

HIGH INTENSITY DISCHARGE BALLASTS

# Pulse Start

For Pulse Start Metal Halide Lamps

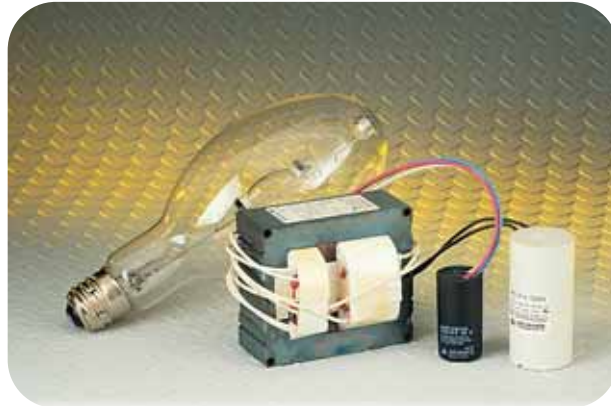


- ▶ SuperCWA
- ▶ Linear Reactor
- ▶ Regulated Lag
- ▶ F-Can



*Where great lighting starts.*

# Exclusively from Advance



## A full line of pulse start metal halide ballasts supporting superior-quality and cost-efficient lighting:

- Super Constant Wattage Auto-transformer (SuperCWA) Ballast - - Supporting mainstream applications from 150W to 1000W, 60hz and 50hz
- Linear Reactor Ballast - - Providing significant energy savings and superior lumen maintenance for 277V applications
- Regulated Lag Ballast - - Delivering premium performance and long life with high lumen maintenance and color stability. Ideal for applications with long burning hours and/or costly lamp maintenance.
- F-Can - - Bringing the performance of pulse start metal halide to applications such as downlighting, indirect lighting, and other indoor commercial installations.

### The HID Dilemma...Good yellow light or poor white light

Until now, high intensity discharge (HID) lighting involved an unavoidable compromise. High pressure sodium (HPS) systems are energy efficient and cost effective but produce hazy yellow illumination. While metal halide lighting delivers desirable white light, it does so at the cost of operational efficiencies.

### Advance leadership powers the solution

New pulse start metal halide systems resolve the yellow light/white light compromise for good. An unprecedented alliance between

Advance and the top four U.S. lamp manufacturers has spurred the joint re-engineering of traditional metal halide lamp and ballast technology.

### Cooperative lamp and ballast development delivers an optimized system

The results of this unique cooperative effort are new and inter-related lamp and ballast designs that dramatically improve virtually every aspect of metal halide lighting, resulting in enhanced lumens per watt and lumen maintenance, longer lamp life, and superior color stability.

### HID lamp development

Both high pressure sodium and metal halide lamps were developed in the 1960s as design improvements over the earlier mercury vapor lamps. Like mercury vapor lamps, traditional probe start metal halide lamps have an internal starting electrode, or probe, powered by a high open circuit voltage from the ballast to initiate an arc. The ballast starts the lamp as well as regulates the current flowing through it. HPS also uses a ballast to regulate the current through the lamp, but includes an ignitor to send a high-voltage pulse directly across the operating electrodes to start the lamp. There is no starting probe.

### High pressure sodium vs. metal halide

High pressure sodium systems provide greater light output, lumen maintenance, lamp life, and efficacy (lumens per watt) than probe start metal halide technology. The yellow light is suitable for applications where color quality is secondary to low operating and maintenance costs. For applications where color quality is important, metal halide lamps produce crisp white light. However, probe start metal halide lighting has several performance drawbacks; shorter life, color variation between lamps, a shift in color of individual lamps over time, low efficacy and poor lumen maintenance.

