HOWARD™
LIGHTING PRODUCTS

Ballast Catalog

www.Howard-Lighting.com

Ballast Catalog

Electronic Ballasts

Welcome to our Ballast Products Catalog. We updated our ballast offerings to better meet the needs of our customers. Our Electronic Ballast section includes our high efficiency multi-volt ballasts available in two, three or four lamp options. Additionally, these ballasts are available in standard, low, and high ballast factor. And, because Howard Lighting is committed to promoting ensuring our products meet market standards, our HE ballasts are CEE listed, and all of our ballasts are UL Listed.

Compact Fluorescent Ballasts

Legislation has impacted some of our current ballast offerings. Because we support the transition to environmentally friendly ballasts, our HID Pulse Start family is in full compliance with the Energy Independence and Security Act of 2007 (EISA2007) efficiency standards.

While our product offerings have expanded considerably within the last few years, our commitment to provide product literature that is user-friendly remains the same. We sort our ballast information by lamp type to help you quickly find the ballast product that best suits your individual needs.

HID Ballasts

Our ballast product lines include electronic fluorescent, electronic compact fluorescent, and high intensity discharge. Each ballast section provides you with a product image in its overview section, as well as specifications, ordering/specification data, wiring diagrams, and case dimensions. You will also find specific product information within each section. For example, you will find lead length information in the electronic fluorescent ballast section, and capacitor, starter, and bracket information in the HID ballast section. Our goal is to create an informational piece of literature to enhance product knowledge, and assist our customers in selecting the very best lighting solutions for their projects. We hope you feel that we have succeeded.

In addition to our ballast product line, Howard Lighting features a full line of lamp and fixture offerings. Contact a Howard sales representative or a member of our support staff with questions or comments.

Howard Corporate Headquarters

Howard Industries' corporate headquarters and computer and medical cart manufacturing facilities are nestled within the 504-acre Howard Technology Park.

Building highlights:
- 60,000 sq ft of office space
- 72,000 sq ft of manufacturing space
- 3,200 sq ft bridge way connecting offices to manufacturing facility

Power Solutions

Howard Power Solutions, originally known as Howard Industries, was founded in 1968 by Billy W. Howard, Sr. Over the past four decades, this company has grown to be the nation's leading manufacturer of distribution transformers, with over 7 million transformers in service throughout the United States and abroad. Located in Laurel, MS, this facility has 2 million square feet, making it the largest transformer plant in the world. Our newest transformer division, Howard Substation Transformers, located near corporate headquarters, began manufacturing operations in April 2005 producing power transformers with higher KVA and voltage ratings.

Technology Solutions

Our new Corporate Headquarters is also home to our technology division, Howard Technology Solutions, and its medical division, Howard Medical. These 2 divisions bring to market cutting-edge, high-quality technology and medical equipment. Whether selling Howard-manufactured products such as desktops, notebooks, servers, and medical carts or partnering with other industry-leading companies to provide over 190,000 products, one can be sure when you buy from Howard, the needed equipment is available at affordable prices.

Lighting Products

Howard Lighting Products markets a vast portfolio including electronic fluorescent ballasts, magnetic HID ballasts, as well as T5/T8 fluorescent lamps, and halogen lamps. Howard Lighting also provides high-qualify linear fluorescent and HID fixtures, and more recently has started designing and offering a large selection of LED fixtures. A line that continues to grow. This division continually updates their product lines to meet the ever-changing demands of the market.

Transportation

Howard Transportation, a wholly-owned subsidiary of Howard Industries, Inc., operates a full-load, long-haul, flat-bed common carrier truck line and brokerage firm that transports commodities and industrial goods throughout the continental United States. Initially started to transport Howard Power Solutions' raw materials and finished products, this division today consists of over 200 trucks with regional terminal facilities also located in West Virginia and North Carolina.

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Electronic Fluorescent Ballasts

Instant Start

Instant Start CFL/Long Tube

Rapid Start

Program Rapid Start

Identifying the fluorescent model number

To simplify the identification of Howard ballasts for specifying, ordering or stocking, every item has been assigned an easy-to-use, easy-to-understand model number. Each individual digit represents a specific characteristic of the ballast. Each alpha/numeric model number provides a complete description of each ballast.

EP2/32IS/MV/MC/HE	ELECTRONIC BALLAST
EP**L**2/32IS/MV/MC/HE	LOW POWER
EP**H**3/32IS/MV/MC/HE	HIGH POWER
E**P**2/32IS/MV/MC/HE	PRECISION POWER < 10% THD
EP**3**/32IS/MV/MC/HE	NUMBER OF LAMPS SUPPORTED BY THE BALLAST
EP3/**32**IS/MV/MC/HE	PRIMARY LAMP DESIGN
EP3/32**IS**/MV/MC/HE	INSTANT START, PARALLEL CIRCUIT
EP2/32**PRS**/MV/MC/HE	PROGRAM RAPID START
EP2/110**RS**/MV/SC	RAPID START
EP2/32IS/**MV**/MC/HE	INPUT LINE VOLTAGE (MULTI-VOLT STANDARD 120-277V)
EP2/32IS/MV/**MC**/HE	MICRO-CASE
EPH4/32IS/MV/**SC**/HE	SMALL-CASE
EP2/32IS/MV/MC/**HE**	HIGH EFFICIENCY BALLAST

Fluorescent Electronic Ballast

Lead Lengths

Electronic Ballast

Compact Fluorescent Ballasts

HID

Fluorescent Ballast Lead Lengths									
	CEE Listed	Ballast Operation	Yellow	Red	Blue	Red/ White	Blue/ White	White	Black
E2/32IS-120MC		Instant Start	-	12	12	-	-	12	12
EP2/32IS/MV/MC	CEE	Instant Start	-	46	31	-	-	25	25
EPL3/32IS/MV/MC	CEE	Instant Start	-	37	31	-	-	25	25
EP2/32IS/MV/MC/HE	CEE	Instant Start	-	46	31	-	-	25	25
E2/32PRS/MV/MC/HE	CEE	Program Rapid Start	46	31	31	-	-	24	24
EPL2/32IS/MV/MC/HE	CEE	Instant Start	-	46	31	-	-	25	25
EPH2/32IS/MV/MC/HE	CEE	Instant Start	-	46	31	-	-	25	25
EP3/32IS/MV/MC/HE	CEE	Instant Start	-	46	31	-	-	25	25
EPL3/32IS/MV/SC/HE	CEE	Instant Start	-	41	30	-	-	24	24
EPH3/32IS/MV/MC/HE	CEE	Instant Start	-	46	31	-	-	25	25
EP4/32IS/MV/MC/HE	CEE	Instant Start	-	46	31	-	-	25	25
EP4/32PPRS/MV/SC/HE	CEE	Parallel Program Rapid Start	48	33	33	33	33	25	25
EPL4/32IS/MV/MC/HE	CEE	Instant Start	-	46	31	-	-	25	25
EPH4/32IS/MV/SC/HE	CEE	Instant Start	46	31	31	-	-	25	25
EP2/59IS/MV/MC/HE		Instant Start	-	79	46	-	-	25	25
EP2/40IS-TT/MV/SC		Instant Start	-	43	32	-	-	26	26
EP2/28T5/PRS/MV		Program Rapid Start	44	28	28	-	-	24	24
EP2/39HO/PRS/MV		Program Rapid Start	44	28	28	-	-	24	24
EP2/54HO/PRS/MV/W/MC		Program Rapid Start	46	31	31	-	-	25	25
EP2/40RS/MV/MC Ⓔ		Rapid Start	46	31	31	-	-	25	25
EP2/110RS/MV/SC Ⓔ		Rapid Start	71	44	44	-	-	27	27
E2/75IS-120MC Ⓔ		Instant Start	-	79	46	-	-	22	22
EP2/75IS/MV/SC Ⓔ		Instant Start	-	60	60	-	-	25	25

CEE Listed: Visit cee1.org for a list of qualified products

Ⓔ Circle E logo indicates that this product complies with federal energy efficiency requirements.

Specifications

Instant Start
- Ballast shall have a five-year warranty
- Ballast shall be UL certified
- Ballast shall be sound rated Class A
- Ballast shall be Class P Type 1 Outdoor
- Ballast shall have a Lamp Current Crest Factor of <1.7
- Ballast shall withstand line transients as specified in ANSI C62.41-1991
- Ballast shall comply with the limits of FCC Part 18C Class A
- Ballast shall have a lamp operating frequency greater than 40KHz
- Ballast shall have a 0 F minimum lamp starting temperature for primary lamp
- Ballast shall be Instant Start
- Ballast shall be Parallel Lamp Operation
- Ballast shall have a minimum Power Factor of 98% for primary lamp operation
- Ballast shall operate within a +/- 10% of the ballast specified line voltage at an input frequency of 50Hz or 60Hz
- Ballast shall have a maximum case hot spot temperature of 90°C

Rapid Start – Residential Rated
- Ballast shall have a five year warranty
- Ballast shall be UL certified
- Ballast shall be sound rated Class A
- Ballast shall be Class P Type 1 Outdoor
- Ballast shall have a Lamp Current Crest Factor of <1.7
- Ballast shall withstand line transients as specified in ANSI C62.41-1991
- Ballast shall comply with the limits of FCC Part 18C Class B (residential)
- Ballast shall have a lamp operating frequency greater than 40KHz
- Ballast shall have a 0 F minimum lamp starting temperature for primary lamp
- Ballast shall be Instant Start
- Ballast shall be Parallel Lamp Operation
- Ballast shall have a minimum Power Factor of 98% for primary lamp operation
- Ballast shall operate within a +/- 10% of the ballast specified line voltage at an input frequency of 60Hz
- Ballast shall have a maximum case hot spot temperature of 90 C

Rapid Start
- Ballast shall have a five year warranty
- Ballast shall be UL certified
- Ballast shall be sound rated Class A
- Ballast shall be Class P Type 1 Outdoor
- Ballast shall have a Lamp Current Crest Factor of <1.7
- Ballast shall withstand line transients as specified in ANSI C62.41-1991
- Ballast shall comply with the limits of FCC Part 18C Class A
- Ballast shall have a lamp operating frequency greater than 20kHz
- Ballast shall have a 32° F/ 0° C minimum lamp starting temperature for primary lamp
- Ballast shall be potted
- Ballast shall be Rapid Start
- Ballast shall be Series Lamp Operation
- Ballast shall have minimum Power Factor of 98% for primary lamp operation
- Ballast shall operate within +/- 10% of the ballast specified line voltage at 60Hz
- Ballast shall have a maximum case hot spot temperature of 90°C

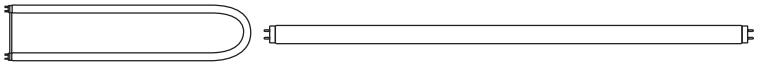
Instant Start CFL/ Long Twin Tube
- Ballast shall have a five-year warranty
- Ballast shall be UL listed
- Ballast shall be sound rated Class A
- Ballast shall be Class P Type 1 Outdoor
- Ballast shall have a Lamp Current Crest Factor of <1.7
- Ballast shall withstand line transients as specified in ANSI C62.41-1991
- Ballast shall comply with the limits of FCC Part 18C Class A
- Ballast shall have a lamp operating frequency greater than 20kHz
- Ballast shall have a 0° F minimum lamp starting temperature for primary lamp
- Ballast shall be potted
- Ballast shall be Rapid Start
- Ballast shall be Series Lamp Operation
- Ballast shall have minimum Power Factor of 99% for primary lamp operation
- Ballast shall operate within +/- 10% of the ballast specified line voltage at 60Hz
- Ballast shall have a maximum case hot spot temperature of 90° C

T5 Program Rapid Start
- Ballast with a maximum case temperature of 90°C shall have a three-year warranty
- Ballast with a maximum case temperature of 70°C shall have a five-year warranty
- Ballast shall be UL listed
- Ballast shall be sound rated Class A
- Ballast shall be Class P Type 1 Outdoor
- Ballast shall have a Lamp Current Crest Factor of <1.7
- Ballast shall withstand line transients as specified in ANSI C62.41-1991
- Ballast shall comply with the limits of FCC Part 18C Class A
- Ballast shall have a lamp operating frequency of 40kHz
- Ballast shall have a 0° F minimum lamp starting temperature for primary lamp
- Ballast shall be Program Rapid Start
- Ballast shall be Series Lamp Operation
- Ballast shall have end-of-life protection
- Ballast shall have a 0°F minimum starting temperature
- Ballast shall have minimum Power Factor of 98% for primary lamp operation
- Ballast shall operate within +/- 10% of the ballast specified line voltage at 60Hz
- Ballast shall operate at a maximum case hot spot temperature of 90°C

T8 Program Rapid Start
- Ballast shall have a five year warranty
- Ballast shall be UL listed
- Ballast shall be sound rated Class A
- Ballast shall be Class P Type 1 Outdoor
- Ballast shall have a Lamp Current Crest Factor of <1.7
- Ballast shall withstand line transients as specified in ANSI C62.41-2002
- Ballast shall comply with the limits of FCC Part 18C Class A
- Ballast shall have a lamp operating frequency of 40kHz
- Ballast shall have a 0° F minimum lamp starting temperature for primary lamp
- Ballast shall be Program Start
- Ballast shall be Series Lamp Operation
- Ballast shall have minimum Power Factor of 98% for primary lamp operation
- Ballast shall operate within +/- 10% of the ballast specified line voltage at 60Hz
- Ballast shall operate at a maximum case hot spot temperature of 90°C

Fluorescent Electronic Ballast

F32T8, FB31T8, FB32T8/6
Primary Lamp Design



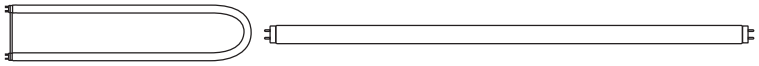
Electronic Ballast

Compact Fluorescent Ballasts

HID

Ballast Factor	Number of Lamps per Ballast	Lamp Watts	Ballast Model Number	Line Voltage	Line Current (amps)	Input Watts (ANSI)	Total Harmonic Distortion Rating	Ballast Factor (ANSI)	Ballast Efficacy Factor	Wir./Dim Diag Pg. 29-30
Standard Power	2	32	E2/32IS-120MC	120	0.49	57	<20%	0.85	1.49	2/A2
	2	32	EP2/32IS/MV/MC	120	0.50	60	<10%	0.87	1.45	2/A2
	2	32	EP2/32IS/MV/MC	277	0.21	59	<10%	0.87	1.47	2/A2
	2	32	EP2/32IS/MV/MC/HE	120	0.46	55	<10%	0.89	1.62	2/A3
	2	32	EP2/32IS/MV/MC/HE	277	0.20	54	<10%	0.89	1.65	2/A3
	2	32	EP2/32PRS/MV/MC/HE	120	0.48	57	<10%	0.88	1.54	7/A3
	2	32	EP2/32PRS/MV/MC/HE	277	0.21	56	<10%	0.88	1.57	7/A3
Low Power	2	32	EPL2/32IS/MV/MC/HE	120	0.40	49	<10%	0.78	1.59	2/A3
	2	32	EPL2/32IS/MV/MC/HE	277	0.18	48	<15%	0.78	1.63	2/A3
High Power	2	32	EPH2/32IS/MV/MC/HE	120	0.62	74	<10%	1.18	1.59	2/A2
	2	32	EPH2/32IS/MV/MC/HE	277	0.27	73	<10%	1.18	1.62	2/A2
Standard Power	3	32	EP3/32IS/MV/MC/HE	120	0.71	85	<10%	0.88	1.04	3/A2
	3	32	EP3/32IS/MV/MC/HE	277	0.31	83	<10%	0.88	1.06	3/A2
Low Power	3	32	EPL3/32IS/MV/MC	120	0.64	76	<10%	0.78	1.03	3/A2
	3	32	EPL3/32IS/MV/MC	277	0.27	74	<10%	0.78	1.05	3/A2
	3	32	EPL3/32IS/MV/SC/HE	120	0.63	72	<10%	0.75	1.04	3/A1
	3	32	EPL3/32IS/MV/SC/HE	277	0.26	72	<10%	0.75	1.04	3/A1
High Power	3	32	EPH3/32IS/MV/MC/HE	120	0.91	109	<10%	1.18	1.08	3/A2
	3	32	EPH3/32IS/MV/MC/HE	277	0.39	107	<10%	1.18	1.10	3/A2
Standard Power	4	32	EP4/32IS/MV/MC/HE	120	0.93	110	<10%	0.88	0.80	4/A2
	4	32	EP4/32IS/MV/MC/HE	277	0.40	108	<10%	0.88	0.81	4/A2
	4	32	EP4/32PPRS/MV/SC/HE	120	0.95	114	<10%	0.86	0.75	9/A11
	4	32	EP4/32PPRS/MV/SC/HE	277	0.42	114	<10%	0.86	0.76	9/A11
Low Power	4	32	EPL4/32IS/MV/MC/HE	120	0.82	98	<10%	0.77	0.79	4/A2
	4	32	EPL4/32IS/MV/MC/HE	277	0.35	96	<10%	0.77	0.80	4/A2
High Power	4	32	EPH4/32IS/MV/SC/HE	120	1.24	145	<10%	1.16	0.80	4/A8
	4	32	EPH4/32IS/MV/SC/HE	277	0.53	144	<10%	1.16	0.81	4/A8

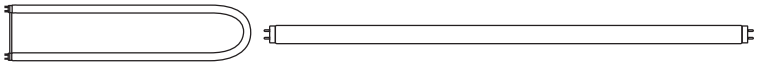
F32T8, FB31T8, FB32T8/6
One Lamp Out



Ballast Factor	Number of Lamps per Ballast	Lamp Watts	Ballast Model Number	Line Voltage	Line Current (amps)	Input Watts (ANSI)	Total Harmonic Distortion Rating	Ballast Factor (ANSI)	Ballast Efficacy Factor	Wir./Dim Diag Pg. 29-30
Standard Power	1	32	E2/32IS-120MC	120	0.31	38	<30%	1.11	2.92	2/A2
	1	32	EP2/32IS/MV/MC	120	0.33	39	<10%	1.00	2.56	2/A2
	1	32	EP2/32IS/MV/MC	277	0.14	39	<10%	1.00	2.56	2/A2
	1	32	EP2/32IS/MV/MC/HE	120	0.29	35	<10%	1.08	3.09	2/A3
	1	32	EP2/32IS/MV/MC/HE	277	0.13	34	<15%	1.08	3.18	2/A3
Low Power	1	32	EPL2/32IS/MV/MC/HE	120	0.26	31	<10%	0.93	3.00	2/A3
	1	32	EPL2/32IS/MV/MC/HE	277	0.12	30	<15%	0.93	3.10	2/A3
High Power	1	32	EPH2/32IS/MV/MC/HE	120	0.37	45	<10%	1.37	3.04	2/A2
	1	32	EPH2/32IS/MV/MC/HE	277	0.17	45	<15%	1.37	3.04	2/A2
Standard Power	2	32	EP3/32IS/MV/MC/HE	120	0.53	63	<10%	0.99	1.57	3/A2
	2	32	EP3/32IS/MV/MC/HE	277	0.24	63	<15%	0.99	1.57	3/A2
Low Power	2	32	EPL3/32IS/MV/MC	120	0.49	58	<10%	0.92	1.59	3/A2
	2	32	EPL3/32IS/MV/MC	277	0.21	57	<15%	0.92	1.61	3/A2
	2	32	EPL3/32IS/MV/SC/HE	120	0.46	55	<10%	0.85	1.55	3/A1
	2	32	EPL3/32IS/MV/SC/HE	277	0.20	54	<10%	0.85	1.57	3/A1
High Power	2	32	EPH3/32IS/MV/MC/HE	120	0.69	81	<10%	1.27	1.57	3/A2
	2	32	EPH3/32IS/MV/MC/HE	277	0.30	80	<10%	1.27	1.59	3/A2
Standard Power	3	32	EP4/32IS/MV/MC/HE	120	0.77	92	<10%	0.96	1.04	4/A2
	3	32	EP4/32IS/MV/MC/HE	277	0.34	89	<10%	0.96	1.08	4/A2
	3	32	EP4/32PPRS/MV/SC/HE	120	0.79	95	<10%	0.92	0.97	10/11
	3	32	EP4/32PPRS/MV/SC/HE	277	0.35	95	<10%	0.93	0.99	10/11
Low Power	3	32	EPL4/32IS/MV/MC/HE	120	0.68	81	<10%	0.82	1.01	4/A2
	3	32	EPL4/32IS/MV/MC/HE	277	0.29	80	<10%	0.82	1.03	4/A2
High Power	3	32	EPH4/32IS/MV/SC/HE	120	1.01	120	<10%	1.24	1.03	4/A8
	3	32	EPH4/32IS/MV/SC/HE	277	0.44	120	<10%	1.24	1.03	4/A8

Fluorescent Electronic Ballast

F25T8/ES, F32T8/ES(25W)



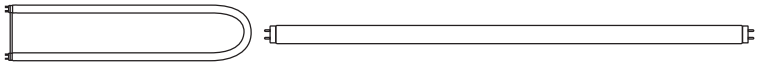
Electronic Ballast

Compact Fluorescent Ballasts

HID

Ballast Factor	Number of Lamps per Ballast	Lamp Watts	Ballast Model Number	Line Voltage	Line Current (amps)	Input Watts (ANSI)	Total Harmonic Distortion Rating	Ballast Factor (ANSI)	Ballast Efficacy Factor	Wir./Dim Diag Pg. 29-30
Standard Power	2	25	EP2/32IS/MV/MC	120	0.39	47	<10%	0.89	1.88	2/A2
	2	25	EP2/32IS/MV/MC	277	0.17	46	<10%	0.89	1.89	2/A2
	2	25	EP2/32IS/MV/MC/HE	120	0.39	46	<10%	0.89	1.93	2/A3
	2	25	EP2/32IS/MV/MC/HE	277	0.17	45	<15%	0.89	1.98	2/A3
	2	25	EP2/32PRS/MV/MC/HE	120	0.42	50	<10%	1.00	2.00	7/A3
	2	25	EP2/32PRS/MV/MC/HE	277	0.18	49	<10%	1.00	2.04	7/A3
Low Power	2	25	EPL2/32IS/MV/MC/HE	120	0.33	39	<10%	0.78	2.00	2/A3
	2	25	EPL2/32IS/MV/MC/HE	277	0.14	38	<15%	0.78	2.05	2/A3
High Power	2	25	EPH2/32IS/MV/MC/HE	120	0.53	63	<10%	1.18	1.87	2/A2
	2	25	EPH2/32IS/MV/MC/HE	277	0.23	62	<15%	1.18	1.90	2/A2
Standard Power	3	25	EP3/32IS/MV/MC/HE	120	0.56	68	<10%	0.90	1.32	3/A2
	3	25	EP3/32IS/MV/MC/HE	277	0.25	68	<15%	0.90	1.32	3/A2
Low Power	3	25	EPL3/32IS/MV/MC	120	0.53	63	<10%	0.85	1.35	3/A2
	3	25	EPL3/32IS/MV/MC	277	0.23	61	<15%	0.85	1.39	3/A2
	3	25	EPL3/32IS/MV/SC/HE	120	0.49	58	<10%	0.75	1.29	3/A1
	3	25	EPL3/32IS/MV/SC/HE	277	0.21	57	<10%	0.75	1.32	3/A1
High Power	3	25	EPH3/32IS/MV/MC/HE	120	0.72	86	<10%	1.20	1.40	3/A2
	3	25	EPH3/32IS/MV/MC/HE	277	0.32	85	<10%	1.20	1.41	3/A2
Standard Power	4	25	EP4/32IS/MV/MC/HE	120	0.74	88	<10%	0.88	1.00	4/A2
	4	25	EP4/32IS/MV/MC/HE	277	0.33	88	<10%	0.88	1.00	4/A2
	4	25	EP4/32PPRS/MV/SC/HE	120	0.77	93	<10%	0.89	0.96	9/A11
	4	25	EP4/32PPRS/MV/SC/HE	277	0.34	93	<10%	0.89	0.96	9/A11
Low Power	4	25	EPL4/32IS/MV/MC/HE	120	0.69	82	<10%	0.78	0.95	4/A2
	4	25	EPL4/32IS/MV/MC/HE	277	0.30	81	<10%	0.78	0.96	4/A2
High Power	4	25	EPH4/32IS/MV/SC/HE	120	0.91	108	<10%	1.16	1.07	4/A8
	4	25	EPH4/32IS/MV/SC/HE	277	0.40	109	<10%	1.16	1.06	4/A8

