

# Sign Illuminating Ballasts

## A Complete Range Of Solutions... From The Name You Trust

Universal Lighting Technologies ("Universal") is known throughout the sign business as a company that can set and meet today's toughest industry standards. Our high-output ballasts are great for rugged outdoor sign cabinet applications because they provide ultra-reliable, low-temperature starting as low as -20° F. All Universal sign ballasts offer Class P thermal protection. We have three product lines spanning the sign business:

- The UNIVERSAL® USB is a line that offers complete coverage with 6 units.
- The UNIVERSAL® MAX-3 ensures that the installer has the right sign ballast on the truck for every application, from 1-6 lamps, 2-48 feet — replacing up to 100 conventional ballasts with a maximum of three models.
- Signa® Electronic Sign ballasts are ideal for new sign installations with minimum wire connections, universal input voltage, parallel lamp operation, and maximum energy savings.

Universal offers the convenience of one-stop shopping for not just sign ballasts, but compact fluorescent, linear fluorescent, HID, and all your other ballast needs.

For the unmistakable sign of quality and reliability, turn to Universal.



Universal® sign ballasts provide ultra-reliable low-temperature starting — plus Class P thermal protection.

# Application And Operating Information

## Heat

Ballasts generate heat during normal operation. By design, fluorescent ballasts should operate so that their maximum hot-spot case temperature does not exceed 90°C (194°F). Operating at higher temperatures will shorten ballast life or may cause the thermal protection circuit to trip.

The temperature the ballast reaches depends on the temperature of the area surrounding it — plus the heat-conducting surface touching the ballast. Ballasts should be installed in a manner that avoids future overheating. To maintain normal ballast temperature, you should:

1. Mount the ballast against a flat surface of heavy gauge metal such as the structural part of the sign.
2. Keep the ballast as far away as possible from other ballasts, lamps or reflective surfaces. (Lamps generate approximately three-fourths of the heat in a plastic sign.) The ends of the lamps are the hottest part, so you should mount the ballast as far away from the ends as possible.
3. Paint the inside of the sign with flat white paint.

## Moisture Protection

1. Vent the sign as well as possible without allowing water to enter.
2. Ballasts should be mounted horizontally (except for weatherproof types). If the ballast must be mounted vertically, allow room for sufficient air circulation. Wherever possible, mount the ballast in an enclosure outside the sign by using Universal pup tents. You can get pup tents at no charge when you order the plastic sign ballast. Your wholesaler will also have a supply for your convenience.

## Grounding

The white lead of a 120-volt ballast must be connected to the neutral or ground side of the power supply. All metal parts of the sign, as well as the ballast case, must be grounded either through the conduit which holds the power supply or by direct connection with a grounding wire. An ungrounded sign is a potential hazard—and it can give misleading symptoms when looking for sign faults.

## Proper Lamp Life and Starting

In rapid-start installations, proper filament heating is necessary for reliable starting and normal lamp life. To ensure that proper heating is taking place, the following steps are recommended:

1. Lamp leads should be kept as short as possible and with a minimum of splices.
2. All connections should be soldered.
3. Maintain proper alignment and spacing of lamp holders to ensure good contact in the sockets.
4. Mount lamps within one inch of grounded metal. This is one lamp manufacturer's published requirement for reliable starting.

## Light Output vs. Temperature

The light output of a fluorescent lamp varies according to the mercury vapor pressure inside the lamp. This pressure is controlled by the coldest spot on the bulb wall. The ballast may start the lamp, but the light output can be very low if the bulb wall temperature is low. Several factors influence this, including ambient temperatures, wind, type of enclosure, etc. If maximum light output is critical, consult a lamp manufacturer for advice.

## Lamp Starting Problems

Occasionally a field problem will arise involving improper lamp starting. The usual complaint is that the lamps start slowly (or not at all). Here are some of the causes:

1. Low line voltage
2. Improper sign grounding
3. Insufficient or no filament voltage
4. Insufficient or no open circuit voltage
5. Dirty lamps during high-humidity operating conditions
6. Lamps improperly inserted in the sockets

If lamp starting is a problem in your installation, check the sign grounding, filament voltage (3.4 - 3.9 volts), and open circuit voltage. If all are normal, the probable cause is dirty lamps. The lamps should be washed in clean water, drip-dried, and reinstalled. If this doesn't solve the problem, contact your nearest Universal representative for further assistance.

## Short Lamp Life

If the lamp has not given proper length of service as specified by the lamp manufacturer, the following reasons for early failure should be considered:

1. Improper starting due to insufficient filament voltage
2. Frequent starting and short operating periods
3. Improper ballast
4. Improper voltage supply
5. Faulty wiring
6. Defective lamps
7. Lamps improperly inserted in sockets

Early lamp failure will be preceded by a dense blackening on either or both ends of the lamps. This blackening will extend three or four inches from the lamp base and should not be confused with a small dense spot, which is a mercury deposit that can occur any time during lamp life. Dense blackening due to early lamp failure should not be confused with the gray bands that sometimes appear toward the end of normal lamp life (about two inches from either end of the lamp).

