Introduction

The Thermostat 518 accurately controls the room temperature for a hydronic heating zone using Pulse Width Modulation (PWM) technology. Simple up and down buttons and a display with large type make this thermostat easy to read and use. The 518 automatically detects a single auxiliary sensor to measure either outdoor, floor or remote room temperature. This easy to install thermostat is a direct replacement for tekmar Thermostats 507 and 508.

Energy Saving Features

- Away Input
- Auto Heating Cycle

Additional Features

- Radiant Floor Heating
- Pulse Width Modulation
- Auxiliary Sensor Input
- Outdoor & Floor Temperature Display
- Backlight
- Freeze Protection
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Important Safety Information

This is a safety-alert symbol. The safety alert symbol is shown alone or used with a signal word (DANGER, WARNING, or CAUTION), a pictorial and/or a safety message to identify hazards.

When you see this symbol alone or with a signal word on your equipment or in this Manual, be alert to the potential for death or serious personal injury.

This pictorial alerts you to electricity, electrocution, and shock hazards.

⚠️ WARNING

This symbol identifies hazards which, if not avoided, could result in death or serious injury.

⚠️ CAUTION

This symbol identifies hazards which, if not avoided, could result in minor or moderate injury.

⚠️ NOTICE

This symbol identifies practices, actions, or failure to act which could result in property damage or damage to the equipment.

⚠️ WARNING

Read Manual and all product labels BEFORE using the equipment. Do not use unless you know the safe and proper operation of this equipment. Keep this Manual available for easy access by all users. Replacement Manuals are available at tekmarControls.com

NOTICE

Do not attempt to service the thermostat. There are no user serviceable parts inside the thermostat. Attempting to do so voids warranty.
**Installation**

**Preparation**

**Tools Required**
- tekmar or jeweller screwdriver
- Phillips head screwdriver
- Wire Stripper

**Materials Required**
- 18 AWG LVT Solid Wire (Low Voltage Connections)

**Removing The Thermostat Base**

To remove the thermostat base:
- Locate the tab on the bottom of the thermostat.
- Push the tab with either your thumb or with a screwdriver.
- Lift the thermostat front away from the thermostat’s base.

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**WARNING**

- It is the installer’s responsibility to ensure that this thermostat is safely installed according to all applicable codes and standards.
- Improper installation and operation of this thermostat could result in damage to the equipment and possibly even personal injury or death.
- This thermostat is not intended for use as a primary limit control. Other controls that are intended and certified as safety limits must be placed into the control circuit.

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**NOTICE**

Consider the following:
- Interior Wall.
- Keep dry. Avoid potential leakage onto the control.
- Relative Humidity less than 90%. Non-condensing environment.
- No exposure to extreme temperatures beyond 32-122°F (0-50°C).
- No draft, direct sun, or other cause for inaccurate temperature readings.
- Away from equipment, appliances, or other sources of electrical interference.
- Easy access for wiring, viewing, and adjusting the display screen.
- Approximately 5 feet (1.5 m) off the finished floor.
- The maximum length of wire is 500 feet (150 m).
- Strip wire to 3/8" (10 mm) for all terminal connections.
- Use standard 8 conductor, 18 AWG wire.

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**Installation Location**

Choose the placement of the thermostats early in the construction process to enable proper wiring during rough-in.
Mounting The Thermostat

**WARNING**

To prevent the risk of personal injury and/or death, make sure power is not applied to the thermostat until it is fully installed and ready for final testing. All work must be done with power to the circuit being worked on turned off.

Please be aware local codes may require this thermostat to be installed or connected by an electrician.

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**If mounting directly to the wall:**

- Drill holes using a 3/16” drill bit and install the wall anchors.
- Feed the wiring through the large hole in the thermostat base.
- Fasten the thermostat base to the wall using the wood screws to the wall anchors.
- Terminate wiring to the wiring strip. Do not over tighten wiring screws. Hand tighten only.
- Push the thermostat front onto the thermostat base.