### Pulse Start System Applications

- *Supermarkets and other mass merchandising stores*
- *Production/assembly facilities*
- *Warehouses*
- *Retail outdoor lighting*
- *Building facade and atrium lighting*
- *Tunnels and roadways*
- *High ceiling public facilities*

HID Lamp Comparison			
Features	Mercury	Probe Metal Halide	High Pressure Sodium
Color	White	White	Yellow
Efficacy (L/W)	50	60 - 85	100 - 125
Lumen Maintenance	50%	65%	90%
Lamp Wattages	50 - 1000	175 - 1000	35 - 1000
Lamp Life (kHrs)	24+	6 - 20	24+

*Let's take a closer look at each of the product high lights...*

# Pulse start metal halide lamps: a major innovation in HID lighting

## The challenge of improving probe start metal halide lamps

Lamp manufacturers sought to improve probe start metal halide lighting by changing the chemistry and increasing the fill pressure in the lamp arc tube to increase lumen efficacy (lumens per watt). However, probe start lamps, with only a 600-volt peak starting voltage from the ballast, would not start where these improvements had been made.

## Advance ignitor clears the way for new lamp designs

The first step towards development of significantly improved metal halide lamps was Advance's introduction of an ignitor as a component of the ballast. The ignitor delivers a high voltage pulse directly across the lamp's operating electrodes to start the lamp, replacing the ballast's 600-volt peak voltage and eliminating the lamp's internal starting probe and its protective switch.

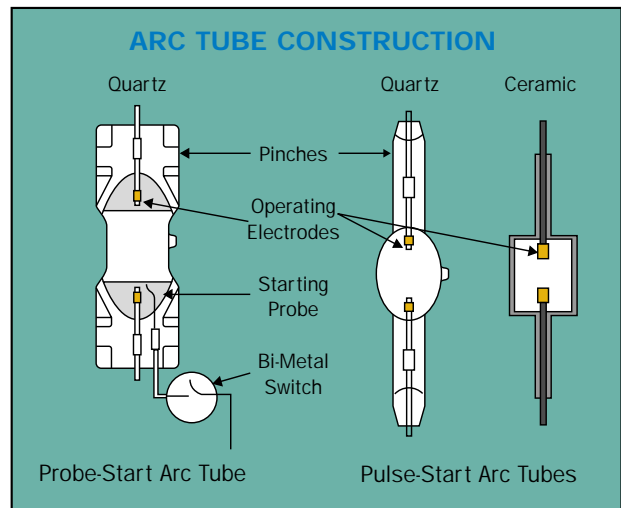
Incorporating an ignitor in the design of Advance pulse start ballasts overcame the major barrier to re-engineering probe start lamps. Lamp manufacturers could now utilize new arc tube designs and materials, allowing for higher operating pressures and new chemical fills.

## Ballast performance gains also realized

In addition to facilitating lamp improvements, Advance's ballast designs also optimized ballast performance. All pulse start ballasts have been designed to specifically meet the needs of the pulse start lamps, and are not simply probe start ballasts with added ignitors. The results include greater energy savings and improvements in lamp current crest factor as well as ballast life.

## Operational efficiencies approach high pressure sodium, plus white light

These inter-related ballast/lamp design innovations optimized pulse start metal halide systems to provide virtually all the efficiencies of high pressure sodium—superior light output, higher lumen maintenance, and long life—plus white light.



Comparison with Pulse Start Metal Halide			
Features	Probe Metal Halide	Pulse Metal Halide	High Pressure Sodium
Color	White	Whiter	Yellow
Efficacy (L/W)	60 - 85	90 - 110	100 - 125
Lumen Maintenance	65%	70% - 75%	90%
Lamp Wattages	175 - 1000	35 - 1000	35 - 1000
Lamp Life (kHrs)	6 - 16	10 - 30	24+

# Exclusive Advance ballast designs: optimizing pulse start system performance

## Separation of ballast functions optimizes performance

Replacing the lamp's internal starting probe with an external ignitor allowed a separation of ballast starting and operating functions. The ignitor starts the lamp, and the ballast's core & coil operates the lamp, allowing for optimization of both lamp and ballast performance.

## Lower crest factor improves lamp life and lumen maintenance

The traditional lead-peak metal halide ballast, with its 600v peak open circuit voltage needed to start probe start metal halide lamps, creates a high lamp current crest factor that compromises lamp performance. By focusing ballast design solely on lamp operation, Advance was able to lower the lamp current crest factor, resulting in improved lamp life, lumen maintenance, and color stability.

