ADVANCE

ELECTRONIC FLUORESCENT

Mark 10® *Powerline*

for Linear Fluorescent and 4-pin CFL Lamps

Programmed Start Electronic Fluorescent Dimming Ballasts

PRODUCT OVERVIEW:

Mark 10 *Powerline* ballasts for linear fluorescent, 4-pin CFL, and T5HO lamps are the ideal choice for 2-wire dimmable lighting installations. Without the need of additional control leads, the **Mark 10 *Powerline*** makes controllable fluorescent lighting systems as fast and as easy to install as fixed output systems - while being up to 80% more energy efficient than incandescent systems.

The **Mark 10 *Powerline*** ballasts programmed start design optimizes lamp and dimming performance by monitoring system performance and making continuous adjustments. Plus the **Mark 10 *Powerline*** does not have to ramp up to full light output and then dim. The ballast will start lamps at the minimum dimming level, increasing comfort levels for area occupants.

DESIGN HIGHLIGHTS:

- 100% - 5% full range continuous dimming (T5HO to 1%)
  - Increase flexibility and enhances visual comfort
- Energy efficient
  - Provides up to 65% energy savings over standard fixed output T8 ballasts (e.g., REL-2P32-SC)
- Absence of additional control leads
  - Enhances ease of installation - requires no extra wiring
  - Highly flexible and compatible with a wide variety of controls by a broad range of control manufacturers
- Programmed Start operation
  - Optimizes lamp life in frequent starting conditions
- Lamp ignition at any light setting, including the 5% dim level (1% in T5HO)
  - Eliminates the need to ramp up to 100% light output when starting
- Operates above 42 kHz
  - Minimizes risk of interference with infrared remote control systems and provides continuous flicker-free dimming
- End-of-Lamp (EOLL) life protection circuit (CFL and T5/HO models only)
  - Safely removes power from lamp at end of life

APPLICATIONS:

- ***General Lighting***
- ***Board Rooms***
- ***Executive Offices***
- ***Conference Rooms***
- ***Meeting Rooms***
- ***Auditoriums***

Tel: 800-322-2086 • Fax: 888-423-1882 • Customer Support/Technical Service: 800-372-3331 •
www.advancetransformer.com

HIGH FREQUENCY ELECTRONIC BALLASTS

For 17 - 32W T8 Lamps

No. of Lamps	Input Volts	Lamp Starting Method	Ballast Family	Catalog Number	Max/Min		Full Light Output		Min. Starting Temp. (°F/°C)	Dim.	Wiring Dia.
					Input Power ANSI (Watts)	Ballast Factor	THD %	Line Current (Amps)			
F17T8, FBO16T8 (17W)											
1	120	PS	Mark 10 *Powerline*	REZ-132-SC	24/7	1.05/0.05	10	0.20	50/10	B	152
	277			VEZ-132-SC				0.09			
2	120			REZ-2S32-SC	38/13			0.32			153
	277			VEZ-2S32-SC				0.14			
3	120			REZ-3S32-SC	56/18			0.47			155
	277			VEZ-3S32-SC				0.21			
F25T8, FBO24T8 (25W)											
1	120	PS	Mark 10 *Powerline*	REZ-132-SC	30/7	1.05/0.05	10	0.26	50/10	B	152
	277			VEZ-132-SC				0.11			
2	120			REZ-2S32-SC	55/13			0.46			153
	277			VEZ-2S32-SC				0.20			
3	120			REZ-3S32-SC	79/19			0.66			155
	277			VEZ-3S32-SC				0.29			
F32T8, FBO31T8, F32T8/U6 (32W)											
1	120	PS	Mark 10 *Powerline*	REZ-132-SC	35/9	1.00/0.05	10	0.29	50/10	B	152
	277			VEZ-132-SC				0.13			
2	120			REZ-2S32-SC	68/15			0.57			153
	277			VEZ-2S32-SC				0.25			
3	120			REZ-3S32-SC	102/20			0.86			155
	277			VEZ-3S32-SC				0.37			

