

Taco Radiant Made Easy Application Guide

Outdoor Boiler Reset

Operating Mode
OM01

EFFECTIVE: March 1, 2004

SUPERSEDES: New

How a Heating System Works.



When air temperature in a house drops below the thermostat setting, a signal is sent for the boiler to turn on and warm up the house. Unfortunately the thermostat only tells the boiler to turn on when the house is too cold or turn off when the house is too warm. There is no in-between.

How many miles per gallon would a car get if the only method of controlling the speed was to accelerate until it's going too fast and then apply the brakes? That is exactly how a conventional heating system is working. The boiler heats up (car accelerating) until the house is too warm (driving too fast) and the thermostat (brakes) turns the boiler off.

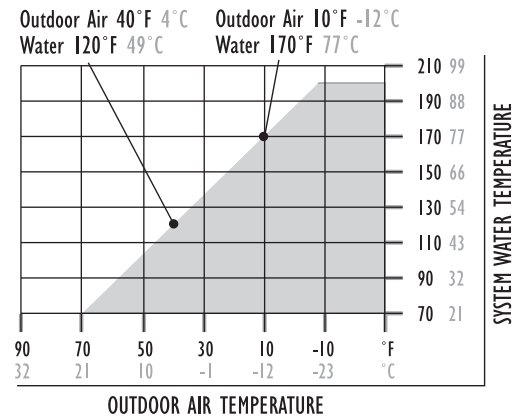
How a Heating System Should Work.

The car's gas pedal is adjusted to maintain a comfortable driving speed and good fuel economy. Why not the same with a heating system? By adding a Taco Outdoor Reset Control, heating system water temperature is adjusted to maintain comfort and improve system efficiency.

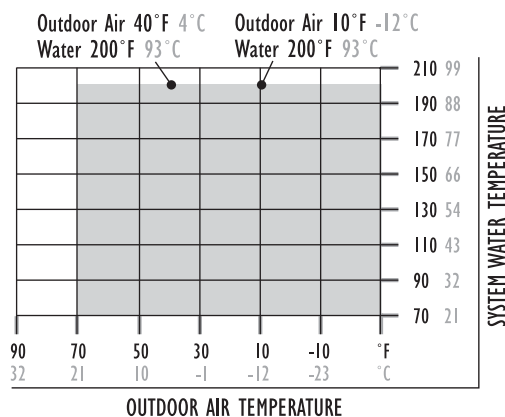
It's Not the Heating System's Fault.

Without a Taco Outdoor Reset Control, the heating system does not know if it is a cool autumn night or the coldest winter day. Therefore it works as if it's always the coldest day of the year and heats the water to a maximum temperature.

With a Taco Control



Thermostat Only



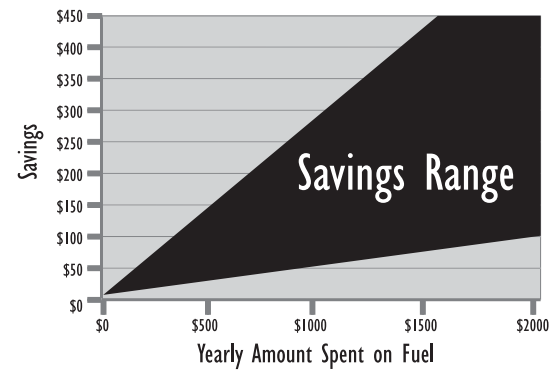
Benefits:

- Increased comfort
- Less fluctuation of indoor temperature
- Reduced expansion noises
- Evens out heat delivery, reducing cold spots
- Reduced possibility of thermal shock
- Energy savings

Products:

- PC700 – Boiler Reset Control
- PC702 – Two Stage Boiler Reset Control

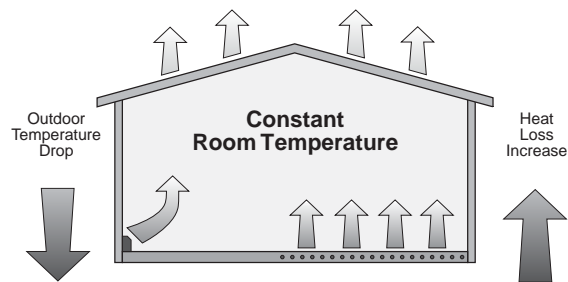
Savings from 5% to 30%



How Much Can be Saved?

Outdoor reset controls are not a new concept. Most controls are installed in commercial applications such as office buildings, apartment houses and churches. Savings will vary depending on many factors, but an energy study performed by the Environment and Energy Resource Center in St. Paul, Minnesota showed that outdoor reset controls saved an average of 14%.

Match Heat Supplied to Heat Lost.



The heat supplied to the building is directly proportional to the temperature of the water and the surface area of the heating element. The higher the temperature of the water flowing through the heating terminal, the higher the heat output.

The heat lost from a building is dependent on the outdoor temperature. As the outdoor temperature drops, the building heat loss increases.

These two facts lead to the concept of outdoor reset, based on a reset ratio, which increases the supply water temperature as the outdoor temperature drops. Using this approach, the heat lost from the building is matched by the heat provided by the terminal units.

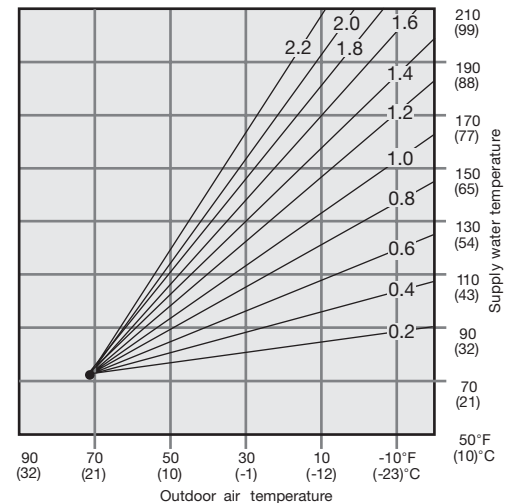
Reset Ratio.

The Reset Ratio sets the relationship between outdoor temperature and supply water temperature. It determines the amount the supply water temperature is raised for every 1 degree outdoor temperature drop. For example, if a Reset Ratio of 1.2 is selected, the supply water temperature is increased by 1.2 degrees of every 1 degree of outdoor temperature drop. The reset ratio is set using the following formula:

$$\text{Reset Ratio} = \frac{\text{Design Supply Temperature} - 72^{\circ}\text{F}}{72^{\circ}\text{F} - \text{Design Outdoor Temperature}}$$

The PC700 and PC702 Boiler Reset Controls automatically determine the reset ratio by setting the following 4 adjustments:

- Outdoor Starting Temperature
- Boiler Starting Temperature
- Outdoor Design Temperature
- Boiler Design Temperature



Radiant Made Easy™

TACO, INC., 1160 Cranston Street, Cranston, RI 02920 Telephone: (401) 942-8000 FAX: (401) 942-2360.

TACO (Canada), Ltd., 6180 Ordan Drive, Mississauga, Ontario L5T 2B3. Telephone: 905/564-9422. FAX: 905/564-9436.

Visit our web site at: <http://www.taco-hvac.com>

Printed in USA

Copyright 2004

TACO, Inc.