Thermostat Schedule:

T-Stat #	Bus/ Address #	Zone	Model	Wire	1st Stage	2nd Stage	Cooling	Aux Sensor	Notes
To Be Filled In Later									

The Tekmar thermostats will establish a communication network when the tN4 terminals are connected to a tN4 bus.
All Thermostats are assigned an address number on the network.
The address includes the bus water temperature designation and device number.
Bus water temperature designations are available as Boiler (b), Mix1 (1), Mix2 (2), Etc.
The device number can range from 1 to 24.
To check the address number for a thermostat go to the miscellaneous menu and the number is displayed in the Item field.
Write the address number in the bus/address # field for future reference.

Example

1	b:01	1-New Zone	TE541	18-4	X		X	Room Sensor

DRAWING SCALE
Not to Scale

Key to Common Symbols

Ball Valve
Purge Valve
Swing Check
Spring Check
Air Separator
Supply Flow
Return Flow
Dial Thermometer
1 1/4 " Pipe Size
18-3 Low Voltage T-stat Cable
Manifold Loop Actuators
Room Thermostat
Supply
Return
Radiant Manifold Station

Mstr Bed/Bath — Tekmar 542 T-stat (Programmable) — 18-4
Guest Bed — Tekmar 541 T-stat — 18-4
Study/Laundry — Tekmar 541 T-stat — 18-4
Main — Tekmar 541 T-stat — 18-4
Loft — Tekmar 541 T-stat — 18-4
Bed 1/Bed 2 — Tekmar 541 T-stat — 18-4
Bath 3 — Tekmar 541 T-stat — 18-4
Garage — Tekmar 541 T-stat — 18-4
Bonus — Tekmar 541 T-stat — 18-4
Basement — Tekmar 538 T-stat — 18-4

To Mechancial Room Control Panel

Manifold A (Slab on Grade) — Supply / Return — 1/2" PEX Tubing
Manifold B (Slab on Grade) — Supply / Return — 3/4" PEX To Remote Manifold
Manifold C (Sandwich) — Supply / Return — 5/8" PEX To Remote Manifold
Manifold D (Sandwich) — Supply / Return — 5/8" PEX To Remote Manifold
Manifold E (Sandwich) — Supply / Return — 5/8" PEX To Remote Manifold
Manifold F (Sandwich) — Supply / Return — 3/4" PEX To Remote Manifold
Manifold G (Sandwich) — Supply / Return — 5/8" PEX To Remote Manifold

Floor Sensors are Used to Maintain a minimum floor Temperature Independent of the room air temperature

Terminal Strip 3x(18-2)

Tekmar 079 Floor Sensor

Outdoor Sensor — 18-2

Boiler Demand 1.8 -10 VDC — 18-2

18-2 DHW Demand

PEX Tubing to Copper Adapters

Caleffi 3/4" Zone Valve

Webstone Ball Valve With Purge Drain

5/8" PEX To Remote Manifold

Supply Header — Return Header — 1 1/4"

Control Board

96"L x 48"H 'Estimated'

120VAC

Tekmar 420 335

Tekmar 335

Cold In — 1/2"

ZVA 3/4" — ZVB 3/4" — ZVC 3/4" — ZVD 3/4" — 3/4" — 3/4" — ZVG 3/4"

5x(18-2)

PS — 18-2

Boiler Supply Sensor

PD — 1 1/4"

1"

Dial Thermometer

Closely Spaced Tee's

Webstone Purge/Fill Ball Valve

Webstone Purge Tee

Fill Valve/ Backflow Preventer w/Waste Vent

Boiler Circuit

DHW Circuit

Air Bladder

Amtrol Exp Tank SX-30V

Suitable Drain

Condensate from the Prestige will be slightly acidic - Typically with a pH from 3.2 to 4.5. Install a Neutralizer if required by code.

