

## Home Energy Management Systems



### Equipment Description:

Home Energy Management Systems (HEMS) automate the adjustment of heating and air conditioning settings and timing of indoor and outdoor lighting that meets the homeowner's schedule. Technology advancements have evolved HEMS into comprehensive residential systems capable of controlling for virtually all energy-consuming equipment, identifying energy savings opportunities, and providing the homeowner energy consumption information.

HEMS use a number of interconnected electronic components to provide energy monitoring and control of selected devices, appliances and equipment to reduce energy costs. These systems are capable of controlling equipment operations by recognizing internal and external environments to reduce energy consumption without the homeowner's intervention.

HEMS may have one or more digital user interface portal(s), such as countertop or wall-mounted touch screen displays, CPU, software, programmable thermostats, electronic equipment controllers, smart

appliances, smart plugs and power strips, lighting and window controllers, and communication interfaces. These components work together with the home smart meter to optimize energy use based on user-defined settings and input conditions. Though set-back thermostats and other HEMS devices are relatively simple to install, integrated and networked HEMS installations should be installed by qualified personnel to assure proper operation.

### Energy Savings & Carbon Footprint:

Home energy management systems can help homeowners significantly reduce energy consumption while reducing a home's carbon footprint.

- Standalone HEMS without displays can save an estimated 5% of overall energy use.
- Non-networked HEMS with visual displays are estimated to save up to 10% of overall home energy use. This increase is due to the display being a constant reminder for the homeowner, which can cause them to take action.
- Networked HEMS that have displays and are connected to the home network can save homeowners as much as 20% on their energy bills. Networked communications of these systems enable connection and exchange of information from smart meters and the utility company. This enables the homeowner to participate in demand-response programs, while enabling them to reap greater savings by reducing energy consumption when utility rates are higher under variable rate cost structures.

### Maintenance Tips:

- Check that infrared occupancy sensors are not obstructed by other objects. These devices will not be able to operate properly if blocked, leading to misoperation and loss of control.
- Make sure that system setting overrides are reset after use so that the system will return to normal.
- Vacuum smart power strips regularly to avoid buildup of dust. The vacuum is able to draw dust away from exposed electrical parts versus wiping down which can cause dust to lodge in the power strip.
- Review energy bills and HEMS generated usage reports on a regular basis to confirm that all equipment and appliances are functioning as expected and that savings is being recognized.
- Check that the HEMS system is functioning properly and communicating with all connected home equipment following a temporary power outage or loss of home network connectivity.

### Loss Prevention:

HEMS contain sensitive electronic components which can be susceptible to voltage fluctuations and power line disturbances. Such disturbances can result in system failure, loss of data, or alteration of data and settings. This can cause the misoperation of home equipment and appliances resulting in loss of energy savings, increased energy costs, and even potential damage to the equipment being controlled.

- Proper grounding of HEMS equipment and adequate home surge protection are essential to mitigating problems from power line disturbances.
- Never leave open liquids near HEMS control panels or displays. If liquids get into these components they can cause the HEMS components to fail, resulting in costly repairs.
- Adhere to maximum loads requirements specified by the manufacturer for smart plugs and smart power strips. Overloading these devices will lead to premature failure and could result in a fire.
- Do not attempt to bypass or alter operations of HEMS components or thermostats. If the system is not operating properly, have a trained system professional perform diagnostics and corrections.
- Make sure that communication networks are secure and password protected. This will ensure that operation of the system will not be compromised by hackers and that system data remains secure.