OccuDimming with Daylight Harvesting

Saving Energy with Photocells and Occupancy Sensors

Why should your lighting fixtures continue to operate at full power when sunlight is shining through the window? It's an unnecessary waste of energy. An intelligent lighting system will detect natural light and reduce power to the lighting fixtures accordingly.

In addition, there are lighting systems that can detect when a room is unoccupied and then reduce and/or shut off power to the lighting fixtures in order to save energy and money.

Best of all, a lighting system that can provide both of these benefits has the potential to pay for itself very quickly, often three years or less. After that, the savings go straight into your pocket.

System Overview

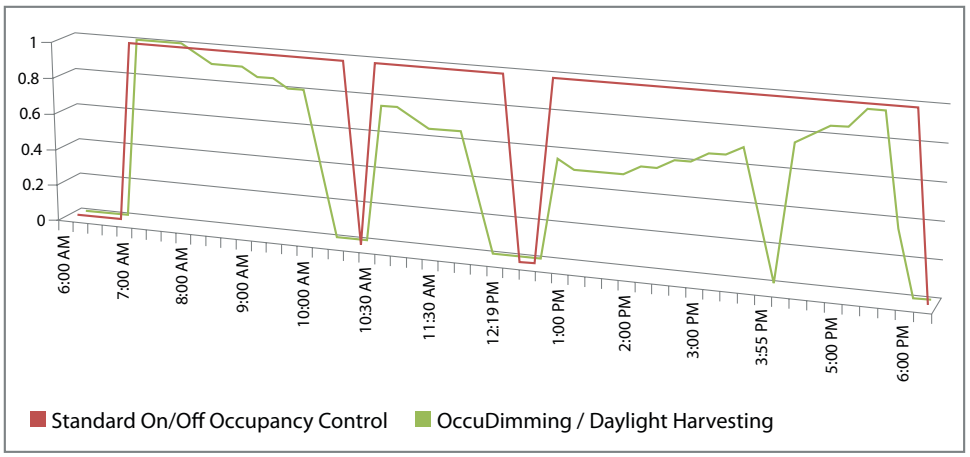
It all starts with DEMANDflex® ballasts from Universal Lighting Technologies. These ballasts allow the installer to set a maximum power level for the specific application, so that the lighting fixtures are never unnecessarily bright (which wastes energy). This alone has the potential to cut the monthly operating costs of your lighting system significantly.

Once they're installed, DEMANDflex ballasts are adjustable from maximum power down to 35% power in one percent increments. This provides a wide range of versatility and control, so that lighting fixtures can respond with precision to changes in natural lighting and/or occupancy.

Ballast power levels are directly controlled by a Programmable Logic Controller (PLC)/Server Manufactured by Plimoth Bay Controls, LLC. The PLC/Server contains a multi-zone schedule control as well as digital sensor input capability. The digital-addressable space sensors can be configured to automatically adjust light levels based upon occupancy and daylight harvesting control.

These technologies can be successfully employed in a wide variety of applications including classrooms, gymnasiums, hallways, parking garages, retail space, conference areas, office space and more.

This graph illustrates the KW demand for a typical classroom based upon two different control technologies; standard occupancy sensors and OccuDimming with Daylight Harvesting.

