Appendix B

Ballast Cut-sheets

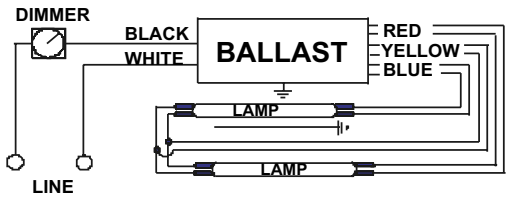
VEZ-2S32-SC

Brand Name	MARK X POWERLINE
Ballast Type	Electronic Dimming
Starting Method	Programmed Start
Lamp Connection	Series
Input Voltage	277
Input Frequency	50/60 HZ
Status	Active

Electrical Specifications

Lamp Type	Num. of Lamps	Rated Lamp Watts	Min. Start Temp (°F/C)	Input Current (Amps)	Input Power (Watts) (min/max)	Ballast Factor (min/max)	MAX THD %	Power Factor	Lamp Current Crest Factor	B.E.F.
F17T8	2	17	50/10	0.14	13/38	0.05/1.05	10	0.99	1.6	2.76
F25T8	2	25	50/10	0.20	13/55	0.05/1.05	10	0.99	1.6	1.91
* F32T8	2	32	50/10	0.25	15/68	0.05/1.00	10	0.99	1.6	1.47

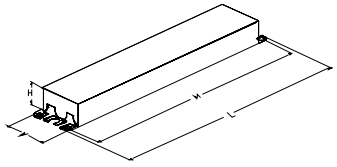
Wiring Diagram



The wiring diagram that appears above is for the lamp type denoted by the asterisk (*)

Standard Lead Length (inches)

Enclosure



Enclosure Dimensions

OverAll (L)	Width (W)	Height (H)	Mounting (M)
9.50 "	1.7 "	1.18 "	8.90 "
9 1/2	1 7/10	1 9/50	8 9/10
24.1 cm	4.3 cm	3 cm	22.6 cm

Revised 10/28/2005

Data is based upon tests performed by Advance Transformer in a controlled environment and representative of relative performance. Actual performance can vary depending on operating conditions. Specifications are subject to change without notice. All specifications are nominal unless otherwise noted.

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Corporate Offices: Phone: 800-322-2086

Advance #		**BAL1**
Brian Smith	**UCSD Cal IT2 - Ballasts**	**# of #**

C2642UNV*xxx*

APPLICATION and PERFORMANCE SPECIFICATION

Description: Electronic compact fluorescent ballast(s) for (1) CFM42W/GX24q or (1) CFTR32W/GX24q or (2/1) CFQ/TR26W/GX24q or (1) FT24/27W/2G11 or (1) CFS28W/GR10q (2D) 4-pin lamps or (1) FC9T5-22W or (1) FC12T5-40W or (1) CFS38W/GR10q or (1) CFM36W/2G10

- Line Voltage: 120vac to 277vac, ±10%, 50-60Hz
- High Power Factor
- Programmed Rapid Start
- Series Lamp Connection

Model	Line Volts	Lamp Type	Lamp #	Input Watts*	Nominal Line Amps	Ballast Factor	Power Factor	THD	Crest Factor
C2642UNV	120	CFQ/TR26W	2	56	0.47	.98	> 0.98	< 10%	<1.5
	277	CFQ/TR26W	2	56	0.21	.98	> 0.98	< 10%	<1.5
C2642UNV	120	CFQ/TR26W	1	28	0.25	1.02	> 0.98	< 10%	<1.5
	277	CFQ/TR26W	1	28	0.11	1.02	> 0.98	< 10%	<1.5
C2642UNV	120	CFM42W	1	48	0.41	.98	> 0.98	< 10%	<1.5
	277	CFM42W	1	48	0.18	.98	> 0.98	< 10%	<1.5
C2642UNV	120	CFTR32W	1	36	0.30	1.00	> 0.98	< 10%	<1.5
	277	CFTR32W	1	36	0.13	1.00	> 0.98	< 10%	<1.5
C2642UNV	120	FT24/27W/2G11	1	30	0.26	.90	> 0.95	< 10%	<1.6
	277	FT24/27W/2G11	1	30	0.11	.90	> 0.95	< 10%	<1.6
C2642UNV	120	CFS28W/GR10q	1	31	0.27	.95	> 0.95	< 10%	<1.6
	277	CFS28W/GR10q	1	31	0.12	.95	> 0.95	< 10%	<1.6
C2642UNV	120	FC9T5-22W	1	25	0.21	1.00	> 0.98	< 10%	<1.5
	277	FC9T5-22W	1	25	0.10	1.00	> 0.98	< 10%	<1.5
C2642UNV	120	FC12T5-40W	1	42	0.35	.98	> 0.98	< 10%	<1.5
	277	FC12T5-40W	1	42	0.16	.98	> 0.98	< 10%	<1.5
C2642UNV	120	CFS38W/GR10q	1	33	0.27	.80	> 0.95	< 10%	<1.6
	277	CFS38W/GR10q	1	33	0.12	.80	> 0.95	< 10%	<1.6
C2642UNV	120	CFM36W/2G10	1	32	0.27	.98	> 0.98	< 10%	<1.7
	277	CFM36W/2G10	1	32	0.12	.98	> 0.98	< 10%	<1.7

* ANSI measured wattage; 25°C ambient; benchtop; lamps base up

Application and Performance Specification Information Subject to Change without Notification.

Performance:
- Meets ANSI Standard C82.11
- Meets FCC Part 18 (Non-Consumer), Limits for EMI/RFI
- Operating Frequency Range: Above 60 kHz
- **Auto-Reset Shutdown Circuit** per NEMA Recommendations
  - Both lamps should be replaced at end of life
  - Lamp relights upon insertion in socket
- Suitable for use in air handling spaces when NEC wiring guidelines are followed
- ME version: Input Terminals L N G intended for one supply connection only

Safety:
- No PCB's
- UL listed (Class P) Type 1 Outdoor, Type CC, Type HL
- CSA Certified

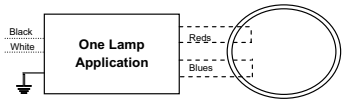
Application:
- Minimum Starting Temperature: 0° F, -18° C
- Maximum Case Temperature (@ t_c): 167° F, 75° C
- Sound Rated: A
- Lead configuration:
  - ***xxx =*** SE - Side Exit (Also available with socket)
  - *or* BE - Bottom Exit
  - *or* BES - Bottom Exit with Studs (2" on center)
  - *or* ME - Multi-Exit Replacement Kit for Distribution
- Remote Mounting 12 feet
- Also operates on 125VDC input, (+)L (-)N

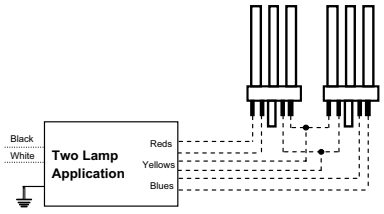
Physical Parameters

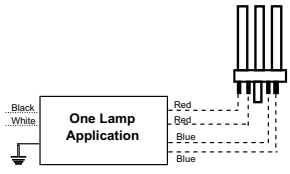
Overall Length:	4.94"
Width:	2.31"
Mounting:	4.61"
Height:	1.00"
Weight:	0.57 lbs
Qty/Carton:	20
Color:	SE-White
	BE/BES-Black
	ME-White
Can Material:	Metal

Warranty:
Universal Lighting Technologies warrants to the purchaser that each electronic ballast will be free from defects in material or workmanship for a period of 5 years from date of manufacture when properly installed and under normal conditions of use. Call **1-800-BALLASTx800** for technical assistance.

