

UltraStart® System Information

* F32T8SPX41 Ballast Description	Lamps Type	# Lamps	PC 10 PK	Input Volts	Line Current	Input Watts	Ballast Factor	Mean System Lumens	Lumens/ Watt
GE132-MVPS-L	F32T8	1	75952	120/277	.22/.10	25	0.72	2016	84
	F32T8/WM	1			.20/.09	23	0.71	1870	86
	F28	1			.19/.09	22	0.71	1819	87
	F32T8/25W	1			.18/.08	21 / 20	0.71	1668	84
GE132-MVPS-N	F32T8	1	75953	120/277	.26/.12	30	0.89	2492	87
	F32T8/WM	1			.24/.11	28	0.87	2292	87
	F28	1			.22/.10	26	0.87	2228	91
	F32T8/25W	1			.18/.08	21 / 20	0.86	2021	89
GE132-MVPS-H	F32T8	1	75954	120/277	.35/.15	39	1.18	3303	89
	F32T8/WM	1			.31/.14	36	1.16	3056	90
	F28	1			.29/.13	33	1.16	2971	95
	F32T8/25W	1			.27/.12	31	1.15	2702	92
GE232-MVPS-XL	F32T8	2	29671	120/277	.39/.19	45/44	0.60	3360	80
	F32T8/WM	2			.24/.12	42	0.59	3109	78
	F28	2			.15/.12	39	0.59	3023	83
	F32T8/25W	2				36	0.59	2772	81
GE232-MVPS-L	F32T8	2	96720	120/277	.40/.18	47	0.71	3976	89
	F32T8/WM	2			.37/.17	44	0.71	3805	91
	F28	2			.34/.15	41	0.71	3638	94
	F32T8/25W	2				37/36	0.65	3055	90
GE232-MVPS-N	F32T8	2	96714	120/277	.49/.18	59/58	0.89	4984	90
	F32T8/WM	2			.45/.20	55/54	0.88	4637	91
	F28	2			.42/.19	51/50	0.88	4509	95
	F32T8/25W	2				45/44	0.86	4042	97
GE232-MVPS-H	F32T8	2	29675	120/277	.64/.29	75/74	1.15	6440	91
	F32T8/WM	2			.60/.27	69	1.14	6007	92
	F28	2			.54/.25	63/62	1.11	5687	97
	F32T8/25W	2				58/57	1.10	5170	96
GE332-MVPS-XL	F32T8	3	29672	120/277	.49/.22	67/66	0.60	5040	80
	F32T8/WM	3			.53/.24	61/60	0.59	4663	82
	F28	3			.49/.22	57/56	0.58	4457	84
	F32T8/25W	3				53/52	0.58	4089	83
GE332-MVPS-L	F32T8	3	96721	120/277	.61/.27	69	0.71	5963	92
	F32T8/WM	3			.54/.24	63/62	0.69	5454	93
	F28	3			.49/.22	58	0.69	5303	97
	F32T8/25W	3				57/56	0.66	4653	88
GE332-MVPS-N	F32T8	3	96715	120/277	.72/.31	86/84	0.89	7476	93
	F32T8/WM	3			.67/.29	80/79	0.89	6798	91
	F28	3			.61/.27	73/72	0.84	6456	95
	F32T8/25W	3				67/66	0.84	5922	95
GE332-MVPS-H	F32T8	3	29676	120/277	.95/.41	110/108	1.15	9659	94
	F32T8/WM	3			.88/.39	102/100	1.14	9011	95
	F28	3			.79/.35	92/91	1.10	8454	98
	F32T8/25W	3				87/86	1.09	7684	95
GE432-MVPS-L	F32T8	4	71832	120/277	.77/.32	90/88	0.71	7952	95
	F32T8/WM	4			.71/.30	85/83	0.69	7272	93
	F28	4			.64/.28	77/76	0.68	6968	97
	F32T8/25W	4				74/73	0.67	6298	91
GE432-MVPS-N	F32T8	4	96716	120/277	.97/.41	114/112	0.89	9968	93
	F32T8/WM	4			.89/.36	105/103	0.86	9064	93
	F28	4			.82/.35	96/95	0.83	8505	95
	F32T8/25W	4				87/85	0.83	7802	97
GE432-MVPS-H	F32T8	4	74476	120/277	1.27/.55	147/144	1.16	12992	95
	F32T8/WM	4			1.20/.52	139/136	1.15	12121	94
	F28	4			1.08/.47	125/123	1.12	11477	99
	F32T8/25W	4				112/111	1.12	10528	100