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**If a single gang box is used:**

- Adapter Plate 012 is required (sold separately).
- Feed the wiring through the hole in the adaptor plate and the thermostat base.
- Fasten the adaptor plate to the gang box.
- Fasten the base of the thermostat to the adaptor plate.
- Terminate wiring to the wiring strip. Do not over tighten wiring screws. Hand tighten only.
- Push the thermostat front onto the thermostat base.

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**If mounting directly to the wall:**

- Drill holes using a 3/16” drill bit and install the wall anchors.
- Feed the wiring through the large hole in the thermostat base.
- Fasten the thermostat base to the wall using the wood screws to the wall anchors.
- Terminate wiring to the wiring strip. Do not over tighten wiring screws. Hand tighten only.
- Push the thermostat front onto the thermostat base.
Thermostat Wiring

Zone Valve

Wiring Center 315 or 316

Relay 003

Install field jumper wire R to Rh

Optional Slab Sensor 079

Do not over tighten wiring screws. Hand tighten only.

Install field jumper wire R to Rh

Optional Slab Sensor 079

Do not over tighten wiring screws. Hand tighten only.

Install field jumper wire R to Rh

Optional Slab Sensor 079

Do not over tighten wiring screws. Hand tighten only.

24 V (ac)
Transformer 009

Install field jumper wire R to Rh

Optional Slab Sensor 079

Do not over tighten wiring screws. Hand tighten only.

Install field jumper wire R to Rh

Optional Slab Sensor 079

Do not over tighten wiring screws. Hand tighten only.

Wiring Center 315 or 316

Install field jumper wire R to Rh

Optional Slab Sensor 079

Do not over tighten wiring screws. Hand tighten only.

Relay 003

Install field jumper wire R to Rh

Optional Slab Sensor 079

Do not over tighten wiring screws. Hand tighten only.
Testing the Thermostat Wiring

Testing the Power

If the thermostat display turns on, this indicates that the thermostat is operating correctly and there are no electrical issues. In the event that the display is permanently off:

1. Remove the thermostat front.
2. Use an electrical meter to measure voltage between the R and C wiring terminals. For AC power supplies the voltage should measure between 10 to 30 V (ac). For DC power supplies the voltage should measure between 10 to 30 V (dc).
3. If the voltage on the R and C wire terminations is continuous and the thermostat display is not on, the thermostat may have a fault. Contact your tekmar sales representative for assistance.

If the thermostat display initially powers on but later shuts off intermittently, there may be a short circuit from the W wire to ground, or the power supply is too small to power the load.

Testing the Heat Zone Output Wiring

1. Touch the △ button and set the heating temperature above the current room temperature. Make sure the display does not flash “Max” if using a floor sensor.
2. When the “Heat On” symbol appears on the display, use an electrical meter to check for voltage on the W and C wires connected to the zone valve, wiring center, relay or switching relay. The electrical meter should read 10 to 30 V (ac) or (dc).
3. If the W and C wire have voltage, check the zone valve, wiring center, relay or pump to determine if the heat device is operating correctly.
User Interface

Home Screen

Symbols Description

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
</table>
| **Heat On** | HEAT ON  
Heat is turned on. |
| **MIN** | MIN  
The floor is at or below the floor minimum temperature. |
| **MAX** | MAX  
The floor has reached the floor maximum temperature. |
| **WARNING SYMBOL** | Indicates an error is present. |
| **AWAY** | Operating at the away temperature. |

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Sequence of Operation

Heating Operation

Push the △ or ▽ button to select a preferred temperature setting. The Heat On symbol is shown on the display when the thermostat is heating. The heat can cycle on and off within +/- 1.5°F (1°C) of the temperature setting.

The floor and air heating can be shut off by holding the ▽ button until Set Room is Off. To resume heating when the Mode is Off, press the △ button to navigate to the Mode setting, then press the △ button to select Mode Heat. The thermostat will resume heating at the last previously set temperature.

The away feature saves energy by heating to a lower temperature while you are away. To activate Away, short the Away and Com wiring terminals together.

Air Temperature Only

If there is only an air temperature sensor (no floor sensor), the thermostat operates to control your desired air temperature.