- Manufactured in North America
- Ballast has plug in wire trap connectors.
- Use 18 AWG solid copper wire, stripped to 3/8".
- Ballast must be grounded in accordance with national and local electrical codes.







Universal #		**BAL2**
Brian Smith	**UCSD Cal IT2 - Ballasts**	**# of #**

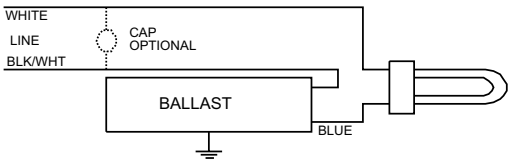
VL-1B13-TP-BLS

Brand Name	COMPACT-NPF
Ballast Type	Magnetic
Starting Method	Pre-Heat
Lamp Connection	Series
Input Voltage	277
Input Frequency	60 HZ
Status	Active

Electrical Specifications

Lamp Type	Num. of Lamps	Rated Lamp Watts	Min. Start Temp (°F/C)	Input Current (Amps)	Starting Current (Amps)	Open Circuit (Amps)	Input Power (Watts)	Ballast Factor	MAX THD %	Power Factor
CFQ13W/GX23	1	13	0/-18	0.24	0.28	0.00	24	0.98	10	0.36
* CFT13W/GX23	1	13	0/-18	0.26	0.28	0.00	20	0.98	15	0.28

Wiring Diagram



Diag. 45

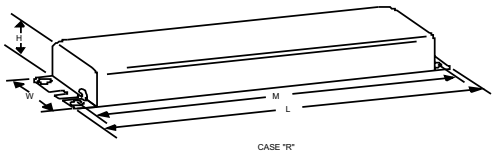
The wiring diagram that appears above is for the lamp type denoted by the asterisk (*)

Standard Lead Length (inches)

	in.	cm.
Black		0
White		0
Blue	7	17.8
Red		0
Yellow		0
Gray		0
Violet		0

	in.	cm.
Yellow/Blue		0
Blue/White		0
Brown		0
Orange		0
Orange/Black		0
Black/White	7	17.8
Red/White		0

Enclosure



Enclosure Dimensions

OverAll (L)	Width (std)/(TP)	Height (H)	Mounting (M)
4.75 "	2.21875 "/0 "	1.625 "	4.375 "
4 3/4	2 7/32 / 0	1 5/8	4 3/8
12.1 cm	5.6 cm / 0 cm	4.1 cm	11.1 cm

Revised 07/01/1999

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Advance #		**BAL3**
Brian Smith	**UCSD Cal IT2 - Ballasts**	**# of #**

Hi-lume Overview

Hi-lume architectural electronic dimming ballasts are designed to meet the most demanding lighting requirements. By providing industry-leading performance with true full-range 100% to 1% fluorescent dimming, Hi-lume ballasts enable you to provide the ideal visual environment for any application.

Hi-lume, case type A
3.00"w (76mm) x 1.00"h (25mm) x 4.90"l (124mm)

Hi-lume, case type C
1.18"w (30mm) x 1.00"h (25mm) x 18.00"l (457mm)

Hi-lume, case type F
2.38"w (60mm) x 1.50"h (38mm) x 9.50"l (241mm)

Features

- Continuous, flicker-free dimming from 100% to 1%
- Standard 3-wire line-voltage phase-control technology for consistent fixture-to-fixture dimming performance
- Models available for T4 triple-tube compact, T5-HO linear, and T8 lamps
- Programmed rapid start design preheats lamp cathodes before applying full arc voltage
- Lamps turn on to any dimmed level without flashing to full brightness
- Low harmonic distortion throughout the entire dimming range maintains power quality
- Frequency of operation ensures that ballast does not interfere with infrared devices operating between 38 and 42 kHz
- Inrush current limiting circuitry eliminates circuit breaker tripping, switch arcing, and relay failure
- End-of-lamp-life protection circuitry (for T4 and T5-HO models) ensures safe operation throughout entire lamp life cycle
- For linear lamps, ballasts maintain consistent light output for different lamp lengths, ensuring fixture uniformity
- Ultra-quiet operation
- Protected from miswires of any input power to control lead, or from lamp leads to each other and/or ground
- 100% compatible with all Lutron 3-wire fluorescent controls
- 100% performance tested at factory
- Designed and assembled in the USA
- 5-year limited warranty with Lutron field service commissioning (3-year standard warranty) from date of purchase

LUTRON® SPECIFICATION SUBMITTAL Page

Job Name:	Model Numbers:
Job Number:	

Lutron #		BAL4
Brian Smith	**UCSD Cal IT2 - Ballasts**	**# of #**

Specifications

Performance

- Dimming Range: 100% to 1% measured relative light output (RLO)
- Lamp Starting: programmed rapid start
- Minimum Lamp Starting Temperature: 10°C (50°F)
- Ambient Temperature Operating Range: 10°C (50°F) to 60°C (140°F)
- Relative Humidity: maximum 90% non-condensing
- Operating Voltage: 120V or 277V at 60Hz
- Lamp Current Crest Factor: less than 1.7
- Lamp Flicker: none visible
- Light Output Variation: constant ±2% light output for line voltage variations of ±10%
- Lamp Life: average lamp life meets or exceeds rating of lamp manufacturer
- Ballast Factor: greater than .85 for T8 lamps, greater than .95 for T4 lamps, equal to 1.0 for T5-HO lamps
- Power Factor: greater than .95
- Total Harmonic Distortion (THD): less than 10%
- Maximum Inrush Current: 7 amps per ballast at 120V, 3 amps per ballast at 277V
- Sound Rating: Inaudible in a 27dBa ambient
- Maximum Ballast Case Temperature: 75°C (167°F)

