

## CSI SECTION 255110

### INTEGRATED GUESTROOM CONTROL SYSTEM

This document defines and specifies an integrated guestroom control system using both wired and wireless modes of communication. The wireless communication required to control the system uses diffusive infrared (IR) technology, which is immune to interference by fluorescent lighting and does not require direct line of sight for effective communication.

This specification is provided in the format recommended by the Construction Specifications Institute (CSI).

#### PART 1 – GENERAL

##### 1.1 SUMMARY

- A. Provide a complete, integrated guestroom control system using wired or wireless IR technology for the following:
  - 1. HVAC equipment.
  - 2. Lighting.
  - 3. Central electronic access control.
  - 4. Integrated telephony and room controls.
  - 5. Integrated VOIP telephony and room controls.
  - 6. Central interface (CI) server application.
  - 7. Remote room monitoring and communications.
  - 8. Do not disturb (DND)/make up room (MUR) notification.
  - 9. Drapery control / monitoring of mini-bar and room safe.

##### 1.2 RELATED WORK

- A. Examine contract documents for requirements that affect work of this section. Other Specification sections that relate directly to work of this section include, but are not limited to:
  - 1. Division 23 – Heating, Ventilating, And Air Conditioning (HVAC)
  - 2. Division 26 – Electrical; Power Wiring to System Hardware
  - 3. Division 27 – Communications
  - 4. Division 28 – Electronic Safety and Security
  - 5. Division 33 – Utilities

##### 1.3 SUBMITTALS

- A. Product Data: Submit the Manufacturer's product data and installation instructions for each component and system.
- B. Shop Drawings: Submit list of components and equipment to be supplied, including proposed locations, clearances, and power requirements.
- C. Operations and Maintenance Manual: Submit the Manufacturer's standard operations and maintenance manual, including emergency maintenance provider.

- D. Qualifications: Submit documentation from the Manufacturer and Installer indicating qualifications listed in Section 1.4, Quality Assurance.
- E. Warranty: Submit the Manufacturer's standard one-year labor and parts warranty for turnkey installation.

#### 1.4 QUALITY ASSURANCE

- A. Qualifications of Manufacturer: The Manufacturer shall have a minimum of 15 years documented experience manufacturing integrated guestroom control systems having similar or more stringent requirements than the system for the current project. The Manufacturer shall submit a list of at least 15 completed projects using a similar integrated guestroom control system.
- B. Qualifications of Installer: Submit a letter signed by the Manufacturer stating that the Installer is licensed by or acceptable to the Manufacturer of the integrated guestroom control system.

#### 1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials and products in unopened, factory-labeled packages. Store and handle in strict compliance with the Manufacturer's instructions and recommendations. Protect from damage. Sequence deliveries to avoid delays, but minimize on-site storage.

#### 1.6 COORDINATION

- A. Conference: Convene a pre-installation conference to establish procedures to coordinate this work with related and adjacent work.
- B. Coordination: Furnish inserts and anchors that must be built into other work. Work closely with installers of finish materials so that units are properly aligned with adjacent materials.

### PART 2 – PRODUCTS

#### 2.1 MANUFACTURER

- A. Acceptable Manufacturer: INNCOM International, Inc., 227 West Main Street, Niantic, CT. Telephone 860-739-4468, website www.inncom.com.

#### 2.2 SYSTEM DESCRIPTION

- A. HVAC Controls:
  - 1. HVAC Type: The control strategy will be dependent on the type of HVAC equipment that is being proposed. The control equipment shall be compatible with most HVAC equipment with 5 relay control including FCU's, PTAC's, WSHP's (Water Source Heat Pump) and VTAC's (Vertical Terminal Air Conditioners. For the most common lodging HVAC design, the following control strategy shall be applied:

