ADVANCE

T5/HO Ballasts

For Linear, Circline and Long Twin Tube Lamps

- **Centium®**
- **Mark X® Powerline**
- **Mark VII® 0-10V**

Fixed output and dimmable electronic ballasts

The Complete

Programmed Rapid-Start

Centium® with IntelliVolt™

Fixed Light Output Ballasts for T5/HO Lamps

Electronic Ballasts with <10% THD Performance, 120 thru 277V Operation

Introducing the ADVANCE T5/HO Centium® ballast featuring IntelliVolt™ technology. IntelliVolt™, 120 through 277V operation at 50/60 Hz, guarantees shipment of correct voltage ballast and fixture for all applications. This feature, incorporated in a ballast that can operate (1) or (2) T5/HO lamps, minimizes SKU's required in inventory, resulting in significant cost savings.

Featuring an enclosure that is only 1" high, these low profile, lightweight ballasts provide fixture manufacturers increased flexibility in new generation fixture design. Color-coded, poke-in connectors ensure wiring accuracy and minimize ballast installation time.

The T5/HO ballasts ensure optimum lamp life in frequent switching applications. Utilizing Programmed-Rapid Start lamp ignition circuitry, the ballasts are ideally suited for frequent lamp on/off cycles associated with occupancy sensors or motion detectors.

MARK X® Powerline

Dimming Ballasts for T5/HO Lamps

Powerline Voltage Control Provides for Ease of Installation

The Mark X® Powerline from Advance makes fluorescent dimming systems as fast and easy to install as incandescent systems - while being up to 80% more energy efficient. The Mark X Powerline dims direct from the power line, thereby requiring no additional control wiring. This ease of wiring provides an easy-to-install retrofit option along with cost-effective new construction opportunities. Plus the Mark X Powerline does not have to ramp up to full light output and then dim. The ballast will start lamps at the low dim level. The full dimming range helps to improve comfort levels for area occupants.

The Mark X Powerline ballast utilizes a lamp end-of-life (EOL) detection system. This system safely removes power from the lamp at end of life and prevents lamp overheating.

The Mark X Powerline is the ideal ballast for most dimming applications.

Family

Exclusively from ADVANCE

Ballasts for T5/HO Lamps

MARK VII® 0-10V

Dimming Ballasts for T5/HO Lamps

0-10V Control Enhances Flexibility for Zone Control

The Mark VII® 0-10V electronic ballast offers an affordable, flexible and versatile dimming solution. Operating from a low-voltage control line, this ballast is compatible with building management control systems. This allows energy-savings opportunities through the use of daylight harvesting and load shedding.

The Mark VII 0-10V ballast will dim T5/HO lamps directly from 0-10V controls. This allows for lighting control across branch circuits, and reduces the number of controls required. Mark VII 0-10V does not have to ramp up to full light output and then dim. The ballast will start lamps at low dim level, increasing comfort levels for area occupants.

The Mark VII 0-10V ballast, helps provide an environmentally friendly design. When used with an energy management system, the decreased light levels will result in less heat within the workspace and therefore a reduction in HVAC cooling requirements. The total ensuing electrical consumption reduction helps the environment.

The Mark VII 0-10V is the ideal ballast for all dimming applications especially when a total building control system is implemented.

Feature	Centium®	MARK X® Powerline	MARK VII® 0-10V
Centium Technology (<10% THD)	Yes	Yes	Yes
IntelliVolt	Yes	No	No
Programmed Rapid-Start	Yes	Yes	Yes
Color-coded Poke-in Connectors	Yes	Yes	Yes
Low-profile housing	Yes	Yes	Yes
0°F start	Yes	No	No
EOL Protection	Yes	Yes	Yes
Operates above 40kHz	Yes	Yes	Yes
Auto restrike	Yes	Yes	Yes
5-year Warranty	Yes	Yes	Yes
Dimming via 0-10V DC	N/A	N/A	Yes
Dimming via AC Powerline	N/A	Yes	N/A

Applications

- Hotels
- Offices
- Schools
- Industrial
- Restaurants
- Boardrooms
- Auditoriums
- Training Areas
- Specialty Stores
- Conference Rooms
- Department Stores
- Houses of Worship
- Healthcare Facilities