Standards

- UL Listed (evaluated to the requirements of UL935)
- CSA certified (evaluated to the requirements of C22.2 No. 74)
- Class P thermally protected
- Meets ANSI C82.11 High Frequency Ballast Standard
- Meets FCC Part 18 Non-Consumer requirements for EMI/RFI emissions
- T4 and T5-HO ballasts are MIL Std. 461E compliant (meets the requirements of CE101, RE101 and RE102)
- Meets ANSI C62.41 Category A surge protection standards up to and including 6kV
- Manufacturing facilities employ ESD reduction practices that comply with the requirements of ANSI/ESD S20.20
- Lutron Quality Systems registered to ISO 9001.2000

LUTRON® SPECIFICATION SUBMITTAL Page

Job Name:	Model Numbers:
Job Number:	

Lutron #		BAL4
Brian Smith	**UCSD Cal IT2 - Ballasts**	**# of #**

Hi-lume Ballast Models

Lamp Type	Lamp Watts (length)	Lamps per ballast	Case Type	120 VOLTS Ballast Current (amps)	120 VOLTS **Hi-lume** Model Number [1]	277 VOLTS Ballast Current (amps)	277 VOLTS **Hi-lume** Model Number [1]
T4 triple-tube 4-pin  1/2" diameter	26W	1	A	.26	HL3-T426-120-1-S	.12	HL3-T426-277-1-S
	32W	1	A	.31	HL3-T432-120-1-S	.13	HL3-T432-277-1-S
T5-HO linear high output  5/8" diameter	24W (21.5")	1 2	C C	.26 .45	FDB-T524-120-1 FDB-T524-120-2	.13 .20	FDB-T524-277-1 FDB-T524-277-2
	39W (33.4")	1 2	C C	.38 .76	FDB-T539-120-1 FDB-T539-120-2	.17 .31	FDB-T539-277-1 FDB-T539-277-2
	54W (45.3")	1 2	C C	.58 1.1	FDB-T554-120-1 FDB-T554-120-2	.25 .45	FDB-T554-277-1 FDB-T554-277-2
T8 linear and U-bent  1" diameter	17W (24")	1 2 3	F F F	.19 .31 .43	FDB-2427-120-1 FDB-2427-120-2 FDB-2427-120-3	.08 .15 .20	FDB-2427-277-1 FDB-2427-277-2 FDB-2427-277-3
	25W (36")	1 2 3	F F F	.24 .43 .62	FDB-3627-120-1 FDB-3627-120-2 FDB-3627-120-3	.12 .19 .28	FDB-3627-277-1 FDB-3627-277-2 FDB-3627-277-3
	32W (48")	1 2 3	F F F	.30 .57 .82	FDB-4827-120-1 FDB-4827-120-2 FDB-4827-120-3	.14 .25 .35	FDB-4827-277-1 FDB-4827-277-2 FDB-4827-277-3
	40W (60")	1 2	F F	.36 .64	FDB-6027-120-1 FDB-6027-120-2	.16 .30	FDB-6027-277-1 FDB-6027-277-2
T12 linear HO (800ma)	85W (72")	1	F	.75	FDB-7280-120-1	- -	- -
 1½" diameter	95W (84")	1	F	.83	FDB-8480-120-1	- -	- -
	110W (96")	1	F	.88	FDB-9680-120-1	- -	- -

[1] Mounting studs standard for T4 ballasts. Delete suffix -S in the model number if mounting studs not needed.

LUTRON® SPECIFICATION SUBMITTAL Page

Job Name:	**Model Numbers:**
Job Number:	

Lutron #		**BAL4**
Brian Smith	**UCSD Cal IT2 - Ballasts**	**# of #**

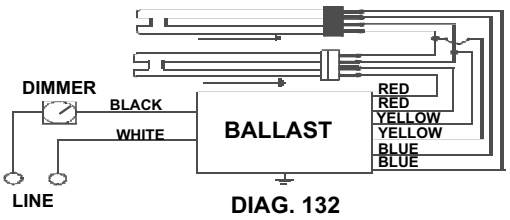
VEZ-2T42-M3-BS

Brand Name	MARK X Powerline
Ballast Type	Electronic Dimming
Starting Method	Programmed Start
Lamp Connection	Series
Input Voltage	277
Input Frequency	60 HZ
Status	Active

Electrical Specifications

Lamp Type	Num. of Lamps	Rated Lamp Watts	Min. Start Temp (°F/C)	Input Current (Amps)	Input Power (Watts)	Ballast Factor	MAX THD %	Power Factor	Lamp Current Crest Factor	B.E.F.
CFTR32W/GX24Q	2	32	50/10	0.28	20	0.05	10	0.98	1.6	0.25
* CFTR42W/GX24Q	2	42	50/10	0.36	20	0.05	10	0.98	1.6	0.25
CFTR57W/GX24Q	1	57	50/10	0.24	18	0.05	10	0.98	1.6	0.28
CFTR70W/GX24Q	1	70	50/10	0.29	18	0.05	10	0.98	1.6	0.28

Wiring Diagram

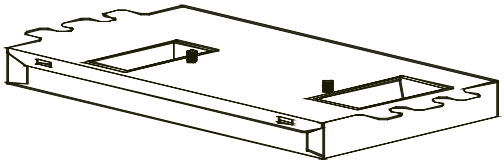


DIAG. 132

The wiring diagram that appears above is for the lamp type denoted by the asterisk (*)

Standard Lead Length (inches)

Enclosure



Enclosure Dimensions

OverAll (L)	Width (W)	Height (H)	Mounting (M)
6.28 "	3.00 "	1.29 "	2.00 "
6 7/25	3	1 29/100	2
16 cm	7.6 cm	3.3 cm	5.1 cm

Revised 09/10/2002

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Advance #		**BAL5**
Brian Smith	**UCSD Cal IT2 - Ballasts**	**# of #**

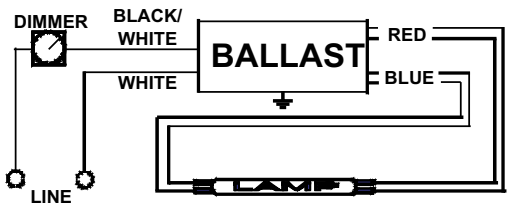
VEZ-132-SC

Brand Name	MARK X POWERLINE
Ballast Type	Electronic Dimming
Starting Method	Programmed Start
Lamp Connection	Series
Input Voltage	277
Input Frequency	50/60 HZ
Status	Active

Electrical Specifications

Lamp Type	Num. of Lamps	Rated Lamp Watts	Min. Start Temp (°F/C)	Input Current (Amps)	Input Power (Watts) (min/max)	Ballast Factor (min/max)	MAX THD %	Power Factor	Lamp Current Crest Factor	B.E.F.
F17T8	1	17	50/10	0.09	07/24	0.05/1.05	10	0.99	1.6	4.38
F25T8	1	25	50/10	0.11	07/30	0.05/1.05	10	0.99	1.6	3.50
* F32T8	1	32	50/10	0.13	09/35	0.05/1.00	10	0.99	1.6	2.86

