Centium®

Optanium®

AmbiStar™


SmartMate®

Standard

T5HO


PureVOLT™

# ELECTRONIC FLUORESCENT BALLASTS



## Contents



**Note:**

Refer to page 9-5 to 9-14 for Ballast Specifications


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# ELECTRONIC FLUORESCENT BALLASTS

## Fluorescent Ballasts - Electronic - Standard Electronic

For T12 Fluorescent Lamps

Reliable and energy-efficient, Philips Lighting Electronics broad line of standard electronic ballasts for T12 fluorescent lamps offers performance and fast payback of investment based on the up to 30% energy savings they drive relative to standard magnetic ballast models. A widely popular product that also qualifies for rebates by a host of utility demand-side management programs nationwide, the Philips Advance line of standard electronic ballasts are ideal for a broad range of commercial retrofit and new construction applications.

These ballasts are ideal for general office applications as well as conference, meeting, and board rooms.

Improved efficiency over magnetic counterparts
Potential Savings of up to 30% over magnetic ballasts*

2-lamp 34/40W versions are now available with IntelliVolt®
Stock 1 ballast for 4-foot, 2-lamp fixtures

High frequency operation
Delivers flicker-free operation

Fits the exact footprint of the magnetic ballasts they replace
Enhances ease of installation in retrofit applications

* Based on input watts of Philips Advance's REL-1S40-SC (35W) and R-140-TP (50W) both operating a 40W lamp. (50W - 35W = 15) (15 / 50 = .3 or 30%)

## Fluorescent Ballasts - Electronic - Centium®

Electronics Ballasts for T5, T8, T12 and Long Twin Tube Fluorescent Lamps

Reliable and energy-efficient, Philips Advance broad line of Centium high frequency electronic ballasts offer all of the energy-saving properties of our standard electronic line plus the added benefits of lamp striation reduction technology making the T8 ballasts compatible with all energy saving T8 lamps. This provides your customers with a more sustainable lighting solution over standard T8 fixtures.

Our Centium ballasts are an optimal choice for a broad range of new construction and retrofit applications within the commercial sector including general office lighting, conference, meeting, and board room applications, indirect and decorative lighting, and new fixture designs requiring smaller ballasts.

### Setting Industry Standards for Ballast Efficiency

The National Electrical Manufacturers Association (NEMA) has created this program to help lighting professionals and end users recognize the market's highest-performing ballast products. A selection of Centium ballasts meet these requirements. For more information on which products comply with this program, visit www.philips.com/advance and click on the "Sustainability" tab.

### Lamp Striation Reduction Technology

Reduces the likelihood of striation often associated with energy-saving lamps, for consistent light output

### IntelliVolt® Technology

Enhances accuracy and ease of ordering while reducing stocking requirement

### Cold temperature lamp ignition down to -20 degrees F

Brings energy-efficient T5 and T8 performance to a variety of new applications such as parking garages, warehouses, and cold storage areas

NEMA Premium®

**The following ballasts are NEMA Premium®:**

ICN2P32N
ICN3P32SC
ICN4P32SC
ICN2P32LWSC
ICN3P32LWSC
ICN4P32LWSC

As a licensee in the NEMA Premium Ballast Program, Philips Lighting Electronics has determined that these products meet the NEMA Premium specification for premium energy efficiency.

# ELECTRONIC FLUORESCENT BALLASTS

## Fluorescent Ballasts - Electronic - Optanium®

High-efficiency electronic ballasts for a broad range of T5 and T8 lamps

Optanium ballasts for T5 and T8 lamps are part of our effort to promote environmental responsibility through Smart Solutions™ - energy efficient products, lighting systems, services and expertise through Philips Advance branded products. They are also one of the charter products of the NEMA Premium® Ballast Program. All of this makes these ballasts part of an overall high-efficiency lighting system that may help you achieve LEED certification, meet ASHRAE standards, become compliant with California Title 24 Energy Efficiency Standards, or any other local energy code you or your customers need to be in compliance.

Optanium ballasts will help you and your customers meet a variety of application challenges including luminaire design, installation, maintenance, and evolving lamp technology. Optanium ballasts are available in a standard light output, low-watt, and a high light output design. Also these ballasts come in options with cold-starting capability down to -20°F (with standard fluorescent lamps). These two features combined make it ideal for just about any T5 or T8 fixture design and application. These ballasts are available in either instant start or programmed start ignition for extended lamp life in frequent switching applications such as those where occupancy sensors or motion detectors are being used. Optanium ballasts are also available in program start with parallel wiring.

### Setting Industry Standards for Ballast Efficiency

As a charter product in the NEMA Premium® Ballast Program, Optanium ballasts are recognized as supporting energy-efficient lighting objectives. The National Electrical Manufacturers Association (NEMA) has created this program to help lighting professionals and end users recognize the market's highest-performing ballast products. For more information on the NEMA Premium Ballast Program, visit www.philips.com/advance and click on the "Sustainability" tab.

### Striation-reduction technology

Reduces the likelihood of striation often associated with energy-saving lamps, for consistent light output

### Cold temperature lamp ignition down to -20°F for instant or program start ballasts

Brings energy-efficient T5 and T8 performance to a variety of new applications such as parking garages, warehouses, and cold storage areas

### Arc-reduction technology — UL Type CC

UL Type CC* (on certain ballasts)

### Program start parallel (PSP)

Program start ballasts with parallel wiring delivers independent lamp operation preventing premature lamp shut down ultimately reducing maintenance

### High efficiency design

Maximize energy savings with improved ballast efficiency

NEMA Premium®

**The following ballasts are NEMA Premium®:**

IOP-1P32-SC
IOP-1P32-LW-SC
IOP-2P32-SC
IOP-2P32-LW-SC
IOP-2P32-HL-SC
IOP-3P32-SC
IOP-3P32-LW-SC
IOP-3P32-HL-90C-SC
IOP-4P32-SC
IOP-4P32-LW-SC
IOP-4P32-HL-90C-G
IOPA-1P32-SC
IOPA-1P32-LW-SC
IOPA-2P32-SC
IOPA-2P32-LW-SC
IOPA-2P32-HL-SC
IOPA-3P32-SC
IOPA-3P32-LW-SC
IOPA-3P32-HL-SC
IOPA-4P32-SC
IOPA-4P32-LW-SC
IOPA-4P32-HL

As a licensee in the NEMA Premium Ballast Program, Philips Lighting Electronics has determined that these products meet the NEMA Premium specification for premium energy efficiency.

## Fluorescent Ballasts - Electronic - SmartMate®

Electronic Ballasts for 4-Pin Compact Fluorescent Lamps

Offering maximum versatility, the Philips Advance family of SmartMate electronic ballasts for 4-pin compact fluorescent lamps drive a broad range of quad and triple-tube, circline, 2D, and long twin-tube lamps. Representing an innovative breakthrough in CFL ballast technology, SmartMate Ballasts' energy-efficient design, compact and lightweight housing, and user-friendly features make SmartMate Ballasts an ideal choice for fixture manufacturers, retrofitters, and MRO replacement.

SmartMate Ballasts are ideal in such applications as restaurants, reception areas, conference and meeting rooms, hotel and convention center ballrooms, and houses of worship, as well as in place of incandescent down-lighting systems.

### We also offer our distribution partners a way to eliminate the need to stock loose components with SmartMate® Ballast Replacement Kits

Conveniently-packaged these kits come complete with a Philips Advance SmartMate Ballast, a mounting plate adaptor, lead wire, and a wire extraction tool for the ultimate in ease and versatility. See page 1-21 for details on kits.

### Dual-entry connector

Reduces SKU requirements and inventory costs, as unit can be used with side or bottom exit leads

### Color-coded, poke-in terminals

Enhances wiring accuracy and ease of assembly/installation

### Operation between 42kHz and 52kHz

Eliminates interference with infrared systems, anti-theft devices, or other electronic equipment

### Lamp End-Of-Life (EOL) Protection Circuit

Removes power to lamps upon lamp failure

# ELECTRONIC FLUORESCENT BALLASTS

## Fluorescent Ballasts - Electronic - AmbiStar™

Residential Ballasts for 4-pin CFL, T5, T8 or T12 Lamps

Today's fixed and dimmable fluorescent fixtures offer greater flexibility and energy savings for residential and hospitality settings than ever before, thanks to Philips Advance AmbiStar™ electronic ballasts. No matter what type of fluorescent lighting you're considering, these ballasts help create warm, inviting interiors while providing Class B FCC EMI Rating - a requirement for the EPA ENERGY STAR® residential lighting fixtures -at a very competitive price.

AmbiStar ballasts feature sleek, compact designs to fit in today's stylish fixtures. AmbiStar ballasts deliver quiet, flicker-free performance, which makes them perfect for any residential or hospitality setting. Fluorescent lighting isn't just for garages and basements anymore.

AmbiStar dimming ballasts are designed to work with most incandescent dimmers, so they are easy to install with new or existing dimming systems. Now you can create any ambiance with dimmable lighting and still enjoy the energysaving benefits of fluorescent lighting.

### Class B FCC EMI Rating

Requirement for the EPA ENERGY STAR Residential Lighting Fixtures

### Title 24 Energy Efficiency Requirements

Enables California's Title 24 Residential Lighting Energy Efficiency standards with applicable luminaire design

### Electronic circuitry

Enable ballast to run cooler and operate quieter than many magnetic ballast alternatives.

### Fast Start Times

Flicker free ignition starts in less than 1.0 second to meet EPA ENERGY STAR Requirements for Residential Lighting Fixtures

NOTE: AmbiStar ballasts meet the ballast-controlled performance requirements in the ENERGY STAR Program Requirements for Residential Light Fixtures. The most current list of ballasts can be found at www.philips.com/advance in the file "ENERGY STAR Ballast Matrix".

## Electronic Ballast Fundamentals

### The job of a ballast

In all fluorescent lighting systems, the ballast's basic tasks include:

- Providing the proper voltage to establish an arc between the two electrodes.
- Regulating the electric current flowing through the lamp to stabilize light output.

In some fluorescent lighting systems, the ballast also provides a controlled amount of electrical energy to preheat or maintain the temperature of the lamp electrodes at levels specified by the manufacturer. This is required to prevent electrode filaments deteriorating prematurely and shortening the lamp life.

### Starting Methods

For many years there were only three types of lighting systems: preheat, rapid start and slimline instant start. With the introduction of electronic ballasts, two additional types of lighting system circuits have been added: instant start for T8 lamps and programmed start. Each requires a special ballast design to operate the lamps in the circuit properly.

Instant start electronic ballasts start lamps without delay (<0.1 seconds) or flicker by providing a starting voltage that is sufficiently high to start a discharge through the lamps without the need for heating lamp electrodes. For F32T8 systems, the starting voltage is about 600V. The elimination of electrode heating maximizes energy savings — typically saving 2W per lamp compared to rapid start ballasts. Instant start ballasts are best suited for applications with limited switches each day. Lamps operated by instant start ballasts typically operate 10,000 to 15,000 switch cycles before failure.

Rapid start electronic ballasts start lamps quickly (0.5 — 1.0 seconds) without flicker by heating the lamp electrodes and simultaneously applying a starting voltage. The starting voltage of about 500V for F32T8 systems is sufficient to start a discharge through the lamps when the electrodes have reached an adequate temperature. Electrode heating continues during operation and typically consumes 2W per lamp. Lamps operated by rapid start ballasts typically operate 15,000 to 20,000 switch cycles before failure.

Programmed start electronic ballasts also start lamps quickly (1.0 -1.5 seconds) without flicker. Programmed start ballasts are designed to maximize lamp life in frequent lamp starting applications such as in areas where occupancy sensor controls are used. Programmed start electronic ballasts precisely heat the lamp electrodes, tightly controlling the preheat duration before applying the starting voltage. This enhancement over rapid start ballasts minimizes electrode stress and depletion of emitter material, thereby maximizing lamp life. Lamps operated by programmed start ballasts typically operate up to 50,000 switch cycles before failure.

### Circuits

Series vs. Parallel. Lighting systems are typically wired in a series or parallel circuit. When a ballast is operating multiple lamps in a series circuit, if one lamp fails, the circuit is opened and all the lamps will extinguish. When a ballast operates multiple lamps in a parallel circuit, the lamps operate independently of each other so, if one lamp fails, the others can keep operating as the circuit between them and the ballast remains unbroken.

As a general rule, rapid start ballasts are wired with the lamps in series. Programmed start ballasts are also typically wired with lamps in series. However, some three- and four-lamp ballasts feature series-parallel operation; so that when a single lamp in one branch fails, the lamp(s) in the parallel branch will continue to operate. Instant start ballasts are typically wired with the lamps in parallel.

### The Language of Ballasts

Input Voltage (dedicated vs. multi). Most ballasts are designed to operate at specific voltages. Newer electronic ballasts, including Philips Advance models that use IntelliVolt® technology, offer much greater flexibility and other advantages such as inventory reduction. Today's increasing demands on electrical utilities can cause wide voltage variations during load demand changes which in turn cause light output from lamps operated on dedicated electronic and electromagnetic ballasts to vary with the input voltage changes. With IntelliVolt technology, many Philips Advance ballasts maintain constant light output through nominal input voltage ranges of 120 to 277 volts, thereby compensating for any change in input voltage. Some ballasts operate from 277 to 480 volts or 347 to 480 volts.

Input Watts/ANSI Watts. Input watts published by ballast manufacturers are the total watts consumed by both the ballast and the lamps it operates. ANSI watts are the rating given for a ballast measured under the strict testing procedures specified by ANSI standards and are a dependable measure of this lamp/ballast performance. Energy savings can be determined by comparing the input watts of different lighting systems.

Input watts may be affected by tolerance build-up from the ballast, lamp, input voltage and ambient temperature. The input watts published in this catalog are for nominal conditions only.

Ballast Factor (BF) is the ratio of light output from a lamp operated on a commercial ballast to the light output of that same lamp operated on a "reference ballast" as specified by ANSI standards. Light output ratings published by lamp manufacturers, are based on this "reference ballast".

$$BF = \frac{\text{light output of lamp operated on commercial ballast}}{\text{light output of lamp operated on reference ballast}}$$

BF is a measure of light output best thought of as a 'multiplier'. Multiplying the BF times rated lumens will determine actual light output of a given system operated on commercial ballasts.

Ballast Efficacy Factor (BEF) is the ratio of ballast factor to input watts. This measurement is generally used to compare the efficiency of various lighting systems — higher numbers being more efficient.

$$\text{Ballast Efficacy Factor} = \frac{\text{Ballast Factor} \times 100}{\text{Input Watts}}$$

This comparison is only valid, however, for ballasts operating the same number and type of lamps. In order to compare different types of lighting systems, the lumen output of the lamps must also be used.

# ELECTRONIC FLUORESCENT BALLASTS

Power Factor (PF) is the measurement of how effectively a ballast converts the voltage and current supplied by the power source into watts of usable power delivered to the ballast and lamps. Perfect power utilization would result in a power factor of one.

$$PF = \frac{\text{Input Watts}}{\text{Input Current x Input Voltage}}$$

A ballast's power factor may be classified under any one of the following categories:

| | |
|---|---|
| High Power Factor (HPF) | 0.90 or greater |
| Power Factor Corrected (PFC) | 0.80 to 0.89 |
| Normal (Low) Power Factor (NPF) | 0.79 or less |

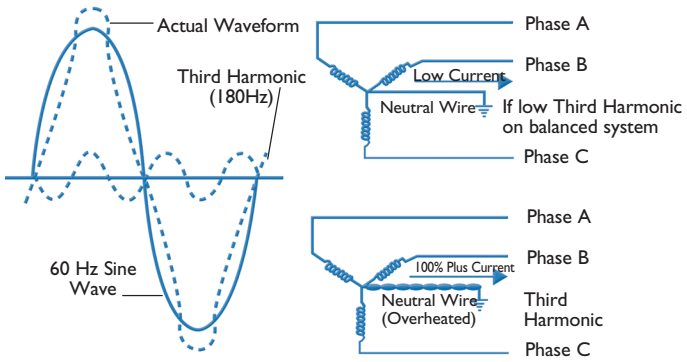
Power factor measurements pertain only to the effective use of power supplied to the ballast. They are not an indication of the ballast's ability to supply light through the lamps. Because low power factor ballasts require about twice the current needed by high power factor ballasts, they allow fewer fixtures per circuit and create added wiring costs. High power factor ballasts are generally specified for all commercial lighting applications.

EMI/RFI. Because they operate at high frequency, electronic ballasts may produce electromagnetic interference (EMI) or radio frequency interference (RFI). RFI frequencies are a subset of EMI frequencies. EMI issues cover all possible operating frequencies while RFI is only concerned with radio and television frequencies. This interference could affect the operation of sensitive electrical equipment, such as radios, televisions or medical equipment. All Philips Advance electronic ballasts incorporate features necessary to afford maximum protection for the operating environment and operate well within regulatory limits.

Ballast Noise. The slight "humming" sound associated with fluorescent lighting systems results from vibration caused by the inherent electromagnetic action in the core-and-coil assembly of the ballasts. All electromagnetic and some electronic ballasts make this sound. Ballasts are assigned a sound rating, "A" through "F", based on the amount of sound produced, with "A" being the quietest. Generally, the larger the lamp and ballast, the higher the sound level and the sound rating will be. Because electronic ballasts have smaller components, they have the lowest sound rating. Some electronic ballasts make almost no sound. There is no ANSI standard for this rating and it is left up to the manufacturer to rate their ballasts.

Inrush Current. All electrical devices including ballasts have an initial current surge that is greater than their steady-state operating current. A standard published by the National Electrical Manufacturers Association (NEMA) — NEMA 410 — Performance Testing for Lighting Controls and Switching Devices with Electronic Fluorescent Ballasts — covers worst-case ballast inrush currents. All circuit breakers and light switches are designed for inrush currents. The electrical system should be designed with this issue in mind.

Total Harmonic Distortion (THD). Harmonic distortion occurs when the wave-shape of current or voltage varies from a pure sine wave. Except for a simple resistor, all electronic devices, including electro-magnetic and electronic ballasts, contribute to power-line distortion. For ballasts, THD is generally considered the percent of harmonic current the ballast adds to the power distribution system. The ANSI standard for electronic ballasts specifies a maximum THD of 32% for commercial applications.. However, most electric utilities now require that the THD of electronic ballasts be 20% or less. Almost all Philips Advance electronic ballasts are rated for either less than 20% THD or less than 10% THD.




Indicates ballast is listed with Underwriters Laboratories, Inc. and complies with UL935 Standard for Fluorescent Lamp Ballasts (File No. E14927).

Visit www.ul.com to find a current listing of Philips Advance ballasts under File No. E14927.

Indicates ballast is certified by Canadian Standards Association and complies with CSA C22.2 No. 74 Standard for Fluorescent Lamp Ballasts (File No. 007310)

Visit www.csa.ca to find current listing of Philips Advance ballasts under File No. 007310.

| Normal Input Voltage | Catalog Number Prefix Code | Label Color Coding |
|---|---|---|
| 120V | R | Yellow |
| 277V | V | Red |
| 347V | G | Grey |
| 120V to 277V | I | Blue |
| 277V to 480V | J | Brown |
| 347V to 480V | H | Purple |

## Total Harmonic Current

### Non-Dimming Applications

When selecting a ballast for a lighting application, the Total Harmonic Current (THC) rating of the ballast is more significant than Total Harmonic Distortion (THD). This is because the absolute value of harmonic current, not the percentage, affects the electrical power distribution system. As can been seen in the table below, the THC rating of our Standard 2-lamp electronic T8 lamp ballast (REL-2P32-SC) is well below that of both the conventional (RQM-2S40-TP) and energy-saving magnetic T12 lamp ballasts (R-2S40-TP) it replaces. Moreover, the THC rating of our Centium electronic ballast is even lower.

### Dimming Applications

**Mark 7® 0-10V and ROVR™**

Traditional low voltage controlled ballasts and ROVR typically produce less than 10% THD at full light output and less than 20% THD throughout the entire dimming range, but require extra wires for the control circuit. THC is always lower than that of the conventional or energy-saving magnetic system.

**Mark 10® Powerline**

Mark 10 *Powerline* electronic dimming ballasts are controlled by 2-wire modified powerline phase-cut style line voltage dimmers. Whenever the ballast is dimmed, the input voltage is cut or "chopped", causing the THD to increase and the Power Factor to decrease.

Mark 10 *Powerline* electronic dimming systems (ballast and controller) have similar THD and Power Factor levels as the conventional lighting systems they replace. Since a much smaller load is required by the Mark 10 *Powerline* electronic dimming system to achieve the same illumination level as a magnetic ballast system (20-30% less), the total input current will be considerably less. As a result, the magnitude of the total harmonic current will be less.

For example, a typical Mark 10 *Powerline* electronic ballast and dimmer control might draw a line current of 0.58A at 15% THD at full light output. If the light level is reduced to 5% of the maximum, the input power is decreased to 0.19A at 95% THD. While the THD level may seem high at the 5% maximum light output setting, the total harmonic current is still lower (0.13A) than the conventional T12 magnetic system (0.20A). Moreover, the overall heating effect on the wires and the distribution transformer is never higher than the existing conventional or energy saving T12 magnetic systems.[1]

### Conclusions

A simple ballast retrofit to electronic ballasts should not cause harmonic problems if none existed before the retrofit. Also, in new fixture applications, total harmonic distortion should not be a concern when specifying electronic ballasts. Finally, it is important to remember that electronic ballasts are not the greatest source of THD in an electrical distribution system. Other electronic devices such as computers, laser printers, and other electronic equipment can draw current with more than 100% THD in some cases.

### Table 1: Comparison of THD and THC Levels

| Philips Advance Part No. | Ballast Type | Light Output Setting | Lamp Type | Input Current | % THD | THC[2] |
|---|---|---|---|---|---|---|
| RQM-2S40-TP | Conventional Magnetic | 100% (Ballast Factor is 0.98) | (2) F40T12 | 0.84A | <25% | 0.20A |
| R2S40-TP | Energy Saving Magnetic | 100% (Ballast Factor is 0.95) | (2) F34T12 | 0.63A | <20% | 0.12A |
| REL-2P32-SC | *Standard* Electronic | 100% (Ballast Factor is 0.88) | (2) F32T8 | 0.49A | <20% | 0.10A |
| ICN-2P32-N | *Centium* Electronic | 100% (Ballast Factor is 0.88) | (2) F32T8 | 0.49A | <10% | 0.05A |
| IZT-2S32-SC + Dimming Control | *Mark 7 0-10V* Electronic | 100% (Ballast Factor is 1.0) | (2) F32T8 | 0.57A | <10% | 0.05A |
| IZT-2S32-SC + Dimming Control | *Mark 7 0-10V* Electronic | 5% (Ballast Factor is 0.05) | (2) F32T8 | 0.12A | <20% | 0.02A |
| REZ-2S32-SC (Ballast Only) | *Mark 10 Powerline* Electronic | 100% (Ballast Factor is 1.0) | (2) F32T8 | 0.58A | <10% | 0.06A |
| REZ-2S32-SC + Dimming Control | *Mark 10 Powerline* Ballast + Dimmer | 100% (Ballast Factor is 1.0) | (2) F32T8 | 0.58A | <15% | 0.09A |
| REZ-2S32-SC + Dimming Control | *Mark 10 Powerline* Ballast + Dimmer | 5% (Ballast Factor is 0.05) | (2) F32T8 | 0.19A | <95% | 0.13A |

[1] For a more technical study comparing the a Mark 10 *Powerline* electronic dimming system to an energy saving magnetic system that it replaces, see the article THD in Philips Advance Mark 10 *Powerline* Electronic Dimming Systems by O.C. Morse.

[2] The Total Harmonic Current (THC) of a ballast is calculated by the following equation: An approximation of THC may be obtained by simply multiplying the ballast input current by %THD.

$$\frac{\text{Ballast Input Current}}{\text{Square Root of } (1 + 1/\text{THD}^2)}$$

# ELECTRONIC FLUORESCENT BALLASTS



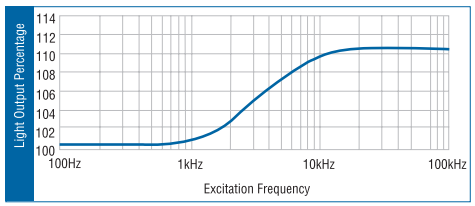
## Ballast Life

Philips Advance fluorescent electronic and magnetic ballasts are designed and manufactured to engineering standards correlating to an average life expectancy of 50,000 hours of operation at maximum rated case temperature. Since Philips Advance ballasts operate below their maximum case temperature in the majority of applications, increased ballast life can be expected. As a rule of thumb, ballast life may be doubled for every 10°C reduction in ballast case operating temperature. However, there are many variables, such as input voltage, ambient temperature, etc. which affect ballast operating temperatures, and therefore ballast life.

## Lamp Operating Frequency

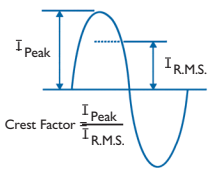
Electromagnetic ballasts and the lamps connected to them operate at an input voltage frequency of 60 Hertz (Hz), 60 cycles per second — which is the standard alternating voltage/current frequency provided in North America. Electronic ballasts, on the other hand, convert this 60 Hz input to operate lamps at much higher frequencies above 20 Kilohertz (kHz), 20,000 cycles per second. Philips Advance ballasts operate above 20 kHz, but avoid certain ranges such as 30-40 kHz (infrared) and 54-62 kHz (theft deterrent systems) due to interference issues.

Because electronic ballasts function at high frequency, the fluorescent lighting systems that they operate can convert power to light more efficiently than systems operated by electromagnetic ballasts (See chart below). For example, lamps operated on electronic ballasts can produce over 10 percent more light then if operated on electromagnetic ballasts at the same power levels. In effect, today's electronic ballasts provide additional energy savings by matching the light output from electromagnetic ballasts while operating the lamps at lower power. This is the main reason why electronic ballast systems are more efficient than magnetic ballast system.




## Crest Factor

Lamp manufacturers use crest factor to determine ballast performance as it relates to lamp life. Lamp Current Crest Factor is a measurement of current supplied by a ballast to start and operate the lamp. It is basically the ratio of peak current to RMS (average) current. High crest factor currents may cause the lamp electrodes to wear out faster, reducing lamp life. Crest factor requirements are regulated by ANSI (American National Standards Institute) standards and specified by lamp manufacturers. For rapid start and instant start T8 lamps the ratio is 1.7 maximum, and for instant start slimline lamps, it is 1 .85 maximum.




## Weight and Size Advantages

Since electronic components in electronic ballasts are smaller and lighter than the core-and-coil assembly in electromagnetic ballasts, electronic ballasts can weigh less than half as much as comparable electromagnetic models. Almost all Philips Advance electronic ballasts have a smaller cross-section than electromagnetic ballasts but maintain the same mounting dimensions. This means that they can fit into all new fixture designs and can be easily retrofitted into existing fluorescent lighting systems.

## Controllability

The ability of a building's occupants to control how they light their space is becoming an increasingly important factor for organizations in determining what real estate they will lease, buy or invest in. The ability to dim the lights or easily shut them off completely is a trend fueled not just by a desire to help the environment, but also by significant economic benefits. These benefits include greater energy efficiency — in terms of reduced HVAC costs as well as energy savings for lighting — more comfortable and productive working environments, and compliance with ever tighter energy efficiency regulations. Philips Advance offers three families of electronic controllable ballasts — ROVR, Mark 7 *0-10V* and Mark 10 *Powerline*.

## Compatibility With Powerline Carrier Systems

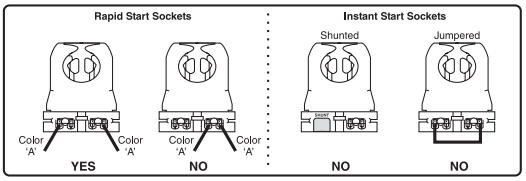
A powerline carrier system (PLC) uses electronic wiring devices to send information via a high frequency signal over the 120V or 277V electrical power distribution system of a building. For example, PLC systems are used in automatic clock systems (master time systems) to synchronize all of the clocks in a building or reset the time after a power outage. They eliminate the need for maintenance personnel to reset hundreds of clocks throughout a facility.

In a PLC system, a generator is used to impose a 1 to 4V high frequency signal on top of the existing voltage sine wave (60 Hz). This signal is generally in the 2500 to 9500Hz range, with some older systems operating at 19,500Hz or higher. Some electronic ballasts which are capacitive can absorb the signal from a PLC system. As a result, the signal becomes too weak to be "heard" by the receiver (like a timeclock) connected to the powerline.

## Instant Start vs. Rapid Start Sockets for Dimming

When using dimming ballasts in fixtures, sockets must be of the Rapid Start type. Many fixtures with T-8 Instant Start electronic ballasts use jumpered or "shunted" Instant Start sockets. Controllable ballasts require two distinctly separate wires for each lamp socket. If you encounter shunted or jumpered sockets in a retrofit application, they must be removed and replaced with Rapid Start sockets.

**Improper socket application will damage the ballast and void the ballast warranty.**
**Refer to ballast wiring diagram for proper installation.**




## Fluorescent Lamp Burn-In

Today, most lamp manufacturers do not require the burn-in of linear fluorescent lamps prior to dimming in order to attain rated lamp life and stable electrical measurements. However, some manufacturers compact fluorescent lamp sources do require a 100 hour burn-in prior to dimming. Consult your lamp manufacturer for their latest requirements.

## Ordering Information

### How to Order

Philips Lighting Electronics has developed the industry's broadest distribution system for electronic ballasts. More than 3000 stocking distributors nationwide. For information on the distributor best able to serve your needs, please call 800-372-3331.

### Electronic Ballast Part Number Breakdown

**I CF - 2 S 26 - HI - LD**

CFL Mounting/Connector Options

BL = Bottom leads
BLS = Bottom leads with mounting studs
BS = Bottom mounting studs with single entry color coded connectors
EL = End leads
ELS = End leads with mounting studs
LD = Length mounting feet with SmartMate® dual entry color coded connectors
LS = Length mounting feet with single entry color coded connectors
QS = QuikStart

Linear Fluorescent Mounting/Connector Options

TP* = Thermal Protected
2LS = 2 Level Switching

CFL Can Desription

H1 = Hybrid metal / plastic case, size 1
L2 = Linear
M1 = Metal case, size 1
M2 = Metal case, size 2
M3 = Metal case, size 3
M4 = Metal case, size 4
M5 = Metal case, size 5
M6 = Metal case, size 6
N = "N" can
S1 = Square, style 1
S2 = Square, style 2

Linear Fluorescent Can Desription

90C = 90°C maximum case temperature rating
A = "A" can
D = 'D' can
G = 'G' can
HL = High light output
L = "L" can
LW = Low watt
MC = Micro can
RH* = Reduced harmonics
S = Slimline
SC = Small can

Lamp Watts (Primary lamp)

Wiring Configuration

D = 2D, series
M = Modified parallel**
P = Parallel
PSP = Programmed Start Parallel
Q = Quad CFL, series
S = Series
T = Triple CFL, series
TTS = Long twin tube, series
TTP = Long twin tube, parallel

Maximum Number of Lamps

Family Name

CF = Compact Fluorescent
DA = ROVR
EB = AmbiStar
EL = Standard
IC = Mark 5®
MB = AmbiStar
ZT = Mark 7® *0-10V*
CN = Centium
DL = ROVR
ELB = AmbiStar
EZ = Mark 10® *Powerline*
LV = Low Cost 0-10V
OP = Optanium

Input Voltage

G = 347V
H = IntelliVolt 347V to 480V 50/60 Hz
I = IntelliVolt 120V to 277V 50/60 Hz
J = IntelliVolt 277V to 480V 50/60 Hz
R = 120V
V = 277V

Corporate Offices
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Customer Support/Technical Service
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(+) 1 847 390-5000 (International)

**Visit our web site at www.philips.com/advance**

- Plan your lighting installation carefully; consider using the services of a qualified lighting designer
- Consult your local electric utility regarding demand side management rebate programs.
- Select the Philips Advance electronic ballast which best matches the requirements of your application. The technical specifications in this catalog (located on pages 9-5 to 9-14) will be useful in obtaining bids from electrical contractors.
- Contact your local Philips Lighting Electronics distributor. You will find them to be a helpful supplier of both products and information.

* Many current and all future electronic ballast part numbers will not use the "RH-TP" suffixes even though these ballasts will be thermally protected.
** Parallel Wiring Configuration. However, if one lamp fails, all other lamps in the circuit will extinguish.

## Remote, Tandem or Through Wiring Distances

### Remote Mounting of Electronic Ballasts

Unlike magnetic ballasts, electronic ballasts are limited in remote mounting distance from the lamps they operate. The factors limiting the distance from the electronic ballasts to the lamps are: open circuit voltage as opposed to operating voltage, operating frequency and the lamp operating current.

As the distance from the high frequency electronic ballasts to the lamp increases, so does the capacitance across the lead wire to the lamp. This increase in capacitance is important for two reasons. First, if the capacitance is too high, there will not be sufficient open circuit voltage across the lamp for proper lamp ignition.