# Sign Ballast Footage Chart

## UNIVERSAL® USB Fluorescent Sign Ballast Matrix

No. of Lamps Per Ballast	TOTAL LAMP FOOTAGE REQUIRED																													
	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48						
1-2	USB-0412-12																													
1-4	USB-0816-14																													
	USB-1024-14																													
2-4	USB-1632-24																													
4-6	USB-2036-46																													
	USB-2048-46																													

No. of Lamps Per Ballast	TOTAL LAMP FOOTAGE REQUIRED																																							
	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48																
1-6	USB-0218-16																																							
	USB-1232-16																																							
	USB-1048-16																																							

## SIGNA® Electronic Sign Ballast Matrix

No. of Lamps Per Ballast	TOTAL LAMP FOOTAGE REQUIRED																																							
	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48																
1-2	ESB216-12																																							
2-4	ESB432-14																																							
4-6	ESB848-46																																							
1-4	ESB1040-14																																							

## Plastic Sign Ballasts LEAD LENGTHS (Inches)

Catalog Number	White	Black	Blues	Reds	Yellows	Browns	Oranges	Orange Blacks	Blue Whites	Red Whites
<b>PLASTIC SIGN BALLASTS - HIGH OUTPUT 800mA RS LAMPS - 120 Volts - 60 Hz</b>										

### TWO LAMP BALLASTS

USB-0412-12	24	24	38	38	48					
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### FOUR LAMP BALLASTS

USB-0816-14	36	24	65	40	39	56			48	
USB-1024-14	24	24	79	48	75	83			57	
USB-1632-24	24	24	80	54	60	80			72	

### SIX LAMP BALLASTS

USB-2036-46	24	24	50	80	70	38	50	50	38	
USB-2048-46	24	24	80	80	70	50	50	50	50	

### MAX-3 HIGH OUTPUT SIGN BALLASTS 800mA RS LAMPS - 120 Volts - 60 Hz

### ONE TO SIX LAMP BALLASTS

USB-0218-16	24	24	60	60	60	60	60	60	60	
USB-1232-16	24	24	80	60	60	80	60	60	72	
USB-1048-16	24	24	80	80	70	50	60	60	50	

### SIGNA ELECTRONIC SIGN BALLASTS- T12 RAPID START HIGH OUTPUT LAMPS - 108 to 305 VOLTS - 50/60 Hz

### ONE TO SIX LAMP BALLASTS

ESB216-12			68	68						
ESB432-14			80	80					80	80
ESB848-46			80	80			80	80	80	80

Note: Maximum volts above ground, any lead 590 volts.

# HIGH OUTPUT BALLASTS



- Provide ultra-reliable low-temperature starting (as low as -20°F)
- Support 1 to 6 lamps
- Ideal for rugged outdoor sign cabinet applications
- Class P thermally protected

# STANDARD HIGH OUTPUT SIGN BALLASTS

Catalog Number	Total Lamp Footage	Start Temp (°F)	Max. Line Cur.	Max. Input Watts	Open Circuit Volt.	Wiring Diagram	Dimen. Chart Ref.	Weight (lbs.)
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**PLASTIC SIGN BALLASTS - HIGH OUTPUT 800mA RS LAMPS - 120 Volts - 60 Hz**

**TWO LAMP BALLASTS**

USB-0412-12	4' min. - 12' max.	-20	1.35	160	500	1a, 2a	1	8
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**FOUR LAMP BALLASTS**

USB-0816-14	8' min. - 16' max.	-20	1.90	220	590	4a, 6a, 9, 1b	2	12
USB-1024-14	10' min. - 24' max.	-20	2.70	325	720	4a, 6a, 9, 1b	3	14
USB-1632-24	16' min. - 32' max.	-20	3.50	420	950	4a, 6a, 9	4	16

**SIX LAMP BALLASTS**

USB-2036-46	20' min. - 36' max.	-20	4.00	480	600	5a, 7, 7a	4	18
USB-2048-46	20' min. - 48' max.	-20	5.00	600	720	5a, 7, 7a	4	18

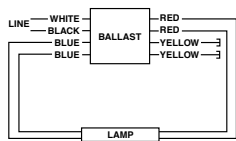


Diagram 1a

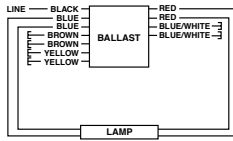
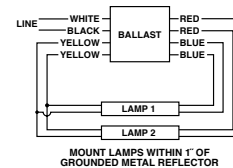
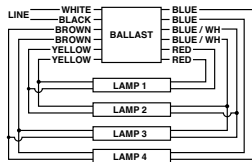


Diagram 1b



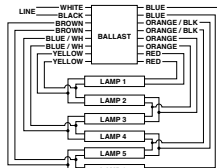
MOUNT LAMPS WITHIN 1' OF GROUNDED METAL REFLECTOR

