

## LIGHTING LAYOUT GUIDE SERIES

CONTROLS GUIDE 5

### KEY TIPS

With a Luminaire Level Lighting Controls (LLLC) solution deployed, the controls can adapt to a change in work flow or a reconfiguring of the inventory.

If upgrading to new fixtures, see if the controls can be installed at the factory. This can ensure a more robust deployment and more reliable performance, and will reduce installation costs.

When a layered control strategy is applied, daylight savings will be minimal in lightly occupied areas because occupancy sensors will have already turned the lights off.

# WAREHOUSE CONTROLS

## THE OPPORTUNITY

The typical warehouse has areas with predictably high and low activity. However, many areas of a warehouse have intermittent activity that is less predictable. Some warehouses also have daylighting through windows, skylights and/or clerestories that provide an additional light source. There is opportunity for significant energy savings by implementing an appropriate lighting controls solution that takes all of these aspects into account.

## THE SOLUTION

To ensure maximum benefit from any control measure, be sure to utilize modern fluorescent or LED fixtures with dimmable ballasts and drivers. Occupancy sensor deployment is the first and best control strategy to apply. This will capture the most savings from sparsely used areas. However, in areas with high activity time-based controls would suffice. If sufficient daylight is present, applying photosensors is a good option.

LLLC that combine occupancy, daylighting, and time clocks on a networked system can be a powerful tool to leverage continued savings.

## DESIGN CONSIDERATIONS

Good visibility is a key consideration when speed and accuracy are important. In a warehouse, most of the visual tasks are vertical (e.g., reading side labels on boxes), so special attention needs to be given to high-angle lighting and glare control. Many warehouses have both forklift and foot traffic, therefore safety is a major concern. Modern lighting, particularly LED sources, can come to full brightness rapidly once sensors detect activity in the area. However, sensor placement is critical to ensuring that activity is detected properly. If controls are installed in each fixture, then the system will be responsive to changes in occupancy. Because of the high mounting heights often found in warehouses, be sure to use sensors that have a sufficient range to respond to foot traffic and a narrow enough detection pattern to limit false ON responses.

When LLLCs are combined with an Advanced Lighting Control network, fixtures can be configured to turn ON in groups or zones, not only aiding in productivity and safety, but increasing energy savings. For example, when someone enters an aisle the light nearest to the activity is turned up to 100% and lights in the immediate area will come on to 50%, while lights further away remain OFF. Helping add to energy savings while improving contrast ratios.



[www.lightingdesignlab.com](http://www.lightingdesignlab.com)

The logo for Northwest Lighting Network features a horizontal bar with a color gradient from blue to yellow. Below the bar, the words "NORTHWEST" and "LIGHTING NETWORK" are stacked vertically in a uppercase, sans-serif font.

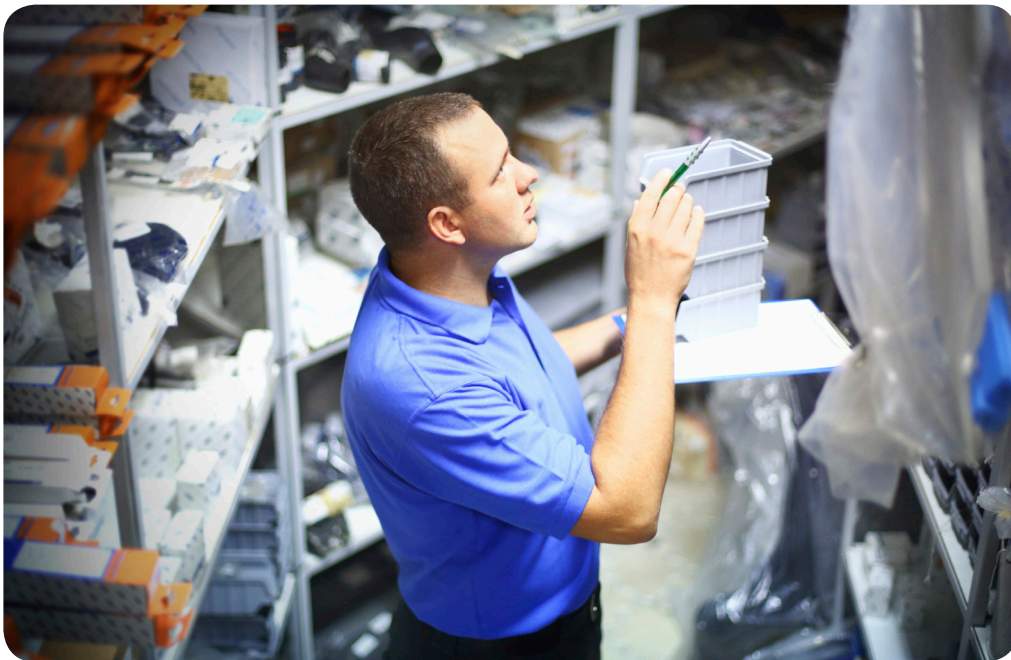
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## WAREHOUSE LIGHTING CONTROLS OPTIONS

STRATEGY	DESCRIPTION	BENEFITS	TECH NOTES
Astronomical Time Clock	An electronic timer that adjusts to seasonal changes in daylight.	Simple and inexpensive way to control lighting in daylight spaces.	Must have a way to override system for unscheduled activity.
Occupancy Sensor	Senses activity in the area around a fixture.	Automatically dims when no activity is present, increasing energy savings.	Lighting can alert other workers when an area is occupied.
Daylight Sensor	Dims lighting if daylight is present.	Reduces power consumption during daylight periods.	LLLC installations make for easy zoning and commissioning.
Networked Lighting	Allows communication between fixtures.	Easy zoning and reporting of system performance	There are different communication modes: wired and wireless (radio, IR, WiFi).

These controls can all be deployed for an Advanced Lighting Controls strategy.



Warehouses have vastly different lighting and controls opportunities. For instance, a staging workspace needs a different strategy than storage aisles. Knowing the warehouse's layout and where predictable activity occurs is crucial before implementing a controls strategy.