



## Specifications – Occupancy/Vacancy Sensors

CSI 26.09.23.

ASHRAE 90.1-2010

AIA Division 16 Section 16950

### 1. PART 1 - General

#### 1.1 Overview

- 1.1.1 Provide Occupancy/Vacancy sensors as shown on the plans and specified herein. The sensors shall sense human activity in the space and provide ON/OFF and/or dimming control based on Occupancy/Vacancy.
- 1.1.2 If Natural Daylight is required, the Occupancy/Vacancy sensor shall have a Photo Sensor incorporated into the device.
- 1.1.3 The Occupancy/Vacancy sensing technologies shall not emit radiation that can interfere with the operation of any electronic devices.
- 1.1.4 The acceptable dual technology sensing shall be passive infrared (PIR) and acoustic voice detection using Accurate Detection Intelligence (ADI-Voice) technology.
- 1.1.5 The acceptable single technology sensing shall be passive infrared (PIR) technology.
- 1.1.6 Dual technology sensors shall have 2 programming methods:
  - 1.1.6..1. Each sensor shall provide manual configuration capabilities of standard parameters without requiring special tools.
  - 1.1.6..2. Each sensor shall allow for programming through the use of an Infrared Setting Unit (Douglas Lighting Controls part # WIR-3110) ; eliminating the need to directly access the device for additional configuration.
- 1.1.7 Single technology sensors shall have 1 programming method:
  - 1.1.7..1. Each sensor shall provide manual configuration capabilities of standard parameters without requiring special tools.
- 1.1.8 It shall be possible to manually set the Time Delay and Sensitivity levels to match specific requirements or the sensor can be set to automatically activate a self-adapting algorithm to maximize energy savings based on occupancy/vacancy tendencies.
- 1.1.9 The installing contractor shall adhere to the manufacturer's recommendations for sensor location.
- 1.1.10 The installing contractor shall set the Time Delay and Sensitivity as per owner's instructions.
- 1.1.11 The installing contractor shall be responsible for adhering to all applicable codes and for providing a completely functional system.

## 1.2 Manufacturers

- 1.2.1 Subject to compliance requirements, Douglas Lighting Controls products shall be used.
- 1.2.2 Subject to compliance requirements, Diversa Occupancy/Vacancy sensors by Douglas Lighting Controls shall be used.

## 1.3 Prior Approval Submissions

- 1.3.1 Manufacturer wishing to submit quotations on the Occupancy/Vacancy sensors must meet prequalification requirements. Prequalification information must be submitted to the electrical consulting engineer not less than ten (10) working days prior to the final closing of tenders for this project.
- 1.3.2 Manufacturer must be prepared to demonstrate the equipment being proposed before the closing of tender.
- 1.3.3 Manufacturer must submit coverage patterns of the proposed system for review.

## 1.4 Instruction Manuals

- 1.4.1 Manuals for system components must be supplied to permit ease of installation, system operation, and maintenance including, but not limited to, the following:
  - Occupancy/Vacancy Sensor step-by-step operating instructions
  - Detailed programming instructions for all configuration parameters.

## 2. PART 2 - Materials

### 2.1 Wall Switch Sensor – Line Voltage WOS Series

- 2.1.1 Sensors shall be **Diversa** WOS series Dual Technology with ADI-Voice detection
- 2.1.2 Sensors shall be **Diversa** WOS series PIR Technology
- 2.1.3 Sensors shall mount in a standard Decora style switch plate and shall mount recessed into the applicable gang box.
- 2.1.4 Sensors shall have a 180 degree coverage pattern.
- 2.1.5 Sensors shall provide an adjustable timeout period of 30 seconds to 30 minutes.
- 2.1.6 There shall be no leakage current to the load when the sensor is in the OFF position.
- 2.1.7 If a Photo Sensor is required, it shall be incorporated into the Occupancy/Vacancy Sensor device and operate so that when Occupancy/Vacancy is detected, the sensor will only allow the load to be switched ON if the light level is below the daylight level set by the user.
- 2.1.8 A Manual Override Switch is to be provided on the sensor to allow the sensor to switch loads ON by the switch and OFF by the sensor.
- 2.1.9 If required by the plans, a **Diversa** WVS series Vacancy Sensor shall be provided. This detector shall not be reconfigurable to be an Occupancy/Vacancy Sensor by the user.
- 2.1.10 Where 2 level switching is required, a 2-pole sensor shall be provided. The sensors must be able to be set to activate alternating poles to provide even lamp wear.