- a. Fan Coil Unit (FCU): The System shall control one 4-pipe Fan-Coil Unit (FCU) in each room. The System shall directly control a 1-, 2-, or 3-speed, line-voltage fan motor with rating of up to 1/2 HP and two spring-return control valves. The System can alternatively control two proportional valves that regulate the cold and hot water flow. INNCOM will provide the FCU Vendor with an electronic board, an X05B with either the X06 or RB05 modules to be installed at point of manufacture into the FCU's for control of the proportional valves. The System shall provide automatic switchover from heating to cooling operation at each room.
  - b. Packaged Terminal Air Conditioners (PTAC): The System shall control one PTAC in each room. The System shall directly control a 1-, 2-, or 3-speed, low-voltage interface. The System will also control the compressor and associated heating equipment. INNCOM will provide the PTAC Vendor with the necessary card or connectors to be installed at point of manufacture or in the rooms. In case of existing PTAC's, the same equipment can be installed in place by trained personnel. The System shall provide automatic switchover from heating to cooling operation at each room.
2. HVAC Control Strategies: Provision shall be made to prevent the system from switching repeatedly from cooling to heating and back while attempting to maintain a constant target temperature. The System's temperature-control performance shall meet the requirements defined below for proportional valves. The System's humidity-refresh performance shall meet the requirements defined below.
- a. Temperature Control: The System in the room shall employ a PID algorithm to minimize fan speed and valve changes and to reduce servo-loop error. Such error, measured as the temperature difference between the set target temperature and the measured room temperature, shall not exceed 1.0° C under steady-state conditions and will automatically compensate for changes in the heat/cooling load of the room. The temperature control algorithm shall be capable of using the full resources of the FCU to maintain target temperature. Proportional-only algorithms that set the fan speed in proportion to the error shall not be accepted (as they cause a temperature control error that increases with the fan speed).
  - b. Humidity Refresh: The System in the room shall be capable of maintaining a maximum level of humidity. The refresh cycle will activate in unoccupied rooms only.
  - c. Humidity Refresh Cycle: The room air conditioning shall be activated on a pre-defined duty cycle to remove excess humidity. The System shall monitor, via central sensors or individual room sensors, the air temperature and relative humidity. When the relative humidity exceeds a preset threshold, the room AC shall be activated if the AC has been shut down for a period of time that exceeds a programmable time value (for example, if the AC has not run for the last one hour).
  - d. Fan Speed Control: Fan speed shall be selected automatically by the System to match the heat gain/loss in the room. Fixed-fan operation shall also be available to the guest. Fan speeds shall be field-programmable to allow limiting fan speeds to a desired range of speeds. For example, if the High-Fan of the FCU is objectionable to the guest due to the noise level it creates, the System shall be capable of being programmed on a room-by room basis to maintain Medium Fan speed and not enter into the High Fan speed under any condition. Fan operation shall be configurable to provide for "Continuous Fan" or "Automatic Fan." Continuous Fan means that the fan shall run even when the target temperature has been satisfied. Automatic Fan means that the fan shall run only on active heating or cooling call.
  - e. Multiple HVAC Zone Rooms (Suites): The System shall be capable of supporting multi-zone rooms, where the rooms are not separated by a door, yet each room has

