Smart Pressure Sensor

Model Number: SPS10A

Quick Start and Installation Guide
Welcome and congratulations on your purchase of the Card Access Smart Pressure Sensor. This Quick Start and Installation Guide is an overview of configuring your Smart Pressure Sensor with a Control4 System. This guide assumes that you are a qualified and trained Control4 dealer.

Introduction

The Card Access Smart Pressure Sensor (Model No. SPS10A) is an easy-to-use, customizable occupancy sensing solution for chairs, beds, and sofas. It works by sensing the change in pressure applied to it when a chair, bed, or sofa is occupied – giving you superior control and flexibility when compared to standard dry contact-based pressure sensors.

The Smart Pressure Sensor must be used in conjunction with a Card Access Wireless Contact Sensor, Model No. WCS10A-2-ZP with firmware version 2.00.09 or greater (ZigBee PRO) -or-. Model No. WCS10A-2 with firmware version 01.03.17 (EmberNet).

If you ordered the Smart Pressure Sensor Package (Model No. WPS10A, WPS10A-ZP) or the CloseBy Network CB-1000 Package, the included Wireless Contact Sensor is fully compatible with the Smart Pressure Sensor.

Specifications

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Tools and Supplies Needed

To complete the installation, you will need the following tools and supplies:

- Small flathead screwdriver
- Cable ties (included)
Site Requirements and Wiring Options

Install the Smart Pressure Sensor in a location which ensures:
1. Easy access to the device for calibration.
2. ZigBee mesh networking efficiency. To insure that the Smart Pressure Sensor gets the best possible ZigBee signal, we recommend that you install it no more than 100 feet from another ZigBee device.
3. Avoiding other electrical equipment that may cause interference with the ZigBee signal (such as cordless telephones that operate on the 2.4 GHz frequency).
4. Avoiding unnecessary exposure to extreme environmental conditions, including temperature extremes and exposure to liquids. See product specifications for more details.

Wiring

Since the Smart Pressure Sensor is analog in nature, it uses the terminal input currently labeled “External Thermistor” on the Wireless Contact Sensor. Connect one of the wires of the Smart Pressure Sensor to input 4 (External Thermistor), and the other to input 2 (Common). It does not matter which wire goes into which input. For your convenience, this wiring diagram is also printed on the back of the sensor.

Control4 Software Installation

**NOTE:** The Card Access Smart Pressure Sensor uses a Control4 DriverWorks™ driver, which is not included with Composer software. It must be downloaded from the Card Access website and manually installed.

**Download and Install Driver:**
2. Download the Smart Pressure Sensor driver and save it to an easy-to-find location, such as your computer desktop.

**Composer Versions 1.8.x and 2.0.x**

Open Composer. In the top main menu under "Drivers," select "Add Driver" from the list. Select the new driver .c4i file you just downloaded and click "Open." Restart Composer.

**Composer Version 1.7.x**

Copy the .c4i file into the "My Documents\Control4\drivers" folder on the PC that you will be using to configure the project in Composer. Start or restart Composer.

Add the Smart Pressure Sensor (SPS10) to your Composer project:
1. In **System Design** view in Composer, select the "Card Access Smart Pressure Sensor" driver from the **Search** tab and drag it into your project (see figure at right).
2. Identification is similar to other Control4 ZigBee devices: Go to **Connections** view in Composer and choose the 'Network' tab. Find the Smart Pressure Sensor device in the device list and highlight it. Then click the 'Identify' button at the top of the screen.
3. When prompted to identify the unit, press the ID button of the Wireless Contact Sensor four (4) times.
4. When the device has successfully joined the ZigBee mesh and been identified, the address of the device will appear in the identification window. Click the 'Close' button.

**Hardware Installation**

The Smart Pressure Sensor works by sensing the change in the distributed pressure applied to it when a chair, bed, or sofa is occupied. This is determined by how much the top actuator plate bends. As such, you should position the Smart Pressure Sensor where the weight applied will be directed down onto the actuator plate. The Smart Pressure Sensor is very precise and the actuator plate need not be bent a great deal on occupancy. However, note that the more it bends when occupied, the more reliable your results will be.

For conventional chair and couch installations, position the sensor under the cushion where the occupant’s weight will be most likely to compress the sensor. The actuator plate will face up.

In instances where the Smart Pressure Sensor is being used in a recliner, the best results can be obtained by placing the sensor directly beneath the springs in the recliner’s base, as shown in the photo below. Note that the actuator plate will be facing up when the chair is upright.

The occupant's weight distribution will shift when the chair is reclined. This can result in a false vacancy reading. If this is a problem, install a magnetic contact switch onto the reclining mechanism under the chair such that occupancy can be inferred when the chair is reclined.