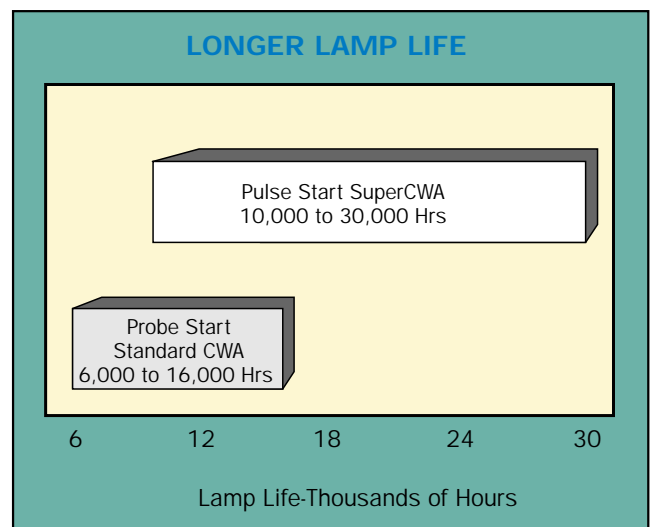
Joint life tests with major lamp manufacturers reveal that pulse start lamps operated by Advance pulse start ballasts have a 10% better lumen maintenance factor than the same lamps operated by traditional lead-peak metal halide ballasts which have been modified to include the addition of an ignitor.

## Cooler operation for longer ballast life

By isolating lamp starting and operating functions, ballast operation is also made more efficient and cooler, because the ballast's core & coil no longer needs to supply the 600v starting voltage of probe start metal halide ballasts. The ballast open circuit voltage requirement is now reduced to the operating requirements of the lamp. This lower open circuit voltage creates lower ballast operating temperatures, resulting in longer ballast life, reduced maintenance/replacement costs, and the possibility of higher fixture ambient temperature ratings.

## Fits existing fixtures for ease of installation

Two of Advance's three new pulse start ballast families have the same core dimensions as standard probe start metal halide, enabling them to fit into existing fixtures. Because the ballasts run cooler, they fit existing fixtures thermally as well; there is no risk of overheating.



# Pulse start ballast/lamp systems: the new level of efficiency and performance

## Improved light output and lower operating costs

Optimized pulse start systems boost both lamp life and lumen output by 25% to 50%. Improving the quality and quantity of white light throughout lamp life provides substantial energy savings, since lower wattage pulse start lamps produce the same light output as higher wattage probe start lamps.

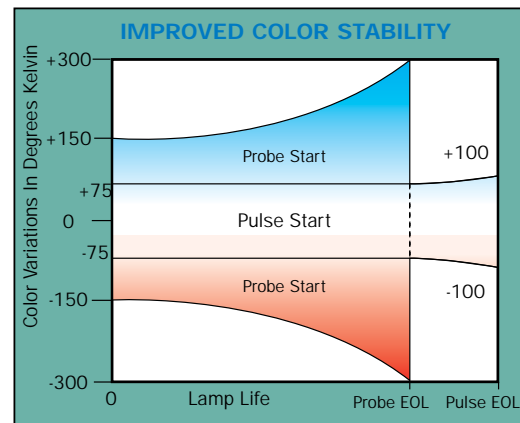
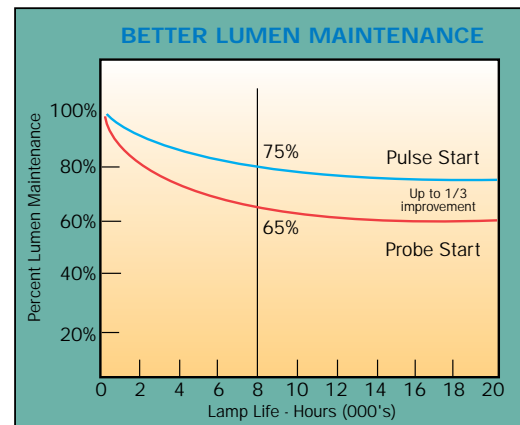
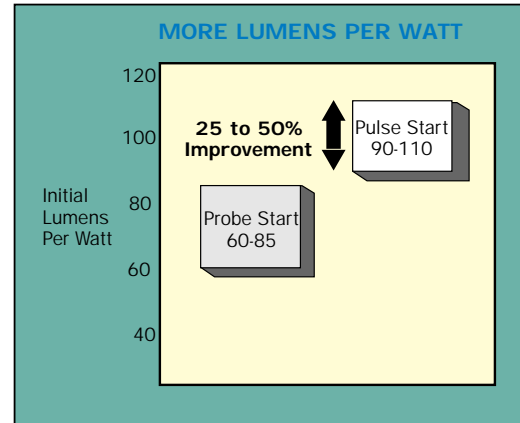
## Better lumen maintenance assures consistent light levels

