



## As easy as 1, 2, 3...

Philips Advance Mark 10<sup>®</sup> *Powerline* dimmable ballasts make converting your existing fixtures easy.

For companies looking to make their fixed-output linear T8, 4-pin CFL, and T5/HO fluorescent systems more cost effective and sustainable, Mark 10 *Powerline* ballasts provide an easy solution without the need for additional control leads. Simply, replace the ballast, replace the switch, dim the lights, that is all it takes.

It's that easy to bring the convenience and flexibility of fluorescent dimming to conference rooms, private offices, auditoriums, architectural cove lighting — anywhere dimming is required.

The flexibility provided by Mark 10 *Powerline* ballasts includes the freedom to choose controls from a wide variety of manufacturers. For a complete list of compatible controls, visit [www.philips.com/advance](http://www.philips.com/advance).

The Mark 10 *Powerline* ballasts programmed start design optimizes lamp life in frequent starting conditions as well as dimming performance by monitoring system performance and making continuous adjustments. The ballast will start lamps at the minimum dimming level. Plus the Mark 10 *Powerline* does not have to ramp up to full light output and then dim.

**Available in linear fluorescent and 4-pin compact fluorescent models**

- Making this ideal for a variety of applications

**Full range continuous dimming (100% light output down to 5% - T5/HO to 1%)**

- Provides task appropriate comfort only where necessary to increase potential energy savings while supporting LEED performance standards

**Programmed start operation**

- Potentially extends lamp life in frequent switching applications such as occupancy sensors and daylight harvesting

**PHILIPS  
ADVANCE**

## For 13 - 70W T4 Lamps

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

## For 13 - 70W T4 Lamps (Continued)

No. of Lamps	Input Volts	Starting Method	Ballast Family	Catalog Number	Max/Min		Full Light Output		Min. Starting Temp (F/C)	Dim.	Wiring Diagram
					Input Power ANSI (Watts)	Ballast Factor	THD %	Line Current (Amps)			
<b>CFTR57W/GX24q - 57W CFL Triple Tube Lamp (PL-T57W, F57QBX/4P, CF57DT/E)</b>											
1	120	PS	Mark 10 Powerline	REZ-2T42-M3-BS	66/18	1.00/0.05	10	0.55	50/10	Size 3	134
				REZ-2T42-M3-LD							
	VEZ-2T42-M3-BS			0.24							
	VEZ-2T42-M3-LD										
<b>CFTR70W/GX24q - 70W CFL Triple Tube Lamp (F70QBX/4P, CF70DT/E)</b>											
1	120	PS	Mark 10 Powerline	REZ-2T42-M3-BS	80/18	1.00/0.05	10	0.67	50/10	Size 3	134
				REZ-2T42-M3-LD							
	VEZ-2T42-M3-BS			0.29							
	VEZ-2T42-M3-LD										

Note: Replacement/Retrofit Ballast Kits indicated by Bold Type with suffix -K are available to distributors. Refer to page I-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 24 - 55W FT5 Lamps

No. of Lamps	Input Volts	Starting Method	Ballast Family	Catalog Number	Max/Min		Full Light Output		Min. Starting Temp (F/C)	Dim.	Wiring Diagram
					Input Power ANSI (Watts)	Ballast Factor	THD %	Line Current (Amps)			
<b>FT24W/2G11 - 24/27WW Long Twin Tube Lamp (PL-L24W, F27BX/RS, FT24DL)</b>											
2	120-277	PS	Mark 10 Powerline	IEZ-2S24-D	57/16	1.00/0.05	10	0.48-0.21	50/10	D	132
<b>FT36W/2G11 - 36/39W Long Twin Tube Lamp (PL-L36W, F39BX/RS, FT36DL)</b>											
1	120	PS	Mark 10 Powerline	REZ-1TTS40-SC	38/9	1.00/0.05	10	0.32	50/10	B	134
				VEZ-1TTS40-SC				0.14			
2	277	PS	Mark 10 Powerline	REZ-2TTS40-SC	75/16	1.00/0.05	10	0.64	50/10	B	132
				VEZ-2TTS40-SC				0.27			
<b>FT40W/2G11/RS - 40W Long Twin Tube Lamp (PL-L40W, F40BX, FT40DL/RS)</b>											
1	120	PS	Mark 10 Powerline	REZ-1TTS40-SC	41/10	1.00/0.05	10	0.32	50/10	B	134
				VEZ-1TTS40-SC				0.15			
2	277	PS	Mark 10 Powerline	REZ-2TTS40-SC	80/17	1.00/0.05	10	0.68	50/10	B	132
				VEZ-2TTS40-SC				0.30			
<b>FT55W/2G11 - 55W Long Twin Tube Lamp (PL-L55W, F55BX, FT55DL)</b>											
1	120	PS	Mark 10 Powerline	REZ-154	59/13	0.90/0.05	10	0.50	50/10	D	134
				VEZ-154				0.22			
2	277	PS	Mark 10 Powerline	REZ-2S54	114/24	0.90/0.05	10	0.96	50/10	D	132
				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 24 - 54W T5/HO Lamps

