PECO
AUTOMATION AND CONTROLS

SK200-001
Installation Instructions

Guestroom
HVAC Energy Management System

GENERAL

INTRODUCTION

The S200 series hospitality HVAC Energy Management (HEM) System is specially designed to provide automatic operation control of HVAC (Heater, Ventilation and Air Conditioner) units in hotel guestrooms.

By utilizing proven passive infrared (PIR) sensing technology and intelligent logic control software, the S200 series devices are able to verify the occupancy status of guestrooms. If the guestroom is physically occupied, the HEM system will allow the guest to control the HVAC operation as usual. Once the guestroom is vacant, the HEM system will automatically shut off the HVAC to reduce energy consumption and equipment wear.

CAUTIONS

- The SD200-001 contains sensitive electronic components, please handle with care.
- Handle by the terminal block or circuit board edges only. Do NOT touch the leads or surface of electronic components to prevent electrostatic discharge damaging the unit.
- Do NOT touch the surface of the infrared sensor (the component with square dark window).
- Do NOT attempt to adjust or repair the Master Sensor/ Controller. Unauthorized modifications or repairs will void the warranty.

WARNINGS

- HVAC units may contain AC line power of 110 VAC, 230 VAC or 277 VAC. To prevent electric shock, ensure that AC line power is disconnected before connecting the S200-001 system with the HVAC unit.
- All electrical connections and wirings MUST conform to the National Electrical Code and applicable local codes.
- The HEM system should be handled and installed by qualified electrical service personnel only.
- Do NOT take shortcuts when connecting the HVAC power circuits.

MAINTENANCE

The SK200-001 system requires very little maintenance. End-user's maintenance is limited to the cleaning of dust on front lens surface on the sensor. If any abnormal or faulty condition occurs, call the installer for local service.

SYSTEM COMPONENTS

STANDARD COMPONENTS

SD200-001 Master Sensor/Controller

SD200-001 is the master sensor/controller of the HEM system. It consists of a high sensitivity passive infrared (PIR) motion sensor and sophisticated microprocessor with intelligent logic control software in an aesthetically pleasing housing. It should be mounted on the wall or ceiling (corner mount recommended) to detect human presence by sensing the movement of body heat energy. In addition to the guest presence detection and verification, the unit also provides various operation settings and component connections of the system.

To avoid the room becoming too hot or too cold during an unoccupied period, thus requiring excessive time and energy to cool down or warm up, the SD200-001 also features a programmable secondary thermostat with various high and low temperature limit settings. The HVAC unit will be activated if room temperature exceeds the set range.

SE200-001 Door Switch

The SE200-001 is a door switch to be recess mounted on the frame of entry door. It should be connected between the GND and DSW terminals of SD200-001 Master Sensor/Controller to report the open/closed status of the door. Once the door is opened, the system will enter into "standby" mode to detect the guest presence. If motion is detected, the SD200-001 will verify the room as "occupied" status and allow guest to operate the thermostat and set the temperature of HVAC unit by themselves. If no motion is detected within a period of time, then the SD200-001 will verify the room "vacant" and then shut off the HVAC operation.

Note: The HEM system will automatically shut off the HVAC operation if any sensor connected door or window is left open for more than 5 minutes.

SF200-001 Power Pack

The SF200-001 power pack not only provides 24 VDC power supply for SD200-001, but also controls the operation of HVAC unit.

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SYSTEM COMPONENTS cont.

OPTIONAL COMPONENTS

SE200-002 Window Switch (optional)

The SE200-002 is a pair of magnetic contacts to verify open/ closed status of window or sliding door to the balcony or patio. If optional door/window switches are installed, all switches, including the primary door switch, must be connected in series and connected between the GND and DSW terminals on the DS200-001 terminal block.

The system will shut off the HVAC if any connected door/window is left open for more than 5 minutes.

Slave Sensor (optional)

The SA200-001 and SB200-001 are optional sensors designed for additional rooms of hotel suites.

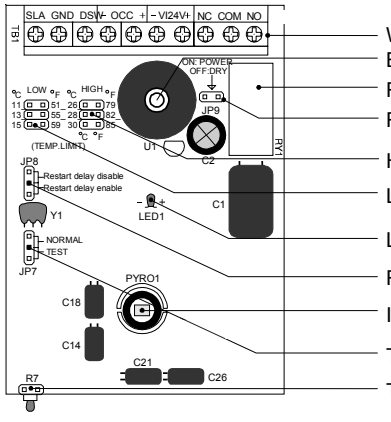
The SA200-001 is ceiling mountable occupancy sensor incorporating a full 360° detection pattern.