Centium® Fixed Light Output Ballast

T5/HO Programmed Start 4-Pin Linear Lamps

Lamp Data		Min. Starting Temp. (°F/°C)	Input Volts	Catalog Number	Line Current (Amps)	Input Power ANSI (Watts)	Ballast Factor	Max. THD (%)	Min. Power Factor
Number	Watts								
F80T5/HO									
1	80	0/-18	120	ICN-1S80	0.76	91	1.00	10	0.98
			230		0.39	89			
			277		0.33				
F54T5/HO									
1	54	0/-18	120	ICN-2S54	0.52	62	1.02	10*	0.96
			230		0.28				
			277		0.23				
2	54	0/-18	120		1.00	120	1.00	10	0.98
			230		0.52	117			
			277		0.43				
F39T5/HO									
1	39	0/-18	120	ICN-2S24	0.34	40	0.90	10	0.98
			230		0.18				
			277		0.15				
			120	ICN-2S39	0.36	43	1.02	10	0.98
			230		0.19				
			277		0.16				
2	39	0/-18	120	ICN-2S39	0.73	87	1.00	10	0.98
			230		0.37	85			
			277		0.31				
F24T5/HO									
1	24	0/-18	120	ICN-2S24	0.23	27	1.02	10	0.98
			230		0.12				
			277		0.10				
			120	ICN-2S39	0.25	29	1.12	15	0.95
			230		0.14				
			277		0.12				
2	24	0/-18	120	ICN-2S24	0.44	52	1.00	10	0.98
			230		0.23				
			277		0.19				
			120	ICN-2S39	0.47	55	1.10	10	0.98
			230		0.25				
			277		0.21				

* Effective Q2 2002 - Currently THD for this application is <15%

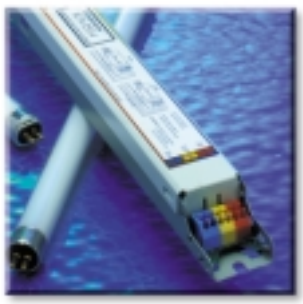
visit us at
www.advancetransformer.com/T5HO

Centium® Fixed Light Output Ballast

T5 Programmed Start 4-Pin Circline Lamps

Lamp Data		Min. Starting Temp. (°F/°C)	Input Volts	Catalog Number	Line Current (Amps)	Input Power ANSI (Watts)	Ballast Factor	Max. THD (%)	Min. Power Factor
Number	Watts								
FC12T5/HO (55W Circline)									
1	55	0/-18	120	ICN-2S54	0.46	55	0.87	15	0.96
			230		0.25				
			277		0.21				
2	55	0/-18	120		0.89	106	0.85	10	0.98
			230		0.45	103			
			277		0.38				
FC12T5 (40W T5 Circline)									
1	40	0/-18	120	ICN-2S24	0.34	40	0.84	10	0.98
			230		0.18				
			277		0.15				
			120	ICN-2S39	0.35	42	0.92	10	0.98
			230		0.19				
			277		0.16				
2	40	0/-18	120	ICN-2S39	0.68	80	0.90	10	0.98
			230		0.35				
			277		0.29				
FC9T5 (22W T5 Circline)									
1	22	0/-18	120	ICN-2S24	0.23	27	1.02	10	0.98
			230		0.12				
			277		0.10				
			120	ICN-2S39	0.24	29	1.12	15	0.95
			230		0.14				
			277		0.12				
2	22	0/-18	120	ICN-2S24	0.44	52	1.00	10	0.98
			230		0.23				
			277		0.19				
			120	ICN-2S39	0.46	54	1.10	10	0.98
			230		0.24				
			277		0.20				
(1)FC9T5 + (1)FC12T5 {(1)22W + (1)40W T5 Circline}									
1 + 1	40 + 22	0/-18	120	ICN-2S39	0.58	68	1.00	10	0.98
			230		0.30				
			277		0.25				