For ballast dimensions and wiring diagrams see page 5

HIGH FREQUENCY ELECTRONIC BALLASTS

For 24 - 55W T5/HO Lamps

No. of Lamps	Input Volts	Lamp Starting Method	Ballast Family	Catalog Number	Max/Min		Full Light Output		Min. Starting Temp. (°F/°C)	Dim.	Wiring Dia.
					Input Power ANSI (Watts)	Ballast Factor	THD %	Line Current (Amps)			
F24T5/HO (24W)											
2	120-277 IntelliVolt	PS	Mark 10 Powerline	IEZ-2S24-D	57/16	1.00/0.05	10	0.48-0.21	50/10	D	153
F54T5/HO (54W)											
1	120	PS	Mark 10 Powerline	REZ-154	63/13	1.00/0.03	10	0.53	50/10	D	152
	277			VEZ-154				0.23			
2	120			REZ-2S54	125/24			1.05			153
	277			VEZ-2S54				0.45			
FC12T5/HO (55W)											
1	120	PS	Mark 10 Powerline	REZ-154	59/13	0.90/0.03	10	0.50	50/10	D	152
	277			VEZ-154				0.22			
2	120			REZ-2S54	114/24			0.96			153
	277			VEZ-2S54				0.42			

For ballast dimensions and wiring diagrams see page 5

For 18 - 70W T4 Lamps

No. of Lamps	Input Volts	Lamp Starting Method	Ballast Family	Catalog Number	Max/Min Input Power ANSI (Watts)	Max/Min Ballast Factor	Full Light Output THD %	Full Light Output Line Current (Amps)	Min. Starting Temp. (°F/°C)	Dim.	Wiring Dia.
CFQ18W/G24q - 18W CFL Quad Tube Lamp (PL-C18W/4P, F18DBX/4P, CF18DD/E) CFTR18W/GX24q - 18W CFL Triple Tube Lamp (PL-T18W, F18TBX/4P, CF18DT/E)											
1	120	PS	Mark 10 Powerline	REZ-1Q18-M2-BS REZ-1Q18-M2-LD	22/7	1.00/0.05	10	0.18	50/10	Size 2	134
	277			VEZ-1Q18-M2-BS VEZ-1Q18-M2-LD				0.07			
2	120			REZ-2Q18-M2-BS REZ-2Q18-M2-LD	43/14			0.36			132
	277			VEZ-2Q18-M2-BS VEZ-2Q18-M2-LD				0.16			
CFQ26W/G24q - 26W CFL Quad Tube Lamp (PL-C26W/4P, F26DBX/4P, CF26DD/E) CFTR26W/GX24q - 26W CFL Triple Tube Lamp (PL-T26W, F26TBX/4P, CF26DT/E)											
1	120	PS	Mark 10 Powerline	REZ-1T42-M2-BS REZ-1T42-M2-LD **REZ-1T42-M2-LD-K** ⓾	31/8	1.00/0.05	10	0.26	50/10	Size 2	134
	277			VEZ-1T42-M2-BS VEZ-1T42-M2-LD **VEZ-1T42-M2-LD-K** ⓾				0.11			
2	120			REZ-2Q26-M2-BS REZ-2Q26-M2-LD **REZ-2Q26-M2-LD-K** ⓾	58/16			0.48			132
	277			VEZ-2Q26-M2-BS VEZ-2Q26-M2-LD **VEZ-2Q26-M2-LD-K** ⓾				0.21			
CFTR32W/GX24q - 32W CFL Triple Tube Lamp (PL-T32W, F32TBX/4P, CF32DT/E)											
1	120	PS	Mark 10 Powerline	REZ-1T42-M2-BS REZ-1T42-M2-LD **REZ-1T42-M2-LD-K** ⓾	38/9	1.00/0.05	10	0.32	50/10	Size 2	134
	277			VEZ-1T42-M2-BS VEZ-1T42-M2-LD **VEZ-1T42-M2-LD-K** ⓾				0.14			
2	120			REZ-2T42-M3-BS REZ-2T42-M3-LD	76/20			0.64		Size 3	132
	277			VEZ-2T42-M3-BS VEZ-2T42-M3-LD				0.28			
CFTR42W/GX24q - 42W CFL Triple Tube Lamp (PL-T42W, F42TBX/4P, CF42DT/E)											
1	120	PS	Mark 10 Powerline	REZ-1T42-M2-BS REZ-1T42-M2-LD **REZ-1T42-M2-LD-K** ⓾	49/10	1.00/0.05	10	0.41	50/10	Size 2	134
	277			VEZ-1T42-M2-BS VEZ-1T42-M2-LD **VEZ-1T42-M2-LD-K** ⓾				0.18			
2	120			REZ-2T42-M3-BS REZ-2T42-M3-LD	98/20			0.82		Size 3	132
	277			VEZ-2T42-M3-BS VEZ-2T42-M3-LD				0.36			
CFTR57W/GX24q - 57W CFL Triple Tube Lamp (PL-T57W, F57QBX/4P, CF57DT/E)											
1	120	PS	Mark 10 Powerline	REZ-2T42-M3-BS REZ-2T42-M3-LD	66/18	1.00/0.05	10	0.55	50/10	Size 3	134
	277			VEZ-2T42-M3-BS VEZ-2T42-M3-LD				0.24			
CFTR70W/GX24q - 70W CFL Triple Tube Lamp (F70QBX/4P, CF70DT/E)											
1	120	PS	Mark 10 Powerline	REZ-2T42-M3-BS REZ-2T42-M3-LD	80/18	1.00/0.05	10	0.67	50/10	Size 3	134
	277			VEZ-2T42-M3-BS VEZ-2T42-M3-LD				0.29			