By achieving lumen maintenance of up to 75%, pulse start lamps reduce light loss over life by up to one-third compared to probe start metal halide. Fewer watts per square foot are required because consistently higher light levels are assured throughout lamp life. Increased lumens per watt and higher lumen maintenance translate into energy savings because a space can be lit with either fewer fixtures or lower-wattage fixtures with no diminishment of light quality.

## New levels of color stability

The improved crest factor and superior lamp wattage regulation provided by the exclusive new ballast designs from Advance, combined with the lamp's new arc tube chemistry and shape, deliver breakthrough improvements in pulse start metal halide's color stability. Color stability is measured by a change in color temperature over the life of the lamp.

Wide operating temperature differences within probe start arc tubes cause color shift and lumen loss as various chemicals leave the arc stream and deposit on the cooler parts of the arc tube walls. As lumen output and color rendering are affected by the mix of metal halides in the arc stream, loss of these chemicals impacts lamp performance. The regulation and improved crest factor characteristics made possible by Advance's new pulse start ballasts, coupled with the new arc tube shapes and chemical fills, assure optimum, consistent performance of the pulse start lamps.



### Less down time with faster warm-up and restrike

The addition of the external ignitor allows changes in the chemical fill to cut lamp warm-up time in half. Reducing warm-up time minimizes electrode wear, thus improving lamp life and lumen maintenance. Reduced restrike time, the time required to restart lamps after power has been momentarily interrupted, drops to three to four minutes. This is 80% faster than probe start.

### Colder starting

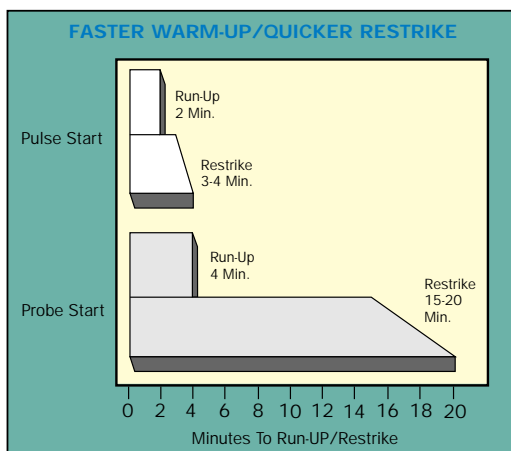
The high voltage ignitor pulse provides colder starting, to -40°F/C, compared to -20°F/-30°C for probe start technology.

### An Advance pulse start ballast for every HID application

By isolating lamp starting and operating functions, ballast Pulse start systems are the first major innovation in HID lighting in 30 years, delivering unprecedented savings in energy, maintenance, and operating costs. Advance has been the only ballast manufacturer to work with all the major lamp companies to capitalize on the optimized design synergies of joint ballast/lamp system development. These unique partnerships continue and will further expand and improve pulse start technology in the future.

The result is a new, dedicated pulse start ballast line-the SuperCWA, Linear Reactor, Regulated Lag, and F-Can ballasts- which represents a new opportunity to upgrade both probe start metal halide and high pressure sodium lighting.