visit us at
www.advancetransformer.com/T5HO



Centium® Fixed Light Output Ballast

FT5 Programmed Start 4-Pin Long Twin Tube Lamps

Lamp Data		Min. Starting Temp. (°F/°C)	Input Volts	Catalog Number	Line Current (Amps)	Input Power ANSI (Watts)	Ballast Factor	Max. THD (%)	Min. Power Factor
Number	Watts								
FT80W (80W Long Twin Tube)									
1	80	0/-18	120	ICN-1S80	0.76	91	1.00	10	0.98
			230		0.39	89			
			277		0.33				
FT55W (55W Long Twin Tube)									
1	55	0/-18	120	ICN-2S54	0.49	58	0.92	15	0.96
			230		0.26				
			277		0.22				
2	55	0/-18	120		0.94	112	0.90	10	0.98
			230		0.48	109			
			277		0.41				
FT50W (50W Long Twin Tube)									
1	50	0/-18	120	ICN-2S54	0.51	61	1.12	15	0.96
			230		0.27				
			277		0.23				
2	50	0/-18	120		0.99	118	1.10	10	0.98
			230		0.51	115			
			277		0.43				
FT40W (40W Long Twin Tube)									
1	40	0/-18	120	ICN-2S24	0.40	47	1.00	10	0.98
			230		0.21				
			277		0.17				
			120	ICN-2S39	0.42	50	1.10	10	0.98
			230		0.22				
			277		0.19				
FT36W (39/36W Long Twin Tube)									
1	36/39	0/-18	120	ICN-2S24	0.29	34	0.90	10	0.98
			230		0.15				
			277		0.13				
			120	ICN-2S39	0.30	36	0.96	15	0.95
			230		0.16				
			277		0.13				
			120	ICN-2S54	0.39	46	1.22	20	0.96
			230		0.21				
			277		0.18				
2	36/39	0/-18	120	ICN-2S39	0.59	69	0.94	10	0.98
			230		0.30				
			277		0.25				
			120	ICN-2S54	0.75	89	1.20	10	0.98
			230		0.38	86			
			277		0.32				
FT24W (24W Long Twin Tube)									
1	24	0/-18	120	ICN-2S24	0.23	27	1.02	10	0.98
			230		0.12				
			277		0.10				
			120	ICN-2S39	0.24	29	1.12	15	0.95
			230		0.14				
			277		0.12				
2	24	0/-18	120	ICN-2S24	0.44	52	1.00	10	0.98
			230		0.23				
			277		0.19				
			120	ICN-2S39	0.46	54	1.10	10	0.98
			230		0.24				
			277		0.20				

Mark X® Powerline Dimming Ballast

MARK X® Powerline for T5/HO 4-Pin Linear Lamps

Lamp Data		Min. Starting Temp. (°F/°C)	Input Volts	Catalog Number	Line Current (Amps)	Input Power ANSI (Watts)	Ballast Factor	Max. THD (%)	Min. Power Factor
Number	Watts								
F54T5/HO									
1	54	50/10	120	REZ-154	0.53-0.22	63-12.5	1.00-0.03	10	0.98
2	54	50/10	120	REZ-2S54	1.05-0.40	125-24	1.00-0.03	10	0.98
1	54	50/10	277	VEZ-154	0.23-0.07	63-12.5	1.00-0.03	10	0.98
2	54	50/10	277	VEZ-2S54	0.45-0.13	125-24	1.00-0.03	10	0.98

MARK X® Powerline for T5/HO 4-Pin Circline Lamps

Lamp Data		Min. Starting Temp. (°F/°C)	Input Volts	Catalog Number	Line Current (Amps)	Input Power ANSI (Watts)	Ballast Factor	Max. THD (%)	Min. Power Factor
Number	Watts								
FC12T5/HO (55W Circline)									
1	55	50/10	120	REZ-154	0.50-0.22	59-12.5	0.90-0.03	10	0.98
2	55	50/10	120	REZ-2S54	0.96-0.40	114-24	0.90-0.03	10	0.98
1	55	50/10	277	VEZ-154	0.22-0.07	59-12.5	0.90-0.03	10	0.98
2	55	50/10	277	VEZ-2S54	0.42-0.13	114-24	0.90-0.03	10	0.98

MARK X® Powerline for FT5 4-Pin Long Twin Tube Lamps

Lamp Data		Min. Starting Temp. (°F/°C)	Input Volts	Catalog Number	Line Current (Amps)	Input Power ANSI (Watts)	Ballast Factor	Max. THD (%)	Min. Power Factor
Number	Watts								
FT55W/2G11 (55W Long Twin Tube)									
1	55	50/10	120	REZ-154	0.50-0.22	59-12.5	0.90-0.03	10	0.98
2	55	50/10	120	REZ-2S54	0.96-0.40	114-24	0.90-0.03	10	0.98
1	55	50/10	277	VEZ-154	0.22-0.07	59-12.5	0.90-0.03	10	0.98
2	55	50/10	277	VEZ-2S54	0.42-0.13	114-24	0.90-0.03	10	0.98

Visit www.advancetransformer.com for a complete listing of compatible control manufacturers.