Note: ⓾ **Replacement/Retrofit Ballast Kits** indicated by **Bold Type** with suffix **-K** are available to distributors. Refer to page1-24 for details.

Some lamp manufacturers recommend burning in new lamps 100 hours at full light output before dimming. Consult lamp manufacturer.
Ballasts utilizing poke-in connectors can accept wire gauges from AWG 16 - 20.

For ballast dimensions and wiring diagrams see page 5

HIGH FREQUENCY ELECTRONIC BALLASTS

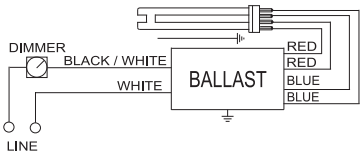
For 24 - 55W FT5 Lamps

No. of Lamps	Input Volts	Lamp Starting Method	Ballast Family	Catalog Number	Max/Min		Full Light Output		Min. Starting Temp. (F/C)	Dim.	Wiring Dia.
					Input Power ANSI (Watts)	Ballast Factor	THD %	Line Current (Amps)			
FT24W/2G11 - 24/27WW Long Twin Tube Lamp (PL-L24W, F27BX/RS, FT24DL)											
2	120-277 IntelliVolt	PS	Mark 10 Powerline	IEZ-2S24-D	57/16	1.00/0.05	10	0.48-0.21	50/10	D	132
FT36W/2G11 - 36/39W Long Twin Tube Lamp (PL-L36W, F39BX/RS, FT36DL)											
1	120	PS	Mark 10 Powerline	REZ-1TTS40-SC	38/9	1.00/0.05	10	0.32	50/10	B	134
	277			VEZ-1TTS40-SC				0.14			
2	120			REZ-2TTS40-SC	75/16			0.64			132
	277			VEZ-2TTS40-SC				0.27			
FT40W/2G11/RS - 40W Long Twin Tube Lamp (PL-L40W, F40BX, FT40DL/RS)											
1	120	PS	Mark 10 Powerline	REZ-1TTS40-SC	41/10	1.00/0.05	10	0.32	50/10	B	134
	277			VEZ-1TTS40-SC				0.15			
2	120			REZ-2TTS40-SC	80/17			0.68			132
	277			VEZ-2TTS40-SC				0.30			
FT55W/2G11 - 55W Long Twin Tube Lamp (PL-L55W, F55BX, FT55DL)											
1	120	PS	Mark 10 Powerline	REZ-154	59/13	0.90/0.05	10	0.50	50/10	D	134
	277			VEZ-154				0.22			
2	120			REZ-2S54	114/24			0.96			132
	277			VEZ-2S54				0.42			