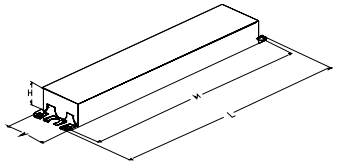
Wiring Diagram



The wiring diagram that appears above is for the lamp type denoted by the asterisk (*)

Standard Lead Length (inches)

Enclosure



Enclosure Dimensions

OverAll (L)	Width (W)	Height (H)	Mounting (M)
9.50 "	1.7 "	1.18 "	8.90 "
9 1/2	1 7/10	1 9/50	8 9/10
24.1 cm	4.3 cm	3 cm	22.6 cm

Revised 10/28/2005

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Corporate Offices: Phone: 800-322-2086

Advance #		**BAL6**
Brian Smith	**UCSD Cal IT2 - Ballasts**	**# of #**

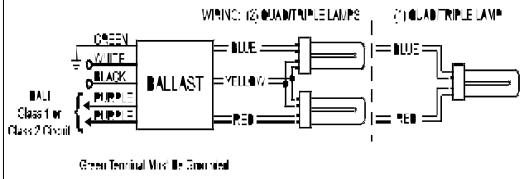
IDL-2S26-M5-BS@277

Brand Name	ROVR
Ballast Type	Electronic Dimming
Starting Method	Programmed Start
Lamp Connection	Series
Input Voltage	120-277
Input Frequency	50/60 HZ
Status	Active

Electrical Specifications

Lamp Type	Num. of Lamps	Rated Lamp Watts	Min. Start Temp (°F/C)	Input Current (Amps)	Input Power (Watts) (min/max)	Ballast Factor (min/max)	MAX THD %	Power Factor	Lamp Current Crest Factor	B.E.F.
* CFQ13W/G24Q	1	13	50/10	0.07	06/18	0.03/1.00	10	0.99	1.6	5.56
CFQ13W/G24Q	2	13	50/10	0.12	09/32	0.03/1.00	10	0.99	1.6	3.13

Wiring Diagram



Diag. 165

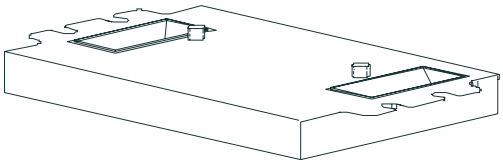
The wiring diagram that appears above is for the lamp type denoted by the asterisk (*)

Standard Lead Length (inches)

	in.	cm.
Black	0	0
White	0	0
Blue	0	0
Red	0	0
Yellow	0	0
Gray		0
Violet		0

	in.	cm.
Yellow/Blue		0
Blue/White		0
Brown		0
Orange		0
Orange/Black		0
Black/White		0
Red/White		0

Enclosure



Enclosure Dimensions

OverAll (L)	Width (W)	Height (H)	Mounting (M)
4.98 "	3.00 "	1.18 "	2.00 "
4 49/50	3	1 9/50	2
12.6 cm	7.6 cm	3 cm	5.1 cm

Revised 12/03/2003

Data is based upon tests performed by Advance Transformer in a controlled environment and representative of relative performance. Actual performance can vary depending on operating conditions. Specifications are subject to change without notice. All specifications are nominal unless otherwise noted.

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Corporate Offices: Phone: 800-322-2086

Advance #		**BAL7**
Brian Smith	**UCSD Cal IT2 - Ballasts**	**# of #**

Hi-lume Overview

Hi-lume architectural electronic dimming ballasts are designed to meet the most demanding lighting requirements. By providing industry-leading performance with true full-range 100% to 1% fluorescent dimming, Hi-lume ballasts enable you to provide the ideal visual environment for any application.

Hi-lume, case type A
3.00"w (76mm) x 1.00"h (25mm) x 4.90"l (124mm)

Hi-lume, case type C
1.18"w (30mm) x 1.00"h (25mm) x 18.00"l (457mm)

Hi-lume, case type F
2.38"w (60mm) x 1.50"h (38mm) x 9.50"l (241mm)

Features

- Continuous, flicker-free dimming from 100% to 1%
- Standard 3-wire line-voltage phase-control technology for consistent fixture-to-fixture dimming performance
- Models available for T4 triple-tube compact, T5-HO linear, and T8 lamps
- Programmed rapid start design preheats lamp cathodes before applying full arc voltage
- Lamps turn on to any dimmed level without flashing to full brightness
- Low harmonic distortion throughout the entire dimming range maintains power quality
- Frequency of operation ensures that ballast does not interfere with infrared devices operating between 38 and 42 kHz
- Inrush current limiting circuitry eliminates circuit breaker tripping, switch arcing, and relay failure
- End-of-lamp-life protection circuitry (for T4 and T5-HO models) ensures safe operation throughout entire lamp life cycle
- For linear lamps, ballasts maintain consistent light output for different lamp lengths, ensuring fixture uniformity
- Ultra-quiet operation
- Protected from miswires of any input power to control lead, or from lamp leads to each other and/or ground
- 100% compatible with all Lutron 3-wire fluorescent controls
- 100% performance tested at factory
- Designed and assembled in the USA
- 5-year limited warranty with Lutron field service commissioning (3-year standard warranty) from date of purchase

LUTRON® SPECIFICATION SUBMITTAL Page

Job Name:	Model Numbers:
Job Number:	

Lutron #		BAL8
Brian Smith	**UCSD Cal IT2 - Ballasts**	**# of #**

Specifications

Performance

- Dimming Range: 100% to 1% measured relative light output (RLO)
- Lamp Starting: programmed rapid start
- Minimum Lamp Starting Temperature: 10°C (50°F)
- Ambient Temperature Operating Range: 10°C (50°F) to 60°C (140°F)
- Relative Humidity: maximum 90% non-condensing
- Operating Voltage: 120V or 277V at 60Hz
- Lamp Current Crest Factor: less than 1.7
- Lamp Flicker: none visible
- Light Output Variation: constant ±2% light output for line voltage variations of ±10%
- Lamp Life: average lamp life meets or exceeds rating of lamp manufacturer
- Ballast Factor: greater than .85 for T8 lamps, greater than .95 for T4 lamps, equal to 1.0 for T5-HO lamps
- Power Factor: greater than .95
- Total Harmonic Distortion (THD): less than 10%
- Maximum Inrush Current: 7 amps per ballast at 120V, 3 amps per ballast at 277V
- Sound Rating: Inaudible in a 27dBa ambient
- Maximum Ballast Case Temperature: 75°C (167°F)