- multiple HVAC units. The System shall be able to link the thermostats and bedside panel (if provided) in these rooms so that they track. This prevents having one room call for heat while the other is calling for cooling.
- f. Temperature History: The System shall have the capability to store the temperature, valve, and fan states for each room for at least three months, with all changes being reported.
- g. Energy Conservation:
- 1) The System shall provide optimized energy conservation measures with minimum inconvenience to the guest. At least four setback strategies shall be employed: two when a room is un-rented (either occupied by staff or unoccupied), and two more when a room is rented (either occupied or unoccupied).
  - 2) The System shall obtain rented status automatically from the Property Management System (PMS). No manual data entry shall be required by the hotel to update the room rented status.
  - 3) The System shall determine room occupancy automatically. The System shall keep the room status as occupied even while the guest is asleep.
  - 4) Setback values and related parameters shall be independently adjustable for rented and un-rented modes. For example, a room may be declared unoccupied 15 minutes after door closure if rented and no motion was detected, but it may take only two minutes to return the room to the unoccupied mode if the room is un-rented.
  - 5) Reduced on/off switching during the night or "night setback" shall be available for implementation by choice of the property as a means to further reduce energy consumption while the guest is asleep.
  - 6) The System will also implement setback strategies or cycle off HVAC equipment when exterior doors or windows are opened and the space is trying to maintain a target temperature. Switches will be applied to all active exterior windows and doors. They can be either wired or wireless.
  - 7) The System can include peak demand controls that will interface with the Building Management System (BMS) or use an integrated peak demand limiting module. Load shedding strategies will be initiated in the following hierarchy: Un-rented rooms will be set back first; then rented, unoccupied rooms; and finally rented, occupied rooms. Demand parameters and load shedding sequences shall be adjustable to allow for minimal guest discomfort while optimizing energy conservation efforts.
- h. Digital Thermostat: This unit shall be modular in construction so that each of the modules can be added at a later time if not installed initially.
- 1) The System shall include a wall-mounted, illuminated digital thermostat. The thermostat will be able to display current room temperature, target temperature, and outside temperature in degrees F and degrees C, as well as the humidity level.
  - 2) The thermostat shall be easy to operate, and shall allow changing the target temperature in steps of 1 degree F or 0.5 degree C. Clear indication shall be provided when the HVAC has been turned off.
  - 3) The thermostat shall have the capacity to work with a built-in Passive Infrared (PIR) motion sensor OR a remote Passive Infrared (PIR) motion sensor OR combinations of both.
  - 4) The thermostat shall be capable of directly controlling HVAC units operating on voltages ranging from 12VDC to 277VAC without the requirement of secondary control relays for the higher voltage applications. The thermostat shall also be

- available in a battery operated version to facilitate installation where the provision of power may not be practical.
- 5) The thermostat shall also be provided with an IR transceiver that will allow remote control of lamps that are equipped with IR receiving modules, an IR capable Entry Light Switch, and the Electronic Door Lock (EDL).
  - 6) The thermostat shall be connectable to the System via a 2-conductor, low-voltage cable. The thermostat shall also have the capability of connecting to the HVAC equipment wirelessly via Infra Red signals.
  - 7) The thermostat shall be capable of controlling HVAC units wirelessly using IR technology that is immune to fluorescent light interference. Direct line-of-sight communication shall not be a requirement for proper IR functionality.
3. Occupancy Detection: The System shall combine inputs from the EDL or door-position switch and from a PIR motion detector to determine whether the room is occupied at any time. Activation of any switch on the digital thermostat or any light switch that is controlled by the System while the entry door is closed shall place the room in the occupied mode. The current occupancy state of the room shall be available to the room controller that controls the room HVAC system, as well as to the outside door panel and to a central computer.

B. Lighting Controls:

1. Lighting control strategy can be dependent on the building codes in effect at the location of the property, the intent of the lighting design, and the type of lighting fixtures or lamps being proposed. Most lodging designs employ one of the following approaches:
  - a. Welcome Lights: The overhead lights in the room shall be turned on when the guest enters the room the first time after check-in and after each subsequent return to the unoccupied room.
  - b. Master Light Switch: The switch by the entry door shall be able to act as a master light switch and turn off all lights and lamps when activated by the guest. Each S217 or S217D shall control one circuit and will communicate via low-voltage wiring or wirelessly to the L206, L207 or L208 equipped lamps and via low voltage wiring to other S217, S217D, Decorator Series and Designer Series switches that may be installed in the room to control other lighting circuits.
  - c. Lighting Scenes: Lighting fixtures and/or lamps may be grouped to turn on/off or dim to preset levels via programmable, low-voltage switches. Other control functions, such as temperature up/down, drapes open/close, and DND/MUR notification, shall also be available for control through these programmable switches. These lighting scenes and other functions shall be controllable through the following options:
    - i. Decorator™ Series programmable switches: These switches shall be available with screw-less, Decora-style plates in white, eagle almond, and black plastic finishes. The switches shall be available in configurations of one to five programmable switches per single-gang-size plate. The switches shall be available with silk-screened text descriptors or custom silk-screened icons that visually describe the function assigned to the switch. The switches shall also be equipped with color (blue, red, amber) LED indicators with programmable brightness levels.
    - ii. Designer™ Series programmable switches: These round switches shall be available with screw-less, plates in white, eagle almond, and black plastic finishes as a standard item and in a variety of other materials (glass, metal, stone and wood, composites) as a custom order. The switches shall be available in