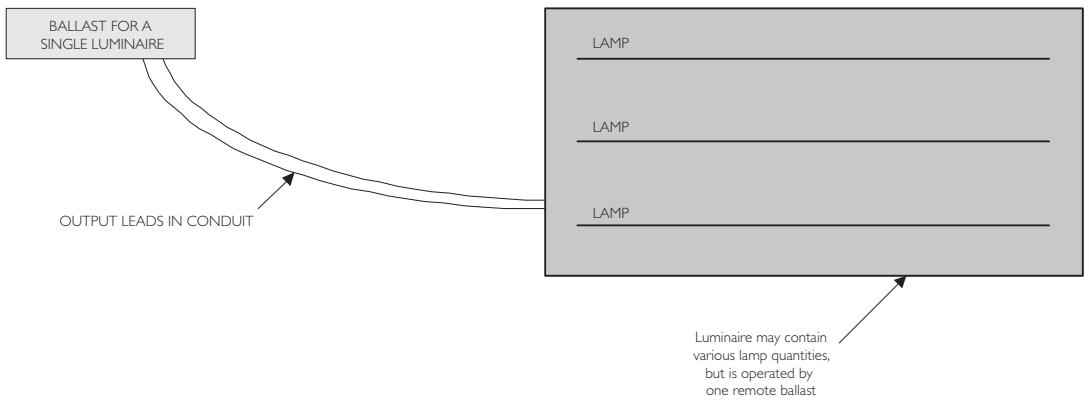
Second, if the lamp is capable of ignition, the increased capacitance will cause a loss in the current to the lamp. The added capacitance creates what is known as a "shunt" around the lamp; in other words the current will leak from the red wire (or blue) to the yellow, completely bypassing the lamp. The current through the lamp will be reduced, resulting in lower lumens, with the possibility that the lamp will not be capable of sustained operation.

The Mark 7 *0-10V*, Mark 10 *Powerline,* and ROVR dimming ballasts are particularly sensitive to high capacitance associated with long lead wires. The dimming ballast is capable of very low dim levels because constant filament heat is provided to the lamp. If there is any loss of current, the filament current will be reduced and the lamp will begin to flicker, or it will be completely extinguished. It is also important that the red and blue leads not be twisted together. Twisting the red and blue leads will add capacitance, causing the lamp to flicker at the lower dimming levels.

Open circuit voltage is a function of input voltage in some ballast designs, particularly for dedicated voltage ballasts. Cold temperature starting is a function of open circuit voltage. The lead length recommendations in the following table are for normal rated input voltages (120V, 277V, 347V) at 25°C ambient temperature.

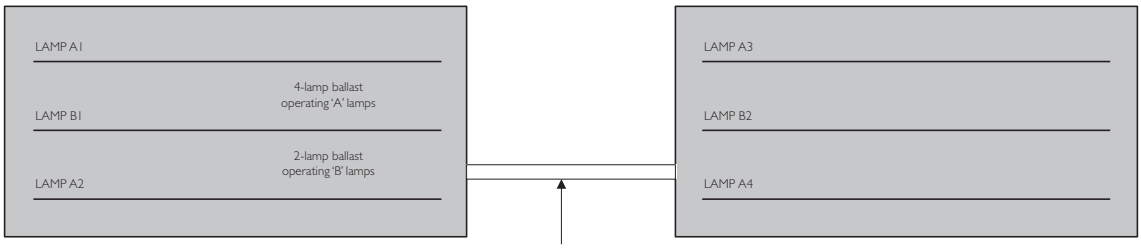
In summary, there is a wide range and varying types of electronic ballast architectures that are capable of being remote mounted for an equally wide range of distances. If you are uncertain of the remote mounting restrictions for a particular electronic ballast please consult Philips Lighting Electronics Customer Care (Warranty/Technical Service)

Remote Wiring



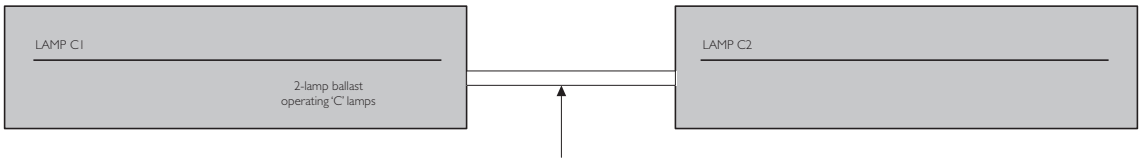
# ELECTRONIC FLUORESCENT BALLASTS

## Tandem Wiring



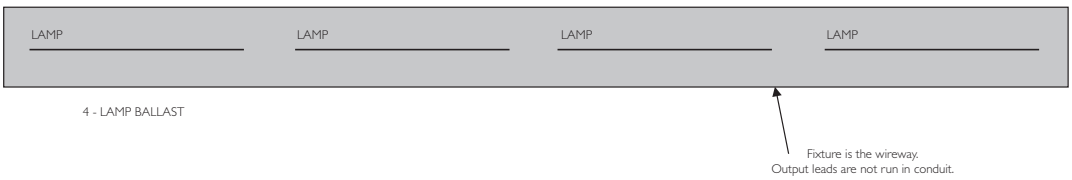

2 BALLAST EXAMPLE

BALLAST 'A' OPERATES OUTBOARD LAMPS
BALLAST 'B' OPERATES INBOARD LAMPS




1 BALLAST EXAMPLE

## Through Wiring

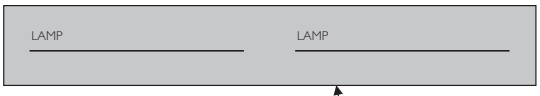



4 - LAMP BALLAST

Fixture is the wireway.
Output leads are not run in conduit.


3 - LAMP BALLAST

Fixture is the wireway.
Output leads are not run in conduit.




2 - LAMP BALLAST

Fixture is the wireway.
Output leads are not run in conduit.

Note: Ballast should be mounted at center of fixture to minimize lead lengths.

Diagrams are also aplicable for multiple lamp cross-section luminaires. For example, an 8-foot luminaire with two lamps in cross section and a single 4-lamp ballast.

# ELECTRONIC FLUORESCENT BALLASTS

| | | Allowed Wiring Configuration | | | Maximum Lead Length (Feet) for Tandem or Through Wiring (Total length of all wires between ballast and lamp sockets) | | | | | | Application Note |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Remote (max length) | Tandem | Through | Blue | Red | Yellow | Blue/White | Brown | Orange | |
| GOPA-1P32-LW-SC (c) | | 8' | Yes | Yes | 8' | 8' | | | | | 1 |
| GOPA-1P32-SC (c) | | 8' | Yes | Yes | 8' | 8' | | | | | 1 |
| GOPA-2P32-LW-SC (c) | | 8' | Yes | Yes | 8' | 8' | | | | | 1 |
| GOPA-2P32-SC (c) | | 8' | Yes | Yes | 8' | 8' | | | | | 1 |
| GOPA-3P32-LW-SC (c) | | 8' | Yes | Yes | 8' | 8' | | | | | 1 |
| GOPA-3P32-SC (c) | | 8' | Yes | Yes | 8' | 8' | | | | | 1 |
| GOPA-4P32-LW-SC (c) | | 8' | Yes | Yes | 8' | 8' | 8' | | | | 1 |
| GOPA-4P32-SC (c) | | 8' | Yes | Yes | 8' | 8' | 8' | | | | 1 |
| HCN-2S54-90C-WL | | 20' | Yes | Yes | 20' | 4' | 20' | | | | 3 |
| HCN-4S54-90C-2LS-G | | 20' | Yes | Yes | 20' | 4' | 4' | 20' | 20' | 20' | 7 |
| ICF-1D38-H1-LD | | 15' | NA | NA | | | | | | | 4 |
| ICF-1H120-M4-LD | 2-Lamp | 6' | Yes | Yes | 2' | 6' | 6' | | | | 2 |
| ICF-2S13-H1-LD<br>ICF-2S13-M1-BS | 1-Lamp | 15' | NA | NA | | | | | | | 4 |
| ICF-2S18-H1-LD<br>ICF-2S18-M1-BS | 1-Lamp | 15' | NA | NA | | | | | | | 4 |
| ICF-2S26-H1-LD<br>ICF-2S26-M1-BS | 1-Lamp | 15' | NA | NA | | | | | | | 4 |
| ICF-2S42-M2-BS<br>ICF-2S42-M2-LD | 1-Lamp | 15' | NA | NA | | | | | | | 4 |
| ICF-2S42-90C-M2-BS<br>ICF-2S42-90C-M2-LD | 1-Lamp | 15' | NA | NA | | | | | | | 4 |
| ICF-2S70-M4-LD | | 6' | Yes | Yes | 2' | 6' | 6' | | | | 2 |
| ICN-132-MC | | 20' | NA | NA | | | | | | | 4 |
| ICN-1P32-N | | 20' | NA | NA | | | | | | | 4 |
| ICN-1S80 | | 20' | NA | NA | | | | | | | 4 |
| ICN-1TTP40-SC | | 20' | NA | NA | | | | | | | 4 |
| ICN-2M32-MC | | 20' | Yes | Yes | 20' | 20' | | | | | 1 |
| ICN-2P32-N | | 20' | Yes | Yes | 20' | 20' | | | | | 1e |
| ICN-2P60-SC | | 20' | Yes | Yes | 20' | 20' | | | | | 1 |
| ICN-2S24 | | 20' | Yes | Yes | 20' | 4' | 20' | | | | 3 |
| ICN-2S28 | | 8' | Yes | Yes | 8' | 4' | 8' | | | | 3 |
| ICN-2S28-N | | 10' | Yes | Yes | 10' | 10' | 10' | | | | 3 |
| ICN-2S39 | | 20' | Yes | Yes | 20' | 4' | 20' | | | | 3 |
| ICN-2S40-N | | 20' | Yes | Yes | 4' | 10' | 10' | | | | 2 |
| ICN-2S54 | | 20' | Yes | Yes | 20' | 4' | 20' | | | | 3 |
| ICN-2S54-WL | | 20' | Yes | Yes | 20' | 4' | 20' | | | | 3 |
| ICN-2S54-90C | | 20' | Yes | Yes | 20' | 4' | 20' | | | | 3 |
| ICN-2S54-90C-SC | | 20' | Yes | Yes | 20' | 4' | 20' | | | | 3 |
| ICN-2S54-90C-WL | | 20' | Yes | Yes | 20' | 4' | 20' | | | | 3 |
| ICN-2S86 (b) | | 12' | Yes | Yes | 12' | 4' | 12' | | | | 3 |
| ICN-2S110-SC | | 20' | Yes | Yes | 4' | 20' | 20' | | | | 2 |
| ICN-2TTP40-SC | | 20' | Yes | Yes | 20' | 20' | | | | | 1 |
| ICN-3P32-SC | | 20' | Yes | Yes | 20' | 20' | | | | | 1e |
| ICN-3S14-D | | No | No | No | | | | | | | 5 |
| ICN-3TTP40-SC | | 20' | Yes | Yes | 20' | 20' | | | | | 1 |
| ICN-4P32-SC | | 20' | Yes | Yes | 20' | 20' | 20' | | | | 1e |

For nominal input voltage and 25°C ambient temperature. See all notes on page 1-19.

# ELECTRONIC FLUORESCENT BALLASTS



| | Allowed Wiring Configuration | | | Maximum Lead Length (Feet) for Tandem or Through Wiring (Total length of all wires between ballast and lamp sockets) | | | | | | Application Note |
|---|---|---|---|---|---|---|---|---|---|---|
| | Remote (max length) | Tandem | Through | Blue | Red | Yellow | Blue/White | Brown | Orange | |
| ICN-4S54-90C-2LS-G | 20' | Yes | Yes | 20' | 4' | 4' | 20' | 20' | 20' | 7 |
| IDA-132-SC | No | NA | NA | | | | | | | 5 |
| IDA-154 | No | NA | NA | | | | | | | 5 |
| IDA-2S32-SC | No | No | Yes | 5' | 4' | 4' | | | | 3 |
| IDA-2S54 | No | No | Yes | 5' | 4' | 4' | | | | 3 |
| IDA-3S32-G | No | No | No | | | | | | | 5 |
| IDA-4S32 | No | No | Yes-8' | 1' | 1.25' | 5.2' | 1.25' | 4.2' | | 3 |
| IDL-2S26-M5-BS<br>IDL-2S26-M5-LD | No | No | No | | | | | | | 5 |
| IDL-2T42-M5-BS<br>IDL-2T42-M5-LD | No | No | No | | | | | | | 5 |
| IEZ-2S24-D | No | No | Yes | 3' | 2' | 2' | | | | 3 |
| ILV-2S32-SC | 6' | Yes | Yes | 6' | 6' | 6' | | | | 1 |
| ILV-4S32-G | No | No | Yes-8' | 1' | 1.25' | 5.2' | 1.25' | 4.2' | | 3 |
| IOP-1P32-LW-SC (c) | 20' | NA | NA | | | | | | | 1e |
| IOP-1P32-SC (c) | 20' | NA | NA | | | | | | | 1e |
| IOP-1S32-LW-SC (c) | 10' | NA | NA | | | | | | | 4 |
| IOP-1S32-SC (c) | 10' | NA | NA | | | | | | | 4 |
| IOP-2P32HL-SC (c) | 20' | Yes | Yes | 20' | 20' | | | | | 1e |
| IOP-2P32-LW-SC (c) | 20' | Yes | Yes | 20' | 20' | | | | | 1e |
| IOP-2P32-SC (c) | 20' | Yes | Yes | 20' | 20' | | | | | 1e |
| IOP-2P59-SC | 20' | Yes | Yes | 20' | 20' | | | | | 1e |
| IOP-2PSP32-LW-SC | 20' | Yes | Yes | 20' | 20' | 18' | | | | 1e |
| IOP-2PSP32-SC | 20' | Yes | Yes | 20' | 20' | 18' | | | | 1e |
| IOP-2PSP54-SC | 20' | Yes | Yes | 20' | 20' | 15' | | | | 1e |
| IOP-2S28-95-SC-SD | 7' | Yes | Yes | 7' | 7' | 7' | | | | 1 |
| IOP-2S28-115-SC-SD | 7' | Yes | Yes | 7' | 7' | 7' | | | | 1 |
| IOP-2S28-95-SC | 20' | Yes | Yes | 20' | 20' | 20' | | | | 1 |
| IOP-2S28-115-SC | 20' | Yes | Yes | 20' | 20' | 20' | | | | 1 |
| IOP-2S32-LW-SC (d) | 10' | Yes | Yes | 4' | 10' | 10' | | | | 2 |
| IOP-2S32-SC (d) | 10' | Yes | Yes | 4' | 10' | 10' | | | | 2 |
| IOP-3P32-HL-90C-SC (c) | 20' | Yes | Yes | 20' | 20' | | | | | 1e |
| IOP-3P32-LW-SC (c) | 20' | Yes | Yes | 20' | 20' | | | | | 1e |
| IOP-3P32-SC (c) | 20' | Yes | Yes | 20' | 20' | | | | | 1e |
| IOP-3PSP32-LW-SC | 20' | Yes | Yes | 20' | 20' | 18' | 18' | | | 1e |
| IOP-3PSP32-SC | 20' | Yes | Yes | 20' | 20' | 18' | 18' | | | 1e |
| IOP-3S32-LW-SC (d) | 10' | Yes | Yes | 10' | 4' | 4' | 10' | | | 7 |
| IOP-3S32-SC (d) | 10' | Yes | Yes | 10' | 4' | 4' | 10' | | | 7 |
| IOP-4PSP54-2LS-G (c) | 20' | Yes | Yes | 20' | 20' | 8' | | | | 1e |
| IOP-4P32-LW-SC (c) | 20' | Yes | Yes | 20' | 20' | 8' | | | | 1e |
| IOP-4P32-SC (c) | 20' | Yes | Yes | 20' | 20' | 8' | | | | 1e |
| IOP-4PSP32-LW-SC | 20' | Yes | Yes | 20' | 20' | 18' | 18' | 18' | | 1e |
| IOP-4PSP32-SC | 20' | Yes | Yes | 20' | 20' | 18' | 18' | 18' | | 1e |
| IOP-4PSP54-90C-G | 20' | Yes | Yes | 20' | 20' | 15' | 15' | 15' | | 1e |
| IOP-4S32-LW-SC (d) | 10' | Yes | Yes | 10' | 4' | 4' | 10' | 10' | | 7 |
| IOP-4S32-SC (d) | 10' | Yes | Yes | 10' | 4' | 4' | 10' | 10' | | 7 |

For nominal input voltage and 25°C ambient temperature. See all notes on page 1-19.

# ELECTRONIC FLUORESCENT BALLASTS

| | | Allowed Wiring Configuration | | | Maximum Lead Length (Feet) for Tandem or Through Wiring (Total length of all wires between ballast and lamp sockets) | | | | | | Application Note |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Remote (max length) | Tandem | Through | Blue | Red | Yellow | Blue/White | Brown | Orange | |
| IOPA-1P32-HL-SC (c) | | 20' | Yes | Yes | 20' | 20' | | | | | 1e |
| IOPA-1P32-LW-SC (c) | | 20' | Yes | Yes | 20' | 20' | | | | | 1e |
| IOPA-1P32-SC (c) | | 20' | Yes | Yes | 20' | 20' | | | | | 1e |
| IOPA-2P32-HL-SC (c) | | 20' | Yes | Yes | 20' | 20" | | | | | 1e |
| IOPA-2P32-LW-SC (c) | | 20' | Yes | Yes | 20' | 20' | | | | | 1e |
| IOPA-2P32-SC (c) | | 20" | Yes | Yes | 20' | 20" | | | | | 1e |
| IOPA-3P32-HL-SC (c) | | 20" | Yes | Yes | 20' | 20" | | | | | 1e |
| IOPA-3P32-LW-SC (c) | | 20' | Yes | Yes | 20' | 20' | | | | | 1e |
| IOPA-3P32-SC (c) | | 20" | Yes | Yes | 20' | 20" | | | | | 1e |
| IOPA-4P32-HL (c) | | 20" | Yes | Yes | 20' | 20' | 8' | | | | 1e |
| IOPA-4P32-LW-SC (c) | | 20' | Yes | Yes | 20' | 20' | 8' | | | | 1e |
| IOPA-4P32-SC (c) | | 20' | Yes | Yes | 20' | 20' | 8' | | | | 1e |
| IZT-132-SC | | 6' | NA | NA | | | | | | | 4 |
| IZT-2S26-M5-BS<br>IZT-2S26-M5-LD | | No | No | No | | | | | | | 5 |
| IZT-2S32-SC | | 6' | Yes | Yes | 6' | 6' | 6' | | | | 1 |
| IZT-2T42-M3-BS<br>IZT-2T42-M3-LD | | No | No | No | | | | | | | 5 |
| IZT-2T42-M5-BS<br>IZT-2T42-M5-LD | | No | No | No | | | | | | | 5 |
| IZT-2TTS40-SC | | 6' | No | No | | | | | | | 4 |
| IZT-3S32-SC | | No | No | No | | | | | | | 5 |
| IZT-4S32 | | No | No | Yes-8' | 1' | 1.25' | 5.2' | 1.25' | 4.2' | | 3 |
| JOP-2S84-G | | 20' | Yes | Yes | 4' | 20' | 20' | | | | 2 |
| RCF-2S13-H1-LD | 1-Lamp | 15' | No | No | | | | | | | 4 |
| RCF-2S13-M1-BS | 2-Lamp | 6' | Yes | Yes | 2' | 6' | 6' | | | | 2 |
| RCF-2S18-H1-LD | 1-Lamp | 15' | No | No | | | | | | | 4 |
| RCF-2S18-M1-BS | 2-Lamp | 6' | Yes | Yes | 2' | 6' | 6' | | | | 2 |
| RCF-2S26-H1-LD | 1-Lamp | 15' | No | No | | | | | | | 4 |
| RCF-2S26-M1-BS | 2-Lamp | 6' | Yes | Yes | 2' | 6' | 6' | | | | 2 |
| RCN-1S32-SC | | 20" | NA | NA | | | | | | | 4 |
| RCN-2S32-SC (d) | | No | Yes | Yes | 20' | 4' | 20' | | | | 3 |
| RCN-3S32-SC (d) | | No | Yes | Yes | 4' | 4' | 20' | 20' | | | 6 |
| RCN-4S32-SC (d) | | No | Yes | Yes | 4' | 4' | 20' | 20' | 20' | | 6 |
| REB-113-M6-BLS | | No | No | No | | | | | | | 5 |
| REB-113-M6-EL | | No | No | No | | | | | | | 5 |
| REB-118-M6-BLS | | No | No | No | | | | | | | 5 |
| REB-118-M6-EL | | No | No | No | | | | | | | 5 |
| REB-126-M6-BLS | | No | No | No | | | | | | | 5 |
| REB-126-M6-EL | | No | No | No | | | | | | | 5 |
| REB-2P32-SC | | 20" | Yes | Yes | 20' | 20' | | | | | 1 |
| REB-2S26-M1-LD-DIM | 1-LAMP | 20" | No | No | | | | | | | 4 |
| | 2-LAMP | No | Yes | Yes | 12' | 2' | 12' | | | | 3 |
| REB-4P32-SC | | 20" | Yes | Yes | 20' | 20' | 20' | | | | 1 |
| REB-2S13-M6-EL | | No | No | No | | | | | | | 5 |
| REB-2S13-M6-BL | | No | No | No | | | | | | | 5 |
| REB-2S18-M6-EL | | No | No | No | | | | | | | 5 |
| REB-2S18-M6-BL | | No | No | No | | | | | | | 5 |
| REB-2S26-M6-EL | | No | No | No | | | | | | | 5 |
| REB-2S26-M6-BL | | No | No | No | | | | | | | 5 |

For nominal input voltage and 25°C ambient temperature. See all notes on page 1-19.

# ELECTRONIC FLUORESCENT BALLASTS



| | Allowed Wiring Configuration | | | Maximum Lead Length (Feet) for Tandem or Through Wiring (Total length of all wires between ballast and lamp sockets) | | | | | | Application Note |
|---|---|---|---|---|---|---|---|---|---|---|
| | Remote (max length) | Tandem | Through | Blue | Red | Yellow | Blue/White | Brown | Orange | |
| RELB-1S40-SC | 20' | NA | NA | | | | | | | 4 |
| RELB-2S40-SC | 20'' | Yes | Yes | 4' | 10' | 10' | | | | 2 |
| REZ-132-SC | 6' | NA | NA | | | | | | | 4 |
| REZ-154 | No | NA | NA | | | | | | | 5 |
| REZ-132-SC | 6' | NA | NA | | | | | | | 4 |
| REZ-154 | No | NA | NA | | | | | | | 5 |
| REZ-1Q18-M2-BS<br>REZ-1Q18-M2-LD | No | NA | NA | | | | | | | 5 |
| REZ-1T42-M2-BS | No | NA | NA | | | | | | | 5 |
| REZ-1T42-M2-LD<br>REZ-1TTS40-SC | 6' | NA | NA | | | | | | | 4 |
| REZ-2Q18-M2-BS<br>REZ-2Q18-M2-LD | No | No | No | | | | | | | 5 |
| REZ-2Q26-M2-BS<br>REZ-2Q26-M2-LD | No | No | No | | | | | | | 5 |
| REZ-2S32-SC | 6' | Yes | Yes | 6' | 6' | 6' | | | | 1 |
| REZ-2S54 | No | No | Yes | 5' | 4' | 4' | | | | 3 |
| REZ-2T42-M3-BS<br>REZ-2T42-M3-LD | No | No | No | | | | | | | 5 |
| REZ-2TTS40-SC | 6' | No | No | | | | | | | 5 |
| REZ-3S32-SC | No | No | No | | | | | | | 5 |
| RK-132-TP (a) | 20' | No | No | | | | | | | 4 |
| RK-2S32-TP (a) | 20' | Yes | Yes | 4' | 20' | 20' | | | | 2 |
| RMB-1P13-S1 | 20' | NA | NA | | | | | | | 4 |
| RMB-1P26-S2 | 20' | NA | NA | | | | | | | 4 |
| RMB-2P13-S2 | 20' | Yes | Yes | 20' | 20' | 20' | | | | 1 |
| RZT-154 | No | NA | NA | | | | | | | 5 |
| RZT-2S54 | No | No | Yes | 5' | 4' | 4' | | | | 3 |
| VCN-1S32-SC | 20'' | No | No | | | | | | | 4 |
| VCN-2S32-SC (d) | No | Yes | Yes | 20' | 4' | 20' | | | | 3 |
| VCN-3S32-SC (d) | No | Yes | Yes | 4' | 4' | 20' | 20' | | | 6 |
| VCN-4S32-SC (d) | No | Yes | Yes | 4' | 4' | 20' | 20' | 20' | | 6 |
| VEL-1S40-SC | 20' | NA | NA | | | | | | | 4 |
| VEZ-132-SC | 6' | NA | NA | | | | | | | 4 |
| VEZ-154 | No | NA | NA | | | | | | | 5 |
| VEZ-1Q18-M2-BS<br>VEZ-1Q18-M2-LD | No | NA | NA | | | | | | | 5 |
| VEZ-1T42-M2-BS<br>VEZ-1T42-M2-LD | No | NA | NA | | | | | | | 5 |
| VEZ-1TTS40-SC | 6' | NA | NA | | | | | | | 4 |
| VEZ-2Q18-M2-BS<br>VEZ-2Q18-M2-LD | No | No | No | | | | | | | 5 |
| VEZ-2Q26-M2-BS<br>VEZ-2Q26-M2-LD | No | No | No | | | | | | | 5 |
| VEZ-2S32-SC | 6' | Yes | No | 6' | 6' | 6' | | | | 1 |
| VEZ-2S54 | No | No | Yes | 5' | 4' | 4' | | | | 5 |

For nominal input voltage and 25°C ambient temperature. See all notes on page 1-19.

# ELECTRONIC FLUORESCENT BALLASTS

| | Allowed Wiring Configuration | | | Maximum Lead Length (Feet) for Tandem or Through Wiring (Total length of all wires between ballast and lamp sockets) | | | | | | Application Note |
|---|---|---|---|---|---|---|---|---|---|---|
| | Remote (max length) | Tandem | Through | Blue | Red | Yellow | Blue/White | Brown | Orange | |
| VEZ-2T42-M3-BS<br>VEZ-2T42-M3-LD | No | No | No | | | | | | | 5 |
| VEZ-2TTS40-SC | 6' | No | No | | | | | | | 4 |
| VEZ-3S32-SC | No | No | No | | | | | | | 5 |
| VK-132-TP (a) | 20' | NA | NA | | | | | | | 4 |
| VK-2S32-TP (a) | 20' | Yes | Yes | 4' | 20' | 20' | | | | 2 |
| VZT-154 | No | NA | NA | | | | | | | 5 |
| VZT-180 | No | NA | NA | | | | | | | 5 |
| VZT-1TTS40 | 6' | NA | NA | | | | | | | 4 |
| VZT-2S54 | No | No | Yes | 5' | 4' | 4' | | | | 3 |
| VZT-4S32-HL | No | No | Yes-8' | 1' | 1.25' | 5.2' | 1.25' | 4.2' | | 3 |
| VZT-4PSP32-G | No | No | Yes-8' | 5' | 5' | 1' | 5' | R/W=5' | | 3 |
| VZT-4S32-G | No | No | Yes-8' | 1' | 1.25' | 5.2' | 1.25' | 4.2' | | 3 |

For nominal input voltage and 25°C ambient temperature.

Notes:
1. For Tandem or Through wiring, any lamp can be remote mounted.
2. For Tandem or Through wiring, BLUE lamp must be in same fixture as ballast.
3. For Tandem or Through wiring, RED lamp must be in same fixture as ballast.
4. No Tandem or Through wiring allowed.
5. No Remote, Tandem or Through wiring allowed.
6. For Tandem or Through wiring, RED lamp and BLUE lamp must be in same fixture as ballast.
7. For Tandem or Through wiring, RED lamp and YELLOW lamp must be in same fixture as ballast.
(a) Ballast can be Remote, Tandem or Through wired farther than 20'. Consult factory.
(b) Ballast can be Remote, Tandem or Through wired to a maximum 12 feet between ballast and lampholder for (2)F96T8/HO lamps or 20 feet for all other T8/HO lamps.
(c) Ballast can be Remote, Tandem or Through wired to a maximum 6 feet between ballast and lampholder for energy-saving lamps or 8 feet for standard lamps.
(d) For tandem wiring, lamp leads from multiple ballast cannot be run in same conduit. Separate conduit must be used for each ballast.
(e) Ballast can be Remote, Tandem, or Through wired to a maximum of 20' for standard lamps and 6' for energy-saving lamps

Use 18 AWG wire or larger

## Reading Date Codes for Warranty Date on Electronic Ballasts

Most date codes are stamped on the back of the ballast (opposite the label side). The date code is part of a larger group of numbers and letters, which call out the various codes for the factory where the ballast was manufactured. Depending upon which Philips Lighting Electronics factory manufactured the ballast, the date stamp can vary slightly, in terms of its position on the ballast and the number sequence.

Some electronic ballasts manufactured from 1988 to 1991 may have the date code in ink stamped on the ballast label. Some ballasts have the manufacturing code printed in ink on the end of the ballast.

A typical date code for an electronic ballast will have the week and the year the ballast was manufactured. Some ballasts will have the day of the week included too.

Some examples of these different date codes that you may find are:

937N1B
B41893
The date code is the 18th week of 1993, stamped one line over the other.

937N1J
P23292
The date code is the 32nd week of 1992, stamped one line over the other.

16
93
973N20P3
The date code is the 16th week of 1993, stamped at the end of the ear on the back.

892P
259P
24
94
The date code is the 4th week of 1994, stamped on four separate lines.

91405BB0291N
The date code is the 2nd week of 1991, stamped on one line.

9716T032HD
120432IS24
The date code is the 16th week of 1997, stamped in ink on the end of the ballast.

The above examples are for ballasts that are already out of warranty. The next two examples are for ballasts that may still be covered under warranty. In 2006 the date code configuration was switched to the bottom example.

693P0MMA
53301707
The date code is the 5th day, of the 33rd week of 2001, stamped on the back of the ballast.

06127M50
F2104571
The date code is the 127th day of 2006 stamped on the back of the ballast.