Standards

- UL Listed (evaluated to the requirements of UL935)
- CSA certified (evaluated to the requirements of C22.2 No. 74)
- Class P thermally protected
- Meets ANSI C82.11 High Frequency Ballast Standard
- Meets FCC Part 18 Non-Consumer requirements for EMI/RFI emissions
- T4 and T5-HO ballasts are MIL Std. 461E compliant (meets the requirements of CE101, RE101 and RE102)
- Meets ANSI C62.41 Category A surge protection standards up to and including 6kV
- Manufacturing facilities employ ESD reduction practices that comply with the requirements of ANSI/ESD S20.20
- Lutron Quality Systems registered to ISO 9001.2000

LUTRON® SPECIFICATION SUBMITTAL Page

Job Name:	Model Numbers:
Job Number:	

Lutron #		BAL8
Brian Smith	**UCSD Cal IT2 - Ballasts**	**# of #**

Hi-lume Ballast Models

Lamp Type	Lamp Watts (length)	Lamps per ballast	Case Type	120 VOLTS Ballast Current (amps)	120 VOLTS **Hi-lume** Model Number [1]	277 VOLTS Ballast Current (amps)	277 VOLTS **Hi-lume** Model Number [1]
T4 triple-tube 4-pin  1/2" diameter	26W	1	A	.26	HL3-T426-120-1-S	.12	HL3-T426-277-1-S
	32W	1	A	.31	HL3-T432-120-1-S	.13	HL3-T432-277-1-S
T5-HO linear high output  5/8" diameter	24W (21.5")	1 2	C C	.26 .45	FDB-T524-120-1 FDB-T524-120-2	.13 .20	FDB-T524-277-1 FDB-T524-277-2
	39W (33.4")	1 2	C C	.38 .76	FDB-T539-120-1 FDB-T539-120-2	.17 .31	FDB-T539-277-1 FDB-T539-277-2
	54W (45.3")	1 2	C C	.58 1.1	FDB-T554-120-1 FDB-T554-120-2	.25 .45	FDB-T554-277-1 FDB-T554-277-2
T8 linear and U-bent  1" diameter	17W (24")	1 2 3	F F F	.19 .31 .43	FDB-2427-120-1 FDB-2427-120-2 FDB-2427-120-3	.08 .15 .20	FDB-2427-277-1 FDB-2427-277-2 FDB-2427-277-3
	25W (36")	1 2 3	F F F	.24 .43 .62	FDB-3627-120-1 FDB-3627-120-2 FDB-3627-120-3	.12 .19 .28	FDB-3627-277-1 FDB-3627-277-2 FDB-3627-277-3
	32W (48")	1 2 3	F F F	.30 .57 .82	FDB-4827-120-1 FDB-4827-120-2 FDB-4827-120-3	.14 .25 .35	FDB-4827-277-1 FDB-4827-277-2 FDB-4827-277-3
	40W (60")	1 2	F F	.36 .64	FDB-6027-120-1 FDB-6027-120-2	.16 .30	FDB-6027-277-1 FDB-6027-277-2
T12 linear HO (800ma)	85W (72")	1	F	.75	FDB-7280-120-1	- -	- -
 1½" diameter	95W (84")	1	F	.83	FDB-8480-120-1	- -	- -
	110W (96")	1	F	.88	FDB-9680-120-1	- -	- -

[1] Mounting studs standard for T4 ballasts. Delete suffix -S in the model number if mounting studs not needed.

LUTRON® SPECIFICATION SUBMITTAL Page

Job Name:	**Model Numbers:**
Job Number:	

Lutron #		**BAL8**
Brian Smith	**UCSD Cal IT2 - Ballasts**	**# of #**

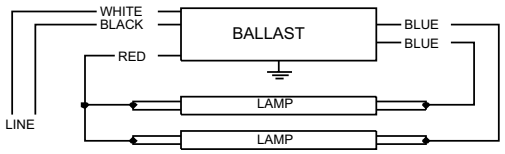
VCN-2M32-MC

Brand Name	CENTIUM MICRO CAN
Ballast Type	Electronic
Starting Method	Instant Start
Lamp Connection	Series
Input Voltage	277
Input Frequency	60 HZ
Status	Active

Electrical Specifications

Lamp Type	Num. of Lamps	Rated Lamp Watts	Min. Start Temp (°F/C)	Input Current (Amps)	Input Power (ANSI Watts)	Ballast Factor	MAX THD %	Power Factor	MAX Lamp Current Crest Factor	B.E.F.
F21T5	2	21	50/10	0.18	50	1.10	10	0.98	1.7	2.20
F25T8	2	25	0/-18	0.18	49	0.88	10	0.99	1.7	1.80
F28T5	2	28	50/10	0.22	60	0.98	10	0.99	1.7	1.63
* F32T8	2	32	0/-18	0.21	59	0.88	10	0.99	1.7	1.49
F32T8/ES (30W)	2	30	60/16	0.20	54	0.88	10	0.99	1.7	1.63

Wiring Diagram



Diag. 64

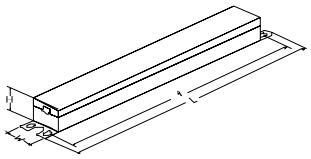
The wiring diagram that appears above is for the lamp type denoted by the asterisk (*)

Standard Lead Length (inches)

	in.	cm.
Black		0
White	25L	63.5
Blue	31R	78.7
Red	37L	94
Yellow		0
Gray		0
Violet		0

	in.	cm.
Yellow/Blue		0
Blue/White		0
Brown		0
Orange		0
Orange/Black		0
Black/White	25L	63.5
Red/White		0

Enclosure



Enclosure Dimensions

OverAll (L)	Width (W)	Height (H)	Mounting (M)
9.50 "	1.08 "	1.05 "	8.91 "
9 1/2	1 2/25	1 1/20	8 91/100
24.1 cm	2.7 cm	2.7 cm	22.6 cm

Revised 07/23/2004

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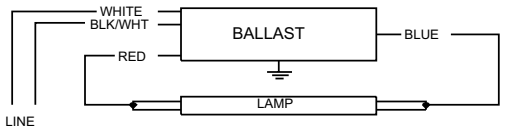
VCN-132-MC	
Brand Name	CENTIUM MICRO CAN
Ballast Type	Electronic
Starting Method	Instant Start
Lamp Connection	Series
Input Voltage	277
Input Frequency	60 HZ
Status	Active

Electrical Specifications

Lamp Type	Num. of Lamps	Rated Lamp Watts	Min. Start Temp (°F/C)	Input Current (Amps)	Input Power (ANSI Watts)	Ballast Factor	MAX THD %	Power Factor	MAX Lamp Current Crest Factor	B.E.F.
F21T5	1	21	50/10	0.10	27	1.10	10	0.98	1.7	4.07
F25T8	1	25	0/-18	0.09	25	0.98	10	0.98	1.7	3.92
* F28T5	1	28	50/10	0.11	30	0.98	10	0.99	1.7	3.27
F32T8	1	32	0/-18	0.11	30	0.98	10	0.98	1.7	3.27
F32T8/ES (30W)	1	30	60/16	0.10	28	0.98	10	0.98	1.7	3.50