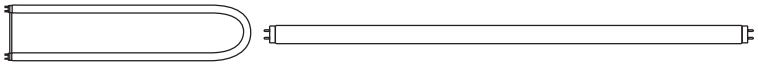
F25T8/ES, F32T8/ES(25W)
One Lamp Out



Ballast Factor	Number of Lamps per Ballast	Lamp Watts	Ballast Model Number	Line Voltage	Line Current (amps)	Input Watts (ANSI)	Total Harmonic Distortion Rating	Ballast Factor (ANSI)	Ballast Efficacy Factor	Wir./Dim Diag Pg. 29-30
Standard Power	1	25	EP2/32IS/MV/MC	120	0.24	29	<10%	1.07	3.68	2/A2
	1	25	EP2/32IS/MV/MC	277	0.105	28	<15%	1.07	3.69	2/A2
	1	25	EP2/32IS/MV/MC/HE	120	0.24	29	<10%	1.08	3.72	2/A3
	1	25	EP2/32IS/MV/MC/HE	277	0.11	29	<15%	1.08	3.72	2/A3
Low Power	1	25	EPL2/32IS/MV/MC/HE	120	0.21	25	<10%	0.93	3.72	2/A3
	1	25	EPL2/32IS/MV/MC/HE	277	0.10	23	<20%	0.93	4.04	2/A3
High Power	1	25	EPH2/32IS/MV/MC/HE	120	0.32	38	<10%	1.38	3.63	2/A2
	1	25	EPH2/32IS/MV/MC/HE	277	0.15	38	<15%	1.38	3.63	2/A2
Standard Power	2	25	EP3/32IS/MV/MC/HE	120	0.43	51	<10%	1.00	1.96	3/A2
	2	25	EP3/32IS/MV/MC/HE	277	0.19	51	<15%	1.00	1.96	3/A2
Low Power	2	25	EPL3/32IS/MV/MC	120	0.41	48	<10%	0.95	1.98	3/A2
	2	25	EPL3/32IS/MV/MC	277	0.18	47	<15%	0.92	1.96	3/A2
	2	25	EPL3/32IS/MV/SC/HE	120	0.36	43	<10%	0.84	1.95	3/A1
	2	25	EPL3/32IS/MV/SC/HE	277	0.16	43	<11%	0.84	1.95	3/A1
High Power	2	25	EPH3/32IS/MV/MC/HE	120	0.56	67	<10%	1.28	1.91	3/A2
	2	25	EPH3/32IS/MV/MC/HE	277	0.25	66	<15%	1.28	1.94	3/A2
Standard Power	3	25	EP4/32IS/MV/MC/HE	120	0.62	74	<10%	0.96	1.30	4/A2
	3	25	EP4/32IS/MV/MC/HE	277	0.27	73	<10%	0.96	1.32	4/A2
	3	25	EP4/32PPRS/MV/SC/HE	120	0.64	76	<10%	0.94	1.23	10/11
	3	25	EP4/32PPRS/MV/SC/HE	277	0.28	76	<10%	0.94	1.24	10/11
Low Power	3	25	EPL4/32IS/MV/MC/HE	120	0.57	68	<10%	0.84	1.24	4/A2
	3	25	EPL4/32IS/MV/MC/HE	277	0.25	66	<15%	0.84	1.27	4/A2
High Power	3	25	EPH4/32IS/MV/SC/HE	120	0.77	92	<10%	1.24	1.35	4/A8
	3	25	EPH4/32IS/MV/SC/HE	277	0.34	93	<10%	1.24	1.33	4/A8

Fluorescent Electronic Ballast

F28T8/ES, F32T8/ES(28W)



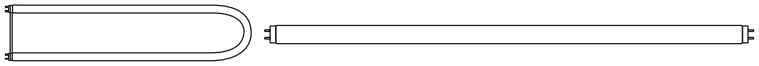
Electronic Ballast

Compact Fluorescent Ballasts

HID

Ballast Factor	Number of Lamps per Ballast	Lamp Watts	Ballast Model Number	Line Voltage	Line Current (amps)	Input Watts (ANSI)	Total Harmonic Distortion Rating	Ballast Factor (ANSI)	Ballast Efficacy Factor	Wir./Dim Diag Pg. 29-30
Standard Power	2	28	EP2/32IS/MV/MC	120	0.41	49	<10%	0.89	1.81	2/A2
	2	28	EP2/32IS/MV/MC	277	0.18	48	<10%	0.89	1.85	2/A2
	2	28	EP2/32IS/MV/MC/HE	120	0.41	49	<10%	0.89	1.82	2/A3
	2	28	EP2/32IS/MV/MC/HE	277	0.18	47	<15%	0.89	1.89	2/A3
	2	28	EP2/32PRS/MV/MC/HE	120	0.44	52	<10%	0.90	1.73	7/A3
	2	28	EP2/32PRS/MV/MC/HE	277	0.19	51	<10%	0.90	1.76	7/A3
Low Power	2	28	EPL2/32IS/MV/MC/HE	120	0.35	41	<10%	0.78	1.90	2/A3
	2	28	EPL2/32IS/MV/MC/HE	277	0.15	41	<15%	0.78	1.90	2/A3
High Power	2	28	EPH2/32IS/MV/MC/HE	120	0.54	64	<10%	1.18	1.84	2/A2
	2	28	EPH2/32IS/MV/MC/HE	277	0.24	63	<15%	1.18	1.87	2/A2
Standard Power	3	28	EP3/32IS/MV/MC/HE	120	0.60	72	<10%	0.88	1.22	3/A2
	3	28	EP3/32IS/MV/MC/HE	277	0.26	70	<15%	0.88	1.26	3/A2
	3	28	EP3/32IS/MV/MC/HE	120	0.60	72	<10%	0.88	1.22	3/A2
	3	28	EP3/32IS/MV/MC/HE	277	0.26	70	<15%	0.88	1.26	3/A2
Low Power	3	28	EPL3/32IS/MV/MC	120	0.55	64	<10%	0.81	1.27	3/A2
	3	28	EPL3/32IS/MV/MC	277	0.24	63	<15%	0.81	1.29	3/A2
	3	28	EPL3/32IS/MV/SC/HE	120	0.52	62	<10%	0.75	1.21	3/A1
	3	28	EPL3/32IS/MV/SC/HE	277	0.22	62	<10%	0.75	1.21	3/A1
High Power	3	28	EPH3/32IS/MV/MC/HE	120	0.78	93	<10%	1.18	1.27	3/A2
	3	28	EPH3/32IS/MV/MC/HE	277	0.34	92	<10%	1.18	1.28	3/A2
Standard Power	4	28	EP4/32IS/MV/MC/HE	120	0.79	94	<10%	0.88	0.94	4/A2
	4	28	EP4/32IS/MV/MC/HE	277	0.35	94	<10%	0.88	0.94	4/A2
	4	28	EP4/32PPRS/MV/SC/HE	120	0.84	100	<10%	0.85	0.85	9/A11
	4	28	EP4/32PPRS/MV/SC/HE	277	0.37	100	<10%	0.86	086	9/A11
Low Power	4	28	EPL4/32IS/MV/MC/HE	120	0.71	84	<10%	0.77	0.92	4/A2
	4	28	EPL4/32IS/MV/MC/HE	277	0.31	84	<10%	0.77	0.92	4/A2
High Power	4	28	EPH4/32IS/MV/SC/HE	120	0.98	116	<10%	1.16	1.00	4/A8
	4	28	EPH4/32IS/MV/SC/HE	277	0.42	115	<10%	1.16	1.01	4/A8

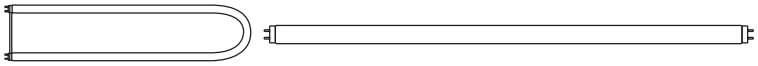
F28T8/ES, F32T8/ES(28W)
One Lamp Out



Ballast Factor	Number of Lamps per Ballast	Lamp Watts	Ballast Model Number	Line Voltage	Line Current (amps)	Input Watts (ANSI)	Total Harmonic Distortion Rating	Ballast Factor (ANSI)	Ballast Efficacy Factor	Wir./Dim Diag Pg. 29-30
Standard Power	1	28	EP2/32IS/MV/MC	120	0.26	31	<10%	1.07	3.45	2/A2
	1	28	EP2/32IS/MV/MC	277	0.12	31	<15%	1.07	3.46	2/A2
	1	28	EP2/32IS/MV/MC/HE	120	0.25	30	<10%	1.08	3.60	2/A3
	1	28	EP2/32IS/MV/MC/HE	277	0.11	29	<15%	1.08	3.72	2/A3
Low Power	1	28	EPL2/32IS/MV/MC/HE	120	0.22	26	<10%	0.93	3.58	2/A3
	1	28	EPL2/32IS/MV/MC/HE	277	0.10	24	<20%	0.93	3.88	2/A3
High Power	1	28	EPH2/32IS/MV/MC/HE	120	0.33	39	<10%	1.38	3.54	2/A2
	1	28	EPH2/32IS/MV/MC/HE	277	0.15	39	<15%	1.38	3.54	2/A2
Standard Power	2	28	EP3/32IS/MV/MC/HE	120	0.45	54	<10%	0.99	1.83	3/A2
	2	28	EP3/32IS/MV/MC/HE	277	0.20	53	<15%	0.99	1.87	3/A2
Low Power	2	28	EPL3/32IS/MV/MC	120	0.42	49	<10%	0.92	1.88	3/A2
	2	28	EPL3/32IS/MV/MC	277	0.19	48	<15%	0.92	1.92	3/A2
	2	28	EPL3/32IS/MV/SC/HE	120	0.40	48	<10%	0.84	1.75	3/A1
	2	28	EPL3/32IS/MV/SC/HE	277	0.17	47	<11%	0.84	1.79	3/A1
High Power	2	28	EPH3/32IS/MV/MC/HE	120	0.59	70	<10%	1.27	1.81	3/A2
	2	28	EPH3/32IS/MV/MC/HE	277	0.26	69	<15%	1.27	1.84	3/A2
Standard Power	3	28	EP4/32IS/MV/MC/HE	120	0.65	77	<10%	0.96	1.25	4/A2
	3	28	EP4/32IS/MV/MC/HE	277	0.29	77	<10%	0.96	1.25	4/A2
	3	28	EP4/32PPRS/MV/SC/HE	120	0.70	83	<10%	0.92	1.11	10/11
	3	28	EP4/32PPRS/MV/SC/HE	277	0.31	83	<12%	0.93	1.12	10/11
Low Power	3	28	EPL4/32IS/MV/MC/HE	120	0.59	70	<10%	0.82	1.17	4/A2
	3	28	EPL4/32IS/MV/MC/HE	277	0.26	70	<10%	0.82	1.17	4/A2
High Power	3	28	EPH4/32IS/MV/SC/HE	120	0.80	95	<10%	1.24	1.31	4/A8
	3	28	EPH4/32IS/MV/SC/HE	277	0.36	98	<10%	1.24	1.27	4/A8

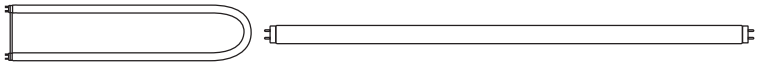
Fluorescent Electronic Ballast

F30T8/ES, F32T8/ES(30W)



Ballast Factor	Number of Lamps per Ballast	Lamp Watts	Ballast Model Number	Line Voltage	Line Current (amps)	Input Watts (ANSI)	Total Harmonic Distortion Rating	Ballast Factor (ANSI)	Ballast Efficacy Factor	Wir./Dim Diag Pg. 29-30
Standard Power	2	30	E2/32IS-120MC	120	0.45	54	<20%	0.87	1.61	2/A2
	2	30	EP2/32IS/MV/MC	277	0.20	55	<10%	0.87	1.58	2/A2
	2	30	EP2/32IS/MV/MC	120	0.47	56	<10%	0.87	1.55	2/A2
	2	30	EP2/32IS/MV/MC/HE	120	0.44	51	<10%	0.89	1.75	2/A3
	2	30	EP2/32IS/MV/MC/HE	277	0.19	51	<15%	0.89	1.75	2/A3
	2	30	EP2/32PRS/MV/MC/HE	120	0.45	54	<10%	0.90	1.67	7/A3
	2	30	EP2/32PRS/MV/MC/HE	277	0.20	53	<10%	0.90	1.70	7/A3
Low Power	2	30	EPL2/32IS/MV/MC/HE	120	0.38	45	<10%	0.78	1.73	2/A3
	2	30	EPL2/32IS/MV/MC/HE	277	0.17	46	<15%	0.78	1.70	2/A3
High Power	2	30	EPH2/32IS/MV/MC/HE	120	0.58	69	<10%	1.18	1.71	2/A2
	2	30	EPH2/32IS/MV/MC/HE	277	0.25	69	<15%	1.18	1.71	2/A2
Standard Power	3	30	EP3/32IS/MV/MC/HE	120	0.65	79	<10%	0.88	1.11	3/A2
	3	30	EP3/32IS/MV/MC/HE	277	0.28	77	<15%	0.88	1.14	3/A2
Low Power	3	30	EPL3/32IS/MV/MC	120	0.60	71	<10%	0.81	1.14	3/A2
	3	30	EPL3/32IS/MV/MC	277	0.26	70	<15%	0.81	1.16	3/A2
	3	30	EPL3/32IS/MV/SC/HE	120	0.57	69	<10%	0.75	1.09	3/A1
	3	30	EPL3/32IS/MV/SC/HE	277	0.24	68	<10%	0.75	1.10	3/A1
High Power	3	30	EPH3/32IS/MV/MC/HE	120	0.84	99	<10%	1.18	1.19	3/A2
	3	30	EPH3/32IS/MV/MC/HE	277	0.37	99	<10%	1.18	1.19	3/A2
Standard Power	4	30	EP4/32IS/MV/MC/HE	120	0.85	101	<10%	0.88	0.87	4/A2
	4	30	EP4/32IS/MV/MC/HE	277	0.37	100	<10%	0.88	0.88	4/A2
	4	30	EP4/32PPRS/MV/SC/HE	120	0.87	104	<10%	0.83	0.80	9/A11
	4	30	EP4/32PPRS/MV/SC/HE	277	0.38	104	<10%	0.84	0.80	9/A11
Low Power	4	30	EPL4/32IS/MV/MC/HE	120	0.76	90	<10%	0.77	0.86	4/A2
	4	30	EPL4/32IS/MV/MC/HE	277	0.33	89	<10%	0.77	0.87	4/A2
High Power	4	30	EPH4/32IS/MV/SC/HE	120	1.01	120	<10%	1.16	0.97	4/A8
	4	30	EPH4/32IS/MV/SC/HE	277	0.44	120	<10%	1.16	0.97	4/A8

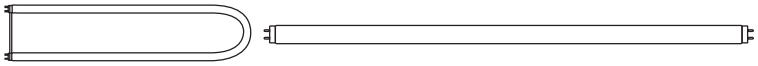
F30T8/ES, F32T8/ES(30W)
One Lamp Out



Ballast Factor	Number of Lamps per Ballast	Lamp Watts	Ballast Model Number	Line Voltage	Line Current (amps)	Input Watts (ANSI)	Total Harmonic Distortion Rating	Ballast Factor (ANSI)	Ballast Efficacy Factor	Wir./Dim Diag Pg. 29-30
Standard Power	1	30	EP2/32IS/MV/MC	120	0.31	37	<10%	1.00	2.70	2/A2
	1	30	EP2/32IS/MV/MC	277	0.13	37	<11%	1.00	2.70	2/A2
	1	30	EP2/32IS/MV/MC/HE	120	0.27	31	<10%	1.08	3.48	2/A3
	1	30	EP2/32IS/MV/MC/HE	277	0.12	30	<15%	1.08	3.60	2/A3
Low Power	1	30	EPL2/32IS/MV/MC/HE	120	0.24	28	<10%	0.93	3.32	2/A3
	1	30	EPL2/32IS/MV/MC/HE	277	0.11	28	<15%	0.93	3.32	2/A3
High Power	1	30	EPH2/32IS/MV/MC/HE	120	0.36	44	<10%	1.38	3.14	2/A2
	1	30	EPH2/32IS/MV/MC/HE	277	0.16	44	<15%	1.38	3.14	2/A2
Standard Power	2	30	EP3/32IS/MV/MC/HE	120	0.48	59	<10%	0.99	1.68	3/A2
	2	30	EP3/32IS/MV/MC/HE	277	0.21	58	<15%	0.99	1.71	3/A2
Low Power	2	30	EPL3/32IS/MV/MC	120	0.45	54	<10%	0.92	1.70	3/A2
	2	30	EPL3/32IS/MV/MC	277	0.20	53	<15%	0.92	1.74	3/A2
	2	30	EPL3/32IS/MV/SC/HE	120	0.44	52	<10%	0.84	1.62	3/A1
	2	30	EPL3/32IS/MV/SC/HE	277	0.19	52	<11%	0.84	1.62	3/A1
High Power	2	30	EPH3/32IS/MV/MC/HE	120	0.64	76	<10%	1.27	1.67	3/A2
	2	30	EPH3/32IS/MV/MC/HE	277	0.28	75	<15%	1.27	1.69	3/A2
Standard Power	3	30	EP4/32IS/MV/MC/HE	120	0.71	84	<10%	0.96	1.14	4/A2
	3	30	EP4/32IS/MV/MC/HE	277	0.31	84	<10%	0.96	1.14	4/A2
	3	30	EP4/32PPRS/MV/SC/HE	120	0.72	86	<10%	0.88	1.03	10/11
	3	30	EP4/32PPRS/MV/SC/HE	277	0.32	86	<10%	0.89	1.03	10/11
Low Power	3	30	EPL4/32IS/MV/MC/HE	120	0.63	75	<10%	0.82	1.09	4/A2
	3	30	EPL4/32IS/MV/MC/HE	277	0.28	74	<10%	0.82	1.11	4/A2
High Power	3	30	EPH4/32IS/MV/SC/HE	120	0.88	105	<10%	1.24	1.18	4/A8
	3	30	EPH4/32IS/MV/SC/HE	277	0.37	101	<10%	1.24	1.23	4/A8

Fluorescent Electronic Ballast

F17T8, FB17T8



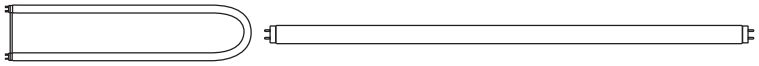
Electronic Ballast

Compact Fluorescent Ballasts

HID

Ballast Factor	Number of Lamps per Ballast	Lamp Watts	Ballast Model Number	Line Voltage	Line Current (amps)	Input Watts (ANSI)	Total Harmonic Distortion Rating	Ballast Factor (ANSI)	Ballast Efficacy Factor	Wir./Dim Diag Pg. 29-30
Standard Power	2	17	E2/32IS-120MC	120	0.30	34	<30%	0.92	2.71	2/A2
	2	17	EP2/32IS/MV/MC	120	0.28	34	<10%	0.89	2.62	2/A2
	2	17	EP2/32IS/MV/MC	277	0.13	34	<12%	0.89	2.62	2/A2
	2	17	EP2/32IS/MV/MC/HE	120	0.25	28	<10%	0.91	3.25	2/A3
	2	17	EP2/32IS/MV/MC/HE	277	0.11	28	<15%	0.91	3.25	2/A3
Low Power	2	17	EPL2/32IS/MV/MC	120	0.21	25	<10%	0.84	3.36	2/A2
	2	17	EPL2/32IS/MV/MC	277	0.10	25	<15%	0.84	3.36	2/A2
	2	17	EPL2/32IS/MV/MC/HE	120	0.21	25	<10%	0.80	3.20	2/A3
	2	17	EPL2/32IS/MV/MC/HE	277	0.09	23	<20%	0.80	3.48	2/A3
High Power	2	17	EPH2/32IS/MV/MC/HE	120	0.33	39	<10%	1.23	3.15	2/A2
	2	17	EPH2/32IS/MV/MC/HE	277	0.15	39	<15%	1.23	3.15	2/A2
Standard Power	3	17	EP3/32IS/MV/MC/HE	120	0.38	45	<10%	0.92	2.04	3/A2
	3	17	EP3/32IS/MV/MC/HE	277	0.17	45	<15%	0.92	2.04	3/A2
Low Power	3	17	EPL3/32IS/MV/MC	120	0.37	43	<10%	0.86	1.95	3/A2
	3	17	EPL3/32IS/MV/MC	277	0.16	43	<15%	0.86	2.00	3/A2
	3	17	EPL3/32IS/MV/SC/HE	120	0.34	41	<10%	0.80	1.95	3/A1
	3	17	EPL3/32IS/MV/SC/HE	277	0.15	40	<12%	0.80	2.00	3/A1
High Power	3	17	EPH3/32IS/MV/MC/HE	120	0.49	58	<10%	1.23	2.12	3/A2
	3	17	EPH3/32IS/MV/MC/HE	277	0.22	57	<10%	1.23	2.15	3/A2
Standard Power	4	17	EP4/32IS/MV/MC/HE	120	0.49	59	<10%	0.93	1.58	4/A2
	4	17	EP4/32IS/MV/MC/HE	277	0.22	58	<10%	0.93	1.60	4/A2
	4	17	EP4/32PPRS/MV/SC/HE	120	0.52	63	<10%	0.87	1.39	9/A11
	4	17	EP4/32PPRS/MV/SC/HE	277	0.24	63	<12%	0.89	1.41	9/A11
Low Power	4	17	EPL4/32IS/MV/MC/HE	120	0.46	54	<10%	0.79	1.46	4/A2
	4	17	EPL4/32IS/MV/MC/HE	277	0.19	52	<10%	0.79	1.52	4/A2
High Power	4	17	EPH4/32IS/MV/SC/HE	120	0.63	75	<10%	1.18	1.57	4/A8
	4	17	EPH4/32IS/MV/SC/HE	277	0.29	79	<10%	1.18	1.49	4/A8

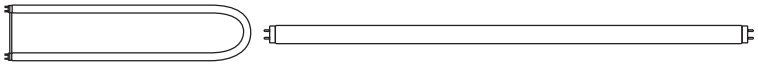
F17T8, FB17T8
One Lamp Out



Ballast Factor	Number of Lamps per Ballast	Lamp Watts	Ballast Model Number	Line Voltage	Line Current (amps)	Input Watts (ANSI)	Total Harmonic Distortion Rating	Ballast Factor (ANSI)	Ballast Efficacy Factor	Wir./Dim Diag Pg. 29-30
Standard Power	1	17	EP2/32IS/MV/MC	120	0.18	22	<10%	1.10	4.95	2/A2
	1	17	EP2/32IS/MV/MC	277	0.08	21	<15%	1.10	5.18	2/A2
	1	17	EP2/32IS/MV/MC/HE	120	0.16	21	<10%	1.10	5.24	2/A3
	1	17	EP2/32IS/MV/MC/HE	277	0.09	21	<15%	1.10	5.24	2/A3
Low Power	1	17	EPL2/32IS/MV/MC/HE	120	0.14	17	<10%	0.96	5.65	2/A3
	1	17	EPL2/32IS/MV/MC/HE	277	0.08	16	<20%	0.96	6.00	2/A3
High Power	1	17	EPH2/32IS/MV/MC/HE	120	0.22	25	<10%	1.42	5.68	2/A2
	1	17	EPH2/32IS/MV/MC/HE	277	0.11	25	<15%	1.42	5.68	2/A2
Low Power	2	17	EPL3/32IS/MV/SC/HE	120	0.27	31	<12%	0.87	2.81	3/A1
	2	17	EPL3/32IS/MV/SC/HE	277	0.12	31	<15%	0.87	2.81	3/A1
Standard Power	3	17	EP4/32PPRS/MV/SC/HE	120	0.45	53	<10%	0.94	1.77	10/11
	3	17	EP4/32PPRS/MV/SC/HE	277	0.21	53	<15%	0.94	1.78	10/11
High Power	3	17	EPH4/32IS/MV/SC/HE	120	0.52	62	<10%	1.27	2.05	4/A8
	3	17	EPH4/32IS/MV/SC/HE	277	0.24	66	<10%	1.27	1.92	4/A8

Fluorescent Electronic Ballast

F25T8, FB25T8



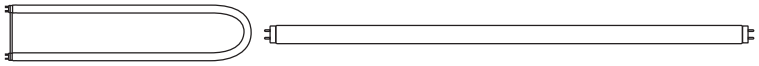
Electronic Ballast

Compact Fluorescent Ballasts

HID

Ballast Factor	Number of Lamps per Ballast	Lamp Watts	Ballast Model Number	Line Voltage	Line Current (amps)	Input Watts (ANSI)	Total Harmonic Distortion Rating	Ballast Factor (ANSI)	Ballast Efficacy Factor	Wir./Dim Diag Pg. 29-30
Standard Power	2	25	E2/32IS-120MC	120	0.38	49	<25%	0.90	1.84	2/A2
	2	25	EP2/32IS/MV/MC	120	0.40	47	<10%	0.88	1.87	2/A2
	2	25	EP2/32IS/MV/MC	277	0.17	47	<10%	0.89	1.87	2/A2
	2	25	EP2/32IS/MV/MC/HE	120	0.36	42	<10%	0.89	2.12	2/A3
	2	25	EP2/32IS/MV/MC/HE	277	0.16	41	<15%	0.89	2.17	2/A3
Low Power	2	25	EPL2/32IS/MV/MC/HE	120	0.31	37	<10%	0.79	2.14	2/A3
	2	25	EPL2/32IS/MV/MC/HE	277	0.13	35	<15%	0.79	2.26	2/A3
High Power	2	25	EPH2/32IS/MV/MC/HE	120	0.45	54	<10%	1.20	2.22	2/A2
	2	25	EPH2/32IS/MV/MC/HE	277	0.20	54	<15%	1.20	2.22	2/A2
Standard Power	3	25	EP3/32IS/MV/MC/HE	120	0.56	68	<10%	0.90	1.32	3/A2
	3	25	EP3/32IS/MV/MC/HE	277	0.24	66	<15%	0.90	1.36	3/A2
Low Power	3	25	EPL3/32IS/MV/MC	120	0.51	60	<10%	0.82	1.37	3/A2
	3	25	EPL3/32IS/MV/MC	277	0.22	58	<15%	0.82	1.41	3/A2
	3	25	EPL3/32IS/MV/SC/HE	120	0.49	58	<10%	0.78	1.34	3/A1
	3	25	EPL3/32IS/MV/SC/HE	277	0.21	57	<10%	0.78	1.37	3/A1
High Power	3	25	EPH3/32IS/MV/MC/HE	120	0.69	81	<10%	1.20	1.48	3/A2
	3	25	EPH3/32IS/MV/MC/HE	277	0.30	81	<10%	1.20	1.48	3/A2
Standard Power	4	25	EP4/32IS/MV/MC/HE	120	0.72	87	<10%	0.89	1.02	4/A2
	4	25	EP4/32IS/MV/MC/HE	277	0.32	85	<10%	0.89	1.05	4/A2
	4	25	EP4/32PPRS/MV/SC/HE	120	0.74	88	<10%	0.84	0.96	9/A11
	4	25	EP4/32PPRS/MV/SC/HE	277	0.33	88	<10%	0.85	0.97	9/A11
Low Power	4	25	EPL4/32IS/MV/MC/HE	120	0.64	76	<10%	0.78	1.03	4/A2
	4	25	EPL4/32IS/MV/MC/HE	277	0.27	74	<10%	0.78	1.05	4/A2
	4	25	EPL4/32IS/MV/SC/HE	120	0.65	77	<10%	0.78	1.01	4/A1
	4	25	EPL4/32IS/MV/SC/HE	277	0.28	76	<10%	0.78	1.03	4/A1
High Power	4	25	EPH4/32IS/MV/SC/HE	120	0.92	109	<10%	1.17	1.07	4/A8
	4	25	EPH4/32IS/MV/SC/HE	277	0.40	109	<10%	1.17	1.07	4/A8