*Power Factor > .98, THD < 10%. (See application data sheet on GELighting.com for PF and THD with specific voltage and lamp applications) All UltraStart® T8 Ballasts have N-1 Lamp Rating Electrical Testing completed to ANSI requirements in open fixture at 25°C

Transforming the **POWER** of Light™

GE National Customer Service Center
1-888-GEBALLAST (432-2552)

For product specifications and application information,
please consult GE's Website: www.gelighting.com

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GE
Lighting



Programmed Start (PS) Ballasts for T8 Fluorescent Lamps

A New Generation of Ultra-Efficient Programmed Start Ballasts

2010 Enhanced Performance Features

UltraStart T8 Rated for F32/WM, F28 and F32/25W Lamps with Anti-Striation Reduction Circuitry

New UltraStart T8 1 lamp Low, Normal and High Ballast Factor



imagination at work

UltraStart® Programmed Start Ballasts

GE UltraStart® is a new generation of T8 and Programmed Start (PS) ballasts that addresses the growing demand for energy-saving strategies incorporating occupancy sensors and other automated light controls to meet strict energy legislation. Switching lights off when an area is unoccupied or filled with daylight makes sense from an energy-savings viewpoint and it is also recommended or required now by several energy regulations.

However, on standard Instant Start (IS) ballasts, lamp life is significantly affected by frequent starting. Programmed Start (PS) ballasts provide a "soft start" and significantly reduce the cathode degradation occurring from each start.

PS ballasts have been available for some time but have suffered from several drawbacks:

- (1) they are less efficient than IS ballasts

Features and Benefits

Longer Lamp Life in Frequently Switched Applications

- UltraStart® extends lamp life by 18% to greater than 200% versus instant start ballasts in frequently switched applications, saving you money in maintenance costs and replacement lamps.

Same Energy Savings as High-Efficiency Instant Start Ballasts

- GE UltraStart® ballasts operate at an industry high 90%+ efficiency. Traditional PS ballasts typically operate between 79-86%.

Simplify Installation with Multi-Voltage Technology

- UltraStart® T8 ballasts incorporate Multi-Voltage technology. UltraStart® can virtually "read" the incoming voltage and adapt automatically to any voltage from 108V to 305V. Fewer models handle more jobs with Multi-Voltage technology, and it eliminates guesswork at the job site. Multi-Voltage Control (MVC) also compensates for incoming voltage fluctuations or variations from unreliable power.

(2) they operate lamps in series which means if one lamp goes out the other lamps on that ballast will also go out

(3) there is typically a starting delay of 1 to 1.5 seconds between the time the ballast is powered and the time the lamp comes on.

GE UltraStart® PS ballasts overcome all these issues. These ballasts use a control circuit to apply very precise cathode heat to ensure that the cathodes have reached an optimum temperature during lamp starting. Precise starting significantly reduces the amount of cathode degradation associated with each start and increases lamp life significantly in frequently switched applications. GE has developed a line of PS ballasts that have the benefit of PS with the energy savings, fast starting and parallel operation convenience of instant start ballasts.

Lower Maintenance costs with Parallel Mode Operation

- Most PS ballasts operate in series mode, if one bulb goes out, they all go out. GE UltraStart® T8 ballasts operate in parallel mode, meaning if one bulb goes out, others stay on.

Fast Starting Time

- GE UltraStart® T8 ballasts start in visually the same time as instant start ballasts (less than 0.7 seconds) - a significant improvement versus traditional PS ballasts. An important feature when using sensors and the annoying delay of waiting for the lights to turn on with traditional PS ballasts.

Complies with (RoHS) Restrictions of Hazardous Materials Standards.