Wiring Diagram



Diag. 63

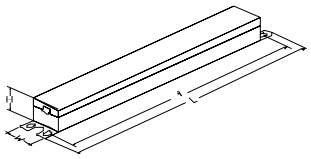
The wiring diagram that appears above is for the lamp type denoted by the asterisk (*)

Standard Lead Length (inches)

	in.	cm.
Black		0
White	25L	63.5
Blue	31R	78.7
Red	37L	94
Yellow		0
Gray		0
Violet		0

	in.	cm.
Yellow/Blue		0
Blue/White		0
Brown		0
Orange		0
Orange/Black		0
Black/White	25L	63.5
Red/White		0

Enclosure



Enclosure Dimensions

OverAll (L)	Width (W)	Height (H)	Mounting (M)
9.50 "	1.08 "	1.05 "	8.91 "
9 1/2	1 2/25	1 1/20	8 91/100
24.1 cm	2.7 cm	2.7 cm	22.6 cm

Revised 07/23/2004

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Advance #		BAL10
Brian Smith	**UCSD Cal IT2 - Ballasts**	**# of #**

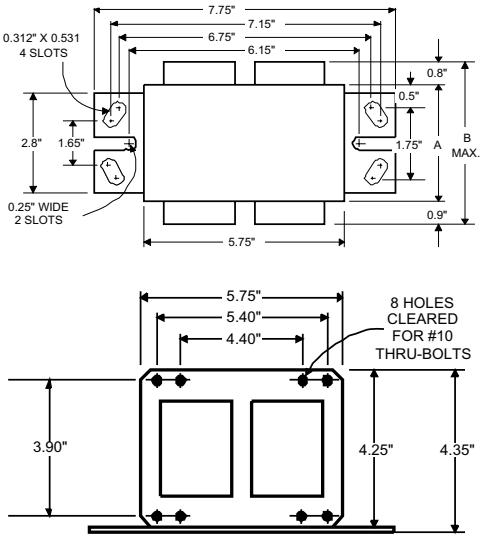
ADVANCE™

Low Pressure Sodium Lamp Ballast

Catalog Number 71A0740
For 180W L74
60 Hz HX-HPF
Status: Active

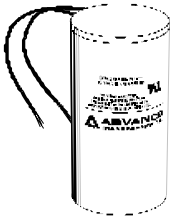
DIMENSIONS AND DATA

4 1/4 X 5 3/4 CORE - 2 COIL UNIT



~~INPUT VOLTS~~		480					
CIRCUIT TYPE	HX-HPF						
POWER FACTOR (min)	90%						
REGULATION							
Line Volts	±5%						
Lamp Watts	±10%						
LINE CURRENT (Amps)							
Operating		0.44					
Open Circuit		1.30					
Starting		0.55					
UL TEMPERATURE RATINGS							
Insulation Class	H(180°C)						
Coil Temperature Code	1029	A					
MIN. AMBIENT STARTING TEMP.	-20°F or -30°C						
NOM. OPEN CIRCUIT VOLTAGE	685						
INPUT VOLTAGE AT LAMP DROPOUT		340					
INPUT WATTS	206						
RECOMMENDED FUSE (Amps)		4					
CORE and COIL							
Dimension (A)	2.40						
Dimension (B)	4.00						
Weight (lbs.)	16.5						
Lead Lengths	12"						
CAPACITOR REQUIREMENT							
Microfarads	16.0						
Volts (min.)	330						
Fault Current Withstand (amps)							
60 Hz TEST PROCEDURES (Refer to Advance Test Procedure for HID Ballasts - Form 1270)							
High Potential Test (Volts)							
1 minute	2000						
2 seconds	2500						
Open Circuit Voltage Test (Volts)	610-760						
Short-Circuit Current Test (Amps)							
Secondary Current	0.90-1.20						
Input Current		0.20 0.30	-	-	-	-	

Capacitor: 7C160M33



Capacitance: 16
Dia/Oval Dim: 1.5
Height: 3.75
Temp Rating: 105°C

Ignitor: NA

This ballast does not require the use of an ignitor.

Wiring Diagram:

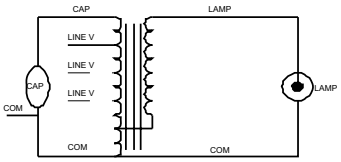


Fig. Q

U.L. RECOGNIZED

Ordering Information	
Order Suffix	**Description**

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03/18/02

Advance #		**BAL11**
Brian Smith	**UCSD Cal IT2 - Ballasts**	**# of #**

ADVANCE	e-Vision® Electronic Ballast for Metal Halide Lamps	Catalog Number IMH-50-A For (1) 39W ANSI M130 or (1) 50W ANSI M110 Metal Halide Lamp 120-277V 50/60Hz Electronic Status: Active

DIMENSIONS AND DATA

Lamp Data		Input Volts	Catalog Number*	Line Current (Amps)	Input Power (W)	Ballast Factor	Max THD (%)	Min Power Factor	Wiring Dia	Figure	Weight (lb)	Max Distance to Lamp (ft)
Number	Watts											
39 Watt Lamp, ANSI Code M130 Minimum Starting Temp -30°C/-20°F												
1	39	120	IMH-50-A-xxx	0.38	45	1.0	15	0.9	1	A	1.4	5
		277		0.16	44							
50 Watt Lamp, ANSI Code M110 Minimum Starting Temp -30°C/-20°F												
1	50	120	IMH-50-A-xxx	0.47	56	1.0	15	0.9	2	A	1.4	5
		277		0.20	55							

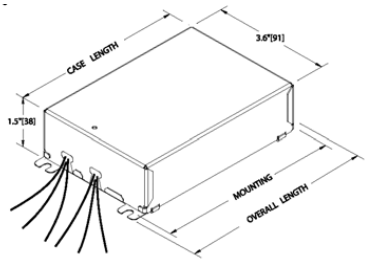
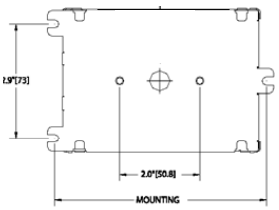
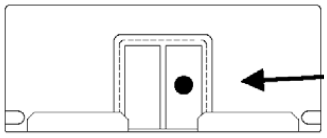


