VAC signal to the 261 boiler control for a setpoint demand.

Both modes of initiating snowmelting also provide a 24 VAC signal to a dedicated tekmar 356 injection control which operate injection pump (P5) to control the temperature of the fluid in the snowmelt distribution system. This 356 control is configured for setpoint mode at a target supply temperature of 120 °F.

If the return temperature to the boiler(s) drops below 130 °F the tekmar 356 control will reduce the speed of the injection pump (P5) as necessary to prevent a further drop in boiler temperature.

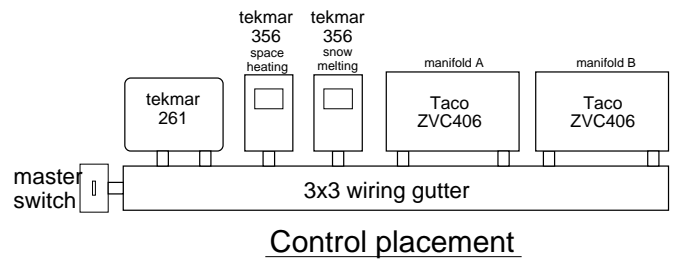
GENERAL: The boiler circulators (P1) and (P2) are operated by the high limit control on each boiler, and run whenever that boiler is called to operate by the tekmar 261 control.

ELECTRICAL NOTES:

- All electrical work must be in full compliance with the National Electrical Code
- Provide a 120 VAC 20 amp circuit for controls, boilers, and manifold circulators as shown in schematic
- All line voltage wiring shall be #12 AWG with THHN insulation
- All low voltage wiring shall use 18 ga. copper thermostat cable
- All line voltage devices shall be grounded as required by NEC
- All line voltage wiring shall be in rigid EMT conduit or MC flexible conduit
- tekmar 261 and both 356 controls shall be mounted above the 3x3 wiring gutter as shown on detail sheet M4.
- A service switch shall be mounted adjacent to the high limit control on each boiler
- Each boiler shall be provided with a separate manual reset high limit control and low-water cut-off device as shown.
- Both required outdoor sensors shall be mounted adjacent to each other in a high protected area on North side of building.
- Both return water temperature sensors shall be mounted adjacent to each other on the boiler return piping as shown.
- All sensors measuring pipe temperature shall be tightly secured to pipe with stainless steel clamps and neatly wrapped with pipe insulation.
- Set all controls at initial settings indicated on plans. Adjust as required.
- Do not place electrical controls under piping.
- Do not run any sensor wiring in the same conduit as line voltage wiring.

INITIAL CONROL SETTINGS:

- Boiler high limit controls: 200 °F
- Manual reset high limit controls: 215 °F
- tekmar 261 boiler controller:
set for characterized heating curve 5 (radiator)
- tekmar 356 (SPACE HEATING)
set for characterized heating curve 1 (high mass radiant)
set boiler sensor to return
set minimum boiler temperature to 130 °F
- temar 356 injection mixing control (SNOWMELTING)
set for setpoint mode at target temperature of 120 °F
set boiler sensor for return
set minimum boiler temperature to 130 °F



Control placement