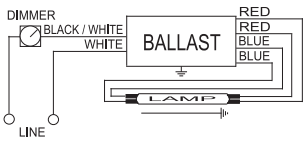
Burn in new lamps 100 hours at full light before dimming.
Ballasts utilizing poke-in connectors can accept wire gauge AWG 16-20.

For ballast dimensions and wiring diagrams see page 5

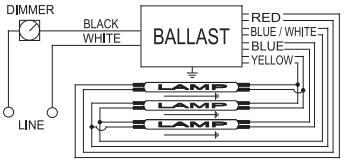
1-Lamp FT40W Ballast - Fig. 134



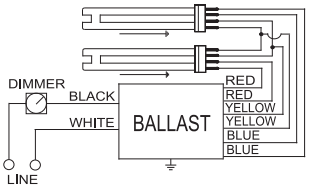
1-Lamp T8 Ballast - Fig. 152



3-Lamp T8 Ballast - Fig. 155



2-Lamp FT40W Ballast - Fig. 132



2-Lamp T8 Ballast - Fig. 153

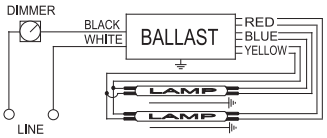
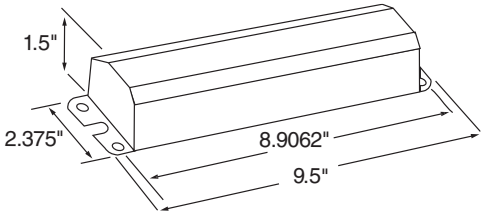
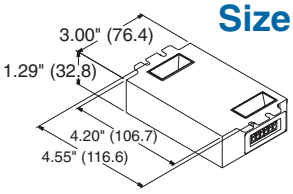


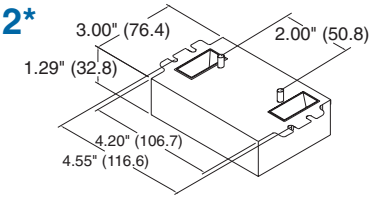
Fig. A



Size 2*

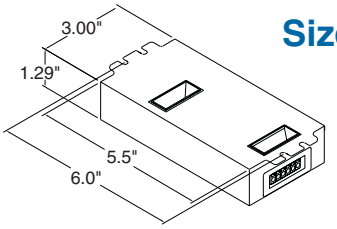


-LD

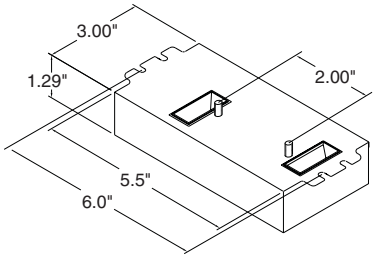


-BS

Size 3*



-LD
Dual Connector for Input Only



-BS

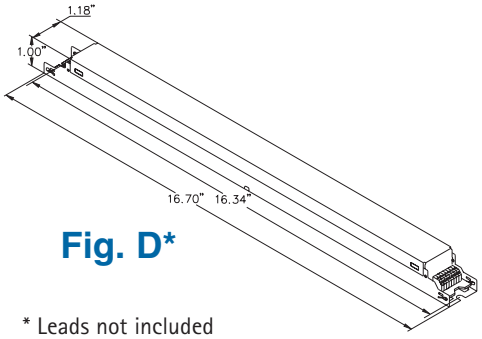
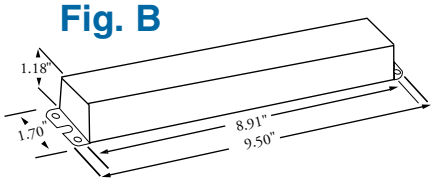


Fig. D*

* Leads not included

Fig. B



NOTE: 1. One and Two-lamp ballasts may be remote mounted up to six feet away from lamps. Three lamp ballasts may not be remote mounted.
2. 1 5/8" and 6" U-bend lamps also acceptable.
3. Lamps must be mounted within 3/4" of a ground plane.

