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**INDUSTRY COMMENTS – EPA MEETING HELD JANUARY 11, 2006
ENERGY STAR PROGRAM FOR PROGRAMMABLE WALL THERMOSTATS**

Following are comments from GE Control Products, Morrison, Illinois regarding a new proposal for EPA Sponsored Energy Star Program and requirements for wall thermostats:

At the meeting, EPA proposed a totally new Energy Star Program for programmable wall thermostats, that would eliminate the feature and performance requirements of the thermostats, and replace it with an educational program which would emphasize user behavior to achieve maximum energy savings from the heating and air conditioning of their homes. The program would apply to all thermostat users, including non-programmable thermostats where users either do or could be informed on how to maximize savings from non-programmable thermostats.

GE's position on this subject is that an educational program would be an important part of achieving energy savings which would address the findings that perhaps less than 50 % of users with manual or programmable thermostats do not use them for set back at night, and less than 7 % set back during the day when not at home. An educational program is definitely needed, and the EPA Proposal set forth at the meeting is a good outline of a program.

Thermostat Features and Design

GE does not subscribe to a total elimination of feature and performance requirements for programmable thermostats. Even with the educational program, in order for users to maximize energy savings, the thermostat should have some minimum number of feature and performance requirements, without making the thermostats too design restrictive or difficult to use. A way of making the thermostats recognized as Energy Star, like the current Energy Star label, would be appropriate. The label should be removable from the thermostat.

Suggested Features:

Programming Days – 7-Day with Copy Key, 5-2 Day, or 5-1-1 Day would be acceptable.
7-Day is preferred.

Programming Periods - (4) Programming Periods per Day.

Period Names- WAKE, LEAVE, RETURN, and SLEEP are the most descriptive of people's daily routines and should be the standard terminology.

Default, or Pre-Programming – An installed program assures that a program is available for people who do not understand the programming procedure.

Loss of Power

Program Memory and temperature settings to be non-volatile in case of battery or power failure.

Clock Memory hold by battery or 2-hours by capacitor on hardwired models.

Temporary Override – For short periods until next programmed time.

Permanent Override (HOLD) – For longer override times. Temperature will remain at the HOLD temperature until the HOLD period is taken off. Most often, this would

be for vacation periods at a lower heating temperature or higher cooling Temperature. People should be given the HOLD option. They will figure out a way around it if it isn't there. For vacations, it would require re-programming of the thermostat if HOLD isn't available.

Recovery from Set Back

Conventional Recovery – Considered as a minimum feature. It does not lend itself to maximum energy efficiency. Users must set the initiating time ahead of their normal WAKE time for the house to be warm. As the outdoor temperatures change during a season, the initiation time may come sooner than outdoor conditions require, so energy is wasted.

Adaptive Recovery – This is the preferred recovery type for maximum energy savings. It starts the system ahead of the programmed time, and completes the recovery at the programmed time, taking into account changes in outdoor temperature during the season. There are several types of Adaptive or Intelligent Recovery designs on the market, each using feedback information from previous recoveries or other calculations to determine the next initiation time. Some are totally adaptive and some are partially adaptive. Continuous running of the equipment during recovery eliminates the user complaint that cycling of the system during recovery is annoying during sleep hours. Adaptive Recovery should be the default or preferred type.

Heat pump Systems with Auxiliary Heat - For heat pumps with auxiliary heat, there should be a requirement for a means to hold off the auxiliary heat during the recovery unless required to complete the recovery at the programmed time. There is no need to use auxiliary heat for recovery if the heat pump alone can complete the recovery. Unnecessary use of auxiliary heat wastes energy.

Cycling Control –A means of providing some selection of cycle times to adapt to various types of heating systems and installation differences. Besides maintaining an acceptable Operating Differential (or Swing), another reason is to minimize temperature overshoot when the heating system shuts off. The ability to select a faster cycle reduces overshoot. Temperature overshoot wastes energy.

Cycling Control by Adjustable Differential – A minimum of (3) selectable differential values is required. Example: 0.5° F, 1.0° F, 2.0° F. Default 1.0°.

Cycling Control by Cycle Rate Control - (Cycle Rate at 50% Duty Cycle as described in NEMA DC-3.) A minimum of (3) selectable values of cycle rates.
Example: 3 CPH, 5 CPH, 7 CPH Heating, 2 CPH, 3 CPH, 4 CPH Cooling.
Default 5 CPH Heating, 3 CPH Cooling.

Performance

Performance should remain a self-certifying item, with the NEMA DC-3 Type Thermostat Chambers and Procedures as the preferred method. The NEMA Chamber is not an exact representation of room temperature control, but is the best available for comparing thermostat performance, and is a reasonable indication of expected temperature control values. This is because the chambers have the capability of providing many of the system and application variables found in actual installation and equipment conditions.

Special Required Features

Filter Monitor – Clogged or blocked filters are one source of poor heating and airconditioning equipment efficiency. If the goal is energy saving, then a filter monitor as described in the draft should be included.

Battery Models - The specification should be that battery life must be a minimum of one-year. The type of battery should not be specified. A “LO BATT” indication must be provided on the LCD display.

Auxiliary Heat Operation – Either an indicator light or LCD icon should be displayed when the auxiliary heat is energized. This, too, can aid in energy saving. If a user sees the AUX indication on the display or thermostat, a way of saving energy is to lower the temperature setting one or two degrees to lower the time that the auxiliary heat is on.

Backlighting – The 5 – 10 second period in the draft is O.K. for battery models;
However , some hardwired thermostats have the option of energizing
the backlighting continuously, or have a 5 – 10 second period.

Feature and operational Definitions.- In any EPA Energy Star Standard, terminology and definitions should be the same as those in NEMA DC-3, which are basically Industry standard terminology and definitions for thermostat design and performance.

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