

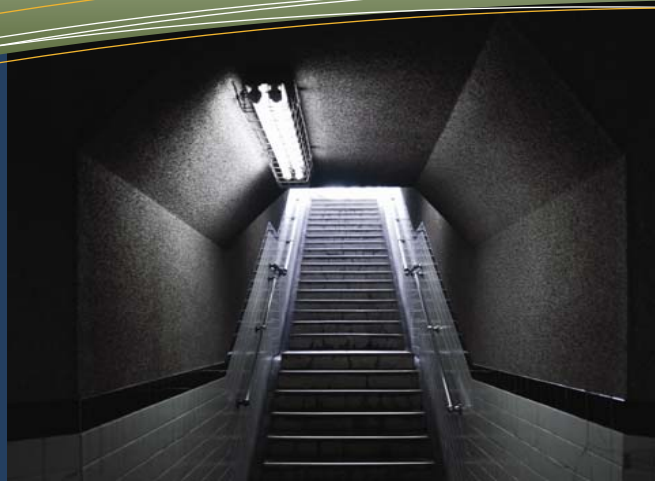
Lighting Application Brief

Achievable Results

Whether your requirement is controllable light, energy savings, aesthetics, safety, or any combination of these attributes you will find they are achievable and straightforward with the Robertson EasyDim ballast. This program start, multi-volt, electronic ballast combines simplicity of installation with the versatility of optional control devices, i.e. motion sensors, occupancy sensors, vacancy sensors, photocells, time delay switches, or standard wall switches, to create three levels of uniform light distribution from your fixture.

Features:

- Multi-Volt, Program Start, Energy Efficient
- 3 Levels of Dimming
- Provides Maximum Lamp Life
- Supports Sustainable Lighting Design
- Complies with State and Local Building Codes
- Easy Installation
- No Special Wiring or Control Devices



EasyDim

Simplicity of Installation **P.1**

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Benefits & Power Savings **P.3**

NEMA Premium & Energy Star **P.4**

EasyDim - Simplicity of Installation

While no control devices are required with the EasyDim ballast, it can be used very effectively with a range of control devices, especially occupancy (or vacancy) sensors. There are many applications where it is desirable to have light set at lower levels when there is no one present in the space and full light when someone is present, for the purpose of energy savings. The EasyDim ballast can be used in conjunction with a simple occupancy sensor to achieve this. Instead of using two conventional switches, use one conventional switch and one occupancy sensor.

If the conventional switch is connected to the LO input, and the occupancy sensor is connected to the MED input, 77% of the power will be saved when the controlled space is vacant.

If the conventional switch is connected to the MED input and the occupancy sensor is connected to the LO input, 50% of the power will be saved when the controlled space is vacant.

The same wattage savings can be achieved by the use of "vacancy" sensors. These use the same technology as occupancy sensors, except they require the user to manually switch on the higher level and automatically

reduce to the lower level after the area has been vacated for a predetermined time period, whereas conventional occupancy sensors would automatically switch to higher levels immediately when the space is occupied.

In the same manner, either input can be connected through a simple timer, set to automatically reduce light levels and energy consumption. This could be used to reduce light levels after normal business hours, for example. Conversely, it could be used to reduce light levels during daylight hours in some applications.

A similar strategy can be used with light level sensors in a simple multi-level day lighting scheme.

The number of ballasts that can be controlled by a single switch, or control device, is only limited by the current rating of the switch, and by the users' choice of how large a zone he wishes to control simultaneously.

FACT:

There are millions of linear fixtures installed in installations where 3 or 4 lamps are used with two ballasts.

EasyDim Ballast

can be used, in new fixtures or retro-fit in existing fixtures, without any changes in existing wiring. The ballast-lamp connections are identical to traditional rapid start and program start ballasts. The lamps are operated in series, the same as traditional. In new installations, they can be used without any changes in wiring concept.

