PHILIPS

sense and simplicity

Philips-Advance High Efficiency Ballasts & Energy-Saving Ballast Strategies

Bob Trate - CPMR

Philips/Advance Ballasts

April 20, 2010

PHILIPS

Fluorescent Ballast Overview

PHILIPS ADVANCE

- There are several generations and design platforms for electronic ballasts
  - There have been 3 major design platform changes since electronic ballasts were introduced in the mid 1980's
  - There have been numerous revisions and changes in electronic ballast designs to keep up with the changes in lamp technology
- Earlier generations are less energy efficient and some will not operate the energy-saving versions of the 32 Watt T-8 lamp properly or not at all
- There are key aspects of any electronic ballast that need to be understood in order to properly configure and lamp and ballast combination for the application
- Lamps and ballast go together – consider both equally when designing a system

PHILIPS

sense and simplicity

Advance Electronic Fluorescent Ballasts For T-8 Lighting Applications

PHILIPS

sense and simplicity

Centium®
T-8 Electronic Ballasts

PHILIPS

Advance Centium® Ballasts

PHILIPS ADVANCE

- IntelliVolt® multiple voltage technology
  - Enables operation from 120 through 277 volts
- Replaces dedicated voltage electronic T-8 ballasts
  - Reduces sku's required for T-8 lamps
- The standard replacement ballast for T-8 applications
- I and 2 lamp T-8 versions have the smallest footprint
- Anti-Striation circuitry added to all 4' T-8 models
- Also available for standard T-12 and T-12 HO lamps

PHILIPS

sense and simplicity

Advance Optanium™
High-efficiency Electronic Ballasts

PHILIPS

Define “High-efficiency”

PHILIPS ADVANCE

- High-efficiency can mean different things to different people
- NEMA established the voluntary premium® ballast program
  - Promotes a more energy efficient environment
  - Assists lighting professionals and end users in recognizing the highest performing ballast products

PHILIPS

NEMA Premium Electronic Ballast Program

Overview of the Program

The NEMA Premium Electronic Ballast Program provides the method for identifying the most efficient T8 fluorescent ballasts available in the market and identifies models that are consistent with the Consortium for Energy Efficiency (CEE) specifications for high performance lamps and ballasts, tested in accordance with ANSI C82 Standards. Products eligible to participate in the new NEMA Premium Electronic Ballast Program include either instant-start or programmed rapid-start electronic ballasts designed for use with four-foot 32 Watt T8 fluorescent lamps. Products qualifying for this program bear a special mark that will help lighting professionals and end users to recognize the market's highest performing electronic ballast products available and will help support energy efficient objectives.

The Special Mark

NEMA Premium

Benefits of the Program

This program not only promotes a more energy efficient environment, but also assists lighting professionals and end users in recognizing the highest performing ballasts products on the market. NEMA anticipates that the NEMA Premium Electronic Ballast Program, by making high efficiency ballasts readily identifiable, will help alleviate market and supply-chain barriers that inhibit higher penetration of energy efficient ballasts nationwide.

How to Specify NEMA Premium Electronic Ballasts

For new luminaires, specify: "Luminaire shall contain a NEMA Premium electronic ballast (do not substitute)." Also, specify starting method, number of lamps, and low, normal or high ballast factor.

For lamp and ballast retrofit, specify: "Ballast shall be a NEMA Premium electronic ballast (do not substitute)." Also, specify starting method, number of lamps, and low, normal or high ballast factor.

For spot ballast replacement, specify: "Ballast shall be a NEMA Premium electronic ballast (do not substitute)." Also, specify ballast, starting method, number of lamps, and low, normal, or high ballast factor.

Qualifying Models

The following screens list companies and their currently qualifying electronic ballast models.