The following pages detail the four different ballast circuits in the exclusive Advance pulse start product line, providing an energy-saving, long life, white-light solution to virtually every



### Pulse Start lamp/ballast system compared to conventional metal halide ballasts

- **Greater efficacy**  
Lumen output per watt consumed increases by 25% to 50%, depending on lamp wattage and burning cycle
- **Better lumen maintenance**  
Lumen maintenance up to 75% achieved - a 16% improvement
- **Longer lamp life**  
Life ratings of 20-30kHr represent up to a 50% improvement
- **Superior color rendition**  
CRI of up to 85 represents a 30% improvement
- **Reduced color shift**  
Lumen output per watt consumed increases by 25% to 50%, depending on lamp wattage and burning cycle
- **Improved lamp-to-lamp color consistency**  
A result of superior ballast regulation capabilities
- **Faster warm-up**  
Warm up time is cut in half to just 2 minutes
- **Quicker restrike**  
Reduces the time needed to restart hot lamps after a momentary outage to just 3 to 4 minutes
- **Colder start**  
To -40°F/C versus -20°F/-30°C

# Four unique Advance Ballast types meet every pulse start application need



As the only ballast manufacturer to partner with lamp companies on pulse-start system design, Advance Transformer offers the only full product line of pulse-start ballasts, with complete availability for general and specialized applications.

## SuperCWA

### The mainstream workhorse

Exclusively from Advance, the SuperCWA ballast is the mainstay pulse start ballast circuit for the typical HID application. It employs two coils to perform the needed voltage transformation to provide the right voltage to the lamp. In addition, the ballast and its associated capacitor work together to control the lamp current to the latest ANSI specifications.

### New, higher sustaining characteristics

Working with lamp manufacturers as they continue their development of pulse start lamps, Advance engineers have upgraded SuperCWA ballast designs to incorporate higher "sustaining characteristics," providing for improved lamp starting, lumen maintenance, and longer lamp life. Advance's SuperCWA ballasts are very cost effective. They have good regulation and voltage dip withstand characteristics to meet the needs of virtually every application. A reduced open circuit voltage resulting in a lower 1.6 crest factor also works to extend lamp life and lumen maintenance. The ballasts have lower losses, run cooler, and allow the use of Advance's 105°C dry-film capacitors for simplified fixture design and assembly.

SUPERCWA CASE STUDY: GAS STATION RETROFIT		
	400W CWA Probe Start	320W SuperCWA Pulse Start
System Watts Per Fixture	458 Watts	368 Watts
Mean Lumens	24,000	21,000
Fixtures	20	20
Power Cost Per Fixt. Per Yr. @ 8¢ (4000 Hrs)	\$147.00	\$117.00

Total savings = \$30.00 x 20 = \$600 per year, forever!

## Applications

- 150 to 1000 watt
- Industrial, commercial, and retail facilities
- Gas station canopies
- Outdoor area lighting, parking lots
- High mast lighting
- Roadways, replacing high pressure sodium

For specifications on available Pulse Start SuperCWA ballasts, see Advance product bulletin Form No. HI-4000

SuperCWA		
Features	Advantages	Benefits
Higher sustaining voltage characteristics	<ul style="list-style-type: none"> <li>• Improves starting</li> <li>• Improves lumen maintenance</li> </ul>	<ul style="list-style-type: none"> <li>• Assures lamps will light under marginal conditions</li> <li>• Fewer fixtures required; more constant light levels throughout lamp life</li> </ul>
Lower crest factor (1.6 vs. up to 1.8)	<ul style="list-style-type: none"> <li>• Extends lamp life</li> <li>• Improves lumen maintenance</li> </ul>	<ul style="list-style-type: none"> <li>• Longer time between lamp changes; reduces maintenance costs</li> <li>• Extends useful lamp life</li> </ul>
Lower ballast losses (5-10 watts less) than probe start CWA	<ul style="list-style-type: none"> <li>• Ballast core &amp; coil runs 5-8°C cooler</li> </ul>	<ul style="list-style-type: none"> <li>• Ballast and other fixture electrical components last 50% longer</li> <li>• Possible opportunity for higher ambient rating on fixture</li> </ul>
Same size as existing probe probe start CWA ballasts	<ul style="list-style-type: none"> <li>• Ballasts will fit into existing fixture designs</li> <li>• Provides possibility of economical retrofit</li> </ul>	<ul style="list-style-type: none"> <li>• Assures retrofit will "fit" thermally (not overheat)</li> <li>• Fixture manufacturers can go to market immediately</li> <li>• New business opportunity—over 70 million 400w MH &amp; HPS fixtures in field today</li> </ul>
105°C dry capacitor	<ul style="list-style-type: none"> <li>• Small size</li> <li>• No exposed live parts</li> <li>• 105°C temperature rating vs. 90°C for oil filled</li> </ul>	<ul style="list-style-type: none"> <li>• Assures replacement will fit</li> <li>• Simplifies fixture design and retrofit</li> <li>• Assures quality</li> </ul>