Floor Temperature Only

If the air sensor has been disabled, the thermostat will only maintain floor temperature and ignore air temperature. This operation is recommended for areas such as bathrooms to ensure that tile floors are warm to the touch.

Floor and Air Temperature

If the air sensor is turned on and a floor sensor is connected, the thermostat will maintain the desired air temperature as well as a minimum floor temperature.

This operation is recommended for areas with large windows that allow the sun to shine into a room and keep it warm without the need for heat. This can allow the floors to cool off during the afternoon. When the sun goes down, it can take a long time for the floors to get warm again. This may cause the room to cool off too much in the early evening. A floor minimum setting can help with this condition by maintaining a floor minimum temperature. Keep in mind the floor minimum temperature will override the air temperature, and if set too high, may overheat the room.

This operation is also recommended for rooms with hardwood floors. Setting floor minimum and maximum temperatures is a way of enhancing the comfort of the living space while protecting floor coverings.

- 90°F (32°C) Feels hot to the touch { Suggested maximum for all floor types other than wood.
- 80 to 85°F (26 to 30°C) Feels warm to the touch { Bathrooms and kitchens. Suggested maximum for wood floors.
- 70°F (21°C) Feels cool to the touch { Rooms with large windows preventing under heating in the evening.
- 40 to 45°F (5 to 7°C) Feels cold to the touch { Freeze protection for garages.

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# Programmable Settings

<table>
<thead>
<tr>
<th>Setting</th>
<th>Display</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>User settings</strong></td>
<td></td>
<td>Press the △ and ▽ buttons together for 3 seconds to enter and advance to the next setting.</td>
</tr>
<tr>
<td><strong>MODE</strong> Select heat or off.</td>
<td>MODE HEAT</td>
<td>Range: HEAT, OFF</td>
</tr>
<tr>
<td><strong>UNITS</strong> Select the temperature units.</td>
<td>UNITS °F</td>
<td>Range: °F or °C</td>
</tr>
<tr>
<td><strong>LIGHT</strong> Select when the display backlight should operate. Auto operates the backlight for 30 seconds after a keystroke.</td>
<td>LIGHT AUTO</td>
<td>Range: OFF, AUTO, ON</td>
</tr>
<tr>
<td><strong>SET FLOOR</strong> Set the floor minimum temperature. Available when an auxiliary floor sensor is connected and the built-in room sensor is on.</td>
<td>SET FLOOR 72</td>
<td>Range: OFF, 40 to 122°F (4.5 to 50.0°C)</td>
</tr>
<tr>
<td><strong>TYPE</strong> Device Type number. Hold the △ button to view the software version.</td>
<td>TYPE 518</td>
<td></td>
</tr>
<tr>
<td><strong>ESCAPE</strong> Release the △ and ▽ buttons to return to the home screen.</td>
<td>ESCAPE</td>
<td></td>
</tr>
</tbody>
</table>

| Installer settings. Press the △ and ▽ buttons together for 5 more seconds. |
|--------------------------|---------|-------------|
| **AUXILIARY SENSOR** Select the type of auxiliary sensor. Available when an auxiliary sensor is automatically detected. | AUX SENSR NONE | Range: NONE = no auxiliary sensor, ROOM = Indoor Sensor, FLOR = Slab Sensor, OUT = Outdoor Sensor | Default: OFF |
| **ROOM SENSOR** Select if the built-in room temperature sensor is on or off. The built-in room sensor can only be disabled when an auxiliary room or slab sensor is connected. | SENSOR ON | Range: ON or OFF | Default: ON |
| **SET FLOOR MAXIMUM** Set the floor maximum temperature in order to protect the floor covering. Suggested settings: Tile = 90°F (32°C), Wood Floor = 85°F (29°C) | SET FLOOR MAX 85 | Range: 40 to 122°F (4.5 to 50.0°C), OFF | Default: 85°F (29.5°C) |
| **SET AWAY** Set the away temperature. | SET AWAY 50 | Range: OFF, 40 to 122°F (4.5 to 35.0°C) | Default: 50°F (10.0°C) |
| **ESCAPE** Release the △ and ▽ buttons to return to the home screen. | ESCAPE | | |
## Troubleshooting