PHILIPS

Advance Optanium™ Ballasts

PHILIPS ADVANCE

- High efficiency ~ 3 watt reduction in ballast losses
- IntelliVolt® Operation – 120 to 277 volt applications
- Normal, low, and high ballast factors
- Instant-Start, Programmed-Start and Programmed-Start Parallel models
- Operates standard and energy saving T-8 lamps
- - 20 deg. “F” starting temperature
  - (when used with the standard 32 watt T-8 lamp)=<
- Philips-Advance high-efficiency fluorescent ballasts are applicable for rebates under PA Act 129
  - Example: Met-Ed rebates low ballast-factor ballasts having a ballast factor =< .78

PHILIPS

Optanium™ Ballasts - Continued

PHILIPS ADVANCE

- UL “CC” rating (“IOP” Models Only)
  - Anti Arc protection
- IOPA Models are standard
- Lamp auto-restrike capability
  - Lower maintenance costs
- No interference with security systems
- Correct lead placement ensures easy installation

PHILIPS

Ballast Factor Defined

PHILIPS ADVANCE

- “Measure of light output from lamp operated by commercial ballast, as compared to laboratory standard referenced ballast specified by ANSI”
- There are 3 nominal ballast factor choices when selecting electronic ballasts:
  - Normal ballast factor ~ (.88)
  - High ballast factor ~ (1.20)
  - Low ballast factor ~ (.75)

PHILIPS

Ballast Factor In Terms Of Control

PHILIPS ADVANCE

- Electronic ballasts are offered with different ballast factors (refer to Advance catalog)
- Selection and application of ballast factor can act as a form of lighting control
- Reducing the ballast factor reduces light output and saves energy
- Reduced light output cannot be below minimum requirements