Air Vent — 30# Relief — Control Panel

Prestige Solo 110 Condensing Boiler 93,000 BTU/Hr DOE Output Without Outdoor Sensor

Capped

Condensate Drain Pitched to Drain

1"

Prestige Parameter 4, The Maximum Boiler Operating Temperature, Is Preset To 186°F. This Setting Is Required For The Boiler To Operate Up To Higher Temperatures To Recover The Indirect Water Heater. This Setting Should Be Confirmed And Acts As A High Limit Cut Out For The Boiler As The Tekmar 420 Control Is Not Designed To Perform The Function As A Safety High Limit Device.

And

Parameter 45 (CH Operating Signal Selection) Needs to be changed from 00 to 02. This will allow the Prestige to modulate with a 1.8 to 10VDC Input signal from the Tekmar 420 Control.

DHW Out — Cold In

Domestic Hot Water Piping By Others

DHW Aquastat — T&P Valve

Triangle Tube Smart 40 Indirect Water Heater

Pump Schedule

PS - Grundfos Alpha 15-55 F
Set to the Constant Pressure I Mode.

PD - Grundfos UPS15-58F
Set to Speed Hi

Grundfos Alpha Circulators Require Integral Check in the Discharge Volute.

** Disclaimer**
Boiler Equipment and Installation must meet all Manufacturer Instruction and local codes and supersedes the information detailed on this diagram

Boiler Operation Note:

The Tekmar 420 Control is Sending a 1.8 to 10 VDC modulated heat Demand to the Prestige Boiler to determine the operating temperture of the boiler. This will allow for the radiant floor heating System to operate with all the features available through the tekmar controls including indoor and outdoor feedback, zone synchronization, and Domestic hot water Priority.

Tekmar Operational Note:

The tekmar 420 control is operating in a two water temperature mode. The radiant heating mode will provide supply radiant water temperatures up to 105°F under design conditions. The domestic hot water mode will provide hot water from the boiler to the indirect storage tank up to 180°F with priority over space heating. 180°F supply water temperature is too hot for space heating and could result in damage to the floor coverings and create expansion noise in the system. Confirm DHW mode 2 is set on the tekmar 420 controller (adjust menu parameter) and operate the system to Verify the heating system zones will shut down during a call for domestic hot water heating.

NORTHEAST RADIANT TECHNOLOGY, L.L.C
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David Michaud: Dave@NRTradiant.com
Robert Brown: Rob@NRTradiant.com

RADIANT PANEL HEATING SYSTEM
Job: Keeberly
Job #: 0311-04
page x of x.
Mechanical Equipment and Controls Diagram
Rev. :
Date
by: David

541 Essential Settings (with Floor Sensor)

Adjust Menu

Item Field	Setting
Mode	Heat
Set Occ	Per User
Set Unocc	Per User
Set Away	Per User
Floor Min Occ*	Per User
Floor Min UnOcc	Off
Floor Max	Off
Sensor 1	Floor
Room Sensor	On
H1 Terminal	Control
H1 Pump	On
H1 Delay	Off
Cool Member	None
(Opt Start/Stop)	On

Scene Menu

Item Field	Setting
Scene	On
Select	Perm 1
Set Perm 1	Schedule

Schedule Menu

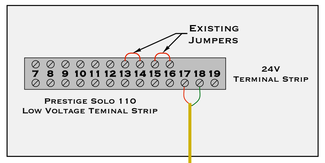
Item Field	Setting
Heat Schd	Member 1

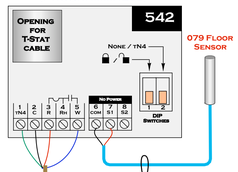
Misc Menu

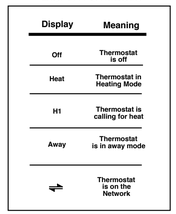
Item Field	Setting
Access	Advanced

The initial thermostat set up can be quite complicated with the Scene the Scheduling options that are available.
Initial set-up of the thermostat can be greatly simplified by setting the 'Heat Sch' to 'None', and the 'Scene' feature to 'Off'.