Mark VII® 0-10V Dimming Ballast

MARK VII® 0-10V for T5/HO 4-Pin Linear Lamps

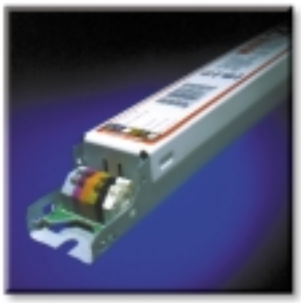
Lamp Data		Min. Starting Temp. (°F/°C)	Input Volts	Catalog Number	Line Current (Amps)	Input Power ANSI (Watts)	Ballast Factor	Max. THD (%)	Min. Power Factor
Number	Watts								
F54T5/HO									
1	54	50/10	120	RZT-154	0.53-0.12	63-12.5	1.00-0.03	10	0.98
2	54	50/10	120	RZT-2S54	1.05-0.21	125-24	1.00-0.03	10	0.98
1	54	50/10	277	VZT-154	0.23-0.05	63-12.5	1.00-0.03	10	0.98
2	54	50/10	277	VZT-2S54	0.45-0.09	125-24	1.00-0.03	10	0.98

MARK VII® 0-10V for T5/HO 4-Pin Circline Lamps

Lamp Data		Min. Starting Temp. (°F/°C)	Input Volts	Catalog Number	Line Current (Amps)	Input Power ANSI (Watts)	Ballast Factor	Max. THD (%)	Min. Power Factor
Number	Watts								
FC12T5/HO (55W Circline)									
1	55	50/10	120	RZT-154	0.50-0.12	59-12.5	0.90-0.03	10	0.98
2	55	50/10	120	RZT-2S54	0.96-0.21	114-24	0.90-0.03	10	0.98
1	55	50/10	277	VZT-154	0.22-0.05	59-12.5	0.90-0.03	10	0.98
2	55	50/10	277	VZT-2S54	0.42-0.09	114-24	0.90-0.03	10	0.98

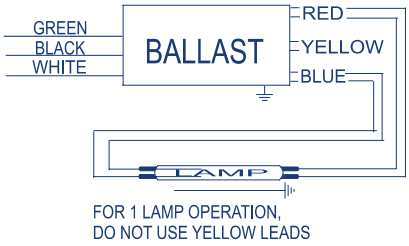
MARK VII® 0-10V for FT5 4-Pin Long Twin Tube Lamps

Lamp Data		Min. Starting Temp. (°F/°C)	Input Volts	Catalog Number	Line Current (Amps)	Input Power ANSI (Watts)	Ballast Factor	Max. THD (%)	Min. Power Factor
Number	Watts								
FT55W/2G11 (55W Long Twin Tube)									
1	55	50/10	120	RZT-154	0.50-0.12	59-12.5	0.90-0.03	10	0.98
2	55	50/10	120	RZT-2S54	0.96-0.21	114-24	0.90-0.03	10	0.98
1	55	50/10	277	VZT-154	0.22-0.05	59-12.5	0.90-0.03	10	0.98
2	55	50/10	277	VZT-2S54	0.42-0.09	114-24	0.90-0.03	10	0.98