# Linear Reactor

## Energy-Savings opportunity for 277v/60hz applications

Only from Advance, the Linear Reactor ballast provides up to 35 watts of additional energy savings for 277V/60Hz applications. Coupled with lower wattage lamps of equal lumens for a typical 4000-5000 hour/year application, savings can total \$30-\$50 per fixture per year.

Because it is a single coil lag ballast, it does not change the sinusoidal wave shape of the incoming voltage. This results in a low 1.4 lamp current crest factor-ideal for arc discharge lamps and key to improving lumen maintenance and extending lamp life.

The Linear Reactor ballast is specifically designed to minimize the current draw of the ballast under lamp starting and open circuit conditions. As a result, Linear Reactors permit the same number of fixtures per circuit as CWA circuits.

This ballast also includes an integral ignitor for lamp starting. By incorporating the ignitor components within the coil wrappings, fixture design and assembly are simplified as one component replaces two.

All Linear Reactor ballasts also feature integral thermal protection for added safety. An Advance dry-film capacitor is used for power factor correction. Dry-film capacitors enhance design flexibility through their reduced size and higher 105°C case temperature rating. They are easy to install, have no exposed live parts and provide long life reliability.



LINEAR REACTOR CASE STUDIES				
Grocery Store - Retrofit Choices				
	400 Watt Probe Start (universal)	320 Watt Pulse Start (base-up)	400 Watt Probe Start (base-up)	350 Watt Pulse Start (base-up)
Mean Lumens	24,000	21,000	25,000	26,000
Ballast Circuit	CWA	Linear Reactor	CWA	Linear Reactor
System Watts Per Fixture	460	342	460	375
Fixtures	400	400	400	400
Power Cost Per Fixt. Per Yr. @ 8¢ (5200 Hrs)	\$191.00	\$142.00	\$191.00	\$156.00
Total Store Savings	\$49.00 X 400 = \$19,600 per year, every year		\$35.00 X 400 = \$14,000 per year, every year	
Choices	320 watt pulse start provides 90% of the original light output and cuts power costs by 25%		350 watt pulse start provides more light than premium base-up probe-start and still cuts power costs by 18%	

Grocery Store - New Construction Alternatives				
	400 Watt Probe Start (universal)	320 Watt Pulse Start (base-up)	350 Watt Pulse Start (base-up)	400 Watt Pulse Start (base-up)
Mean Lumens	24,000	21,000	26,000	30,000
Total Lumens	9.6 mil	9.6 mil	9.6 mil	9.6 mil
Fixtures Required for Equal Lumens	400	457	370	320
Ballast Circuit	CWA	Linear Reactor	Linear Reactor	Linear Reactor
System Watts per Fixture	460	342	375	425
Total Store Watts	184,000	156,000	138,750	136,000
Annual Power Costs @ 8¢ (5200hrs)	\$76,500	\$64,900	\$57,700	\$ 56,600
Annual Savings vs. 400 Watt Probe (universal)		\$11,600 (15%)	\$18,800 (25%)	\$19,900 (26%)

## Applications

- 150 to 450W, 277V applications, where energy savings is desired
- Light industry
- Warehouses
- Supermarkets
- Large retail stores
- Parking garages

For specifications on available Pulse Start Linear Reactor ballasts, see Advance product bulletin Form No. HI-4040