No. of Lamps	Input Volts	Starting Method	Ballast Family	Catalog Number	Max/Min		Full Light Output		Min. Starting Temp (F/C)	Dim.	Wiring Diagram
					Input Power ANSI (Watts)	Ballast Factor	THD %	Line Current (Amps)			
<b>F24T5/HO (24W)</b>											
2	120-277	PS	Mark 10 Powerline	IEZ-2S24-D	57/16	1.00/0.05	10	0.48-0.21	50/10	D	153
<b>F54T5/HO/ES (49W)</b>											
1	120	PS	Mark 10 Powerline	REZ-154	59/13	1.00/0.03	10	0.49	50/10	D	152
	277			VEZ-154				0.21			
2	120	PS	Mark 10 Powerline	REZ-2S54	117/24	1.00/0.03	10	0.98	50/10	D	153
	277			VEZ-2S54				0.42			
<b>F54T5/HO (54W)</b>											
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	PS	Mark 10 Powerline	REZ-2S54	125/24	1.00/0.03	10	1.05	50/10	D	153
	277			VEZ-2S54				0.45			
<b>FC12T5/HO (55W)</b>											
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	PS	Mark 10 Powerline	REZ-2S54	114/24	0.90/0.03	10	0.96	50/10	D	153
	277			VEZ-2S54				0.42			

Ballasts utilizing poke-in connectors can accept wire gauge AWG 16-20.

Some lamp manufacturers recommend burning in new lamps 100 hours at full light output prior to dimming. Consult lamp manufacturer.

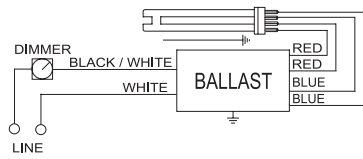
## For 17 - 32W T8 Lamps

No. of Lamps	Input Volts	Starting Method	Ballast Family	Catalog Number	Max/Min		Full Light Output		Min. Starting Temp (F/C)	Dim.	Wiring Diagram
					Input Power ANSI (Watts)	Ballast Factor	THD %	Line Current (Amps)			
<b>F17T8, FBO16T8 (17W)</b>											
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	PS	Mark 10 Powerline	REZ-2S32-SC	38/13	1.05/0.05	10	0.32	50/10	B	153
	277			VEZ-2S32-SC				0.14			
3	120	PS	Mark 10 Powerline	REZ-3S32-SC	56/18	1.05/0.05	10	0.47	50/10	B	155
	277			VEZ-3S32-SC				0.21			
<b>F25T8, FBO24T8 (3' 25W)</b>											
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	PS	Mark 10 Powerline	REZ-2S32-SC	55/13	1.05/0.05	10	0.46	50/10	B	153
	277			VEZ-2S32-SC				0.20			
3	120	PS	Mark 10 Powerline	REZ-3S32-SC	79/19	1.05/0.05	10	0.66	50/10	B	155
	277			VEZ-3S32-SC				0.29			
<b>F32T8, FBO31T8, F32T8/U6 (32W)</b>											
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	PS	Mark 10 Powerline	REZ-2S32-SC	68/15	1.00/0.05	10	0.57	50/10	B	153
	277			VEZ-2S32-SC				0.25			
3	120	PS	Mark 10 Powerline	REZ-3S32-SC	100/20	1.00/0.05	10	0.84	50/10	B	155
	277			VEZ-3S32-SC				0.36			

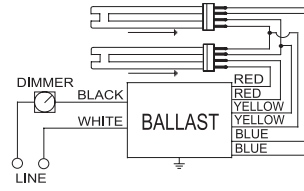
Ballasts utilizing poke-in connectors can accept wire gauge AWG 16-20.