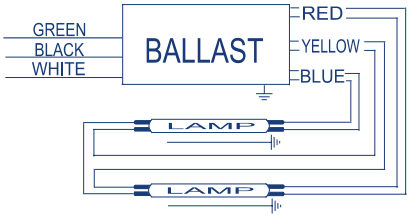


Wiring Diagrams / Ballast Case

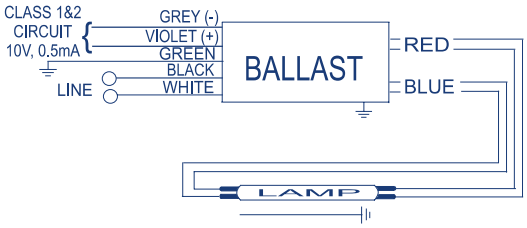
Centium - 1-Lamp Ballast



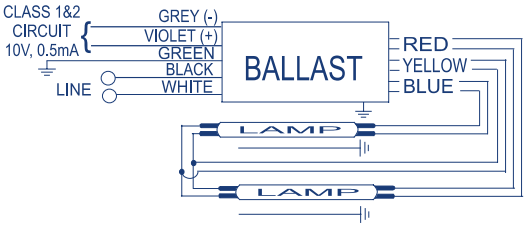
Centium - 2-Lamp Ballast



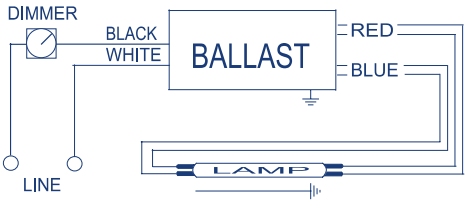
MARK VII - 1 Lamp T5/HO Ballast



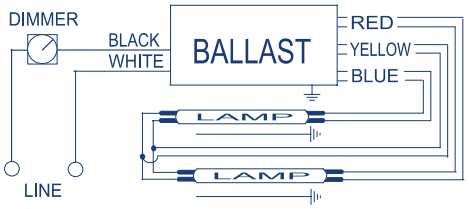
MARK VII - 2-Lamp T5/HO Ballast

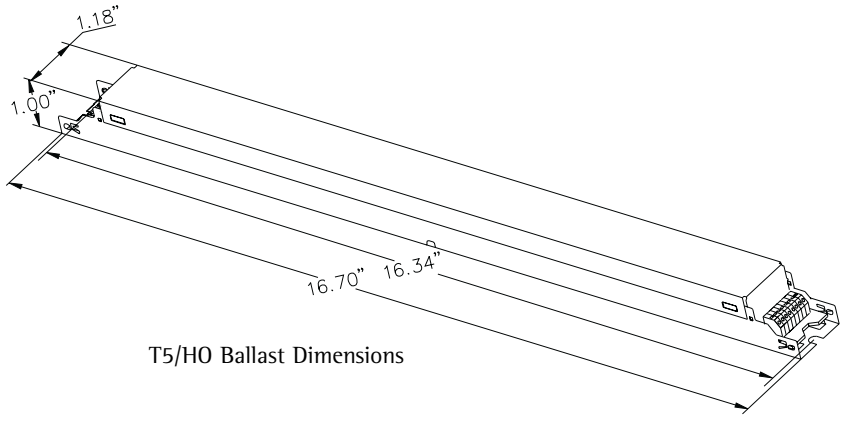


MARK X - 1 Lamp T5/HO Ballast



MARK X - 2-Lamp T5/HO Ballast





T5/HO Ballast Dimensions

T5/HO Lamps Provide:

- Up to 93 lumens per watt
- 95% lumen maintenance
- 85 CRI
- Slim profile design
- Improved optical control
- Up to a 40% size reduction in fixture size

Centium® Ballast Specifications

Section I – Physical Characteristics

1.1 The electronic ballast shall have a maximum height of 1".

1.2 The electronic ballast shall be provided with poke-in connectors, color-coded to ANSI C82.11.

Section II – Performance Requirements

2.1 The electronic ballast shall operate from a nominal line voltage of 120 - 277 volts, 50/60Hz.

2.2 The electronic ballast input current shall have Total Harmonic Distortion (THD) of less than 10%, when used with primary lamp.

2.3 The electronic ballast shall have a Power Factor greater than 98% when used with primary lamp.

2.4 The electronic ballast shall withstand a sustained short to ground or open circuit of any output leads.

2.5 The electronic ballast shall be Sound Rated A.

2.6 The electronic ballast output frequency to the lamps shall be above 40kHz to minimize interference with infrared control systems and eliminate visible flicker.