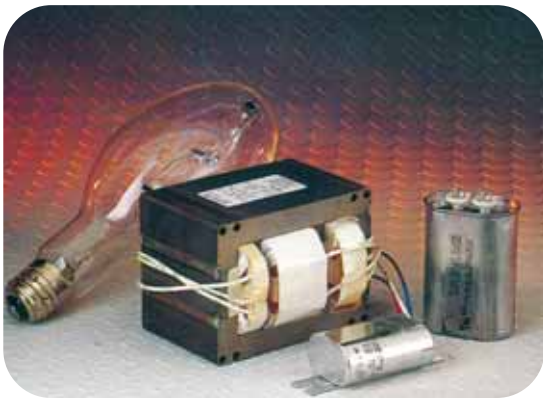
Linear Reactor		
Features	Advantages	Benefits
Designed specifically for 277 volt applications	• No voltage transformation necessary	• Low ballast losses, saves energy
Lowest crest factor (1.4)	• Extends lamp life • Improves lumen maintenance	• Reduced maintenance costs • Fewer fixtures required
105°C dry capacitor	• Small size • No exposed live parts  • 105°C temperature rating vs. 90°C for oil filled	• Assures replacement will fit • Simplifies fixture design, assembly and retrofit • Assures quality
Integral ignitor	• One component system	• Simplifies fixture design, assembly and retrofit
Same size as existing CWA	• Fits in existing fixture designs	• OEMs can go to market quickly • Opportunity for easy retrofits
Faster run-up (2 - 4 minutes) Quicker re-strike Cooler Operation temperature	• Minimize lamp electrode stress • Enhanced safety • Extended life of the ballast	• Extended lamp life • Minimized down time • Minimize fixture thermal stress

## Regulated Lag

### Premium performance to meet the needs of heavy industry

The Regulated Lag ballast design (also known as mag reg) is the premium magnetic ballast circuit of the Advance pulse start line. Its low 1.5 lamp current crest factor and excellent 10:4 lamp wattage regulation (10% change in line voltage results in only a 4% change in lamp wattage) combine to significantly extend lamp life with improved lumen maintenance and color stability. Feedback from the field confirms reports of applications with a working lamp life of 40,000 hours—nearly five years of 24 hour, 7 day per week continuous burn.

The superior lamp wattage regulation property yields two additional benefits particularly important for heavy-industry applications. The Advance Regulated Lag ballasts will absorb system voltage dips of up to 50% as well as compensate for large voltage drops that can be associated with long circuit runs. These ballasts are also especially effective where voltage fluctuations are common due to the presence of large motors or other heavy loads on the electrical system.



For specifications on available Pulse Start Regulated Lag ballasts, see Advance product bulletin Form No. HI-4110

### REGULATED LAG CASE STUDY: HEAVY INDUSTRY

	400W Probe	400W Pulse
Mean Lumens*	24,000	30,000
Fixture Required for Equal Lumens	1.25	1.0
Ballast Circuit	CWA	RegLag
System Watts Per Fixture	460	470
Adjusted Fixture Watts	575	470
Annual Power Cost @ 8¢ (8760 Hrs)	\$403	\$329
400W pulse start metal halide with RegLag ballasts is 22% more cost effective than 400W probe-start metal.		

\*Note: Rated lamp life of pulse start metal halide with RegLag ballasts is 30,000 hours. Rated lamp life of probe start metal halide with CWA ballasts is only 20,000 hours.

### Applications

- 175 to 450 watt
- Heavy industry with large power fluctuations and long burning hour applications
- Hard-to-reach installations or settings involving costly lamp changeouts
- Roadways and tunnels
- Indoor high bay replacement

### Regulated Lag

Features	Advantages	Benefits
Low crest factor (1.5)	Extends lamp life to 30,000 hours Improves lumen maintenance	Reduced maintenance costs Few fixtures required
Premium regulation (10:4)	Maximizes lamp life 50% voltage dip withstand	Reduced maintenance costs Lamp stay lit
Above features in combination	Improves lamp-to-lamp color consistency and color stability	Better quality of light

## F-Can

### Bringing the performance of pulse start technology to indoor commercial applications

Advance developed the pulse start F-Can ballast to help bring the performance of pulse start metal halide to applications such as downlighting, indirect lighting, and other indoor commercial installations. Each ballast features 120/277V, 60Hz dual-voltage input and Advance's exclusive Xtenza® wide-range ignitor technology for remote mounting capability.

Pulse start F-can ballasts utilize a SuperCWA (constant wattage autotransformer) circuit design to deliver improved metal halide performance. All components (two-coil autotransformer ballast, dry-film capacitor, and Xtenza ignitor) are completely self-contained.