The SB200-001 is a wall mountable occupancy sensor, which mounts in the same manner and has the same 110° detection pattern as the SD200-001.

Both sensors are designed to verify occupancy of a room or open area, thus allowing control the associated HVAC device based on the occupancy status. Each provides a Form-C relay output for automatic control of a fan coil. An LED is provided under the lens to verify detection and proper operation.

DESCRIPTION & CONFIGURATION

SD200-001 Description



Wiring terminal block
Buzzer
Relay
Relay output format selection
High-temp Limit setting
Low-temp Limit setting
LED indicatior
Restart delay disable/enable
Infrared sensor (DO NOT Touch)
Test/Normal switch
Temperature sensor (DO NOT BLOCK)

Jumper Setting

Low temperature limit

This jumper allows the selection of 3 different low temperature limits in which the HEM system will automatically operate the HVAC when room temperature is lower than the set value. The sensor measures room temperature once every 5 minutes. To disable the low temperature limit, remove the jumper. This function will only operate when room is unoccupied

High temperature limit

This jumper allows the selection of 3 different temperature limits in which the HEM system will automatically operate the HVAC when room temperature is higher than the set value. The sensor measures room temperature once every 5 minutes. To disable the high temperature limit, remove the jumper. This function will only operate when room is unoccupied.

Relay output format selection

This jumper allows the selection of relay output format. Placing the jumper on both pins will make the relay contact with 24V power output. If dry contact (no load) output is required, remove the jumper off the pins (disconnect the pins).

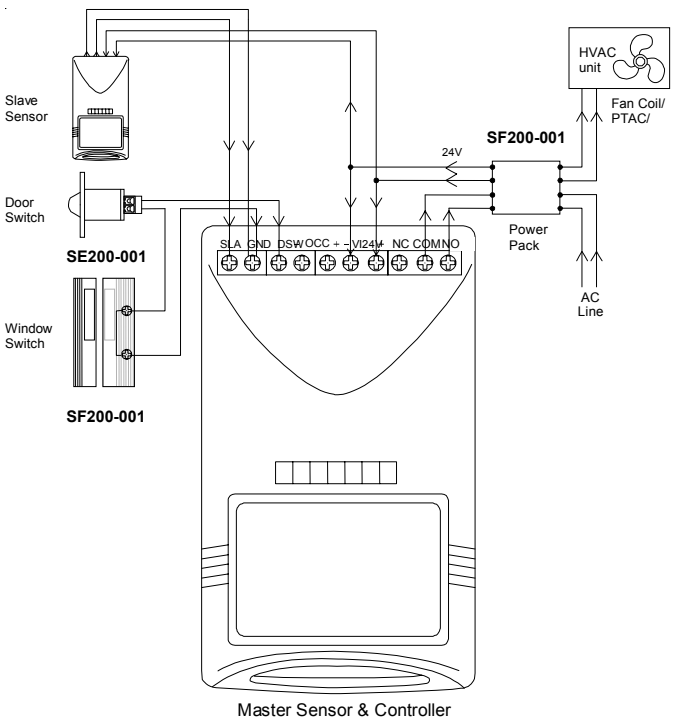
Restart delay enable/disable

This jumper enables/disables the 2-minute short start cycle protection. With this restart delay enabled, the HVAC will start operating after 2 minutes. This restart delay is generally required by the individual Packaged Terminal Air Conditioner (PTAC) units to protect the compressor from being damaged from frequent cycling. To disable short start protection, place the jumper at disable position.

Test/normal mode selection

This jumper enables/disables the LED and buzzer indication. When jumper is placed at "**TEST**" position, the LED will light for approximately 2 seconds whenever the motion is detected and the buzzer will beep. If jumper is placed at "**NORMAL**" position, the LED will NOT light when sensor detects the motion. But it will blink about 10 seconds after the SD200-001 activates the HVAC. This indication helps the maintenance staff to check if the HEM system is working normal

Typical System Configuration



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INSTALLATION INSTRUCTIONS

HVAC System Introduction

The typical HVAC systems used in today's hotel/motel rooms are generally one of the following two types:

Type A: Individually Packaged Terminal Air Conditioner (PTAC)

The PTAC is commonly known as "through-the-wall" HVAC unit. The PTAC types are electrically operated by various AC voltages and contain the guest operated controls on the unit or via a remote control device.