**For Assistance in Determining a Date Code – Call Customer Care (Technical Services /Warranty) at 1-800-372-3331**

# ELECTRONIC FLUORESCENT BALLASTS

## SmartMate and Mark 10 *Powerline* Ballast Kits


| Kit Contents and Key Features | Key Benefits |
|---|---|
| **SmartMate or Mark 10 *Powerline* ballast**<br>• Intellivolt Technology<br>• Dual-entry color-coded connectors<br>• Multi-Lamp Capability | **Makes ballast selection and installation a breeze**<br>• Provides full range input voltage from 120V to 277V<br>• Adds to application versatility; simplifies wiring<br>• Encompasses a wide variety of applications, including quads, triple tubes, circline, 2D and long twin-tube lamps |
| **Mounting Plate Adapter**<br>• Multiple lead wire cutouts, including center hole<br>• Integral mounting studs | **Takes the guess-work out of mounting**<br>• Allows wiring and mounting to existing fixture's mounting plate<br>• Eliminates need to stock units with and without studs |
| **Lead Wire**<br>• Color-coded<br>• Pre-stripped 3/8" on one end — 5/8" on the other | **Allows installer to pre-wire**<br>• Ensures wiring accuracy<br>• Meets UL poke-in connector requirements and facilitates final connection |
| **Wire Extraction Tool** | **Makes for quick disconnections if necessary** |
| **Individually Shrink-Wrapped Kits** | |

**ICF-2S13-H1-LD-K*** **REZ-2Q26-M2-LD-K****
**ICF-2S18-H1-LD-K*** **VEZ-2Q26-M2-LD-K***
**ICF-2S26-H1-LD-K*** **REZ-1T42-M2-LD-K***
**ICF-2S42-M2-LD-K*** **VEZ-1T42-M2-LD-K***
**Kits contain the standard ballasts.**
**For lamp and operational data consult pages 1-23 through 1-35 and 2-9**

- Ideally suited for replacement of expired electronic ballasts, regardless of brand or mounting configuration.
- Dramatically simplifies the upgrading of incandescent fixtures to energy-saving CFL.
- Compatible with most J-Box covers

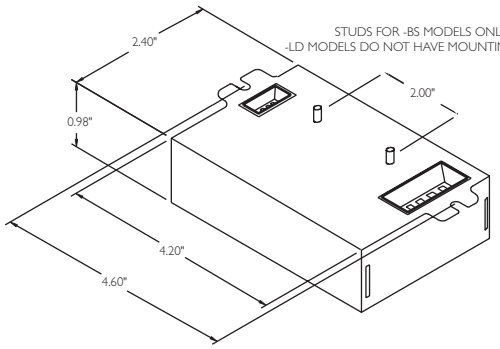
Notes

# For 7-9W Lamps

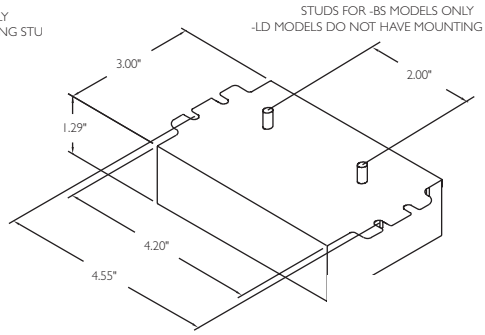
HIGH POWER FACTOR SOUND RATED A

| No. of Lamps | Input Volts | Lamp Starting Method | Ballast Family | Catalog Number | Input Power ANSI (Watts) | Ballast Factor | Max. THD % | Line Current (Amps) | Min. Starting Temp. (°F/°C) | Dim. | Wiring Dia. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **CFT7W/2G7 - 7W CFL Twin Tube Lamp (CF7DS/E)** | | | | | | | | | | | |
| 1 | 120 | IS | AmbiStar | RMB-1P13-S1* | 8 | 1.00 | 150 | 0.13 | 0/-18 | S1 | 160 |
| 2 | 120 | IS | AmbiStar | RMB-2P13-S2* | 16 | 1.10 | 150 | 0.24 | 0/-18 | S2 | 159 |
| **CFT9W/2G7 - 9W CFL Twin Tube Lamp (CF9DS/E)** | | | | | | | | | | | |
| 1 | 120 | IS | AmbiStar | RMB-1P13-S1* | 10 | 1.10 | 150 | 0.16 | 0/-18 | S1 | 160 |
| 2 | 120 | IS | AmbiStar | RMB-2P13-S2* | 20 | 1.10 | 125 | 0.29 | 0/-18 | S2 | 159 |

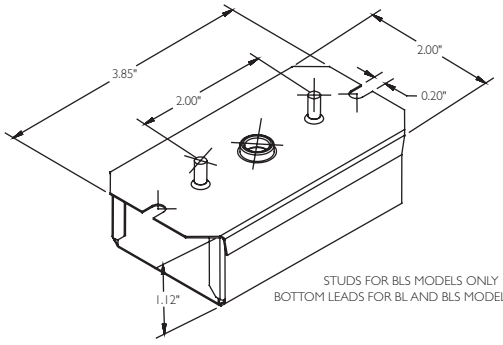
* Normal Power Factor



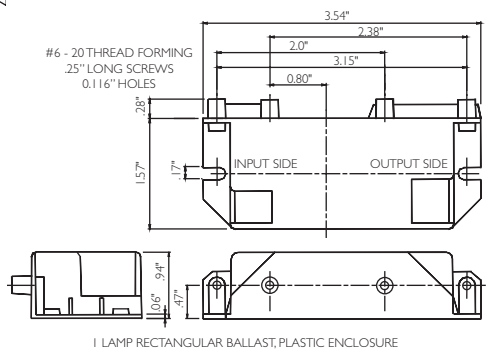

Size 1 Enclosure




Size 2 Enclosure

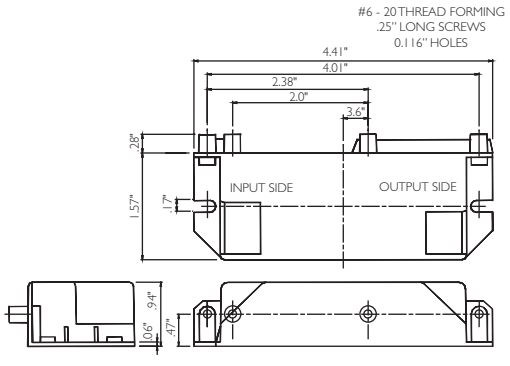



Size 6 Enclosure




1 LAMP RECTANGULAR BALLAST, PLASTIC ENCLOSURE

S1 Model




2 LAMP RECTANGULAR BALLAST, PLASTIC ENCLOSURE

S2 Model

*Refer to page 1-24 for wiring diagrams*
*Refer to pages 9-24 to 9-28 for lead lengths and shipping data*

# For 13-18W Quad Lamps

HIGH POWER FACTOR SOUND RATED A

| No. of Lamps | Input Volts | Lamp Starting Method | Ballast Family | Catalog Number | Input Power ANSI (Watts) | Ballast Factor | Max. THD % | Line Current (Amps) | Min. Starting Temp. (°F/°C) | Dim. | Wiring Dia. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **CFQ13W/G24q - 13W CFL Quad Tube Lamp (PL-C13W/4P, F13DBX/4P, CF13DD/E)** | | | | | | | | | | | |
| 1 | 120 | IS | AmbiStar | REB-113-M6-BLS* | 13 | 1.00 | 150 | 0.23 | 0/-18 | Size 6 | 160A |
| | | | | REB-113-M6-EL* | | | | | | | |
| | | | | RMB-1P13-S1* | 14 | 1.00 | 150 | 0.20 | | S1 | 160 |
| | | RS | | RCF-2S13-H1-LD-QS | 16 | 1.00 | 10 | 0.13 | | Size 1 | |
| | | | | RCF-2S13-M1-BS-QS | | | | | | | |
| | 120-277 | | SmartMate | ICF-2S13-M1-BS-QS | 16 | 1.00 | 10 | 0.13-0.06 | | | |
| | | PS | | ICF-2S13-H1-LD | | | | | | | |
| | | | | ICF-2S13-H1-LD-K ⓫ | | | | | | | |
| | | | | ICF-2S13-M1-BS | | | | | | | |
| 2 | 120 | IS | AmbiStar | REB-2S13-M6-EL* | 27 | 0.88 | 135 | 0.42 | 0/-18 | Size 6 | 159 |
| | | | | REB-2S13-M6-BL* | | | | | | | |
| | | | | RMB-2P13-S2* | 25 | 0.95 | 125 | 0.35 | | S2 | |
| | | RS | | RCF-2S13-H1-LD-QS | 29 | 1.00 | 10 | 0.25 | | Size 1 | |
| | | | | RCF-2S13-M1-BS-QS | | | | | | | |
| | 120-277 | | SmartMate | ICF-2S13-M1-BS-QS | 29 | 1.00 | 10 | 0.25-0.11 | | | |
| | | PS | | ICF-2S13-H1-LD | | | | | | | |
| | | | | ICF-2S13-H1-LD-K ⓫ | | | | | | | |
| | | | | ICF-2S13-M1-BS | | | | | | | |
| **CFQ18W/G24q - 18W CFL Quad Tube Lamp (PL-C18W/4 P, F18DBX/4P, CF18DD/E)** | | | | | | | | | | | |
| 1 | 120 | IS | AmbiStar | REB-118-M6-BLS* | 18 | 1.00 | 150 | 0.29 | 0/-18 | Size 6 | 160A |
| | | | | REB-118-M6-EL* | | | | | | | |
| | | | | RMB-2P13-S2* | 16 | 0.80 | 150 | 0.26 | | S2 | *159 |
| | | RS | | RCF-2S18-H1-LD-QS | 19 | 1.00 | 10 | 0.16 | | Size 1 | 160 |
| | | | | RCF-2S18-M1-BS-QS | | | | | | | |
| | 120-277 | | SmartMate | ICF-2S18-M1-BS-QS | 19 | 1.00 | 10 | 0.16-0.07 | | | |
| | | PS | | ICF-2S18-H1-LD | | | | | | | |
| | | | | ICF-2S18-H1-LD-K ⓫ | | | | | | | |
| | | | | ICF-2S18-M1-BS | | | | | | | |
| 2 | 120 | RS | AmbiStar | REB-2S18-M6-EL* | 37 | 0.90 | 135 | 0.55 | 0/-18 | Size 6 | 159 |
| | | | | REB-2S18-M6-BL* | | | | | | | |
| | | | | RCF-2S18-H1-LD-QS | 35 | 0.95 | 10 | 0.30 | | Size 1 | |
| | | | | RCF-2S18-M1-BS-QS | | | | | | | |
| | 120-277 | | SmartMate | ICF-2S18-M1-BS-QS | 35 | 0.95 | 10 | 0.30-0.13 | | | |
| | | PS | | ICF-2S18-H1-LD | | | | | | | |
| | | | | ICF-2S18-H1-LD-K ⓫ | | | | | | | |
| | | | | ICF-2S18-M1-BS | | | | | | | |

*Normal Power Factor

⓫ Replacement/Retrofit ballast kits indicated with suffix K are available to distributors. Refer to page 1-21 for details.

*Refer to page 1-22 for dimensions*
*Refer to page 1-24 for wiring diagrams*
*Refer to pages 9-24 to 9-28 for lead lengths and shipping data*

# For 26W Quad Lamps

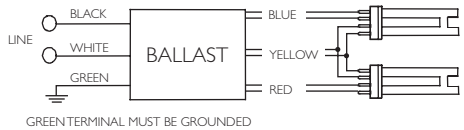
HIGH POWER FACTOR SOUND RATED A

| No. of Lamps | Input Volts | Lamp Starting Method | Ballast Family | Catalog Number | Input Power ANSI (Watts) | Ballast Factor | Max. THD % | Line Current (Amps) | Min. Starting Temp. (°F/°C) | Dim. | Wiring Dia. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CFQR26W/G24q - 26W CFL Quad Tube Lamp (PL-C26W/4P, F26DBX/4P, CF26DD/E) | | | | | | | | | | | |
| 1 | 120 | IS | AmbiStar | REB-126-M6-BLS* | 25 | 1.00 | 150 | 0.38 | 0/-18 | Size 6 | 160A |
| | | | | REB-126-M6-EL* | | | | | | | |
| | | | | RMB-1P26-S2* | 26 | 0.95 | 125 | 0.38 | | S2 | 160 |
| | | RS | | RCF-2S26-H1-LD-QS | 27 | 1.00 | 10 | 0.23 | | Size 1 | |
| | | | | RCF-2S26-M1-BS-QS | | | | | | | |
| | 120-277 | | SmartMate | ICF-2S26-M1-BS-QS | 27 | 1.00 | 10 | 0.23-0.10 | | | |
| | | PS | | ICF-2S26-H1-LD | | | | | | | |
| | | | | ICF-2S26-H1-LD-K ⓫ | | | | | | | |
| | | | | ICF-2S26-M1-BS | | | | | | | |
| 2 | 120 | QS | AmbiStar | REB-2S26-M6-EL* | 52 | 0.88 | 135 | 0.77 | 0/-18 | Size 6 | 159 |
| | | | | REB-2S26-M6-BL* | | | | | | | |
| | | RS | | RCF-2S26-H1-LD-QS | 51 | 1.00 | 10 | 0.43 | | Size 1 | |
| | | | | RCF-2S26-M1-BS-QS | | | | | | | |
| | 120-277 | PS | SmartMate | ICF-2S26-M1-BS-QS | 51 | 1.00 | 10 | 0.43-0.19 | | | |
| | | | | ICF-2S26-H1-LD | | | | | | | |
| | | | | ICF-2S26-H1-LD-K ⓫ | | | | | | | |
| | | | | ICF-2S26-M1-BS | | | | | | | |
| | | | | ICF-2S42-M2-BS | 52 | 1.00 | 10 | 0.43-0.19 | | Size 2 | |
| | | | | ICF-2S42-M2-LD | | | | | | | |
| | | | | ICF-2S42-M2-LD-K ⓫ | | | | | | | |
| | | | | ICF-2S42-90C-M2-BS | 52 | 1.00 | 10 | 0.43-0.19 | | | |
| | | | | ICF-2S42-90C-M2-LD | | | | | | | |

* Normal Power Factor

⓫ Replacement/Retrofit ballast kits indicated with suffix K are available to distributors. Refer to page 1-21 for details.

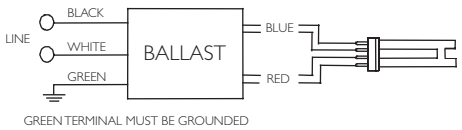
WIRING: (2) LAMP




Diag. 159

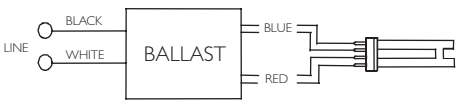
**Note:** For AmbiStar 1-lamp operation on 2-lamp ballast, use red and blue connectors

WIRING: (1) LAMP




Diag. 160

WIRING: (1) LAMP




Diag. 160A

*Refer to page 1-22 for dimensions*
*Refer to pages 9-24 to 9-28 for lead lengths and shipping data*

# For 13W Triple Lamps

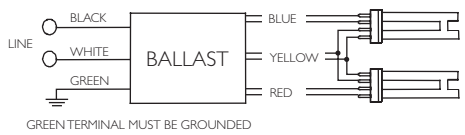
HIGH POWER FACTOR SOUND RATED A

| No. of Lamps | Input Volts | Lamp Starting Method | Ballast Family | Catalog Number | Input Power ANSI (Watts) | Ballast Factor | Max. THD % | Line Current (Amps) | Min. Starting Temp. (°F/°C) | Dim. | Wiring Dia. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CFTR13W/GX24q - 13W CFL Triple Tube Lamp (F13TBX/4P, CF13DT/E) | | | | | | | | | | | |
| 1 | 120 | IS | AmbiStar | REB-113-M6-BLS* | 13 | 1.00 | 150 | 0.23 | 0/-18 | Size 6 | 160A |
| | | | | REB-113-M6-EL* | | | | | | | |
| | | | | RMB-1P13-S1* | 14 | 1.00 | 150 | 0.20 | | S1 | 160 |
| | | RS | | RCF-2S13-H1-LD-QS | 16 | 1.00 | 10 | 0.13 | | Size 1 | |
| | | | | RCF-2S13-M1-BS-QS | | | | | | | |
| | 120-277 | PS | SmartMate | ICF-2S13-M1-BS-QS | 16 | 1.00 | 10 | 0.13-0.06 | | | |
| | | | | ICF-2S13-H1-LD | | | | | | | |
| | | | | ICF-2S13-H1-LD-K ⓾ | | | | | | | |
| | | | | ICF-2S13-M1-BS | | | | | | | |
| 2 | 120 | IS | AmbiStar | REB-2S13-M6-EL* | 27 | 0.88 | 135 | 0.42 | 0/-18 | Size 6 | 159 |
| | | | | REB-2S13-M6-BL* | | | | | | | |
| | | | | RMB-2P13-S2* | 25 | 0.95 | 125 | 0.35 | | S2 | |
| | | RS | | RCF-2S13-H1-LD-QS | 29 | 1.00 | 10 | 0.25 | | Size 1 | |
| | | | | RCF-2S13-M1-BS-QS | | | | | | | |
| | 120-277 | PS | SmartMate | ICF-2S13-M1-BS-QS | 29 | 1.00 | 10 | 0.25-0.11 | | | |
| | | | | ICF-2S13-H1-LD | | | | | | | |
| | | | | ICF-2S13-H1-LD-K ⓾ | | | | | | | |
| | | | | ICF-2S13-M1-BS | | | | | | | |

* Normal Power Factor

⓾ Replacement/Retrofit ballast kits indicated with suffix K are available to distributors. Refer to page 1-21 for details.

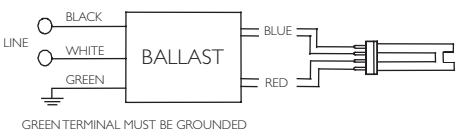
WIRING: (2) LAMP




Diag. 159

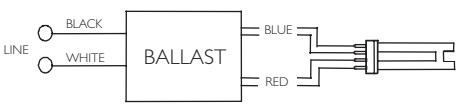
**Note:** For AmbiStar 1-lamp operation on 2-lamp ballast, use red and blue connectors

WIRING: (1) LAMP




Diag. 160

WIRING: (1) LAMP




Diag. 160A

*Refer to page 1-22 for dimensions*
*Refer to pages 9-24 to 9-28 for lead lengths and shipping data*

# For 18W Triple Lamps

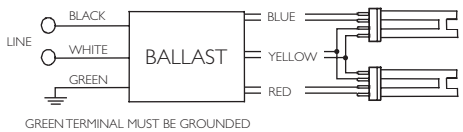
HIGH POWER FACTOR SOUND RATED A

| No. of Lamps | Input Volts | Lamp Starting Method | Ballast Family | Catalog Number | Input Power ANSI (Watts) | Ballast Factor | Max. THD % | Line Current (Amps) | Min. Starting Temp. (°F/°C) | Dim. | Wiring Dia. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **CFTR18W/GX24q - 18W CFL Triple Tube Lamp (PL-T18W, F18TBX/4P, CF18DT/E)** | | | | | | | | | | | |
| 1 | 120 | IS | AmbiStar | REB-1S18-M6-BLS* | 18 | 1.00 | 150 | 0.29 | 0/-18 | Size 6 | 160A |
| | | | | REB-1S18-M6-EL* | | | | | | | |
| | | | | RMB-2P13-S2* | 16 | 0.80 | 150 | 0.26 | | S2 | *159 |
| | | RS | | RCF-2S18-H1-LD-QS | 20 | 1.05 | 10 | 0.17 | | Size 1 | 160 |
| | | | | RCF-2S18-M1-BS-QS | | | | | | | |
| | 120-277 | PS | SmartMate | ICF-2S18-M1-BS-QS | 20 | 1.05 | 10 | 0.17-0.08 | | | |
| | | | | ICF-2S18-H1-LD | | | | | | | |
| | | | | ICF-2S18-H1-LD-K ⓾ | | | | | | | |
| | | | | ICF-2S18-M1-BS | | | | | | | |
| 2 | 120 | IS | AmbiStar | REB-2S18-M6-EL* | 37 | 0.90 | 135 | 0.55 | 0/-18 | Size 6 | 159 |
| | | | | REB-2S18-M6-BL* | | | | | | | |
| | | RS | | RCF-2S18-H1-LD-QS | 39 | 1.05 | 10 | 0.33 | | Size 1 | |
| | | | | RCF-2S18-M1-BS-QS | | | | | | | |
| | 120-277 | PS | SmartMate | ICF-2S18-M1-BS-QS | 39 | 1.05 | 10 | 0.33-0.14 | | | |
| | | | | ICF-2S18-H1-LD | | | | | | | |
| | | | | ICF-2S18-H1-LD-K ⓾ | | | | | | | |
| | | | | ICF-2S18-M1-BS | | | | | | | |

* Normal Power Factor

⓾ Replacement/Retrofit ballast kits indicated with suffix K are available to distributors. Refer to page 1-21 for details.

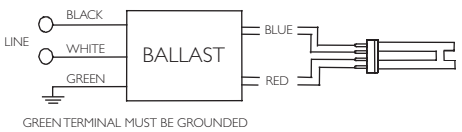
WIRING: (2) LAMP




Diag. 159

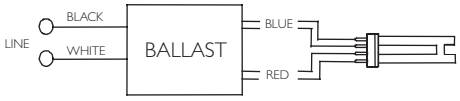
**Note:** For AmbiStar 1-lamp operation on 2-lamp ballast, use red and blue connectors

WIRING: (1) LAMP




Diag. 160

WIRING: (1) LAMP




Diag. 160A

*Refer to page 1-22 for dimensions*
*Refer to pages 9-24 to 9-28 for lead lengths and shipping data*

# For 26-32W Triple Lamps

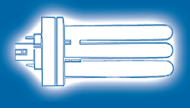
HIGH POWER FACTOR SOUND RATED A

| No. of Lamps | Input Volts | Lamp Starting Method | Ballast Family | Catalog Number | Input Power ANSI (Watts) | Ballast Factor | Max. THD % | Line Current (Amps) | Min. Starting Temp. (°F/°C) | Dim. | Wiring Dia. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **CFTR26W/GX24q - 26W CFL Triple Tube Lamp (PL-T26W, F26TBX/4P, CF26DT/E)** | | | | | | | | | | | |
| 1 | 120 | IS | AmbiStar | REB-126-M6-BLS* | 25 | 1.00 | 150 | 0.38 | 0/-18 | Size 6 | 160A |
| | | | | REB-126-M6-EL* | | | | | | | |
| | | | | RMB-1P26-S2* | 26 | 0.95 | 125 | 0.38 | | S2 | 160 |
| | | RS | | RCF-2S26-H1-LD-QS | 29 | 1.10 | 10 | 0.24 | | Size 1 | |
| | | | | RCF-2S26-M1-BS-QS | | | | | | | |
| | 120-277 | PS | SmartMate | ICF-2S26-M1-BS-QS | 29 | 1.10 | 10 | 0.24-0.11 | | | |
| | | | | ICF-2S26-H1-LD | | | | | | | |
| | | | | ICF-2S26-H1-LD-K ⓾ | | | | | | | |
| | | | | ICF-2S26-M1-BS | | | | | | | |
| 2 | 120 | IS | AmbiStar | REB-2S26-M6-EL* | 52 | 0.88 | 135 | 0.55 | 0/-18 | Size 6 | 159 |
| | | | | REB-2S26-M6-BL* | | | | | | | |
| | | RS | | RCF-2S26-H1-LD-QS | 54 | 1.00 | 10 | 0.45 | | Size 1 | |
| | | | | RCF-2S26-M1-BS-QS | | | | | | | |
| | 120-277 | PS | SmartMate | ICF-2S26-M1-BS-QS | 54 | 1.00 | 10 | 0.45-0.20 | | | |
| | | | | ICF-2S26-H1-LD | | | | | | | |
| | | | | ICF-2S26-H1-LD-K ⓾ | | | | | | | |
| | | | | ICF-2S26-M1-BS | | | | | | | |
| | | | | ICF-2S42-M2-BS | 55 | 1.00 | 10 | 0.46-0.21 | | Size 2 | |
| | | | | ICF-2S42-M2-LD | | | | | | | |
| | | | | ICF-2S42-M2-LD-K ⓾ | | | | | | | |
| | | | | ICF-2S42-90C-M2-BS | | | | | | | |
| | | | | ICF-2S42-90C-M2-LD | | | | | | | |
| **CFTR32W/GX24q - 32W CFL Triple Tube Lamp (PL-T32W, F32TBX/4P, CF32DT/E)** | | | | | | | | | | | |
| 1 | 120 | RS | AmbiStar | RCF-2S26-H1-LD-QS | 36 | 0.98 | 10 | 0.31 | 0/-18 | Size 1 | 160 |
| | | | | RCF-2S26-M1-BS-QS | | | | | | | |
| | 120-277 | PS | SmartMate | ICF-2S26-M1-BS-QS | 36 | 0.98 | 10 | 0.31-0.13 | | | |
| | | | | ICF-2S26-H1-LD | | | | | | | |
| | | | | ICF-2S26-H1-LD-K ⓾ | | | | | | | |
| | | | | ICF-2S26-M1-BS | | | | | | | |
| 2 | 120-277 | PS | SmartMate | ICF-2S42-M2-BS | 68 | 0.98 | 10 | 0.57-0.25 | 0/-18 | Size 2 | 159 |
| | | | | ICF-2S42-M2-LD | | | | | | | |
| | | | | ICF-2S42-M2-LD-K ⓾ | | | | | | | |
| | | | | ICF-2S42-90C-M2-BS | | | | | | | |
| | | | | ICF-2S42-90C-M2-LD | | | | | | | |

* Normal Power Factor

⓾ Replacement/Retrofit ballast kits indicated with suffix K are available to distributors. Refer to page 1-21 for details.

*Refer to page 1-22 for dimensions*
*Refer to page 1-24 for wiring diagrams*
*Refer to pages 9-24 to 9-28 for lead lengths and shipping data*





# For 42-70W Triple Lamps

HIGH POWER FACTOR SOUND RATED A

| No. of Lamps | Input Volts | Lamp Starting Method | Ballast Family | Catalog Number | Input Power ANSI (Watts) | Ballast Factor | Max. THD % | Line Current (Amps) | Min. Starting Temp. (°F/°C) | Dim. | Wiring Dia. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **CFTR42W/GX24q - 42W CFL Triple Tube Lamp (PL-T42W, F42TBX/4P, CF42DT/E)** | | | | | | | | | | | |
| 1 | 120 | RS | AmbiStar | RCF-2S26-H1-LD-QS | 46 | 0.98 | 10 | 0.38 | 0/-18 | Size 1 | 160 |
| | | | | RCF-2S26-M1-BS-QS | | | | | | | |
| | 120-277 | PS | SmartMate | ICF-2S26-M1-BS-QS | 46 | 0.98 | 10 | 0.38-0.17 | | | |
| | | | | ICF-2S26-H1-LD | | | | | | | |
| | | | | ICF-2S26-H1-LD-K ⓫ | | | | | | | |
| | | | | ICF-2S26-M1-BS | | | | | | | |
| 2 | 120-277 | PS | SmartMate | ICF-2S42-M2-BS | 93 | 0.97 | 10 | 0.78-0.33 | 0/-18 | Size 2 | 159 |
| | | | | ICF-2S42-M2-LD | | | | | | | |
| | | | | ICF-2S42-M2-LD-K ⓫ | | | | | | | |
| | | | | ICF-2S42-90C-M2-BS | | | | | | | |
| | | | | ICF-2S42-90C-M2-LD | | | | | | | |
| **CFTR57W/GX24q - 57W CFL Lamp (PL-T57W, F57QBX/4P, F57DT/E)** | | | | | | | | | | | |
| 1 | 120-277 | PS | SmartMate | ICF-2S42-M2-BS | 59 | 0.94 | 10 | 0.50-0.21 | 14/-10 | Size 1 | 160 |
| | | | | ICF-2S42-M2-LD | | | | | | | |
| | | | | ICF-2S42-M2-LD-K ⓫ | | | | | | | |
| | | | | ICF-2S42-90C-M2-BS | | | | | | | |
| | | | | ICF-2S42-90C-M2-LD | | | | | | | |
| 2 | 120-277 | PS | SmartMate | ICF-2S70-M4-LD | 128-126 | 1.00 | 10 | 1.07-0.46 | 0/-18 | Size 4 | 159 |
| **CFTR70W/GX24q - 70W CFL Lamp (F70QBX/4P, CF70DT/E)** | | | | | | | | | | | |
| 1 | 120-277 | PS | SmartMate | ICF-2S42-M2-BS | 75 | 0.96 | 10 | 0.63-0.27 | 14/-10 | Size 2 | 160 |
| | | | | ICF-2S42-M2-LD | | | | | | | |
| | | | | ICF-2S42-M2-LD-K ⓫ | | | | | | | |
| | | | | ICF-2S42-90C-M2-BS | | | | | | | |
| | | | | ICF-2S42-90C-M2-LD | | | | | | | |
| 2 | 120-277 | PS | SmartMate | ICF-2S70-M4-LD | 156-152 | 1.00 | 10 | 1.30-0.56 | 0/-18 | Size 4 | 159 |

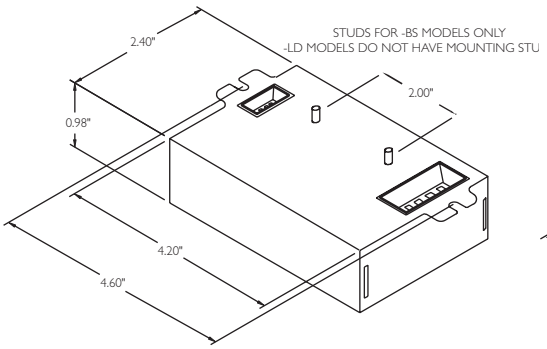
⓫ Replacement/Retrofit ballast kits indicated with suffix K are available to distributors. Refer to page 1-21 for details.

*Refer to page 1-29 for dimensions and wiring diagrams*
*Refer to pages 9-24 to 9-28 for lead lengths and shipping data*

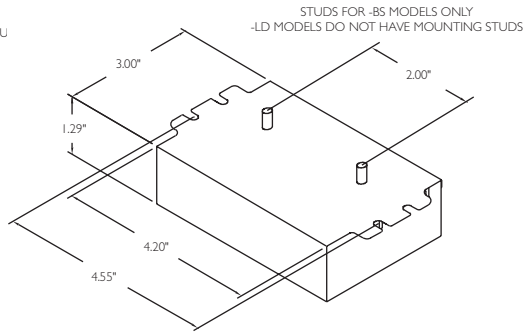
# For 60-120W Lamps

HIGH POWER FACTOR SOUND RATED A

| No. of Lamps | Input Volts | Lamp Starting Method | Ballast Family | Catalog Number | Input Power ANSI (Watts) | Ballast Factor | Max. THD % | Line Current (Amps) | Min. Starting Temp. (°F/°C) | Dim. | Wiring Dia. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **60W PLH (PL-H60W/4P)** | | | | | | | | | | | |
| 1 | 120-277 | PS | SmartMate | ICF-1H120-M4-LD | 70 | 1.00 | 15 | 0.59-0.26 | -22/-30 | Size 4 | 160 |
| 2 | 120-277 | PS | | ICF-1H120-M4-LD | 139-136 | 1.00 | 10 | 1.16-0.50 | -22/-30 | Size 4 | 159 |
| **85W PLH (PL-H85W/4P)** | | | | | | | | | | | |
| 1 | 120-277 | PS | SmartMate | ICF-1H120-M4-LD | 98-97 | 1.00 | 10 | 0.82-0.36 | -22/-30 | Size 4 | 160 |
| **120W PLH (PL-H120W/4P)** | | | | | | | | | | | |
| 1 | 120-277 | PS | SmartMate | ICF-1H120-M4-LD | 139-136 | 1.00 | 10 | 1.16-0.50 | -22/-30 | Size 4 | 160 |

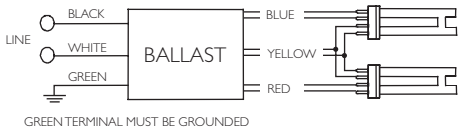



Size 1 Enclosure



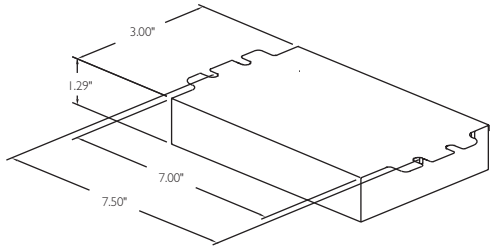

Size 2 Enclosure

WIRING: (2) LAMP



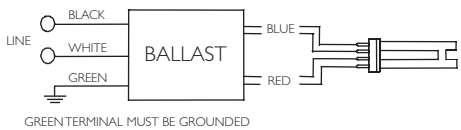

Diag. 159

Note: For AmbiStar 1-lamp operation on 2-lamp ballast, use red and blue connectors




Size 4 Enclosure

WIRING: (1) LAMP




Diag. 160

*Refer to pages 9-24 to 9-28 for lead lengths and shipping data*



# For 18-36W Lamps

HIGH POWER FACTOR SOUND RATED A

| No. of Lamps | Input Volts | Lamp Starting Method | Ballast Family | Catalog Number | Input Power ANSI (Watts) | Ballast Factor | Max. THD % | Line Current (Amps) | Min. Starting Temp. (°F/°C) | Dim. | Wiring Dia. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **FT18W/2G11/RS - 18W (F18BX/RS, FT18DL/RS)** | | | | | | | | | | | |
| 1 | 120 | IS | AmbiStar | RMB-1P26-S2* | 23 | 1.00 | 150 | 0.37 | 0/-18 | S2 | 160 |
| **FT24W/2G11 - 24/27W (PL-L24W, F27BX/RS, FT24DL)** | | | | | | | | | | | |
| 1 | 120 | IS | AmbiStar | RMB-1P26-S2* | 26 | 0.95 | 150 | 0.40 | 0/-18 | S2 | 160 |
| | 120-277 | PS | Centium | ICN-2S24+ | 27 | 1.02 | 10 | 0.23-0.10 | | D | 73 |
| | | | | ICN-2S39 | 29 | 1.12 | 15 | 0.24-0.12 | | | |
| 2 | 120-277 | PS | SmartMate | ICF-2S26-H1-LD | 48 | 0.93 | 10 | 0.41-0.18 | 0/-18 | Size 1 | 160 |
| | | | | ICF-2S26-H1-LD-K ⓫ | | | | | | | |
| | | | | ICF-2S26-M1-BS | | | | | | | |
| | | | | ICF-2S42-M2-BS | 48 | 0.93 | 15 | 0.40-0.18 | | Size 2 | 159 |
| | | | | ICF-2S42-M2-LD | | | | | | | |
| | | | | ICF-2S42-M2-LD-K ⓫ | | | | | | | |
| | | | | ICF-2S42-90C-M2-BS | | | | | | | |
| | | | | ICF-2S42-90C-M2-LD | | | | | | | |
| | | | Centium | ICN-2S24+ | 52 | 1.00 | 10 | 0.44-0.19 | | D | 74A |
| | | | | ICN-2S39 | 54 | 1.10 | 10 | 0.46-0.20 | | | |
| **FT36W/2G11 - 36/39W (PL-L36W, F39BX/RS, FT36DL)** | | | | | | | | | | | |
| 1 | 120-277 | PS | Centium | ICN-2S24+ | 34 | 0.90 | 10 | 0.29-0.13 | 0/-18 | D | 73 |
| | | | | ICN-2S39 | 36 | 0.96 | 15 | 0.30-0.13 | | | |
| | | | | ICN-2S54+ | 46 | 1.22 | 20 | 0.39-0.18 | -20/-29 | | |
| | | | | ICN-2S54-90C+ | | | | | | | |
| | | | | ICN-2S54-90C-SC | | | | | | B | |
| | | | Optanium | IOP-2PSP54-SC | 46 | 1.20 | 10 | 0.39-0.18 | | | |
| | 347-480 | | Centium | HCN-2S54-90C-WL | 46 | 1.22 | 15 | 0.13-0.10 | | L | |
| 2 | 120-277 | PS | Centium | ICN-2S39 | 69 | 0.94 | 10 | 0.59-0.25 | 0/-18 | D | 74A |
| | | | | ICN-2S54+ | 89-86 | 1.20 | 10 | 0.75-0.32 | -20/-29 | | |
| | | | | ICN-2S54-90C+ | | | | | | | |
| | | | | ICN-2S54-90C-SC | | | | | | B | |
| | | | Optanium | IOP-2PSP54-SC | 88-85 | 1.20 | 10 | 0.73-0.31 | | | |
| | 347-480 | | Centium | HCN-2S54-90C-WL | 89 | 1.20 | 10 | 0.26-0.19 | | L | |
| 3 | 120-277 | PS | Centium | ICN-4S54-90C-2LS | 133-132 | 1.20 | 10 | 1.11-0.49 | -20/-29 | E | 75A |
| | | | | ICN-4S54-90C-2LS-G | | | | | | G | |
| | | | Optanium | IOP-4P2P54-2LS-G | 128-127 | 1.20 | 10 | 1.07-0.31 | | | |
| | 347-480 | | Centium | HCN-4S54-90C-2LS-G | 137-135 | 1.20 | 10 | 0.40-0.29 | | | |
| 4 | 120-277 | PS | Centium | ICN-4S54-90C-2LS | 176-173 | 1.20 | 10 | 1.47-0.64 | -20/-29 | E | 75 |
| | | | | ICN-4S54-90C-2LS-G | | | | | | G | |
| | | | Optanium | IOP-4P2P54-2LS-G | 170-167 | 1.20 | 10 | 1.42-0.61 | | | |
| | 347-480 | | Centium | HCN-4S54-90C-2LS-G | 182-180 | 1.20 | 10 | 0.53-0.38 | | | |

* Normal Power Factor.
+ Also available with leads (ICN-2S24-WL, ICN-2S54-WL, or ICN-2S54-90C-WL)
⓫ Replacement/Retrofit ballast kits indicated with suffix K are available to distributors. Refer to page 1-21 for details.