2.7 The electronic ballast shall meet ANSI C82.11.

2.8 The electronic ballast shall withstand transients specified in ANSI C62.41, Location Category A3.

2.9 The electronic ballast shall be Programmed Rapid-Start lamp operation.

2.10 The electronic ballast shall have an end-of-life lamp shutdown circuit.

2.11 The electronic ballast shall have a lamp current crest factor of <1.7.

Section III – Regulatory Requirements

3.1 The electronic ballast shall meet the requirements of the Federal Communications Commission rules and regulations, Title 47 CFR part 18, for Non-Consumer equipment.

3.2 The electronic ballast shall comply with all applicable state and federal efficiency standards.

3.3 The electronic ballast shall be Underwriters Laboratories (UL) Listed (Class P) and CSA Certified.

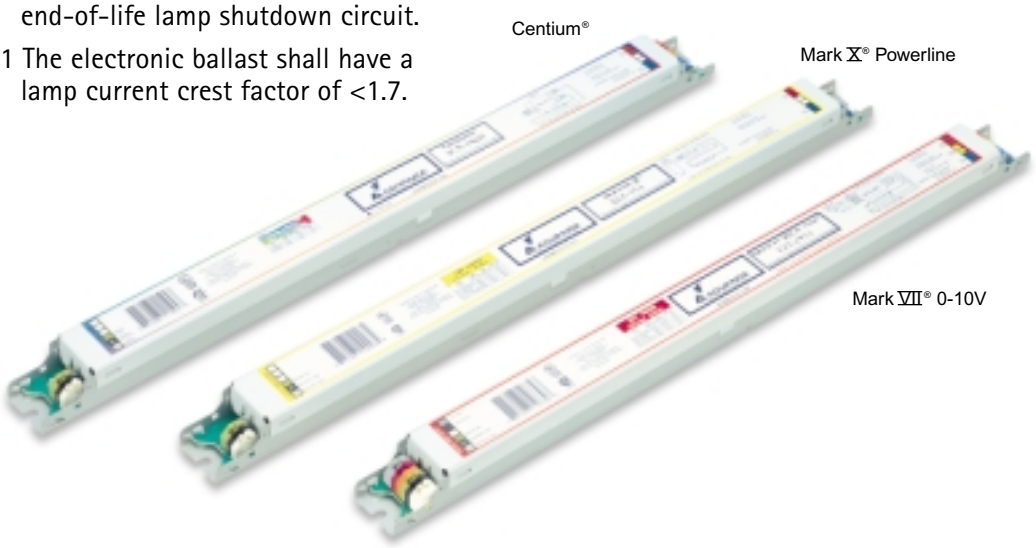
Section IV – Other

4.1 The electronic ballast shall not contain Polychlorinated Biphenyl (PCB's).

4.2 The electronic ballast shall carry a five-year warranty from the date of manufacture. Warranty shall be valid for a maximum case temperature of 70° C.

4.3 The manufacturer shall have a ten-year history of producing electronic ballasts for the North American market.

4.4 The electronic ballasts shall be produced in a factory certified to ISO 9002 Quality System Standards.



Dimming Ballast Specifications

Section I – Physical Characteristics

1.1 The electronic ballast shall have a maximum height of 1".

1.2 Ballast shall be provided with integral leads or color-coded connectors that comply with ANSI standard C82.11 (latest revision).

Section II – Performance Requirements

2.1 Ballast shall be Programmed Rapid Start

2.2 (MARK VII) Ballast shall operate from a nominal line voltage of 120 or 277 volts, 50/60Hz. 120V ballast shall operate from 90V - 145V. 277V ballast shall operate from 200V - 305V.

2.3 (MARK X) Ballast shall operate from a nominal line voltage of 120 or 277 volts, 60Hz and maintain constant light output for line voltage variations of ±10%.

2.4 (MARK VII) Ballast shall maintain constant light output, for line voltage variations of ±10% of rated supply voltage.

2.5 Ballast shall ignite the lamps at any light output setting selected without first starting at maximum light output.

2.6 Ballast input current shall have Total Harmonic Distortion (THD) of less than 10% at maximum light output for primary lamps. Total Harmonic Current (THC) at minimum light output shall not exceed THC at maximum light output.

2.7 Ballast shall have a Power Factor greater than 98% at full light output and greater than 90% throughout the dimming range when used with primary lamp.