F25T8, FB25T8
One Lamp Out



Ballast Factor	Number of Lamps per Ballast	Lamp Watts	Ballast Model Number	Line Voltage	Line Current (amps)	Input Watts (ANSI)	Total Harmonic Distortion Rating	Ballast Factor (ANSI)	Ballast Efficacy Factor	Wir./Dim Diag Pg. 29-30
Standard Power	1	25	EP2/32IS/MV/MC	120	0.26	32	<10%	1.01	3.16	2/A2
	1	25	EP2/32IS/MV/MC	277	0.12	32	<10%	1.01	3.16	2/A2
	1	25	EP2/32IS/MV/MC/HE	120	0.23	26	<10%	1.08	4.15	2/A3
	1	25	EP2/32IS/MV/MC/HE	277	0.10	26	<15%	1.08	4.15	2/A3
Low Power	1	25	EPL2/32IS/MV/MC/HE	120	0.20	24	<10%	0.95	3.96	2/A3
	1	25	EPL2/32IS/MV/MC/HE	277	0.09	22	<20%	0.95	4.32	2/A3
High Power	1	25	EPH2/32IS/MV/MC/HE	120	0.28	33	<10%	1.23	3.73	2/A2
	1	25	EPH2/32IS/MV/MC/HE	277	0.13	33	<15%	1.23	3.73	2/A2
Standard Power	2	25	EP3/32IS/MV/MC/HE	120	0.42	50	<10%	1.00	2.00	3/A2
	2	25	EP3/32IS/MV/MC/HE	277	0.18	50	<15%	1.00	2.00	3/A2
Low Power	2	25	EPL3/32IS/MV/SC/HE	120	0.37	44	<10%	0.86	1.95	3/A1
	2	25	EPL3/32IS/MV/SC/HE	277	0.16	44	<15%	0.86	1.95	3/A1
High Power	2	25	EPH3/32IS/MV/MC/HE	120	0.55	65	<10%	1.28	1.97	3/A2
	2	25	EPH3/32IS/MV/MC/HE	277	0.25	65	<15%	1.28	1.97	3/A2
Standard Power	3	25	EP4/32PPRS/MV/SC/HE	120	0.62	74	<10%	0.90	1.21	10/11
	3	25	EP4/32PPRS/MV/SC/HE	277	0.28	74	<12%	0.90	1.21	10/11
Low Power	3	25	EPL4/32IS/MV/MC/HE	120	0.53	62	<10%	0.84	1.35	4/A2
	3	25	EPL4/32IS/MV/MC/HE	277	0.22	61	<15%	0.84	1.38	4/A2
High Power	3	25	EPH4/32IS/MV/SC/HE	120	0.75	89	<10%	1.26	1.42	4/A8
	3	25	EPH4/32IS/MV/SC/HE	277	0.32	87	<10%	1.26	1.45	4/A8

Fluorescent Electronic Ballast

F40T8
One Lamp Out

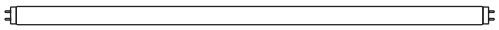
Electronic Ballast

Compact Fluorescent Ballasts

HID

Ballast Factor	Number of Lamps per Ballast	Lamp Watts	Ballast Model Number	Line Voltage	Line Current (amps)	Input Watts (ANSI)	Total Harmonic Distortion Rating	Ballast Factor (ANSI)	Ballast Efficacy Factor	Wir./Dim Diag Pg. 29-30
Standard Power	1	40	E2/32IS-120MC	120	0.48	45	<30%	1.00	2.22	2/A2
	1	40	EP2/32IS/MV/MC	120	0.39	47	<10%	0.99	2.11	2/A2
	1	40	EP2/32IS/MV/MC	277	0.17	46	<10%	0.99	2.15	2/A2
	1	40	EP2/32IS/MV/MC/HE	120	0.35	44	<10%	1.00	2.27	2/A3
	1	40	EP2/32IS/MV/MC/HE	277	0.16	43	<15%	1.00	2.33	2/A3
Low Power	1	40	EPL2/32IS/MV/MC	120	0.35	41	<10%	0.89	2.17	2/A2
	1	40	EPL2/32IS/MV/MC	277	0.15	40	<15%	0.89	2.23	2/A2
	1	40	EPL2/32IS/MV/MC/HE	120	0.30	35	<10%	0.90	2.57	2/A3
	1	40	EPL2/32IS/MV/MC/HE	277	0.13	35	<15%	0.90	2.57	2/A3
High Power	1	40	EPH2/32IS/MV/MC/HE	120	0.45	54	<10%	1.26	2.33	2/A2
	1	40	EPH2/32IS/MV/MC/HE	277	0.20	54	<15%	1.26	2.33	2/A2
Standard Power	2	40	EP3/32IS/MV/MC/HE	120	0.65	78	<10%	0.95	1.22	3/A2
	2	40	EP3/32IS/MV/MC/HE	277	0.29	77	<15%	0.95	1.23	3/A2
	2	40	EP3/32IS/MV/MC/HE	120	0.65	78	<10%	0.95	1.22	3/A2
	2	40	EP3/32IS/MV/MC/HE	277	0.29	77	<15%	0.95	1.23	3/A2
Low Power	2	40	EPL3/32IS/MV/MC	120	0.60	71	<10%	0.87	1.23	3/A2
	2	40	EPL3/32IS/MV/MC	277	0.26	70	<15%	0.87	1.24	3/A2
	2	40	EPL3/32IS/MV/SC/HE	120	0.58	68	<10%	0.84	1.24	3/A1
Low Power	2	40	EPL3/32IS/MV/SC/HE	277	0.25	67	<10%	0.84	1.25	3/A1
High Power	2	40	EPH3/32IS/MV/MC/HE	120	0.84	100	<10%	1.26	1.26	3/A2
	2	40	EPH3/32IS/MV/MC/HE	277	0.36	98	<10%	1.26	1.29	3/A2
Standard Power	3	40	EP4/32IS/MV/MC/HE	120	0.77	92	<10%	0.96	1.04	4/A2
	3	40	EP4/32IS/MV/MC/HE	277	0.41	109	<10%	0.96	0.88	4/A2
	3	3	EP4/32PPRS/MV/SC/HE	120	0.93	111	<10%	0.88	0.80	10/A11
	3	3	EP4/32PPRS/MV/SC/HE	277	0.41	111	<10%	0.89	0.80	10/A11
Low Power	3	40	EPL4/32IS/MV/MC/HE	120	0.82	98	<10%	0.82	0.85	4/A2
	3	40	EPL4/32IS/MV/MC/HE	277	0.35	96	<10%	0.82	0.85	4/A2
High Power	3	40	EPH4/32IS/MV/SC/HE	120	1.22	143	<10%	1.25	0.87	4/A8
	3	40	EPH4/32IS/MV/SC/HE	277	0.51	139	<10%	1.25	0.90	4/A8

F96T8
Primary lamp Design

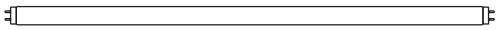


Ballast Factor	Number of Lamps per Ballast	Lamp Watts	Ballast Model Number	Line Voltage	Line Current (amps)	Input Watts (ANSI)	Total Harmonic Distortion Rating	Ballast Factor (ANSI)	Ballast Efficacy Factor	Wir./Dim Diag Pg. 29-30
Standard Power	2	59	EP2/59IS/MV/MC/HE	120	0.93	111	<10%	0.92	0.83	2/A3
	2	59	EP2/59IS/MV/MC/HE	277	0.40	109	<10%	0.92	0.84	2/A3

FT40W/2G11
Primary lamp Design

Ballast Factor	Number of Lamps per Ballast	Lamp Watts	Ballast Model Number	Line Voltage	Line Current (amps)	Input Watts (ANSI)	Total Harmonic Distortion Rating	Ballast Factor (ANSI)	Ballast Efficacy Factor	Wir./Dim Diag Pg. 29-30
Standard Power	2	40	EP2/40IS-TT/MV/SC	120	0.56	67	<10%	0.84	1.25	5/A1
	2	40	EP2/40IS-TT/MV/SC	277	0.24	65	<10%	0.84	1.29	5/A1

F28T5
Primary Lamp Design



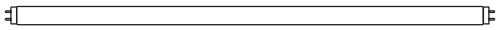
Ballast Factor	Number of Lamps per Ballast	Lamp Watts	Ballast Model Number	Line Voltage	Line Current (amps)	Input Watts (ANSI)	Total Harmonic Distortion Rating	Ballast Factor (ANSI)	Ballast Efficacy Factor	Wir./Dim Diag Pg. 29-30
Standard Power	2	28	EP2/28T5/PRS/MV	120	0.56	67	<10%	1.05	1.57	6/A12
	2	28	EP2/28T5/PRS/MV	277	0.24	67	<10%	1.05	1.57	6/A12
	1	28	EP2/28T5/PRS/MV	120	0.28	34	<10%	1.07	3.15	6/A12
	1	28	EP2/28T5/PRS/MV	277	0.13	34	<12%	1.07	3.15	6/A12
F21T5										
Standard Power	2	49	EP2/28T5/PRS/MV	120	0.38	46	<10%	0.94	2.04	6/A12
	2	49	EP2/28T5/PRS/MV	277	0.17	46	<12%	0.94	2.04	6/A12
	1	49	EP2/28T5/PRS/MV	120	0.20	24	<10%	0.97	4.04	6/A12
	1	49	EP2/28T5/PRS/MV	277	0.10	25	<12%	1.02	4.08	6/A12
F14T5										
Standard Power	2	55	EP2/28T5/PRS/MV	120	0.25	30	<10%	0.92	3.06	6/A12
	2	55	EP2/28T5/PRS/MV	277	0.12	31	<12%	0.94	3.03	6/A12
	1	55	EP2/28T5/PRS/MV	120	0.14	17	<10%	1.00	5.88	6/A12
	1	55	EP2/28T5/PRS/MV	277	0.07	17	<15%	1.00	5.88	6/A12

Fluorescent Electronic Ballast

F39T5/HO Primary Lamp Design

Ballast Factor	Number of Lamps per Ballast	Lamp Watts	Ballast Model Number	Line Voltage	Line Current (amps)	Input Watts (ANSI)	Total Harmonic Distortion Rating	Ballast Factor (ANSI)	Ballast Efficacy Factor	Wir./Dim Diag Pg. 29-30
Standard Power	2	39	EP2/39HO/PRS/MV	120	0.78	90	<10%	1.00	1.11	6/A12
	2	39	EP2/39HO/PRS/MV	277	0.34	89	<10%	1.00	1.12	6/A12
	1	39	EP2/39HO/PRS/MV	120	0.39	49	<10%	1.03	2.23	6/A12
	1	39	EP2/39HO/PRS/MV	277	0.18	47	<12%	1.06	2.25	6/A12
F24T5/HO										
Standard Power	2	24	EP2/39HO/PRS/MV	120	0.50	59	<10%	1.08	1.83	6/A12
	2	24	EP2/39HO/PRS/MV	277	0.22	59	<10%	1.08	1.83	6/A12
	1	24	EP2/39HO/PRS/MV	120	0.25	30	<10%	1.10	3.66	6/A12
	1	24	EP2/39HO/PRS/MV	277	0.12	30	<15%	1.10	3.66	6/A12
FC12T5 40W										
Standard Power	2	40	EP2/39HO/PRS/MV	120	0.78	93	<10%	1.02	1.09	6/A12
	2	40	EP2/39HO/PRS/MV	277	0.34	92	<10%	1.01	1.09	6/A12
	1	40	EP2/39HO/PRS/MV	120	0.41	49	<10%	1.07	2.18	6/A12
	1	40	EP2/39HO/PRS/MV	277	0.19	50	<12%	1.10	2.18	6/A12
FC9T5 22W										
Standard Power	2	22	EP2/39HO/PRS/MV	120	0.53	63	<10%	1.25	1.98	6/A12
	2	22	EP2/39HO/PRS/MV	277	0.23	63	<10%	1.25	1.98	6/A12
	1	22	EP2/39HO/PRS/MV	120	0.28	33	<10%	1.31	3.97	6/A12
	1	22	EP2/39HO/PRS/MV	277	0.13	33	<12%	1.31	3.97	6/A12
FT36W/2G11										
Standard Power	2	36	EP2/39HO/PRS/MV	120	0.60	72	<10%	0.87	1.20	6/A12
	2	36	EP2/39HO/PRS/MV	277	0.26	71	<10%	0.87	122	6/A12
	1	36	EP2/39HO/PRS/MV	120	0.32	38	<10%	0.92	2.42	6/A12
	1	36	EP2/39HO/PRS/MV	277	0.14	38	<10%	0.92	2.42	6/A12
FT24W/2G11										
Standard Power	2	24	EP2/39HO/PRS/MV	120	0.45	54	<10%	0.99	1.83	6/A12
	2	24	EP2/39HO/PRS/MV	277	0.20	55	<10%	0.99	1.80	6/A12
	1	24	EP2/39HO/PRS/MV	120	0.25	30	<10%	1.09	3.63	6/A12
	1	24	EP2/39HO/PRS/MV	277	0.12	30	<15%	1.09	3.63	6/A12
FT40W/2G11										
Standard Power	1	40	EP2/39HO/PRS/MV	120	0.42	50	<10%	1.09	2.18	6/A12
	1	40	EP2/39HO/PRS/MV	277	0.19	50	<12%	1.09	2.18	6/A12
FC9T5 + FC12T5										
Standard Power	1+1	22/40	EP2/39HO/PRS/MV	120	0.57	68	<10%	0.96	1.41	6/A12
	1+1	22/40	EP2/39HO/PRS/MV	277	0.25	68	<10%	0.96	1.41	6/A12

F54T5/HO Primary Lamp Design



Ballast Factor	Number of Lamps per Ballast	Lamp Watts	Ballast Model Number	Line Voltage	Line Current (amps)	Input Watts (ANSI)	Total Harmonic Distortion Rating	Ballast Factor (ANSI)	Ballast Efficacy Factor	Wir./Dim Diag Pg. 29-30
Standard Power	2	54	EP2/54HO/PRS/MV/W/MC	120	1.00	120	<10%	1.00	0.80	7/A3
	2	54	EP2/54HO/PRS/MV/W/MC	277	0.43	117	<10%	1.00	0.80	7/A3
	1	54	EP2/54HO/PRS/MV/W/MC	120	0.52	62	<10%	1.03	1.60	8/A3
	1	54	EP2/54HO/PRS/MV/W/MC	277	0.23	62	<20%	1.03	1.60	8/A3
F54T5HO/ES										
Standard Power	2	49	EP2/54HO/PRS/MV/W/MC	120	0.88	106	<10%	0.99	0.90	7/A3
	2	49	EP2/54HO/PRS/MV/W/MC	277	0.38	105	<10%	0.98	0.90	7/A3
	1	49	EP2/54HO/PRS/MV/W/MC	120	0.44	53	<10%	0.90	1.60	8/A3
	1	49	EP2/54HO/PRS/MV/W/MC	277	0.21	58	<10%	1.04	1.70	8/A3
FC12T5/HO										
Standard Power	2	55	EP2/54HO/PRS/MV/W/MC	120	0.87	106	<10%	0.86	0.80	7/A3
	2	55	EP2/54HO/PRS/MV/W/MC	277	0.37	103	<10%	0.86	0.80	7/A3
	1	55	EP2/54HO/PRS/MV/W/MC	120	0.45	55	<10%	0.88	1.60	8/A3
	1	55	EP2/54HO/PRS/MV/W/MC	277	0.20	55	<20%	0.88	1.60	8/A3
FT55W/2G11										
Standard Power	2	55	EP2/54HO/PRS/MV/W/MC	120	0.94	112	<10%	0.91	0.80	7/A3
	2	55	EP2/54HO/PRS/MV/W/MC	277	0.40	109	<10%	0.91	0.80	7/A3
	1	55	EP2/54HO/PRS/MV/W/MC	120	0.51	58	<10%	0.93	1.60	8/A3
	1	55	EP2/54HO/PRS/MV/W/MC	277	0.22	58	<20%	0.93	1.60	8/A3
FT50W/2G11										
Standard Power	2	50	EP2/54HO/PRS/MV/W/MC	120	1.01	118	<10%	1.12	0.90	7/A3
	2	50	EP2/54HO/PRS/MV/W/MC	277	0.43	115	<10%	1.12	0.90	7/A3
	1	50	EP2/54HO/PRS/MV/W/MC	120	0.52	61	<10%	1.15	1.80	8/A3
	1	50	EP2/54HO/PRS/MV/W/MC	277	0.23	61	<20%	0.90	1.80	8/A3

Circle E logo indicates that this product complies with federal energy efficiency requirements.

Fluorescent Electronic Ballast

F40T12
Primary Lamp Design

Ballast Factor	Number of Lamps per Ballast	Lamp Watts	Ballast Model Number	Line Voltage	Line Current (amps)	Input Watts (ANSI)	Total Harmonic Distortion Rating	Ballast Factor (ANSI)	Ballast Efficacy Factor	Wir./Dim Diag Pg. 29-30
Standard Power	2	40	EP2/40RS/MV/MC Ⓔ	120	.62	72	<10%	0.85	1.18	1/A3
	2	40	EP2/40RS/MV/MC Ⓔ	277	.26	70	<10%	0.85	1.21	1/A3
F34T12										
Standard Power	2	34	EP2/40RS/MV/MC Ⓔ	120	.55	62	<10%	0.85	1.37	1/A3
	2	34	EP2/40RS/MV/MC Ⓔ	277	0.23	61	<10%	0.85	1.39	1/A3
F30T12										
Standard Power	2	30	EP2/40RS/MV/MC Ⓔ	120	0.48	58	<10%	0.93	1.60	1/A3
	2	30	EP2/40RS/MV/MC Ⓔ	277	0.20	56	<10%	0.93	1.66	1/A3
F25T12										
Standard Power	2	25	EP2/40RS/MV/MC Ⓔ	120	0.58	70	<10%	1.10	1.57	1/A3
	2	25	EP2/40RS/MV/MC Ⓔ	277	0.24	69	<10%	1.10	1.59	1/A3

F96T12/HO
Primary Lamp Design

Ballast Factor	Number of Lamps per Ballast	Lamp Watts	Ballast Model Number	Line Voltage	Line Current (amps)	Input Watts (ANSI)	Total Harmonic Distortion Rating	Ballast Factor (ANSI)	Ballast Efficacy Factor	Wir./Dim Diag Pg. 29-30
Standard Power	2	110	EP2/110RS/MV/SC Ⓔ	120	1.54	185	<10%	0.88	0.48	1/A9
	2	110	EP2/110RS/MV/SC Ⓔ	277	0.66	180	<10%	0.88	0.49	1/A9
	1	110	EP2/110RS/MV/SC Ⓔ	120	0.80	96	<10%	0.91	0.95	1/A9
	1	110	EP2/110RS/MV/SC Ⓔ	277	0.37	95	<10%	0.91	0.96	1/A9
F96T12HO/ES										
Standard Power	2	95	EP2/110RS/MV/SC Ⓔ	120	1.38	165	<10%	0.88	0.53	1/A9
	2	95	EP2/110RS/MV/SC Ⓔ	277	0.60	162	<10%	0.88	0.54	1/A9
	1	95	EP2/110RS/MV/SC Ⓔ	120	0.74	88	<10%	0.91	1.03	1/A9
	1	95	EP2/110RS/MV/SC Ⓔ	277	0.32	86	<15%	0.91	1.04	1/A9
F72T12/HO										
Standard Power	2	85	EP2/110RS/MV/SC Ⓔ	120	1.17	140	<10%	0.85	0.61	1/A9
	2	85	EP2/110RS/MV/SC Ⓔ	277	0.50	137	<10%	0.85	0.62	1/A9
F60T12/HO										
Standard Power	2	75	EP2/110RS/MV/SC Ⓔ	120	0.98	117	<10%	0.82	0.62	1/A9
	2	75	EP2/110RS/MV/SC Ⓔ	277	0.42	114	<10%	0.82	0.70	1/A9
F48T12/HO										
Standard Power	2	60	EP2/110RS/MV/SC Ⓔ	120	0.80	96	<10%	0.83	0.86	1/A9
	2	60	EP2/110RS/MV/SC Ⓔ	277	0.34	94	<10%	0.83	0.87	1/A9

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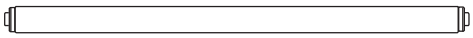
Fluorescent Electronic Ballast

F96T12
Primary Lamp Design



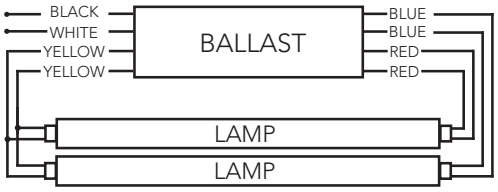
Ballast Factor	Number of Lamps per Ballast	Lamp Watts	Ballast Model Number	Line Voltage	Line Current (amps)	Input Watts (ANSI)	Total Harmonic Distortion Rating	Ballast Factor (ANSI)	Ballast Efficacy Factor	Wir./Dim Diag Pg. 29-30
Standard Power	2	75	EP2/75IS/MV/SC Ⓔ	120	1.12	133	<10%	0.90	0.68	2/A10
	2	75	E2/75IS-120MC Ⓔ	120	1.13	135	<10%	0.88	0.65	2/A8
	2	75	EP2/75IS/MV/SC Ⓔ	277	0.49	135	<10%	0.90	0.67	2/A10
	1	75	EP2/75IS/MV/SC Ⓔ	120	0.70	83	<10%	1.00	1.20	2/A10
	2	75	E2/75IS-120MC Ⓔ	120	0.68	82	<10%	1.02	1.24	2/A8
	1	75	EP2/75IS/MV/SC Ⓔ	277	0.31	84	<10%	1.00	1.19	2/A10
F96T12ES										
Standard Power	2	60	EP2/75IS/MV/SC Ⓔ	120	0.95	113	<10%	0.90	0.80	2/A10
	2	60	E2/75IS-120MC Ⓔ	120	0.88	105	<10%	0.88	0.84	2/A8
	2	60	EP2/75IS/MV/SC Ⓔ	277	0.42	115	<10%	0.90	0.78	2/A10
	1	60	EP2/75IS/MV/SC Ⓔ	120	0.60	71	<10%	1.05	1.48	2/A10
	2	60	E2/75IS-120MC Ⓔ	120	0.54	64	<10%	1.00	1.56	2/A8
	1	60	EP2/75IS/MV/SC Ⓔ	277	0.26	72	<10%	1.05	1.46	2/A10
F72T12										
Standard Power	2	55	EP2/75IS/MV/SC Ⓔ	120	0.92	107	<10%	0.90	0.84	2/A10
	2	55	E2/75IS-120MC Ⓔ	120	0.85	106	<10%	0.90	0.85	2/A8
	2	55	EP2/75IS/MV/SC Ⓔ	277	0.39	107	<10%	0.90	0.48	2/A10
	1	55	EP2/75IS/MV/SC Ⓔ	120	0.60	66	<10%	1.04	1.58	2/A10
	2	55	E2/75IS-120MC Ⓔ	120	0.54	64	<10%	1.02	1.63	2/A8
	1	55	EP2/75IS/MV/SC Ⓔ	277	0.25	66	<10%	1.04	1.58	2/A10
F48T12										
Standard Power	2	39	EP2/75IS/MV/SC Ⓔ	120	0.68	76	<10%	0.95	1.25	2/A10
	2	39	EP2/75IS/MV/SC Ⓔ	277	0.29	76	<10%	0.95	1.25	2/A10
F48T12ES										
Standard Power	2	32	EP2/75IS/MV/SC Ⓔ	120	0.60	64	<10%	0.95	1.48	2/A10
	2	32	EP2/75IS/MV/SC Ⓔ	277	0.25	64	<10%	0.95	1.48	2/A10

Ⓔ Circle E logo indicates that this product complies with federal energy efficiency requirements.

Wiring Diagrams

Install in accordance with National and Local Electrical Codes. Disconnect power when installing or servicing. Ballast case must be grounded. Install lamps within 3/4" of grounded metal plane. Wiring diagram leads may exit from a different end than what is shown; however, the lamp wiring will be the same.