## 2.2 Wall Switch Sensor – Low Voltage WOS Series

- 2.2.1 Sensors shall be **Diversa** WOS series Dual Technology with ADI-Voice detection
- 2.2.2 Sensors shall be **Diversa** WOS series PIR Technology
- 2.2.3 Sensors shall mount in a standard Decora style switch plate and shall mount recessed into the applicable gang box.
- 2.2.4 Sensor shall have a 180 degree coverage pattern.
- 2.2.5 Sensors shall provide an adjustable timeout period of 30 seconds to 30 minutes.
- 2.2.6 Sensors shall operate with the **Diversa** WP-PP20-D / WP-PP20-2P-D / WP-PP20-347-D Power Pack using diode pulse technology.
- 2.2.7 If required, multiple sensors may be linked together on a single Power Pack and be configured so that all sensors in a single space can act together as one zone.
- 2.2.8 A **Douglas Lighting Controls** WR-4075 transformer shall be used if required.
- 2.2.1 If a Photo Sensor is required, it shall be incorporated into the Occupancy/Vacancy Sensor device and operate so that when Occupancy/Vacancy is detected, the sensor will only allow the load to be switched ON if the light level is below the daylight level set by the user.
- 2.2.2 A Manual Override Switch is to be provided on the sensor to allow the sensor to switch loads ON by the switch and OFF by the sensor.
- 2.2.3 Where 2 level switching is required, a 2-pole sensor shall be provided. The sensors must be able to be set to activate alternating poles to provide even lamp wear.
- 2.2.4 Provide as required on the plans, options that are available from the following list:
  - 0-10VDC outputs for dimming ballast option for Natural Daylight with user settable light levels.
  - Configurable high and low light level set points so that the sensor can toggle between light levels upon Occupancy/Vacancy.
  - Auxiliary relay, for signaling other systems, which can be configured so that it synchronizes with the ON/OFF status of the load or the status of Occupancy/Vacancy.
  - Remote Manual Override Switch, **Douglas Lighting Controls** WR-86xx series switch

## 2.3 Ceiling Sensor – Line Voltage WOR Series

- 2.3.1 Sensors shall be **Diversa** WOR series Dual Technology with ADI-Voice detection.
- 2.3.2 Sensors shall be **Diversa** WOR series PIR Technology
- 2.3.3 Ceiling sensors shall mount recessed in to the ceiling space.
- 2.3.4 Sensors shall have a 360 degree coverage pattern with an adjustable swivel head to maximize coverage area when mounted on sloped ceilings.
- 2.3.5 Sensors shall provide an adjustable time out period of 30 seconds to 30 minutes.
- 2.3.1 If a Photo Sensor is required, it shall be incorporated into the Occupancy/Vacancy Sensor device and operate so that when Occupancy/Vacancy is detected, the sensor will only allow the load to be switched ON if the light level is below the daylight level set by the user.
- 2.3.2 A Manual Override Switch is to be provided on the sensor to allow the load to be manually switched ON and OFF for the purpose of testing during installation.
- 2.3.3 Where 2 level switching is required, a 2-pole sensor shall be provided. The sensors must be able to be set to activate alternating poles to provide even lamp wear.

## 2.4 Ceiling Sensor – Low Voltage WOR Series

- 2.4.1 Sensors shall be **Diversa** WOR series Dual Technology with ADI-Voice detection.
- 2.4.2 Sensors shall be **Diversa** WOR series PIR Technology
- 2.4.3 Ceiling sensors shall mount recessed in to the ceiling space.
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- 2.4.5 Sensors shall provide an adjustable time out period of 30 seconds to 30 minutes.
- 2.4.6 Sensors shall operate with the **Diversa** WP-PP20-D / WP-PP20-2P-D / WP-PP20-347-D Power Pack using diode pulse technology.
- 2.4.7 A **Douglas Lighting Controls** WR-4075 transformer shall be used if required.
- 2.4.1 If a Photo Sensor is required, it shall be incorporated into the Occupancy/Vacancy Sensor device and operate so that when Occupancy/Vacancy is detected, the sensor will only allow the load to be switched ON if the light level is below the daylight level set by the user.
- 2.4.2 A Manual Override Switch is to be provided on the sensor to allow the load to be manually switched ON and OFF for the purpose of testing during installation.
- 2.4.3 Where 2 level switching is required, a 2-pole sensor shall be provided. The sensors must be able to be set to activate alternating poles to provide even lamp wear.
- 2.4.4 Provide as required on the plans, options that are available from the following list:
  - 0-10VDC outputs for dimming ballast option for Natural Daylight with user settable light levels
  - Configurable high and low light level set points so that the sensor can toggle between light levels upon Occupancy/Vacancy
  - Auxiliary relay, for signaling other systems, which can be configured so that it synchronizes with the ON/OFF status of the load or the status of Occupancy/Vacancy
  - Remote Manual Override Switch, **Douglas Lighting Controls** WR-86xx series switch