PHILIPS

Ballast Factor Is Important

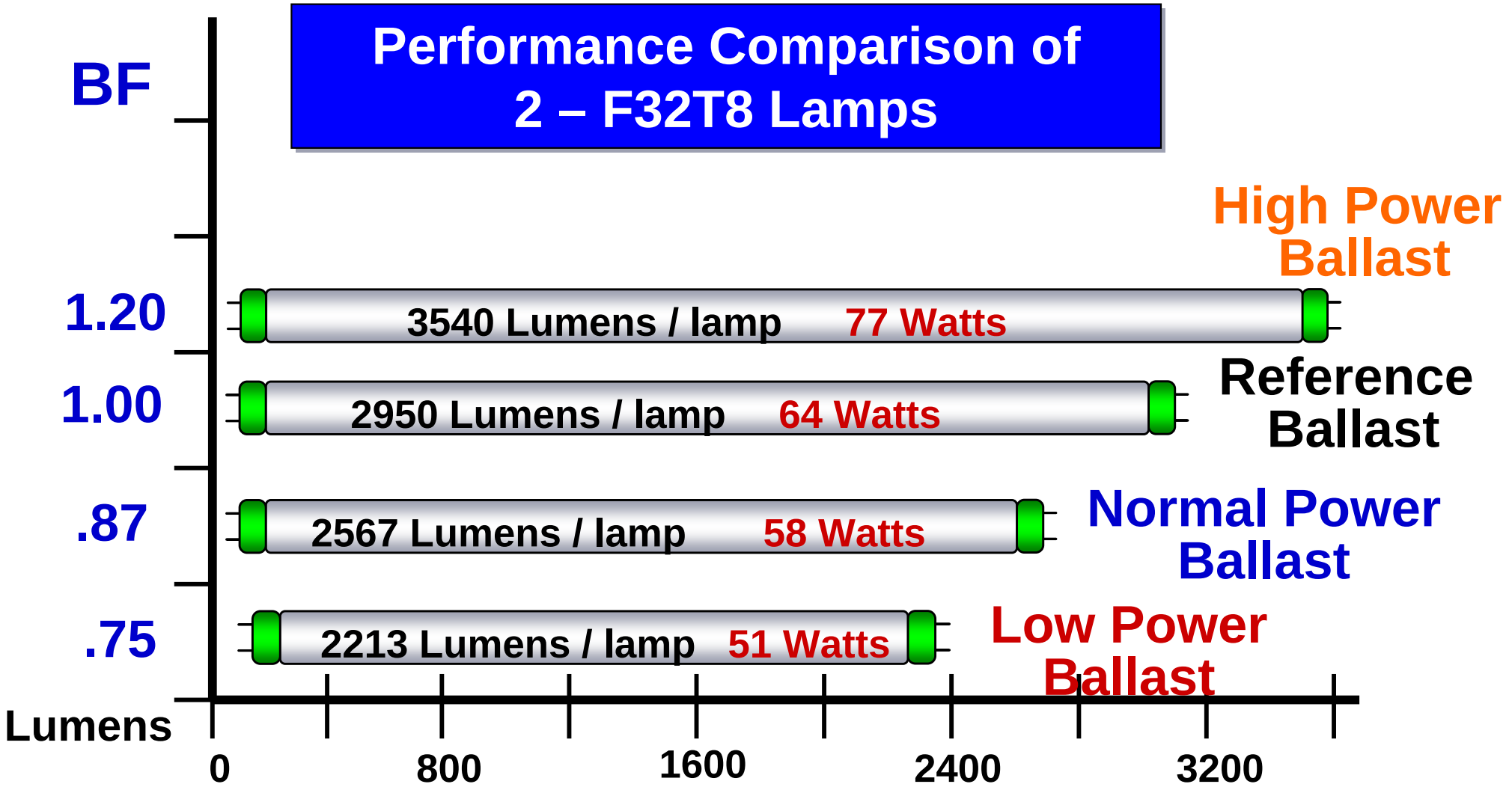
PHILIPS ADVANCE

- You can control the amount light you need by selecting the correct ballast factor
- Low ballast factor = less light and saves energy
- High ballast factor = more light and less energy efficient
- Know when and where to use the different ballast factors

PHILIPS

PHILIPS ADVANCE

Ballast Factor & Light Output



PHILIPS

System Solutions Comparison

PHILIPS ADVANCE

Ballast	Ballast Factor	Input Watts	Lamp Type	# Lamps	Lamp Lumens	System Lumens	LPW	BEF	% of Base
E.S. Magnetic	0.87	68	F34 T12 Cool White	2	2700	4698	69	1.28	100%
H.E Std. BF	0.87	55	F32 T8	2	2950	5133	93	1.58	109%
H.E Low BF	0.77	48	F32 T8	2	2950	4543	95	1.60	97%
H.E.High BF	1.18	74	F32 T8	2	2950	6962	94	1.59	148%
H.E Std. BF	0.87	52	F32 T8 30W/ES	2	2850	4959	95	1.67	106%
H.E Low BF	0.77	45	F32 T8 30W/ES	2	2850	4389	98	1.71	93%
H.E.High BF	1.18	72	F32 T8 30W/ES	2	2850	6726	93	1.64	143%
H.E Std. BF	0.87	48	F32 T8 28W/ES	2	2725	4742	99	1.81	101%
H.E Low BF	0.77	42	F32 T8 28W/ES	2	2725	4197	100	1.83	89%
H.E.High BF	1.18	65	F32 T8 28W/ES	2	2725	6431	99	1.82	137%
H.E Std. BF	0.87	44	F32 T8 25W/ES	2	2400	4176	95	1.98	89%
H.E Low BF	0.77	38	F32 T8 25W/ES	2	2400	3696	97	2.03	79%
H.E.High BF	1.18	60	F32 T8 25W/ES	2	2400	5664	94	1.97	121%

PHILIPS

Lamp Lumens – Based On Philips

PHILIPS ADVANCE

32 W T-8						30 W T-8		28 W T-8		25 W T-8	
ADV	ADV	TL700		TL800							
Kelvin Temperature											
3000 3500 4100	5000	3000 3500 4100	5000	3000 3500 4100	5000	3000 3500 4100	5000	3000 3500 4100	5000	3000 3500 4100	5000
Initial Lamp Lumens (ANSI Bench Ballast – Ballast Factor of 1.00)											
3100	3025	2800	2700	2950	2850	2850	2800	2725	2675	2500	2400