1



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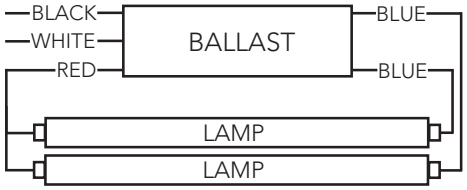
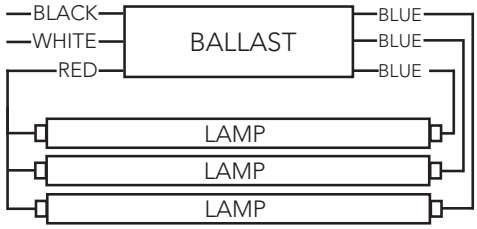


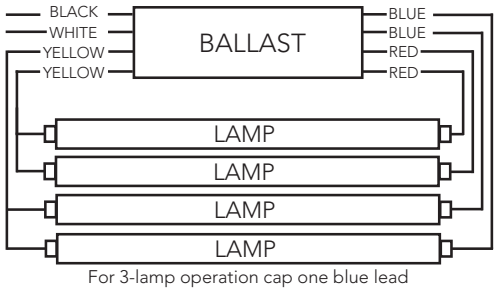
For 1-lamp operation cap one blue lead

3



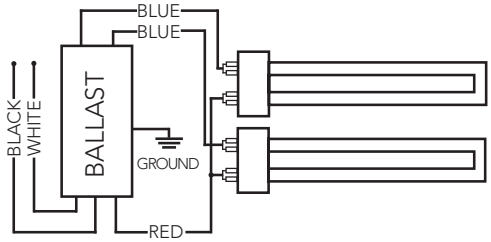
For 2-lamp operation cap one blue lead

4



For 3-lamp operation cap one blue lead

5



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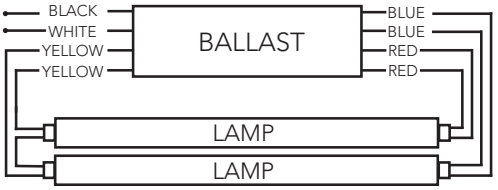
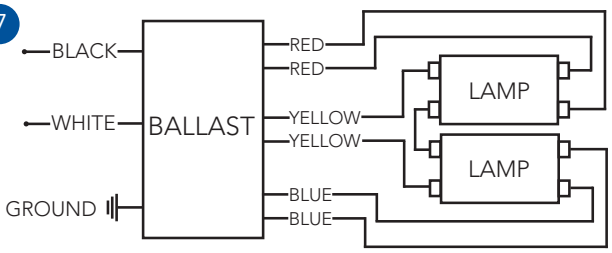


For 1-lamp operation cap one yellow lead

7



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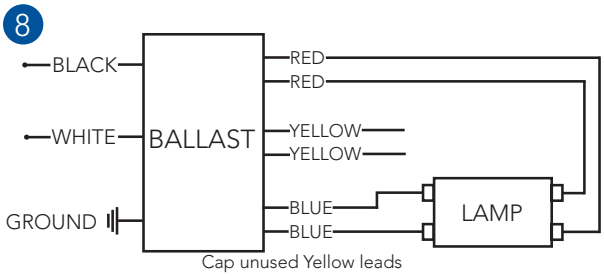
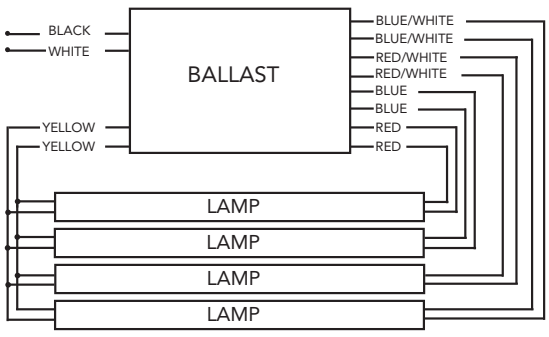


Cap unused Yellow leads

9



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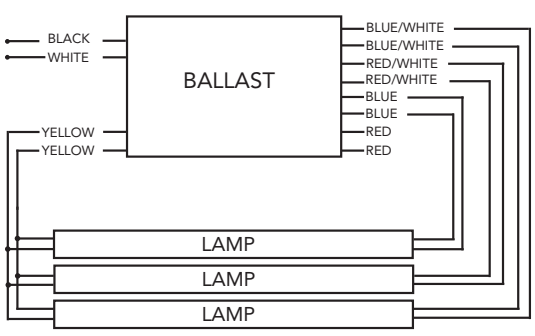
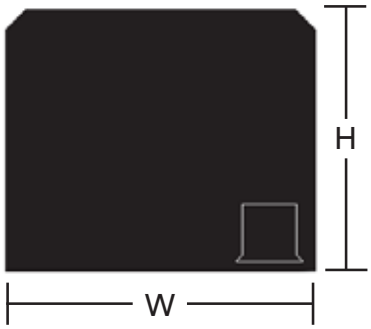


Fluorescent Electronic Ballast

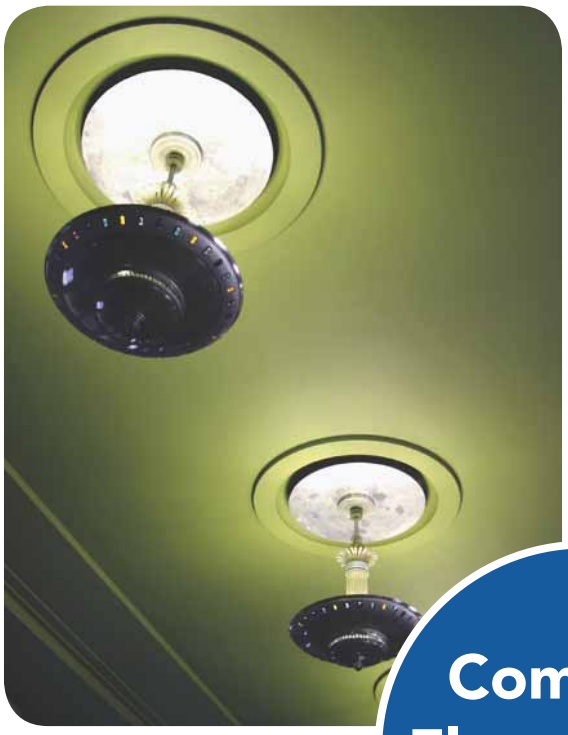
Linear Case Ballast Dimensions

Diagram	Measurement in inches.			
	Dim. L	Dim. W	Dim. H	Dim. M
A1	9.50	1.80	1.20	9.00
A2	9.50	1.30	1.05	9.00
A3	9.50	1.30	1.00	9.00
A4	9.50	1.70	1.30	9.00
A5	11.75	2.375	1.63	11.13
A6	9.50	2.375	1.60	9.00
A7	16.75	1.18	1.00	16.25
A8	9.50	1.70	1.20	9.00
A9	11.80	2.15	1.61	11.00
A10	9.45	1.80	1.37	8.90
A11	9.50	1.65	1.18	8.90
A12	9.45	1.35	1.06	8.96

Side Ballast View



Bottom Ballast View



Compact Fluorescent Ballasts

26W Compact Fluorescent

42W Compact Fluorescent

Compact Fluorescent Electronic Ballast

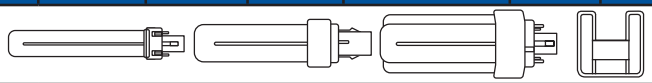
Specifications

- Ballast shall have a five-year warranty with maximum case temperature of 70°C or three-year warranty with maximum case temperature of 90°C.
- Ballast shall be UL certified.
- Ballast shall be sound rated Class A.
- Ballast shall be Class P Type 1 Outdoor.
- Ballast shall have a Lamp Current Crest Factor of <1.7.
- Ballast shall withstand line transients as specified in ANSI C62.41.
- Ballast shall comply with the limits of FCC Part 18C Class B (Consumer).
- Ballast shall have a lamp operating frequency greater than 40KHz.
- Ballast shall have color-coded, dual entry poke-in connectors.
- Ballast shall ignite lamps within 900ms.
- Ballast shall have a 0°F minimum lamp starting temperature for primary lamp(s).
- Ballast shall be Program Start.
- Ballast shall be Series Lamp Operation.
- Ballast shall have a minimum Power Factor of 97% for primary lamp operation.
- Ballast shall operate within a +/- 10% of the ballast specified line voltage at an input frequency of 50Hz or 60Hz.
- Ballast shall have a maximum case hot spot temperature of 90°C.
- Ballast shall have end of lamp life protection.
- Ballast shall have auto restart.

	Number of Lamps per Ballast	Lamp Watts	Ballast Model Number	Line Voltage	Line Current (amps)	Input Watts (ANSI)	Total Harmonic Distortion Rating	Ballast Factor (ANSI)	Ballast Efficacy Factor
*Primary Lamp Design									
CF7SE	1	7	EP2/13CF/MV/K2	120	0.08	9	<10%	0.88	9.53
CF7SE	1	7	EP2/13CF/MV/K2	277	0.04	10	<20%	0.93	9.42
CF7SE	2	7	EP2/13CF/MV/K2	120	0.14	16	<10%	0.91	5.59
CF7SE	2	7	EP2/13CF/MV/K2	277	0.06	17	<20%	0.91	5.48
CF9SE	1	9	EP2/13CF/MV/K2	120	0.09	11	<10%	0.92	8.37
CF9SE	1	9	EP2/13CF/MV/K2	277	0.05	12	<20%	1.00	8.42
CF9SE	2	9	EP2/13CF/MV/K2	120	0.16	19	<10%	0.92	4.7
CF9SE	2	9	EP2/13CF/MV/K2	277	0.08	21	<15%	0.98	4.77
2D10W	1	10	EP2/13CF/MV/K2	120	0.11	13	<10%	0.92	7.09
2D10W	1	10	EP2/13CF/MV/K2	277	0.05	13	<20%	0.93	6.93
2D10W	2	10	EP2/13CF/MV/K2	120	0.2	24	<10%	0.94	3.9
2D10W	2	10	EP2/13CF/MV/K2	277	0.09	24	<15%	0.97	4.01

	Number of Lamps per Ballast	Lamp Watts	Ballast Model Number	Line Voltage	Line Current (amps)	Input Watts (ANSI)	Total Harmonic Distortion Rating	Ballast Factor (ANSI)	Ballast Efficacy Factor
CF13DE	1	13	EP2/13CF/MV/K2	120	0.15	17	<10%	1.04	6.02
CF13DE	1	13	EP2/13CF/MV/K2	277	0.07	18	<20%	1.05	5.93
CF13DE*	2	13	EP2/13CF/MV/K2	120	0.27	33	<10%	1.03	3.17
CF13DE*	2	13	EP2/13CF/MV/K2	277	0.12	32	<10%	1.04	3.23
CF13TE	1	13	EP2/13CF/MV/K2	120	0.14	16	<10%	0.97	6.04
CF13TE	1	13	EP2/13CF/MV/K2	277	0.06	16	<20%	0.96	5.9
CF13TE*	2	13	EP2/13CF/MV/K2	120	0.25	30	<10%	0.92	3.1
CF13TE*	2	13	EP2/13CF/MV/K2	277	0.11	29	<10%	0.93	3.17
2D10W	1	10	EP2/13CF/MV/K2	120	0.11	13	<10%	0.92	7.09
2D10W	1	10	EP2/13CF/MV/K2	277	0.05	13	<20%	0.93	6.93
2D10W	2	10	EP2/13CF/MV/K2	120	0.2	24	<10%	0.94	3.9
2D10W	2	10	EP2/13CF/MV/K2	277	0.09	24	<15%	0.97	4.01
2D16W	1	16	EP2/13CF/MV/K2	120	0.15	18	<10%	0.9	5.08
2D16W	1	16	EP2/13CF/MV/K2	277	0.07	18	<20%	0.9	5.04
2D16W	2	16	EP2/18CF/MV/K2	120	0.32	38	<10%	1.02	2.7
2D16W	2	16	EP2/18CF/MV/K2	277	0.14	38	<10%	1.08	2.81
CF18DE	1	18	EP2/18CF/MV/K2	120	0.19	23	<10%	1.12	4.8
CF18DE	1	18	EP2/18CF/MV/K2	277	0.09	23	<15%	1.13	4.83
CF18DE*	2	18	EP2/18CF/MV/K2	120	0.36	44	<10%	1.08	2.48
CF18DE*	2	18	EP2/18CF/MV/K2	277	0.16	42	<10%	1.08	2.54
CF18TE	1	18	EP2/18CF/MV/K2	120	0.18	21	<10%	1.03	4.91
CF18TE	1	18	EP2/18CF/MV/K2	277	0.08	21	<15%	1.04	4.88
CF18TE*	2	18	EP2/18CF/MV/K2	120	0.33	39	<10%	0.98	2.52
CF18TE*	2	18	EP2/18CF/MV/K2	277	0.14	39	<10%	1.11	2.88
2D21W	1	21	EP2/18CF/MV/K2	120	0.17	20	<10%	0.84	4.11
2D21W	1	21	EP2/18CF/MV/K2	277	0.08	21	<15%	0.84	4.07

Compact Fluorescent Electronic Ballast

	Number of Lamps per Ballast	Lamp Watts	Ballast Model Number	Line Voltage	Line Current (amps)	Input Watts (ANSI)	Total Harmonic Distortion Rating	Ballast Factor (ANSI)	Ballast Efficacy Factor
*Primary Lamp Design									
2D21W	2	21	EP2/18CF/MV/K2	120	0.31	38	<10%	0.80	2.13
2D21W	2	21	EP2/18CF/MV/K2	277	0.14	37	<10%	0.80	2.15
CFQ26W/G24q*	2	26	EP2/26CF/MV/K2	120	0.43	51	<10%	1.00	1.96
CFQ26W/G24q*	2	26	EP2/26CF/MV/K2	277	0.19	51	<10%	1.00	1.96
CFQ26W/G24q	1	26	EP2/26CF/MV/K2	120	0.23	27	<10%	1.00	3.70
CFQ26W/G24q	1	26	EP2/26CF/MV/K2	277	0.10	27	<10%	1.00	3.70
CFTR26W/GX24q	2	26	EP2/26CF/MV/K2	120	0.45	54	<10%	1.00	1.85
CFTR26W/GX24q	2	26	EP2/26CF/MV/K2	277	0.20	54	<10%	1.00	1.85
CFTR26W/GX24q	1	26	EP2/26CF/MV/K2	120	0.24	29	<10%	1.10	3.79
CFTR26W/GX24q	1	26	EP2/26CF/MV/K2	277	0.11	29	<10%	1.10	3.79
CFTR42W/GX24q	1	42	EP2/26CF/MV/K2	120	0.38	46	<10%	0.98	2.13
CFTR42W/GX24q	1	42	EP2/26CF/MV/K2	277	0.17	46	<10%	0.98	2.13
CFTR32W/GX24q	1	32	EP2/26CF/MV/K2	120	0.31	36	<10%	0.98	2.72
CFTR32W/GX24q	1	32	EP2/26CF/MV/K2	277	0.13	36	<10%	0.98	2.72
CFTR57W/GX24q	1	57	EP2/26CF/MV/K2	120	0.43	52	<10%	0.81	1.56
CFTR57W/GX24q	1	57	EP2/26CF/MV/K2	277	0.19	51	<10%	0.82	1.61
CFQ57W/G24q	1	57	EP2/26CF/MV/K2	120	0.43	52	<10%	0.81	1.56
CFQ57W/G24q	1	57	EP2/26CF/MV/K2	277	0.19	51	<10%	0.82	1.61
CFS21W/GR10q	2	21	EP2/26CF/MV/K2	120	0.42	51	<10%	1.12	2.2
CFS21W/GR10q	2	21	EP2/26CF/MV/K2	277	0.18	51	<10%	1.12	2.2
FT24W/2G11	1	24	EP2/26CF/MV/K2	120	0.41	48	<10%	0.93	1.94
FT24W/2G11	1	24	EP2/26CF/MV/K2	277	0.18	48	<10%	0.93	1.94
FT24W/2G11	2	24	EP2/26CF/MV/K2	120	0.21	26	<10%	0.90	3.52
FT24W/2G11	2	24	EP2/26CF/MV/K2	277	0.10	26	<10%	0.89	3.46

	Number of Lamps per Ballast	Lamp Watts	Ballast Model Number	Line Voltage	Line Current (amps)	Input Watts (ANSI)	Total Harmonic Distortion Rating	Ballast Factor (ANSI)	Ballast Efficacy Factor
FT18W/2G11	2	18	EP2/26CF/MV/K2	120	0.27	33	<10%	0.73	2.24
FT18W/2G11	2	18	EP2/26CF/MV/K2	277	0.12	33	<10%	0.74	2.26
F24T5 HO	2	24	EP2/26CF/MV/K2	120	0.44	51	<10%	1.00	1.96
F24T5 HO	2	24	EP2/26CF/MV/K2	277	0.19	51	<10%	1.00	1.96
FC16T9 40W	1	40	EP2/26CF/MV/K2	120	0.36	43	<10%	1.00	2.33
FC16T9 40W	1	40	EP2/26CF/MV/K2	277	0.16	43	<10%	1.00	2.33
FC12T5 40W	1	40	EP2/26CF/MV/K2	120	0.28	34	<10%	0.74	2.17
FC12T5 40W	1	40	EP2/26CF/MV/K2	277	0.13	34	<10%	0.75	2.18
FC9T5 22W	1	22	EP2/26CF/MV/K2	120	0.22	27	<10%	1.02	3.84
FC9T5 22W	1	22	EP2/26CF/MV/K2	277	0.08	27	<12%	1.03	3.82
CFM36W/2G10	1	36	EP2/42CF/MV/K2	120	0.27	33	<10%	0.80	2.45
CFM36W/2G10	1	36	EP2/42CF/MV/K2	277	0.13	33	<15%	0.80	2.44
CFM36W/2G10	2	36	EP2/42CF/MV/K2	120	0.52	63	<10%	0.78	1.25
CFM36W/2G10	2	36	EP2/42CF/MV/K2	277	0.23	62	<10%	0.79	1.27
CFQ26W/G24q	1	26	EP2/42CF/MV/K2	120	0.27	32	<10%	1.00	3.12
CFQ26W/G24q	1	26	EP2/42CF/MV/K2	277	0.13	32	<12%	1.00	3.12
CFQ26W/G24q	2	26	EP2/42CF/MV/K2	120	0.45	54	<10%	0.90	1.67
CFQ26W/G24q	2	26	EP2/42CF/MV/K2	277	0.21	54	<12%	0.90	1.67
CFS28W/GR10q	1	28	EP2/42CF/MV/K2	120	0.29	34	<10%	1.00	2.94
CFS28W/GR10q	1	28	EP2/42CF/MV/K2	277	0.14	34	<10%	1.00	2.94
CFTR26W/GX24q	1	26	EP2/42CF/MV/K2	120	0.27	32	<10%	1.00	3.12
CFTR26W/GX24q	1	26	EP2/42CF/MV/K2	277	0.13	32	<12%	1.00	3.12
CFTR26W/GX24q	2	26	EP2/42CF/MV/K2	120	0.45	54	<10%	0.90	1.67
CFTR26W/GX24q	2	26	EP2/42CF/MV/K2	277	0.21	54	<12%	0.90	1.67

Compact Fluorescent Electronic Ballast

Electronic Ballasts

Compact Fluorescent Ballasts

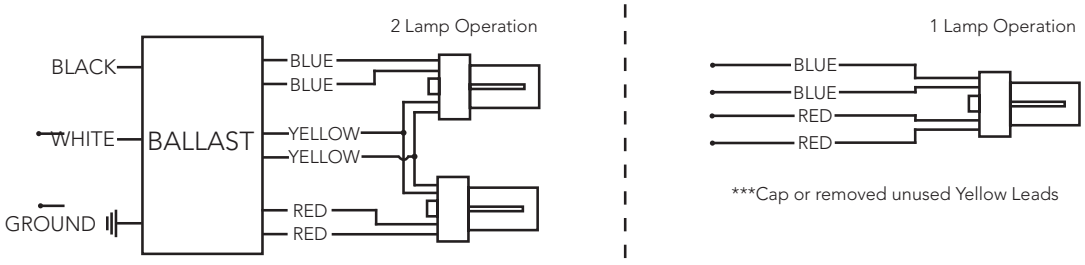
HID Ballasts

	Number of Lamps per Ballast	Lamp Watts	Ballast Model Number	Line Voltage	Line Current (amps)	Input Watts (ANSI)	Total Harmonic Distortion Rating	Ballast Factor (ANSI)	Ballast Efficacy Factor
CFTR32W/GX24q	1	32	EP2/42CF/MV/K2	120	0.35	42	<10%	0.96	2.29
CFTR32W/GX24q	1	32	EP2/42CF/MV/K2	277	0.13	42	<12%	0.96	2.29
CFTR32W/GX24q	2	32	EP2/42CF/MV/K2	120	0.53	63	<10%	0.95	1.51
CFTR32W/GX24q	2	32	EP2/42CF/MV/K2	277	0.23	63	<12%	0.95	1.51
CFTR42W/GX24q	1	42	EP2/42CF/MV/K2	120	0.4	47	<10%	1.00	2.13
CFTR42W/GX24q	1	42	EP2/42CF/MV/K2	277	0.18	47	<10%	1.00	2.13
CFTR42W/GX24q*	2	42	EP2/42CF/MV/K2	120	0.77	94	<10%	1.00	1.14
CFTR42W/GX24q*	2	42	EP2/42CF/MV/K2	277	0.38	93	<10%	1.00	1.08
CFTR57W/GX24q	1	57	EP2/42CF/MV/K2	120	0.49	58	<10%	1.00	1.72
CFTR57W/GX24q	1	57	EP2/42CF/MV/K2	277	0.22	58	<12%	1.00	1.72
CFTR70W/GX24q	1	70	EP2/42CF/MV/K2	120	0.61	73	<10%	1.00	1.37
CFTR70W/GX24q	1	70	EP2/42CF/MV/K2	277	0.27	73	<12%	1.00	1.37
FC12T5 40W	1	40	EP2/42CF/MV/K2	120	0.31	37	<10%	0.84	2.24
FC12T5 40W	1	40	EP2/42CF/MV/K2	277	0.14	37	<15%	0.84	2.24
FC12T5 40W	2	40	EP2/42CF/MV/K2	120	0.59	70	<10%	0.80	1.13
FC12T5 40W	2	40	EP2/42CF/MV/K2	277	0.26	70	<10%	0.81	1.15
FC9T5 22W	2	22	EP2/42CF/MV/K2	120	0.44	52	<10%	1.10	2.11
FC9T5 22W	2	22	EP2/42CF/MV/K2	277	0.19	52	<12%	1.10	2.11
FC9T5+FC12T5	1+1	22 40	EP2/42CF/MV/K2	120	0.55	67	<10%	0.90	1.34
FC9T5+FC12T5	1+1	22 40	EP2/42CF/MV/K2	277	0.25	67	<10%	0.90	1.34
FT24W/2G11	1	24	EP2/42CF/MV/K2	120	0.22	26	<10%	0.92	3.56
FT24W/2G11	1	24	EP2/42CF/MV/K2	277	0.1	27	<15%	0.92	3.48
FT24W/2G11	2	24	EP2/42CF/MV/K2	120	0.45	54	<10%	1.00	1.85
FT24W/2G11	2	24	EP2/42CF/MV/K2	277	0.2	54	<10%	1.00	1.85

	Number of Lamps per Ballast	Lamp Watts	Ballast Model Number	Line Voltage	Line Current (amps)	Input Watts (ANSI)	Total Harmonic Distortion Rating	Ballast Factor (ANSI)	Ballast Efficacy Factor
FT36W/2G11	1	36	EP2/42CF/MV/K2	120	0.31	37	<10%	0.88	2.38
FT36W/2G11	1	36	EP2/42CF/MV/K2	277	0.14	37	<12%	0.88	2.38
FT36W/2G11	2	36	EP2/42CF/MV/K2	120	0.55	66	<10%	0.8	1.21
FT36W/2G11	2	36	EP2/42CF/MV/K2	277	0.24	65	<10%	0.8	1.21
FT39W/2G11	1	39	EP2/42CF/MV/K2	120	0.37	45	<10%	1.00	2.22
FT39W/2G11	1	39	EP2/42CF/MV/K2	277	0.17	45	<12%	1.00	2.22
FT39W/2G11	2	39	EP2/42CF/MV/K2	120	0.69	82	<10%	0.95	1.16
FT39W/2G11	2	39	EP2/42CF/MV/K2	277	0.3	82	<10%	0.95	1.16
FT40W/2G11	1	40	EP2/42CF/MV/K2	120	0.37	45	<10%	1.00	2.22
FT40W/2G11	1	40	EP2/42CF/MV/K2	277	0.17	45	<12%	1.00	2.22
FT40W/2G11	2	40	EP2/42CF/MV/K2	120	0.69	82	<10%	0.95	1.16
FT40W/2G11	2	40	EP2/42CF/MV/K2	277	0.3	82	<10%	0.95	1.16
FT55W/2G11	1	55	EP2/42CF/MV/K2	120	0.36	43	<10%	0.71	1.65
FT55W/2G11	1	55	EP2/42CF/MV/K2	277	0.16	44	<12%	0.72	1.66

Wiring Diagrams, Case Dimensions & Lamp Guide

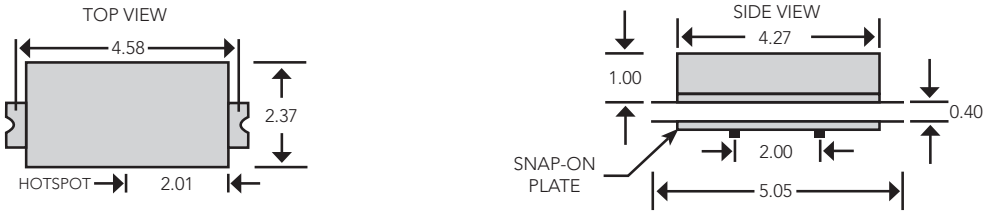
EP2/13CF/MV/K2
Wiring Diagram



Compact Fluorescent Electronic Ballast

Wiring Diagrams, Case Dimensions & Lamp Guide

Ballast Dimensions



This ballast will operate the following lamps:

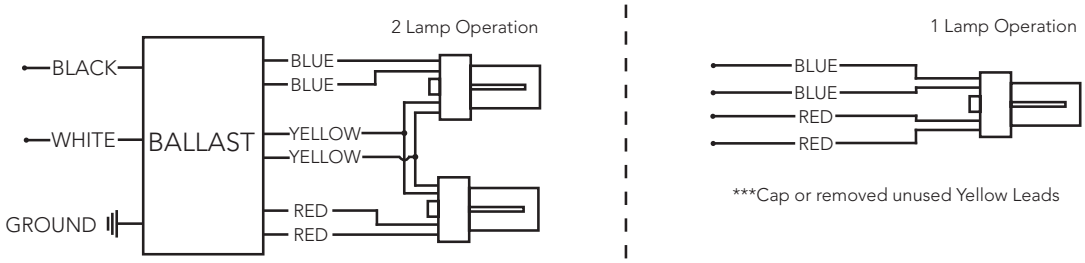
TWIN (CFSE), 4 PIN 7W, 9W

DOUBLE (CFDE), 4 PIN 13W

TRIPLE (CFTE), 4 PIN 13W

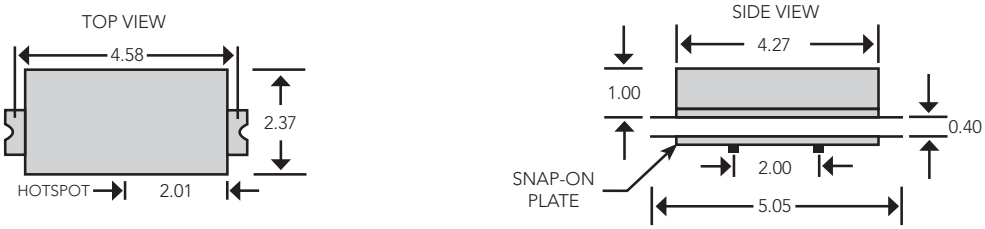
2D10/16W

EP2/18CF/MV/K2
Wiring Diagram

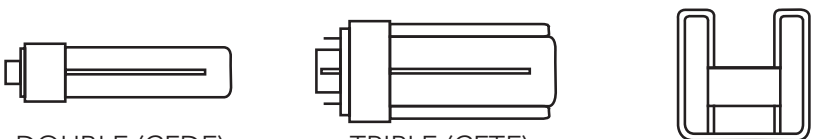


***Cap or removed unused Yellow Leads

Ballast Dimensions



This ballast will operate the following lamps:



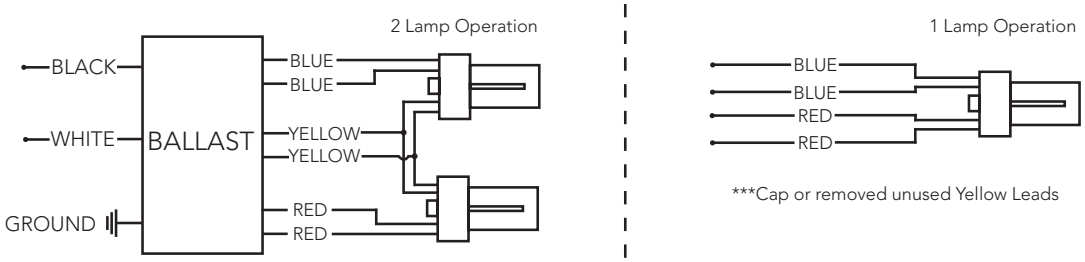
DOUBLE (CFDE), 4 PIN 13W

TRIPLE (CFTE), 4 PIN 13W

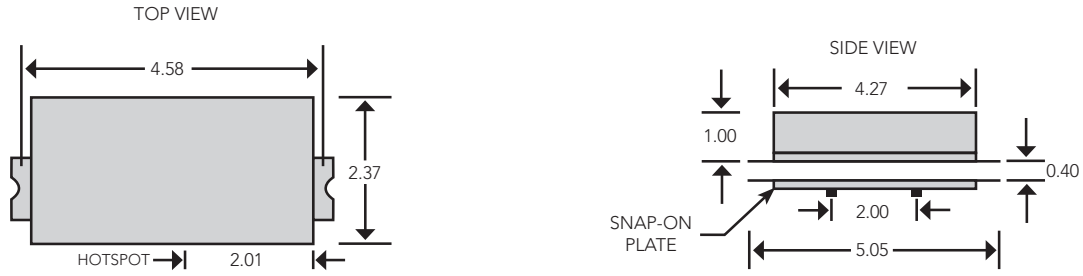
2D10/16W

Wiring Diagrams, Case Dimensions & Lamp Guide

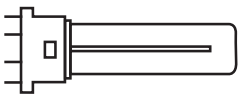
EP2/26CF/MV/K2
Wiring Diagram



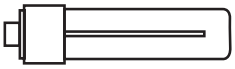
Ballast Dimensions



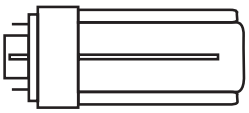
This ballast will operate the following lamps:



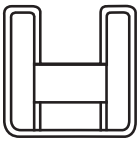
TWIN (CFSE), 4 PIN
13W, 24W



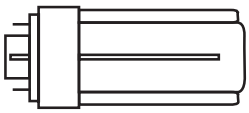
DOUBLE (CFDE),
4 PIN 26W



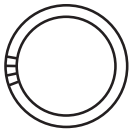
TRIPLE (CFTE),
4 PIN 26/32/42W



2D21/28/38W



TRIPLE (CFTE),
4 PIN 57W

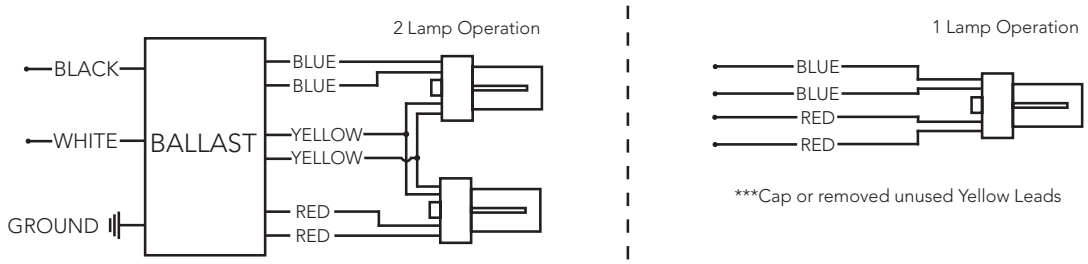


CIRCLINE (CFTE),
22W 40W

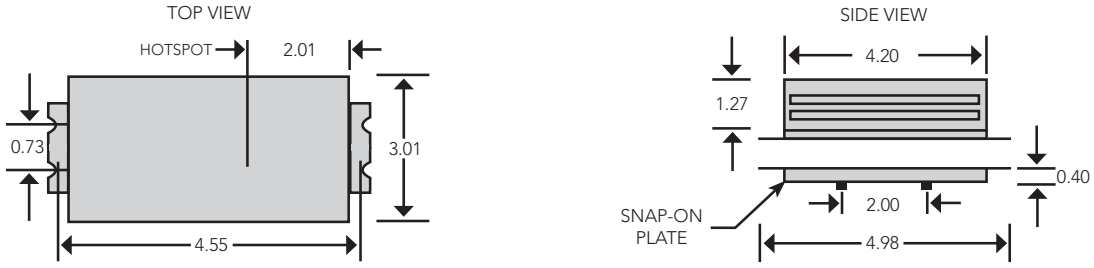
Compact Fluorescent Electronic Ballast

Wiring Diagrams, Case Dimensions & Lamp Guide

EP2/42CF/MV/K2
Wiring Diagram

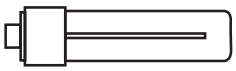


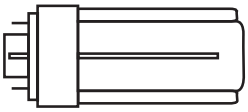
Ballast Dimensions

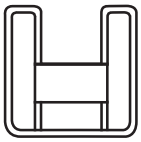


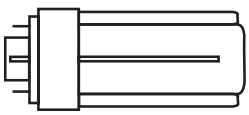
This ballast will operate the following lamps:

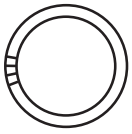

TWIN (CFSE), 4 PIN
27-27/36/40W 36TUV


DOUBLE (CFDE),
4 PIN 26W

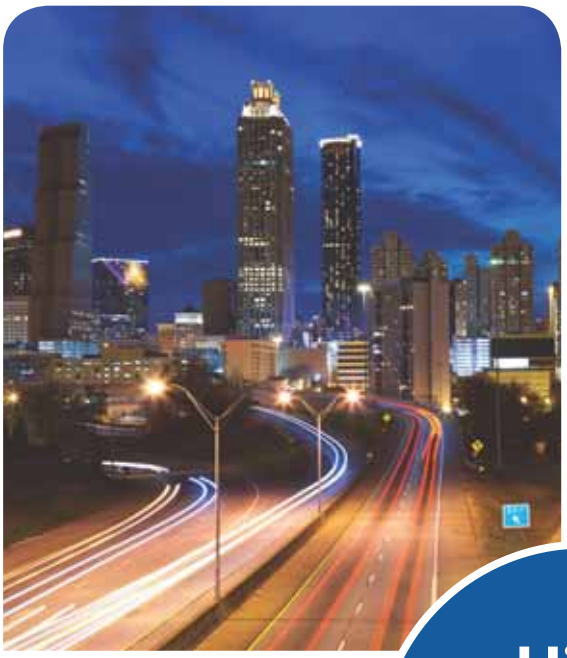

TRIPLE (CFTE),
4 PIN 26/32/42W


2D28/38W


TRIPLE (CFTE),
4 PIN 57/70W


CIRCLINE (CFTE),
22W 40W

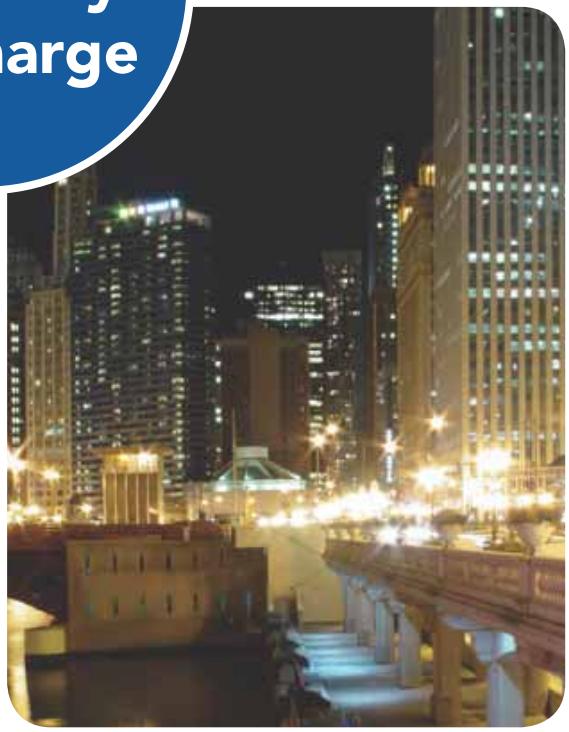
GPH793T5L



High Intensity Discharge

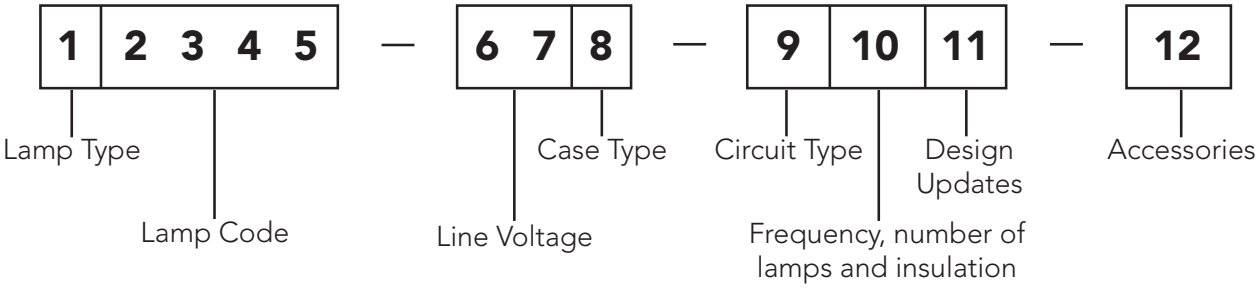
High Pressure Sodium
Pulse Start Metal Halide
Metal Halide

Ballast Kits



High Intensity Discharge (HID) Ballasts

Core and Coil Ballasts
Identifying the Ballast Model Number



HID Ballast Model Number example: Metal Halide (M), 400 watt (0400), 120/208/240/277 line voltage (71), *core and coil (C), CWA circuit (2), 60 line frequency/1lamp (1), standard design (1), replacement kit (K).

M	0 4 0 0	—	7 1	C	—	2	1	1	—	K

LAMP CODE

Column 1:
Selects the proper lamp type.
M = Metal Halide/Pulse Start MH
S = High Pressure Sodium
MS = Metal Halide/High Pressure Sodium

LAMP WATTAGE

Column 2 3 4 5:
Selects the proper lamp wattages.
0035 = 35 Watt
0050 = 50 Watt
0070 = 70 Watt
0100 = 100 Watt
0150 = 150 Watt
0175 = 175 Watt
0250 = 250 Watt
0320 = 320 Watt
0350 = 350 Watt
0400 = 400 Watt
0750 = 750 Watt
0875 = 875 Watt
1000 = 1000 Watt
1500 = 1500 Watt

LINE VOLTAGE

Column 6 7:
Selects the proper input operating voltages.

120	0 2
120/277	2 3
120T/480	2 9
120/208/240/277	7 1
120/208/240/277/480	8 1

CASE TYPE

Column 8:
Indicates the type of case used.
Case Construction Type.

Core and Coil	C
Utility - Tabbed	U

CIRCUIT TYPE

Column 9:
Indicates the type of circuit used.
Design Type

R-HPF - Reactor	1
CWA - Constant Wattage Auto Transformer	2
HX-HPF - High Reactance-High Power Factor	5
PS-CWA - Pulse Start Constant Wattage Autotransformer	6
Multiple Lamp Reactor	8
Multiple Lamp CWA	9

LINE FREQUENCY AND NUMBER OF LAMPS

Column 10:
Ballast operating frequency and total number of lamps that the ballast can operate at any one time.

Frequency	No. of Lamps	Insulation Class
60	1	H (180) 1
60	1	N (200) 2
60	1	H (180) E

* E = (E) EISA 2007 Compliant (Circle E)

DESIGN UPDATES

Column 11:
Indicates design revisions that are deemed significant enough for a model number change.

ACCESSORIES

Column 12:
Accessory codes are used to specify components included in the ballast order. This code is not part of the model number included on the label, but will be used as an extension to identify accessories.

CORE AND COIL ONLY	NO SUFFIX
Ballast with welded bracket	B
Ballast with oil cap	C
Ballast with dry cap	D
Ballast with standard starter	E

*Disclaimer: All possible ballast product numbers might not be available. Please consult factory before ordering.

Ballast Kits
Identifying the Ballast Model Number

Lamp Type		Wattage		Input Volts		Circuit Type		Packaging
M	-	400	-	4T	-	CWA	-	K
M - Metal Halide		175 250 400 1000 1500		4T 5T 480T		CWA		Kit
MP	-	400	-	4T	-	PSCWA	-	K
MP - Pulse Start Metal Halide		50 70 100 150 250 400 750 875 1000		2T 4T 5T		HXH PSCWA		Kit
S	-	150	-	4T	-	HXH	-	K
S - High Pressure Sodium		35 50 70 100 150 250 400 1000		120 4T 5T		RXN RXH HXH CWA		Kit

LAMP TYPE	WATTAGE	INPUT VOLTS
• M = Metal Halide • MP = Pulse Start MH • S = High Pressure Sodium	• Metal Halide - 175, 250, 400, 1000, 1500 • Pulse Start - 50, 70, 100, 150, 250, 400, 1000 • High Pressure Sodium - 35, 50, 70, 100, 150, 250, 400, 1000	• 2T - 120/277v • 4T - 120/208/240/277v • 5T - 120/208/240/277/480v • 120 - 120v • 480T - 120T/480v

CIRCUIT TYPE	PACKAGING		
	K - Kit		
RXN - Reactor Normal Power Factor* RXH - Reactor High Power Factor HXN - High Reactance Normal Power Factor* HXN - High Reactance High Power Factor CWA - Constant Wattage Autotransformer PSCWA - Pulse Start CWA	**Metal Halide Ballast Kit** • Ballast • Capacitor • Mounting Bracket	**Pulse Start Ballast Kit** • Ballast • Capacitor* • Starter • Mounting Bracket	**High Pressure Sodium Ballast Kit** • Ballast • Capacitor* • Starter • Mounting Bracket

* For Normal Power Factor High Reactance and Reactor ballasts, the ballast operates without the use of a capacitor. Therefore, a capacitor will not be included with the kit. For all other circuit types, a capacitor is included and standard.

High Intensity Discharge (HID) Ballasts

HID Ballast Kits

New Kit Model #	Core and Coil Model
Metal Halide	
M-175-4T-CWA-K	M0175-71C-2XX
M-175-5T-CWA-K	M0175-81C-2XX
M-250-4T-CWA-K	M0250-71C-2XX
M-250-5T-CWA-K	M0250-81C-2XX
M-400-4T-CWA-K	M0400-71C-2XX
M-400-5T-CWA-K	M0400-81C-2XX
M-1000-4T-CWA-K	M1000-71C-2XX
M-1000-5T-CWA-K	M1000-81C-2XX
M-1500-4T-CWA-K	M1500-71C-2XX
Pulse Start Metal Halide	
MP-50-2T-HXH-K	M0050-23C-1XX
MP-70-4T-HXH-K	M0070-71C-5XX
MP-100-4T-HXH-K	M0100-71C-5XX
MP-150-4T-HXH-K	M0150-71C-5XX
MP-250-4T-PSCWA-K	M0250-71C-6XX
MP-320-4T-PSCWA-K	M0320-71C-6XX

New Kit Model #	Core and Coil Model
MP-350-4T-PSCWA-K	M0350-71C-6XX
MP-400-4T-PSCWA-K	M0400-71C-6XX
MP-750-4T-PSCWA-K	M0750-71C-6XX
MP-1000-4T-PSCWA-K	M1000-71C-6XX
MP-50-2T-HXH-K	M0050-23C-1XX
MP-70-4T-HXH-K	M0070-71C-5XX
MP-100-4T-HXH-K	M0100-71C-5XX
MP-150-4T-HXH-K	M0150-71C-5XX
MP-250-4T-PSCWA-K	M0250-71C-6XX
MP-320-4T-PSCWA-K	M0320-71C-6XX
MP-350-4T-PSCWA-K	M0350-71C-6XX
MP-400-4T-PSCWA-K	M0400-71C-6XX
MP-750-4T-PSCWA-K	M0750-71C-6XX
MP-1000-4T-PSCWA-K	M1000-71C-6XX
High Pressure Sodium	
S-35-120-RXN-K*	S0035-02C-111-K
S-35-120-RXH-K	S0035-02C-111

New Kit Model #	Core and Coil Model
S-50-120-RXN-K*	S0050-02C-111-K
S-50-120-RXH-K	S0050-02C-111
S-70-120-RXN-K*	S0070-02C-111-K
S-70-120-RXH-K	S0070-02C-111
S-70-4T-HXH-K	S0070-71C-5XX
S-100-120-RXN-K*	S0100-02C-111-K
S-100-120-RXH-K	S0100-02C-111
S-100-4T-HXH-K	S0100-71C-5XX
S-150-120-RXN-K*	S0150-02C-111-K
S-150-120-RXH-K	S0150-02C-111
S-150-4T-HXN-K	S0150-71C-5XX
S-250-4T-CWA-K	S0250-71C-2XX
S-250-5T-CWA-K	S0250-81C-2XX
S-400-4T-CWA-K	S0400-71C-2XX
S-400-5T-CWA-K	S0400-81C-2XX
S-1000-4T-CWA-K	S1000-71C-2XX
S-1000-5T-CWA-K	S1000-81C-2XX

Specifications

Performance:
- Ballast shall be designed in accordance with all applicable ANSI specifications including ANSI C82.4.
- Ballast shall be designed with Class "H" (180°C) or higher insulation system.
- Ballasts shall be designed to operate for 60,000 hours of continuous operation at their maximum rated temperature.
- Ballast and starter combinations shall operate reliably at starting temperatures of -40°C for High Pressure Sodium ballasts and -30°C for Metal Halide ballasts at nominal line voltage of plus or minus 10%.
- All HID ballast shall have a nominal ballast factor of 1.0.

Regulatory:
- Manufacturer shall provide written warranty against defects in material or workmanship for 2-Years from date of manufacture.
- Manufacturer shall have been manufacturing HID ballasts for at least ten years.
- All HID ballasts shall be UL component recognized.
- Ballast must be Howard Lighting Products (or approved equal).

Capacitors & Starters for HID

Capacitors:
- All capacitors provided shall have a self-contained internal bleeder resistor where required according to UL1029.
- All oil-filled capacitors shall be housed in aluminum or corrosion-resistant steel cans and contain.25" quick disconnect terminals.
- Oil filled capacitors shall have a 90°C max. Case temperature rating.
- Dry film acitors shall have a 100°C max. case temperature rating cap.

Starters:
- All starters will be epoxy-filled with a plastic external housing or aluminum external housing.
- All starters shall be designed to provide six months of open circuit operation without failure.
- All starters shall have a case rating temperature of 105°C.
- All starters shall be designed to withstand 10,000 hours of continuous pulsing.
- All starters shall have no exposed live parts.

HID Kits:
- All HID kits shall be precision wound to insure proper insulation.
- HID core and coil shall be interchangeable with prior ballast or include mounting bracket to adapt ballast to intended fixture.
- All HID kits shall be supplied with pre-insulated input voltage leads.
- There are to be no exposed live parts on the core & coil, starter, or dry capacitor.
- Must meet all ANSI Specifications for the specified lamp.
- Kit must include installation instructions and 1-800# for field assistance.
- Ballast must be Howard Lighting Product (or approved equal).

*Ballast operates without a capacitor. Therefore a capacitor is not included with the standard kit.

Energy Policy

Metal Halide Legislation
(EISA) Energy Independence & Security Act of 2007

Implementation Date: January 1, 2009

Products Affected: All metal halide fixtures (indoor or outdoor) from 150 to 500 watts. Products not compliant can no longer be manufactured after December 31, 2008.

Inventory: Replacement lamps and ballast for probe start (standard metal halide) will remain available and are not affected by the legislation. Remaining probe start fixture inventory may be sold after January 1, 2009, provided it was manufactured prior to January 1, 2009.

Purpose/Intent: Shift the US to energy independence and utilization of higher efficiency lighting products.

Luminaire Exemptions:

Standards do not apply to fixtures that:

- Use electronic ballast rated for 480 volts
- Use regulated lag ballast
- Fixtures that meet all of the following criteria (within a single fixture):

1. Contain a ballast rated to operate at an ambient air temperature above 50° C as specified by UL 1029-2001
2. Rated for wet location use as defined by National Electrical Code 2002 Section 410.4(A)
3. Are only rated for 150W lamps

Federal Trade Commission (FTC) Label Identification:

- Circle E logo is required on ballast contained in the fixture, product packaging, all advertising and marketing materials (merchandising, catalogs, website content, point of purchase, etc.)*.
- Affected products (150W - 500W) manufactured on or after January 1, 2009, require the identification mark.