Anti-Striation Reduction Circuitry for better light quality with energy saving lamps

UltraStart® Saves Energy

Energy Savings by Turning the Lights Off

Using occupancy sensors in unoccupied spaces or using daylight harvesters in partial daylight areas is one of the most cost-effective, energy-savings solutions today. Extensive studies on energy savings while using lighting controls are available. One of the more credible studies performed by the Lighting Research Center and sponsored by the US EPA ENERGY STAR® Buildings Program shows the impact of energy consumption with and without occupancy sensors*. The results are shown on the table below. Occupancy sensors showed an average annual energy consumption savings of 12% to 42% depending on the application. GE UltraStart® provides the proper lamp starting and energy savings to take advantage of this technology without sacrificing lamp life or incurring high maintenance costs.

Lamp Replacement and Maintenance Costs

Increased calendar lamp life and reduced maintenance costs are other significant benefits. The less time that lamps are left on increases overall calendar lamp life. UltraStart® lasts over 100,000 switching cycles in occupancy sensor and other building control system applications resulting in significant lamp replacement and maintenance cost savings. UltraStart® parallel lamp operation also avoids unnecessary lamp replacement costs when only one lamp fails.

Energy Savings When the Lights Are On

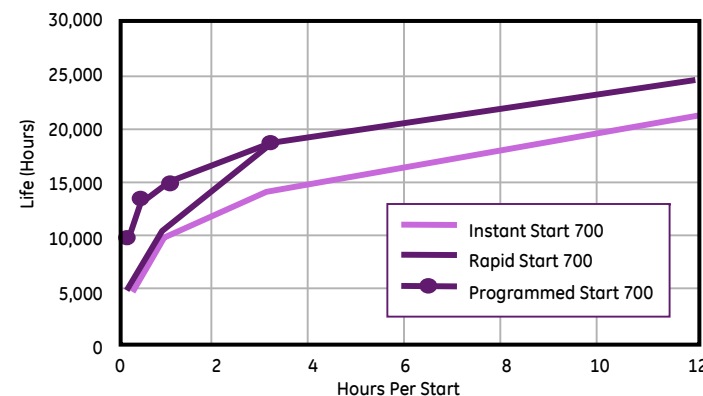
The UltraStart® ballasts saves as much energy as high-efficiency (>90%) T8 instant start ballasts like GE UltraMax® instant start. Systems combining UltraStart® electronic ballasts and GE T8 energy-savings lamps can deliver over 40% energy savings over standard T12 electromagnetic ballast systems not including the incremental savings from the use of occupancy sensors or daylight harvesters.

Energy-Saving Impact of Using Occupancy Sensors by Application*

	Non Sensors, Control Left to Occupant		Occupancy Sensors with 20 Minute Timeout Setting			
	Average % Occupied	Average Annual Operating Hours	Total Annual Energy Cost (\$)	Average Annual Operating Hours	Total Annual Energy Costs (\$)	Annual Savings %
Break Room	24%	3,092	\$4,821	2,576	\$4,249	12%
Classroom	15%	2,732	\$94,488	1,424	\$54,864	42%
Conference Room	11%	1,778	\$3,724	1,113	\$3,006	19%
Private Office	18%	2,925	\$41,125	1,961	\$32,156	22%
Restroom	20%	5,866	\$2,054	3,097	\$1,322	36%

* "The Effects of Changing Occupancy Sensor Timeout Setting on Energy Savings, Lamp Cycling and Maintenance Costs", LRC School of Architecture / US EPA ENERGY STAR® Buildings Program, IES Paper #42, August 2000, Electric Rate \$0.8/kw Hour.