PHILIPS

Overview

PHILIPS ADVANCE

- There are (4) 4-foot T-8 lamps offered
  - 32 watt - 30 watt - 28 watt - 25 watt
- There are different lumen outputs available for each lamp
- There are also different CRI's available on some of these lamps
- There are 3 different ballast factors offered in electronic T-8 ballasts
- There are 36 combinations of these lamps and ballasts regarding light levels
- There are additional lamp combinations based on Kelvin temperature

PHILIPS

sense and simplicity

T-8 Ballast & Lamp Choices

PHILIPS

Application

PHILIPS ADVANCE

- Choose lamp and ballast factor to meet desired lighting levels
- Choose lamp based on life, lumens, CRI and color temperature
- Choose ballast based on application requirements
  - "Instant-start" for most applications
    - Best energy savings
    - Most economical
  - "Programmed-start" for high switch cycles and long lamp life
    - Higher cost
    - Lower energy savings
    - Longer lamp life
  - "Programmed-start-parallel" for the best of both "Instant-Start" and "Programmed-Start"

PHILIPS

Typical Recommendations

PHILIPS ADVANCE

- Classrooms
  - 32T8/TL841/XEW/ALTO 25w & IOPA normal ballast factor
- Library
  - F32T8/TL830/XEW/ALTO 25w & IOPA normal ballast factor
- Cafeteria
  - F32T8/TL841/XEW/ALTO 25w & IOPA normal ballast factor
- Hallways
  - F32T8/TL835/XEW/ALTO 25w & IOPA normal ballast factor
- Administrative Offices
  - F32T8/TL835/XEW/ALTO 25w & IOPA normal ballast factor
- Utility
  - F32T8/TL841/XEW/ALTO 25w & IOPA normal ballast factor

Source: Wm. Middlebrook – Philips Lamps

PHILIPS

Centium Vs. Optanium

PHILIPS ADVANCE

Feature	Centium	Optanium
IntelliVolt	Yes	Yes

PHILIPS

Centium Vs. Optanium

PHILIPS ADVANCE

Feature	Centium	Optanium
IntelliVolt	Yes	Yes
Anti-Striation Circuitry	Yes	Yes

PHILIPS

Centium Vs. Optanium

PHILIPS ADVANCE

Feature	Centium	Optanium
IntelliVolt	Yes	Yes
Anti-Striation Circuitry	Yes	Yes
Operates 32, 30, 28 and 25 Watt 4-Foot T-8 lamps	Yes	Yes

PHILIPS

Centium Vs. Optanium

PHILIPS ADVANCE

Feature	Centium	Optanium
IntelliVolt	Yes	Yes
Anti-Striation Circuitry	Yes	Yes
Operate 32, 30, 28 and 25 Watt 4-Foot T-8 lamps	Yes	Yes
Multiple Ballast Factors	No	Yes

PHILIPS

Centium Vs. Optanium

PHILIPS ADVANCE

Feature	Centium	Optanium
IntelliVolt	Yes	Yes
Anti-Striation Circuitry	Yes	Yes
Operate 32, 30, 28 and 25 Watt 4-Foot T-8 lamps	Yes	Yes
Multiple Ballast Factors	No	Yes
UL “CC” Rating	No	Yes (“IOP” Only)

PHILIPS

Centium Vs. Optanium

PHILIPS ADVANCE

Feature	Centium	Optanium
IntelliVolt	Yes	Yes
Anti-Striation Circuitry	Yes	Yes
Operate 32, 30, 28 and 25 Watt 4-Foot T-8 lamps	Yes	Yes
Multiple Ballast Factors	No	Yes
UL “CC” Rating	No	Yes (“IOP” Only)
Instant-Start Models	Yes	Yes

PHILIPS

Centium Vs. Optanium

PHILIPS ADVANCE

Feature	Centium	Optanium
IntelliVolt	Yes	Yes
Anti-Striation Circuitry	Yes	Yes
Operate 32, 30, 28 and 25 Watt 4-Foot T-8 lamps	Yes	Yes
Multiple Ballast Factors	No	Yes
UL “CC” Rating	No	Yes (“IOP” Only)
Instant-Start Models	Yes	Yes
Programmed-Start	Limited	Yes