When the final position of the sensor is determined, fix it into place with zip ties. Ensure that the cable is routed and Wireless Contact Sensor mounted in such a way that they won't interfere with normal movement of the chair.
Smart Calibration

1. Push and hold the ID button of the Contact Sensor for 10 seconds until the LED begins to blink red.
2. Release the ID button.
3. Have the occupant sit in the chair/sofa or lie in the bed as they normally would and hold as still as possible. The sensor is calibrating to the occupied state.
4. When the LED begins blinking green, have the occupant exit the chair or bed.
5. The sensor is now calibrating to the vacant state. Do not occupy chair/bed or move sensor while the LED is blinking green.
6. The LED will stop blinking. Calibration is complete, and the Wireless Contact Sensor will be in diagnostic mode for 30 seconds. While in this mode, the LED will turn red when occupied and green when vacant.
7. Verify by looking at the Smart Pressure Sensor’s properties page in Composer that the contact state changes as desired. Alternately, you can enter diagnostic mode for the SPS at any time by clicking the ID button four (4) times.
8. The Smart Pressure Sensor can be recalibrated using this method at any time.

Calibration Best Practices:

1. For best results, always recalibrate the sensor if it is relocated or repositioned.
2. Calibrate the Smart Pressure Sensor with the actual person who is the intended occupant, as different weights and sitting/laying postures will affect the amount of pressure applied.
3. If you intend use the Smart Pressure sensor where 2 or more occupants could occupy the same space at different times, calibrate the Smart Pressure Sensor to the lightest occupant.
4. If you wish to sense occupancy across a larger area than a single Smart Occupancy Sensor will accommodate, contact Card Access for instructions on how to wire multiple sensors in series.

Calibration Troubleshooting:

If the Smart Pressure Sensor fails to calibrate as desired, ensure that:

1. The occupant is still while the sensor calibrates to occupancy.
2. No additional pressure beyond the weight of the cushion or mattress is placed on the sensor while it calibrates to vacancy.
3. The base plate of the sensor is relatively stationary and not shifting or settling during calibration. We suggest occupying the chair, couch, or bed several times before calibration to ensure that the sensor has settled adequately.
4. The actuator plate is bending a sufficiently different amount upon occupancy when compared to that of vacancy. Experiment with different installation locations if this is an issue. If you are still not able to obtain satisfactory results, see the section entitled “Threshold Settings” for information on how to change the occupancy/vacancy thresholds within Composer.

Composer Programming

- This driver provides four contacts: the original two external contact inputs and magnetic contact, plus a new “Pressure Sensor” contact. You can see the status of each in the driver properties page.
- Select an appropriate contact proxy driver (we suggest the generic Contact Sensor) and add it to your project. Go to the “Connections-A/V” tab. Select the Smart Pressure Sensor driver and bind the Pressure Sensor output to the generic Contact Sensor driver.
Program the desired actions on the generic Contact Sensor driver. Events are "When the contact opens" and "When contact closes."

The following table provides a quick way to relate contact state to the state of the chair, bed, or sofa:

<table>
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<tr>
<th>Contact State</th>
<th>Chair/Bed State</th>
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<td>Opened</td>
<td>Vacant</td>
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<tr>
<td>Closed</td>
<td>Occupied</td>
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**SPS10 Driver Properties**

- **Device Status**: “Online” or “Offline.” Also displays current firmware version (ZigBee PRO only).
- **Last Check-In**: Shows the date and time of the sensor’s last successful check-in with the network. Also displays remaining battery life as a percentage.
- **Contact 1 State**: “Opened” or “Closed.” Reflects the state of an external contact sensor wired into the “Sensor 1” input of the Wireless Contact Sensor. If no external contact sensor is attached, the value will be “Opened.”
- **Contact 2 State**: “Opened” or “Closed.” Reflects the state of an external contact sensor wired into the “Sensor 2” input of the Wireless Contact Sensor. If no external contact sensor is attached, the value will be “Opened.”
- **Magnetic Contact State**: “Opened” or “Closed.” Reflects the state of the integrated magnetic reed switch of the Wireless Contact Sensor. If this feature is not used, the value will be “Opened.”
- **Pressure Sensor State**: “Opened” or “Closed.” The Opened state indicates vacancy, while the Closed state indicates occupancy.
- **Temperature**: Displays the local temperature sensed by the Wireless Contact Sensor.

**Local Temperature Offset**: Can be used to adjust the local temperature value displayed.

**Check-In Interval**: Specifies the interval at which the Wireless Contact Sensor checks in with the network. Default value is 3 minutes. Note that a more frequent check-in interval will lead to decreased battery life.
SPS Hold State: “Occupancy” or “Vacancy.” Select which hold time type you wish to adjust. Important: You must click “Set” before selecting your Hold Time, or changes will not be applied.

The “Hold” feature delays the change in state to avoid unwanted detection.