### Error Messages

<table>
<thead>
<tr>
<th>Error Message</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SETUP MENU SAVE ERROR</td>
<td>The thermostat failed to read the Programmable Settings from memory and has reloaded the factory default settings. The thermostat stops normal operation until all Programmable Settings are checked except to provide freeze protection.</td>
</tr>
<tr>
<td>ROOM SENSOR OPEN CIRCUIT ERROR</td>
<td>The built-in air temperature sensor has an open circuit fault. Do not confuse this error with the auxiliary room sensor short circuit error. This error cannot be field repaired. Contact your wholesaler or tekmar sales representative for details on repair procedures.</td>
</tr>
<tr>
<td>ROOM SENSOR SHORT CIRCUIT ERROR</td>
<td>The built-in air temperature sensor has a short circuit fault. Do not confuse this error with the auxiliary room sensor short circuit error. This error cannot be field repaired. Contact your wholesaler or tekmar sales representative for details on repair procedures.</td>
</tr>
<tr>
<td>AUXILIARY SENSOR OPEN CIRCUIT ERROR</td>
<td>The auxiliary sensor has an open circuit. Check for loose or damaged wires. Locate and repair the problem as described in the sensor Installation &amp; Operation Manual (070_D, 079_D). The error clears once the auxiliary sensor fault is corrected. If the auxiliary sensor was intentionally removed, power the thermostat down and up to clear the error.</td>
</tr>
<tr>
<td>AUXILIARY SENSOR SHORT CIRCUIT ERROR</td>
<td>The auxiliary sensor has a short circuit. Check for damaged wires. Locate and repair the problem as described in the sensor Installation &amp; Operation Manual (070_D, 079_D). The error clears after the auxiliary sensor fault is corrected.</td>
</tr>
</tbody>
</table>
### Frequently Asked Questions

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Look for...</th>
<th>Corrective Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display powering on and off.</td>
<td>Measure voltage at wiring terminals R and C.</td>
<td>The power supply transformer may have limited VA capacity. A transformer with a larger VA rating is recommended.</td>
</tr>
<tr>
<td>Thermostat does not heat.</td>
<td>Mode Off</td>
<td>Thermostat must be in Mode Heat in order to provide heating.</td>
</tr>
</tbody>
</table>

### Technical Data

**Thermostat 518** *One Stage Heat*

<table>
<thead>
<tr>
<th>Literature</th>
<th>518_C, 518_D, 518_Q, 518_U</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>Microprocessor control. This is not a safety (limit) control</td>
</tr>
<tr>
<td>Packaged weight</td>
<td>0.53 lb. (240 g)</td>
</tr>
<tr>
<td>Dimensions</td>
<td>3-11/16” H x 3” W x 15/16” D (94 x 76 x 24 mm)</td>
</tr>
<tr>
<td>Enclosure</td>
<td>White PVC plastic, NEMA Type 1</td>
</tr>
<tr>
<td>Approvals</td>
<td>Meets Class B: ICES &amp; FCC Part 15</td>
</tr>
<tr>
<td>Ambient conditions</td>
<td>Indoor use only, 32 to 122°F (0 to 50°C), RH ≤90% non-condensing</td>
</tr>
<tr>
<td>Power supply</td>
<td>10 to 30 V (ac/dc), 50/60 Hz, 1.8 VA standby, 56 VA max fully loaded, Class 2</td>
</tr>
<tr>
<td>Relay</td>
<td>30 V (ac/dc) 2 A, Class 2 circuits</td>
</tr>
<tr>
<td>Sensor</td>
<td>NTC thermistor, 10 kΩ @ 77°F (25°C ±0.2°C) β=3892</td>
</tr>
<tr>
<td>– Included</td>
<td>None</td>
</tr>
<tr>
<td>– Optional</td>
<td>tekmar type # 070, 072, 073, 076, 077, 079, 084</td>
</tr>
</tbody>
</table>
Limited Warranty and Product Return Procedure

Limited Warranty The liability of tekmar under this warranty is limited. The Purchaser, by taking receipt of any tekmar product (“Product”), acknowledges the terms of the Limited Warranty in effect at the time of such Product sale and acknowledges that it has read and understands same.