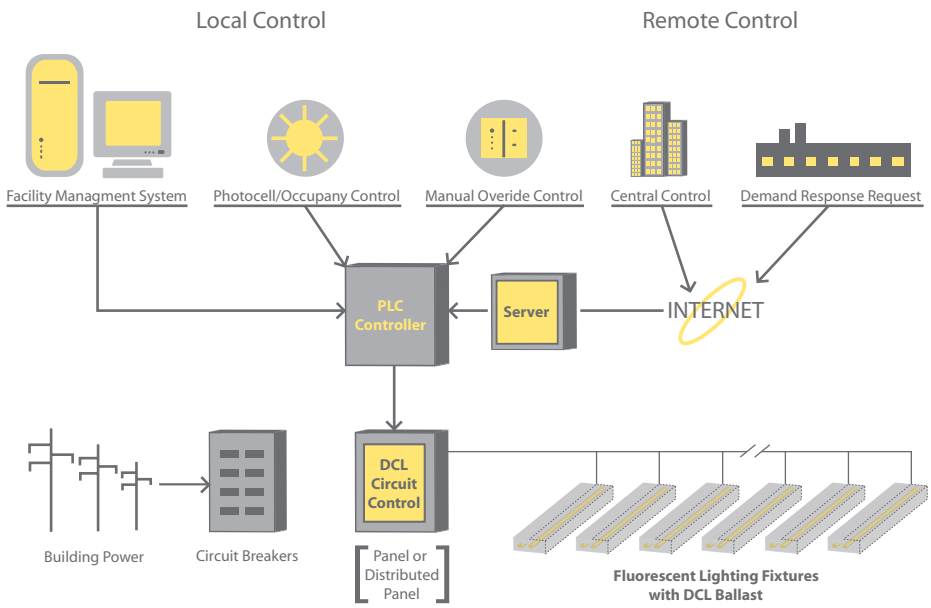


How It Works

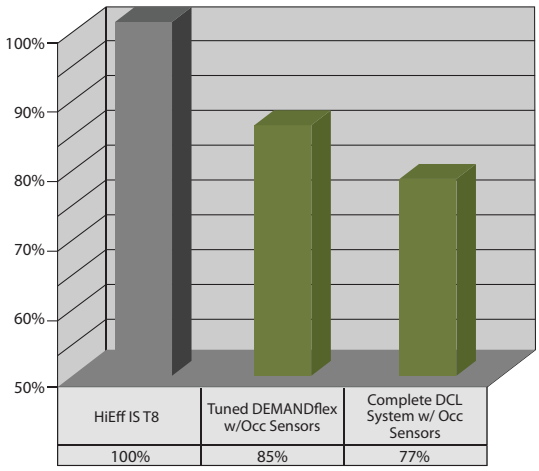
When the occupancy sensor is active (i.e., the room is occupied), then the photocell will determine how much artificial light is necessary to maintain the ideal level of illumination within the room. When there is no natural light, the photocell will relay this information to the PLC, which will signal the DEMANDflex ballasts to operate at their pre-programmed maximum level. When the photocell detects natural light, the PLC will dim the ballasts by an equivalent amount so that the total illumination of the room does not change. This process is called Daylight Harvesting.

When the occupancy sensor detects that the room is unoccupied, then the PLC stops taking orders from the photocell and instead initiates a shut-down program. It begins with a dimming sequence with a field-adjustable time of 30 seconds. Power to the ballasts will decrease to 35% power for ten minutes. Then, the fixtures will turn off. This process is called OccuDimming. Should the space be re-occupied prior to the system timeout, the occupancy sensor would alert the PLC, and ballast output would immediately return to the level established by the photocell.

Note: most other control systems with occupancy sensors are programmed to remain at full power for 15 to 20 minutes after zero occupancy. By immediately reducing power to 35% for ten minutes, the difference is equal to one additional hour of savings per day.



Operational Cost Comparison



Return on Investment:

The real-world savings achieved with occupancy sensors and photocells are relatively simple to calculate, including the ROI and payback schedule. For a complete analysis of your facility, contact Jim Killion.

3-Lamp Fixture Savings Example

Ballast Type	Lamp Type	Input Power	Annual Operating Costs	Annual Savings Over Instant Start	Occupancy Sensor Savings	Potential Total Savings per Fixture Over Magnetic
Instant Start Electronic	F32T8	86	$41.28	n/a	n/a	n/a
DEMANDflex® No Tuning	F32T8	85	$40.80	$0.48	$6.12	$6.60
DEMANDflex® Tuned 15%	F32T8	73	$35.04	$6.24	$5.26	$11.50
DEMANDflex™ - Tuned (.60 Ballast Factor)	F32T8	66	$31.68	$9.60	$4.75	$14.35

$0.12 Utility Rate ($/kwh)	4,000 Annual Operating Hours	15% Occupancy Sensor Savings

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