Figure A

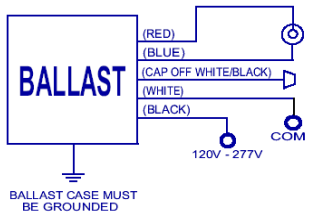
CASE LENGTH = 4.72" [120mm]
MOUNTING LENGTH = 5.20" [132mm]
MOUNTING WIDTH = 2.87" [73mm]
OVERALL LENGTH = 5.51" [140mm]
CASE WIDTH = 3.62" [92mm]
HEIGHT = 1.50" [38mm]



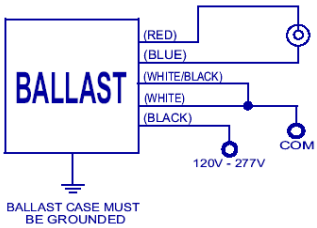


MEASURE CASE TEMPERATURE ON RIGHT HEAT SINK CLIP AT BALAST END

Case Temperature Measurement Location



Wiring Diagram 1



Wiring Diagram 2

INSTALLATION & APPLICATION NOTES:

1. Maximum allowable case temperature is 85°C. See figure above for measurement location
2. Ignition pulse is 4 kV max
3. All leads are 12 inches long
4. Ballast output will shutdown after 20 minutes if lamp fails to ignite
5. Power must be cycled off – then on, after replacing lamp

***Ordering Information**

Order Suffix	Description
-LF	Ballast with side exit leads and mounting feet
-BLS	Ballast with bottom exit leads and mounting studs

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10/11//05

Advance #		**BAL12**
Brian Smith	**UCSD Cal IT2 - Ballasts**	**# of #**

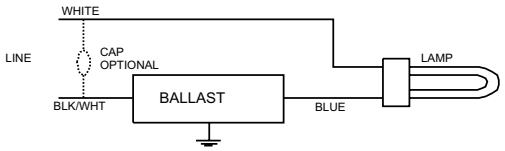
VL-1B9-TP-BLS

Brand Name	COMPACT-NPF
Ballast Type	Magnetic
Starting Method	Pre-Heat
Lamp Connection	Series
Input Voltage	277
Input Frequency	60 HZ
Status	Active

Electrical Specifications

Lamp Type	Num. of Lamps	Rated Lamp Watts	Min. Start Temp (°F/C)	Input Current (Amps)	Starting Current (Amps)	Open Circuit (Amps)	Input Power (Watts)	Ballast Factor	MAX THD %	Power Factor
CFQ9W/G23	1	9	0/-18	0.16	0.18	0.00	15	0.90	10	0.33
CFT5W/G23	1	5	0/-18	0.17	0.18	0.00	12	0.96	15	0.25
CFT7W/G23	1	7	0/-18	0.17	0.18	0.00	14	0.95	15	0.29
* CFT9W/G23	1	9	0/-18	0.17	0.18	0.00	14	0.92	15	0.31

Wiring Diagram



Diag. 42

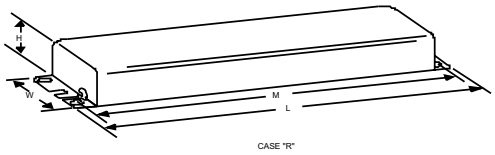
The wiring diagram that appears above is for the lamp type denoted by the asterisk (*)

Standard Lead Length (inches)

	in.	cm.
Black		0
White		0
Blue	7	17.8
Red		0
Yellow		0
Gray		0
Violet		0

	in.	cm.
Yellow/Blue		0
Blue/White		0
Brown		0
Orange		0
Orange/Black		0
Black/White	7	17.8
Red/White		0

Enclosure



Enclosure Dimensions

OverAll (L)	Width (std)/(TP)	Height (H)	Mounting (M)
4.75 "	2.21875 "/0 "	1.625 "	4.375 "
4 3/4	2 7/32 / 0	1 5/8	4 3/8
12.1 cm	5.6 cm / 0 cm	4.1 cm	11.1 cm

Revised 09/14/1999

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Advance #		**BAL13**
Brian Smith	**UCSD Cal IT2 - Ballasts**	**# of #**

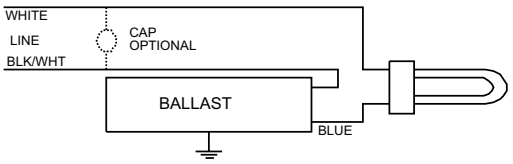
VL-1B13-TP-BLS

Brand Name	COMPACT-NPF
Ballast Type	Magnetic
Starting Method	Pre-Heat
Lamp Connection	Series
Input Voltage	277
Input Frequency	60 HZ
Status	Active

Electrical Specifications

Lamp Type	Num. of Lamps	Rated Lamp Watts	Min. Start Temp (°F/C)	Input Current (Amps)	Starting Current (Amps)	Open Circuit (Amps)	Input Power (Watts)	Ballast Factor	MAX THD %	Power Factor
* CFQ13W/GX23	1	13	0/-18	0.24	0.28	0.00	24	0.98	10	0.36
CFT13W/GX23	1	13	0/-18	0.26	0.28	0.00	20	0.98	15	0.28

Wiring Diagram



Diag. 45

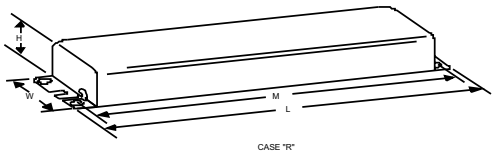
The wiring diagram that appears above is for the lamp type denoted by the asterisk (*)

Standard Lead Length (inches)

	in.	cm.
Black		0
White		0
Blue	7	17.8
Red		0
Yellow		0
Gray		0
Violet		0

	in.	cm.
Yellow/Blue		0
Blue/White		0
Brown		0
Orange		0
Orange/Black		0
Black/White	7	17.8
Red/White		0

Enclosure



Enclosure Dimensions

OverAll (L)	Width (std)/(TP)	Height (H)	Mounting (M)
4.75 "	2.21875 "/0 "	1.625 "	4.375 "
4 3/4	2 7/32 / 0	1 5/8	4 3/8
12.1 cm	5.6 cm / 0 cm	4.1 cm	11.1 cm

Revised 07/01/1999

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Advance #		**BAL14**
Brian Smith	**UCSD Cal IT2 - Ballasts**	**# of #**

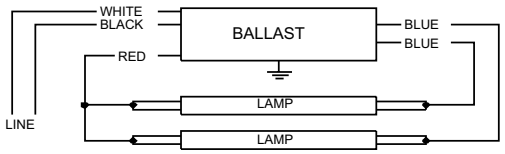
VCN-2M32-MC

Brand Name	CENTIUM MICRO CAN
Ballast Type	Electronic
Starting Method	Instant Start
Lamp Connection	Series
Input Voltage	277
Input Frequency	60 HZ
Status	Active