Type B: Centrally Chilled and Heated Water Fan-Coil HVAC Unit

This type of HVAC unit is typically located in the dropped ceiling of entry foyer of the room. It consists a coil (radiator) assembly and fan (blower). Chilled or heated water is pumped through the coil from a central source. The fan operation and/or water valves are controlled by the wall-mounted thermostat in each room.

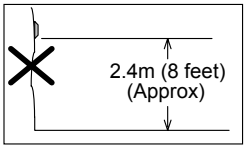
The HEM system can be used to control any electrically or pneumatically operated HVAC units.

NOTE: Certain models of HVAC units contain a built-in energy management interface. The HEM system is designed to directly connect to these units without the use of the SF200-001Power Pack, if 24 VAC power supply is available. Please refer to the instructions of HVAC units to make the wiring connection correctly. A no voltage, "dry" contact output format is generally required to turn "OFF" the unit.

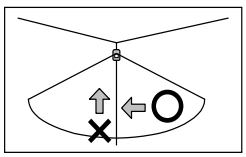
The system installation consists of mounting and wiring of each component. The following diagrams and instructions provide some useful references for ease of installation.

INSTALLATION HINTS

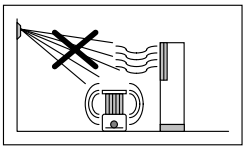
Selection a proper mounting location of the SD200-001 Master Sensor/Controller is very important in assuring optimum performance of the system. Improper sensor location may result in poorer performance.



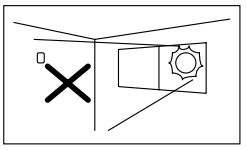
The sensor should be mounted at 8 ft. above the floor, preferably in a corner that has a good field of view to the movements of hotel guest.



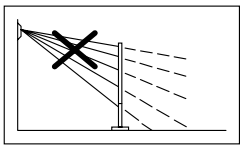
The sensor is more sensitive to the movements across the detection zones than those toward or away the sensor.



AVOID facing the sensor toward any object likely to change temperature rapidly, such as electric heater or fireplace.



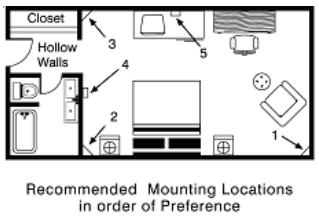
AVOID mounting the sensor where it will receive direct sunlight or direct draft of heating/cooling vents.



AVOID locating the sensor where its detection zones may be blocked by doors, draperies or curtains.

Recommended sensor locations

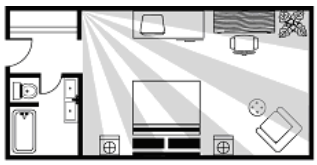
The numbers indicated represent order of preference.

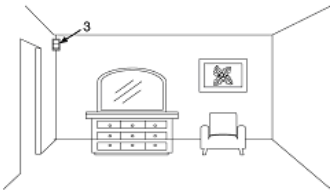


Recommended Mounting Locations in order of Preference

CAUTION

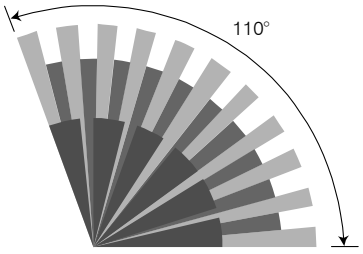
Make sure that hot or cold air from HVAC vents does not blow directly on Sensor, especially in location 1.



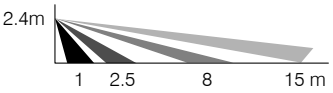


DETECTION PATTERN

Top View



Side View



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MOUNT THE SENSOR

1.Remove the sensor cover by releasing the locking screw at the bottom of the housing.
2.Carefully remove the circuit board by removing the screw.
3.For corner mount (recommended), use the mounting holes on both 45° slopes to mount the base.
4.Lead the cable into the base. Replace the circuit board on the base and install the screw.

INSTALL THE DOOR SWITCH

1.Carefully select the location on the doorframe to mount the door switch.
2.Drill a 3/4" hole in the frame.
3.Using the spacer or switch as a guide, drill two holes for POP rivets or screws.
4.Drill a small hole just above the carpet for wire entry into the door frame.
5.Route the wires and connect with the switch.
6.Insert the switch into the hole and mount it firmly with the doorframe. If the gap between door and frame is too big, use a spacer to ensure proper operation of the switch.

