Model T-9000
Wireless Environmental
Control

**T-9000**
 an innovative, battery operated, programmable thermostat.
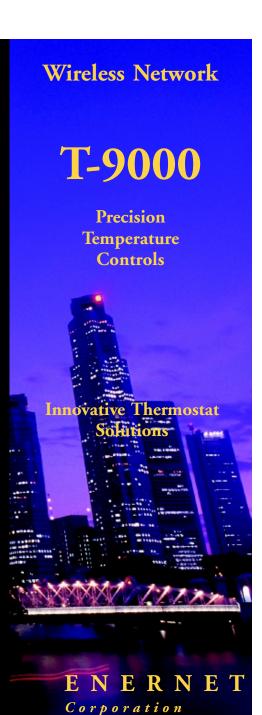
Uniquely designed to provide precision temperature and load control management to HVAC loads with intergal thermostat controls:

• Baseboard Elec.
• Window A/C
• PTAC
• Hydronic
• Other

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**Energy Savings • New Technology • Wireless • Load Management**

**Wireless Network**

# T-9000

**Precision Temperature Controls**

**Innovative Thermostat Solutions**

# E N E R N E T
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# T-9000 Wireless RF Thermostat



*Programmable, battery operated thermostat. . . .*

*Precision RF Temperature and Load Control*

*The T-9000 wireless RF thermostat is an innovative energy saving tool. Targeted to HVAC devices typically ignored such as window A/C, the T-9000 provides precision temperature control to an important class of building electrical load.*

*Bring precision control with resulting energy savings to:*

√ *Baseboard Electric Heat*

√ *Window A/C*

√ *Thru-wall PTAC*

√ *Hydronic Control Valves*

√ *Other*

## Background

Energy Service providers working in multi-family, low-income housing, dormitory or institutional buildings such as hospitals are often confronted with poorly controlled equipment with no viable cost effective way to handle it. HVAC loads like electric baseboard strip heat with integral thermostat control, Packaged Terminal Air Conditioning (PTAC) and window A/C are common examples. While properly located wall mounted precision thermostat controls can save energy, retrofit wiring is disruptive and cost-prohibitive. New technology line-voltage thermostats such as the Chronotherm™ from Honeywell Ltd. and the Lin-STAT® from PSG Industries, Inc., developed in conjunction with the Electric Power Research Institute (EPRI), report savings as high as 23% and 30% respectively in some applications over typical bimetal controls.

## Line-Voltage Thermostat Problems

A conventional bimetallic line-voltage thermostat combines the function of a temperature sensor, control logic, actuator and switch, in a highly integrated electromechanical device.

### Typical performance:

Accuracy - 6°F(> set point)
Droop - 5°F
Deadband - 8°F

Test observations of the generic line-voltage thermostat are indeed typical. A deadband as high as 10°F may be experienced. *(Heitz, E., "Thermostats: Small but Critical," Home Energy Update, March/April 1988.)*

## Energy Consumption and Comfort

Thermostat set points are selected based on the maintenance of a minimum acceptable temperature.

Temperature fluctuations from the T-9000 may not even be noticed since the deadband is very small. Conversely, the average occupant will perceive the typical 8°F deadband of a generic line-voltage thermostat such as those found on baseboard strip heat and window A/C. To maintain a minimum heated space temperature of 70°F the T-9000 thermostat may need to be set to 71°F to ensure comfort. The generic line-voltage thermostat on the other hand, with its 8°F deadband, may need to be set as high as 78°F to ensure comfort. If the average indoor temperature required to provide equivalent comfort is about 4°F higher, the energy consumption for the bimetallic thermostat will be higher by 28 percent compared to that of an electronic thermostat. *(EPRI RP 3512-05, Testing and Evaluation of Line-Voltage Thermostats)*

## T-9000 Setback Savings

"Programmable thermostats, when used properly can save consumers 20-30% on heating and cooling bills". *(EPA Energy Star FAQ Page)*

"A double setback (at night as well as during the day) can result in up to 30% savings". *(Greenbuilder - Sustainable Building Sourcebook)*

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The T-9000 RF thermostat system provides a powerful new energy conservation tool. Adding precision control to poorly controlled heating and cooling devices such as window A/C and baseboard electric heat, ensures long-term persistent energy savings.

- • **Energy Savings**
- • **Easy to Install**
- • **Low-cost Retrofit**
- • **916 mHz Network**
- • **Load Control**

## APPLICATION

The T-9000 RF thermostat system consists of a battery operated thermostat and one or more Remote Control Nodes (RCN). An RCN interfaces as needed with the equipment being controlled. Unique addressing is automatically handled during installation, ensuring each thermostat system operates only its associated RCN device(s). A thermostat, logically linked to multiple RCN devices can for example, control several window A/C units or a window A/C and one or more baseboard electric heat strips. Any combination of heating and cooling device control can be done. The user can operate the thermostat manaually or program up to four heating and cooling setback times and temperatures for each day. Simultaneously, each T-9000 system can be part of a larger building-wide local operating network, allowing extensive control management for load curtailment programs, energy management, unoccupied setback or other operational strategies.

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