Occancy hold means that the pressure sensor state will remain Closed until occupancy has not been detected for X seconds (specified by the Hold Time value). This is useful for applications where you want to ensure that the occupant has truly left the chair or bed before performing an action, and not when they merely shift or get up for only a moment.

Vacancy hold means that the pressure sensor state will remain Open until occupancy has been detected for X seconds (specified by the Hold Time value). This is useful for applications where you want to ensure that the occupant is truly occupying the chair or bed before performing any actions.

SPS Hold Time: Specifies the number of seconds for which you wish to hold occupancy or vacancy states. See descriptions above for more detail.

Threshold Settings: Card Access recommends that you use the Smart Calibration feature whenever possible, and only adjust these settings if absolutely necessary.

Occupancy Threshold: A value from 1-100 indicating the point at which the pressure sensor state changes from Opened to Closed. In practice, a higher occupancy threshold means that more weight will need to be applied for the contact to close.

It may be useful to manually raise the occupancy threshold if you are seeing an excess of false positives (instances where occupancy is detected when the chair or bed is vacant) or manually lower the occupancy threshold if you are unable to consistently detect occupancy.

Vacancy Threshold: A value from 1-100 indicating the point at which the pressure sensor state changes from Closed to Opened. In practice, a higher vacancy threshold means that more weight can be applied to the sensor and the state will remain vacant.

It may be useful to manually raise the vacancy threshold if you are seeing an excess of false positives (instances where occupancy is detected when the chair or bed is vacant).

NOTE: Occupancy threshold must be at least 5 points greater than Vacancy threshold.

Debug Mode: To be used for support purposes only.

Reflash Status: Shows pending device firmware updates and their status. (ZigBee PRO only).

Regulatory Statements

FCC
FCC ID: MHIWCS10
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
Reorient or relocate the receiving antenna. 
Increase the separation between the equipment and receiver. 
Connect the equipment into an outlet on a circuit different from that to which the receiver is connected. 
Consult your dealer or an experienced radio/TV technician for help.

IMPORTANT! Changes or modifications not expressly approved by Card Access, Inc. void the user’s authority to operate the equipment.

CE
We, Card Access, Inc. of 11778 South Election Road, Suite 260, Salt Lake City, Utah, 84020 USA, declare under our sole responsibility that the product, the Card Access Wireless Contact Sensor, Model Number WCS10A, to which this declaration relates, is in conformity with the following standards and / or other normative documents:
EN60950, EN55022, EN55024

We hereby declare that the above named product is in conformity with the essential requirements and other relevant provisions of Directive 1999/5/EC. The conformity assessment procedure referred to in Article 10(3) and detailed in Annex II of Directive 1999/5/EC has been followed.

Restriction of Hazardous Substances (RoHS)
All parts in the Card Access Smart Pressure Sensor and Wireless Contact Sensor meet the material restrictions of RoHS, as proposed by the RoHS Technical Adaptation Committee. This is based upon information provided by suppliers of the raw materials used by Card Access, Inc. to manufacture these products. As such, Card Access, Inc. makes no independent representations or warranties, expressed or implied, and assume no liability in connection with the use of this information.

One-Year Limited Warranty
This product is warranted to be free of defects in material and workmanship for one year from date of original purchase from Card Access, Inc. (“Card Access”).

Card Access will, at its election and as the purchaser’s or end user’s sole and exclusive remedy for any breach of the limited warranty set forth above, repair or replace this product if a defect in material or workmanship is identified and communicated to Card Access within the one-year period described above. Card Access is not responsible for removal or reinstallation costs. This warranty is not valid in cases where damage to this product is the result or arises out of misuse, abuse, incorrect repair or improper wiring or installation.

To notify Card Access of any breach of the foregoing limited warranty and to obtain warranty service, contact Card Access Customer Support by e-mail to inhomesupport@cardaccess-inc.com or by calling 801-748-4900, extension 15, to obtain a Return Materials Authorization (“RMA”) number and instructions for returning your defective product to Card Access.

IMPLIED WARRANTIES, INCLUDING THOSE OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE EXPRESSLY DISCLAIMED, EXCEPT WHERE SUCH DISCLAIMER IS PROHIBITED BY APPLICABLE LAW. CARD ACCESS AND/OR THE SELLER DISCLAIM(S) ANY AND ALL LIABILITY FOR SPECIAL, INCIDENTAL AND CONSEQUENTIAL DAMAGE IN ANY WAY ASSOCIATED WITH OR RELATED TO THE PURCHASE, INSTALLATION AND/OR USE OF THIS PRODUCT.

Some states/provinces do not allow limitations on how long an implied warranty lasts, or the exclusion or limitation of special, incidental or consequential damages, so these limitations and exclusions may not apply to you. This warranty gives you specific legal rights. You may also have other rights which vary from state/province to state/province. This is Card Access’ exclusive written warranty.