WIRING CONNECTION

To connect the wires between the sensor and other components of the system, the terminals should be connected with correct wire to ensure optimum performance. Each terminal block of the SD200-001 are described as follows in the left to right sequence.

- **SLA**: This terminal and terminal "**GND**" are for connection with the N.O. output of slave sensor. If multiple slave sensors are used, the connection should be made in parallel.
- **GND**: This terminal normally goes together with terminal "**SLA**" or "**DSW**" for connection with slave sensor or door switch.
- **DSW**: This terminal and terminal "**GND"** are for connection with the door switch. If multiple door/window switches are used, the connection should be made in series.
- **OCC**: These terminals provide an output for accessory devices that indicate guestroom occupancy status.
- **–VI24V+**: These two terminals are for the input of 24V power supply from power pack.
- **NC**: This terminal and terminal "**COM**" form the Normally Closed (NC) output of SD200-001.
- **COM**: This terminal is the common pole of relay output.
- **NO**: "**NO**" and terminal "**COM**" form Normally Open (NO) output of SD200-001.

SYSTEM OPERATION TEST

1.After wiring connection is completed, ensure the jumper JP7 is placed at "**TEST**" mode. Replace and fasten the front cover with the locking screw.
2.Whenever power is applied to the SD200-001, please wait for about 25 seconds for sensor to warm-up. During warm-up period, the buzzer will sound beep-beep (each beep lasts 1 second). Both LED and relay will be activated.
*The activated SD200-001 means the HVAC unit will NOT operate due to its fail-safe design.
3.When warm-up period expires, the buzzer stops sounding, LED light is off, but relay will still be active.
4.DOOR SWITCH TEST - Open the door, the buzzer should sound constantly until the door is closed.
*If the buzzer does not sound while door is opened, check the door switch and ensure correct wiring connection between door switch and SD200-001.
5.SLAVE SENSOR TEST - If a slave sensor is NOT installed,skip this test. The sensor should be tested after the door switch function is tested and verified. Walk across the room of slave sensor installation, the LED of the slave sensor will light whenever it detects the movement. The buzzer of SD200-001 will sound one long beep (1 sec.) and - one short beep (0.2 sec.) when the slave sensor is activated.
*If the buzzer does not sound when the slave sensor detects movement, but the LED of slave sensor is working, check the wiring between slave sensor and SD200-001.
6.MASTER SENSOR TEST – Walk across the room of master sensor installation, within the detection zone. The LED will light and the buzzer will sound beep-beep (0.2 sec.) whenever master sensor detects movement. The HVAC unit will operate at least 30 seconds for every detection.
*If no further movement is detected within 30 seconds after the last detection, the HVAC unit will stop operating.

NORMAL SYSTEM OPERATION

After the system operation test is completed, place the jumper JP7 to "**NORMAL**" position for normal operation of the system.
The normal operation of HEM system is quite sophisticated. Many different operation modes and statuses are carefully managed and controlled by the microprocessor. Various modes and statuses are described as follow;

Standby Mode

If the room is vacant, the system will enter into "standby" mode after the warm-up time expires. Under standby mode, the HVAC unit will not operate.

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Temp-control Status

While room is unoccupied, the temperature sensor of SD200-001 will measure the room temperature every 5-minute. When room temperature becomes higher or lower than the high/low temperature limit setting, the HVAC unit will automatically operate until the room temperature is back within the setting range. Once the room temperature returns to the setting range, the system will return to "standby" mode. This function will operate only if jumpers are set in place and HVAC unit is"ON".

Occupied Mode

If the master or any slave sensor detects movement during standby mode, the system will enter into "occupied" mode. Under the "occupied" mode, the hotel guests can manage or set the room temperature using the wall or unit thermostat.

Door-open Status

Whenever the door is opened, the system will detect it and enter into "door-open" status. The HVAC unit will operate and LED will flash for 10 seconds. The LED flash indicates that the system functions are normal.

If the door is left open for more than 5 minutes, the system will shut off the HVAC unit until the door is closed.

Delay Status

Once the door is closed, the system will enter into "delay" status. During this 10-second period, the system will remain in its original mode.

Waiting Mode

The system will enter into "Waiting" mode after the 10-second delay status expires.

If the master or any slave sensor detects movement during waiting mode, the system will enter into "occupied" mode.

If no movement is detected within 5 minutes, then system will enter into "standby" mode.

