



## IECC (2015) DLM SOLUTIONS

COMMERCIAL SPACES BY CODE DESIGN GUIDE



Commercial energy codes are the foundation for a lighting control design specification. Every three years, the IECC energy code changes and while states and municipalities decide when to implement the changes, eventually the changes will become the new minimum compliance for design. Legrand<sup>®</sup> is an expert in Code Compliant Education and Training. The Wattstopper<sup>®</sup> product line leads the way in simple, flexible, and scalable code compliant, energy efficient lighting controls solutions.

Code compliance is often seen as a hindrance to business with added cost and changes in on-hand inventory needs. The code compliance team at Legrand see changes in code compliance as an opportunity for innovations and improved energy efficiency. The Wattstopper IECC (2015) Commercial Spaces by Code Design Guide provides designers and contractors with tools and design recommendations for common commercial spaces. Working together as partners, we can educate and simplify code compliant solutions for distribution and designers.

Download Legrand's code compliance tools and resources at https://legrand.us/codesolutions

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Breakroom/Kitchen Classroom Conference Room Large Private Office Multi-Stall Restroom Open Office Private Restroom Small Conference Room Small Office



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## **Private Restroom**

IECC (2015) Compliant On/Off Switching with line voltage wallbox product



#### **SEQUENCE OF OPERATION**

- 1. Lighting and fan are manually controlled On/Off with occupancy sensor switch.
- 2. Lighting and fan will auto Off within 20 minutes of occupants leaving.

#### **DESIGN CONSIDERATIONS**

• Demand Response, time scheduling and remote programming functions may be enabled by using DLM product with LMBC-300 Network Bridge connectivity for this space.

BILL OF MATERIALS		
PW-301 (1)	Wallbox PIR Occupancy Sensor	

CODE REQUIREMENTS		
C405.2.1	Occupancy Sensor Controls	
C405.2.2.3	Manual Controls	



### Small Office

### IECC (2015) Compliant On/Off Switching with DLM product



#### **SEQUENCE OF OPERATION**

- 1. Lighting (a) auto On to 50% when occupancy detected.
- 2. Manaul On/Off and 50% reduction control of lighting (a,b) with wall switch occupancy sensor.
- 3. Auto Off all lighting within 20 minutes of occupants leaving.

#### **DESIGN CONSIDERATIONS**

- Although not required by IECC, receptacle control can be added to this space for additional energy savings using either an RF transmitter with receptacle RF receivers, or hardwired receptacles using an LMPL-101 Plug Load Room Controller.
- Time scheduling, demand response and remote programming/ diagnostic functions are enabled with installation of the LMBC-300 Network Bridge for system connectivity.
- To integrate occupancy detection control with the HVAC System, use a LMRL-100 Isolated Relay Interface.

BILL OF MATERIALS		
LMRC-102 (1)	_MRC-102 (1) 2-Relay Room Controller	
LMDW-102 (1)	2-Button Dual Tech Wall Switch Occupancy Sensor	
LMRJ	Pre-Terminated Cable	
CODE REQUIREMENTS		
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### IECC (2015) Compliant Dimming with DLM Product



#### **SEQUENCE OF OPERATION**

- 1. Lighting auto On to 50% when occupancy detected.
- 2. Manual On/Off/Dim and reduction control of general lighting with dimmer switch.
- 3. Lighting will continuously dim based on daylight contribution to maintain at least 35FC at task level.
- 4. Auto Off all lighting within 20 minutes of occupants leaving.

#### **DESIGN CONSIDERATIONS**

- Although not required by IECC, receptacle control can be added to this space for additional energy savings using either an RF transmitter with receptacle RF receivers, or hardwired receptacles using an LMPL-101 Plug Load Room Controller.
- Time scheduling, demand response and remote programming/ diagnostic functions are enabled with installation of the LMBC-300 Network Bridge for system connectivity.
- To integrate occupancy detection control with the HVAC System, use a LMRL-100 Isolated Relay Interface.

#### BILL OF MATERIALS

LMRC-111 (1)	1-Relay Room Controller, 0-10V Dimming
LMDX-100 (1)	Corner Mount Dual Tech Occupancy Sensor
LMDM-101 (1)	1-Button Dimming Wall Switch
LMLS-400 (1)	Photosensor, Closed Loop
LMRJ	Pre-Terminated Cable

CODE REQUIREMENTS		
C405.2.1	Occupancy Sensor Controls	
C405.2.1.1	Manual On / Partial Auto On	
C405.2.2.3	Manual Controls	
C405.2.2.2	Light Reduction Controls	
C405.2.3.2	Daylight Responsive Control	



### Breakroom/Kitchen

### IECC (2015) Compliant On/Off Switching with DLM Product



#### **SEQUENCE OF OPERATION**

- 1. General lighting (a) auto On to 50% when occupancy detected.
- Manual On/Off and 50% reduction control of general lighting (a, b) with wall switch occupancy sensor.
- 3. Manual On/Off control under cabinet lighting (c) with switch.
- 4. Auto off all lighting within 20 minutes of occupants leaving.