The tekmar Limited Warranty to the Purchaser on the Products sold hereunder is a manufacturer’s pass-through warranty which the Purchaser is authorized to pass through to its customers. Under the Limited Warranty, each tekmar Product is warranted against defects in workmanship and materials if the Product is installed and used in compliance with tekmar’s instructions, ordinary wear and tear excepted. The pass-through warranty period is for a period of twenty-four (24) months from the production date if the Product is not installed during that period, or twelve (12) months from the documented date of installation if installed within twenty-four (24) months from the production date.

The liability of tekmar under the Limited Warranty shall be limited to, at tekmar’s sole discretion: the cost of parts and labor provided by tekmar to repair defects in materials and / or workmanship of the defective product; or to the exchange of the defective product for a warranty replacement product; or to the granting of credit limited to the original cost of the defective product, and such repair, exchange or credit shall be the sole remedy available from tekmar, and, without limiting the foregoing in any way, tekmar is not responsible, in contract, tort or strict product liability, for any other losses, costs, expenses, inconveniences, or damages, whether direct, indirect, special, secondary, incidental or consequential, arising from ownership or use of the product, or from defects in workmanship or materials, including any liability for fundamental breach of contract.

The pass-through Limited Warranty applies only to those defective Products returned to tekmar during the warranty period. This Limited Warranty does not cover the cost of the parts or labor to remove or transport the defective Product, or to reinstall the repaired or replacement Product, all such costs and expenses being subject to Purchaser’s agreement and warranty with its customers.

Any representations or warranties about the Products made by Purchaser to its customers which are different from or in excess of the tekmar Limited Warranty are the Purchaser’s sole responsibility and obligation. Purchaser shall indemnify and hold tekmar harmless from and against any and all claims, liabilities and damages of any kind or nature which arise out of or are related to any such representations or warranties by Purchaser to its customers.

The pass-through Limited Warranty does not apply if the returned Product has been damaged by negligence by persons other than tekmar, accident, fire, Act of God, abuse or misuse; or has been damaged by modifications, alterations or attachments made subsequent to purchase which have not been authorized by tekmar; or if the Product was not installed in compliance with tekmar’s instructions and / or the local codes and ordinances; or if due to defective installation of the Product; or if the Product was not used in compliance with tekmar’s instructions.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, WHICH THE GOVERNING LAW ALLOWS PARTIES TO CONTRACTUALLY EXCLUDE, INCLUDING, WITHOUT LIMITATION, IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, DURABILITY OR DESCRIPTION OF THE PRODUCT, ITS NON-INFRINGEMENT OF ANY RELEVANT PATENTS OR TRADEMARKS, AND ITS COMPLIANCE WITH OR NON-VIOLATION OF ANY APPLICABLE ENVIRONMENTAL, HEALTH OR SAFETY LEGISLATION; THE TERM OF ANY OTHER WARRANTY NOT HEREBY CONTRACTUALLY EXCLUDED IS LIMITED SUCH THAT IT SHALL NOT EXTEND BEYOND TWENTY-FOUR (24) MONTHS FROM THE PRODUCTION DATE, TO THE EXTENT THAT SUCH LIMITATION IS ALLOWED BY THE GOVERNING LAW.

Product Warranty Return Procedure All Products that are believed to have defects in workmanship or materials must be returned, together with a written description of the defect, to the tekmar Representative assigned to the territory in which such Product is located. If tekmar receives an inquiry from someone other than a tekmar Representative, including an inquiry from Purchaser (if not a tekmar Representative) or Purchaser’s customers, regarding a potential warranty claim, tekmar’s sole obligation shall be to provide the address and other contact information regarding the appropriate Representative.

WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. For more information: Watts.com/prop65

All specifications are subject to change without notice