Probe Start (watts)	ANSI	Lamp Size	Mean Lumens	Pulse Start Watts	ANSI	Lamp Size	Mean Lumens
150	M107/E	Medium	8500	150	M102/E	Medium	10000
175	M57/E	Medium Mogul	9300	175	M152/E M137/E	Mogul	12800
				200	M136/E	Mogul	13500
250	M58/E	Mogul	17000	250	M153/E M138/E	Mogul	19000
				320	M154/E M132/E	Mogul	21000
				350	M131/E	Mogul	27000
400	M59/E	Mogul	23500	400	M155/E M135/E	Mogul	31000

EISA Minimum Ballast Efficiency:

Ballast Type	Minimum Ballast Efficiency Rating	Fixture Wattage
Magnetic Probe Start	94%	150W - 250W
Magnetic or Electronic Pulse Start	88%	
Electronic (non-Pulse Start)	90% 92%	251W - 500W

Ⓔ Compliant Efficiency Calculation (examples):

Fixture Wattage	Minimum Efficiency	Input Watt Calculation (maximum fixture input watts)
250 Watt Probe Start	94%	250/.94 = 266
250 Watt Pulse Start	88%	250/.88 = 284
250 Watt Electronic Pulse Start	90%	250/.90 = 278

Benefits of Pulse Start Metal Halide vs Probe Start :

- Faster restrike time (3-4 minutes)
- Half the warm up time (2 minutes)
- 25% to 50% improved lumen output (efficacy)
- Improved illumination levels over life (better lumen maintenance)
- Colder starting temperatures

Contact your local Howard Lighting District Manager or Agent to receive:

- Howard Lighting product information
- Product specification details
- Other energy saving lighting products from Howard Lighting
- Energy audit information

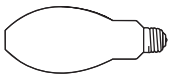
High Intensity Discharge (HID) Ballasts

Electronic Ballasts

Compact Fluorescent Ballasts

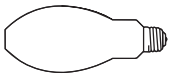
HID Ballasts

Metal Halide Ballasts



Input Voltage	Model Number	Input Power (Watts)	Max. Input Current	Nom. Open Cir. Volt.	Wir. Dia. pgs. 56-60	Dim. Fig pg. 61	A (in.)	B (in.)	Capacitor pg. 52-54	Total Wt. (lbs.)	Ignitor Part Number	Pri/Sec Conductor C-Copper A-Alum	U.L. Bench Top Rise Code
175 WATT, ANSI Code M-57, CWA Kit Model#: M-175-4T-CWA-K, M175-5T-CWA-K													
120V 208V 240V 277V	M0175-71C-214	210 210 210 210	2.20 1.30 1.10 1.00	305	C	1	2.42	4.00	10.0/400	7.00	-	C/A	D D D D
120V 208V 240V 277V	M0175-71C-215	210 210 210 210	3.00 1.15 1.00 0.90	300	C	1	2.4	3.8	10.0/400	7.00	-	C/A	B C C C
120V 208V 240V 277V	M0175-71C-216	215 215 215 215	1.80 1.10 0.90 0.90	320	C	1	2.4	3.8	10.0/400	7.00	-	C/A	B C C B
120V 208V 240V 277V 480V	M0175-81C-213	202 202 202 202 202	2.20 1.30 1.10 0.90 0.50	295	C	1	2.50	4.10	10.0/400	8.00	-	C/A	D D D D D
120V 208V 240V 277V 480V	M0175-81C-214	220 220 220 220 220	2.40 1.40 1.20 1.00 0.60	303	C	1	2.42	4.0	10.0/400	6.90	-	C/A	D D D D D
250 WATT, ANSI Code M-58, CWA KIT Model#: M-250-4T-CWA-K, M-250-5T-CWA-K													
120V 208V 240V 277V	M0250-71C-214	295 295 295 295	3.502.0 1.80 1.50	305	C	2	1.6	3.5	15.0/400	8.40	-	C/A	A A A A
120V 208V 240V 277V	M0250-71C-216	290 290 290 290	2.50 1.40 1.30 1.10	305	C	2	1.5	3.3	15.0/400	8.30	-	C/A	A A A A
120V 208V 240V 277V 480V	M0250-81C-215	295 295 295 295 295	3.90 2.40 2.00 1.80 1.00	310	C	2	1.90	3.80	15.0/400	10.00	-	C/A	A A A A A
120V 208V 240V 277V 480V	M0250-81C-216	280 280 280 280 280	2.70 1.60 1.40 1.20 0.70	308	C	2	1.65	3.6	15.0/400	9.00	-	C/A	A A A A A

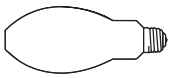
Metal Halide Ballasts



Input Voltage	Model Number	Input Power (Watts)	Max. Input Current	Nom. Open Cir. Volt.	Wir. Dia. pgs. 56-60	Dim. Fig pg. 61	A (in.)	B (in.)	Capacitor pg. 52-54	Total Wt. (lbs.)	Ignitor Part Num-ber	Pri/Sec Conduc-tor C-Copper A-Alum	U.L. Bench Top Rise Code
400 WATT, ANSI Code M-59, CWA Kit Model#: M-400-4T-CWA-K; M400-5T-CWA-K													
120V 208V 240V 277V	M0400-71C-213	453 453 453 453	4.00 2.30 2.00 1.80	300	C	2	2.20	4.20	24.0/400	11.00	-	A/A	D D D D
120V 208V 240V 277V	M0400-71C-214	458 458 458 458	4.50 2.80 2.40 2.20	310	C	2	2.0	4.1	24.0/360	10.00	-	A/A	D E E E
120V 208V 240V 277V 480V	M0400-81C-212	459 459 459 459 459	4.00 2.30 2.00 1.80 1.00	305	C	2	2.30	4.23	24.0/360	12.00	-	C/A	B B C C C
120V 208V 240V 277V 480V	M0400-81C-213	457 457 457 457 457	2.70 1.80 1.40 1.20 0.70	305	C	2	2.15	4.2	24.0/365	11.00	-	C/A	C E E D E
1000 WATT, ANSI Code M-47, CWA KIT Model#: M-1000-4T-CWA-K, M-1000-5T-CWA-K, M-1000-480T-CWA-K													
120V 208V 240V 277V	M1000-71C-214	1085 1085 1085 1085	9.30 5.30 4.60 4.00	445	C	5	3.50	5.70	24.0/480	21.00	-	A/A	C C C C
120V 208V 240V 277V 480V	M1000-81C-213	1100 1100 1100 1100 1100	9.20 5.30 4.60 4.00 2.30	420	C	5	3.20	5.20	24.0/480	21.00	-	C/A	D D D D D
480V	M1000-29C-214	1085	2.0	420	C	5	2.8	4.9	24.0/480	18.5	-	C/A	D
1500 WATT, ANSI Code M-48, CWA KIT Model#: M-1500-4T-CWA-K, M-1500-480T-CWA-K													
120V 208V 240V 277V	M1500-71C-215	1605 1605 1605 1605	7.9 4.6 3.9 3.4	440	C	3	4.1	6.1	32.0/525	31.00	-	C/C	G E E E
480V	M1500-29C-214	1625	2.1	450	C	3	4.2	6.2	32.0/525	31.00	-	C/C	E

High Intensity Discharge (HID) Ballasts

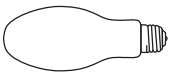
Pulse Start Metal Halide Ballasts



Input Voltage	Model Number	Input Power (Watts)	Max. Input Current	Norm. Open Cir. Volt.	Wir. Dia. pgs. 56-60	Dim. Fig pg. 61	A (in.)	B (in.)	Capacitor pg. 52-54	Total Wt. (lbs.)	Ignitor Part Number	Pri/Sec Conductor C-Copper A-Alum	U.L. Bench Top Rise Code
50 WATT, ANSI Code M-110, HX-HPF Kit Model#: MP-50-2T-HXH-K													
120V 277V	M0050-23C-512	68 68	1.45 0.60	265	B	1	1.05	2.1	6.0/280	3.50	ST1001	C/A	A A
70 WATT, ANSI Code M-98, HX-HPF KIT Model#: MP-70-4T-HXH-K													
120V 208V 240V 277V	M0070-71C-511	85 85 86 85	2.00 1.20 1.00 0.90	305	B	1	1.44	2.75	8.0/280	4.60	ST1001	C/C	A A A A
120V 208V 240V 277V	M0070-71C-512	92 92 92 92	2.00 1.20 1.00 0.90	250	B	1	1.45	2.85	8.0/280	4.60	ST1001	C/A	A A A A
120V 208V 240V 277V 480V	M0070-71C-513	85 85 85 85	2.00 1.10 1.00 0.90	250	B	1	1.50	2.90	8.0/280	4.5	ST1001	C/A	A A A A
100 WATT, ANSI Code M-90, HX-HPF KIT Model#: MP-100-4T-HXH-K													
120V 208V 240V 277V	M0100-71C-512	129 129 129 129	3.00 1.75 1.50 1.30	270	B	1	1.50	2.90	12.0/280	5.50	ST1001	C/C	B B B B
120V 208V 240V 277V	M0100-71C-516	125 125 125 125	4.50 2.80 2.40 2.20	270	B	1	1.70	3.10	12.0/280	5.20	ST1001	C/A	A A A A
150 WATT, ANSI Code M-102, HX-HPF KIT Model#: MP-150-4T-HXH-K													
120V 208V 240V 277V	M0150-71C-513	182 182 182 182	5.10 3.00 2.40 2.10	255	B	1	2.30	3.80	16.0/280	6.80	ST1001	C/A	B B A A
250 WATT, ANSI Code M-153, PS-CWA Kit Model#: MP-250-4T-PSCWA-K													
120V 208V 240V 277V	M0250-71C-6E2 Ⓔ	283 283 283 283	3.50 1.90 1.70 1.50	275	D	2	2.00	3.75	17.0/480	12.0	ST1000 Or ST1001	A/A	A A A A
120V 208V 240V 277V	M0250-71C-6E3 Ⓔ	284 284 284 284	2.25 1.35 1.15 1.00	275	D	2	2.00	4.10	16.0/370	11.00	ST1001	A/A	A A A A

Circle E logo indicates that this product complies with federal energy efficiency requirements.

Pulse Start Metal Halide Ballasts

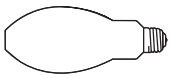


Input Voltage	Model Number	Input Power (Watts)	Max. Input Current	Norm. Open Cir. Volt.	Wir. Dia. pgs. 56-60	Dim. Fig pg. 61	A (in.)	B (in.)	Capacitor pg. 52-54	Total Wt. (lbs.)	Ignitor Part Number	Pri/Sec Conductor C-Copper A-Alum	U.L. Bench Top Rise Code
320 WATT, ANSI Code M-135/M-154, PS-CWA Kit Model#: MP-320-4T-PSCWA-K													
120V 208V 240V 277V	M0320-71C-6E5 Ⓔ	364 364 364 364	1.90 1.20 1.00 0.90	280	D	2	2.00	4.15	22.0/330	10.00	ST1001	A/A	B B B C
350 WATT, ANSI Code M-131, PS-CWA Kit Model#: MP-350-4T-PSCWA-K													
120V 208V 240V 277V	M0350-71C-6E4 Ⓔ	397 397 397 397	2.40 1.40 1.10 1.10	275	D	2	2.30	4.20	24.0/400	12.00	ST1000 Or ST1001	C/A	A A A A
400 WATT, ANSI Code M-135/M-155, PS-CWA Kit Model#: MP-400-4T-PSCWA-K													
120V 208V 240V 277V	M0400-71C-6E5 Ⓔ	450 450 450 450	2.10 1.10 1.00 0.90	250	D	2	1.92	4.10	26.0/345	10.00	ST1001	A/A	C C D D
750 WATT, ANSI Code M-149, PS-CWA Kit Model#: MP-750-4T-PSCWA-K, MP-750-5T-PSCWA-K													
120V 208V 240V 277V	M0750-71C-613	815 815 815 815	5.80 3.30 2.90 2.50	370	D	5	2.30	4.30	24.0/480	18.00	ST1003	C/C	B C B B
120V 208V 240V 277V 480V	M0750-81C-612	823 820 820 825 821	7.40 4.10 3.70 3.20 1.90	355	D	5	2.80	5.50	28.0/400	19.30	ST1003	C/C	B C C C C
875 WATT, ANSI Code M-166, PS-CWA Kit Model#: MP-875-4T-PSCWA-K													
120V 208V 240V 277V	M0875-71C-611	970 930 973 972	6.35 3.00 3.15 2.70	420	D	5	3.00	5.50	22.0/480	19.50	ST2002	C/A	B A A A
1000 WATT, ANSI Code M-141, PS-CWA Kit Model#: MP-1000-4T-PSCWA-K													
120V 208V 240V 277V	M1000-71C-613	1077 1077 1077 1077	8.70 5.10 4.50 4.10	404	D	5	3.00	4.90	24.0/480	21.20	ST2002	C/A	C C C C
120V 208V 240V 277V	M1000-71C-914	1080 1080 1080 1080	7.30 5.30 4.00 3.40	420	D	5	2.80	5.0	24.0/480	18.5	ST2002	C/A	D D C D

Ⓔ Circle E logo indicates that this product complies with federal energy efficiency requirements.

High Intensity Discharge (HID) Ballasts

High Pressure Sodium Ballasts



Input Voltage	Model Number	Input Power (Watts)	Max. Input Current	Norm. Open Cir. Volt.	Wir. Dia. pgs. 56-60	Dim. Fig pg. 61	A (in.)	B (in.)	Capacitor pg. 52-54	Total Wt. (lbs.)	Ignitor Part Number	Pri/Sec Conductor C-Copper A-Alum	U.L. Bench Top Rise Code
35 WATT, ANSI Code S-76, R-HPF, R-NPF Kit Model#: S-35-120-RXH-K, S-35-120-RXN-K													
120V	S0035-02C-111	42	1.10	120	A	7	0.63	1.70	20.0/120	1.17	ST2001	C	A
50 WATT, ANSI Code S-68, R-NPF Kit Model#: S-70-120-RXN-K													
120V	S0050-02C-111	61	1.10	120	A	7	0.90	1.80	20.0/120	1.43	ST2001	C	A
70 WATT, ANSI Code S-62, R-HPF, R-NPF, HX-HPF Kit Model#: S-70-120-RXH-K, S-70-120-RXN-K, S-70-4T-HXH-K													
120V	S0070-02C-111	80	1.60	120	A	7	1.30	2.50	28.0/120	2.10	ST2001	C	A
120V	S0070-02C-112	83	0.90	120	A	7	1.30	2.50	28.0/120	2.00	ST2001	C	A
120V 208V 240V 277V	S0070-71C-512	68 107 119 149	1.70 1.00 0.90 0.70	120	B	1	1.50	3.10	7.0/280	5.00	ST2001	C	A A A A
100 WATT, ANSI Code S-54, R-HPF, R-NPF, HX-HPF Kit Model#: S-100-120-RXH-K, S-100-120-RXN-K, S-100-4T-HXH-K													
120V	S0100-02C-111	115	2.10	120	A	7	1.54	2.60	46.0/120	2.50	ST2001	C	A
120V	S0100-02C-113	112	2.00	120	A	7	1.54	2.80	36.0/120	2.40	ST2001	C	A
120V 208V 240V 277V	S0100-71C-512	128 129 130 128	2.55 1.60 1.40 1.20	125	B	1	2.00	3.40	10.0/280	7.20	ST2001A	C	B A A A
150 WATT, ANSI Code S-55, R-HPF, R-NPF, HX-HPF Kit Model#: S-150-120-RXH-K, S-150-120-RXN-K, S-150-4T-HXH-K													
120V	S0150-02C-111	167	3.00	120	A	7	2.20	3.50	55.0/120	3.40	ST2001	C	A
120V 208V 240V 277V	S0150-71C-512	188 188 188 188	3.50 1.95 1.70 1.50	120	B	1	2.50	3.80	14.0/280	8.00	ST2001	C	C C C C

High Pressure Sodium Ballasts

Input Voltage	Model Number	Input Power (Watts)	Max. Input Current	Norm. Open Cir. Volt.	Wir. Dia. pgs. 56-60	Dim. Fig pg. 61	A (in.)	B (in.)	Capacitor pg. 52-54	Total Wt. (lbs.)	Ignitor Part Number	Pri/Sec Conductor C-Copper A-Alum	U.L. Bench Top Rise Code
250 WATT, ANSI Code S50, CWA Kit Model#: S-250-4T-CWA-K, S-250-5T-CWA-K													
120V 208V 240V 277V	S0250-71C-214	290 290 290 290	1.80 1.10 0.90 0.80	185	D	2	1.83	3.60	35.0/240	10.90	ST2000	C/C	A A A A
120V 208V 240V 277V 480V	S0250-81C-214	292 292 292 292 292	2.40 1.40 1.20 1.10 0.60	186	D	2	2.00	3.60	35.0/240	11.70	ST2000	C/C	A A A A A
400 WATT, ANSI Code S-51, CWA Kit Model#: S-400-4T-CWA-K, S-250-5T-CWA-K													
120V 208V 240V 277V	S-400-71C-212	464 464 464 464	2.00 1.25 1.00 0.90	190	D	2	2.28	4.23	55.0/240	13.50	ST2000	C/C	C D C B
120V 208V 240V 277V 480V	S-400-81C-212	475 475 475 475 475	2.50 1.40 1.25 1.10 0.65	190	D	2	2.62	4.25	55.0/240	15.0	ST2000	C/C	D D D D D
1000 WATT, ANSI Code S-52, CWA Kit Model#: S-1000-4T-CWA-K, S-1000-5T-CWA-K													
120V 208V 240V 277V	S1000-71C-212	1087 1038 1091 1084	5.80 3.25 2.90 2.65	525	D	3	3.75	5.88	26.0/525	27.00	ST2002	C/C	B B B B
120V 208V 240V 277V 480V	S1000-81C-212	1124 1072 1126 1133 1127	8.00 4.70 3.90 3.60 2.10	435	D	3	4.0	6.1	26.0/525	28.20	ST2002	C/C	D D D D D

High Intensity Discharge (HID) Ballasts

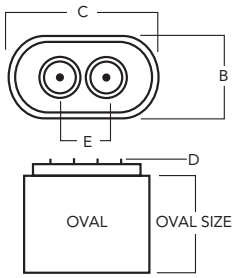
Capacitors

Identifying the capacitor model number

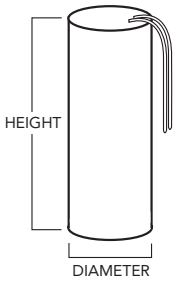
1 2 3	4 5 6	7	8
MICROFARAD (M fd.) VALUE	RATED VOLTAGE	CAPACITOR TYPE (1) OIL-FILLED (2) DRY FILM (3) ROUND OIL-FILLED	CASE DIMENSIONS (SEE TABLES)

Capacitor Dimensions (inches)

OVAL OIL-FILLED CAPACITOR DIMENSIONS (inches)					
MODEL TYPE	MAXIMUM				
	OVAL SIZE	DIM. B	DIM. C	DIM. D	DIM. E
A	1.25	1.31	2.16	0.50	0.81
B	1.50	1.56	2.69	0.50	0.81
C	1.75	1.91	2.91	0.50	0.81
D	2.00	1.97	2.66	0.50	0.81



ROUND OIL-FILLED CAPACITOR DIMENSIONS (inches)		
MODEL TYPE	MAXIMUM DIAMETER	MAXIMUM HEIGHT
A	1.51	3.27
B	1.77	3.27
C	2	4.06
D	2.5	5.63



ROUND DRY FILM CAPACITOR DIMENSIONS (inches)		
MODEL TYPE	MAXIMUM DIAMETER	MAXIMUM HEIGHT
A	1.25	3.23
B	1.58	3.62
C	1.77	4.21
D	2	1.97

Capacitor Specifications

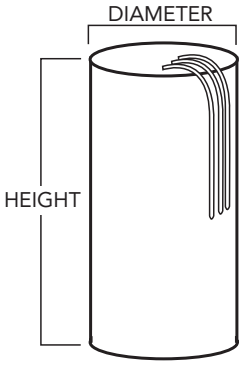
MODEL NUMBER	MICROFARAD VALUE	VOLTS	MAX HEIGHT (inches)	HOWARD INDUSTRIES BALLAST FAMILY WHERE USED
OVAL OIL-FILLED 90°C				
12.0/280-1A	12.0	280	3.13	M0100-XXC-511 MH 100 HX-HPF M-90
10.0/400-1B	10.0	400	2.87	M0175-XXC-212 MH 175 CWA M-57
15.0/300-1C	15.0	300	2.69	M0200-XXC-611 MH 200 PS CWA, M136
15.0/400-1C	15.0	400	2.90	M0250-XXC-X1X MH 250 CWA & PA CWA M-58, M138
24.0/400-1C	24.0	400	3.87	M0400-XXC-21X MH 400 CWA M-59
24.0/480-1C	24.0	480	3.88	M1000-XXC-212 MH 1000 CWA M-47
5.0/280-1A	5.0	280	2.50	S0050-XXC-511 HPS 50 HX-HPF S-68
7.0/280-1A	7.0	280	2.50	S0070-XXC-511 HPS 70 HX-HPF S-62
10.0/280-1A	10.0	280	2.50	S0100-XXC-511 HPS 100 HX-HPF S-54
14.0/280-1B	14.0	280	2.87	S0150-XXC-X11 HPS 150 HX-HPF S-55
28.0/280-1C	28.0	280	3.87	S0200-XXC-X11 HPS 200 HX-HPF S-66
35.0/240-1C	35.0	240	3.87	S0250-XXC-211 HPS 250 CWA S-50
55.0/240-1C	55.0	240	3.87	S0400-XXC-211 HPS 400 CWA S-51
26.0/525-1C	26.0	525	4.87	S1000-XXC-211 HPS 1000 CWA S-52
19.5/400-1C	19.5	400	3.40	M0320-XXC-611 MH 320 PS CWA M-132
17.5/280-1B	17.5	280	3.23	M0320-08C-711 MH 320 PS REACTOR M-132
20.5/400-1C	20.5	400	3.40	M0350-XXC-611 MH 350 PS CWA M-131
20.0/280-1B	20.0	280	3.23	M0350-08C-711 MH 350 PS REACTOR M-131
15.0/300-1C	15.0	300	3.23	M0400-08C-711 MH 400 PS REACTOR M-135, M-155
26.0/330-1C	26.0	330	3.23	M0400-XXC-611 MH 400 PS CWA M-135, M-155
21.0/480-1C	21.0	480	3.23	M0400-XXC-411 MH 400 REG-LAG M-128, M-135, M-59
32.0/525-1D	32.0	525	5.30	M1500-XXC-212 MH 1500 CWA M-48
ROUND OIL-FILLED 90°C				
12.0/280-3A	12.0	280	3.27	M0100-XXC-511 MH 100 HX-HPF M-90
10.0/400-3A	10.0	400	3.27	M0175-XXC-212 MH 175 CWA M-57
15.0/400-3B	15.0	400	3.27	M0250-XXC-X1X MH 250 CWA & PA CWA M-58, M138
24.0/400-3C	24.0	400	4.06	M0400-XXC-21X MH 400 CWA M-59
24.0/480-3C	24.0	480	4.06	M1000-XXC-212 MH 1000 CWA M-47
5.0/280-3A	5.0	280	3.27	S0050-XXC-511 HPS 50 HX-HPF S-68
7.0/280-3A	7.0	280	3.27	S0070-XXC-511 HPS 70 HX-HPF S-62
10.0/280-3A	10.0	280	3.27	S0100-XXC-511 HPS 100 HX-HPF S-54
14.0/280-3A	14.0	280	3.27	S0150-XXC-X11 HPS 150 HX-HPF S-55
28.0/280-3B	28.0	280	3.27	S0200-XXC-X11 HPS 200 HX-HPF S-66
26.0/525-3D	26.0	525	5.63	S1000-XXC-211 HPS 1000 CWA S-52
19.5/400-3B	19.5	400	4.06	M0320-XXC-611 MH 320 PS CWA M-132
17.5/280-3A	17.5	280	3.27	M0320-08C-711 MH 320 PS REACTOR M-132
20.0/280-3B	20.0	280	3.27	M0350-08C-711 MH 350 PS REACTOR M-131
32.0/525-3D	32.0	525	5.63	M1500-XXC-212 MH 1500 CWA M-48
45.0/280-3C	45.0	280	4.06	S0310-XXU-211 HPS 310 CWA S-67

High Intensity Discharge (HID) Ballasts

MODEL NUMBER	MICROFARAD VALUE	VOLTS	MAX HEIGHT (inches)	HOWARD INDUSTRIES BALLAST FAMILY WHERE USED
ROUND DRY FILM 100°C				
10.0/400-2B	10.0	400	3.72	M0175-XXC-212 MH 175 CWA M-57
15.0/300-2C	15.0	300	3.75	M0200-XXC-611 MH 200 PS CWA, M136
15.0/400-2C	15.0	400	4.20	M0250-XXC-X1X MH 250 CWA & PS CWA M-58, M-138
24.0/400-2C	24.0	400	5.20	M0400-XXC-21X MH 400 CWA M-59
5.0/280-2A	5.0	280	3.23	S0050-XXC-511 HPS 50 HX-HPF S-68
7.0/280-2A	7.1	280	3.23	S0070-XXC-511 HPS 70 HX-HPF S-62
10.0/280-2B	10.0	280	3.23	S0100-XXC-511 HPS 100 HX-HPF S-54
12.0/280-2B	12.0	280	3.23	M0100-XXC-511 MH 100 HX-HPF M-90
14.0/280-2B	14.0	280	3.72	S0150-XXC-X11 HPS 150 HX-HPF S-55
28.0/280-2C	28.0	280	4.70	S0200-XXC-X11 HPS 200 CWA S-66
35.0/240-2C	35.0	240	4.70	S0250-XXC-211 HPS 250 CWA S-50
55.0/240-2C	55.0	240	4.21	S0400-XXC-211 HPS 400 CWA S-51
19.5/400-2C	19.5	400	4.70	M0320-XXC-611 MH 320 PS CWA M-132
17.5/280-2C	17.5	280	4.70	M0320-08C-711 MH 320 PS REACTOR M-132
20.5/400-2C	20.5	400	4.70	M0350-XXC-611 MH 350 PS CWA M-131
20.0/280-2C	20.0	280	3.80	M0350-08C-711 MH 350 PS REACTOR M-131
20.0/280-2C	20.0	280	4.70	M0400-08C-711 MH 400 PS REACTOR M-135, M-155
26.0/330-2C	26.0	330	4.20	M0400-XXC-611 MH 400 PS CWA M-135, M-155

Starters

STARTERS				
MODEL TYPE	BALLAST FAMILY WHERE USED	UPC CODE	MAXIMUM DIMENSIONS	
			DIAMETER	HEIGHT
ST1000	Pulse Start MH Reactor Ballasts (320, 350, 400 Watt)	61000	1.25	2.5
ST1001	Pulse Start CWA and HX Circuits 100 - 400 Watts	61001	1.25	2.5
ST1002	Pulse Start Regulated Lag	61002	1.25	2.5
ST1003	Pulse Start 750 Watt	99679	1.25	2.5
ST2000	HPS CWA Circuits 250 & 400 w atts	62000	1.25	2.5
ST2001A	HPS Hx Circuits 35 - 150 Watts	62004	1.25	2.5
ST2002	HPS CWA 1000 Watt	62002	1.25	2.5
ST2002LR	Long Range HPS CWA 1000 Watt	62003	1.25	2.5



Brackets

Brackets									
BRACKET CATALOG NUMBER	WELDED BRACKET DIMENSIONS					ACCESSORY CODE	COMMONLY USED FOR	BALLAST DIM FIG.	BRACKET FIG.
	L	W	M	S					
1092-077303-100	----	----	----	----	Loose	B00	3X4 Core size kits	1	B
1092-077303-102	----	----	----	----	Loose	B02	4.25 x 4.75 4.25 x 6.00 Core size kits	2	A
1092-077303-103	----	----	----	----	Welded	B03	Reactor Ballasts	6	6
1092-077303-106	6.5	1.25	5.75	0.28	Welded	B06	4.25 x 4.75 Core size	2,3	C
1092-077303-107	5.1	1	4.5	0.25	Welded	B07	3 x 4 Core size	1	C
1092-077303-108	7.8	2.75	6.13	0.25	Welded	B08	4.25 x 6.00 Core size	5	C
1092-077303-109	7.8	4.5	6.75	0.31	Welded	B09	4.25 x 6.00 Core size	5	C
1092-077304-100	----	----	----	----	Loose	B12	Starters	----	----
1092-077304-101	----	----	----	----	Loose	B11	Capacitors	----	----