Electrical Specifications

Lamp Type	Num. of Lamps	Rated Lamp Watts	Min. Start Temp (°F/C)	Input Current (Amps)	Input Power (ANSI Watts)	Ballast Factor	MAX THD %	Power Factor	MAX Lamp Current Crest Factor	B.E.F.
F21T5	2	21	50/10	0.18	50	1.10	10	0.98	1.7	2.20
F25T8	2	25	0/-18	0.18	49	0.88	10	0.99	1.7	1.80
* F28T5	2	28	50/10	0.22	60	0.98	10	0.99	1.7	1.63
F32T8	2	32	0/-18	0.21	59	0.88	10	0.99	1.7	1.49
F32T8/ES (30W)	2	30	60/16	0.20	54	0.88	10	0.99	1.7	1.63

Wiring Diagram



Diag. 64

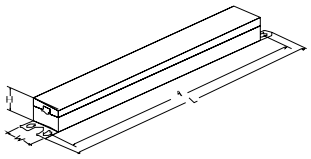
The wiring diagram that appears above is for the lamp type denoted by the asterisk (*)

Standard Lead Length (inches)

	in.	cm.
Black		0
White	25L	63.5
Blue	31R	78.7
Red	37L	94
Yellow		0
Gray		0
Violet		0

	in.	cm.
Yellow/Blue		0
Blue/White		0
Brown		0
Orange		0
Orange/Black		0
Black/White	25L	63.5
Red/White		0

Enclosure



Enclosure Dimensions

OverAll (L)	Width (W)	Height (H)	Mounting (M)
9.50 "	1.08 "	1.05 "	8.91 "
9 1/2	1 2/25	1 1/20	8 91/100
24.1 cm	2.7 cm	2.7 cm	22.6 cm

Revised 07/23/2004

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ADVANCE	e-Vision® Electronic Ballast for Metal Halide Lamps	Catalog Number IMH-70-D For (1) 70W Metal Halide Lamp ANSI M98, M139, M143 120-277V 50/60Hz Electronic Status: Active

DIMENSIONS AND DATA

Lamp Data		Input Volts	Catalog Number*	Line Current (Amps)	Input Power (W)	Ballast Factor	Max THD (%)	Min Power Factor	Wiring Dia	Figure	Weight (lb)	Max Distance to Lamp (ft)
Number	Watts											
70 Watt Lamp, ANSI Code M98, M139 or M143 Minimum Starting Temp -30°C/-20°F												
1	70	120	IMH-70-D-xxx	0.67	80	1.0	15	0.9	3	D	1.6	5
		277		0.29	79							

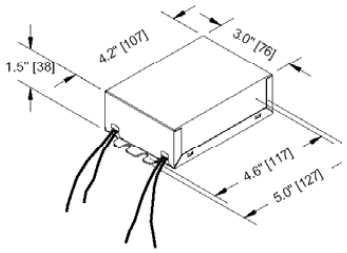
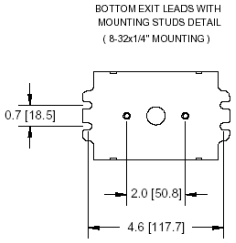
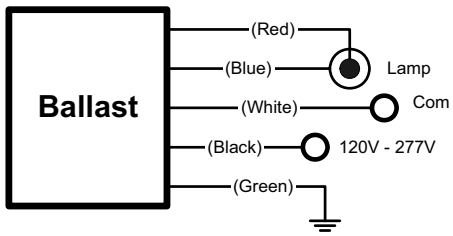


Figure D

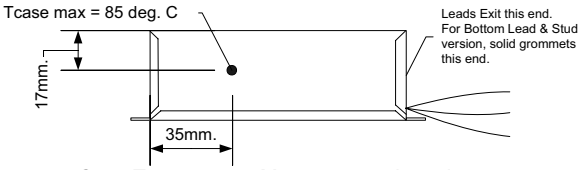
(Side exit leads shown – see diagram at right for bottom leads with mounting studs detail)





Ballast Case must be Grounded

Wiring Diagram 3



Case Temperature Measurement Location

INSTALLATION & APPLICATION NOTES:

1. Maximum allowable case temperature is 85°C. See figure above for measurement location
2. Ignition pulse is 4 kV max
3. All leads are 12 inches long
4. Ballast output will shutdown after 20 minutes if lamp fails to ignite
5. Power must be cycled off – then on, after replacing lamp

***Ordering Information**

Order Suffix	Description
-LF	Ballast with side exit leads and mounting feet
-BLS	Ballast with bottom exit leads and mounting studs

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Revised 1/13/06

Advance #		**BAL16**
Brian Smith	**UCSD Cal IT2 - Ballasts**	**# of #**

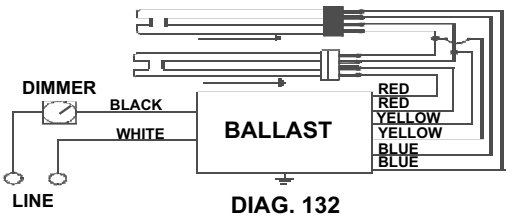
VEZ-2T42-M3-BS

Brand Name	MARK X Powerline
Ballast Type	Electronic Dimming
Starting Method	Programmed Start
Lamp Connection	Series
Input Voltage	277
Input Frequency	60 HZ
Status	Active

Electrical Specifications

Lamp Type	Num. of Lamps	Rated Lamp Watts	Min. Start Temp (°F/C)	Input Current (Amps)	Input Power (Watts)	Ballast Factor	MAX THD %	Power Factor	Lamp Current Crest Factor	B.E.F.
* CFTR32W/GX24Q	2	32	50/10	0.28	20	0.05	10	0.98	1.6	0.25
CFTR42W/GX24Q	2	42	50/10	0.36	20	0.05	10	0.98	1.6	0.25
CFTR57W/GX24Q	1	57	50/10	0.24	18	0.05	10	0.98	1.6	0.28
CFTR70W/GX24Q	1	70	50/10	0.29	18	0.05	10	0.98	1.6	0.28

Wiring Diagram

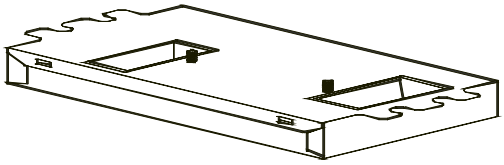


DIAG. 132

The wiring diagram that appears above is for the lamp type denoted by the asterisk (*)

Standard Lead Length (inches)

Enclosure



Enclosure Dimensions

OverAll (L)	Width (W)	Height (H)	Mounting (M)
6.28 "	3.00 "	1.29 "	2.00 "
6 7/25	3	1 29/100	2
16 cm	7.6 cm	3.3 cm	5.1 cm

Revised 09/10/2002

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Advance #		**BAL17**
Brian Smith	**UCSD Cal IT2 - Ballasts**	**# of #**