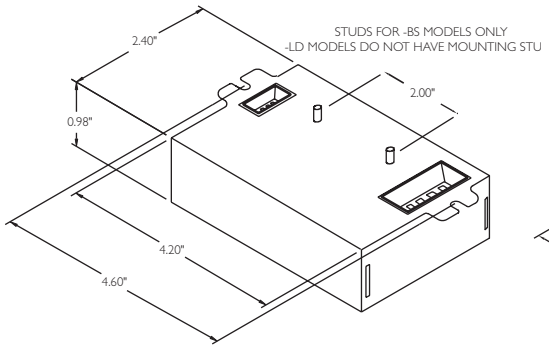
*Refer to pages 1-31 and 1-32 for dimensions*
*Refer to page 1-33 for wiring diagrams*
*Refer to pages 9-24 to 9-28 for lead lengths and shipping data*

# For 40W Lamps

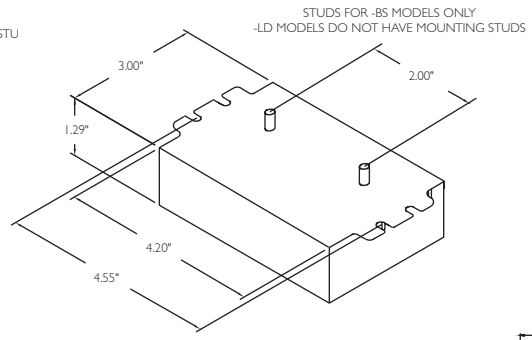
HIGH POWER FACTOR SOUND RATED A

| No. of Lamps | Input Volts | Lamp Starting Method | Ballast Family | Catalog Number | Input Power ANSI (Watts) | Ballast Factor | Max. THD % | Line Current (Amps) | Min. Starting Temp. (°F/°C) | Dim. | Wiring Dia. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| FT40W/2G11/RS - 40W (PL-L40W, F40BX, FT40DL/RS) | | | | | | | | | | | |
| 1 | 120-277 | IS | Centium | ICN-1TTP40-SC | 39 | 0.90 | 10 | 0.33-0.14 | 0/-18 | B | 70 |
| | | | | ICN-2TTP40-SC | 41 | 1.00 | 10 | 0.35-0.15 | | | |
| | | PS | | ICN-2S24*+ | 47 | 1.00 | 10 | 0.40-0.17 | | D | 73 |
| | | | | ICN-2S39 | 50 | 1.10 | 10 | 0.42-0.19 | | | |
| | | | SmartMate | ICF-2S42-M2-BS | 44 | 0.95 | 10 | 0.37-0.16 | | Size 2 | 160 |
| | | | | ICF-2S42-M2-LD-K ⓾ | | | | | | | |
| | | | | ICF-2S42-M2-LD | | | | | | | |
| | | | | ICF-2S42-90C-M2-BS | | | | | | | |
| | | | | ICF-2S42-90C-M2-LD | | | | | | | |
| 2 | 120-277 | IS | Centium | ICN-2TTP40-SC | 67 | 0.88 | 10 | 0.57-0.25 | 0/-18 | B | 71 |
| | | | | ICN-3TTP40-SC | 72 | 0.96 | 10 | 0.61-0.27 | | | |
| | | PS | SmartMate | ICF-2S42-M2-BS | 78 | 0.95 | 10 | 0.66-0.28 | | Size 2 | 159 |
| | | | | ICF-2S42-M2-LD | | | | | | | |
| | | | | ICF-2S42-M2-LD-K ⓾ | | | | | | | |
| | | | | ICF-2S42-90C-M2-BS | | | | | | | |
| | | | | ICF-2S42-90C-M2-LD | | | | | | | |
| 3 | 120-277 | IS | Centium | ICN-3TTP40-SC | 99 | 0.88 | 10 | 0.83-0.35 | 0/-18 | B | 72 |

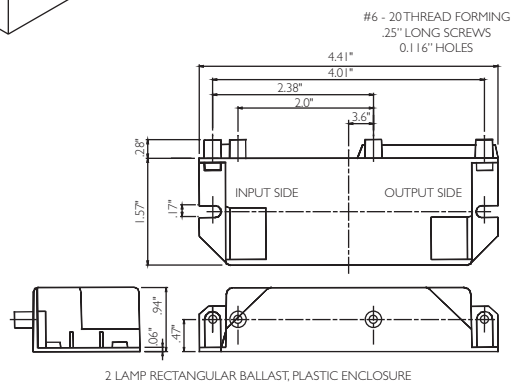
* Normal Power Factor.
\+ Also available with leads (ICN-2S24-WL, ICN-2S54-WL, or ICN-2S54-90C-WL)
⓾ Replacement/Retrofit ballast kits indicated with suffix K are available to distributors. Refer to page 1-21 for details.




Size 1 Enclosure




Size 2 Enclosure




2 LAMP RECTANGULAR BALLAST, PLASTIC ENCLOSURE

S2 Model

*Refer to page 1-32 for additional dimensions*
*Refer to page 1-33 for wiring diagrams*
*Refer to pages 9-24 to 9-28 for lead lengths and shipping data*

# For 50W Lamps

HIGH POWER FACTOR SOUND RATED A

| No. of Lamps | Input Volts | Lamp Starting Method | Ballast Family | Catalog Number | Input Power ANSI (Watts) | Ballast Factor | Max. THD % | Line Current (Amps) | Min. Starting Temp. (°F/°C) | Dim. | Wiring Dia. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **FT50W/2G11/RS - 50W (PL-L50W, F50BX/RS)** | | | | | | | | | | | |
| 1 | 120-277 | PS | Centium | ICN-2S54+ | 61 | 1.12 | 15 | 0.51-0.23 | -20/-29 | D | 73 |
| | | | | ICN-2S54-90C+ | | | | | | B | |
| | | | | ICN-2S54-90C-SC | | | | | | | |
| | | | Optanium | IOP-2PSP54-90C-SC | 61 | 1.10 | 10 | 0.51-0.23 | | | |
| | 347-480 | | Centium | HCN-2S54-90C-WL | 61 | 1.12 | 10 | 0.18-0.13 | | L | |
| 2 | 120-277 | PS | Centium | ICN-2S54+ | 118-115 | 1.10 | 10 | 0.99-0.43 | -20/-29 | D | 74A |
| | | | | ICN-2S54-90C+ | | | | | | B | |
| | | | | ICN-2S54-90C-SC | | | | | | | |
| | | | Optanium | IOP-2PSP54-SC | 117-114 | 1.10 | 10 | 0.97-0.42 | | | |
| | 347-480 | | Centium | HCN-2S54-90C-WL | 118 | 1.10 | 10 | 0.34-0.25 | | L | |
| 3 | 120-277 | PS | Centium | ICN-4S54-90C-2LS | 178-175 | 1.10 | 10 | 1.49-0.65 | -20/-29 | E | 75A |
| | | | | ICN-4S54-90C-2LS-G | | | | | | G | |
| | | | Optanium | IOP-4PSP54-2LS-G | 172-169 | 1.10 | 10 | 1.44-0.62 | | | |
| | 347-480 | | Centium | HCN-4S54-90C-2LS-G | 185-183 | 1.10 | 10 | 0.54-0.39 | | | |
| 4 | 120-277 | PS | Centium | ICN-4S54-90C-2LS | 235-230 | 1.10 | 10 | 1.96-0.84 | -20/-29 | E | 75 |
| | | | | ICN-4S54-90C-2LS-G | | | | | | G | |
| | | | Optanium | IOP-4PSP54-2LS-G | 228-223 | 1.10 | 10 | 1.90-0.81 | | | |
| | 347-480 | | Centium | HCN-4S54-90C-2LS-G | 236-234 | 1.10 | 10 | 0.68-0.49 | | | |

+ Also available with leads (ICN-2S24-WL, ICN-2S54-WL, or ICN-2S54-90C-WL)

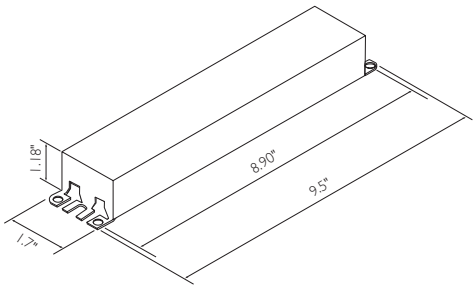



Fig. B

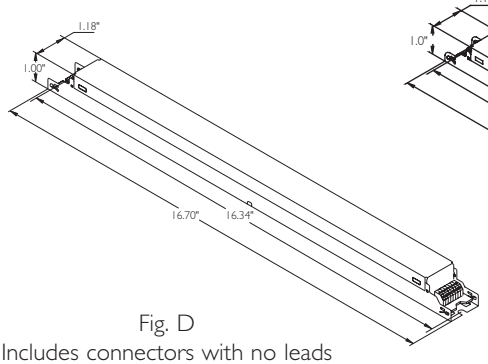



Fig. D
Includes connectors with no leads

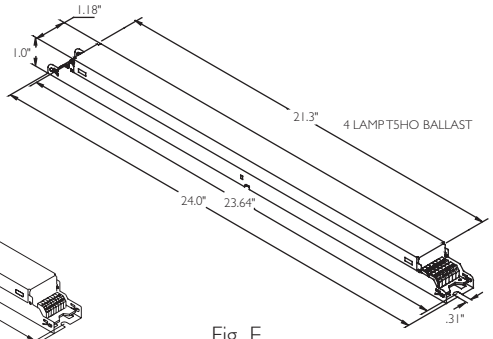



Fig. E

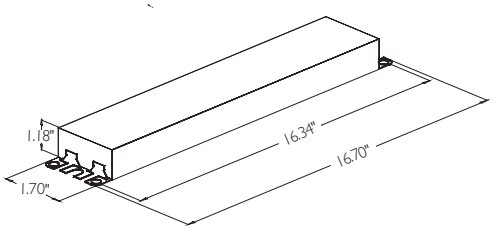



Fig. G

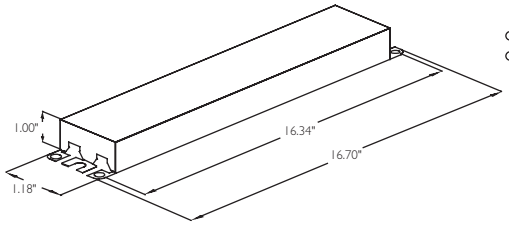
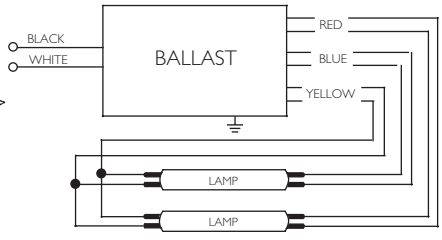
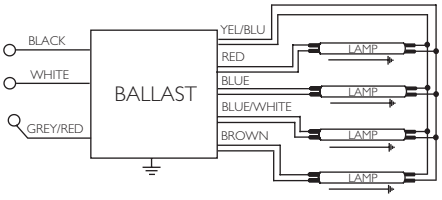



Fig. L




Diag. 78




Diag. 79

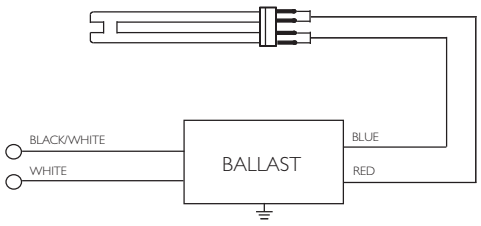
*Refer to page 1-33 for wiring diagrams*
*Refer to pages 9-24 to 9-28 for lead lengths and shipping data*

# For 55-80W Lamps

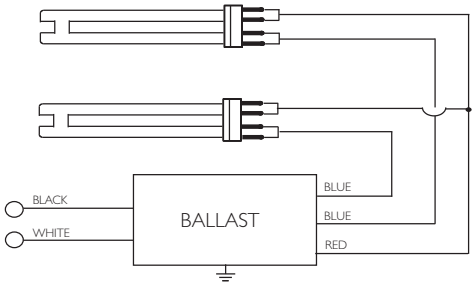
HIGH POWER FACTOR SOUND RATED A

| No. of Lamps | Input Volts | Lamp Starting Method | Ballast Family | Catalog Number | Input Power ANSI (Watts) | Ballast Factor | Max. THD % | Line Current (Amps) | Min. Starting Temp. (°F/°C) | Dim. | Wiring Dia. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **FT55W/2G11 - 55W (PL-L55W, F55BX, FT55DL)** | | | | | | | | | | | |
| 1 | 120-277 | PS | Centium | ICN-2S54+ | 58 | 0.92 | 15 | 0.49-0.22 | -20/-29 | D | 73 |
| | | | | ICN-2S54-90C+ | | | | | | | |
| | | | | ICN-2S54-90C-SC | | | | | | B | |
| | | | Optanium | IOP-2PSP54-90C-SC | 58 | 0.90 | 10 | 0.49-0.22 | | | 78 |
| | 347-480 | | Centium | HCN-2S54-90C-WL | 58 | 0.92 | 10 | 0.17-0.13 | | L | 73 |
| 2 | 120-277 | PS | Centium | ICN-2S54+ | 112-109 | 0.90 | 10 | 0.94-0.41 | -20/-29 | D | 74A |
| | | | | ICN-2S54-90C+ | | | | | | | |
| | | | | ICN-2S54-90C-SC | | | | | | B | |
| | | | Optanium | IOP-2PSP54-90C-SC | 110-108 | 0.90 | 10 | 0.92-0.40 | | | 78 |
| | 347-480 | | Centium | HCN-2S54-90C-WL | 112 | 0.90 | 10 | 0.33-0.24 | | L | 74A |
| 3 | 120-277 | PS | Centium | ICN-4S54-90C-2LS-G | 169-166 | 0.90 | 10 | 1.41-0.61 | -20/-29 | G | 75A |
| | | | Optanium | IOP-4PSP54-2LS-G | 164-161 | 0.90 | 10 | 1.37-0.59 | | | 79 |
| | 347-480 | | Centium | HCN-4S54-90C-2LS-G | 178-176 | 0.90 | 10 | 0.52-0.37 | | | 75A |
| 4 | 120-277 | PS | Centium | ICN-4S54-90C-2LS-G | 222-217 | 0.90 | 10 | 1.86-0.80 | -20/-29 | G | 75 |
| | | | Optanium | IOP-4PSP54-2LS-G | 217-212 | 0.90 | 10 | 1.81-0.77 | | | 79 |
| | 347-480 | | Centium | HCN-4S54-90C-2LS-G | 228-226 | 0.90 | 10 | 0.66-0.47 | | | 75 |
| **FT80W/2G11 - 80W (PL-L80W, FT80DL)** | | | | | | | | | | | |
| 1 | 120-277 | PS | Centium | ICN-1S80 | 91-89 | 1.00 | 10 | 0.76-0.33 | 0/-18 | D | 73 |

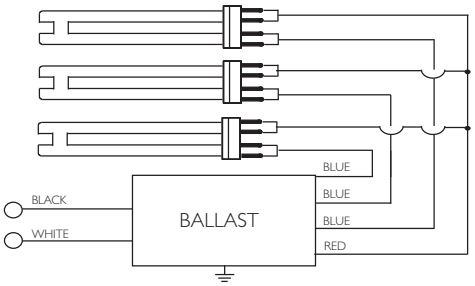
+ Also available with leads (ICN-2S24-WL, ICN-2S54-WL, or ICN-2S54-90C-WL)



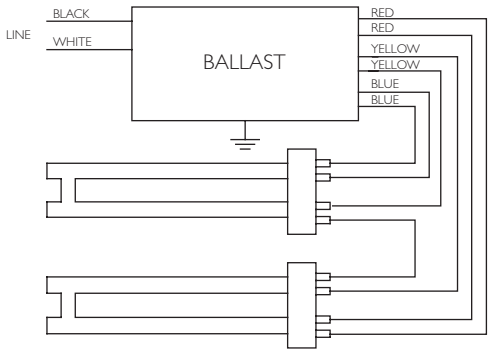

Diag. 70



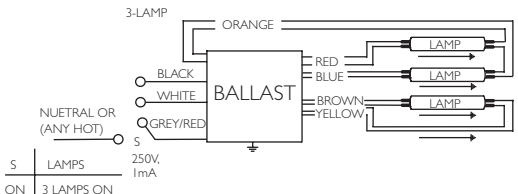

Diag. 71



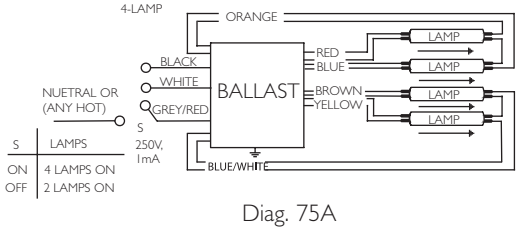

Diag. 72




Diag. 74A




Diag. 75




Diag. 75A

*Refer to page 1-32 for dimensions*
*Refer to page 1-37 for diagram 73 and page 1-32 for diagrams 78 and 79.*
*Refer to pages 9-24 to 9-28 for lead lengths and shipping data*

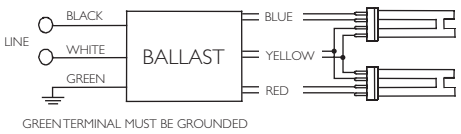
# For 10-21W Lamps

HIGH POWER FACTOR SOUND RATED A

| No. of Lamps | Input Volts | Lamp Starting Method | Ballast Family | Catalog Number | Input Power ANSI (Watts) | Ballast Factor | Max. THD % | Line Current (Amps) | Min. Starting Temp. (°F/°C) | Dim. | Wiring Dia. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **CFS10W/GR10q - 10W 2D Lamp (F10 2D/4P)** | | | | | | | | | | | |
| 1 | 120-277 | PS | SmartMate | ICF-2S13-H1-LD<br>ICF-2S13-H1-LD-K ⓫<br>ICF-2S13-M1-BS | 13 | 1.05 | 15 | 0.11-0.05 | 0/-18 | Size 1 | 160 |
| 2 | 120-277 | PS | SmartMate | ICF-2S13-H1-LD<br>ICF-2S13-H1-LD-K ⓫<br>ICF-2S13-M1-BS | 23 | 0.95 | 15 | 0.19-0.09 | 0/-18 | Size 1 | 159 |
| **CFS16W/GR10q - 16W 2D Lamp (F16 2D/4P)** | | | | | | | | | | | |
| 1 | 120-277 | PS | SmartMate | ICF-2S13-H1-LD<br>ICF-2S13-H1-LD-K ⓫<br>ICF-2S13-M1-BS | 17 | 1.00 | 15 | 0.14-0.06 | 0/-18 | Size 1 | 160 |
| 2 | 120-277 | PS | SmartMate | ICF-2S18-H1-LD<br>ICF-2S18-H1-LD-K ⓫<br>ICF-2S18-M1-BS | 37 | 1.00 | 10 | 0.31-0.13 | 0/-18 | Size 1 | 159 |
| **CFS21W/GR10q - 21W 2D Lamp (F21 2D/4P)** | | | | | | | | | | | |
| 1 | 120-277 | PS | SmartMate | ICF-2S18-H1-LD<br>ICF-2S18-H1-LD-K ⓫<br>ICF-2S18-M1-BS | 20 | 0.90 | 15 | 0.16-0.07 | 0/-18 | Size 1 | 160 |
| 2 | 120-277 | PS | SmartMate | ICF-2S18-H1-LD<br>ICF-2S18-H1-LD-K ⓫<br>ICF-2S18-M1-BS | 40 | 0.91 | 10 | 0.33-0.14 | 0/-18 | Size 1 | 159 |
| | | | | ICF-2S26-H1-LD<br>ICF-2S26-H1-LD-K ⓫<br>ICF-2S26-M1-BS | 51 | 1.12 | 10 | 0.42-0.18 | | | |

⓫ Replacement/Retrofit ballast kits indicated with suffix K are available to distributors. Refer to page 1-21 for details.

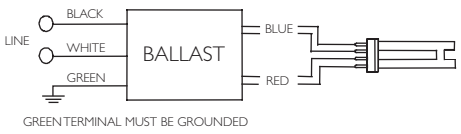
WIRING: (2) LAMP



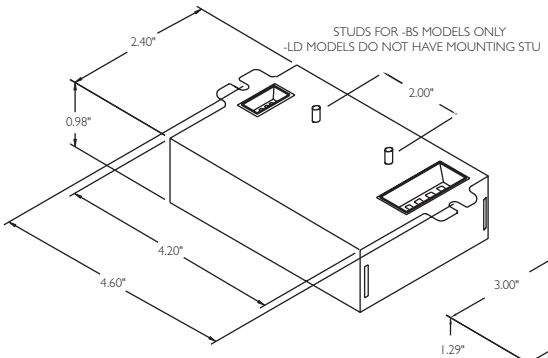

Diag. 159

Note: For AmbiStar 1-lamp operation on 2-lamp ballast, use red and blue connectors

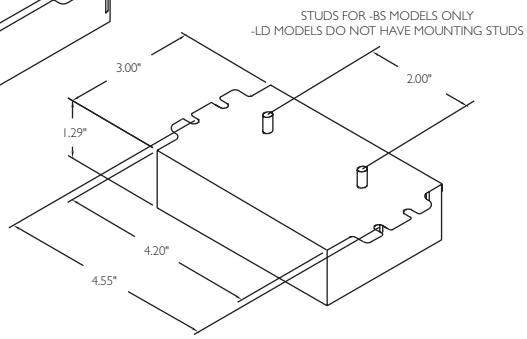
WIRING: (1) LAMP




Diag. 160




Size 1 Enclosure




Size 2 Enclosure

*Refer to pages 9-24 to 9-28 for lead lengths and shipping data*

# For 28-38W Lamps

HIGH POWER FACTOR SOUND RATED A

| No. of Lamps | Input Volts | Lamp Starting Method | Ballast Family | Catalog Number | Input Power ANSI (Watts) | Ballast Factor | Max. THD % | Line Current (Amps) | Min. Starting Temp. (°F/°C) | Dim. | Wiring Dia. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **CFS28W/GR10q - 28W 2D Lamp (PL-Q 28W/4P, F28 2D/4P)** | | | | | | | | | | | |
| 1 | 120-277 | PS | SmartMate | ICF-1D38-H1-LD | 27 | 1.00 | 10 | 0.23-0.10 | 0/-18 | Size 1 | 160 |
| 2 | 120-277 | PS | SmartMate | ICF-2S42-M2-BS | 57 | 1.00 | 10 | 0.48-0.21 | 0/-18 | Size 2 | 159 |
| | | | | ICF-2S42-M2-LD | | | | | | | |
| | | | | ICF-2S42-M2-LD-K ⓾ | | | | | | | |
| | | | | ICF-2S42-90C-M2-BS | | | | | | | |
| | | | | ICF-2S42-90C-M2-LD | | | | | | | |
| **CFS38W/GR10q - 38W 2D Lamp (PL-Q 38W/4P, F38 2D/4P)** | | | | | | | | | | | |
| 1 | 120-277 | PS | SmartMate | ICF-1D38-H1-LD | 31 | 0.85 | 10 | 0.26-0.11 | 0/-18 | Size 1 | 160 |
| 2 | 120-277 | PS | SmartMate | ICF-2S42-M2-BS | 62 | 0.80 | 10 | 0.55-0.23 | 0/-18 | Size 2 | 159 |
| | | | | ICF-2S42-M2-LD | | | | | | | |
| | | | | ICF-2S42-M2-LD-K ⓾ | | | | | | | |
| | | | | ICF-2S42-90C-M2-BS | | | | | | | |
| | | | | ICF-2S42-90C-M2-LD | | | | | | | |

⓾ Replacement/Retrofit ballast kits indicated with suffix K are available to distributors. Refer to page 1-21 for details.

*Refer to page 1-34 for dimensions*
*Refer to pages 9-24 to 9-28 for lead lengths and shipping data*

# For 8-13W Lamps

HIGH POWER FACTOR SOUND RATED A

| No. of Lamps | Input Volts | Lamp Starting Method | Ballast Family | Catalog Number | Input Power ANSI (Watts) | Ballast Factor | Max. THD % | Line Current (Amps) | Min. Starting Temp. (°F/°C) | Dim. | Wiring Dia. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **F8T5 (8W)** | | | | | | | | | | | |
| 1 | 120 | IS | AmbiStar | RMB-1P13-S1* | 10 | 1.30 | 150 | 0.16 | 0/-18 | S1 | 163 |
| 2 | 120 | IS | AmbiStar | RMB-2P13-S2* | 19 | 1.30 | 125 | 0.27 | 0/-18 | S2 | 162 |
| **(1) F8T5 & (1) F13T5 {(1) 8W & (1) 13W}** | | | | | | | | | | | |
| 1 | 120 | IS | AmbiStar | RMB-2P13-S2* | 23 | 1.10 | 125 | 0.33 | 0/-18 | S1 | 162 |
| **F13T5 (13W)** | | | | | | | | | | | |
| 1 | 120 | IS | AmbiStar | RMB-1P13-S1* | 14 | 1.00 | 150 | 0.21 | 0/-18 | S1 | 163 |
| 2 | 120 | IS | AmbiStar | RMB-2P13-S2* | 27 | 0.95 | 125 | 0.38 | 0/-18 | S2 | 162 |

* Normal Power Factor

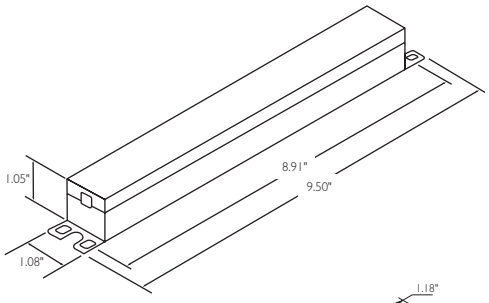



Fig. A2

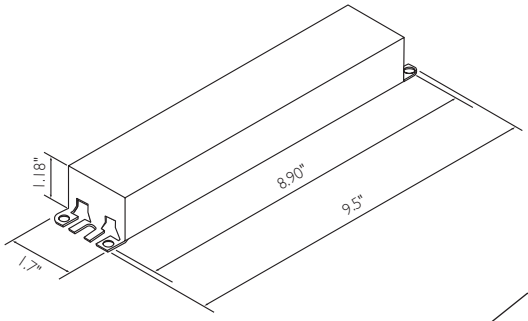



Fig. B

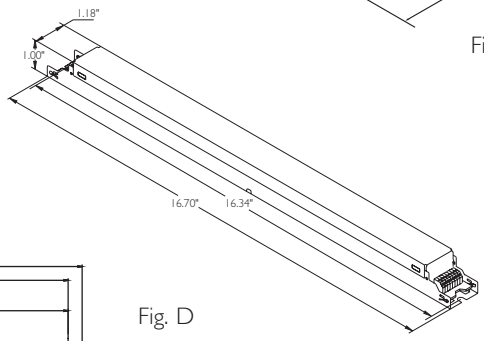



Fig. D

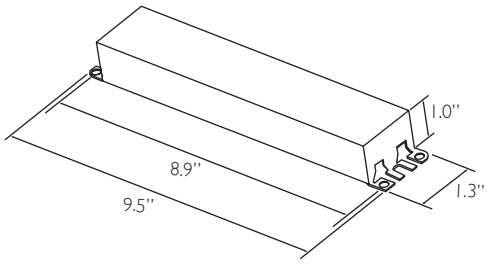
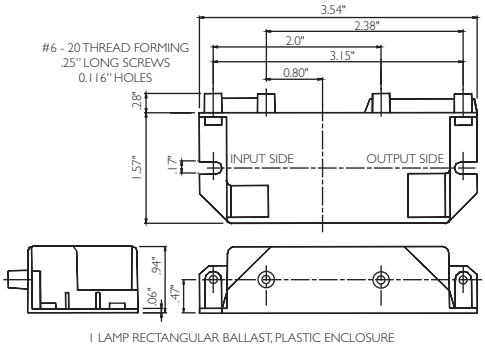
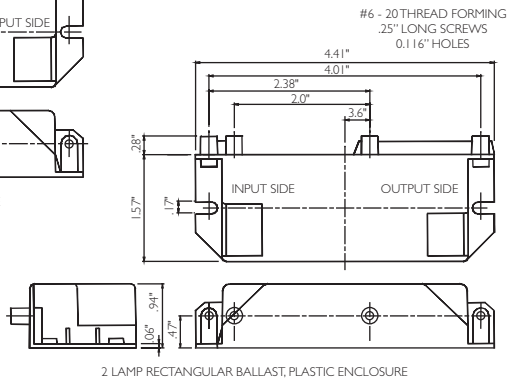


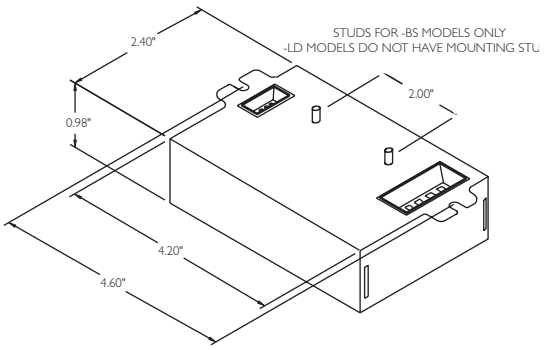

Fig. N




S1 Model




S2 Model




Size 1 Enclosure

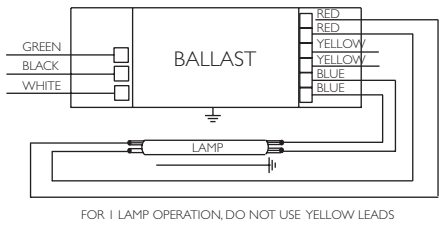
*Refer to page 1-37 for wiring diagrams*
*Refer to pages 9-24 to 9-28 for lead lengths and shipping data*

# For 14-35W Lamps

HIGH POWER FACTOR SOUND RATED A

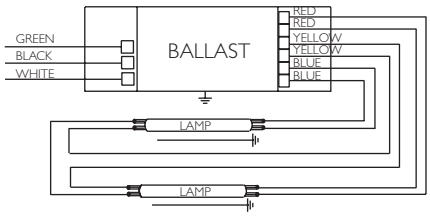
| No. of Lamps | Input Volts | Lamp Starting Method | Ballast Family | Catalog Number | Input Power ANSI (Watts) | Ballast Factor | Max. THD % | Line Current (Amps) | Min. Starting Temp. (°F/°C) | Dim. | Wiring Dia. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **F14T5 (14W)** | | | | | | | | | | | |
| 1 | 120 | IS | AmbiStar | RMB-1P13-S1* | 14 | 0.95 | 150 | 0.21 | 0/-18 | S1 | 163 |
| | 120-277 | PS | Centium | ICN-2S28-N | 17 | 1.07 | 10 | 0.14-0.07 | | N | 73 |
| 2 | 120 | IS | AmbiStar | RMB-2P13-S2* | 27 | 0.90 | 125 | 0.40 | 0/-18 | L2 | 162 |
| | 120-277 | PS | Centium | ICN-2S28-N | 33 | 1.04 | 10 | 0.28-0.13 | 0/-18 | N | 74 |
| | | | | ICN-3S14-D | 36 | 1.10 | 10 | 0.31-0.13 | | D | 172 |
| 3 | 120-277 | PS | Centium | ICN-3S14-D | 50 | 1.00 | 10 | 0.42-0.18 | 0/-18 | D | 171 |
| **F21T5 (21W)** | | | | | | | | | | | |
| 1 | 120-277 | PS | Centium | ICN-2S28-N | 25 | 1.06 | 10 | 0.22-0.10 | 0/-18 | N | 73 |
| 2 | 120-277 | PS | Centium | ICN-2S28-N | 49 | 1.02 | 10 | 0.43-0.19 | 0/-18 | N | 74 |
| **F28T5 (25W)** | | | | | | | | | | | |
| 1 | 120-277 | PS | Centium | ICN-2S28-N | 30 | 1.05 | 10 | 0.25-0.11 | 0/-18 | N | 73 |
| 2 | 120-277 | PS | Centium | ICN-2S28-N | 58-57 | 1.00 | 10 | 0.49-0.21 | 0/-18 | N | 74 |
| | | | | IOP-2S28-95-SC | 54 | 0.95 | 10 | 0.45 | | B | |
| | | | | IOP-2S28-115-SC | 63 | 1.15 | 10 | 0.53-0.23 | | B | |
| **F28T5 (28W)** | | | | | | | | | | | |
| 1 | 120-277 | PS | Centium | ICN-2S28-N | 31 | 1.05 | 10 | 0.29-0.12 | 0/-18 | N | 73 |
| 2 | 120-277 | PS | Centium | ICN-2S28-N | 62-61 | 1.00 | 10 | 0.59-0.23 | 0/-18 | N | 74 |
| | | | | IOP-2S28-95-SC | 59-58 | 0.95 | 10 | 0.55-0.22 | | B | |
| | | | | IOP-2S28-115-SC | 71-69 | 1.15 | 10 | 0.60-0.26 | | B | |

* Normal Power Factor.