PHILIPS

Centium Vs. Optanium

PHILIPS ADVANCE

Feature	Centium	Optanium
IntelliVolt	Yes	Yes
Anti-Striation Circuitry	Yes	Yes
Operate 32, 30, 28 and 25 Watt 4-Foot T-8 lamps	Yes	Yes
Multiple Ballast Factors	No	Yes
UL “CC” Rating	No	Yes (“IOP” Only)
Instant-Start Models	Yes	Yes
Programmed-Start	Limited	Yes
Programmed-Start Parallel	No	Yes

PHILIPS

Application Guidelines

PHILIPS ADVANCE

- “ICN” for MRO applications including T-12 standard and high-output lamps
  - Note: Only offered in standard ballast factor
- “IOPA” for system retrofits and to address specific lighting level requirements
  - Available in low, standard and high ballast factors
  - Available in “Instant-Start”, Programmed-Start” and “Programmed-Start-Parallel
- The most common T-8 lamps sold by Philips is the 28 Watt T-8
- The “IOPA” “LW” ballast is often chosen to operate this lamp due to the energy savings based on the low ballast factor
- “IOP” for freezer case applications or where arc-detection circuitry would benefit the installation

PHILIPS

sense and simplicity

Advance Dimming & Controllable Ballasts

PHILIPS

Fluorescent Dimming

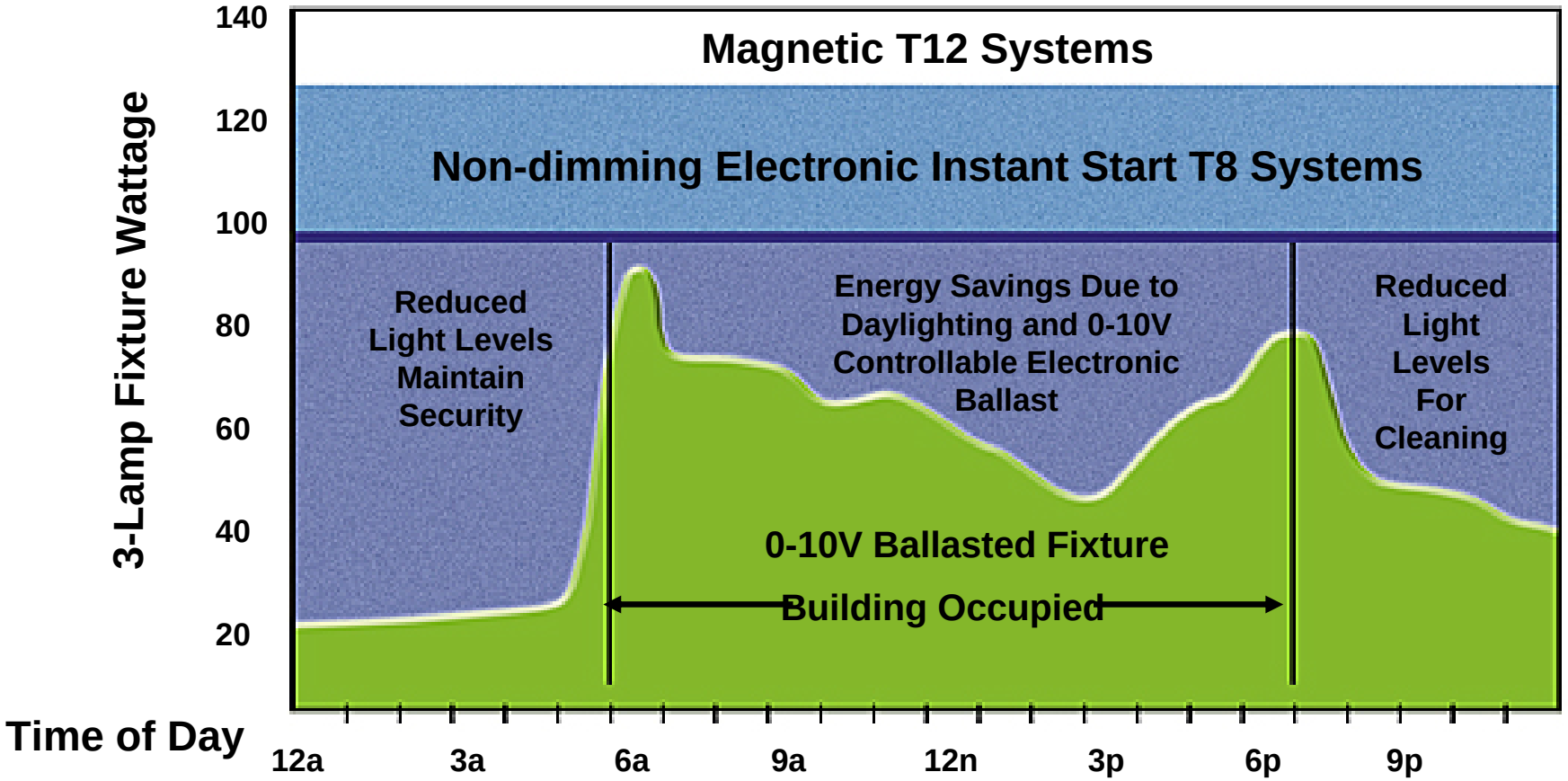
PHILIPS ADVANCE

- An excellent method of control resulting in exceptional energy savings
- Varies ballast factor to create ≈100 % to 5 % light output (depending upon model)
- Advance offers 3 types:
  - Mark X® – Powerline 2-wire
  - Mark VII® – 0-10 Volt DC Control
  - EssentiaLine™ – 0-10 Volts DC Control
- Multiple compatible control manufacturers

PHILIPS

PHILIPS
ADVANCE

How can dimming save you energy?



PHILIPS

Advance Mark X® Powerline

PHILIPS ADVANCE

- Applications
  - Linear Fluorescent
  - 4-Pin Compact Fluorescent
  - T5-HO