NEMA Document: T8 Lamp Life vs. Starting Method*

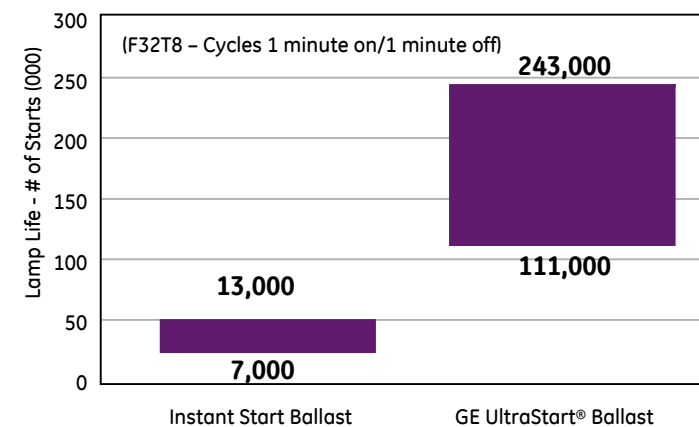


*A NEMA lighting division document - "Compatibility of Fluorescent Lamps and Electronic Ballasts in Frequently Switched Applications," August 18, 2003 (V1.7B)
Note: 700 is the most common color rendering index rating for T8 lamps.

Independent studies by the National Electrical Manufacturers Association (NEMA) and GE have shown that Programmed Start ballasts provide the best lamp starting and longest lamp life in frequently switched applications. This chart is from the NEMA study "Compatibility of Fluorescent Lamps and Electronic Ballasts in Frequently Switched Applications" and demonstrates the significant improvement in lamp life when using programmed start ballasts versus instant start ballasts.

The NEMA study recommends PS ballasts in applications with frequent starts where extended lamp life is a primary concern. NEMA defines frequently switched applications and recommends the use of PS ballasts in applications of 5 or more starts per day. Applications with greater than 8 starts per day may void lamp manufacturers' warranties when used on an instant start ballasts. GE UltraStart® maximizes lamp life in frequently switched applications and provides the GE Total System Limited Warranty.

GE Lamp Life Range – Instant Start vs. Programmed Start**



GE lamp life studies have shown that lamp life is up to 20 times longer in rapid cycle testing. Lamp life test have demonstrated 111,000 to 243,000 starts on F32T8 lamps when GE UltraStart® ballasts as opposed to only 7,000 to 13,000 starts with standard instant start ballasts.

UltraStart™ maximizes lamp life in frequently witted applications and where lamp life is a primary concern. GE UltraStart® ballasts and lamps provide guaranteed performance with the GE Total system Limited Warranty.

**GE 2004-2005 lamp testing at industry standard 850 rapid cycle testing



T8 UltraStart®

- F32T8 Fast startup (less than .07 seconds)
- Greater than 100,000 on/off cycles**
- High Ballast Efficiency (>90%)
- Ballast factors: Ultra-Low Watts (.60), Low Watts (.71), Normal (.89) and High Light Output (1.15)
- 1 lamp for today's designs
- Ultra system warranty
- <10% THD. >0.98 PF

GE Edison Award Winner. Photography by Michael Northrop.



.60 (XL) Ultra Low Watt and .71 (L) Low Watt Ballast Factor

120-277 Multi-Volt

Best used for low light level areas-bathrooms and hallways, partial daylit areas.

The Ultra Low XL ballast offers facilities the ability to maximize energy savings with 4 ft. T8 lamps. Many facilities maintain one lamp in inventory with F32T8 high lumen lamp and change light levels throughout the facility with ballast factor.

GE Edison Award of Merit and Award for Sustainable Design. Photograph by Earl F. Levin and Robert L. Smith



.89 (N) Normal Ballast Factor

Multi-Volt (122 & 277)

Best used in applications incorporating occupancy sensors, daylight harvesting strategies and other frequently switched applications (>5 on/off per day)
- General office lighting, retail, schools

*UltraStart® T8 XL < 90% Efficient

** GE 2004 - 2005 lamp testing at industry standard 850 rapid cycle testing

GE Edison Award of Merit and Award for Sustainable Design. Photograph by Earl F. Levin and Robert L. Smith



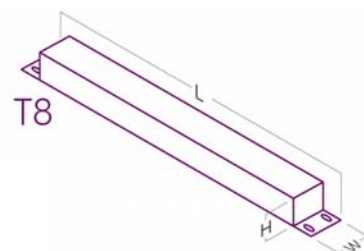
1.15 (H) High Light Level Ballast Factor

120-277 Multi-Volt

Best used in high light output areas such as high bay fixtures
- Warehouses manufacturing, retail

Total System Limited Warranty

UltraStart® ballasts are designed by GE's expert engineers and custom manufactured to our Six Sigma specifications, all backed by a full 5 year warranty. When used with GE lamps, you get our Total Performance System Warranty covering lamps and ballasts. With today's complicated system of ballasts, lamps, sensors and frequently switching lights, you need a system that is designed for these applications and backed with the GE Total System Limited Warranty. Contact your GE Representative for details.