#### **DESIGN CONSIDERATIONS**

- A ceiling or corner mount occupancy sensor can be used instead of the wall switch occupancy sensor for larger rooms or to achieve a more specific area of occupancy detection coverage.
- Time scheduling, demand response and remote programming/ diagnostic functions are enabled with installation of the LMBC-300 Network Bridge for system connectivity.
- Although not required by IECC, receptacle control can be added to this space for additional energy savings using either an RF transmitter with receptacle RF receivers, or hardwired receptacles using an LMPL-101 Plug Load Room Controller.
- To integrate occupancy detection control with the HVAC System, use a LMRL-100 Isolated Relay Interface.

#### BILL OF MATERIALS

LMRC-101 (1)	1-Relay Room Controller
LMRC-102 (1)	2-Relay Room Controller
LMDW-102 (1)	2-Button Dual Tech Wall Switch Occupancy Sensor
LMSW-101 (1)	1-Button Digital Wall Switch
LMRJ	Pre-Terminated Cable

CODE REQUIREMENTS		
C405.2.1	Occupancy Sensor Controls	
C405.2.1.1	Manual On / Partial Auto On	
C405.2.2.3	Manual Controls	
C405.2.2.2	Light Reduction Controls	



## IECC (2015) Compliant Dimming with DLM Product



#### **SEQUENCE OF OPERATION**

- 1. General lighting (a, adz1) auto On to 50% when occupancy detected.
- 2. Manual On/Off/Dim and light reduction control of general lighting (a, adz1) with dimmer switches.
- 3. Manual On/Off/Dim white board lighting (b) with dimmer switch.
- 4. Lighting in daylight zone (adz1) will continuously dim based on daylight contribution to maintain at least 35FC at task level.
- 5. Auto Off all lighting within 20 minutes of occupants leaving.

#### **DESIGN CONSIDERATIONS**

- Although not required by IECC, receptacle control can be added to this space for additional energy savings using either an RF transmitter with receptacle RF receivers, or hardwired receptacles using an LMPL-101 Plug Load Room Controller.
- To integrate occupancy detection control with the HVAC System, use a LMRL-100 Isolated Relay Interface.

#### **BILL OF MATERIALS**

LMRC-213 (1)	3-Relay Room Controller, 0-10V Dimming
LMDC-100 (2)	Ceiling Mount Dual Tech Occupancy Sensor
LMDM-101 (3)	1-Button Dimming Wall Switch
LMLS-500 (1)	Photosensor Open Loop
LMRJ	Pre-Terminated Cable

#### **CODE REQUIREMENTS**

C405.2.1	Occupancy Sensor Controls
C405.2.1.1	Manual On / Partial Auto On
C405.2.2.3	Manual Controls
C405.2.2.2	Light Reduction Controls
C405.2.3.2	Daylight Responsive Control

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Classroom

## IECC (2015) Compliant Dimming with DLM Product



#### **SEQUENCE OF OPERATION**

- 1. General lighting (a, adz1) auto On to 50% when occupancy detected.
- 2. Manual On/Off/Dim and reduction control of general lighting (a, adz1) and down lighting (b, c, d) with scene switches.
- 3. Scene settings

a. General Lighting	(a, adz1) 100%	(b) 0%	(c)0%	(d) 0%
b. Projection	(a, adz1) 0%	(b) 75%	(c) 50%	(d) 0%
c. Conferencing	(a, adz1) 50%	(b) 50%	(c) 25%	(d) 50%
d. All Off	(a, adz1) 0%	(b) 0%	(c) 0%	(d) 0%

- 4. Lighting in daylight zone (adz1) will continuously dim based on daylight contribution to maintain at least 35FC at task level.
- 5. Auto Off all lighting and A/V systems within 20 minutes of occupants leaving.

BILL OF MATERIALS		
3-Relay Room Controller, 0-10V Dimming		
2-Relay Room Controller, 0-10V Dimming		
Ceiling Mount Dual Tech Occupancy Sensor		
5-Button Scene Switch		
Photosensor, Open Loop		
Serial Data (A/V) Interface		
Pre-Terminated Cable		

CODE REQUIREMENTS		
C405.2.1	Occupancy Sensor Controls	
C405.2.1.1	Manual On / Partial Auto On	
C405.2.2.3	Manual Controls	
C405.2.2.2	Light Reduction Controls	
C405.2.3.2	Daylight Responsive Control	

#### **DESIGN CONSIDERATIONS**

- Although not required by IECC, receptacle control can be added to this space for additional energy savings using either an RF transmitter with receptacle RF receivers, or hardwired receptacles using an LMPL-101 Plug Load Room Controller.
- Time scheduling, demand response and remote programming/diagnostic functions are enabled with installation of the LMBC-300 Network Bridge for system connectivity.
- To integrate occupancy detection control with the HVAC System, use a LMRL-100 Isolated Relay Interface.