configurations of one to six programmable switches per single-gang-size plate or in larger number of switches via custom order for custom size plates. The switches shall be available with silk-screened text descriptors or custom silk-screened icons that visually describe the function assigned to the switch. The switches shall also be equipped with color (blue, red) LED indicators with programmable brightness levels. The switches shall be available for traditional wall installation as well as for installation in millwork or furniture.

iii. Bedside Controllers. All lighting control shall be available through custom designed controllers that incorporate either the Decorator or Designer programmable switches and the property's choice of devices that will be controlled.

iv. Integration with third party light switches. Lighting controls shall be such that they can also accept inputs from third party light switches.

v. Integrated telephony / control devices: Lighting control shall also be available through VOIP telephones or an analog telephone integrated with a color touch screen device that can integrate with the INNCOM system..

C. Access Control: The System shall seamlessly integrate with select third party (Saflok, TimeLox, or equal) EDLs to create an access control system. The integrated access system shall meet the following requirements:

1. Wireless Link: The EDL shall communicate with the System via a wireless wall-mounted entry light, a wireless ceiling-mounted IR transceiver, or a wireless wall-mounted IR transceiver.
  - a. Wireless Wall-Mounted Entry Light: A wireless wall-mounted entry light (S217 or S217D) switch will be installed in the guestroom and a wireless transceiver installed in the guestroom side of the lock. (The transceiver will be installed by Saflok, TimeLox, or equal EDL manufacturer and provided by INNCOM.) The link shall be immune to interference from TV remote controls, fluorescent lights in close proximity to either the EDL or any System component, and radio signals generated by two-way communication devices in the property.
  - b. Wireless Ceiling-Mounted IR Transceiver: A wireless ceiling-mounted IR transceiver (K592C) will be installed in the guestroom and a wireless transceiver installed in the guestroom side of the lock. (The transceiver will be installed by Saflok, TimeLox, or equal EDL manufacturer and provided by INNCOM.) The link shall be immune to interference from TV remote controls, fluorescent lights in close proximity to either the EDL or any System component, and radio signals generated by two-way communication devices in the property.
  - c. Wireless Wall-Mounted IR Transceiver: A wireless wall-mounted IR transceiver (K592W) will be installed in the guestroom and a wireless transceiver installed in the guestroom side of the lock. (The transceiver will be installed by Saflok, TimeLox, or equal EDL manufacturer and provided by INNCOM.) The link shall be immune to interference from TV remote controls, fluorescent lights in close proximity to either the EDL or any System component, and radio signals generated by two-way communication devices in the property.
2. Doorbell: The System shall include a doorbell or a chime in each guestroom.