Mounting Brackets

FIGURE A

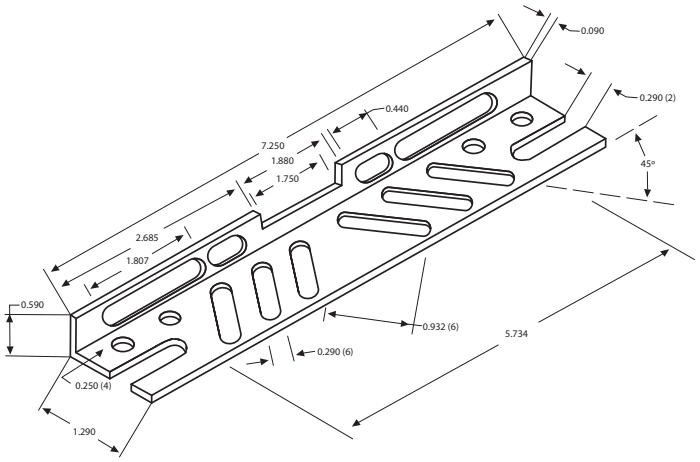


FIGURE B

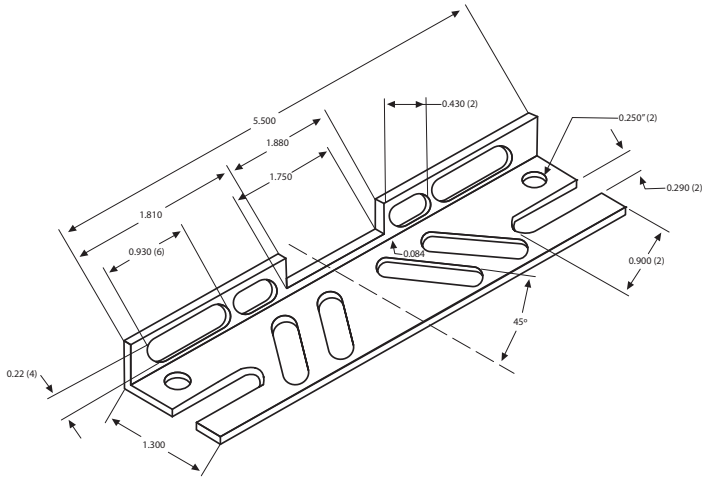
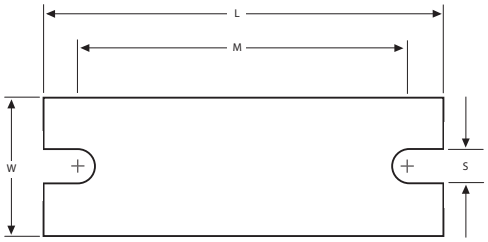


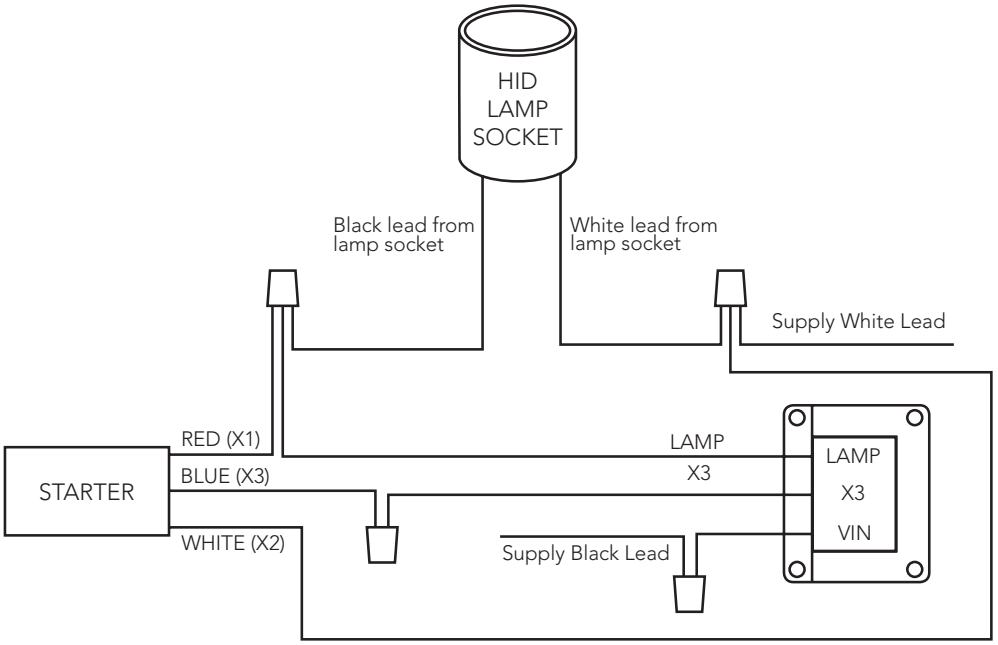
FIGURE C



High Intensity Discharge (HID) Ballasts

HID Ballast Wiring Connections

A

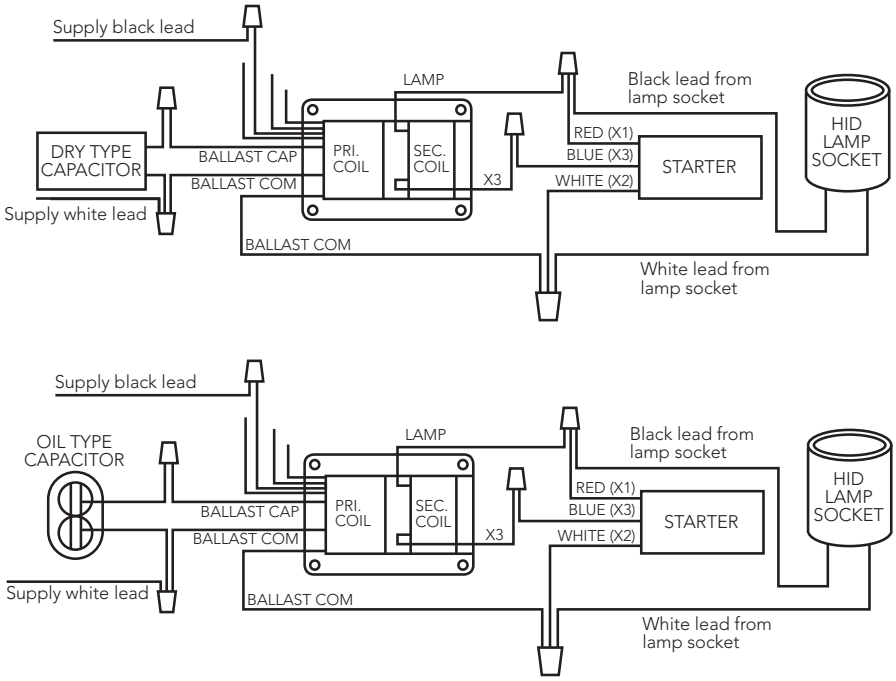


TYPICAL REACTOR WIRING CONNECTIONS
(for HI reactor ballasts with model number –1xx or –7xx suffix, such as S0150-02C-111 or M0400-08C-711)

1. Field wiring connections should only be made by qualified personnel.
2. Turn off supply voltage at breaker before accessing fixture Wiring Compartment.
3. Refer to wiring diagram on ballast label for proper component connections (typical connections illustrated above).
4. For safe operation:
    a) Ground all system components (metallic case capacitor, ballast core, fixture housing, etc)
    b) Insure all unused leads are individually insulated from ground
    c) Wire product in accordance with local and national electric codes
    d) Never perform maintenance while fixture is energized
5. Reassemble fixture Wiring Compartment after completing wiring connections.
6. Turn on supply voltage at breaker.

HID Ballast Wiring Connections

B

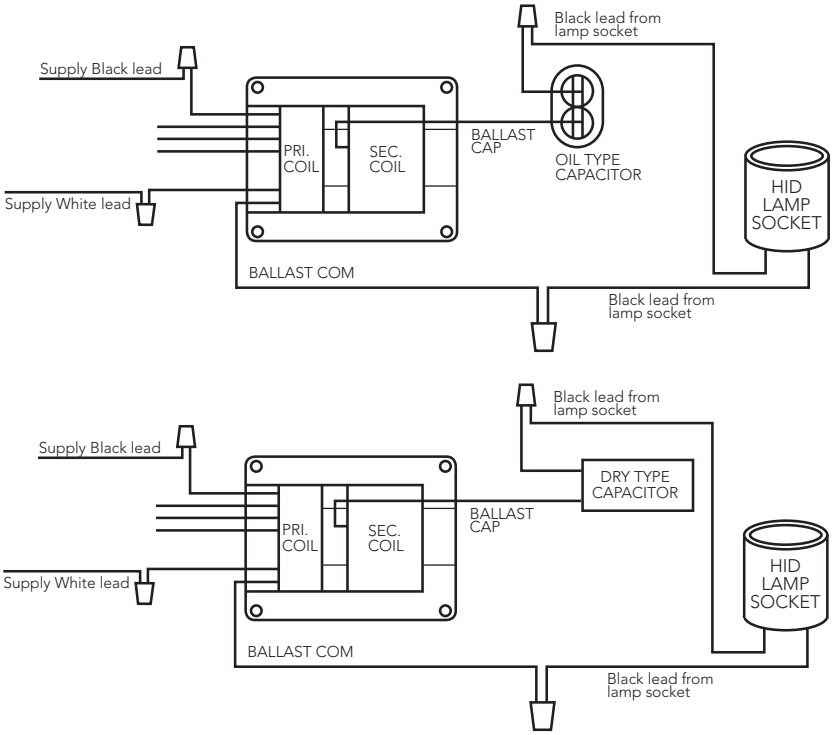


TYPICAL HX (High Reactance) BALLAST CONNECTIONS
(for HI HX-ballasts with model number –5xx suffix, such as M0100-71C-511)

1. Field wiring connections should only be made by qualified personnel.
2. Turn off supply voltage at breaker before accessing fixture Wiring Compartment.
3. Refer to wiring diagram on ballast label for proper component connections (typical connections illustrated above).
4. For safe operation:
    a) Ground all system components (metallic case capacitor, ballast core, fixture housing, etc)
    b) Insure all unused leads are individually insulated from ground
    c) Wire product in accordance with local and national electric codes
    d) Never perform maintenance while fixture is energized
5. Reassemble fixture Wiring Compartment after completing wiring connections.
6. Turn on supply voltage at breaker.

High Intensity Discharge (HID) Ballasts

HID Ballast Wiring Connections

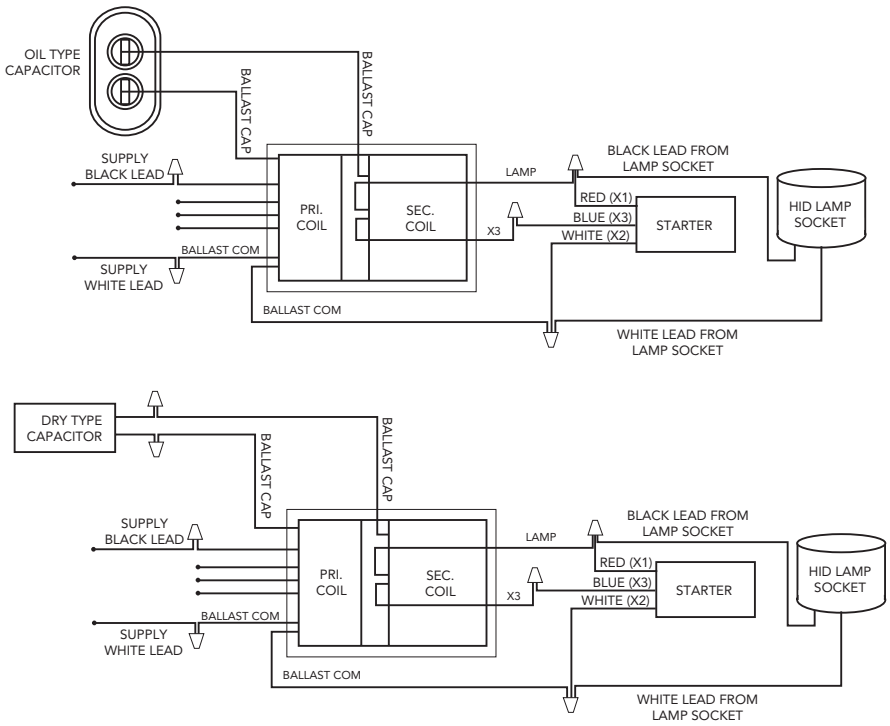


TYPICAL CWA BALLAST WIRING CONNECTIONS
(for HI Metal Halide CWA type ballasts with model number –2xx suffix, such as M0400-71C-211)

1. Field wiring connections should only be made by qualified personnel.
2. Turn off supply voltage at breaker before accessing fixture Wiring Compartment.
3. Refer to wiring diagram on ballast label for proper component connections (typical connections illustrated above).
4. For safe operation:
   a) Ground all system components (metallic case capacitor, ballast core, fixture housing, etc)
   b) Insure all unused leads are individually insulated from ground
   c) Wire product in accordance with local and national electric codes
   d) Never perform maintenance while fixture is energized
5. Reassemble fixture Wiring Compartment after completing wiring connections.
6. Turn on supply voltage at breaker.

HID Ballast Wiring Connections

D



TYPICAL CWA BALLAST w/STARTER WIRING CONNECTIONS

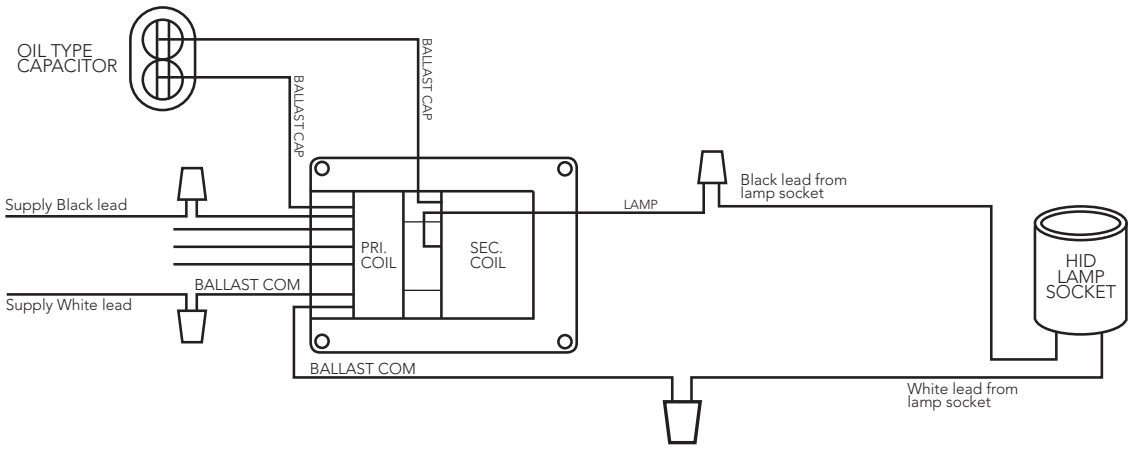
(for HI Pulse Start CWA type ballasts with model number –6xx suffix, such as M0400-71C-611)(also, for HI High Pressure Sodium CWA type ballasts with model number –2xx suffix, such as S0400-71C-211)

1. Field wiring connections should only be made by qualified personnel.
2. Turn off supply voltage at breaker before accessing fixture Wiring Compartment.
3. Refer to wiring diagram on ballast label for proper component connections (typical connections illustrated above).
4. For safe operation:
   a) Ground all system components (metallic case capacitor, ballast core, fixture housing, etc)
   b) Insure all unused leads are individually insulated from ground
   c) Wire product in accordance with local and national electric codes
   d) Never perform maintenance while fixture is energized
5. Reassemble fixture Wiring Compartment after completing wiring connections.
6. Turn on supply voltage at breaker.

High Intensity Discharge (HID) Ballasts

HID Ballast Wiring Connections

E



M1000-81C-2xx CWA BALLAST WIRING CONNECTIONS

1. Field wiring connections should only be made by qualified personnel.
2. Turn off supply voltage at breaker before accessing fixture Wiring Compartment.
3. Refer to wiring diagram on ballast label for proper component connections (typical connections illustrated above).
4. For safe operation:
    a) Ground all system components (metallic case capacitor, ballast core, fixture housing, etc)
    b) Insure all unused leads are individually insulated from ground
    c) Wire product in accordance with local and national electric codes
    d) Never perform maintenance while fixture is energized
5. Reassemble fixture Wiring Compartment after completing wiring connections.
6. Turn on supply voltage at breaker.

Ballast Dimensions

FIGURE #1

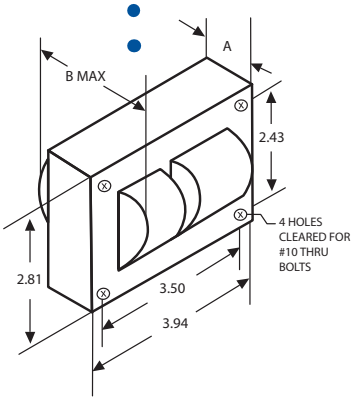


FIGURE #2

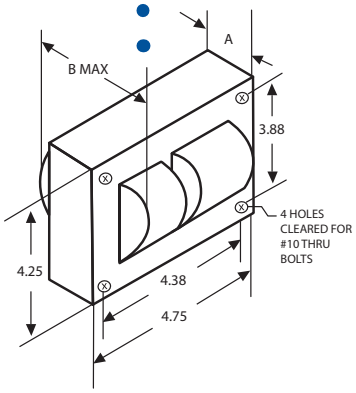


FIGURE #3

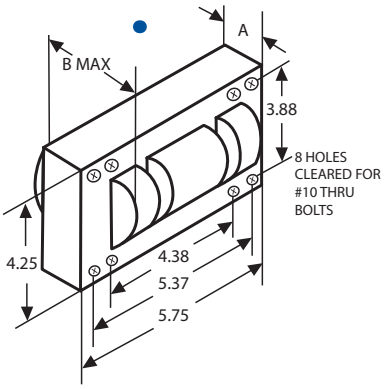


FIGURE #4

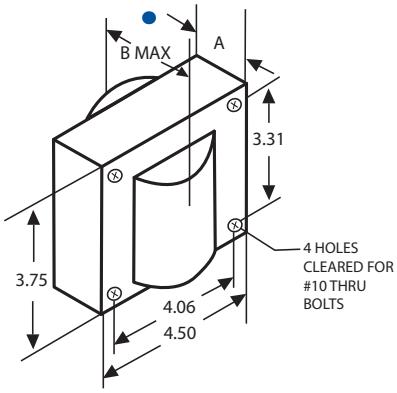


FIGURE #5

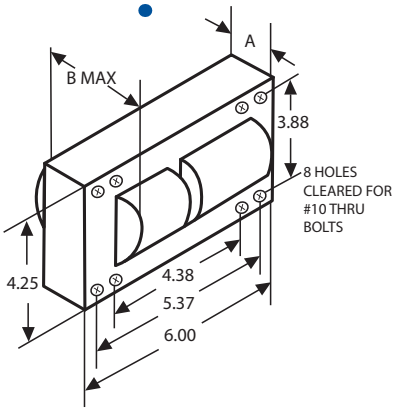
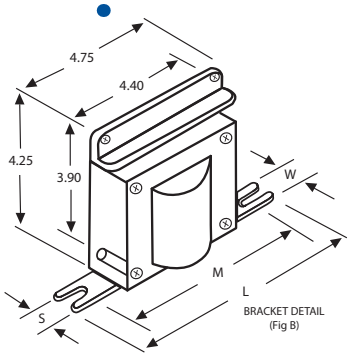


FIGURE #6



High Intensity Discharge (HID) Ballasts

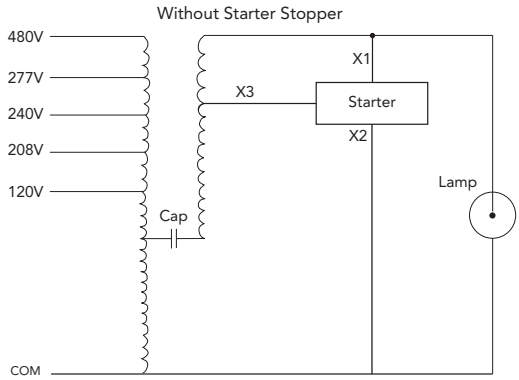
Starter Stopper Wiring Connections

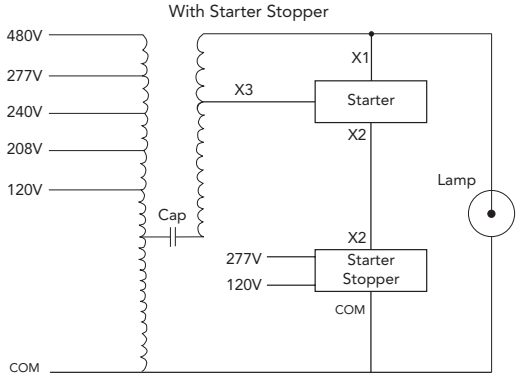
Electronic Ballasts

Compact Fluorescent Ballasts

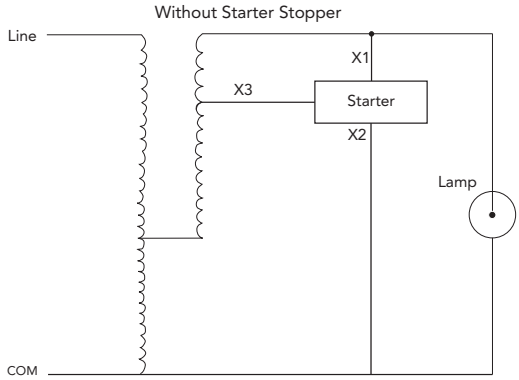
HID Ballasts

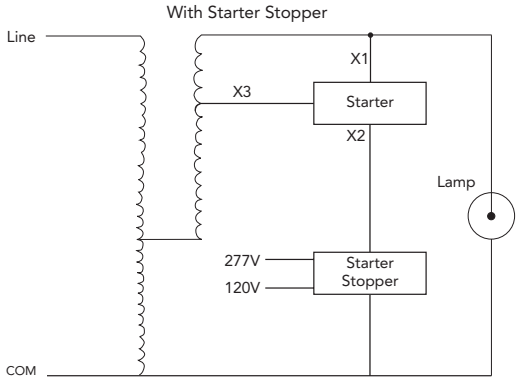
A Constant Wattage Autotransformer (CWA)



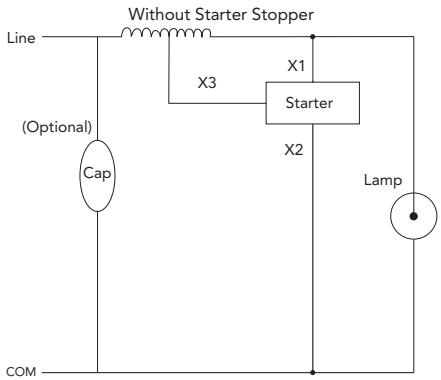


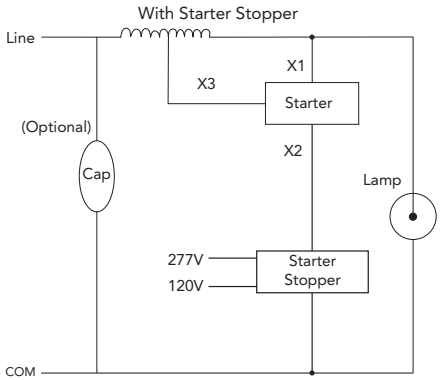
B High Reactance Autotransformer (HX)





C Reactor (R)