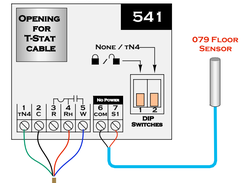
* Set slab minimum to the same as room heat.
If the room is to warm for comfort decrease slab minimum temperature. If the floor is cool for comfort increase slab minimum temperature.







Teknar thermostats include four different access levels. The Access level restricts the number of menus, Items and adjustments that can be accessed by the user. To Access these features, it is required that the Access Level located in the Miscellaneous menu be set to 'Advanced' instead of 'User' (Default). After programming, the Access level can be set to the level most appropriate for the user.



542 Essential Settings (with Floor Sensor)

Adjust Menu

Item Field	Setting
Mode	Heat
Set Occ	Per User
Set Unocc	Per User
Set Away	Per User
Floor Min Occ*	Per User
Floor Min UnOcc	Off
Floor Max	Off
Sensor 1	Floor
Sensor 2	Off
Room Sensor	On
H1 Terminal	Control
H1 Pump	On
H1 Delay	Off
Cool Member	None
WWSD	Control
(Opt Start/Stop)	On

Scene Menu

Item Field	Setting
Scene	On
Select	Perm 1
Set Perm 1	Schedule

Schedule Menu

Item Field	Setting
Heat Schd	MSTR1
Type	24 Hr
Mode	2
Occ (time)	Homeowner Specified
Unocc (time)	Homeowner Specified

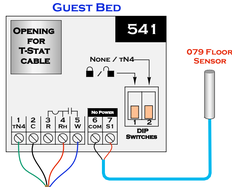
Misc Menu

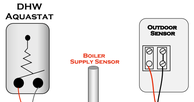
Item Field	Setting
Access	Advanced

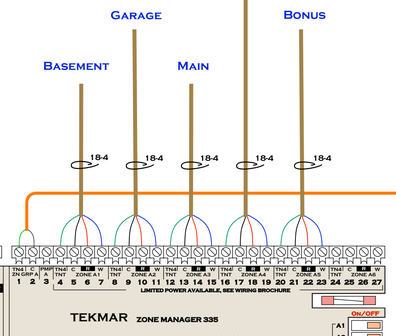
The schedule menu settings are shown configured for the simplest setback schedule including the same schedule for each day of the week and two events per day. More scheduling options are possible, please refer to the data brochures for additional information.

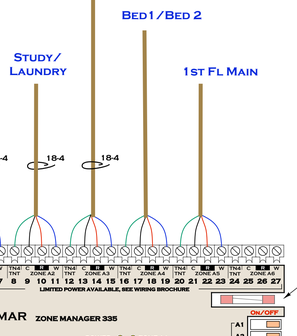
The initial thermostat set up can be quite complicated with the Scene the Scheduling options that are available.
Initial set-up of the thermostat can be greatly simplified by setting the 'Heat Sch' to 'None', and the 'Scene' feature to 'Off'.

* Set slab minimum to the same as room heat.
If the room is to warm for comfort decrease slab minimum temperature. If the floor is cool for comfort increase slab minimum temperature.

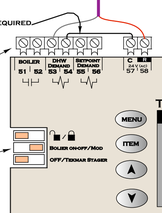


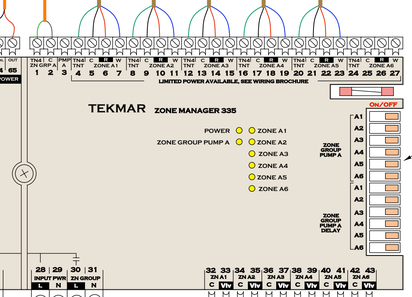


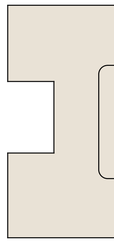


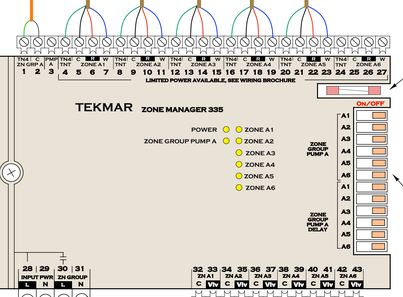


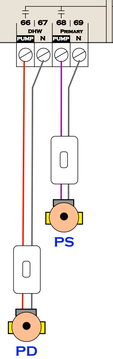
Power Down The Controllers When Making Thermostat Connections Or Risk Blowing Low Voltage Fuse, Blown fuse is indicated by the power LED displayed in the color AMBER.