- a. The doorbell shall be activated through a button on a doorplate mounted outside the room. Pressing the button shall activate the bell once, regardless of how long the button is pressed. Once released, the bell shall respond again after a pre-selected delay from the last activation, to reduce guest annoyance. The bell shall not respond if the room has been placed in the DND state.
  - b. The interior plate with the chime, MUR, and DND buttons should be mounted in a 4x4 J box with a double-gang Decora cover so that the entry door package (P564 and S217 or S217D) provides the guest with the entry light switch and DND/MUR buttons.
  - c. In suites with multiple entry doors, the System shall link the operation of the doorbells and the DND operation in such a way as to have all the doorbells disabled when one room in the suite is placed in DND state.
  - d. The doorbell electronics shall be available for integration with equipment provided by the architectural signage provider.
3. **Fast Response:** The link between the System and the EDL shall provide a 0.5-second response time to meet the functional requirements defined herein.
  4. **EDL Battery Life:** The addition of the required circuitry in the EDL to facilitate wireless communication with the System shall not materially reduce the service life of the batteries that power the EDL. Under no condition shall the service life be less than 18 months. A low battery warning shall be provided as a system alarm.
  5. **Door Status:** The linked EDL shall report to the System any change in the status of the door opening. Such information shall be used by the System in its Occupancy logic, as defined herein. Note that said link shall alleviate the need for the installation of a separate door contact.
  6. **Staff Access Restriction:** In addition to the normal staff access rights as controlled by the door locks, the EDL shall deny access to low-level staff cardkeys when a guest occupies the room.
  7. **Staff Access Cancellation:** The System shall allow instantaneous cancellation of any staff card, without affecting the access rights of other staff cards. The cancellation shall take effect in specific rooms, a group of rooms, or the entire property within three seconds. The System shall automatically update the cancellation list in replaced locks to prevent access by unexpired, cancelled staff cards.
  8. **Guest Card Cancellation:** The guest card shall be denied access to a room immediately upon the guest checkout, even if the card's date of expiration has not yet been exceeded.
  9. **VIP Guest Cards:** The System shall accept pre-issued VIP cards for access to the guestroom. Authorization for the use of VIP cards shall be passed to the System from the PMS. The System shall transmit this authorization to the appropriate EDL.
  10. **Alarms and Reports:** The System shall report the following exception conditions:
    - a. **Low EDL Battery:** The System shall generate a report of all EDL that have a low battery condition. Replacing the battery in the EDL will automatically clear the alarm condition in the central computer.
    - b. **Door Open Too Long:** The System shall generate an alarm if the guestroom door has been left open for a period exceeding a preset time period.

- c. Door Ajar: The System shall generate an immediate alarm if the guestroom door is partially closed, but not latched.
  - d. Access History: Every access or attempted access from any guestroom door shall be reported and stored within 15 seconds at the server level. This data shall be available for retrieval by date, room number, or card number. Staff card access information shall also be accessible for retrieval by staff member name.
- 11. Remote Door Control: The System shall allow authorized staff to unlock EDLs remotely.
  - 12. Fault Tolerance: The System shall allow authorized access to the guestroom by both staff and guest, even in the event of power failure to any component of the System.
  - 13. In-Room Diagnostics: The System shall provide a simple method of allowing the staff to determine if an access problem is caused by the EDL or by a System component.
  - 14. Central Diagnostics: The System shall allow direct diagnostic and programming of parameters in the EDL, if authorized by the EDL manufacturer. Such diagnostics shall be similar to the functions available at the EDL using a hand-held diagnostic tool provided by the EDL manufacturer.
- D. Integrated Telephony and Room Controls:
- 1. The System shall seamlessly integrate the functions of a standard single- or two-line analog telephone with select, programmable guestroom control functions available through a color touch-screen interface. The integrated guest control system shall meet the following requirements:
    - a. The telephone shall interface with standard telephone wiring. No separate/new wiring shall be required.
    - b. The touch-pad shall be displayed on the touch-screen.
    - c. The telephone shall have a handset and shall also have a fully functional speaker-phone so it can be used hands-free.
    - d. Touch-to-dial buttons shall be available for one-touch dialing from the touch-screen.
    - e. The screen shall be fully configurable to display the information designated by the client.
    - f. The device shall incorporate a fully functional alarm clock which will be controlled from the touch-screen.
    - g. The device shall optionally include an AM-FM stereo radio with a separate sub-woofer.
    - h. The device shall optionally include a port for an iPod.
    - i. The device shall be able to control up to two lamps, which can be plugged directly into the device's built-in AC outlets.
    - j. The device shall also be able to control other devices that are connected to the local room network. These devices can control temperature, lighting, drapes, and DND/MUR notification.
    - k. Acceptable model: GDA-700 from INNCOM international inc.
- E. Integrated VOIP Telephony and Room Controls:

1. The System shall seamlessly integrate the functions of a VOIP instrument with select, programmable guestroom control functions available through the touch-screen interface. The integrated guest control system shall meet the following requirements:
  - a. The telephone shall interface with standard Ethernet wiring. No separate/new wiring shall be required.
  - b. The screen shall be fully configurable to display the information designated by the client.
  - c. The device shall also be able to control other devices that are connected to the local room network. These devices can control temperature, lighting, drapes, and DND/MUR notification.

F. Central Interface (CI) Server Application:

1. Each guestroom system or sub-system will communicate in real time with a central server running *INNcontrol-II* application software. The software shall provide a comprehensive list of room status information and alarms, and shall also interface among the rooms and other systems in the hotel.
  - a. PMS Interface: The software shall interface with the PMS computer through a serial link or TCP/IP. The PMS will provide the *INNcontrol-II* software with current sale status of the guestrooms (rented/un-rented and check-in/checkout). This information shall be transferred from the *INNcontrol-II* software to the room within five seconds, and will be used to determine the operation of the HVAC, lights, and other loads in the room. The *INNcontrol-II* server shall also be linked and interfaced with the EDL server.
  - b. Management Display: The *INNcontrol-II* application, or terminals connected to the *INNcontrol-II* server, shall provide access to management to view and control such parameters as room temperature, room target temperature, HVAC operation, light control, and other conditions and statuses. In general, the *INNcontrol-II* application shall provide access to any function of the room control system that is available to the guest in the room. The System shall be capable of interfacing with the Hotel Ethernet System via an RS 485 or TCP/IP interface.
  - c. Remote Access/Diagnostics: The application shall provide full support of a remote terminal connected via modem or TCP/IP, or via a serial link to the server. The server software architecture shall be of a client/server structure. The remote terminals shall be PCs operating under MS Windows 2000 or later. The application shall be capable of running complete diagnostics of the System from a remote service center via dial-up phone lines or TCP/IP.
  - d. Alarm Outputs: The application software shall be programmable to route alarm conditions to a printer, paging system, file, hard disk, third-party interface, or the PMS.
  - e. The user shall have the option of *not* logging on, which will allow View (read-only) use of the software, or logging on, which will allow Control functions based on the logon identification.
  - f. The software shall open to a pre-determined default language. It shall also be possible to choose another language available from the list.
  - g. In the software, the first screen that appears when *INNcontrol-II* is opened is the 'Quick View' screen. Each guestroom selected for Quick View display shall be represented by a block on the screen. The block shall be numbered to correspond to the actual room number. By right-clicking on a room block, the user shall be able to