UltraStart T8 XL, L, N, H	
Length	9.50"
Mount Length	8.89"
Width	1.70"
Mount Width	1.05"
Height	1.18"

UltraStart® and Energy Codes

Turning the lights off and using automatic light controls not only makes good sense from an energy-saving strategy but it is now required by federal and local energy codes throughout the U.S. These codes require new buildings, and those undergoing major renovation, to meet stringent watts-per-square-foot requirements or use automated shutoff controls. GE UltraStart® is your best solution to maintain the energy savings and conveniences of instant start ballasts and also maintain your long life lamps. Below are highlights of three major programs driving these requirements:

ASHRAE/IESNA Standard 90.1

The Department of Energy (DOE) selected ANSI/IESNA Standard 90.1 - 1999 as the commercial building reference standard for state building energy codes by its authority. Sates were required to adopt an energy code at least as stringent as 90.1 - 1999 by July 1, 2004. New control requirements include the following:

- Buildings larger than 5,000 sq. ft. must use an automatic control device to turn off lighting in all spaces
- Each space that is enclosed by ceiling height partitions must have at least one control device that independently controls the general lighting in the space. Each control device shall be activated either by an automatic motion sensor or manually by an occupant
- Lighting for all exterior applications shall be controlled by a photocell or astronomical time clock

California Title 24

California's Title 24 standards for lighting controls are tougher than ASHRAE/IESNA 90.1 requirements and establishing standards similar to Title 24. Here are some of the lighting control requirements found in Title 24:

- Controls for daylight areas greater than 250 sq. ft. that can receive effective light from daylight must switch or dim to reduce lighting by at least 50%
- Light level reduction controls are required for spaces greater than 100 sq. ft. with a lighting load greater than 0.8 watts per square foot and more than one luminaire
- All interior lighting systems must have an occupancy sensor, automatic time switch or other device that automatically shuts off lighting
- All permanently installed exterior lighting must use a photocell or time switch

US Green Building Council's Leadership in Energy and Environmental Design (LEED) Program

The LEED rating and certification system is a voluntary standard through which existing commercial buildings obtain points toward certification to a set of energy and environmental performance criteria. Some states offer tax incentives for meeting certain standards established by the LEED standard. Lighting controls and GE UltraStart® Programmed Start ballasts play three primary roles in helping a building achieve LEED certification:

- 1) Controls are required for enabling code compliance, which is a major LEED prerequisite
- 2) LEED strongly encourages designing buildings using daylight as a primary light source
- 3) Lighting controls can be used for further lighting energy reductions

Environmental Awareness

GE UltraStart® is one of GE's ways to create products that help our customers improve their environmental and operating performance. GE UltraStart® are high-efficiency, energy-saving and RoHS-compliant ballasts.

GE UltraStart® PS and UltraMax® Instant Start ballasts are among the highest energy-efficient ballasts available and contribute to significant reductions in energy consumption and greenhouse gas emissions. In addition to energy savings, GE UltraStart® ballasts are RoHS-compliant. The RoHS (European Directive 2002/95EC on the Restriction of Hazardous Substances) states that (beyond certain limited exemptions) electrical and electronic products shall not contain lead, cadmium, mercury, hexavalent chromium,

polybrominated biphenyls (PBBs), or polybrominated diphenyl ethers (PBDEs), GE's UltraStart® ballasts will use lead-free solder and other environmentally preferable materials that meet the RoHS directive. RoHS-compliant ballasts are GE's commitment to helping our customers meet their disposal needs now and in the future if RoHS becomes a global requirement.

GE expects to be the first RoHS-compliant product segment among our competitors. GE hopes to encourage customer awareness of the importance of reducing hazardous materials and complying with future environmental trends. Look for the RoHS compliant mark on all GE UltraStart® and other GE ballasts.

The above data are highlights from the standards established for each program. Please see local codes or standards websites for the impact on your requirements.