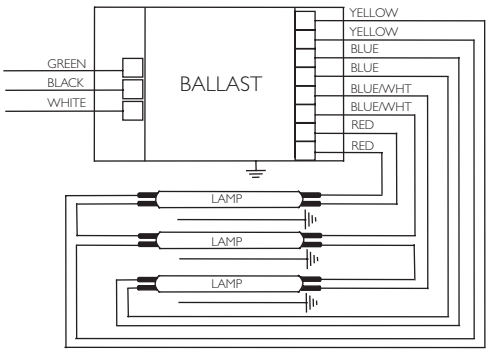

FOR 1 LAMP OPERATION, DO NOT USE YELLOW LEADS

Diag. 73



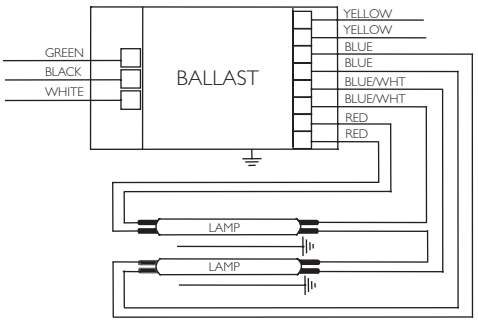

Diag. 74

3-LAMP

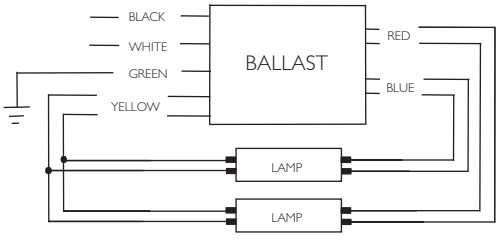



Diag. 171

2-LAMP

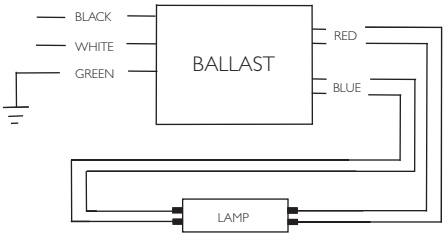



Diag. 172




GREEN TERMINAL MUST BE GROUNDED

Diag. 162




GREEN TERMINAL MUST BE GROUNDED

Diag. 163

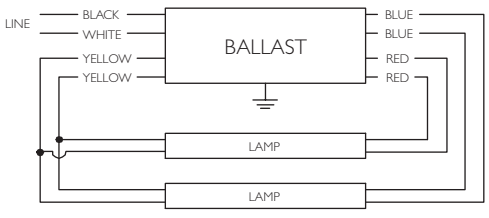
*Refer to page 1-36 for dimensions*
*Refer to pages 9-24 to 9-28 for lead lengths and shipping data*

# For 22-55W Lamps

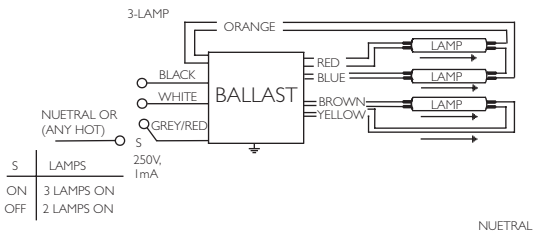
HIGH POWER FACTOR SOUND RATED A

| No. of Lamps | Input Volts | Lamp Starting Method | Ballast Family | Catalog Number | Input Power ANSI (Watts) | Ballast Factor | Max. THD % | Line Current (Amps) | Min. Starting Temp. (°F/°C) | Dim. | Wiring Dia. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **FC9T5 (22W Circline)** | | | | | | | | | | | |
| 1 | 120 | IS | AmbiStar | RMB-1P26-S2* | 25 | 1.00 | 150 | 0.39 | 0/-18 | S2 | 163 |
| | 120-277 | PS | SmartMate | ICF-1D38-H1-LD | 25 | 1.00 | 15 | 0.21-0.09 | | Size 1 | |
| | | | Centium | ICN-2S24+ | 27 | 1.02 | 10 | 0.23-0.10 | | D | 73 |
| | | | | ICN-2S39 | 29 | 1.12 | 15 | 0.24-0.12 | | | |
| 2 | 120-277 | PS | Centium | ICN-2S24+ | 52 | 1.00 | 10 | 0.44-0.19 | 0/-18 | D | 74 |
| | | | | ICN-2S39 | 54 | 1.10 | 10 | 0.46-0.20 | | | |
| **FC12T5 (40W Circline)** | | | | | | | | | | | |
| 1 | 120-277 | PS | SmartMate | ICF-1D38-H1-LD | 38 | 0.95 | 10 | 0.32-0.14 | 0/-18 | Size 1 | 163 |
| | | | Centium | ICN-2S24+ | 40 | 0.84 | 10 | 0.34-0.15 | | D | 73 |
| | | | | ICN-2S39 | 42 | 0.92 | 10 | 0.35-0.16 | | | |
| 2 | 120-277 | PS | Centium | ICN-2S39 | 80 | 0.90 | 10 | 0.68-0.29 | 0/-18 | D | 74 |
| **(1) FC9T5 & (1) FC12T5 {(1) 22W & (1) 40W Circline}** | | | | | | | | | | | |
| 1&1 | 120-277 | PS | SmartMate | ICF-2S42-M2-BS | 61 | 0.85 | 10 | 0.51-0.22 | 0/-18 | Size 2 | 162 |
| | | | | ICF-2S42-M2-LD | | | | | | | |
| | | | | ICF-2S42-M2-LD-K ⑩ | | | | | | | |
| | | | | ICF-2S42-90C-M2-BS | | | | | | | |
| | | | | ICF-2S42-90C-M2-LD | | | | | | | |
| | | | Centium | ICN-2S39 | 68 | 1.00 | 10 | 0.58-0.25 | | D | 74 |
| **FC12T5/HO (55W Circline)** | | | | | | | | | | | |
| 1 | 120-277 | PS | Centium | ICN-2S54*+ | 55 | 0.87 | 15 | 0.46-0.21 | 0/-18 | D | 73 |
| | | | | ICN-2S54-90C*+ | | | | | | | |
| | | | | ICN-2S54-90C-SC | | | | | | B | |
| | | | Optanium | IOP-2PSP54-90C-SC | 53 | 0.85 | 10 | 0.44 | | | |
| | 347-480 | | Centium | HCN-2S54-90C-WL | 55 | 0.87 | 10 | 0.16-0.12 | | L | |
| 2 | 120-277 | PS | Centium | ICN-2S54*+ | 106-103 | 0.85 | 10 | 0.89-0.38 | 0/-18 | D | 74 |
| | | | | ICN-2S54-90C*+ | | | | | | | |
| | | | | ICN-2S54-90C-SC | | | | | | B | |
| | | | Optanium | IOP-2PSP54-90C-SC | 103-100 | 0.85 | 10 | 0.86-0.36 | | | |
| | 347-480 | | Centium | HCN-2S54-90C-WL | 106 | 0.85 | 10 | 0.31-0.22 | | L | |

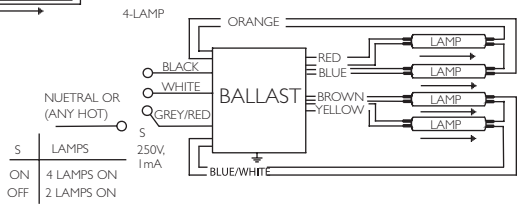
* Normal Power Factor.
\+ Also available with leads (ICN-2S24-WL, ICN-2S54-WL, or ICN-2S54-90C-WL)




Diag. 21




Diag. 75




Diag. 75A

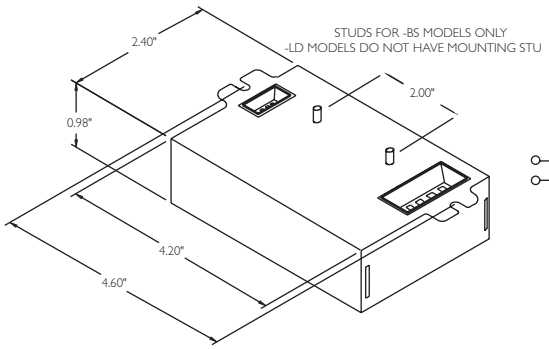
*Refer to page 1-36 for dimensions*
*Refer to page 1-37 for diagrams 73, 74, 162 and 163*
*Refer to pages 9-24 to 9-28 for lead lengths and shipping data*

# For 24-54W Lamps

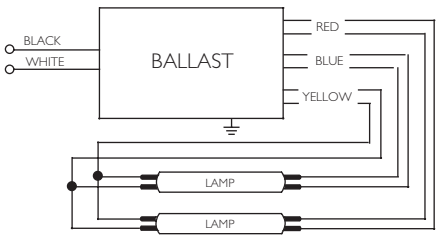
HIGH POWER FACTOR SOUND RATED A

| No. of Lamps | Input Volts | Lamp Starting Method | Ballast Family | Catalog Number | Input Power ANSI (Watts) | Ballast Factor | Max. THD % | Line Current (Amps) | Min. Starting Temp. (°F/°C) | Dim. | Wiring Dia. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **F24T5/HO (24W)** | | | | | | | | | | | |
| 1 | 120-277 | PS | Centium | ICN-2S24+ | 27 | 1.02 | 10 | 0.23-0.10 | 0/-18 | D | 73 |
| | | | | ICN-2S39 | 29 | 1.12 | 15 | 0.25-0.12 | | | |
| 2 | 120-277 | PS | Centium | ICN-2S24+ | 52 | 1.00 | 10 | 0.44-0.19 | 0/-18 | D | 74 |
| | | | | ICN-2S39 | 55 | 1.10 | 10 | 0.47-0.21 | | | |
| **F39T5/HO (39W)** | | | | | | | | | | | |
| 1 | 120-277 | PS | Centium | ICN-2S24+ | 40 | 0.90 | 10 | 0.34-0.15 | 0/-18 | D | 73 |
| | | | | ICN-2S39 | 43 | 1.02 | 10 | 0.36-0.16 | | | |
| 2 | 120-277 | PS | Centium | ICN-2S39 | 87-85 | 1.00 | 10 | 0.73-0.31 | 0/-18 | D | 74 |
| **F54T5/HO (49W)** | | | | | | | | | | | |
| 1 | 120-277 | PS | Centium | ICN-2S54+ | 58 | 1.02 | 10 | 0.49-0.21 | -20/-29 | D | 73 |
| | | | | ICN-2S54-90C+ | | | | | | | |
| | | | | ICN-2S54-90C-SC | | | | | | B | |
| | | | Optanium | IOP-2PSP54-SC | 57 | 1.00 | 10 | 0.47-0.21 | | | 78 |
| | 347-480 | | Centium | HCN-2S54-90C-WL | 58 | 1.02 | 10 | 0.18-0.13 | | L | 73 |
| 2 | 120-277 | PS | Centium | ICN-2S54+ | 112-109 | 1.00 | 10 | 0.93-0.40 | -20/-29 | D | 74 |
| | | | | ICN-2S54-90C+ | | | | | | | |
| | | | | ICN-2S54-90C-SC | | | | | | B | |
| | | | Optanium | IOP-2PSP54-SC | 109-105 | 1.00 | 10 | 0.91-0.38 | | | 78 |
| | 347-480 | | Centium | HCN-2S54-90C-WL | 112-109 | 1.00 | 10 | 0.35-0.25 | | L | 74 |
| 3 | 120-277 | PS | Centium | ICN-4S54-90C-2LS | 168-165 | 1.00 | 10 | 1.52-0.66 | -20/-29 | E | 75 |
| | | | | ICN-4S54-90C-2LS-G | | | | | | G | |
| | | | Optanium | IOP-4PSP54-2LS-G | 162-159 | 1.00 | 10 | 1.35-0.58 | | | 79 |
| | 347-480 | | Centium | HCN-4S54-90C-2LS-G | 175-172 | 1.00 | 10 | 0.54-0.39 | | | 75 |
| 4 | 120-277 | PS | Centium | ICN-4S54-90C-2LS | 222-216 | 1.00 | 10 | 2.00-0.86 | -20/-29 | E | 75A |
| | | | | ICN-4S54-90C-2LS-G | | | | | | G | |
| | | | Optanium | IOP-4PSP54-2LS-G | 224-208 | 1.00 | 10 | 1.79-0.76 | | | 79 |
| | 347-480 | | Centium | HCN-4S54-90C-2LS-G | 223-221 | 1.00 | 10 | 0.69-0.50 | | | 75A |

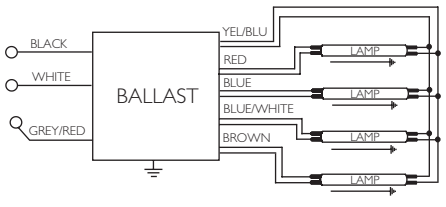
+ Also available with leads (ICN-2S24-WL, ICN-2S54-WL, or ICN-2S54-90C-WL)




Size 1 Enclosure




Diag. 78




Diag. 79

*Refer to pages 1-37 and 1-38 for wiring diagrams*
*Refer to page 1-40 for dimensions B, D, G, L, and E*
*Refer to pages 9-24 to 9-28 for lead lengths and shipping data*

# For 54-80W Lamps

HIGH POWER FACTOR SOUND RATED A

| No. of Lamps | Input Volts | Lamp Starting Method | Ballast Family | Catalog Number | Input Power ANSI (Watts) | Ballast Factor | Max. THD % | Line Current (Amps) | Min. Starting Temp. (°F/°C) | Dim. | Wiring Dia. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **F54T5/HO (54W)** | | | | | | | | | | | |
| 1 | 120-277 | PS | Centium | ICN-2S54+ | 62 | 1.02 | 10 | 0.52-0.23 | -20/-29 | D | 73 |
| | | | | ICN-2S54-90C+ | | | | | | | |
| | | | | ICN-2S54-90C-SC | | | | | | B | |
| | | | Optanium | IOP-2PSP54-SC | 60 | 1.00 | 10 | 0.50 - 0.22 | | | TBD |
| | 347-480 | | Centium | HCN-2S54-90C-WL | 62 | 1.02 | 10 | 0.18-0.13 | | L | 73 |
| 2 | 120-277 | PS | Centium | ICN-2S54+ | 120-117 | 1.00 | 10 | 1.00-0.43 | -20/-29 | D | 74 |
| | | | | ICN-2S54-90C+ | | | | | | | |
| | | | | ICN-2S54-90C-SC | | | | | | B | |
| | | | Optanium | IOP-2PSP54-SC | 117-114 | 1.00 | 10 | 0.98 - 0.41 | | | TBD |
| | 347-480 | | Centium | HCN-2S54-90C-WL | 120-119 | 1.00 | 10 | 0.35-0.25 | | L | 74 |
| 3 | 120-277 | PS | Centium | ICN-4S54-90C-2LS | 182-179 | 1.00 | 10 | 1.52-0.66 | -20/-29 | E | 75A |
| | | | | ICN-4S54-90C-2LS-G | | | | | | G | |
| | | | Optanium | IOP-4PSP54-2LS-G | 176-174 | 1.00 | 10 | 1.47-0.83 | | | TBD |
| | 347-480 | | Centium | HCN-4S54-90C-2LS-G | 188-186 | 1.04 | 10 | 0.54-0.39 | | | 75 |
| 4 | 120-277 | PS | Centium | ICN-4S54-90C-2LS | 240-234 | 1.00 | 10 | 2.00-0.86 | -20/-29 | E | 75 |
| | | | | ICN-4S54-90C-2LS-G | | | | | | G | |
| | | | Optanium | IOP-4PSP54-2LS-G | 235-229 | 1.00 | 10 | 1.96-0.83 | | | TBD |
| | 347-480 | | Centium | HCN-4S54-90C-2LS-G | 239-237 | 1.00 | 10 | 0.69-0.50 | | | 75 |
| **F80T5/HO (80W)** | | | | | | | | | | | |
| 1 | 120-277 | PS | Centium | ICN-1S80 | 91-89 | 1.00 | 10 | 0.76-0.33 | 0/-18 | D | 73 |

+ Also available with leads (ICN-2S24-WL, ICN-2S54-WL, or ICN-2S54-90C-WL)

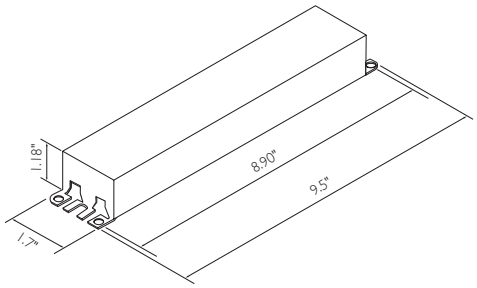



Fig. B

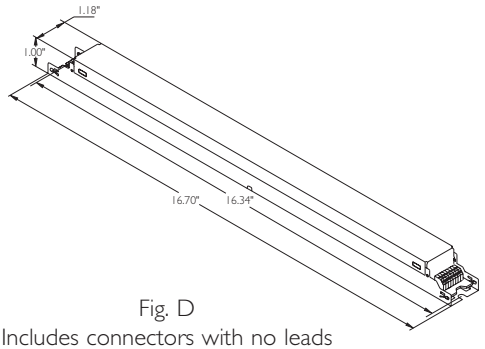



Fig. D
Includes connectors with no leads

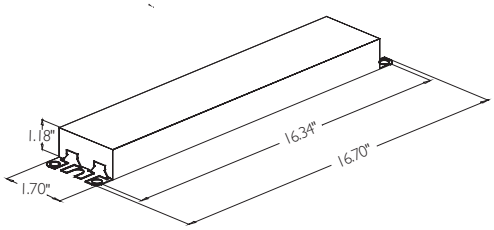



Fig. G

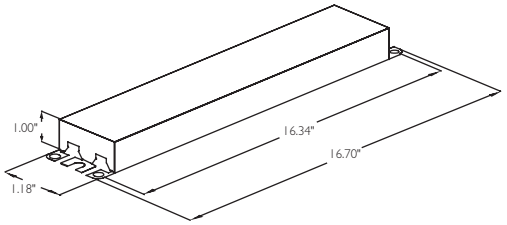



Fig. L

*Refer to page 1-37 and 1-38 for wiring diagrams*
*Refer to pages 9-24 to 9-28 for lead lengths and shipping data*

# For 17W Lamps

HIGH POWER FACTOR SOUND RATED A

| No. of Lamps | Input Volts | Lamp Starting Method | Ballast Family | Catalog Number | Input Power ANSI (Watts) | Ballast Factor | Max. THD % | Line Current (Amps) | Min. Starting Temp. (°F/°C) | Dim. | Wiring Dia. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **F17T8, FBO16T8 (17W)** | | | | | | | | | | | |
| 1 | 120 | IS | AmbiStar‡ | REB-2P32-SC | 19 | 1.02 | 150 | 0.30 | 0/-18 | B | *64 |
| | | PS | Centium | RCN-1S32-SC | 22 | 1.00 | 10 | 0.19 | 32/0 | | 20 |
| | 277 | | | VCN-1S32-SC | 22 | 1.00 | 10 | 0.08 | | | |
| | 120-277 | IS | Centium | ICN-132-MC | 17 | 0.88 | 20 | 0.14-0.06 | 0/-18 | A2 | 63 |
| | | | | ICN-1P32-LW-SC | 16 | 0.80 | 10 | 0.13-0.06 | | B | |
| | | | | ICN-1P32-N | 19 | 0.93 | 15 | 0.16-0.07 | | | |
| | | | | ICN-2P32-LW-SC | 19 | 0.90 | 20 | 0.16-0.07 | | | *64 |
| | | | | ICN-2P32-N | 22 | 1.07 | 15 | 0.18-0.09 | | | |
| | | | Optanium | IOP-1P32-LW-SC | 15 | 0.80 | 10 | 0.13-0.06 | -20/-29 | | 63 |
| | | | | IOPA-1P32-LW-SC | | | | | | | |
| | | | | IOP-1P32-SC | 16 | 0.90 | 10 | 0.14-0.07 | | | |
| | | | | IOPA-1P32-SC | | | | | | | |
| | | | | IOP-1P32-HL-SC | 22 | 1.23 | 15 | 0.19-0.08 | | | |
| | | | | IOPA-1P32-HL-SC | | | | | | | |
| | | | | IOP-2P32-LW-SC | 18 | 0.90 | 20 | 0.15-0.07 | | | *64 |
| | | | | IOPA-2P32-LW-SC | | | | | | | |
| | | | | IOP-2P32-SC | 19 | 1.06 | 15 | 0.17-0.08 | | | |
| | | | | IOPA-2P32-SC | | | | | | | |
| | | | | IOP-2P32-HL-SC | 25 | 1.42 | 20 | 0.21-0.10 | | | |
| | | | | IOPA-2P32-HL-SC | | | | | | | |
| | | PS | | IOP-1S32-LW-SC | 14 | 0.79 | 10 | 0.12-0.05 | 0/-18 | | 20 |
| | | | | IOP-1S32-SC | 16 | 0.97 | 10 | 0.14-0.07 | | | |
| | | | | IOP-2S32-LW-SC | 15 | 0.78 | 15 | 0.12-0.06 | | | 39 |
| | | | | IOP-2S32-SC | 17 | 0.97 | 15 | 0.14-0.07 | | | |
| | 347 | IS | Optanium | GOPA-1P32-LW-SC | 15 | 0.80 | 10 | 0.05 | -20/-29 | | 63 |
| | | | | GOPA-1P32-SC | 16 | 0.93 | | 0.06 | | | |
| | | | | GOPA-2P32-LW-SC | 17 | 0.89 | | 0.06 | | | *64 |
| | | | | GOPA-2P32-SC | 20 | 1.07 | | 0.06 | | | |

‡ The above AmbiStar ballasts are normal power factor and labeled 'For Residential Use Only'

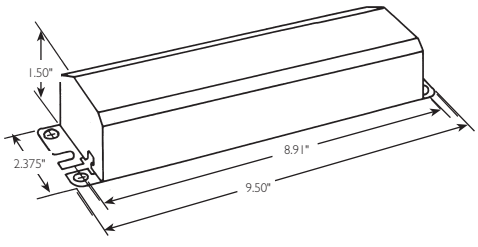



Fig. A

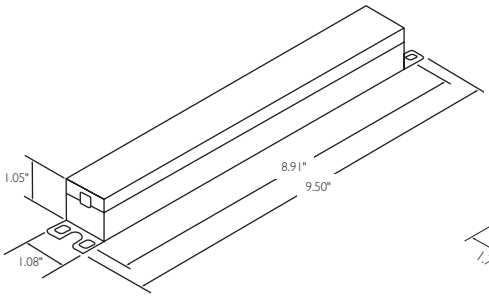



Fig. A2

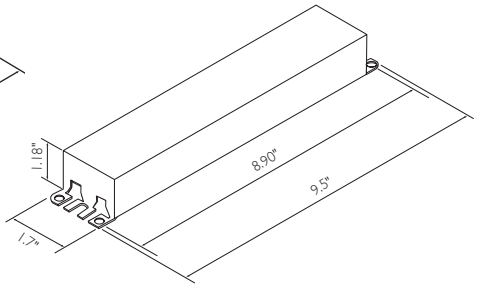



Fig. B

*Refer to page 1-43 and 1-44 for wiring diagrams*
*Refer to pages 9-24 to 9-28 for lead lengths and shipping data*

# For 17W Lamps

HIGH POWER FACTOR SOUND RATED A

| No. of Lamps | Input Volts | Lamp Starting Method | Ballast Family | Catalog Number | Input Power ANSI (Watts) | Ballast Factor | Max. THD % | Line Current (Amps) | Min. Starting Temp. (°F/°C) | Dim. | Wiring Dia. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **F17T8, FBO16T8 (17W)** | | | | | | | | | | | |
| 2 | 120 | IS | AmbiStar‡ | REB-2P32-SC | 31 | 0.91 | 140 | 0.45 | 0/-18 | B | 64 |
| | | PS | Centium | RCN-2S32-SC | 39 | 1.00 | 10 | 0.33 | 32/0 | | 21 |
| | 277 | | | VCN-2S32-SC | 39 | 1.00 | 10 | 0.15 | | | |
| | 120-277 | IS | Centium | ICN-2M32-MC | 31 | 0.88 | 10 | 0.26-0.11 | 0/-18 | A2 | 64 |
| | | | | ICN-2P32-LW-SC | 28 | 0.79 | 20 | 0.23-0.10 | | B | |
| | | | | ICN-2P32-N | 33 | 0.93 | 15 | 0.28-0.13 | | | |
| | | | | ICN-3P32-LW-SC | 32 | 0.88 | 20 | 0.27-0.18 | | | *65 |
| | | | | ICN-3P32-SC | 38 | 1.07 | 15 | 0.32-0.14 | | | |
| | | | Optanium | IOP-2P32-LW-SC | 27 | 0.80 | 10 | 0.23-0.10 | -20/-29 | | 64 |
| | | | | IOPA-2P32-LW-SC | | | | | | | |
| | | | | IOP-2P32-SC | 31 | 0.90 | 10 | 0.26-0.11 | | | |
| | | | | IOPA-2P32-SC | | | | | | | |
| | | | | IOP-2P32-HL-SC | 41 | 1.23 | 15 | 0.34-0.15 | | | |
| | | | | IOPA-2P32-HL-SC | | | | | | | |
| | | | | IOP-3P32-LW-SC | 31 | 0.87 | 20 | 0.26-0.12 | | | *65 |
| | | | | IOPA-3P32-LW-SC | | | | | | | |
| | | | | IOP-3P32-SC | 35 | 1.01 | 15 | 0.30-0.14 | | | |
| | | | | IOPA-3P32-SC | | | | | | | |
| | | | | IOP-3P32-HL-90C-SC | 47 | 1.37 | 10-30 | 0.39-0.20 | | | |
| | | | | IOPA-3P32-HL-SC | | | | | | | |
| | | PS | | IOP-2S32-LW-SC | 25 | 0.73 | 10 | 0.21-0.09 | 0/-18 | | 21 |
| | | | | IOP-2S32-SC | 29 | 0.90 | 15 | 0.24-0.11 | | | |
| | 347 | IS | Optanium | GOPA-2P32-LW-SC | 27 | 0.78 | 10 | 0.08 | -20/-29 | B | 64 |
| | | | | GOPA-2P32-SC | 30 | 0.88 | | 0.09 | | | |
| | | | | GOPA-3P32-LW-SC | 30 | 0.87 | | 0.09 | | | *65 |
| | | | | GOPA-3P32-SC | 34 | 1.01 | | 0.10 | | | |

‡ The above AmbiStar ballasts are normal power factor and labeled 'For Residential Use Only'

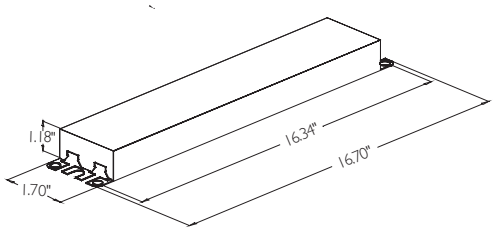



Fig. G

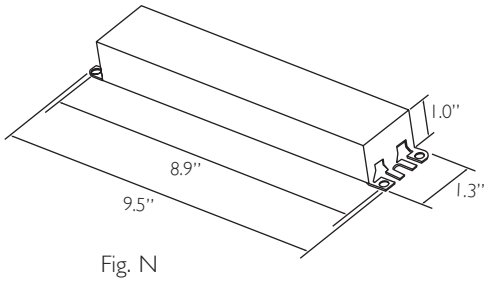



Fig. N

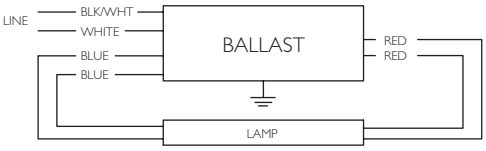
*Refer to page 1-41 for additional dimensions*
*Refer to page 1-43 and 1-44 for wiring diagrams*
*Refer to pages 9-24 to 9-28 for lead lengths and shipping data*

# For 17W Lamps

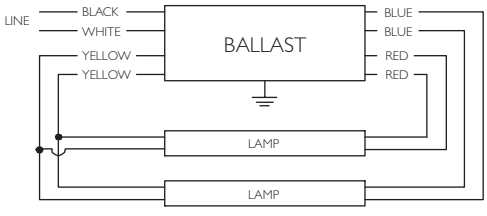
HIGH POWER FACTOR SOUND RATED A

| No. of Lamps | Input Volts | Lamp Starting Method | Ballast Family | Catalog Number | Input Power ANSI (Watts) | Ballast Factor | Max. THD % | Line Current (Amps) | Min. Starting Temp. (°F/°C) | Dim. | Wiring Dia. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **F17T8, FBO16T8 (17W)** | | | | | | | | | | | |
| 3 | 120 | IS | AmbiStar‡ | REB-4P32-SC | 44 | 0.81 | 135 | 0.87 | 0/-18 | B | *66 |
| | | PS | Centium | RCN-3S32-SC | 61 | 1.00 | 10 | 0.51 | 32/0 | | 30 |
| | 277 | | | VCN-3S32-SC | 61 | 1.00 | 10 | 0.22 | | | |
| | 120-277 | IS | Centium | ICN-3P32-LW-SC | 42 | 0.80 | 15 | 0.35-0.16 | 0/-18 | B | 65 |
| | | | | ICN-3P32-SC | 48 | 0.92 | 15 | 0.39-0.17 | | | |
| | | | | ICN-4P32-LW-SC | 43 | 0.85 | 15 | 0.36-0.16 | | | *66 |
| | | | | ICN-4P32-SC | 53 | 1.04 | 15 | 0.45-0.20 | | | |
| | | | Optanium | IOP-3P32-LW-SC | 40 | 0.81 | 10 | 0.34-0.15 | -20/-29 | | 65 |
| | | | | IOPA-3P32-LW-SC | | | | | | | |
| | | | | IOP-3P32-SC | 45 | 0.90 | 10 | 0.38-0.17 | | | |
| | | | | IOPA-3P32-SC | | | | | | | |
| | | | | IOP-3P32-HL-90C-SC | 59 | 1.22 | 10-15 | 0.49-0.22 | | | |
| | | | | IOPA-3P32-HL-SC | | | | | | | |
| | | | | IOP-4P32-LW-SC | 43 | 0.85 | 20 | 0.36-0.17 | | | *66 |
| | | | | IOPA-4P32-LW-SC | | | | | | | |
| | | | | IOP-4P32-SC | 49 | 1.00 | 15 | 0.41-0.18 | | | |
| | | | | IOPA-4P32-SC | | | | | | | |
| | | | | IOP-4P32-HL-90C-G | 69 | 1.28 | 10-15 | 0.58-0.26 | | G | |
| | | | | IOPA-4P32-HL | | | | | | A | |
| | | PS | | IOP-3PSP32-LW-SC | TBD | 0.71 | 10 | TBD | 0/-18 | B | TBD |
| | | | | IOP-3PSP-SC | 47 | 0.90 | 10 | 0.39-0.17 | | | |
| | | | | IOP-3S32-LW-SC | 37 | 0.72 | 10 | 0.31-0.14 | | | 30 |
| | | | | IOP-3S32-SC | 43 | 0.89 | 10 | 0.36-0.16 | | | |
| | 347 | IS | Optanium | GOPA-3P32-LW-SC | 39 | 0.81 | 10 | 0.12 | -20/-29 | B | 65 |
| | | | | GOPA-3P32-SC | 44 | 0.92 | | 0.13 | | | |
| | | | | GOPA-4P32-LW-SC | 45 | 0.82 | | 0.13 | | | *66 |
| | | | | GOPA-4P32-SC | 50 | 1.00 | | 0.15 | | | |

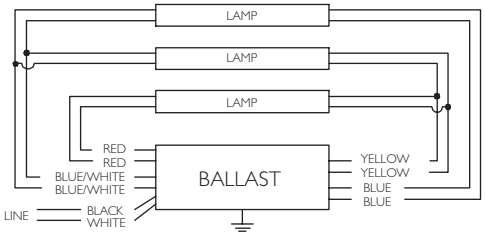
‡ The above AmbiStar ballasts are normal power factor and labeled 'For Residential Use Only'




Diag. 20




Diag. 21




Diag. 30

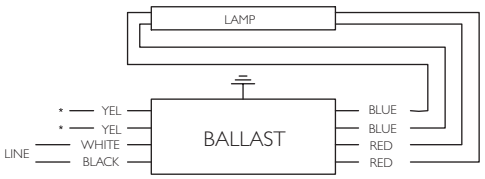
*Refer to page 1-41 and 1-42 for dimensions*
*Refer to page 1-44 for additional wiring diagrams*
*Refer to pages 9-24 to 9-28 for lead lengths and shipping data*