- access the menus and sub-menus that will display selected information for that room. The resulting menu shall allow the display of butler calls, MUR calls, valet requests, pick up tray requests, DND indications, SOS indications, and possibly one or two other requests if desired by the property – for example, cab request.
- h. All service requests shall be displayed at once on the Quick View screen. The color coding shall allow easy recognition of each type of call.
  - i. The software shall display Housekeeping Calls to show a list of rooms requesting the indicated service. Other types of information shall also be optionally shown in the communication area, including clean/dirty room status, notifications, and issues to be handled by the front desk.
  - j. The software shall allow for the display of guest preferences including ADA/hearing impaired rooms, kosher/Sabbath rooms or Enviro-Mode rooms.
    - 1) ADA/hearing impaired rooms shall be set up such that the entry light flashes 10 times when the doorbell outside the room is pressed. An INNCOM P564 doorbell kit and S217 entry light switch are required for this function.
    - 2) Kosher/Sabbath rooms are set up such that all automatic functions that would be triggered by guests are suspended and the HVAC does not respond to occupancy information.
    - 3) Enviro-Mode rooms are activated when the guest presses the Green Button on the thermostat, thus enrolling in the property's environmental sustainability programs.
  - k. The software shall offer a Dynamic Suite Linking option and it shall display rooms that are linked as suites. The linked rooms shall be color-coded, and the type of link (common door or connecting door) shall be shown displayed in the room blocks.
  - l. The software shall be able to display as a minimum the following room conditions:
    - 1) Rented – Shows which rooms are currently rented.
    - 2) Occupancy – Shows which rooms are currently occupied, either by guests or staff.
    - 3) Rented + Occupancy – Shows which rooms are rented *and* occupied.
    - 4) Clean Status – Shows which rooms have been cleaned and which need cleaning. This option also shows “supervisor required” and “out-of-order.”
    - 5) Dirty Rooms – Shows which rooms need cleaning. The color coding will indicate the rented and occupancy status for these rooms.
    - 6) Supervisor Visit Requested – Shows which rooms have been cleaned and are ready for review by a supervisor.
    - 7) Out of Order – Shows which rooms are out of order for any reason (such as equipment needing repair).
    - 8) Telephone Usage – Shows which rooms have telephones currently in use.
    - 9) Safe and Orphaned Valuables – Shows which rooms have a locked safe and which rooms have “orphaned” (left behind) valuables in the safe.
    - 10) Minibar Used – Shows which rooms need replenishment for the minibar.
    - 11) Measured Room Temperature – Shows the temperature of each room on the block grid.
    - 12) Target Room Temperature – Shows the desired room temperature for each room on the block grid.
    - 13) AC Mode – Shows the operational status of the air conditioning system for all rooms on the block grid.
    - 14) Measured, Target and AC Mode – Shows all the above on the block grid.
    - 15) Measured Humidity – Shows the humidity for each room on the block grid.
    - 16) HVAC Equipment Operation – Shows heating, cooling, and fan operation for each room on the block grid.

- 17) Second Stage Operation – Shows forced, ready, active, and normal status for each room on the block grid.
  - 18) Peak Demand/Load Shedding/Fire – Shows high, medium, low, and normal for peak demand/load shedding, and shows HVAC response to fire.
  - 19) Open Doors or Windows – Shows which rooms have open doors or windows.
  - 20) ETM – Shows rooms that have no energy management devices currently operating.
  - 21) VIP/Reduced Energy Management – Indicates room thermostat is not being controlled by the system.
  - 22) De-Humidification – Shows all rooms on the block grid that are being dehumidified.
  - 23) De-Icing – Shows all rooms on the block grid that are being de-iced.
  - 24) HVAC Trouble – Shows all rooms on the block grid with active HVAC alarms.
  - 25) Equipment Type – Shows the HVAC equipment type for all rooms on the block grid.
- m. The software shall display diagnostic information for guestroom devices.
- n. The software shall have Navigation Tree Displays. The rows of icons allow the user to display property views in the navigation area below the icon bars by clicking on the icon. A room can be selected from the Navigation Tree for display of its statuses. In the Floor View and Network View displays, a plus (+) or minus (-) sign will appear before each room. A plus sign indicates that more information can be displayed by clicking on the plus sign.
- o. The default icon in the navigation area shall be the Floor View, which shall display a list of hotel floors. Double clicking on a floor shall display a list of rooms on the floor.
- p. The software shall have a Network View icon to display the guestrooms organized according to their network connectivity status.
- q. The software shall be able to display a graph of the HVAC trend for each room. The display shall show the room's temperature band as a yellow block. The HVAC trend line shall be color-keyed: black (the HVAC is not currently heating or cooling), red (the HVAC is heating), or blue (the HVAC is cooling).
- r. The software shall be able to generate reports that show outstanding guest requests at the time of report generation. The report shall be able to be generated in a printable notepad format with the time of day of the report generation shown at the top of the report. The report can be saved and/or printed, making it convenient for staff to carry as a reminder of outstanding requests.
- s. The software shall be able to receive and set guest requests from *INNcontrol-II* or from other INNCOM systems in the property. Whatever the source of the setting, a guest request shall be displayed on every *INNcontrol-II* screen that has the particular room selected for view. For example, a guest may press a switch in the guestroom to request MUR service. The request will appear on *INNcontrol-II*.
- t. The software shall allow staff to "take ownership" of guest requests. By taking ownership, the staff member commits to performing the request or ensuring that it is performed. Once ownership is taken, the room shall be re-listed along with the name of the person who has taken ownership. This allows anyone on a terminal anywhere in the property to see who has taken responsibility for a guest request.
- u. The software shall allow Hotel staff to designate a room needing cleaning or as being out of order. Once the room has been cleaned, staff can report that it has been cleaned and request review by a supervisor. The software indicates that a hotel maid has seen that the room needs to be cleaned.