INSTALL THE SLAVE SENSOR

For the additional rooms of hotel suites or condominiums, the system may require slave sensors SA200-001 or SB200-001 to be connected with the SD200-001. Install according to instructions included with slave sensor unit. Select the location where the slave sensor has a good view of the additional room.

INSTALL ADDITONAL DOOR/ WINDOW SWITCHES

For multiple entry/exit doors to the room, additional SE200-001 door switches may be required to connect with the SD200-001. A pair of surface mount magnetic switches can be installed on the sliding door/window to inhibit the operation if the door/window is left open for a period of time. The additional switches should be connected in series with SE200-001 door switch, between the DSW and GND terminals.

SPECIFICATIONS

SD200-001Master Sensor/Controller

Power supply.....24 ± 2 VAC/DC
Current drain.....Standby: 20 mA, Operating: 10 mA
Relay output.....Form C (NC-COM-NO),24v power or dry contact selectable
Max. switching current.....NO: 5A, NC: 3A, resistive load
Max. switching voltage.....AC: 250V, DC: 30 V
High temperature limit.....26/28/30°C (79/82/85°F) programmable
Low temperature limit.....11/13/15°C (51/55/59°F) programmable
Detection coverage.....110° wide, 15m (50ft) long @25°C(77°F)
Warm-up period.....25 ± 2 seconds
Restart cycle protection.....2 minute, can be disabled
Test indication.....Buzzer (audible) and LED (visible) , can be disabled
Housing material.....ABS
Operating temperature.....-10°C ~ 38°C (14°F ~ 100°F)
Operating humidity.....Max. 95% RH non-condensated
Dimensions.....112 x 66 x 45 mm (4.4 x 2.6 x 1.8 inch)

SF200-001Power Pack

Input power.....110~240 VAC 50/60hz
Power output.....24 VDC, 200 mA max.
Relay output.....Form C (NC-COM-NO)
Max. switching current.....NO: 16A, NC: 10A, resistive load
Max. switching voltage.....AC: 250V
Housing material.....ABS
Operating temperature.....-10°C ~ 60°C (14°F ~ 140°F)
Operating humidity.....Max. 95% RH non-condensated
Dimensions.....110 x 52.5 x 33 mm (4.3 x 2.1 x 1.3 inch)

SB200-001 Slave Sensor

Power supply.....24 ± 2 VAC/DC
Current drain.....Standby: 5 mA, Operating:18 mA
Relay output.....Form C (NC-COM-NO) dry contact only, 0.2A max.
Detection coverage.....110° wide, 15m (50ft) long @25°C(77°F)

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Warm-up period.....25 ± 2 seconds
Operating temperature.....-10°C ~ 38°C
(14°F ~ 100°F)
Operating humidity.....Max. 95% RH
non-condensated
Dimensions.....112 x 66 x 45 mm
(4.4 x 2.6 x 1.8 inch)

SA200-001 Slave Sensor

Power supply.....24 ± 2 VAC/DC
Current drain.....5mA @ 24VAC
Relay output.....Form C (NC-COM-NO)
Max. switching current.....0.2A max
resistive load
Max. switching voltage.....DC: 30 VDC
Detection pattern.....360°
(see table below for details)

Mount height	2.4m	3.0m	3.6m	4.2m
Coverage (Dia.)	6.0m	7.5m	9.0m	10.5m

Warm-up period.....25 ± 2 seconds
Housing material.....ABS
Operating temperature.....-10°C ~ 38°C
(14°F ~ 100°F)
Operating humidity.....Max. 95% RH
non-condensated
Dimensions.....110(DIA) x 44(H)cm.
(4.33 x 1.73) inch

WARNING

- READ THESE INSTRUCTIONS CAREFULLY BEFORE ATTEMPTING TO INSTALL, OPERATE OR SERVICE THIS DEVICE.
- Failure to observe safety information and comply with instructions could result in PERSONAL INJURY, DEATH AND/ OR PROPERTY DAMAGE.
- To avoid electrical shock or damage to equipment, disconnect power before installing or servicing.
- To avoid potential fire and/ or explosion do not use in potentially flammable or explosive atmospheres.
- Retain these instructions for future reference. This product, when installed, will be part of an engineered system whose specifications and performance characteristics are not designed or controlled by PECO, Inc. You must review your application and national and local codes to assure that your installation will be functional and safe.

CAUTION Use Copper wire only, insulate or wire nut all un-used leads.

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