SuperCWA F-can ballasts provide an optimal combination of operating parameters: higher sustaining characteristics, good regulation and voltage dip tolerance, lower ballast losses, lower crest factor, faster run-up, and quicker re-strike.



For specifications on available Pulse Start F-Can ballasts, see Advance product bulletin Form No. HI-4060

F-Can		
Features	Advantages	Benefits
Pulse start technology vs. traditional probe start	<ul style="list-style-type: none"> <li>Increased lumens per watt and higher lumen maintenance</li> </ul>	<ul style="list-style-type: none"> <li>Maximizes energy costs</li> <li>Lower energy costs</li> </ul>
Faster run-up (2 min. vs. 4min.)	<ul style="list-style-type: none"> <li>Minimizes stress on lamp electrodes</li> </ul>	<ul style="list-style-type: none"> <li>Extends lamp life</li> </ul>
Quick re-strike after momentary outage (3 - 4 min. vs. standard 15 - 20 min>	<ul style="list-style-type: none"> <li>Less time in dark</li> </ul>	<ul style="list-style-type: none"> <li>Less time in dark</li> <li>Minimizes downtime</li> </ul>
Self contained Xtenza wide-range ignitor	<ul style="list-style-type: none"> <li>Meets ANSI requirements for pulse height and width at all ballast-to-lamp distances from 0 to 50 ft.</li> </ul>	<ul style="list-style-type: none"> <li>Provides flexibility for remote mount applications</li> </ul>
Industry standard profile	<ul style="list-style-type: none"> <li>Fits existing fixtures</li> </ul>	<ul style="list-style-type: none"> <li>Fixture manufacturers can go to market immediately</li> </ul>
Auto-reset thermal protection	<ul style="list-style-type: none"> <li>Safely and quickly interrupts power to ballast</li> </ul>	<ul style="list-style-type: none"> <li>Enhances safety</li> </ul>

### A full line of Advance pulse start ballasts available

All ballasts listed are available from stock or regular production. For individual specification sheets, visit the online product catalog section of our website at [www.advancetransformer.com](http://www.advancetransformer.com) or call Advance at (847) 390-5000.



### Applications

Available for 175 - 400 watt pulse start lamps

- Downlighting
- Indirect lighting
- Noise-sensitive areas (libraries, schools, etc.)

Advance... The power behind the brand.

The protection behind the system.



When you specify "Advance" for all of your ballast requirements, you're harnessing the power of the world's leader in ballast engineering, manufacturing and service. As a division of Philips Electronics North America Corporation, Advance has the global capabilities to bring you innovative solutions for your lighting and energy management challenges. And, with Advance's network of partners and lighting sales professionals, you can count on a level of service and support that matches the unsurpassed quality of Advance's products.

Reliable Advance quality, backed by a 2-year warranty and our exclusive PLUS 90 Protection® warranty program.\*

\*Advance PLUS 90 Protection – combination Lamp and Ballast System Limited Warranty: This value-added warranty provides an additional 90 days protection, subject to restrictions, to both the lamps and ballasts when installed as a system combining Advance Ballasts with lamps manufactured by GE Lighting, Osram-Sylvania, Philips Lighting or Venture Lamp.

## The Advance Advantage—

### Improving Your Bottom Line, Improving the Quality of Your Lighting System

Specifying or purchasing Advance ballasts brings you a variety of benefits, including many ranging far beyond the actual product. Benefits like:

- ▶ The broadest ballast product line available, with selections specially matched to any specific need or application, including the newest in energy-efficient lighting technology.
- ▶ Extensive distribution network means ready availability, with fast access to the right ballasts for your requirements.
- ▶ Advance's wide brand preference, company-wide ISO certifications and strong partnerships with lighting fixture and control manufacturers are your assurance of quality and reliability.
- ▶ Advance's deep support network, including the Advance Specification Sales Group, Energy Service Company (ESCO) and distributor partners, qualified factory customer support specialists and dedicated field salespeople... all working together to ensure your satisfaction.

## Demand Advance

If you want the best in ballast performance and innovation, combined with unsurpassed service and the security provided by Advance PLUS 90 Protection®, Advance is your clear choice. Always demand Advance for all your ballast needs.

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