# For 17W Lamps

HIGH POWER FACTOR SOUND RATED A

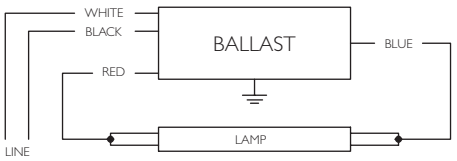
| No. of Lamps | Input Volts | Lamp Starting Method | Ballast Family | Catalog Number | Input Power ANSI (Watts) | Ballast Factor | Max. THD % | Line Current (Amps) | Min. Starting Temp. (°F/°C) | Dim. | Wiring Dia. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **F17T8, FBO16T8 (17W)** | | | | | | | | | | | |
| 4 | 120 | IS | AmbiStar‡ | REB-4P32-SC | 52 | 0.82 | 135 | 1.00 | 0/-18 | B | 66 |
| | 120 | PS | Centium | RCN-4S32-SC | 79 | 1.00 | 10 | 0.67 | 32/0 | B | 138 |
| | 277 | PS | Centium | VCN-4S32-SC | 79 | 1.00 | 10 | 0.29 | 32/0 | B | 138 |
| | 120-277 | IS | Centium | ICN-4P32-LW-SC | 53 | 0.79 | 15 | 0.44-0.19 | 0/-18 | B | 66 |
| | 120-277 | IS | Centium | ICN-4P32-SC | 64 | 0.93 | 10 | 0.54-0.23 | 0/-18 | B | 66 |
| | 120-277 | IS | Optanium | IOP-4P32-LW-SC | 53 | 0.81 | 10 | 0.45-0.20 | -20/-29 | B | 66 |
| | 120-277 | IS | Optanium | IOPA-4P32-LW-SC | 53 | 0.81 | 10 | 0.45-0.20 | -20/-29 | B | 66 |
| | 120-277 | IS | Optanium | IOP-4P32-SC | 58 | 0.90 | 10 | 0.49-0.22 | -20/-29 | B | 66 |
| | 120-277 | IS | Optanium | IOPA-4P32-SC | 58 | 0.90 | 10 | 0.49-0.22 | -20/-29 | B | 66 |
| | 120-277 | IS | Optanium | IOP-4P32-HL-90C-G | 79 | 1.22 | 10-15 | 0.66-0.29 | -20/-29 | G | 66 |
| | 120-277 | IS | Optanium | IOPA-4P32-HL | 79 | 1.22 | 10-15 | 0.66-0.29 | -20/-29 | A | 66 |
| | 120-277 | PS | Optanium | IOP-4PSP32-LW-SC | TBD | 0.71 | 10 | TBD | 0/-18 | B | 177 |
| | 120-277 | PS | Optanium | IOP-4S32-LW-SC | 48 | 0.72 | 10 | 0.40-0.18 | 0/-18 | B | 138 |
| | 120-277 | PS | Optanium | IOP-4PSP32-SC | 60 | 0.90 | 10 | 0.50-0.22 | 0/-18 | B | 177 |
| | 120-277 | PS | Optanium | IOP-4S32-SC | 57 | 0.89 | 10 | 0.47-0.21 | 0/-18 | B | 138 |
| | 347 | IS | Optanium | GOPA-4P32-LW-SC | 53 | 0.79 | 10 | 0.16 | -20/-29 | B | 66 |
| | 347 | IS | Optanium | GOPA-4P32-SC | 60 | 0.93 | 10 | 0.17 | -20/-29 | B | 66 |

‡ The above AmbiStar ballasts are normal power factor and labeled 'For Residential Use Only'

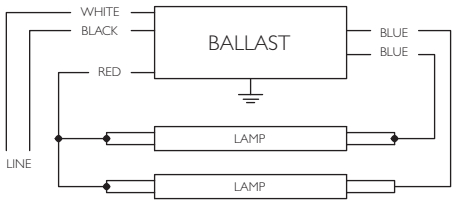



*FOR SINGLE LAMP OPERATION, INSULATE YELLOW LEADS INDIVIDUALLY FOR 600V

Diag. 39

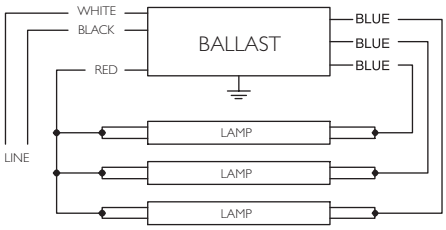



Diag. 63



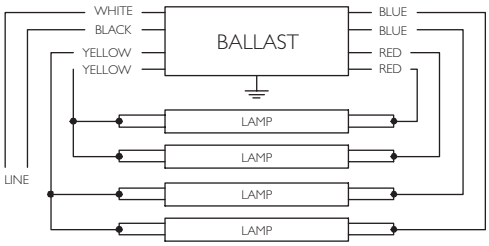

*FOR SINGLE LAMP OPERATION, INSULATE UNUSED BLUE LEAD FOR 600V

Diag. 64



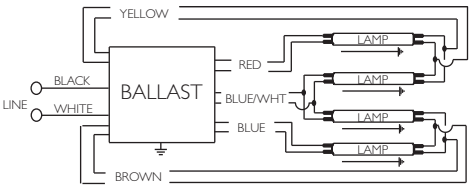

*FOR TWO LAMP OPERATION, INSULATE UNUSED BLUE LEADS INDIVIDUALLY FOR 600V

Diag. 65

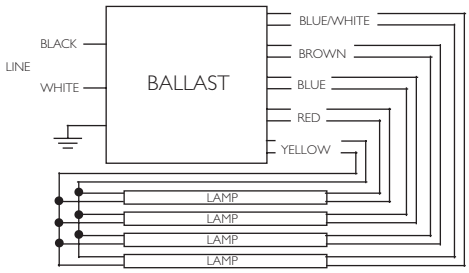



*FOR THREE LAMP OPERATION, INSULATE UNUSED BLUE LEADS INDIVIDUALLY FOR 600V

Diag. 66




Diag. 138




Diag. 177

*Refer to page 1-41 and 1-42 for dimensions*
*Refer to page 1-43 for additional wiring diagrams*
*Refer to pages 9-24 to 9-28 for lead lengths and shipping data*

# For 25W-36" Lamps

HIGH POWER FACTOR SOUND RATED A

| No. of Lamps | Input Volts | Lamp Starting Method | Ballast Family | Catalog Number | Input Power ANSI (Watts) | Ballast Factor | Max. THD % | Line Current (Amps) | Min. Starting Temp. (°F/°C) | Dim. | Wiring Dia. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **F25T8, FBO24T8 (25W - 36")** | | | | | | | | | | | |
| 1 | 120 | IS | AmbiStar‡ | REB-2P32-SC | 26 | 1.00 | 150 | 0.39 | 0/-18 | B | *64 |
| | | PS | Centium | RCN-1S32-SC | 28 | 0.95 | 10 | 0.24 | 32/0 | | 20 |
| | 277 | | | VCN-1S32-SC | 28 | 0.95 | 10 | 0.10 | | | |
| | 120-277 | IS | Centium | ICN-132-MC | 23 | 0.88 | 15 | 0.19-0.09 | 0/-18 | A2 | 63 |
| | | | | ICN-1P32-LW-SC | 22 | 0.80 | 15 | 0.18-0.08 | | B | |
| | | | | ICN-1P32-N | 26 | 0.91 | 10 | 0.22-0.10 | | | |
| | | | | ICN-2P32-LW-SC | 25 | 0.88 | 20 | 0.21-0.10 | | | *64 |
| | | | | ICN-2P32-N | 29 | 1.06 | 15 | 0.24-0.11 | | | |
| | | | Optanium | IOP-1P32-LW-SC | 21 | 0.78 | 10 | 0.17-0.08 | -20/-29 | | 63 |
| | | | | IOPA-1P32-LW-SC | | | | | | | |
| | | | | IOP-1P32-SC | 23 | 0.88 | 10 | 0.20-0.09 | | | |
| | | | | IOPA-1P32-SC | | | | | | | |
| | | | | IOP-1P32-HL-SC | 30 | 1.22 | 10 | 0.26-0.11 | | | |
| | | | | IOPA-1P32-HL-SC | | | | | | | |
| | | | | IOP-2P32-LW-SC | 24 | 0.90 | 10 | 0.20-0.09 | | | *64 |
| | | | | IOPA-2P32-LW-SC | | | | | | | |
| | | | | IOP-2P32-SC | 28 | 1.05 | 10 | 0.23-0.10 | | | |
| | | | | IOPA-2P32-SC | | | | | | | |
| | | | | IOP-2P32-HL-SC | 35 | 1.40 | 20 | 0.29-0.13 | | | |
| | | | | IOPA-2P32-HL-SC | | | | | | | |
| | | PS | | IOP-1S32-LW-SC | 20 | 0.74 | 10 | 0.16-0.07 | 0/-18 | | 20 |
| | | | | IOP-1S32-SC | 22 | 0.92 | 10 | 0.19-0.08 | | | |
| | | | | IOP-2S32-LW-SC | 20 | 0.73 | 15 | 0.17-0.08 | | | 39 |
| | | | | IOP-2S32-SC | 23 | 0.90 | 15 | 0.19-0.09 | | | |
| | 347 | IS | Optanium | GOPA-1P32-LW-SC | 20 | 0.80 | 10 | 0.07 | -20/-29 | | 63 |
| | | | | GOPA-1P32-SC | 22 | 0.91 | | 0.07 | | | |
| | | | | GOPA-2P32-LW-SC | 24 | 0.88 | | 0.08 | | | *64 |
| | | | | GOPA-2P32-SC | 27 | 1.05 | | 0.08 | | | |

‡ The above AmbiStar ballasts are normal power factor and labeled 'For Residential Use Only'

*Refer to page 1-41 and 1-42 for dimensions*
*Refer to pages 1-47 & 1-48 for wiring diagrams*
*Refer to pages 9-24 to 9-28 for lead lengths and shipping data*

# For 25W-36" Lamps

HIGH POWER FACTOR SOUND RATED A

| No. of Lamps | Input Volts | Lamp Starting Method | Ballast Family | Catalog Number | Input Power ANSI (Watts) | Ballast Factor | Max. THD % | Line Current (Amps) | Min. Starting Temp. (°F/°C) | Dim. | Wiring Dia. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **F25T8, FBO24T8 (25W - 36")** | | | | | | | | | | | |
| 2 | 120 | IS | AmbiStar‡ | REB-2P32-SC | 43 | 0.89 | 130 | 0.61 | 0/-18 | B | 64 |
| | | PS | Centium | RCN-2S32-SC | 53 | 0.95 | 10 | 0.45 | 32/0 | | 21 |
| | 277 | | | VCN-2S32-SC | 53 | 0.95 | 10 | 0.20 | | | |
| | 120-277 | IS | Centium | ICN-2M32-MC | 44 | 0.88 | 15 | 0.37-0.16 | 0/-18 | A2 | 64 |
| | | | | ICN-2P32-LW-SC | 40 | 0.77 | 15 | 0.34-0.14 | | B | |
| | | | | ICN-2P32-N | 48 | 0.91 | 10 | 0.40-0.18 | | | |
| | | | | ICN-3P32-LW-SC | 44 | 0.85 | 15 | 0.37-0.16 | | | *65 |
| | | | | ICN-3P32-SC | 51 | 1.03 | 15 | 0.43-0.19 | | | |
| | | | Optanium | IOP-2P32-LW-SC | 39 | 0.78 | 10 | 0.32-0.14 | -20/-29 | | 64 |
| | | | | IOPA-2P32-LW-SC | | | | | | | |
| | | | | IOP-2P32-SC | 43 | 0.88 | 10 | 0.37-0.16 | | | |
| | | | | IOPA-2P32-SC | | | | | | | |
| | | | | IOP-2P32-HL-SC | 57 | 1.20 | 10 | 0.48-0.21 | | | |
| | | | | IOPA-2P32-HL-SC | | | | | | | |
| | | | | IOP-3P32-LW-SC | 43 | 0.86 | 10 | 0.36-0.16 | | | *65 |
| | | | | IOPA-3P32-LW-SC | | | | | | | |
| | | | | IOP-3P32-SC | 49 | 1.00 | 10 | 0.42-0.18 | | | |
| | | | | IOPA-3P32-SC | | | | | | | |
| | | | | IOP-3P32-HL-90C-SC | 64 | 1.32 | 10-15 | 0.54-0.24 | | | |
| | | | | IOPA-3P32-HL-SC | | | | | | | |
| | | PS | | IOP-2S32-LW-SC | 36 | 0.71 | 10 | 0.30-0.13 | 0/-18 | | 21 |
| | | | | IOP-2S32-SC | 43 | 0.89 | 10 | 0.36-0.16 | | | |
| | 347 | IS | Optanium | GOPA-2P32-LW-SC | 38 | 0.78 | 10 | 0.12 | -20/-29 | B | 64 |
| | | | | GOPA-2P32-SC | 44 | 0.88 | | 0.13 | | | |
| | | | | GOPA-3P32-LW-SC | 42 | 0.85 | | 0.12 | | | *65 |
| | | | | GOPA-3P32-SC | 48 | 1.01 | | 0.14 | | | |

‡ The above AmbiStar ballasts are normal power factor and labeled 'For Residential Use Only'

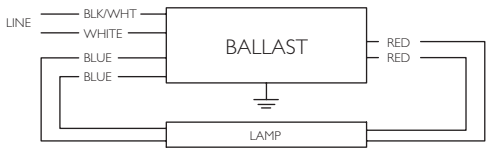
*Refer to page 1-41 and 1-42 for dimensions*
*Refer to pages 1-47 and 1-48 for wiring diagrams*
*Refer to pages 9-24 to 9-28 for lead lengths and shipping data*

# For 25W-36" Lamps

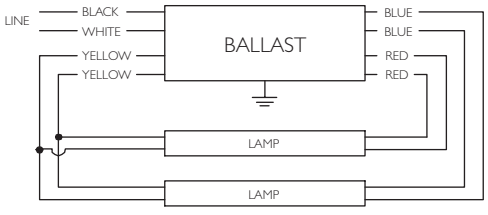
HIGH POWER FACTOR SOUND RATED A

| No. of Lamps | Input Volts | Lamp Starting Method | Ballast Family | Catalog Number | Input Power ANSI (Watts) | Ballast Factor | Max. THD % | Line Current (Amps) | Min. Starting Temp. (°F/°C) | Dim. | Wiring Dia. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **F25T8, FBO24T8 (25W - 36")** | | | | | | | | | | | |
| 3 | 120 | IS | AmbiStar‡ | REB-4P32-SC | 63 | 0.86 | 125 | 1.14 | 0/-18 | B | *66 |
| | | PS | Centium | RCN-3S32-SC | 77 | 0.95 | 10 | 0.65 | 32/0 | | 30 |
| | 277 | | | VCN-3S32-SC | 77 | 0.95 | 10 | 0.28 | | | |
| | 120-277 | IS | Centium | ICN-3P32-LW-SC | 58 | 0.79 | 15 | 0.49-0.21 | 0/-18 | | 65 |
| | | | | ICN-3P32-SC | 67 | 0.90 | 10 | 0.56-0.24 | | | |
| | | | | ICN-4P32-LW-SC | 62 | 0.85 | 10 | 0.52-0.22 | | | *66 |
| | | | | ICN-4P32-SC | 74 | 1.01 | 10 | 0.62-0.27 | | | |
| | | | Optanium | IOP-3P32-LW-SC | 57 | 0.79 | 10 | 0.48-0.21 | -20/-29 | B | 65 |
| | | | | IOPA-3P32-LW-SC | | | | | | | |
| | | | | IOP-3P32-SC | 64 | 0.88 | 10 | 0.54-0.24 | | | |
| | | | | IOPA-3P32-SC | | | | | | | |
| | | | | IOP-3P32-HL-90C-SC | 84 | 1.20 | 10 | 0.70-0.31 | | | |
| | | | | IOPA-3P32-HL-SC | | | | | | | |
| | | | | IOP-4P32-LW-SC | 62 | 0.85 | 10 | 0.52-0.22 | | | *66 |
| | | | | IOPA-4P32-LW-SC | | | | | | | |
| | | | | IOP-4P32-SC | 71 | 0.97 | 10 | 0.59-0.26 | | | |
| | | | | IOPA-4P32-SC | | | | | | | |
| | | | | IOP-4P32-HL-90C-G | 94 | 1.28 | 10 | 0.80-0.35 | | G | |
| | | | | IOPA-4P32-HL-G | | | | | | A | |
| | | PS | | IOP-3PSP32-LW-SC | TBD | 0.71 | 10 | TBD | 0/-18 | B | TBD |
| | | | | IOP-3PSP32-SC | 66 | 0.89 | 10 | 0.55-0.24 | | | |
| | | | | IOP-3S32-LW-SC | 54 | 0.71 | 10 | 0.45-0.20 | | | 30 |
| | | | | IOP-3S32-SC | 64 | 0.88 | 10 | 0.53-0.23 | | | |
| | 347 | IS | Optanium | GOPA-3P32-LW-SC | 56 | 0.77 | 10 | 0.16 | -20/-29 | B | 65 |
| | | | | GOPA-3P32-SC | 63 | 0.90 | | 0.18 | | | |
| | | | | GOPA-4P32-LW-SC | 62 | 0.81 | | 0.18 | | | *66 |
| | | | | GOPA-4P32-SC | 70 | 0.96 | | 0.20 | | | |

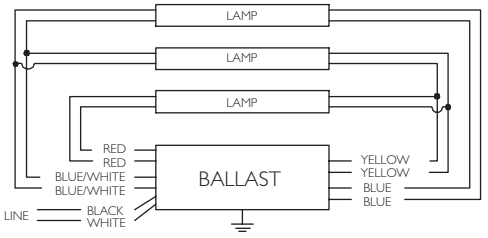
‡ The above AmbiStar ballasts are normal power factor and labeled 'For Residential Use Only'




Diag. 20




Diag. 21




Diag. 30

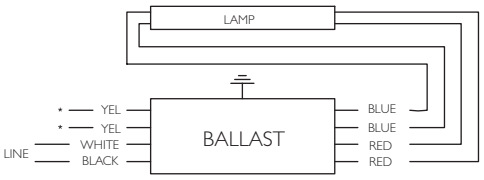
*Refer to page 1-41 and 1-42 for dimensions*
*Refer to page 1-48 for additional wiring diagrams*
*Refer to pages 9-24 to 9-28 for lead lengths and shipping data*

# For 25W-36" Lamps

HIGH POWER FACTOR SOUND RATED A

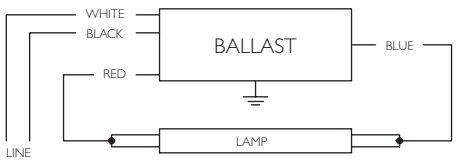
| No. of Lamps | Input Volts | Lamp Starting Method | Ballast Family | Catalog Number | Input Power ANSI (Watts) | Ballast Factor | Max. THD % | Line Current (Amps) | Min. Starting Temp. (°F/°C) | Dim. | Wiring Dia. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **F25T8, FBO24T8 (25W - 36")** | | | | | | | | | | | |
| 4 | 120 | IS | AmbiStar‡ | REB-4P32-SC | 77 | 0.81 | 125 | 1.31 | 0/-18 | B | 66 |
| | | PS | Centium | RCN-4S32-SC | 101 | 0.95 | 10 | 0.84 | 32/0 | | 138 |
| | 277 | | | VCN-4S32-SC | 101 | 0.95 | 10 | 0.36 | | | |
| | 120-277 | IS | Centium | ICN-4P32-LW-SC | 75 | 0.79 | 10 | 0.63-0.27 | 0/-18 | B | 66 |
| | | | | ICN-4P32-SC | 89 | 0.91 | 10 | 0.74-0.32 | | | |
| | | | Optanium | IOP-4P32-LW-SC | 76 | 0.79 | 10 | 0.64-0.27 | -20/-29 | | |
| | | | | IOPA-4P32-LW-SC | | | | | | | |
| | | | | IOP-4P32-SC | 85 | 0.88 | 10 | 0.72-0.31 | | | |
| | | | | IOPA-4P32-SC | | | | | | | |
| | | | | IOP-4P32-HL-90C-G | 113 | 1.20 | 10 | 0.96-0.41 | | G | |
| | | | | IOPA-4P32-HL-G | | | | | | A | |
| | | PS | | IOP-4PSP32-LW-SC | TBD | 0.71 | 10 | TBD | 0/-18 | B | 177 |
| | | | | IOP-4S32-LW-SC | 69 | 0.72 | 10 | 0.58-0.25 | | | 138 |
| | | | | IOP-4PSP32-SC | 85 | 0.90 | 10 | 0.71-0.31 | | | 177 |
| | | | | IOP-4S32-SC | 85 | 0.88 | 10 | 0.72-0.31 | | | 138 |
| | 347 | IS | Optanium | GOPA-4P32-LW-SC | 74 | 0.79 | 10 | 0.22 | -20/-29 | B | 66 |
| | | | | GOPA-4P32-SC | 86 | 0.91 | | 0.25 | | | |

‡ The above AmbiStar ballasts are normal power factor and labeled 'For Residential Use Only'

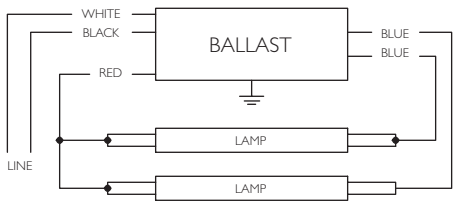



*FOR SINGLE LAMP OPERATION, INSULATE YELLOW LEADS INDIVIDUALLY FOR 600V

Diag. 39

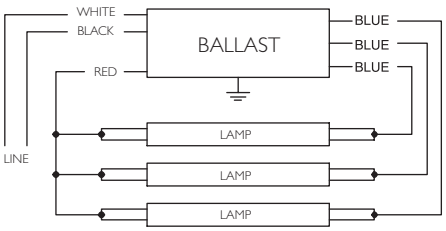



Diag. 63



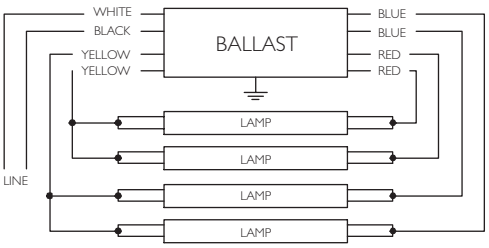

*FOR SINGLE LAMP OPERATION, INSULATE UNUSED BLUE LEAD FOR 600V

Diag. 64



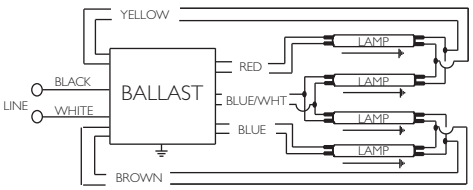

*FOR TWO LAMP OPERATION, INSULATE UNUSED BLUE LEADS INDIVIDUALLY FOR 600V

Diag. 65

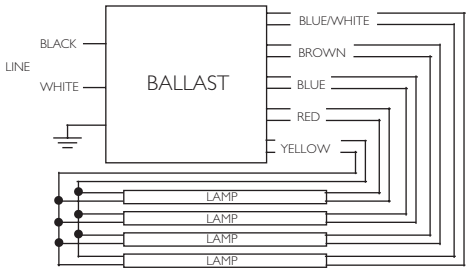



*FOR THREE LAMP OPERATION, INSULATE UNUSED BLUE LEADS INDIVIDUALLY FOR 600V

Diag. 66




Diag. 138




Diag. 177

*Refer to page 1-41 and 1-42 for dimensions*
*Refer to page 1-47 for additional wiring diagrams*
*Refer to pages 9-24 to 9-28 for lead lengths and shipping data*

# For 25W-48" Lamps

HIGH POWER FACTOR SOUND RATED A

| No. of Lamps | Input Volts | Lamp Starting Method | Ballast Family | Catalog Number | Input Power ANSI (Watts) | Ballast Factor | Max. THD % | Line Current (Amps) | Min. Starting Temp. (°F/°C) | Dim. | Wiring Dia. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **F32T8/ES (25W - 48")** | | | | | | | | | | | |
| 1 | 120-277 | IS | Optanium | IOP-1P32-LW-SC | 21 | 0.77 | 10 | 0.17-0.07 | 60/16 | B | 63 |
| | | | | IOPA-1P32-LW-SC | | | | | | | |
| | | | | IOP-1P32-SC | 23 | 0.87 | 10 | 0.20-0.09 | | | |
| | | | | IOPA-1P32-SC | | | | | | | |
| | | | | IOP-1P32-HL-SC | 32 | 1.21 | 10 | 0.26-0.12 | | | |
| | | | | IOPA-1P32-HL-SC | | | | | | | |
| | | | | IOP-2P32-LW-SC | 24 | 0.90 | 10 | 0.20-0.09 | | | *64 |
| | | | | IOPA-2P32-LW-SC | | | | | | | |
| | | | | IOP-2P32-SC | 27 | 1.05 | 10 | 0.23-0.10 | | | |
| | | | | IOPA-2P32-SC | | | | | | | |
| | | | | IOP-2P32-HL-SC | 37 | 1.40 | 15 | 0.31-0.14 | | | |
| | | | | IOPA-2P32-HL-SC | | | | | | | |
| | | PS | | IOP-1S32-LW-SC | 21 | 0.72 | 10 | 0.17-0.07 | | | 20 |
| | | | | IOP-1S32-SC | 24 | 0.88 | 10 | 0.20-0.08 | | | |
| | | | | IOP-2S32-LW-SC | 21 | 0.73 | 10 | 0.17-0.08 | | | 39 |
| | | | | IOP-2S32-SC | 24 | 0.89 | 10-15 | 0.20-0.09 | | | |
| | 347 | IS | Optanium | GOPA-1P32-LW-SC | 21 | 0.77 | 10 | 0.06 | | | 63 |
| | | | | GOPA-1P32-SC | 23 | 0.88 | | 0.06 | | | |
| | | | | GOPA-2P32-LW-SC | 25 | 0.88 | | 0.07 | | | |
| | | | | GOPA-2P32-SC | 27 | 1.04 | | 0.09 | | | *64 |
| 2 | 120-277 | IS | Optanium | IOP-2P32-LW-SC | 38 | 0.77 | 10 | 0.32-0.14 | 60/16 | B | 64 |
| | | | | IOPA-2P32-LW-SC | | | | | | | |
| | | | | IOP-2P32-SC | 44-43 | 0.87 | 10 | 0.37-0.06 | | | |
| | | | | IOPA-2P32-SC | | | | | | | |
| | | | | IOP-2P32-HL-SC | 60 | 1.19 | 10 | 0.50-0.22 | | | |
| | | | | IOPA-2P32-HL-SC | | | | | | | |
| | | | | IOP-3P32-LW-SC | 43 | 0.86 | 10 | 0.36-0.16 | | | *65 |
| | | | | IOPA-3P32-LW-SC | | | | | | | |
| | | | | IOP-3P32-SC | 49 | 1.00 | 10 | 0.42-0.18 | | | |
| | | | | IOPA-3P32-SC | | | | | | | |
| | | | | IOP-3P32-HL-90C-SC | 70 | 1.32 | 10-20 | 0.59-0.27 | | | |
| | | | | IOPA-3P32-HL-SC | | | | | | | |
| | | PS | | IOP-2S32-LW-SC | 39-38 | 0.71 | 10 | 0.32-0.14 | | | 21 |
| | | | | IOP-2S32-SC | 45-44 | 0.88 | 10 | 0.38-0.16 | | | |
| | 347 | IS | Optanium | GOPA-2P32-LW-SC | 39 | 0.78 | 10 | 0.12 | | | 63 |
| | | | | GOPA-2P32-SC | 44 | 0.88 | | 0.13 | | | |
| | | | | GOPA-3P32-LW-SC | 43 | 0.86 | | 0.13 | | | *64 |
| | | | | GOPA-3P32-SC | 48 | 1.00 | | 0.14 | | | |

*Refer to page 1-41 and 1-42 for dimensions*
*Refer to page 1-47 and 1-48 for wiring diagrams*
*Refer to pages 9-24 to 9-28 for lead lengths and shipping data*

# For 25W-48" Lamps

HIGH POWER FACTOR SOUND RATED A

| No. of Lamps | Input Volts | Lamp Starting Method | Ballast Family | Catalog Number | Input Power ANSI (Watts) | Ballast Factor | Max. THD % | Line Current (Amps) | Min. Starting Temp. (°F/°C) | Dim. | Wiring Dia. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **F32T8/ES (25W - 48")** | | | | | | | | | | | |
| 3 | 120-277 | IS | Optanium | IOP-3P32-LW-SC | 58-57 | 0.77 | 10 | 0.49-0.21 | 60/16 | B | 65 |
| | | | | IOPA-3P32-LW-SC | | | | | | | |
| | | | | IOP-3P32-SC | 65-64 | 0.87 | 10 | 0.55-0.24 | | | |
| | | | | IOPA-3P32-SC | | | | | | | |
| | | | | IOP-3P32-HL-90C-SC | 95-93 | 1.20 | 10 | 0.79-0.35 | | | |
| | | | | IOPA-3P32-HL-SC | | | | | | | |
| | | | | IOP-4P32-LW-SC | 62-61 | 0.85 | 10 | 0.52-0.22 | | | *66 |
| | | | | IOPA-4P32-LW-SC | | | | | | | |
| | | | | IOP-4P32-SC | 70-69 | 0.97 | 10 | 0.59-0.26 | | | |
| | | | | IOPA-4P32-SC | | | | | | | |
| | | | | IOP-4P32-HL-90C-G | 101-100 | 1.27 | 10 | 0.85-0.37 | | G | |
| | | | | IOPA-4P32-HL | | | | | | A | |
| | | PS | | IOP-3PSP32-LW-SC | TBD | 0.71 | 10 | TBD | | B | TBD |
| | | | | IOP-3PSP32-SC | 70 | 0.88 | 10 | 0.59-0.26 | | | |
| | | | | IOP-3S32-LW-SC | 57-56 | 0.71 | 10 | 0.48-0.21 | | | 30 |
| | | | | IOP-3S32-SC | 67-66 | 0.89 | 10 | 0.56-0.25 | | | |
| | 347 | IS | Optanium | GOPA-3P32-LW-SC | 58 | 0.77 | 10 | 0.17 | 60/16 | B | 65 |
| | | | | GOPA-3P32-SC | 64 | 0.88 | | 0.19 | | | |
| | | | | GOPA-4P32-LW-SC | 65 | 0.81 | | 0.19 | | | *66 |
| | | | | GOPA-4P32-SC | 74 | 0.95 | | 0.21 | | | |
| 4 | 120-277 | IS | Optanium | IOP-4P32-LW-SC | 77-75 | 0.77 | 10 | 0.65-0.28 | 60/16 | B | 66 |
| | | | | IOPA-4P32-LW-SC | | | | | | | |
| | | | | IOP-4P32-SC | 87-85 | 0.87 | 10 | 0.73-0.31 | | | |
| | | | | IOPA-4P32-SC | | | | | | | |
| | | | | IOP-4P32-HL-90C-G | 124-122 | 1.19 | 10 | 1.05-0.45 | | G | |
| | | | | IOPA-4P32-HL | | | | | | A | |
| | | PS | | IOP-4PSP32-LW-SC | TBD | 0.71 | 10 | TBD | | B | 177 |
| | | | | IOP-4S32-LW-SC | 74-73 | 0.71 | 10 | 0.62-0.27 | | | 138 |
| | | | | IOP-4PSP32-SC | 90 | 0.88 | 10 | 0.75-0.33 | | | 177 |
| | | | | IOP-4S32-SC | 87-85 | 0.87 | 10 | 0.73-0.31 | | | 138 |
| | 347 | IS | Optanium | GOPA-4P32-LW-SC | 78 | 0.78 | 10 | 0.22 | 60/16 | B | 66 |
| | | | | GOPA-4P32-SC | 89 | 0.88 | | 0.26 | | | |

*Refer to page 1-41 and 1-42 for dimensions*
*Refer to page 1-47 and 1-48 for wiring diagrams*
*Refer to pages 9-24 to 9-28 for lead lengths and shipping data*

# For 28W-48" Lamps

HIGH POWER FACTOR SOUND RATED A

| No. of Lamps | Input Volts | Lamp Starting Method | Ballast Family | Catalog Number | Input Power ANSI (Watts) | Ballast Factor | Max. THD % | Line Current (Amps) | Min. Starting Temp. (°F/°C) | Dim. | Wiring Dia. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| F32T8/ES (28W - 48") | | | | | | | | | | | |
| 1 | 120-277 | IS | Optanium | IOP-1P32-LW-SC | 22 | 0.77 | 10 | 0.19-0.08 | 60/16 | B | 63 |
| | | | | IOPA-1P32-LW-SC | | | | | | | |
| | | | | IOP-1P32-SC | 25 | 0.87 | 10 | 0.22-0.10 | | | |
| | | | | IOPA-1P32-SC | | | | | | | |
| | | | | IOP-1P32-HL-SC | 33 | 1.21 | 10 | 0.28-0.12 | | | |
| | | | | IOPA-1P32-HL-SC | | | | | | | |
| | | | | IOP-2P32-LW-SC | 26 | 0.90 | 10 | 0.22-0.10 | | | *64 |
| | | | | IOPA-2P32-LW-SC | | | | | | | |
| | | | | IOP-2P32-SC | 31 | 1.05 | 10 | 0.26-0.11 | | | |
| | | | | IOPA-2P32-SC | | | | | | | |
| | | | | IOP-2P32-HL-SC | 39 | 1.38 | 10 | 0.33-0.15 | | | |
| | | | | IOPA-2P32-HL-SC | | | | | | | |
| | | PS | | IOP-1S32-LW-SC | 21 | 0.72 | 10 | 0.18-0.07 | | | 20 |
| | | | | IOP-1S32-SC | 25 | 0.88 | 10 | 0.20-0.09 | | | |
| | | | | IOP-2S32-LW-SC | 22 | 0.73 | 10 | 0.18-0.08 | | | 39 |
| | | | | IOP-2S32-SC | 26 | 0.88 | 10-15 | 0.21-0.09 | | | |
| | 347 | IS | Optanium | GOPA-1P32-LW-SC | 22 | 0.77 | 10 | 0.07 | 60/16 | | 63 |
| | | | | GOPA-1P32-SC | 25 | 0.88 | | 0.07 | | | |
| | | | | GOPA-2P32-LW-SC | 26 | 0.88 | | 0.08 | | | *64 |
| | | | | GOPA-2P32-SC | 29 | 1.04 | | 0.09 | | | |
| 2 | 120-277 | IS | Optanium | IOP-2P32-LW-SC | 42 | 0.77 | 10 | 0.35-0.15 | 60/16 | B | 64 |
| | | | | IOPA-2P32-LW-SC | | | | | | | |
| | | | | IOP-2P32-SC | 48-47 | 0.87 | 10 | 0.41-0.18 | | | |
| | | | | IOPA-2P32-SC | | | | | | | |
| | | | | IOP-2P32-HL-SC | 65-64 | 1.19 | 10 | 0.55-0.24 | | | |
| | | | | IOPA-2P32-HL-SC | | | | | | | |
| | | | | IOP-3P32-LW-SC | 47 | 0.86 | 10 | 0.40-0.18 | | | *65 |
| | | | | IOPA-3P32-LW-SC | | | | | | | |
| | | | | IOP-3P32-SC | 55-54 | 1.00 | 10 | 0.46-0.20 | | | |
| | | | | IOPA-3P32-SC | | | | | | | |
| | | | | IOP-3P32-HL-90C-SC | 74-73 | 1.31 | 10-15 | 0.62-0.27 | | | |
| | | | | IOPA-3P32-HL-SC | | | | | | | |
| | | PS | | IOP-2S32-LW-SC | 41-40 | 0.71 | 10 | 0.34-0.15 | | | 21 |
| | | | | IOP-2S32-SC | 49-48 | 0.88 | 10 | 0.41-0.18 | | | |
| | 347 | IS | Optanium | GOPA-2P32-LW-SC | 42 | 0.78 | 10 | 0.12 | 60/16 | B | 64 |
| | | | | GOPA-2P32-SC | 47 | 0.88 | | 0.14 | | | |
| | | | | GOPA-3P32-LW-SC | 46 | 0.77 | | 0.13 | | | *65 |
| | | | | GOPA-3P32-SC | 52 | 1.00 | | 0.16 | | | |