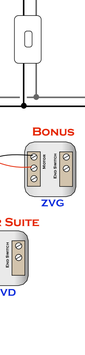


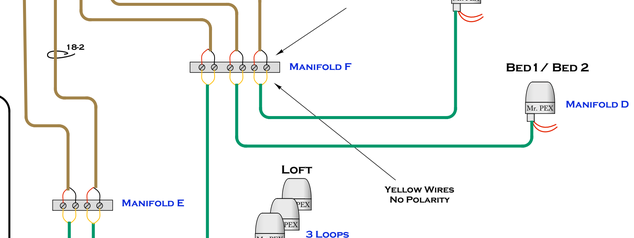












Control Error Notes

When a tN4 thermosat is removed for the communication Network after being connected, the Tekmar 420 will display a device (thermostat) error. This error will remain even after the thermostat has been re-connected. To clear the error from the tekmar 420 Display, press the 'UP' and 'DOWN' arrows at the same time for a second and release.

420 Essential Settings Adjust Menu

Item Field	Setting
Outdoor Design	-5°F
Boiler Term	HRF2
Boiler Indoor	70°F
Boiler Design**	105°F
Boiler Min*	OFF
Boiler Max	190°F
Fire Delay*	0:35 Min
Boiler Diff*	Au (Auto)
Boiler Motor*	90 Seconds
Min. Modulation*	18%
Max. Modulation*	100%
Cyc (Cycles/hr)*	Au (Auto)
Schedule	OFF
DHW Mode	2
DHW Exch Occ	180°F
Setpoint Mode	Off
WWSD Occ	65°F

* Item Settings Per Tekmar Specifications

** The Maximum Radiant Floor Heating Supply Water Temperature Setting Could be 10°F higher Than Boiler Design

Testing the Control

Press and hold the test button for ONE second to test the items connected to the 420 control. The control will run through a sequence. To advance to a particular step, repeatedly press and release the test button.

Press and hold the test button for six seconds to test the items connected to the zone controllers. Press the up button to change the display to 'ZN TEST'. The control operates one zone at a time and all other devices are shut off. Use the arrow buttons to change the devise number to be tested.

The Tekmar 420 has two different Access Levels. These Access levels restricts the number of menus, items and adjustments that can be accessed by the user. The Access Level setting is found in the Miscellaneous (MISC) menu. The factory default setting is Installer (Ins). To have access to all the settings required, change the setting to Advanced (Ad).

Mr. Pex Thermal Actuator Note

Mr. Pex thermal actuators have a 'First-Open' feature. This feature comes out of the box in a partially open position to aide in the installation of the actuator to the manifold valve. The first time the actuator is powered open the lifting stroke cancels the 'first-open' feature and the actuator is ready for operation. The 'first-open' feature should allow the installer to connect the actuators to the manifold and still be able to fill and purge the system without the need to either remove the actuators or power them open.

Thermostat Operational Notes

Tekmar tN4 thermostats include a number of advanced features to increase both the comfort and energy efficiency for your radiant heating system. One of these features is the ability to form a communications network. The purpose of this document is to highlight some of the network features to allow the user to utilize the network to identify thermostats and assist in locating and correcting network errors.

Tekmar thermostats include five different access levels. The Access level restricts the number of menus, Items and Adjustments that can be accessed by the user. The Access Level is located in the Miscellaneous menu and is usually set to Advanced instead of User (Default) for initial set up. This will allow the user access to all the settings available to the thermostat. After the settings are determined and set, the thermostat access level can be set for the people who use the thermostat on a regular basis.