HOWARD™
LIGHTING PRODUCTS

Ballast Cross Reference

U.P.C. ITEM #	Howard Model #	UNIVERSAL	ADVANCE/ PHILLIPS	OSI	GE	Keystone	Epsen
ELECTRONIC FLUORESCENT BALLASTS							
01945	E2/32IS-120MC	B232I120RES-A	REB-2P32-SC	QTR2X32T8/120ISN-SC	GE-323-120-RES	KTEB-232RIS-1-TP-SL	VE232120HIP
02826	EP2/32IS/MV/MC	B232IUNVHP-B	ICN-2M32-MC	QTP2x32T8/UNVISN-SC	GE-232-MV-N	N/A	VE232MVHIP
02960	EPL3/32IS/MV/MC	B332IUNEL-A	IOP-3P32-LW-SC	QHE3x32T8/UNVISL-SC	GE332MAX-L/ULTRA	N/A	VE332MVHIPL
04454	EP2/32IS/MV/MC/HE	B232IUNVHE-A	GOPA-2-32SC	QHE2X32T8/UNVISN-SC	GE232MAX-G-N	KTEB-232-UV-IS-N-P	VE232MVHIPE
04033	EP3/32IS/MV/MC/HE	B332IUNVHE-A	ICN-3P32-SC	QTP3x32T8/UNVISN-SC	GE-332-MV-N	KTEB-332-UV-IS-N-P	VE332MVHIPE
04034	EP4/32IS/MV/MC/HE	B432IUNVHE-A	ICN-4P32-SC	QTP4x32T8/UNVISN-SC	GE-432-MV-N	KTEB-432-UV-IS-N-P	VE432MVHIPE
04665	EPH2/32IS/MV/MC/HE	B232IUNVHEH-A	IOP-2P32-HL-SC	QHE2x32T8/UNVISH-SC	GE232MAX-H/ULTRA	KTEB-232-UV-IS-H-P	VE232MVHIPHE
04221	EPH3/32IS/MV/MC/HE	B332IUNVHEH-A	IOP-3P32-HL-SC	QHE3x32T8/UNVISH-SC	GE332MAX-H/ULTRA	KTEB-332-UV-IS-H-P	VE332MVHIPHE
05296	EPH4/32IS/MV/SC/HE	N/A	IOA-4P32-HL-SC	QHE4X32T8/UNVISH-SC	GE432MAX-H/ULTRA	KTEB-432-UV-IS-H-P	VE432MVHIPHE
22143	EPL2/32IS/MV/MC/HE	B232IUNVEL-A	IOP-2P32-LW-SC	QHE2x32T8/UNVISL-SC	GE232MAX-L/ULTRA	KTEB-232-UV-IS-L-P	VE232MVHIPLE
01469	EPL3/32IS/MV/SC/HE	B332IUNEL-A	IOP-3P32-LW-SC	QHE3x32T8/UNVISL-SC	GE332MAX-L/ULTRA	KTEB-332-UV-IS-L-P	VE332MVHIPLE
04036	EPL4/32IS/MV/MC/HE	B432IUNVEL-A	IOP-4P32-LW-SC	QHE4x32T8/UNVISL-SC	GE432MAX-L/ULTRA	KTEB-432-UV-IS-L-P	VE432MVHIPLE
11112	EP2/59IS/MV/MC/HE	B259IUNVHP-A	IOP-2P59-SC	QHE2x59T8ISN-SC	GE-259-MV-N	KTEB-259-UV-IS-N	VE259MVHIP
11109	EP2/32PRS/MV/MC/HE	B232PUNVHE-B	N/A	QHE2X32T8/UNVPSN-SC	GE232-MVPS-H	KTEB-232-UV-PS-N-P	BE232MVHRPE
05295	EP4/PPRS/MV/SC/HE	N/A	IOP-4PSP32HLG	QHE4X32T8/UNVPSN-SC-B	GE432-MVPS-N	KTEB-432-UV-PS-N-P	N/A
11116	EP2/54HO/PRS/MV/W/MC	B254PUNV-D	ICN-S254N	QTP2X54T5HOUN-VPS80SC	GE254MVPS-D	KTEB-254HO-UV-PS-SL	VE254MVHRP
11110	EP2/54HO/PRS/MV/W/SC	B254PUNV-D	ICN-S254N	QTP2X54T5HOUN-VPS80SC	GE254MVPS-D	KTEB-254HO-UV-PS-SL	VE254MVHRP
04856	EP2/28T5/PRS/MV	B228PUNV90-D	ICN2S28N	QTP2X28T5/UNVPSN	GE228MVPS-A	KTEB-228HE-UV-PS-SL	N/A
04857	EP2/39HO/PRS/MV	N/A	ICN2S39N	QHE2X39-24T5HO/ UNVPSN	GE239MVPS-A	KTEB-239HO-UV-PS-SL	N/A
12410	EP2/110RS/MV/SC	B295SRUNVHP	ICN-2S110-SC	QTP2X96T12HO/UNV	GE296HO-MV-N	KTEB-2110-UV-TP-PIC	N/A
12409	EP2/40RS/MV/MC	N/A	ICN-2S40-N	QTP2X40T12/UNVRS-SC	GE240RS-MV-N	KTEB-240-UV-TP-PIC	VE240MVHRP
32403	EP2/75IS/MV/SC	B260IUNVHP	ICN-2P60-SC	QTP2X96/T12/UNV/IS	GE260IS-MV-N	KTEB-275-UV-TP-PIC-SL	VE275MVHIP
01940	EP2/40IS-TT/MV/SC	C240PUNVHP-B	REL-2TT540	QTP2X40TT5/120/277PSN-F	C240PUNVHP-B-IP	N/A	N/A
COMPACT FLUORESCENT BALLASTS							
04749	EP2/13CF/MV/K2	C213UNVME/BE/ SE/BES	ICF-2S13-H1-LD-K	QTP1/2x13CF/UNVBS	GEC213-MVPS-SE	KTEB-213-UV-RS-DW-KIT	VE213MVHRP-C
05115	EP2/18CF/MV/K2	C218UNV/ME/BE/ SE/BES	ICF-2S18-H1-LD-K	QTP1/2x18CF/UNVBS	GEC218-MVPS-SE	KTEB-218-UV-RS-DW-KIT	VE218MVHRP-C
03926	EP2/26CF/MV/K2	C2642UNV/ME/BE/ SE/BES	ICF-2S26-H1-LD-K	QTP1/2x26CF/UNVBS	GEC226-MVPS-SE	KTEB-226-UV-RS-DW-KIT	VE226MVHRP-C
14303	EP2/42CF/MV/K2	C2642UNV/ME/BE/ SE/BES	ICF-2S42-M2-LD-K	QTP1/2x26/32/42CF/ UNVBM	C242UNVSE-IP	KTEB-242-UV-RS-DW-KIT	N/A
HID BALLASTS							
06981	M-175-4T-CWA-K	M175MLTAC3M500K	71A5590-001D	M175/MULTI-KIT	GEM175MLTAC3-5	MH-70A-Q-KIT	VM-MH70-4T-001D
03976	M-175-5T-CWA-K	M175ML5AC3M500K	N/A	M175/SUPER5-KIT	GEM175ML5AC3-5	MH-70A-P-KIT	VM-MH70-5T-001D
90109	M-250-4T-CWA-K	M250MLTAC4M500K	71A5770-001D	M250/MULTI-KIT	GEM250MLTAC-5	MH-250A-Q-KIT	VM-MH250-4T-001D
03977	M-250-5T-CWA-K	M250ML5AC4M500K	71A5750-001D	M250/SUPER5-KIT	GEM250ML5AC4-5	MH-250A-P-KIT	VM-MH250-5T-001D
06504	M-400-4T-CWA-K	M400MLTAC4M500K	71A6071-001D	M400/MULTI-KIT	GEM400MLTAA4-5	MH-400A-Q-KIT	VM-MH400-4T-001D
99919	M-400-5T-CWA-K	M400ML5AC4M500K	71A6051-001D	M400/SUPER5-KIT	GEM400ML5AA4-5	MH-400A-P-KIT	VM-MH400-5T-001D
04091	M-1000-4T-CWA-K	M1000MLTAC5M500K	71A6572-001D	M1000/MULTI-KIT	GEM1000MLTAA5-5	MH-1000A-Q-KIT	VM-MH1000-4T-001
99948	M-1000-5T-CWA-K	M1000ML5AC5M500K	71A6552-001	M1000/SUPER5-KIT	GEM1000ML5AA5-5	MH-1000A-P-KIT	VM-MH1000-5T-001
95002	M-1000-480T-CWA-K	N/A	71A6542	M1000/480-KIT	GEM100048TAA5-5/2	MH-1000A-480-KIT	N/A
07971	M-1500-4T-CWA-K	M1500MLTAC5M500K	71A6772-001	M1500/MULTI-KIT	GEM1500MLTAC5-5	MH-1500A-Q-KIT	VM-MH1500-4T-001
90006	M-1500-480T-CWA-K	N/A	71A6742T	M1500/480-KIT	N/A	N/A	N/A

Ballast Catalog

Ballast Cross Reference

Electronic Ballasts

Compact Fluorescent Ballasts

HID Ballasts

U.P.C. ITEM #	Howard Model #	UNIVERSAL	ADVANCE/ PHILLIPS	OSI	GE	Keystone	Epsen
99982	MP-50-2T-HXH-K	N/A	71A5181-001D	M50/120/277-KIT	N/A	N/A	VM-MH50-MV-001D
99971	MP-70-4T-HXH-K	M70MLTLC3M500K	71A5292-001D	M70/MULTI-KIT	GEM70MLTLC3D-5	MH-70X-Q-KIT	VM-MH70-4T-001D
06503	MP-100-4T-HXH-K	M100MLTLC3M500K	71A590-001D	M100/MULTI-KIT	N/A	MH-100X-Q-KIT	VM-MH100-4T-001D
05130	MP-150-4T-HXH-K	M150MLTLC3M500K	71A5492-001D	M150/MULTI-KIT	GEM150MLTLC3D-5	MH-150X-Q-KIT	VM-MH150-4T-001D
06988	MP-250-4T-PSCWA-K	P250MLTAC4M500K	71A5792-001D	M250/MULTI-PS-KIT	GEP250MLTAC4-5	MPS-250A-Q-KIT	VM-MH250-4T-001D-PS
99915	MP-320-4T-PSCWA-K	P320MLTAC4M500K	71A5892-001D	M320/MULTI-PS-KIT	GEP320MLTAC4M-5	MPS-320A-Q-KIT	VM-MH320-4T-001D-PS
99916	MP-350-4T-PSCWA-K	P350MLTAC4M500K	71A5993-001D	M350/MULTI-PS-KIT	GEP350MLTAC4-5	MPS-350A-Q-KIT	VM-MH350-4T-001D-PS
06979	MP-400-4T-PSCWA-K	P400MLTAC4M500K	71A6092-001D	M400/MULTI-PS-KIT	GEP400MLTAC4-5	MPS-400A-Q-KIT	VM-MH400-4T-001D-PS
99431	MP-750-4T-PSCWA-K	P750MLTAC5M500K	71A6490	M750/MULTI-PS-KIT	GEP750MLTAC5-5	MPS-750A-Q-KIT	N/A
99432	MP-750-5T-PSCWA-K	N/A	71A6452	M750/120/277/347/480-PS-KIT	GEP750MLTAA5-5/2	MPS-750A-P-KIT	N/A
99071	MP-875-4T-PSCWA-K	P875MLTAC5M500K	71A6498	N/A	N/A	N/A	N/A
99942	MP-1000-4T-PSCWA-K	P1000MLTAC5M500K	71A6593-001	M1000/MULTI-PS-KIT	GEP1000MLTAC5-5	MPS-1000A-Q-KIT	N/A
99883	S-35-120-RXH-K	S35120RCEM000K	71A7701-001DB	LU35/120R	N/A	HPS-35R-1-KIT	VM-HPS35-120-001D
05126	S-35-120-RXN-K	S35120RCEM000K	71A7701-001DB	LU35/120R	N/A	HPS-35R-1-KIT	VM-HPS35-120-001D
05123	S-50-120-RXN-K	S50120RCEM000K	71A7807-001DB	LU50/120R	N/A	HPS-50R-1-KIT	VM-HPS50-120-001D
93135	S-70-120-RXH-K	S70120RCEM000K	71A7907-001DB	LU70/120R	1233142U000I	HPS-70R-1-KIT	VM-HPS70-120-001D
05124	S-70-120-RXN-K	S70120RCEM000K	71A7907-001DB	LU70/120R	1233142U000I	HPS-70R-1-KIT	VM-HPS70-120-001D
93169	S-70-4T-HXH-K	S70MLTLC3M500K	71A7971-001D	LU70/MULTI-KIT	GES70MLTLC3D-5	HPS-70X-Q-KIT	VM-HPS70-4T-001D
93137	S-100-120-RXH-K	S100120RCEM000K	71A8007-001DB	LU100/120R	N/A	HPS-100R-1-KIT	VM-HPS100-120-001D
05127	S-100-120-RXN-K	S100120RCEM000K	71A8007-001DB	LU100/120R	N/A	HPS-100R-1-KIT	VM-HPS100-120-001D
07051	S-100-4T-HXH-K	S100MLTLC3M000K	71A8071-001D	LU100/MULTI-KIT	GES100MLTLC3D-5	HPS-100X-Q-KIT	VM-HPS100-4T-001D
90002	S-150-120-RXH-K	S150120RCEM000K	71A8107-001D	LU150/120R	1233154U000I	HPS-150R-1-KIT	VM-HPS150-120-001D
05125	S-150-120-RXN-K	S150120RCEM000K	71A8107-001D	LU150/120R	1233154U000I	HPS-150R-1-KIT	VM-HPS150-120-001D
06502	S-150-4T-HXH-K	S150MLTAC4M500K	71A8172-001D	LU150/MULTI-KIT	GES150MLTLC3D-5	HPS-150X-Q-KIT	VM-HPS150-4T-001D
99411	S-250-4T-CWA-K	S250MLTAC4M500K	71A8271-001D	LU250/MULTI-KIT	GES250MLTAC4-5	HPS-250A-Q-KIT	VM-HPS250-4T-001D
99925	S-250-5T-CWA-K	S250ML5AC4M500K	71A8251-001D	LU250/SUPER5-KIT	GES250ML5AC4-5	HPS-250A-P-KIT	VM-HPS250-5T-001D
94413	S-400-4T-CWA-K	S400MLTAC4M500K	71A8473-001D	LU400/MULTI-KIT	GES400MLTAC4-5	HPS-400A-Q-KIT	VM-HPS400-4T-001D
99923	S-400-5T-CWA-K	S400ML5AC4M500K	71A8453-001D	LU400/SUPER5-KIT	GES400ML5AC4-5	HPS-400A-P-KIT	VM-HPS400-5T-001D
99935	S-1000-4T-CWA-K	S1000MLTAC5M500K	71A8773-001D	LU1000/MULTI-KIT	GES1000MLTAC505	HPS-1000A-Q-KIT	VM-HPS1000-4T-001
99937	S-1000-5T-CWA-K	N/A	71A8753	LU1000/SUPER5-KIT	N/A	HPS-1000A-P-KIT	VM-HPS1000-5T-001

ELECTRONIC FLUORESCENT BALLAST 5 YEAR LIMITED WARRANTY

Howard Industries, Inc. warrants to the purchaser that it's electronic fluorescent ballasts will be free from defects in material and workmanship as conditioned herein for a period of five (5) years from date of manufacture. The date of manufacture by Howard Industries, Inc., Ballast Products Division is stamped on the ballast.

During said warranty period, Howard Industries, Inc. agrees and shall be obligated to a limit of refund of the purchase price of the ballast or, at the option of Howard Industries, Inc., replacement of defective ballasts including a $10.00 provision for installation costs.

This warranty is not applicable and is voided to any product manufactured by Howard Industries, Inc. which is not stored, installed, operated and maintained in accordance with:

- The National Electric Code (NEC
- The Standards for Safety of Underwriters Laboratories, Inc. (UL)
- The Standards for the American National Standards Institute (ANSI)
- The Specific Instructions Provided by Howard Industries, Inc. for the Installation of the Product(s)
- Accepted industry practices

The warranties set forth herein are in lieu of any and all other warranties expressed or implied including the warranties of mechantability and fitness for a particular purpose. In no case shall Howard Industries, Inc. be obligated or liable for any indirect, consequential, orincidental damages for breach of this or any other warranty, expressed or implied, whatsoever.

Should at any time within the stated five year period from date of manufacture any appearance of defect in material or workmanship appear, purchaser must notify Howard Industries, Inc. by calling 1-800-956-3456 or (601) 422-0033. Written notice may be mailed to Howard Industries, Inc., Ballast Products Division, PO Box 1590, Laurel, MS 39441 or by fax at (601) 422-1652.

As a condition to qualify for refund of original ballast purchase price or replacement under the provisions of this limited warranty, defective ballasts must be available for return to Howard Industries, Inc. at its request for inspection and test analysis. Prior written approval for return must be obtained from the factory.

MAGNETIC HID BALLAST 2 YEAR LIMITED WARRANTY

Howard Industries, Inc. warrants to the purchaser that it's magnetic HID ballasts will be free from defects in material and workmanship as conditioned herein for a period of two (2) years from date of manufacture. The date of manufacture by Howard Industries, Inc., Ballast Products Division is stamped on the ballast.

During said warranty period, Howard Industries, Inc. agrees and shall be obligated to a limit of refund of the purchase price of the ballast or, at the option of Howard Industries, Inc., replacement of defective ballasts.

This warranty is not applicable and is voided to any product manufactured by Howard Industries, Inc. which is not stored, installed, operated and maintained in accordance with:

- The National Electric Code (NEC
- The Standards for Safety of Underwriters Laboratories, Inc. (UL)
- The Standards for the American National Standards Institute (ANSI)
- The Specific Instructions Provided by Howard Industries, Inc. for the Installation of the Product(s)
- Accepted industry practices

The warranties set forth herein are in lieu of any and all other warranties expressed or implied including the warranties of mechantability and fitness for a particular purpose. In no case shall Howard Industries, Inc. be obligated or liable for any indirect, consequential, or incidental damages for breach of this or any other warranty, expressed or implied, whatsoever.

Should at any time within the stated two year period from date of manufacture any appearance of defect in material or workmanship appear, purchaser must notify Howard Industries, Inc. by calling 1-800-956-3456 or (601) 422-0033. Written notice may be mailed to Howard Industries, Inc., Ballast Products Division, PO Box 1590, Laurel, MS 39441 or by fax at (601) 422-1652.

As a condition to qualify for refund of original ballast purchase price or replacement under the provisions of this limited warranty, defective ballasts must be available for return to Howard Industries, Inc. at its request for inspection and test analysis. Prior written approval for return must be obtained from the factory.

Combination T8 Lamp/Ballast System Warranty "Security Plus"

Howard Industries, Inc. – Lighting Products Division warrants lamps installed on Howard electronic ballast to be free from defects in material and workmanship and to operate from the date of installation (or date of manufacture if installation date is not known or available) for the time periods and subject to the terms and conditions specified in the table below. If lamps fail to operate for the warranty period, Howard Lighting Products will provide a free replacement lamp (no labor allowance). If a Howard electronic ballast fails to operate within the warranty period, Howard Lighting Products will provide a free replacement ballast and labor allowance in accordance with our ballast warranty guide.

Electronic Ballast	Lamp	Ballast Warranty	Lamp Warranty
Standard Power	F17T8/xxx/ECO, F25T8/xxx/ECO, F30T8/8xx/ES/ECO, F32T8/xxx/ECO, F32T8/8xx/HL/ECO, FB32T8/xxx/6/ECO	60 months	36 months[1]
Low Power	F17T8/xxx/ECO, F25T8/xxx/ECO, F30T8/8xx/ES/ECO, F32T8/xxx/ECO, F32T8/8xx/HL/ECO, FB32T8/xxx/6/ECO	60 months	36 months[1]
High Power	F17T8/xxx/ECO, F25T8/xxx/ECO, F30T8/8xx/ES/ECO, F32T8/xxx/ECO, F32T8/8xx/HL/ECO, FB32T8/xxx/6/ECO	60 months	36 months[1]
HE Standard Power	F17T8/xxx/ECO, F25T8/xxx/ECO, F28T8/8xx/ES/ECO, F30T8/8xx/ES/ECO, F32T8/xxx/ECO, F32T8/8xx/HL/ECO, FB28T8/8xx/ES/ECO, FB32T8/xxx/6/ECO	60 months	36 months[1]
HE Low Power	F17T8/xxx/ECO, F25T8/xxx/ECO, F28T8/8xx/ES/ECO, F30T8/8xx/ES/ECO, F32T8/xxx/ECO, F32T8/8xx/HL/ECO, FB28T8/8xx/ES/ECO, FB32T8/xxx/6/ECO	60 months	36 months[1]
T5HO	F54T5/8xx/HO	36 months @ <90°C case	36 months[1]
		60 months @ <75°C case	36 months[1]

Note: Fluorescent lamp warranty periods are based on a 3 hour minimum cycle, unless otherwise noted, with a maximum of 4,000 hours per year. Other operating cycles may affect the warranty period. The Howard lamp warranty can renew when the installation is group relamped. For more details contact Howard Lighting Products.

1. Occupancy sensor application, 15 minute/start minimum, allowed with program start ballast
2. Maximum case temperature <70°C, for normal environmental operating conditions (40°C max., ambient) unless noted

Terms and Conditions

1. HOWARD Industries warrants the lamps to be free from defects in material and workmanship, and warrants its ballasts as provided in HOWARD's current published ballast warranty, hereby made part of this warranty.
2. Howard lamps and electronic ballast must be installed together as a system. Lamps must be operated on ballasts indicated, within the electrical values noted on HOWARD ballast labels, and with all lamp and lighting equipment instructions and be operated within the normal specified operating range of environmental conditions for the systems. Ballasts and lamps must be installed and operated in accordance with the latest National Electric Code, UL, and ANSI specifications. Ballasts and lamps operated in any system, which has been subjected to abnormal stresses, but not limited to, excess temperatures or under or over voltage conditions are excluded from coverage under this Warranty.
3. The installation must be registered with HOWARD Industries within thirty (30) days from date of completion. HOWARD's combination T8 Lamp/Ballast System Warranty (Security Plus) Registration Form must be completed per instructions and installation acknowledged by HOWARD Industries.
4. Replacement of Howard lamps with lamps from other manufacturers will void the lamp portion of this warranty.
5. Replacement of Howard electronic ballast with any other ballast manufacturer will void the entire warranty.
6. For ballast refer to HOWARD Industries current published ballast warranty. HOWARD Industries will replace in-warranty failures by furnishing lamps in kind.
7. Howard Industries reserves the right to examine all failed ballasts and/or lamps and reserves the right to be the sole judge as to whether any ballasts and/or lamps are defective and covered under this warranty.
8. This Warranty shall be the sole remedy of the Customer and the sole liability of HOWARD Industries to Customer. NO IMPLIED WARRANTY OR MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE IS MADE OR IS TO BE IMPLIED. HOWARD Industries will not under any circumstances whether as a result of breach of contract, breach of warranty, tort, strict liability or otherwise be liable for consequential, incidental, special or exemplary damages including, but not limited to, loss of profits or revenues, loss of use of ballasts or any other goods or associated equipment or damages to any associated equipment, cost of capital, cost of substitute products, facilities or services, down time costs, or claims of claimant's customers.
9. After contacting Howard Lighting Products and receiving a return authorization number, the user/customer shall promptly return the product at the user/customer's expense to Howard Lighting Products after receiving instructions as to when and where to ship product. Failure to follow this procedure shall void this warranty.
10. Refer to HOWARD Industries Ballast Limited Warranty for other terms and conditions and limitations not otherwise superseded in the foregoing HOWARD Lighting Products Combination T8 Lamp/Ballast System Warranty (Security Plus).
11. Subject to change without notice.

Terms and Conditions of Sales

1. General

a. All orders are subject to acceptance by Howard Industries, Inc. – Lighting Products Division (hereinafter "Howard Lighting").
b. Specifications are subject to change without notice. Contact Howard Lighting for verification.
c. Howard Lighting assumes no responsibility for the improper selection, installation, use, and/or maintenance of its products.
d. The terms and conditions set forth herein are in lieu of any and all other terms and conditions expressed or implied including the warranties of merchantability and fitness for a particular purpose. In no case shall Howard Lighting or Howard Industries, Inc. be obligated or liable for any indirect, consequential, or incidental damages for breach of these or any other terms and conditions expressed or implied whatsoever.

2. Terms

a. Purchaser understands net is due thirty (30) calendar days from the Howard Lighting invoice date.
b. Purchaser understands an interest charge of 1.5% per month will be added on any past due balances.

3. Pricing

Unless noted otherwise in writing by Howard Lighting:

a. All pricing and quotes are based on US dollars.
b. Pricing is subject to change without notice.
c. The applicable taxes will be added to invoices.
d. Written quotes will be honored for thirty (30) calendar days given all fixtures are released for shipment within sixty (60) calendar days from the quote date.
e. Shipments requested after a quote expires may be subject to a price increase.
    i. Exceptions may be made when specific ship dates are noted on the original quote.
    ii. Pricing is subject to change if any accessory, option, or other condition is changed from the original quote.

4. Minimum Billing

Howard Lighting's minimum billing amount is $100 (US).

5. Freight Allowance

a. Howard Lighting provides a freight allowance for orders totaling $1,000 (US) net given the full order is being shipped via normal freight to the same address in any of the contiguous 48 states in the US. Additional freight charges will be added as applicable to shipments to Alaska, Hawaii, and outside the US.
b. Partial shipments and shipments made to more than one location must each total $1,000 (US) net to earn a freight allowance. Howard Lighting may make partial shipments at its own discretion, billing each shipment as it is made, but with freight terms applicable to the complete order.
c. Orders of less than $1,000 (US) net will be shipped as directed by the purchaser either freight collect or prepaid with the freight charges being added to the invoice.
d. For air or premium freight requests on orders over $1,000 (US) net, Howard Lighting will add the air or premium freight charges less the normally-incurred freight charges to the invoice.
e. Unless noted otherwise in writing by Howard Lighting, all published prices and quotes are F.O.B. factory, Mendenhall, MS or from one of our authorized representatives' facilities.
f. To qualify for this freight allowance, Howard Lighting reserves the right to select the shipment's point of origin, method of transportation, and routing.

6. Freight Claims

Purchaser understands and agrees to report claims for damage, shortage, or errors in material as follows:

a. Claims for damage and/or shortage caused by shipping must be made by the consignee to the shipper within ten (10) calendar days of delivery.
    i. All items in question must be kept in their original cartons and at the original delivery point for inspection by carrier (upon request).
    ii. If notified, Howard Lighting will assist purchaser as possible with claim.
b. Claims involving shortages or errors in material believed to be caused by Howard Lighting will not be considered unless noted on the delivery receipt and reported to Howard Lighting within ten (10) calendar days of delivery.

7. Returned Goods Policy

a. Howard Lighting will not accept any returned products without prior written authorization from Howard Lighting.
b. Return request must be made to Howard Lighting within 90 days of original shipment.
c. Purchaser agrees to prepay all transportation charges on all returned products.
d. Credit will be issued at the prices in effect at the time of shipment or at the time of the return – whichever is lower – provided the products are in a saleable condition, are current models, and are listed in the published price sheet in effect at the time of the return.
e. Purchaser understands that all non-stock, special, custom, or modified versions of normal factory-stock items are not returnable.
f. If Howard Lighting accepts the returned merchandise and credits the purchaser's account, the purchaser agrees to pay a restocking fee of 25% plus the original freight cost. These amounts will be deducted from the credit to cover the cost of handling and inspection.
g. Howard Lighting will not issue account credits when the value of the items to be returned is less than $50 (US).
h. Returns from any one-job order will be limited to no more than 10% of the original job order's value.
i. Orders for stocked products may be cancelled without any cancellation charges provided Howard Lighting receives a written cancellation request prior to shipment.
j. Order cancellations for custom products are subject to cancellation charges based on the costs incurred and commitments made by Howard Lighting up to and including the date the written cancellation notification was received.

8. Hold For Release Orders

Orders received as "hold for release" or "will advise" are not processed for manufacture until a written release is received and the order has been priced.

9. Claims

Refunds, repairs, or replacement will be at the sole discretion of Howard Lighting. Reimbursement for any field labor and/or service charges must be pre-approved in writing by Howard Lighting. Refer to our product warranty for more information.

*Surround yourself with **Howard Lighting**. We did.*

Nestled within the 504 acre Howard Technology Park, our new corporate headquarters are surrounded and filled with our superior lighting products. From the round back floods and compact fluorescents throughout the approximately 62,000 square feet of office space to the high bays illuminating the roughly 77,000 square foot Howard Technology Solutions and Howard Medical manufacturing facilities, we are your total lighting resource.

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