Some lamp manufacturers recommend burning in new lamps 100 hours at full light output prior to dimming. Consult lamp manufacturer.

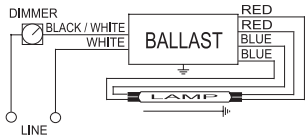
# Wiring Diagrams



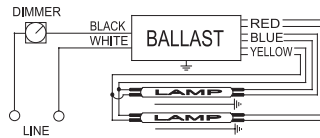
1-Lamp FT40W Ballast - Fig. 134



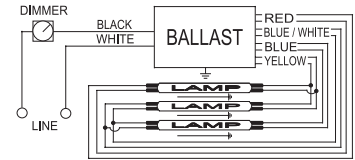
2-Lamp FT40W Ballast - Fig. 132



1-Lamp T8 Ballast - Fig. 152



2-Lamp T8 Ballast - Fig. 153



3-Lamp T8 Ballast - Fig. 155

# Dimensions

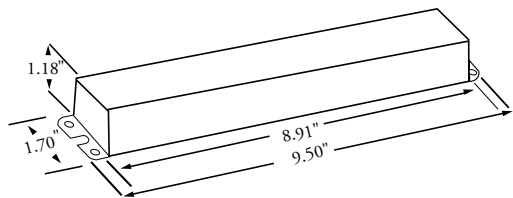


Fig. B

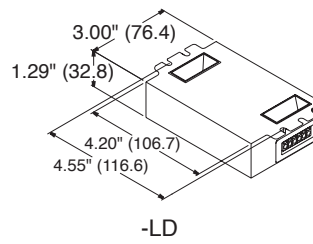


Fig. Size 2

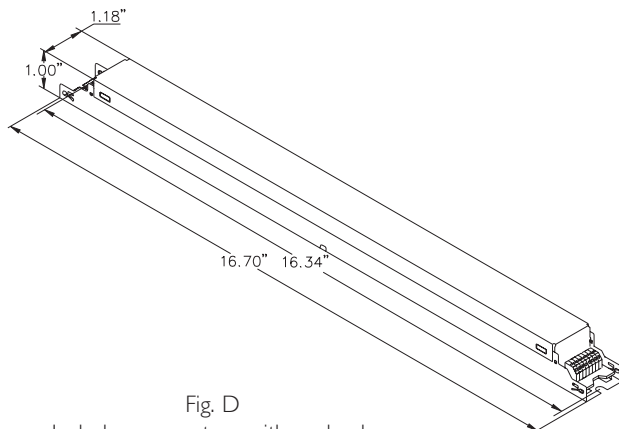
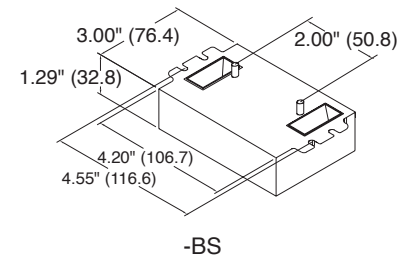


Fig. D  
Includes connectors with no leads

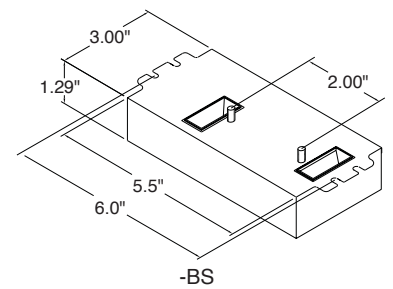
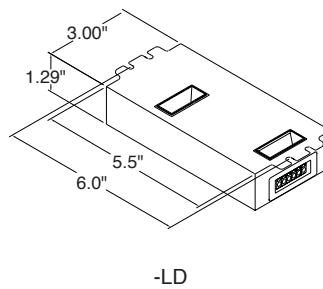


Fig. Size 3  
Dual Connector for Input Only

# Ballast Specification

## 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 I 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.philips.com/advancewarranty](http://www.philips.com/advancewarranty)).
- 4.3 Manufacturer shall have a twenty 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 Philips Advance part # \_\_\_\_\_ or approved equal.