BALLAST SPECIFICATIONS

Mark 10® Powerline

Section I - Physical Characteristics

1.1 Ballast shall be physically interchangeable with standard electromagnetic or standard electronic ballasts, where applicable.

1.2 Ballast shall be available in a plastic/metal can or all metal can construction to meet all plenum requirements.

1.3 Ballast shall be provided with poke-in wire trap connectors or integral leads color coded per ANSI C82.11.

Section II - Performance Requirements

2.1 Ballast shall be Programmed Start.

2.2 Ballast shall contain auto restart circuitry in order to restart lamps without resetting power.

2.3 Ballast shall operate from 60 Hz input source of 120V, 277V or 347V as applicable with sustained variations of +/- 10% (voltage and frequency) with no damage to the ballast.

2.4 Ballast shall be high frequency electronic type and operate lamps at a frequency above 42 kHz to avoid interference with infrared devices and eliminate visible flicker.

2.5 Ballast shall have a Power Factor greater than 0.98 at full light output and greater than 0.90 throughout the dimming range for primary lamp.

2.6 Ballast shall have a minimum ballast factor of 1.00 at maximum light output and 0.05 at minimum light output for primary lamp.

2.7 Ballast shall provide for a Lamp Current Crest Factor of 1.7 or less throughout the dimming range in accordance with lamp manufacturer recommendations.

2.8 Ballast input current shall have Total Harmonic Distortion (THD) of less than 10% at maximum light output when operated at nominal line voltage with primary lamp. Total Harmonic Current (THC) at minimum light output shall not exceed THC at maximum light output.

2.9 Ballast shall have a Class A sound rating.

2.10 Ballast shall have a minimum starting temperature of 10C (50F) for primary lamp.

2.11 Ballast shall provide Lamp EOL Protection Circuit for all T5, T5/HO, and CFL lamps.

2.12 Ballast shall control lamp light output from 100% - 5% relative light output for T8 and CFL lamps and 100% - 1% relative light output for T5/HO lamps.

2.13 Ballast shall ignite the lamps at any light output setting without first going to another output setting.

2.14 Ballast shall tolerate sustained open circuit and short circuit output conditions without damage.

Section III - Regulatory Requirements

3.1 Ballast shall not contain any Polychlorinated Biphenyl (PCB).

3.2 Ballast shall be Underwriters Laboratories (UL) listed, Class P and Type 1 Outdoor; and Canadian Standards Association (CSA) certified where applicable.

3.3 Ballast shall comply with ANSI C62.41 Category A for Transient protection.

3.4 Ballast shall comply with ANSI C82.11 where applicable.

3.5 Ballast shall comply with the requirements of the Federal Communications Commission (FCC) rules and regulations, Title 47 CFR part 18, Non-Consumer (Class A) for EMI/RFI (conducted and radiated).

Section IV - Other

4.1 Ballast shall be manufactured in a factory certified to ISO 9002 Quality System Standards.

4.2 Ballast shall carry a _____warranty from date of manufacture against defects in material or workmanship for operation at a maximum case temperature of _____ (Go to our web site for up-to-date warranty information: www.advancetransformer.com/warranty).

4.3 Manufacturer shall have a fifteen year history of producing electronic ballasts for the North American market.

4.4 Ballast shall be controlled by a compatible Mark 10 Powerline two-wire dimmer.

4.5 Ballast shall be Advance part # _____ or approved equal.

ADVANCE
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Form No. EL-2020-R03 3/08