Applications Include:

- Offices
- Classrooms
- Conference Rooms
- Stairwells
- Warehouse Aisles
- Retail Spaces

Easy Dim can be used effectively with a range of optional control devices:

- Motion Sensors
- Occupancy Sensors
- Vacancy Sensors
- Photocells
- Time Delay Switches
- Standard Wall Switches



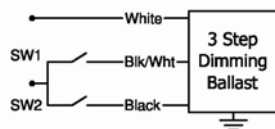
Two Manual Switches

In an area wired with two switches, the ballast black/white lead can be wired to one switch, the ballast black lead to the other switch. Turning on the first switch only will result in a 10% light level and a 77% power savings; turning on the second switch only will result in a 40% light level and a 50% power savings. Turning on both switches will provide 100% light and power consumption.

TWO SWITCH

SW1	SW2	LIGHT LEVEL	POWER SAVINGS
OFF	OFF	0%	100%
ON	OFF	10%	77%
OFF	ON	40%	50%
ON	ON	100%	0%

INPUT CONNECTIONS



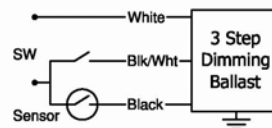
One Manual Switch /One Occupancy Sensor

Compared to the example above, either of the manual switches can be replaced by an occupancy sensor.

If the manual switch is connected to the black/white lead and the occupancy sensor to the black lead, then the light level will go to 10% when the switch is turned on and to 100% so long as occupancy is sensed. 77% of the power will be saved when there is no occupancy.

OCCUPANCY SENSOR

SW	OCCUPANCY ?	LIGHT LEVEL	POWER SAVINGS
OFF	NO	0%	100%
ON	NO	10%	77%
OFF	YES	40%	50%
ON	YES	100%	0%



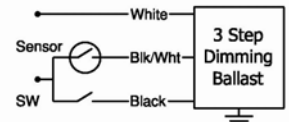
If the manual switch is connected to the black lead and the occupancy sensor to the black/white lead, then the light level will go to 40% when the switch is turned on and to 100% so long as occupancy is sensed. 50% of the power will be saved when there is no occupancy.

Ease and Simplicity of Installation

The Advantage of the EasyDim Step-dimming Ballast

OCCUPANCY SENSOR

SW	OCCUPANCY ?	LIGHT LEVEL	POWER SAVINGS
OFF	NO	0%	100%
ON	NO	40%	50%
OFF	YES	10%	77%
ON	YES	100%	0%

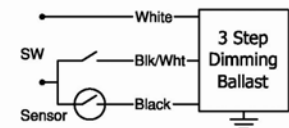


Light Sensors

Light sensors can be used instead of occupancy sensors, but connected and used in similar manner to reduce the light level and power consumption when the ambient light level exceeds predetermined levels.

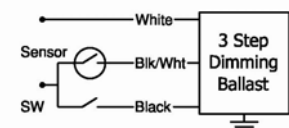
LIGHT SENSOR

SW	LIGHT ?	LIGHT LEVEL	POWER SAVINGS
OFF	NO	40%	50%
ON	NO	100%	0%
OFF	YES	0%	100%
ON	YES	10%	77%



LIGHT SENSOR

SW	LIGHT ?	LIGHT LEVEL	POWER SAVINGS
OFF	NO	10%	77%
ON	NO	100%	0%
OFF	YES	0%	100%
ON	YES	40%	50%



Reduce Power Consumption and Light Level

Why Buy EasyDim ?

EasyDim Ballast provides three levels /steps of light reduction and energy savings which may qualify for rebates and tax incentives

EasyDim ballasts meet the dimming ballast efficiency specifications of California Title 24 and comply with state and local building codes.

EasyDim offers program-start performances results in maximum lamp performance and life.

EasyDim ballast delivers even lighting distribution that can all be achieved with NO special wiring and NO control devices, other than normal light switches.

Stairwell Lighting



Another Ideal Application For EasyDim

We Put Green In a New Light



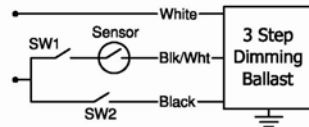
When you see this logo, Robertson is green

Two Manual Switches/ One Vacancy Sensor

A vacancy sensor can be added to either of the circuits, in addition to the standard manual switches. This will ensure that light level is reduced and power is saved, even if both switches have been manually turned on.