*Refer to page 1-41 and 1-42 for dimensions*
*Refer to page 1-47 and 1-48 for wiring diagrams*
*Refer to pages 9-24 to 9-28 for lead lengths and shipping data*

# For 28W-48" Lamps

HIGH POWER FACTOR SOUND RATED A

| No. of Lamps | Input Volts | Lamp Starting Method | Ballast Family | Catalog Number | Input Power ANSI (Watts) | Ballast Factor | Max. THD % | Line Current (Amps) | Min. Starting Temp. (°F/°C) | Dim. | Wiring Dia. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **F32T8/ES (28W - 48")** | | | | | | | | | | | |
| 3 | 120-277 | IS | Optanium | IOP-3P32-LW-SC | 64-63 | 0.77 | 10 | 0.54-0.23 | 60/16 | B | 65 |
| | | | | IOPA-3P32-LW-SC | | | | | | | |
| | | | | IOP-3P32-SC | 72-71 | 0.87 | 10 | 0.61-0.26 | | | |
| | | | | IOPA-3P32-SC | | | | | | | |
| | | | | IOP-3P32-HL-90C-SC | 99-97 | 1.20 | 10 | 0.83-0.36 | | | |
| | | | | IOPA-3P32-HL-SC | | | | | | | |
| | | | | IOP-4P32-LW-SC | 69-68 | 0.85 | 10 | 0.58-0.25 | | | *66 |
| | | | | IOPA-4P32-LW-SC | | | | | | | |
| | | | | IOP-4P32-SC | 79-78 | 0.97 | 10 | 0.66-0.28 | | | |
| | | | | IOPA-4P32-SC | | | | | | | |
| | | | | IOP-4P32-HL-90C-G | 107-106 | 1.24 | 10 | 0.90-0.39 | | G | |
| | | | | IOPA-4P32-HL | | | | | | | |
| | | PS | | IOP-3PSP32-LW-SC | TBD | 0.71 | 10 | TBD | | B | TBD |
| | | | | IOP-3PSP32-SC | 75 | 0.88 | 10 | 0.62-0.27 | | | 30 |
| | | | | IOP-3S32-LW-SC | 62-61 | 0.71 | 10 | 0.51-0.22 | | | |
| | | | | IOP-3S32-SC | 72-71 | 0.89 | 10 | 0.60-0.26 | | | |
| | 347 | IS | Optanium | GOPA-3P32-LW-SC | 62 | 0.77 | 10 | 0.18 | 60/16 | B | 65 |
| | | | | GOPA-3P32-SC | 70 | 0.88 | | 0.20 | | | |
| | | | | GOPA-4P32-LW-SC | 70 | 0.81 | | 0.20 | | | *66 |
| | | | | GOPA-4P32-SC | 79 | 0.97 | | 0.23 | | | |
| 4 | 120-277 | IS | Optanium | IOP-4P32-LW-SC | 84-82 | 0.77 | 10 | 0.71-0.30 | 60/16 | B | 66 |
| | | | | IOPA-4P32-LW-SC | | | | | | | |
| | | | | IOP-4P32-SC | 96-94 | 0.87 | 10 | 0.81-0.35 | | | |
| | | | | IOPA-4P32-SC | | | | | | | |
| | | | | IOP-4P32-HL-90C-G | 130-129 | 1.19 | 10 | 1.10-0.47 | | G | |
| | | | | IOPA-4P32-HL | | | | | | A | |
| | | PS | | IOP-4PSP32-LW-SC | TBD | 0.71 | 10 | TBD | | B | 177 |
| | | | | IOP-4S32-LW-SC | 80-79 | 0.71 | 10 | 0.67-0.29 | | | 138 |
| | | | | IOP-4PSP32-SC | 97 | 0.88 | 10 | 0.81-0.35 | | | 177 |
| | | | | IOP-4S32-SC | 97-96 | 0.88 | 10 | 0.82-0.35 | | | 138 |
| | 347 | IS | Optanium | GOPA-4P32-LW-SC | 84 | 0.78 | 10 | 0.24 | 60/16 | B | 66 |
| | | | | GOPA-4P32-SC | 96 | 0.88 | | 0.28 | | | |

*Refer to page 1-41 and 1-42 for dimensions*
*Refer to page 1-47 and 1-48 for wiring diagrams*
*Refer to pages 9-24 to 9-28 for lead lengths and shipping data*

# For 30W-48" Lamps

HIGH POWER FACTOR SOUND RATED A

| No. of Lamps | Input Volts | Lamp Starting Method | Ballast Family | Catalog Number | Input Power ANSI (Watts) | Ballast Factor | Max. THD % | Line Current (Amps) | Min. Starting Temp. (°F/°C) | Dim. | Wiring Dia. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **F32T8/ES (30W - 48")** | | | | | | | | | | | |
| 1 | 120 | PS | Centium | RCN-1S32-SC | 32 | 0.90 | 10 | 0.27 | 60/16 | B | 20 |
| | 277 | | | VCN-1S32-SC | 32 | 0.90 | 10 | 0.12 | | | |
| | 120-277 | IS | Centium | ICN-132-MC | 27 | 0.88 | 10 | 0.23-0.10 | 60/16 | A2 | 63 |
| | | | | ICN-1P32-LW-SC | 25 | 0.77 | 10 | 0.21-0.09 | | B | |
| | | | | ICN-1P32-N | 29 | 0.90 | 10 | 0.24-0.11 | | | |
| | | | | ICN-2P32-LW-SC | 29-28 | 0.85 | 15-20 | 0.24-0.11 | | | *64 |
| | | | | ICN-2P32-N | 33 | 1.03 | 10 | 0.28-0.12 | | | |
| | | | Optanium | IOP-1P32-LW-SC | 24 | 0.77 | 10 | 0.20-0.09 | | | 63 |
| | | | | IOPA-1P32-LW-SC | | | | | | | |
| | | | | IOP-1P32-SC | 27 | 0.87 | 10 | 0.23-0.10 | | | |
| | | | | IOPA-1P32-SC | | | | | | | |
| | | | | IOP-1P32-HL-SC | 37-36 | 1.20 | 10 | 0.31-0.13 | | | |
| | | | | IOPA-1P32-HL-SC | | | | | | | |
| | | | | IOP-2P32-LW-SC | 28 | 0.90 | 10 | 0.24-0.10 | | | *64 |
| | | | | IOPA-2P32-LW-SC | | | | | | | |
| | | | | IOP-2P32-SC | 33 | 1.05 | 10 | 0.28-0.12 | | | |
| | | | | IOPA-2P32-SC | | | | | | | |
| | | | | IOP-2P32-HL-SC | 42 | 1.38 | 10 | 0.35-0.16 | | | |
| | | | | IOPA-2P32-HL-SC | | | | | | | |
| | | PS | | IOP-1S32-LW-SC | 23 | 0.72 | 10 | 0.19-0.08 | | | 20 |
| | | | | IOP-1S32-SC | 27 | 0.88 | 10 | 0.22-0.10 | | | |
| | | | | IOP-2S32-LW-SC | 24-23 | 0.73 | 10 | 0.20-0.09 | | | 39 |
| | | | | IOP-2S32-SC | 27 | 0.90 | 10 | 0.23-0.10 | | | |
| | 347 | IS | Optanium | GOPA-1P32-LW-SC | 24 | 0.77 | 10 | 0.07 | 60/16 | | 63 |
| | | | | GOPA-1P32-SC | 27 | 0.88 | | 0.08 | | | |
| | | | | GOPA-2P32-LW-SC | 28 | 0.88 | | 0.08 | | | *64 |
| | | | | GOPA-2P32-SC | 32 | 1.04 | | 0.10 | | | |

*Refer to page 1-41 and 1-42 for dimensions*
*Refer to page 1-55 and 1-56 for wiring diagrams*
*Refer to pages 9-24 to 9-28 for lead lengths and shipping data*

# For 30W-48" Lamps

HIGH POWER FACTOR SOUND RATED A

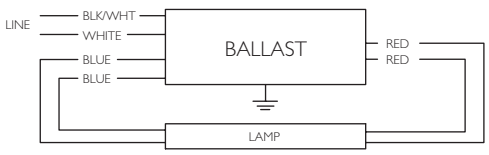
| No. of Lamps | Input Volts | Lamp Starting Method | Ballast Family | Catalog Number | Input Power ANSI (Watts) | Ballast Factor | Max. THD % | Line Current (Amps) | Min. Starting Temp. (°F/°C) | Dim. | Wiring Dia. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **F32T8/ES (30W - 48")** | | | | | | | | | | | |
| 2 | 120 | PS | Centium | RCN-2S32-SC | 60 | 0.88 | 10 | 0.51 | 60/16 | B | 21 |
| | 277 | | | VCN-2S32-SC | 60 | 0.88 | 10 | 0.22 | | | |
| | 120-277 | IS | Centium | ICN-2M32-MC | 54 | 0.88 | 10 | 0.45-0.20 | 60/16 | A2 | 64 |
| | | | | ICN-2P32-LW-SC | 47-46 | 0.77 | 10 | 0.39-0.17 | | B | |
| | | | | ICN-2P32-N | 54 | 0.88 | 10 | 0.45-0.20 | | | |
| | | | | ICN-3P32-LW-SC | 52 | 0.83 | 10 | 0.44-0.19 | | | *65 |
| | | | | ICN-3P32-SC | 61 | 1.01 | 10 | 0.51-0.22 | | | |
| | | | Optanium | IOP-2P32-LW-SC | 45 | 0.77 | 10 | 0.38-0.17 | | | 64 |
| | | | | IOPA-2P32-LW-SC | | | | | | | |
| | | | | IOP-2P32-SC | 52-51 | 0.87 | 10 | 0.44-0.19 | | | |
| | | | | IOPA-2P32-SC | | | | | | | |
| | | | | IOP-2P32-HL-SC | 72-70 | 1.19 | 10 | 0.60-0.26 | | | |
| | | | | IOPA-2P32-HL-SC | | | | | | | |
| | | | | IOP-3P32-LW-SC | 51 | 0.85 | 10 | 0.43-0.19 | | | *65 |
| | | | | IOPA-3P32-LW-SC | | | | | | | |
| | | | | IOP-3P32-SC | 59-58 | 1.00 | 10 | 0.50-0.21 | | | |
| | | | | IOPA-3P32-SC | | | | | | | |
| | | | | IOP-3P32-HL-90C-SC | 78-77 | 1.31 | 10 | 0.65-0.29 | | | |
| | | | | IOPA-3P32-HL-SC | | | | | | | |
| | | PS | | IOP-2S32-LW-SC | 44-43 | 0.71 | 10 | 0.36-0.16 | | | 21 |
| | | | | IOP-2S32-SC | 52 | 0.88 | 10 | 0.44-0.19 | | | |
| | 347 | IS | Optanium | GOPA-2P32-LW-SC | 46 | 0.78 | 10 | 0.13 | 60/16 | B | 64 |
| | | | | GOPA-2P32-SC | 51 | 0.88 | | 0.15 | | | |
| | | | | GOPA-3P32-LW-SC | 50 | 0.86 | | 0.15 | | | *65 |
| | | | | GOPA-3P32-SC | 57 | 1.00 | | 0.17 | | | |

*Refer to page 1-41 and 1-42 for dimensions*
*Refer to page 1-55 and 1-56 for wiring diagrams*
*Refer to pages 9-24 to 9-28 for lead lengths and shipping data*

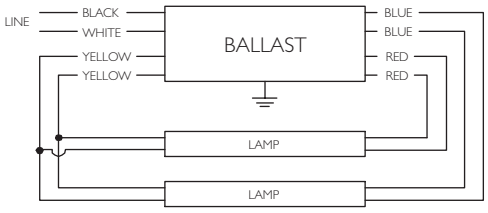
# For 30W-48" Lamps

HIGH POWER FACTOR SOUND RATED A

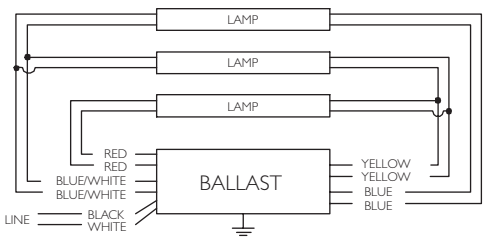
| No. of Lamps | Input Volts | Lamp Starting Method | Ballast Family | Catalog Number | Input Power ANSI (Watts) | Ballast Factor | Max. THD % | Line Current (Amps) | Min. Starting Temp. (°F/°C) | Dim. | Wiring Dia. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **F32T8/ES (30W - 48")** | | | | | | | | | | | |
| 3 | 120 | PS | Centium | RCN-3S32-SC | 22 | 0.88 | 10 | 0.72 | 60/16 | B | 30 |
| | 277 | | | VCN-3S32-SC | 85 | 0.88 | 10 | 0.31 | | | |
| | 120-277 | IS | Centium | ICN-3P32-LW-SC | 69-68 | 0.77 | 10 | 0.57-0.25 | 60/16 | B | 65 |
| | | | | ICN-3P32-SC | 79 | 0.88 | 10 | 0.66-0.29 | | | |
| | | | | ICN-4P32-LW-SC | 75-74 | 0.80 | 10 | 0.62-0.27 | | | *66 |
| | | | | ICN-4P32-SC | 87 | 1.00 | 10 | 0.73-0.32 | | | |
| | | | Optanium | IOP-3P32-LW-SC | 68-67 | 0.77 | 10 | 0.57-0.25 | | | 65 |
| | | | | IOPA-3P32-LW-SC | | | | | | | |
| | | | | IOP-3P32-SC | 77-76 | 0.87 | 10 | 0.65-0.28 | | | |
| | | | | IOPA-3P32-SC | | | | | | | |
| | | | | IOP-3P32-HL-90C-SC | 106-104 | 1.20 | 10 | 0.88-0.38 | | | |
| | | | | IOPA-3P32-HL-SC | | | | | | | |
| | | | | IOP-4P32-LW-SC | 75-74 | 0.84 | 10 | 0.63-0.27 | | | *66 |
| | | | | IOPA-4P32-LW-SC | | | | | | | |
| | | | | IOP-4P32-SC | 84-82 | 0.97 | 10 | 0.70-0.30 | | | |
| | | | | IOPA-4P32-SC | | | | | | | |
| | | | | IOP-4P32-HL-90C-G | 115-114 | 1.24 | 10 | 0.97-0.42 | | G | |
| | | | | IOPA-4P32-HL | | | | | | A | |
| | | PS | | IOP-3PSP32-LW-SC | TBD | 0.71 | 10 | TBD | | B | TBD |
| | | | | IOP-3PSP32-SC | 79 | 0.88 | 10 | 0.66-0.29 | | | |
| | | | | IOP-3S32-LW-SC | 66-65 | 0.71 | 10 | 0.55-0.24 | | | 30 |
| | | | | IOP-3S32-SC | 77-76 | 0.88 | 10 | 0.64-0.28 | | | |
| | 347 | IS | Optanium | GOPA-3P32-LW-SC | 67 | 0.77 | 10 | 0.19 | 60/16 | B | 65 |
| | | | | GOPA-3P32-SC | 76 | 0.88 | | 0.22 | | | |
| | | | | GOPA-4P32-LW-SC | 74 | 0.81 | | 0.22 | | | *66 |
| | | | | GOPA-4P32-SC | 84 | 0.95 | | 0.25 | | | |



Diag. 20



Diag. 21



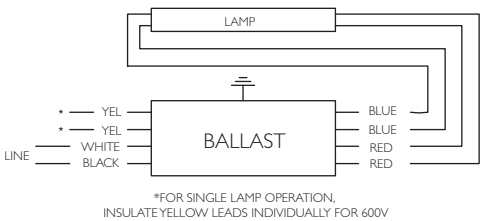
Diag. 30

*Refer to page 1-41 and 1-42 for dimensions*
*Refer to page 1-56 for additional wiring diagrams*
*Refer to pages 9-24 to 9-28 for lead lengths and shipping data*

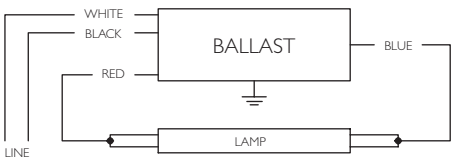
# For 30W-48" Lamps

HIGH POWER FACTOR SOUND RATED A

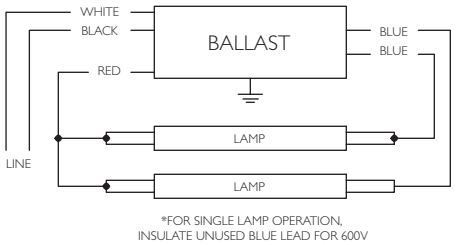
| No. of Lamps | Input Volts | Lamp Starting Method | Ballast Family | Catalog Number | Input Power ANSI (Watts) | Ballast Factor | Max. THD % | Line Current (Amps) | Min. Starting Temp. (°F/°C) | Dim. | Wiring Dia. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **F32T8/ES (30W - 48")** | | | | | | | | | | | |
| 4 | 120 | PS | Centium | RCN-4S32-SC | 114 | 0.88 | 10 | 0.97 | 60/16 | B | 138 |
| | 277 | | | VCN-4S32-SC | 114 | 0.88 | 10 | 0.42 | | | |
| | 120-277 | IS | Centium | ICN-4P32-LW-SC | 91-89 | 0.77 | 10 | 0.76-0.32 | 60/16 | B | 66 |
| | | | | ICN-4P32-SC | 105 | 0.88 | 10 | 0.88-0.38 | | | |
| | | | Centium | IOP-4P32-LW-SC | 90-88 | 0.77 | 10 | 0.76-0.33 | | | |
| | | | | IOPA-4P32-LW-SC | | | | | | | |
| | | | Optanium | IOP-4P32-SC | 102-100 | 0.87 | 10 | 0.86-0.37 | | | |
| | | | | IOPA-4P32-SC | | | | | | | |
| | | | | IOP-4P32-HL-90C-G | 143-140 | 1.18 | 10 | 1.21-0.51 | | G | |
| | | | | IOPA-4P32-HL-G | | | | | | A | |
| | | PS | | IOP-4PSP32-LW-SC | TBD | 0.71 | 10 | TBD | | B | 177 |
| | | | | IOP-4S32-LW-SC | 86-84 | 0.71 | 10 | 0.71-0.31 | | | 138 |
| | | | | IOP-4PSP32-SC | 103 | 0.88 | 10 | 0.86-0.37 | | | 177 |
| | | | | IOP-4S32-SC | 102-100 | 0.88 | 10 | 0.86-0.37 | | | 138 |
| | 347 | IS | Optanium | GOPA-4P32-LW-SC | 89 | 0.78 | 10 | 0.26 | 60/16 | B | 66 |
| | | | | GOPA-4P32-SC | 102 | 0.88 | | 0.30 | | | |



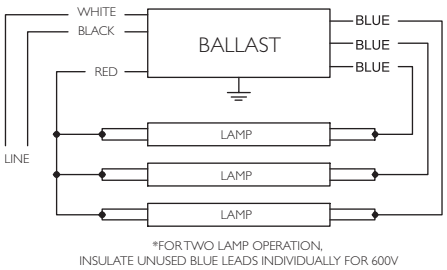

Diag. 39



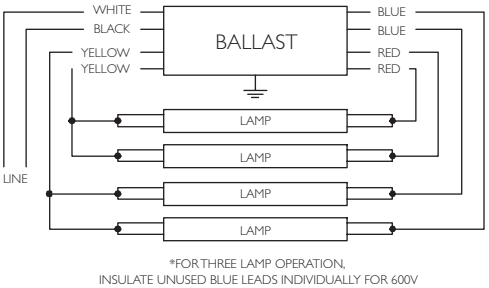

Diag. 63



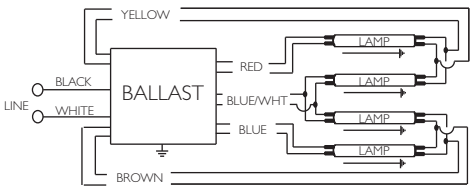

Diag. 64



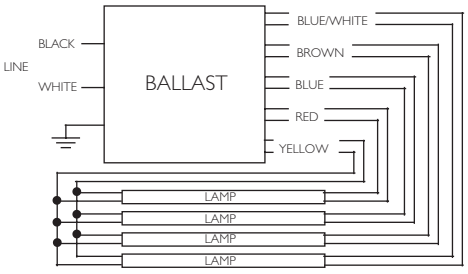

Diag. 65




Diag. 66




Diag. 138




Diag. 177

*Refer to page 1-41 and 1-42 for dimensions*
*Refer to page 1-55 for additional wiring diagrams*
*Refer to pages 9-24 to 9-28 for lead lengths and shipping data*

# For 32W Lamps

HIGH POWER FACTOR SOUND RATED A

| No. of Lamps | Input Volts | Lamp Starting Method | Ballast Family | Catalog Number | Input Power ANSI (Watts) | Ballast Factor | Max. THD % | Line Current (Amps) | Min. Starting Temp. (°F/°C) | Dim. | Wiring Dia. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **F32T8, FBO31T8, F32T8/U6 (32W)** | | | | | | | | | | | |
| 1 | 120 | IS | AmbiStar‡ | REB-2P32-SC | 33 | 1.00 | 140 | 0.48 | 0/-18 | B | *64 |
| | | PS | Centium | RCN-1S32-SC | 34 | 0.90 | 10 | 0.29 | 32/0 | | 20 |
| | | RS | PowrKut | RK-132-TP | 34 | 0.85 | 20 | 0.31 | 50/10 | A | |
| | 277 | PS | Centium | VCN-1S32-SC | 34 | 0.90 | 10 | 0.13 | 32/0 | B | |
| | | RS | PowrKut | VK-132-TP | 34 | 0.85 | 20 | 0.13 | 50/10 | A | |
| | 120-277 | IS | Centium | ICN-132-MC | 30 | 0.88 | 10 | 0.25-0.11 | 0/-18 | A2 | 63 |
| | | | | ICN-1P32-LW-SC | 27 | 0.77 | 10 | 0.22-0.10 | | B | |
| | | | | ICN-1P32-N | 31 | 0.90 | 10 | 0.26-0.12 | | | |
| | | | | ICN-2P32-LW-SC | 32 | 0.85 | 15-20 | 0.27-0.12 | | | *64 |
| | | | | ICN-2P32-N | 36 | 1.03 | 15 | 0.30-0.14 | | | |
| | | | Optanium | IOP-1P32-LW-SC | 25 | 0.77 | 10 | 0.22-0.10 | -20/-29 | | 63 |
| | | | | IOPA-1P32-LW-SC | | | | | | | |
| | | | | IOP-1P32-SC | 28 | 0.87 | 10 | 0.25-0.11 | | | |
| | | | | IOPA-1P32-SC | | | | | | | |
| | | | | IOP-1P32-HL-SC | 39-38 | 1.18 | 10 | 0.33-0.14 | | | |
| | | | | IOPA-1P32-HL-SC | | | | | | | |
| | | | | IOP-2P32-LW-SC | 31 | 0.90 | 10 | 0.26-0.11 | | | *64 |
| | | | | IOPA-2P32-LW-SC | | | | | | | |
| | | | | IOP-2P32-SC | 35 | 1.05 | 10 | 0.30-0.13 | | | |
| | | | | IOPA-2P32-SC | | | | | | | |
| | | | | IOP-2P32-HL-SC | 45 | 1.37 | 10 | 0.37-0.17 | | | |
| | | | | IOPA-2P32-HL-SC | | | | | | | |
| | | PS | | IOP-1S32-LW-SC | 25 | 0.72 | 10 | 0.20-0.09 | 0/-18 | | 20 |
| | | | | IOP-1S32-SC | 28 | 0.88 | 10 | 0.24-0.10 | | | |
| | | | | IOP-2S32-LW-SC | 25 | 0.73 | 10 | 0.20-0.09 | | | 39 |
| | | | | IOP-2S32-SC | 29 | 0.90 | 10 | 0.24-0.11 | | | |
| | 347 | IS | Optanium | GOPA-1P32-LW-SC | 26 | 0.77 | 10 | 0.08 | -20/29 | | 63 |
| | | | | GOPA-1P32-SC | 30 | 0.88 | | 0.09 | | | |
| | | | | GOPA-2P32-LW-SC | 31 | 0.88 | | 0.09 | | | *64 |
| | | | | GOPA-2P32-SC | 34 | 1.03 | | 1.03 | | | |

‡ The above AmbiStar ballasts are normal power factor and labeled 'For Residential Use Only'

NEMA Premium®

See pages 1-3 and 1-4 for specific SKU's that meet the NEMA Premium Standard

*Refer to page 1-41 and 1-42 for dimensions*
*Refer to page 1-59 and 1-60 for wiring diagrams*
*Refer to pages 9-24 to 9-28 for lead lengths and shipping data*

# For 32W Lamps

HIGH POWER FACTOR SOUND RATED A

| No. of Lamps | Input Volts | Lamp Starting Method | Ballast Family | Catalog Number | Input Power ANSI (Watts) | Ballast Factor | Max. THD % | Line Current (Amps) | Min. Starting Temp. (°F/°C) | Dim. | Wiring Dia. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **F32T8, FBO31T8, F32T8/U6 (32W)** | | | | | | | | | | | |
| 2 | 120 | IS | AmbiStar‡ | REB-2P32-SC | 56 | 0.88 | 120 | 0.80 | 0/-18 | B | 64 |
| | | PS | Centium | RCN-2S32-SC | 63 | 0.88 | 10 | 0.53 | 32/0 | | 21 |
| | | RS | PowrKut | RK-2S32-TP | 66 | 0.86 | 15 | 0.60 | 50/10 | A | |
| | 277 | PS | Centium | VCN-2S32-SC | 63 | 0.88 | 10 | 0.23 | 32/0 | B | *65 |
| | | RS | PowrKut | VK-2S32-TP | 66 | 0.85 | 15 | 0.26 | 50/10 | A | 21 |
| | 120-277 | IS | Centium | ICN-2M32-MC | 59 | 0.88 | 10 | 0.50-0.21 | 0/-18 | A2 | 64 |
| | | | | ICN-2P32-LW-SC | 50-49 | 0.77 | 10 | 0.42-0.12 | | B | |
| | | | | ICN-2P32-N | 59 | 0.88 | 10 | 0.49-0.22 | | | |
| | | | | ICN-3P32-LW-SC | 57-56 | 0.86 | 10 | 0.48-0.21 | | | *65 |
| | | | | ICN-3P32-SC | 65 | 1.01 | 10 | 0.54-0.24 | | | |
| | | | Optanium | IOP-2P32-LW-SC | 48 | 0.77 | 10 | 0.41-0.17 | -20/-29 | | 64 |
| | | | | IOPA-2P32-LW-SC | | | | | | | |
| | | | | IOP-2P32-SC | 55-54 | 0.87 | 10 | 0.47-0.20 | | | |
| | | | | IOPA-2P32-SC | | | | | | | |
| | | | | IOP-2P32-HL-SC | 74-72 | 1.18 | 10 | 0.62-0.26 | | | |
| | | | | IOPA-2P32-HL-SC | | | | | | | |
| | | | | IOP-3P32-LW-SC | 55-54 | 0.85 | 10 | 0.46-0.20 | | | *65 |
| | | | | IOPA-3P32-LW-SC | | | | | | | |
| | | | | IOP-3P32-SC | 63-62 | 1.00 | 10 | 0.53-0.23 | | | |
| | | | | IOPA-3P32-SC | | | | | | | |
| | | | | IOP-3P32-HL-90C-SC | 80-79 | 1.38 | 10 | 0.67-0.29 | | | |
| | | | | IOPA-3P32-HL-SC | | | | | | | |
| | | PS | | IOP-2S32-LW-SC | 47-46 | 0.71 | 10 | 0.38-0.17 | 0/-18 | | 21 |
| | | | | IOP-2S32-SC | 56-55 | 0.88 | 10 | 0.47-0.20 | | | |
| | 347 | IS | Optanium | GOPA-2P32-LW-SC | 48 | 0.78 | 10 | 0.14 | -20/-29 | B | 64 |
| | | | | GOPA-2P32-SC | 54 | 0.88 | | 0.16 | | | |
| | | | | GOPA-3P32-LW-SC | 55 | 0.86 | | 0.16 | | | *65 |
| | | | | GOPA-3P32-SC | 63 | 1.00 | | 0.18 | | | |

‡ The above AmbiStar ballasts are normal power factor and labeled 'For Residential Use Only'

NEMA Premium

See pages 1-3 and 1-4 for specific SKU's that meet the NEMA Premium Standard

*Refer to page 1-41 and 1-42 for dimensions*
*Refer to page 1-59 and 1-60 for wiring diagrams*
*Refer to pages 9-24 to 9-28 for lead lengths and shipping data*

# For 32W Lamps

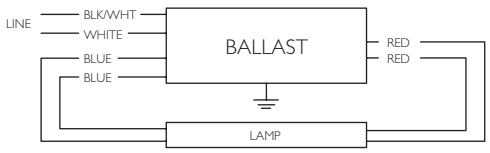
HIGH POWER FACTOR SOUND RATED A

| No. of Lamps | Input Volts | Lamp Starting Method | Ballast Family | Catalog Number | Input Power ANSI (Watts) | Ballast Factor | Max. THD % | Line Current (Amps) | Min. Starting Temp. (°F/°C) | Dim. | Wiring Dia. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **F32T8, FBO31T8, F32T8/U6 (32W)** | | | | | | | | | | | |
| 3 | 120 | IS | AmbiStar‡ | REB-4P32-SC | 80 | 0.84 | 125 | 1.36 | 0/-18 | B | *66 |
| | | PS | Centium | RCN-3S32-SC | 91 | 0.88 | 10 | 0.78 | 32/0 | | 30 |
| | 277 | | | VCN-3S32-SC | 91 | 0.88 | 10 | 0.34 | | | |
| | 120-277 | IS | Centium | ICN-3P32-LW-SC | 74-73 | 0.77 | 10 | 0.62-0.27 | 0/-18 | | 65 |
| | | | | ICN-3P32-SC | 85 | 0.88 | 10 | 0.71-0.31 | | | |
| | | | | ICN-4P32-LW-SC | 80-79 | 0.82 | 10 | 0.67-0.29 | | | *66 |
| | | | | ICN-4P32-SC | 93 | 1.00 | 10 | 0.78-0.33 | | | |
| | | | Optanium | IOP-3P32-LW-SC | 73-71 | 0.77 | 10 | 0.62-0.27 | -20/-29 | | 65 |
| | | | | IOPA-3P32-LW-SC | | | | | | | |
| | | | | IOP-3P32-SC | 82-80 | 0.87 | 10 | 0.70-0.30 | | | |
| | | | | IOPA-3P32-SC | | | | | | | |
| | | | | IOP-3P32-HL-90C-SC | 110-107 | 1.18 | 10 | 0.91-0.39 | | | |
| | | | | IOPA-3P32-HL-SC | | | | | | | |
| | | | | IOP-4P32-LW-SC | 80-79 | 0.84 | 10 | 0.67-0.29 | | | *66 |
| | | | | IOPA-4P32-LW-SC | | | | | | | |
| | | | | IOP-4P32-SC | 90-88 | 0.97 | 10 | 0.75-0.32 | | | |
| | | | | IOPA-4P32-SC | | | | | | | |
| | | | | IOP-4P32-HL-90C-G | 120-119 | 1.26 | 10 | 1.02-0.44 | | G | |
| | | | | IOPA-4P32-HL | | | | | | A | |
| | | PS | | IOP-3PSP32-LW-SC | TBD | 0.71 | 10 | TBD | 0/-18 | B | TBD |
| | | | | IOP-3PSP32-SC | 85 | 0.88 | 10 | 0.71-0.31 | | | 30 |
| | | | | IOP-3S32-LW-SC | 71-70 | 0.71 | 10 | 0.59-0.21 | | | |
| | | | | IOP-3S32-SC | 83-81 | 0.88 | 10 | 0.70-0.30 | | | |
| | 347 | IS | Optanium | GOPA-3P32-LW-SC | 74 | 0.77 | 10 | 0.21 | -20/-29 | B | 65 |
| | | | | GOPA-3P32-SC | 84 | 0.88 | | 0.24 | | | |
| | | | | GOPA-4P32-LW-SC | 77 | 0.81 | | 0.23 | | | *66 |
| | | | | GOPA-4P32-SC | 89 | 0.96 | | 0.26 | | | |