## 2.5 Corner Mount Sensor – Low Voltage WOW series

- 2.5.1 Sensors shall be **Diversa** WOW series Dual Technology with ADI-Voice detection
- 2.5.2 Corner Mount Sensors shall connect to a mounting bracket designed to allow 45 degree movement in both the horizontal and vertical directions.
- 2.5.3 Sensors shall have a 90 degree coverage area for corner mount applications and 130 degree coverage area for large area applications.
- 2.5.4 Sensors shall provide an adjustable time out period of 30 seconds to 30 minutes.
- 2.5.5 Sensors shall operate with the **Diversa** WP-PP20-D / WP-PP20-2P-D / WP-PP20-347-D Power Pack using diode pulse technology.
- 2.5.6 A **Douglas Lighting Controls** WR-4075 transformer shall be used if required.
- 2.5.1 If a Photo Sensor is required, it shall be incorporated into the Occupancy/Vacancy Sensor device and operate so that when Occupancy/Vacancy is detected, the sensor will only allow the load to be switched ON if the light level is below the daylight level set by the user.
- 2.5.2 A Manual Override Switch is to be provided on the sensor to allow the load to be manually switched ON and OFF for the purpose of testing during installation.

- 2.5.3 Where 2 level switching is required, a 2-pole sensor shall be provided. The sensors must be able to be set to activate alternating poles to provide even lamp wear.
- 2.5.4 Provide as required on the plans, options that are available from the following list:
- 0-10VDC outputs for dimming ballast option for Natural Daylight with user settable light levels
  - Configurable high and low light level set points so that the sensor can toggle between light levels upon Occupancy/Vacancy
  - Auxiliary relay, for signaling other systems, which can be configured so that it synchronizes with the ON/OFF status of the load or the status of occupancy/vacancy
  - Remote Manual Override Switch, **Douglas Lighting Controls** WR-86xx series switch

## 2.6 Infrared Setting Unit - WIR-3110

- 2.6.1 Provide a **Douglas Lighting Controls** WIR-3110 Infrared Setting Unit to facilitate the following functions:
- Set switch type and address
  - Configure device presets
  - Calibrate Photo Sensors, set addresses, set light levels
  - Set address of Occupancy/Vacancy Sensors

## 2.7 Low Voltage Power Packs – WP-PP20 series

- 2.7.1 Where indicated on the plans, provide **Douglas Lighting Controls** WP series Power Packs capable of powering multiple sensors. The Power Pack shall be controlled by a diode pulse provided by a switch (**Douglas Lighting Controls** WR-86xx Series) or Occupancy/Vacancy Sensor.
- 2.7.2 Power Packs shall provide up to a maximum of 150mA at 24VAC to the low voltage Occupancy/Vacancy Sensors.
- 2.7.3 Power Packs shall be offered in single pole, 2-pole and 347VAC configurations.

# 3. PART 3 – Installation

## 3.1 Occupancy/Vacancy Sensors

- 3.1.1 Locate sensors so there are no objects blocking the infrared sensor from viewing all of the coverage area. Keep away from HVAC vents, direct sunlight and direct light from light fixtures.
- 3.1.2 Adhere to manufacturer's recommendations for location, coverage area, wiring and programming.

## 3.2 Power Packs

- 3.2.1 Mount Power Packs into a 4 inch junction box through a ½ inch conduit opening.

## 3.3 Low Voltage Wiring

- 3.3.1 Low voltage wiring shall be #18 AWG LVT wire type or equivalent.

### **3.4 Line Voltage Wiring**

- 3.4.1 Pigtail leads from sensors are #14AWG. Use appropriately sized wire for the branch circuit.
- 3.4.2 Make appropriate grounding connections to the Wall Switch sensors.

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