If the vacancy sensor is connected to the black lead, the light level will drop to 10% when the space is vacated, and 77% of the power will be saved.

VACANCY SENSOR				
SW1	SW2	OCCUPANCY ?	LIGHT LEVEL	POWER SAVINGS
OFF	OFF	NO	0%	100%
OFF	ON	NO	40%	50%
ON	OFF	NO	0%	100%
ON	ON	NO	40%	50%
OFF	OFF	YES	0%	100%
OFF	ON	YES	40%	50%
ON	OFF	YES	10%	77%
ON	ON	YES	100%	0%

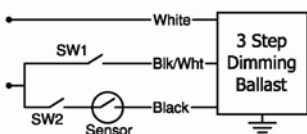


Stairwell lighting

This ballast is ideally suited to save energy in applications like stairwells, where some light is required by codes at all times, but where the occupancy rate is relatively low.

In the most efficient scenario, the black/white is permanently hard wired, resulting in 10% light at all times. The black lead is connected to an occupancy sensor, so that the light level is 100% when the space is occupied.

VACANCY SENSOR				
SW1	SW2	OCCUPANCY ?	LIGHT LEVEL	POWER SAVINGS
OFF	OFF	NO	0%	100%
OFF	ON	NO	0%	100%
ON	OFF	NO	10%	77%
ON	ON	NO	10%	77%
OFF	OFF	YES	0%	100%
OFF	ON	YES	40%	50%
ON	OFF	YES	10%	77%
ON	ON	YES	100%	0%



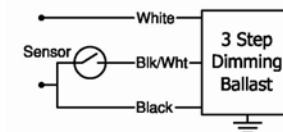
If the vacancy sensor is connected to the black/white lead, the light level will drop to 40% when the space is vacated and 50% of the power will be saved.

This results in a 77% power savings. The annual power savings will be 473 kwh/yr for a two lamp T8 fixture. At \$0.10 per kwh, the electricity cost savings will be \$47 / yr.

In some applications, the 10% light level may not provide the amount of light required by code. In these applications, the black lead should be permanently hard wired and the black/white connected to an occupancy sensor. This will result in a 40% light level at all times, with a 100% light level when the space is occupied.

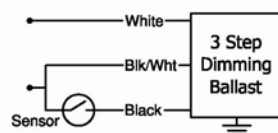
STAIRWELL APPLICATION

OCCUPANCY ?	LIGHT LEVEL	POWER SAVINGS
NO	40%	50%
YES	100%	0%



This results in a 50% power savings; a savings of 306 kwh/yr; an electricity cost savings, at \$0.10 per kwh, of \$31 / yr.

STAIRWELL APPLICATION		
OCCUPANCY ?	LIGHT LEVEL	POWER SAVINGS
NO	10%	77%
YES	100%	0%



The charts provided in this application brief demonstrate the potential power savings of each of the optional control devices at various light levels.



EasyDim

Supports sustainable lighting design as measured by LEED and complies with state and local building codes.

Innovation Award Recipient

Robertson Worldwide was presented with the Best of Category Award for the EasyDim™ Ballast during the LFI Innovations Awards Program held on Tuesday, May 5th, 2009 during the Lightfair International Trade Show and Convention conducted in New York City, NY.

Energy Savings Ballasts from Robertson

- **NEMA Premium – Program Start**

For frequently switched applications and consistent performance choose the energy efficient Program Rapid Start NEMA Premium Ballast

- **NEMA Premium – Instant Start**

For greater efficiency and energy savings choose the Instant Start NEMA Premium Ballast

Both the Program Rapid and the Instant Start achieve green initiatives, LEED Certification, ASHRAE, Title 24 or other energy codes

- **Electra Series – Energy Star Qualified**

Robertson Worldwide is the leader of Energy Star qualified ballasts for both commercial and residential markets with the most extensive listing of fluorescent ballasts meeting Energy Star® requirements in the industry