G. Communications:

1. Throughput: The *INNcontrol-II* application server and the network that links it to the rooms shall be able to handle a minimum of five transactions per second per 500 rooms. A transaction is defined as the sending of a command or data to a room from the *INNcontrol-II* server and the receipt of acknowledgment of the proper execution of such command back at the *INNcontrol-II* server. The System and its network shall guarantee a response within five seconds when accessing any room component remotely. Such response shall not be conditional on any other activities that take place at that time anywhere else in the System.
2. Network Integrity: The communication in the System shall comply with ISO/OSI standards. The network shall be secure from insertion of commands from external stations. Errors in communications shall be detected and corrected automatically. The addition and removal of stations shall be captured and reported as an alarm by the *INNcontrol-II* server.
  - a. Networking Capabilities: The System shall be capable of communicating from the *INNcontrol-II* server to the guestroom devices using a single shielded or unshielded twisted pair of wires, Cat3 or better.
  - b. Networking Capabilities: The System shall be capable of communicating from the *INNcontrol-II* server to the guestroom devices using a dedicated or shared Ethernet network, running on Cat 6 or fiber.

H. Wiring: All field wiring to the System shall be made through plug-in connectors to facilitate service and diagnostics. The Vendor shall provide as-run wiring diagrams for room wiring and network wiring.

I. Field Programmability:

1. Parameter Changes: All room-related parameters, such as target temperature upon check-in, setback temperatures, and the like, shall reside in non-volatile memory in each room and shall be programmable from the *INNcontrol-II* server. The server shall be able to access rooms on an individual basis, in groups, or in total (i.e., the entire property at one time).
2. Program Changes: The application program residing in the room controller shall be modifiable through the *INNcontrol-II* server computer without the need to visit the room. The program stored in each room shall not be affected by the temporary loss of power, regardless of the duration of the power outage.
3. Power Fail Recovery: After a power outage, the System throughout the hotel shall start up automatically and will be fully operational within five minutes after restoration of power. In the rooms, all loads controlled by the System will be returned to their previous states, including target temperature, selected fan speed operation, and lights, regardless of the duration of the power outage.
4. Noise Restriction: All system components shall be installed in such a manner as to eliminate audible noise to the guest when the System operates while the guest is asleep.
5. Code Compliance: Components installed by the Vendor and wiring/installation performed by the Vendor shall comply with the applicable standards and electrical codes.

## PART 3 – EXECUTION

### 3.1 INSTALLATION

- A. There shall be strict compliance with the Manufacturer's instructions and recommendations. The onset of work shall indicate that the Installer accepts the existing substrates and conditions. System installation shall be coordinated with related and adjacent work.
- B. The system shall be tested for proper operation in accordance with the Manufacturer's commissioning guide. Damaged components shall be repaired or replaced until the proper operation is achieved.
- C. The Installer shall instruct the Owner's personnel in proper operation and maintenance of the system.

END OF SECTION