

## Heat Computers, by Carla L. Romita The Mann Report, March 2006

As fuel prices rise, property owners have several energy saving options available to them. One solution is to install a heating control system.

Sorting through the maze of manufacturers is confusing. A prudent owner will ask: (i) How involved do I want to be in operating the system? (ii) What type of savings can I expect to achieve? (iii) What are the different capabilities of the systems? and (iv) Will spending more money on a system result in greater fuel savings and cost reduction?

Automatic heating system controls fall into two categories, indirect monitoring control (IMC) systems and direct monitoring control (DMC) systems. Each controls the starting and stopping of the heating plant, but the percent of fuel savings varies significantly.

IMC systems monitor outside air temperature, boiler steam pressure, condensate return temperature, boiler discharge hot water temperature and return water temperature. IMC systems run longer and at higher temperatures the colder the outdoor temperature gets. This raises the water or steam pipe temperatures to deliver more heat. These systems often overheat the space because there is no monitoring of the actual space being heated. Tenants typically open windows to cool off apartments; wasting energy.

IMC systems are difficult to set up and maintain. Frequently the superintendent overrides the controls to satisfy tenants who complain about a lack of heat. Building owners have no way of knowing the actual apartment temperatures and have no record of how often the IMC is bypassed. These systems do not record the history of heating equipment's on and off cycles.

DMC systems use temperature sensors installed in selected apartments to control the heating plant. DMC systems can provide hourly recordings to owners documenting actual space temperatures.

Sensors are located along interior walls away from radiators, usually in a living room or bedroom. The heating plant is commonly commanded to start generating heat when a majority of sensors report that the space temperature is below 70 degrees and to stop when a majority of the sensors report the space temperature to be above 72 degrees. Studies performed by New York State Energy Research and Development Authority (NYSERDA) demonstrate that DMC systems can typically achieve savings 15% greater than IMC systems.

All DMC systems function similarly, but ease of installation and operation varies dramatically depending on the manufacturer. DMC systems can be broken down into two distinct categories: (i) text based, hard-wired systems and (ii) graphics based, wireless temperature systems. Text based systems rely on running wires from a control panel in the boiler room to the inside of each monitored apartment. Graphics based wireless systems use wireless temperature sensors to transmit the space temperature to the control system, eliminating the expense, inconvenience, and tenant resistance involved in running wires throughout the building.

Both text and graphics based systems incorporate remote connection to a central computer. Phone lines are the most popular and least expensive connection method, but internet connections are making their way into the market.

Dramatic differences in appearance and ease of use between the DMC text and graphic systems become obvious during operation. Some text based systems require the user to constantly press a key on the keyboard to update temperature readings. The user must shift through many different screens to look up historical operating data such as daily burner run time and average daily indoor and out door temperature. The data is confusing to view and hard to understand. Lack of memory to store operating data or failure to download the data in a timely manner can leave the owner vulnerable to fines from the NYC Department of Housing Preservation and Development if reports cannot be produced for dates coinciding with a notice of violation for a no-heat complaint.

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Text based DMC systems are a "one size fits all" product. The only real differences are the number of sensors they use to monitor the space temperatures. They lack the ability to perform other functions such as monitoring burner lead/lag, burner fuel modulation, lighting control, key card access, utility metering and sub-metering, including electric, water, oil, and natural gas usage.

Newer graphics based wireless systems are very user friendly and hold substantially more operating history. Custom color graphics depicting the heating plant and space temperatures are depicted in real-time. Adjustment of temperature settings and viewing other information are simple point and click functions.

Graphics systems convert historical data into usable information in easy to read tabular format. The user can export the information to Microsoft Excel to create customized reports. They can hold six months of information before requiring a download of information for permanent record keeping. They can be expanded and customized to control burner lead/lag, full burner modulation, and control zone valves. Graphics based systems are slightly more expensive when they are customized with various options. However, a basic text based heat computer installation and a basic graphics based heat computer installation are comparable in cost. Some manufacturers offer remote monitoring of the building as a service while others offer a dial-out service to a boiler service contractor when an alarm is detected within the system.

You should carefully consider ease of use, presentation of information and the degree to which the reports can be customized to suit your needs. No two buildings use energy in exactly the same way. Customizability of a heating control system to the needs of each building is a significant advantage. Your fuel oil dealer or service provider can help you decide which system will best suit your needs.