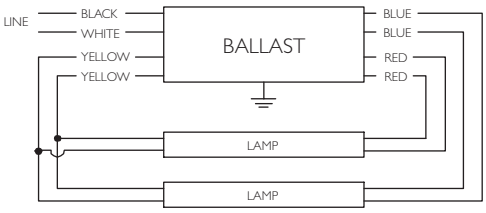
‡ The above AmbiStar ballasts are normal power factor and labeled 'For Residential Use Only'

NEMA Premium®

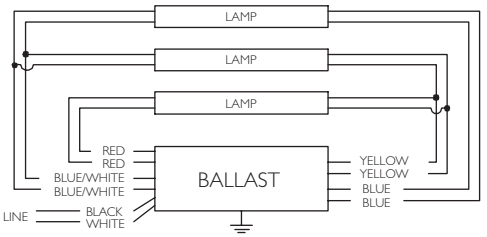
See pages 1-3 and 1-4 for specific SKU's that meet the NEMA Premium Standard




Diag. 20




Diag. 21




Diag. 30

*Refer to page 1-41 for dimensions*
*Refer to page 1-60 for additional wiring diagrams*
*Refer to pages 9-24 to 9-28 for lead lengths and shipping data*

# For 32W Lamps

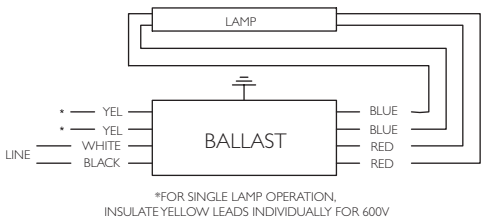
HIGH POWER FACTOR SOUND RATED A

| No. of Lamps | Input Volts | Lamp Starting Method | Ballast Family | Catalog Number | Input Power ANSI (Watts) | Ballast Factor | Max. THD % | Line Current (Amps) | Min. Starting Temp. (°F/°C) | Dim. | Wiring Dia. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **F32T8, FBO31T8, F32T8/U6 (32W)** | | | | | | | | | | | |
| 4 | 120 | IS | AmbiStar‡ | REB-4P32-SC | 103 | 0.81 | 125 | 1.57 | 0/-18 | B | 66 |
| | | PS | Standard | RCN-4S32-SC | 121 | 0.88 | 10 | 1.03 | 32/0 | | 138 |
| | 277 | | Centium | VCN-4S32-SC | 121 | 0.88 | 10 | 0.45 | | | |
| | 120-277 | IS | Centium | ICN-4P32-LW-SC | 97-95 | 0.77 | 10 | 0.81-0.34 | 0/-18 | B | 66 |
| | | | | ICN-4P32-SC | 112 | 0.88 | 10 | 0.94-0.41 | | | |
| | | | Optanium | IOP-4P32-LW-SC | 96-94 | 0.77 | 10 | 0.81-0.35 | -20/-29 | | |
| | | | | IOPA-4P32-LW-SC | | | | | | | |
| | | | | IOP-4P32-SC | 109-106 | 0.87 | 10 | 0.92-0.39 | | | |
| | | | | IOPA-4P32-SC | | | | | | | |
| | | | | IOP-4P32-HL-90C-G | 146-143 | 1.18 | 10 | 1.23-0.53 | | G | |
| | | | | IOPA-4P32-HL | | | | | | A | |
| | | PS | | IOP-4PSP-LW-SC | TBD | 0.71 | 10 | TBD | 0/-18 | B | 177 |
| | | | | IOP-4S32-LW-SC | 93-91 | 0.71 | 10 | 0.77-0.33 | | | 138 |
| | | | | IOP-4PSP32-SC | 110 | 0.88 | 10 | 0.93-0.40 | | | 177 |
| | | | | IOP-4S32-SC | 110 | 0.88 | 10 | 0.92-0.40 | | | 138 |
| | 347 | IS | Optanium | GOPA-4P32-LW-SC | 92 | 0.78 | 10 | 0.27 | -20/-29 | B | 66 |
| | | | | GOPA-4P32-SC | 107 | 0.88 | | 0.31 | | | |

‡ The above AmbiStar ballasts are normal power factor and labeled 'For Residential Use Only'

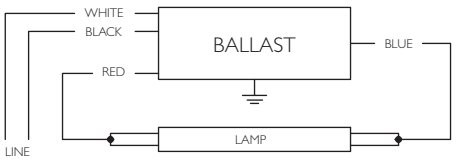
NEMA Premium

See pages 1-3 and 1-4 for specific SKU's that meet the NEMA Premium Standard

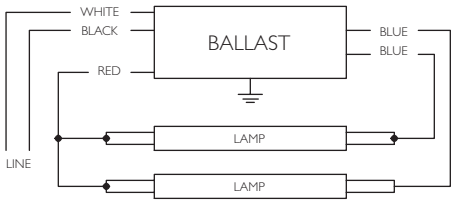



*FOR SINGLE LAMP OPERATION, INSULATE YELLOW LEADS INDIVIDUALLY FOR 600V

Diag. 39

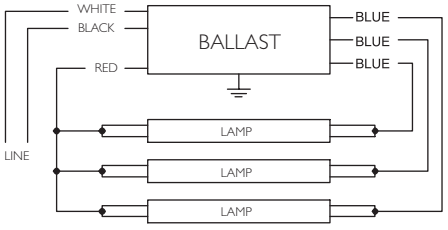



Diag. 63



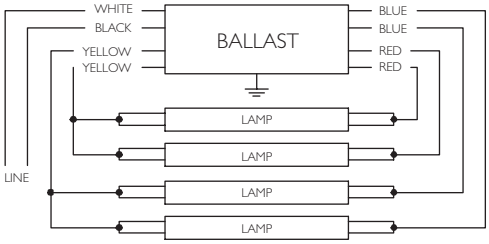

*FOR SINGLE LAMP OPERATION, INSULATE UNUSED BLUE LEAD FOR 600V

Diag. 64



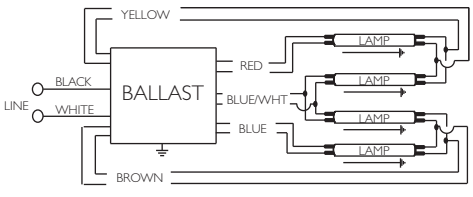

*FOR TWO LAMP OPERATION, INSULATE UNUSED BLUE LEADS INDIVIDUALLY FOR 600V

Diag. 65

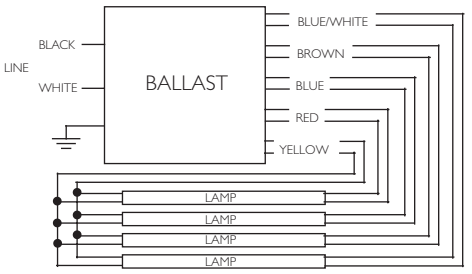



*FOR THREE LAMP OPERATION, INSULATE UNUSED BLUE LEADS INDIVIDUALLY FOR 600V

Diag. 66




Diag. 138




Diag. 177

*Refer to page 1-62 for dimensions*
*Refer to page 1-59 for additional wiring diagrams*
*Refer to pages 9-24 to 9-28 for lead lengths and shipping data*

# For 40W Lamps

HIGH POWER FACTOR SOUND RATED A

| No. of Lamps | Input Volts | Lamp Starting Method | Ballast Family | Catalog Number | Input Power ANSI (Watts) | Ballast Factor | Max. THD % | Line Current (Amps) | Min. Starting Temp. (°F/°C) | Dim. | Wiring Dia. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **F40T8 (40W)** | | | | | | | | | | | |
| 1 | 120-277 | IS | Centium | ICN-2P32-LW-SC | 37 | 0.86 | 10-15 | 0.31-0.14 | 32/0 | B | *64 |
| | | | | ICN-2P32-N | 42 | 1.00 | 10 | 0.35-0.15 | | | |
| | | | Optanium | IOP-2P32-LW-SC | 35 | 0.87 | 10 | 0.29-0.13 | | | |
| | | | | IOPA-2P32-LW-SC | | | | | | | |
| | | | | IOP-2P32-SC | 41 | 1.01 | 10 | 0.35-0.15 | | | |
| | | | | IOPA-2P32-SC | | | | | | | |
| | | | | IOP-2P32-HL-SC | 55-54 | 1.35 | 10 | 0.46-0.20 | | | |
| | | | | IOPA-2P32-HL-SC | | | | | | | |
| | | PS | | IOP-2S32-LW-SC | 31-30 | 0.73 | 10 | 0.73-0.11 | | | 39 |
| | | | | IOP-2S32-SC | 36 | 0.90 | 10 | 0.30-0.13 | | | |
| | 347 | IS | Optanium | GOPA-2P32-LW-SC | 37 | 0.86 | 10 | 0.11 | | | *64 |
| | | | | GOPA-2P32-SC | 42 | 1.02 | | 0.12 | | | |
| 2 | 120-277 | IS | Centium | ICN-3P32-LW-SC | 69-67 | 0.83 | 10 | 0.58-0.25 | 32/0 | B | *65 |
| | | | | ICN-3P32-SC | 77 | 1.00 | 10 | 0.65-0.28 | | | |
| | | | Optanium | IOP-3P32-LW-SC | 67-66 | 0.85 | 10 | 0.58-0.25 | | | |
| | | | | IOPA-3P32-LW-SC | | | | | | | |
| | | | | IOP-3P32-SC | 74-72 | 1.01 | 10 | 0.64-0.27 | | | |
| | | | | IOPA-3P32-SC | | | | | | | |
| | | | | IOP-3P32-HL-90C-SC | 102-100 | 1.30 | 10 | 0.85-0.37 | | | |
| | | | | IOPA-3P32-HL-SC | | | | | | | |
| | 347 | IS | Optanium | GOPA-3P32-LW-SC | 65 | 0.85 | 10 | 0.19 | | | |
| | | | | GOPA-3P32-SC | 75 | 1.00 | | 0.22 | | | |

*Refer to page 1-62 for wiring diagrams and dimensions*
*Refer to pages 9-24 to 9-28 for lead lengths and shipping data*

# For 40W Lamps

HIGH POWER FACTOR SOUND RATED A

| No. of Lamps | Input Volts | Lamp Starting Method | Ballast Family | Catalog Number | Input Power ANSI (Watts) | Ballast Factor | Max. THD % | Line Current (Amps) | Min. Starting Temp. (°F/°C) | Dim. | Wiring Dia. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **F40T8 (40W)** | | | | | | | | | | | |
| 3 | 120-277 | IS | Centium | ICN-4P32-LW-SC | 97-95 | 0.82 | 10 | 0.81-0.34 | 32/0 | B | *66 |
| | | | | ICN-4P32-SC | 112 | 0.97 | 10 | 0.94-0.40 | | | |
| | | | Optanium | IOP-4P32-LW-SC | 98-96 | 0.84 | 10 | 0.82-0.35 | | | |
| | | | | IOPA-4P32-LW-SC | | | | | | | |
| | | | | IOP-4P32-SC | 110-107 | 0.93 | 10 | 0.92-0.38 | | | |
| | | | | IOPA-4P32-SC | | | | | | | |
| | | | | IOP-4P32-HL-90C-G | 150-147 | 1.25 | 10 | 1.27-0.54 | | G | |
| | | | | IOPA-4P32-HL | | | | | | A | |
| | 347 | IS | Optanium | GOPA-4P32-LW-SC | 97 | 0.84 | 10 | 0.28 | | B | |
| | | | | GOPA-4P32-SC | 113 | 0.93 | | 0.28 | | | |

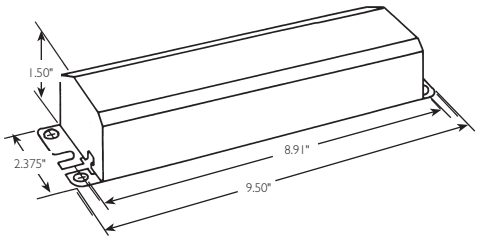



Fig. A

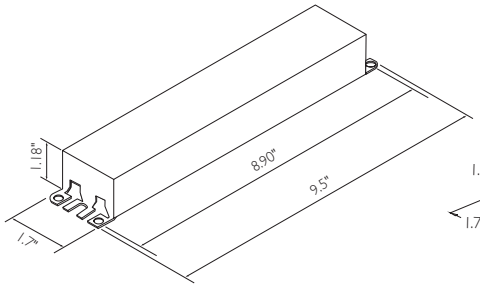



Fig. B

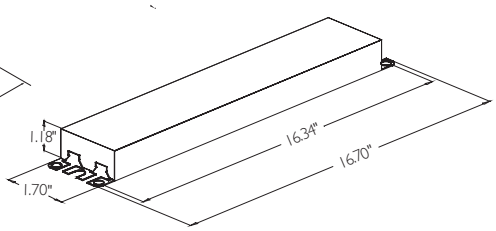



Fig. G

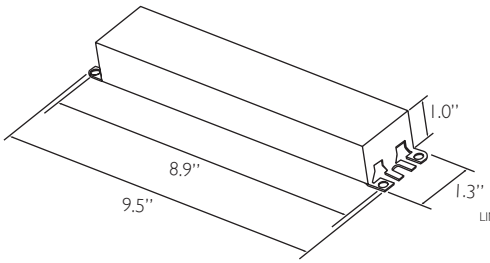
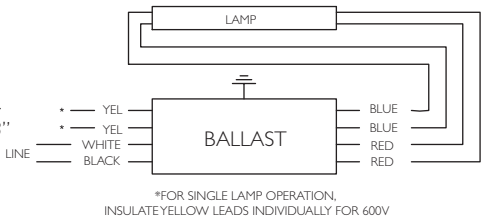
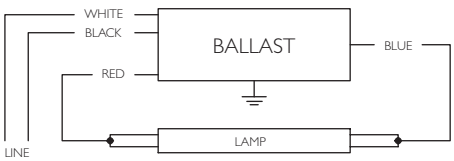



Fig. N

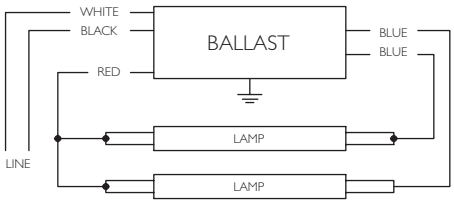



*FOR SINGLE LAMP OPERATION, INSULATE YELLOW LEADS INDIVIDUALLY FOR 600V

Diag. 39

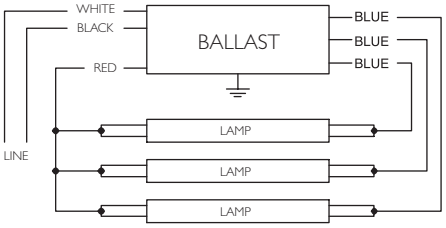



Diag. 63



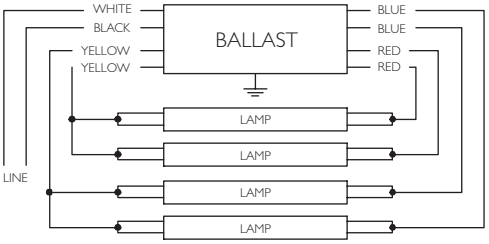

*FOR SINGLE LAMP OPERATION, INSULATE UNUSED BLUE LEAD FOR 600V

Diag. 64




*FOR TWO LAMP OPERATION, INSULATE UNUSED BLUE LEADS INDIVIDUALLY FOR 600V

Diag. 65




*FOR THREE LAMP OPERATION, INSULATE UNUSED BLUE LEADS INDIVIDUALLY FOR 600V

Diag. 66

*Refer to pages 9-24 to 9-28 for lead lengths and shipping data*

# For 46-59W Lamps

HIGH POWER FACTOR SOUND RATED A

| No. of Lamps | Input Volts | Lamp Starting Method | Ballast Family | Catalog Number | Input Power ANSI (Watts) | Ballast Factor | Max. THD % | Line Current (Amps) | Min. Starting Temp. (°F/°C) | Dim. | Wiring Dia. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **F72T8 (46W)** | | | | | | | | | | | |
| 1 | 120-277 | IS | Optanium | IOP-2P59-SC | 54 | 1.09 | 10 | 0.46-0.20 | 32/0 | B | *64A |
| 2 | 120-277 | IS | Optanium | IOP-2P59-SC | 88 | 0.92 | 10 | 0.74-0.32 | 32/0 | B | 64A |
| **F96T8/ES (57W)** | | | | | | | | | | | |
| 1 | 120-277 | IS | Optanium | IOP-2P59-SC | 64 | 1.05 | 10 | 0.56-0.25 | 60/16 | B | *64A |
| 2 | 120-277 | IS | Optanium | IOP-2P59-SC | 103 | 0.87 | 10 | 0.86-0.37 | 60/16 | B | 64A |
| **F96T8 (59W)** | | | | | | | | | | | |
| 1 | 120-277 | IS | Optanium | IOP-2P59-SC | 67 | 1.05 | 10 | 0.56-0.25 | 32/0 | B | *64A |
| 2 | 120-277 | IS | Optanium | IOP-2P59-SC | 107 | 0.87 | 10 | 0.91-0.39 | 32/0 | B | 64A |

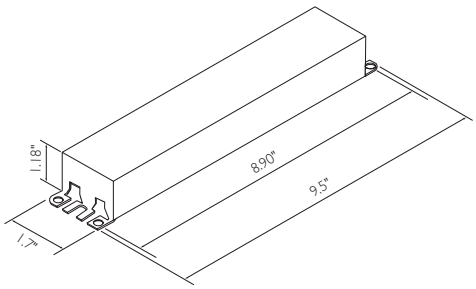
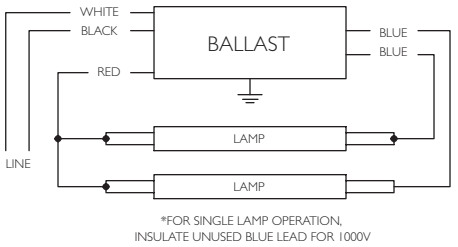



Fig. B




Diag. 64A

*Refer to pages 9-24 to 9-28 for lead lengths and shipping data*

# For 44-86W Lamps

HIGH POWER FACTOR SOUND RATED A

| No. of Lamps | Input Volts | Lamp Starting Method | Ballast Family | Catalog Number | Input Power ANSI (Watts) | Ballast Factor | Max. THD % | Line Current (Amps) | Min. Starting Temp. (°F/°C) | Dim. | Wiring Dia. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **F48T8/HO (44W)** | | | | | | | | | | | |
| 1 | 120-277 | PS | Centium | ICN-2S86 | 59 | 1.02 | 20 | 0.50-0.23 | -20/-29 | C | 39A |
| 2 | 120-277 | | | ICN-2S86 | 98 | 0.95 | 10 | 0.84-0.36 | | | 21 |
| **F60T8/HO (55W)** | | | | | | | | | | | |
| 1 | 120-277 | PS | Centium | ICN-2S86 | 70 | 1.00 | 20 | 0.58-0.26 | -20/-29 | C | 39A |
| 2 | 120-277 | | | ICN-2S86 | 118 | 0.92 | 10 | 1.04-0.45 | | | 21 |
| **F72T8/HO (65W)** | | | | | | | | | | | |
| 1 | 120-277 | PS | Centium | ICN-2S86 | 81 | 1.00 | 15 | 0.68-0.30 | -20/-29 | C | 39A |
| 2 | 120-277 | | | ICN-2S86 | 140 | 0.94 | 10 | 1.21-0.54 | | | 21 |
| **F96T8/HO (86W)** | | | | | | | | | | | |
| 1 | 120-277 | PS | Centium | ICN-2S86 | 100 | 1.00 | 10 | 0.84-0.36 | -20/-29 | C | 39A |
| 2 | 120-277 | | | ICN-2S86 | 185 | 0.95 | 10 | 1.57-0.68 | | | 21 |

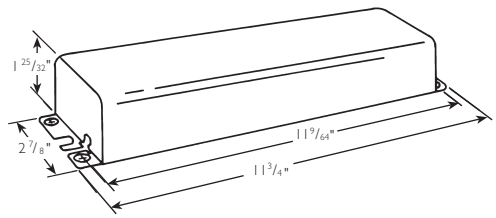
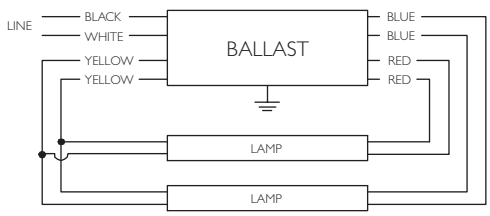
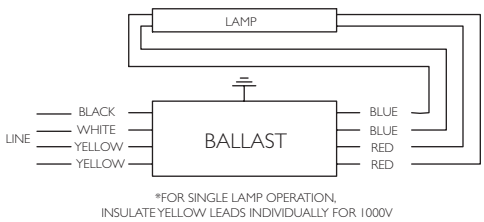



Fig C




Diag. 21



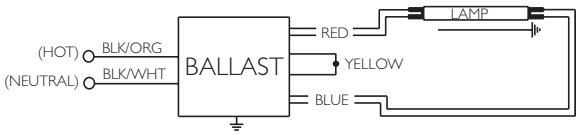

Diag. 39A

*Refer to pages 9-24 to 9-28 for lead lengths and shipping data*

# For 55 - 75W Lamps

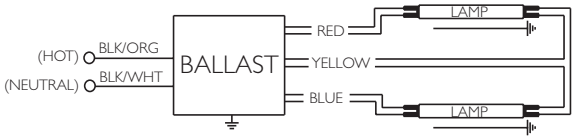
HIGH POWER FACTOR SOUND RATED A

| No. of Lamps | Input Volts | Lamp Starting Method | Ballast Family | Catalog Number | Input Power ANSI (Watts) | Ballast Factor | Max. THD % | Line Current (Amps) | Min. Starting Temp. (°F/°C) | Dim. | Wiring Dia. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| F48T8/VHO (84W) | | | | | | | | | | | |
| 1 | 277 | PS | Optanium | JOP-2S84-G | 97 | 1.05 | 10 | 0.35 | -20/-29 | G | 70 |
| | 347 | | | | | | | 0.28 | | | |
| | 480 | | | | | | | 0.21 | | | |
| 2 | 277 | PS | Optanium | JOP-2S84-G | 185 | 1.00 | 10 | 0.67 | -20/-29 | G | 71 |
| | 347 | | | | | | | 0.53 | | | |
| | 480 | | | | | | | 0.38 | | | |




YELLOW LEADS MUST BE CONNECTED FOR (1) LAMP OPERATION

Diag. 70




Diag. 71

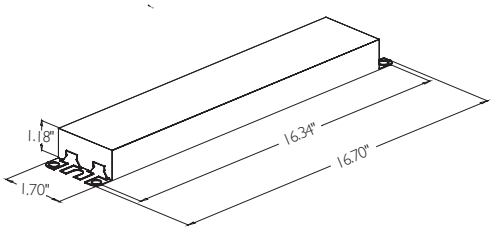



Fig. G

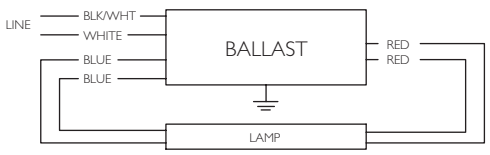
*Refer to pages 9-24 to 9-28 for lead lengths and shipping data*

# For 22-40W Lamps

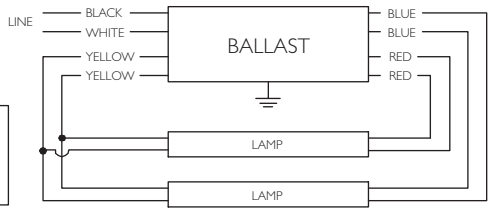
HIGH POWER FACTOR SOUND RATED A

| No. of Lamps | Input Volts | Lamp Starting Method | Ballast Family | Catalog Number | Input Power ANSI (Watts) | Ballast Factor | Max. THD % | Line Current (Amps) | Min. Starting Temp. (°F/°C) | Dim. | Wiring Dia. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **F30T12 (30W - 36")** | | | | | | | | | | | |
| 1 | 120 | RS | AmbiStar | RELB-1S40-SC | 30 | 0.98 | 20 | 0.27 | 50/10 | B | 20 |
| | 277 | | Standard | VEL-1S40-SC | | | | 0.12 | | | |
| 2 | 120-277 | | Centium | ICN-2S40-N | 58 | 0.93 | | 0.48-0.20 | | | 21 |
| **F34T12, F34T12/U (34W)** | | | | | | | | | | | |
| 1 | 120 | RS | AmbiStar | RELB-1S40-SC | 35 | 0.92 | 20 | 0.29 | 50/10 | B | 20 |
| | 277 | | Standard | VEL-1S40-SC | 31 | 0.88 | | 0.12 | | | |
| 2 | 120 | | AmbiStar | RELB-2S40-SC | 62 | 0.85 | | 0.53 | | | 21 |
| 2 | 120-277 | | Centium | ICN-2S40-N | 62 | 0.85 | 10 | 0.53-0.23 | | N | |
| **F40T12, F40T12/U (40W)** | | | | | | | | | | | |
| 1 | 120 | RS | AmbiStar | RELB-1S40-SC | 38 | 0.88 | 20 | 0.31 | 50/10 | B | 20 |
| | 277 | | Standard | VEL-1S40-SC | 35 | 0.85 | | 0.13 | | | |
| 2 | 120 | | AmbiStar | RELB-2S40-SC | 72 | 0.85 | | 0.62 | | | 21 |
| 2 | 120-277 | | Centium | ICN-2S40-N | 72 | 0.85 | 10 | 0.62-0.26 | | N | |
| **FC8T9 (22W Circline)** | | | | | | | | | | | |
| 1 | 120 | IS | AmbiStar | RMB-1P26-S2* | 22 | 0.95 | 150 | 0.35 | 0/-18 | S2 | 163 |

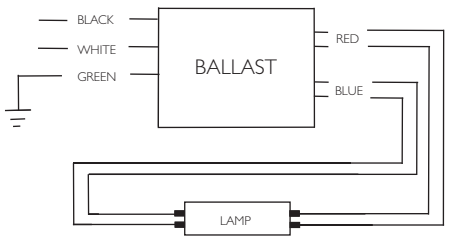
* Normal Power Factor




Diag. 20




Diag. 21




GREEN TERMINAL MUST BE GROUNDED

Diag. 163

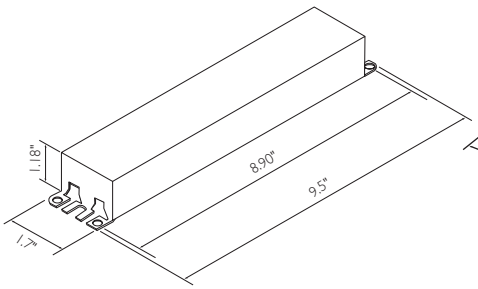



Fig. B

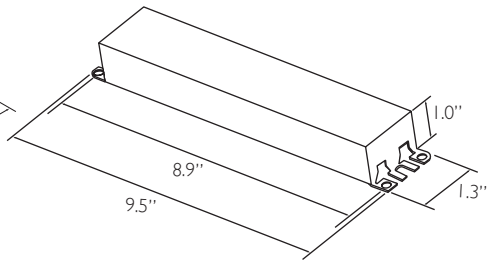
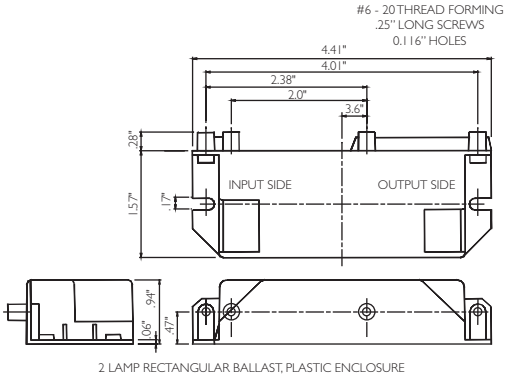



Fig. N




2 LAMP RECTANGULAR BALLAST, PLASTIC ENCLOSURE

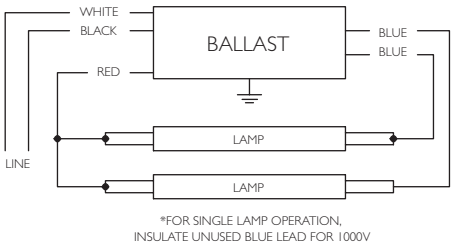
S2 Model

*Refer to pages 9-24 to 9-28 for lead lengths and shipping data*

# For 55-75W Lamps

HIGH POWER FACTOR SOUND RATED A

| No. of Lamps | Input Volts | Lamp Starting Method | Ballast Family | Catalog Number | Input Power ANSI (Watts) | Ballast Factor | Max. THD % | Line Current (Amps) | Min. Starting Temp. (°F/°C) | Dim. | Wiring Dia. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **F72T12 (55W)** | | | | | | | | | | | |
| 1 | 120-277 | IS | Centium | ICN-2P60-SC | 68-67 | 1.05 | 10 | 0.70-0.31 | 0/-18 | B | *64A |
| 2 | 120-277 | | | | 108-107 | 0.92 | 10 | 0.91-0.40 | | | 64A |
| **F96T12/ES (60W)** | | | | | | | | | | | |
| 1 | 120-277 | IS | Centium | ICN-2P60-SC | 70-68 | 1.04 | 10 | 0.53-0.24 | 60/16 | B | *64A |
| 2 | 120-277 | | | | 105-103 | 0.89 | 10 | 0.88-0.38 | | | 64A |
| **F96T12 (75W)** | | | | | | | | | | | |
| 1 | 120-277 | IS | Centium | ICN-2P60-SC | 84-82 | 1.04 | 10 | 0.55-0.25 | 0/-18 | B | *64A |
| 2 | 120-277 | | | | 137-135 | 0.90 | 10 | 1.17-0.50 | | | 64A |




Diag. 64A

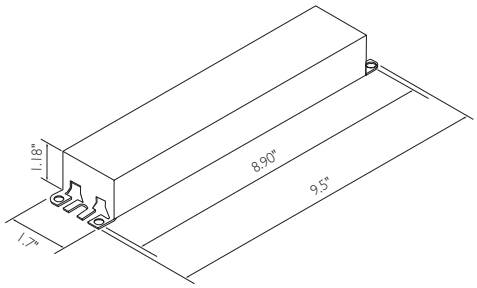


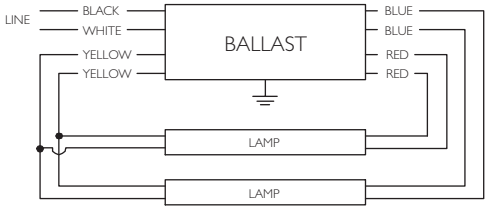

Fig. B

*Refer to pages 9-24 to 9-28 for lead lengths and shipping data*

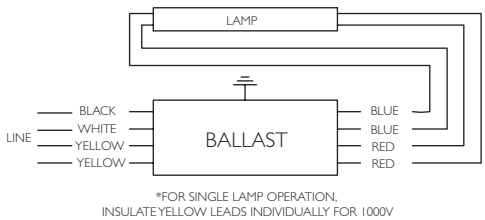
# For 95 - 110W Lamps

HIGH POWER FACTOR SOUND RATED A

| No. of Lamps | Input Volts | Lamp Starting Method | Ballast Family | Catalog Number | Input Power ANSI (Watts) | Ballast Factor | Max. THD % | Line Current (Amps) | Min. Starting Temp. (°F/°C) | Dim. | Wiring Dia. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **F96T12/HO (95W)** | | | | | | | | | | | |
| 1 | 120-277 | RS | Standard | ICN-2S110-SC | 78-77 | 0.91 | 10 | 0.65-0.31 | 60/16 | C | 39A |
| | | | | | | | | 1.28-0.57 | | | |
| 2 | 120-277 | | | | 154-151 | 0.89 | 10 | 0.84-0.58 | | | 21 |
| | | | | | | | | 1.60-0.89 | | | |
| **F96T12/HO (110W)** | | | | | | | | | | | |
| 1 | 120-277 | RS | Standard | ICN-2S110-SC | 100-92 | 0.91 | 10 | 1.10 | -20/-29 | C | 39A |
| | | | | | | | | 0.48 | | | |
| 2 | 120-277 | | | | 194-190 | 0.89 | 10 | 1.74 | | | 21 |
| | | | | | | | | 0.76 | | | |




Diag. 21




Diag. 39A

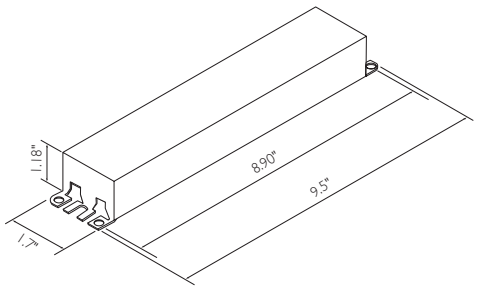



Fig. B

*Refer to pages 9-24 to 9-28 for lead lengths and shipping data*

Notes