- 100% to 5% full-range continuous dimming (down to 1% in T5/HO models)
- Delivers up to 65% energy savings over standard Fixed Output T8 ballasts

PHILIPS

Advance Mark X® Powerline

PHILIPS ADVANCE

- Standard Wiring – no special control leads
- Programmed Start Ignition
- Lamp ignition at any light setting, including the 5% level (1% in T5/HO models)
- Uses:
  - Atriums, Auditoriums, Classrooms, Conference Rooms, and Dining areas
- Use a line voltage control specifically designed for this ballast

PHILIPS

Advance Mark VII® 0-10 VDC

PHILIPS ADVANCE

- 100% to 5% full-range continuous dimming (down to 1% in T5/HO models)
- Direct operation from a 0-10V DC control device
- IntelliVolt® multiple-voltage technology enables operation at any input voltage from 120 to 277 volts, 50/60Hz
- Use controls offered by various control manufacturers

PHILIPS

Advance EssentiaLine™

PHILIPS ADVANCE

- Continuous dimming range from 100% to 20%
- Direct operation from a 0-10V DC control devices from more than 30 manufacturers
- “Programmed-start” operation
  - Use in frequent switching applications
- IntelliVolt® multiple-voltage technology enables operation at any input voltage from 120 to 277 volts, 50/60Hz
- Leviton and others provide specific controls for this ballast
- Meets NEMA Premium and CSA Energy Efficiency requirements
- RoHS compliant
- For F17, F25 and F32 T-8 lamps
- Ballast factor - .88 to .20

PHILIPS

“Step-dim” Ballasts For T-5

PHILIPS ADVANCE

- Designed to operate (2) 28 watt T-5 lamps
- Controlled by any line voltage switching device
  - Separate line voltage leads for operation of each lamp
- IntelliVolt™ design
  - Operates on any voltage between 120 and 277 VAC
- Programmed-Start for use with occupancy sensors and other control devices