### Multi-Stall Restroom

### IECC (2015) Compliant On/Off Switching with DLM Product



#### **SEQUENCE OF OPERATION**

- 1. For each restroom independently, lighting (a) auto On to 50% and exhaust fan auto on when occupancy detected.
- 2. Manual On/Off and 50% reduction control of general lighting (a, b) with switches.
- 3. Auto Off all lighting and exhaust fans for each restroom independently within 20 minutes of occupants leaving.

#### **DESIGN CONSIDERATIONS**

- It is important that each restroom (men and women) operate independently and be isolated for correct auto configuration and operation of each independent exhaust fan.
- The IECC standard allows restroom lighting to automatically turn On up to 100% lighting power if desired.
- Time scheduling, demand response and remote programming/ diagnostic functions are enabled with installation of the LMBC-300 Network Bridge for system connectivity.

BILL OF MATERIALS			
2-Relay Room Controller			
Ceiling Mount Dual Tech Occupancy Sensor			
2-Button Digital Wall Switch			
Isolated Relay Interface			
Pre-Terminated Cable			
CODE REQUIREMENTS			
Occupancy Sensor Controls			
Manual On / Partial Auto On			
Manual Controls			

C405.2.2.2

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Light Reduction Controls

### **IECC (2015) Compliant** Space < 5000 ft<sup>2</sup>, Dimming with DLM product



#### **SEQUENCE OF OPERATION**

- 1. General lighting (a, adz1) auto On to 50% when occupancy detected.
- 2. Manual On/Off/Dim and reduction control of general lighting (a, adz1) with dimmer switches.
- 3. Lighting in daylight zone (adz1) will continuously dim based on daylight contribution to maintain at least 35FC at task level.
- 4. Auto Off all lighting within 20 minutes of occupants leaving.
- 5. Emergency lighting transfers to emergency power source and full On with loss of normal power.

#### **DESIGN CONSIDERATIONS**

- Although not required by IECC, receptacle control can be added to this space for additional energy savings using either an RF transmitter with receptacle RF receivers, or hardwired receptacles using an LMPL-101 Plug Load Room Controller.
- Time scheduling, demand response and remote programming/ diagnostic functions are enabled with installation of the LMBC-300 Network Bridge for system connectivity.
- To integrate occupancy detection control with the HVAC System, use a LMRL-100 Isolated Relay Interface.

#### **BILL OF MATERIALS**

LMRC-212 (1)	2-Relay Room Controller, 0-10V Dimming
LMDC-100 (2)	Ceiling Mount Dual Tech Occupancy Sensor
LMDM-101 (2)	1-Button Dimming Wall Switch
LMLS-500 (1)	Photosensor, Open Loop
ELCU-200 (2)	UL924 Emergency Control Unit
LMRJ	Pre-Terminated Cable

#### **CODE REQUIREMENTS**

C405.2.1	Occupancy Sensor Controls
C405.2.1.1	Manual On / Partial Auto On
C405.2.2.3	Manual Controls
C405.2.2.2	Light Reduction Controls
C405.2.3.2	Daylight Responsive Control

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### IECC (2015) Compliant Dimming with DLM product



#### **SEQUENCE OF OPERATION**

- 1. General lighting (a) auto On to 50% when occupancy detected.
- 2. Manual On/Off/Dim and reduction control of general lighting (a) and down lighting (b, c) with scene switch.
- 3. Scene settings

a. General Lighting	(a) 100%	(b) 0%	(c) 0%
b. Presentation	(a) 75%	(b) 50%	(c) 100%
c. Video	(a) 20%	(b) 75%	(c) 0%
d. All Off	(a) 0%	(b) 0%	(c) 0%

4. Auto Off all lighting within 20 minutes of occupants leaving.

#### DESIGN CONSIDERATIONS

- Although not required by IECC, receptacle control can be added to this space for additional energy savings using either an RF transmitter with receptacle RF receivers, or hardwired receptacles using an LMPL-101 Plug Load Room Controller.
- Time scheduling, demand response and remote programming/ diagnostic functions are enabled with installation of the LMBC-300 Network Bridge for system connectivity.
- To integrate occupancy detection control with the HVAC System, use a LMRL-100 Isolated Relay Interface.

BILL OF MATERIALS				
LMRC-213 (1)	3-Relay Room Controller, 0-10V Dimming			
LMDC-100 (1)	Ceiling Mount Dual Tech Occupancy Sensor			
LMSW-105 (1)	5-Button Scene Switch			
LMRJ	Pre-Terminated Cable			

CODE REQUIREMENTS			
C405.2.1	Occupancy Sensor Controls		
C405.2.1.1	Manual On / Partial Auto On		
C405.2.2.3	Manual Controls		
C405.2.2.2	Light Reduction Control		