The Tekmar thermostats will establish a communication network when the tN4 terminals are connected to a tN4 bus. All Thermostats are assigned an address number on the network. The address includes the bus water temperature designation and device number. Bus water temperature designations are available as Boiler (b), Mix1 (1), Mix2 (2), Etc. The device number can range from 1 to 24. To check the address number for a thermostat go to the miscellaneous menu and the number is displayed in the Item field. The LCD will flash "Auto" then "B:AA" where B is the bus number and AA is the address number. The 'Auto' means the address number has been automatically assigned. It is important to keep track of the address numbers to be able to troubleshoot when the thermostat encounters an error. The literature for each thermostat includes a Job Record Sheet which is a good place to record the data.

When the thermostat encounters a error, a Warning Symbol appears in the upper right corner of all thermostat displays and the tekmar boiler control. The thermostat with the error will display the error in the view menu (as long as the thermostat is in the 'Installer' or 'Advanced" access modes. Refer to the thermostat data brochure for resolution of the error. Note if the thermostat is in the 'View' menu, the 'Item' button must be pressed until the error is displayed. If the thermostat is in another menu, then press the 'Menu' button and the 'View' menu will display the error without the need to scroll with the 'Item' button.

When the thermostat encounters a error, a Warning Symbol appears in the upper right corner of all thermostat displays and the tekmar boiler control. The thermostat without the error will display the device address in the view menu (as long as the thermostat is in the 'Installer' or 'Advanced" access modes. Refer to the thermostat data brochure for resolution of the error. Note if the thermostat is in the 'View' menu, the 'Item' button must be pressed until the error is displayed. If the thermostat is in another menu, then press the 'Menu' button and the 'View' menu will display the error without the need to scroll with the 'Item' button.

When the thermostat encounters a error, a Warning Symbol appears in the upper right corner of all thermostat displays and the tekmar boiler control. The tekmar boiler control will also display the device address with the error in the view menu. When in the 'View' menu, scroll with the 'Item' button until the error is displayed. Note as well that a tekmar boiler control will also display other error messages associated with the sensor connections an internal settings. Refer to the data brochure for resolution recommendations of the error.

Finally, the tekmar boiler controls will keep track of the number of devices (thermostats) on the network. If the device count changes (a thermostat is removed from the network, for example), the tekmar boiler control might display the 'Warning Symbol'. Sometimes the error message will clear automatically and other times the error message will remain. To clear the error message, in the "View" menu, scroll with the 'Item' button until the error is displayed. Then press and hold and 'Up' and 'Down' arrow buttons until the error is removed.

Key to Common Symbols

- Line Voltage "Hot" (Multi-colored)
- Line Voltage "Neutral" (Gray-Scale)
- Low Voltage & Sensor Wires (Multi-colored)
- Wire Connections
- Service Switch
- 18-2 Individual Conductors within a multi-conductor Low Voltage Cable

Individual Conductors shown as Dashed are Depicted for Visual Clarity Only

Wiring Notes:

- It is important to prevent induced electrical interferencx in sensor wiring. Do not run RTU or other sensor wires alongside line voltage wiring of near motor contactors. If necessary, cross the line voltage and sensor wires perpendicular to each other. If large motors, heat pumps or other sources of electrical noise such as electronic boiler ignition systems are located near the sensors, then shielded cable of metal conduit is required for RTU or sensor wiring.
- Refer to equipment data sheets for additional wiring and operational details and safety information not described in this wiring diagram.
- For clarity, grounding of equipment is omitted on this wiring diagram. All equipment should be grounded in accordance with NEC and local codes.

DRAWING SCALE Not to Scale

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RADIANT PANEL HEATING SYSTEM

Job: KEBERLY
Job #: 0311-04
Rev.: -
page x of x.
CONTROLS WIRING DIAGRAM
Date
by: David