2.8 Lamp Current Crest Factor shall be 1.6 or less throughout the dimming range in accordance with lamp manufacturer recommendation.

2.9 Ballast shall withstand a sustained short to ground or open circuit of any output leads.

2.10 Ballast shall be Sound Rated A.

2.11 Ballast shall be a high frequency electronic type and operate lamps above 40kHz to avoid interference with infrared control systems, and eliminate visible flicker.

2.12 Ballast shall have a lamp end-of-life detection and shutdown circuitry that meets proposed ANSI/IEC standard.

2.13 Ballast shall comply with ANSI C82.11.

2.14 Ballast shall provide transient immunity as specified in ANSI C62.41.

2.15 (MARK VII) Ballast shall be controlled by a Class 1 or Class 2 low-voltage 0-10V circuit.

2.16 (MARK VII) Ballast shall be furnished with integral protection circuitry to withstand connection of control leads to mains power supply. In this event, ballast shall default to the maximum light output level.

Section III – Regulatory Requirements

3.1 Ballast shall comply with the requirements of the Federal Communications Commission (FCC) rules and regulations, Title 47 CFR Part 18, for Non-Consumer equipment, Class A for EMI (Conducted and Radiated).

3.2 Ballast shall comply with all applicable state and federal efficiency standards.

3.3 Ballast shall be Underwriters Laboratories (UL 935) listed, Class P, Type 1 Outdoor, and CSA Certified where applicable.

Section IV – Other

4.1 Ballast shall not contain Polychlorinated Biphenyl (PCB's).

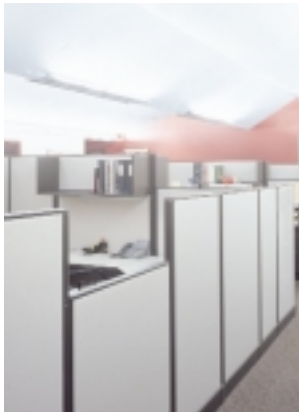
4.2 Manufacturer shall provide written warranty against defects in material or workmanship including replacement, for five years from date of manufacture when ballast case temperature does not exceed 70°C.

4.3 Ballast manufacturer shall have a ten-year history of producing electronic ballasts for the North American market.

4.4 Ballasts shall be produced in a factory certified to ISO 9002 Quality System Standards.

4.5 (MARK VII) Ballast shall be controlled by a Mark VII® 0-10V compatible lighting control.

4.6 (MARK X) Ballast shall be controlled by a Mark X® Powerline compatible lighting control.



ADVANCE T5/HO Programmed-Rapid Start Ballast Provide:

- High system efficiency
- Full-safe operation at end-of-life for frequent starting
- Extends lamp life vs. instant start system
- Slim profile design
- Up to 40% reduction in fixture size

Quick Look-up Table

Lamp Type	No. of Lamps	ICN-2S54	ICN-2S39	ICN-2S24	ICN-1S80	MARK VII	MARK X
T5/HO							
F80T5/HO	1				✔		
F54T5/HO	1	✔				✔	✔
	2	✔				✔	✔
F39T5/HO	1		✔	✔			
	2		✔				
F24T5/HO	1		✔	✔			
	2		✔	✔			
T5 Circline							
FC12T5/HO (55W)	1	✔				✔	✔
	2	✔				✔	✔
FC12T5 (40W)	1		✔	✔			
	2		✔				
FC9T5 (22W)	1		✔	✔			
	2		✔	✔			
FC12T5 (40W) + FC9T5 (22W)	1 + 1		✔				
FT5 Long Twin Tube							
FT80W	1				✔		
FT55W	1	✔				✔	✔
	2	✔				✔	✔
FT50W	1	✔					
	2	✔					
FT40W	1		✔	✔			
FT36/39W	1	✔	✔	✔			
	2	✔	✔				
FT24	1		✔	✔			
	2		✔	✔			

Form No. EL-2110 - R01

ADVANCE™

Advance Transformer Co. • O'Hare International Center
10275 West Higgins Road • Rosemont, Illinois 60018
Telephone: (800) 322-2086 • FAX: (888) 423-1882
Customer Support/Technical Service: (800) 372-3331
www.advancetransformer.com

A DIVISION OF PHILIPS ELECTRONICS NORTH AMERICA CORPORATION