PHILIPS

“Step-dim” Wiring

PHILIPS ADVANCE

Power Output	Position	
	S1	S2
100%	On	On
50%	On	Off
50%	Off	On
0%	Off	Off

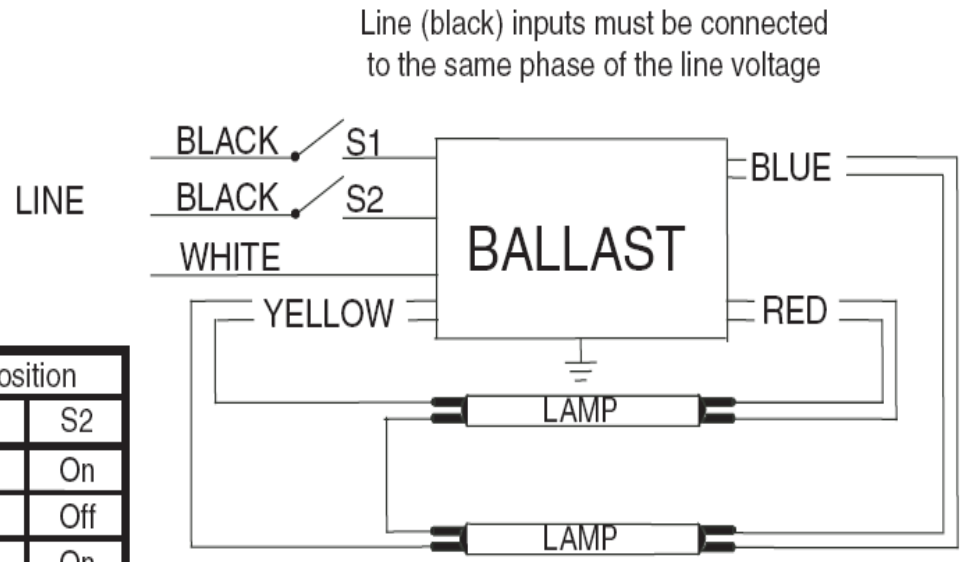


Diagram 173

PHILIPS

Magnetic & HID Update

PHILIPS ADVANCE

- Magnetic ballasts for many common T-12 lamps will be discontinued on July 1, 2010
  - You must purchase electronic ballast for these lamps going forward
- All new Metal Halide fixtures through 500 watts must now be “Pulse-Start” per the “EISA” act of 2007
  - The government has established new efficiency standards for Metal-Halide lamps
  - Metal-Halide lamps above 500 watts are NOT affected
- Many new “Pulse-Start” ballasts are available from Philips

PHILIPS

sense and simplicity

Philips Affinium™ LED Modules

PHILIPS

PHILIPS

Solid State Lighting

Philips Affinium LED modules

Affinium LED String
Channel Letter Applications

Affinium LED PosterBox
Backlit Signage Applications

Affinium LED RDL
Refrigeration Applications

PHILIPS

Philips LED Lighting Products

PHILIPS ADVANCE

- Philips is the only company in the world that manufactures the entire system
  - LED chip
  - Module/Lamp/Light source
  - Power Supply
- Proper management of thermal dissipation
  - Over driving the lamp will dramatically shorten the life
- Simple rules to move forward with when considering an LED system:
  - Can they explain their Thermal Management for the system?
  - How do they bin/sort there product to ensure even color and illumination over thousands of units?
  - How do they drive their LED units to ensure proper forward voltage, to not damage LED?

PHILIPS

Philips LED Lighting Products

PHILIPS ADVANCE

- Philips is the only integrated company capable of controlling all of the aspects of manufacturing LED lighting products
- Without full top to bottom manufacturing integration you lose internal control of the process, thus losing the probability of accurately predicting the life of the LED unit over tens/hundreds of thousands of units over time

PHILIPS

sense and simplicity

Questions?


PHILIPS