Diagram 2a



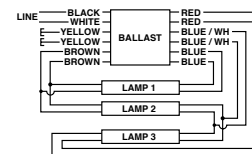
MOUNT LAMPS WITHIN 1' OF GROUNDED METAL REFLECTOR

Diagram 4a



MOUNT LAMPS WITHIN 1' OF GROUNDED METAL REFLECTOR

Diagram 5a



INDIVIDUALLY CAP THE YELLOW LEADS

Diagram 6a

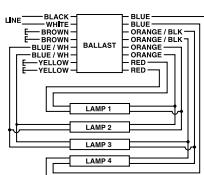
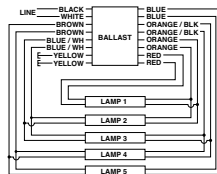


Diagram 7



INDIVIDUALLY GAP THE YELLOW LEADS

Diagram 7a

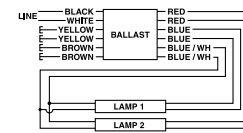


Diagram 9

**PLASTIC SIGN FLUORESCENT BALLASTS DIMENSION CHART - STANDARD CASE (INCHES)**

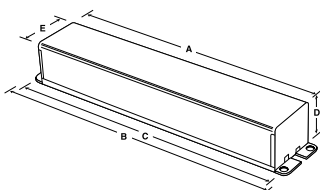
Ref. #	A	B	C	D	E
1	10 37/64"	11 45/64"	11 9/64"	1 3/4"	3 3/16"
2	10 37/64"	11 45/64"	11 9/64"	2 43/64"	3 3/16"
3	13 3/16"	14 5/16"	13 3/4"	2 43/64"	3 3/16"
4	15 3/16"	16 11/16"	16 1/8"	2 43/64"	3 3/16"

**Diagrams Notes:**

Note 1: When operating a two-lamp ballast on one lamp insulate each yellow lead.

Note 3: When operating a four-lamp ballast on three lamps insulate each yellow blue/white, and brown lead.

Plastic Sign Ballasts



# UNIVERSAL® MAX-3 HIGH OUTPUT SIGN BALLASTS

- Superior fill material coats all components and fills all voids to dissipate heat for cooler operation, longer life.
- Supports 1 to 6 lamps, 2 to 48 feet total length
- Low watt-loss steel lamination and all-copper coils assure cooler, more efficient operation and performance.
- Class P thermally protected



## MAX-3 BALLASTS

Catalog Number	Total Lamp Footage	Start Temp (°F)	Max. Line Cur.	Max. Input Watts	Open Circuit Volt.	Wiring Diagram	Dimen. Chart Ref.	Weight (lbs.)
<b>MAX-3 HIGH OUTPUT SIGN BALLASTS 800mA RS LAMPS - 120 Volts - 60 Hz</b>								
<b>ONE TO SIX LAMP BALLASTS</b>								
USB-0218-16	2' min. - 18' max.	-20°	2.00	240	625	3, 4, 5, 6, 7, 8	1	15
USB-1232-16	12' min. - 32' max.	-20°	3.50	410	970	3, 4, 5, 6, 7, 8	1	16
USB-1048-16	10' min. - 48' max.	-20°	4.80	570	800	1, 2, 3, 4, 7, 8	2	18

See page 6-3 for Lead Lengths

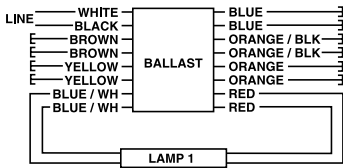


Diagram 1

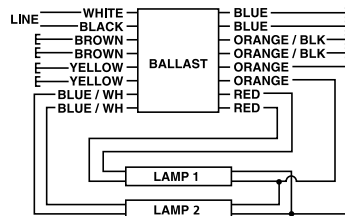


Diagram 2

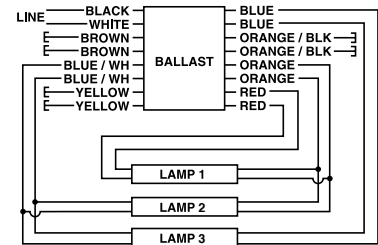
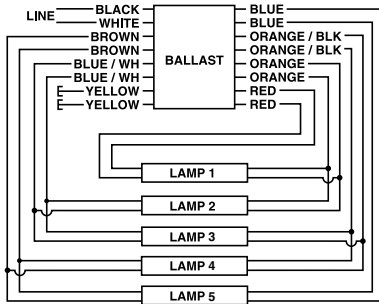


Diagram 3



INDIVIDUALLY CAP THE YELLOW LEADS

Diagram 4

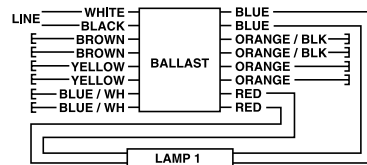


Diagram 5

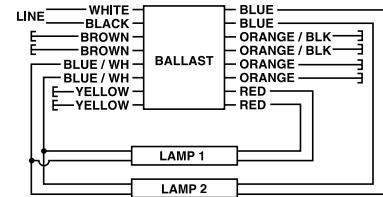


Diagram 6

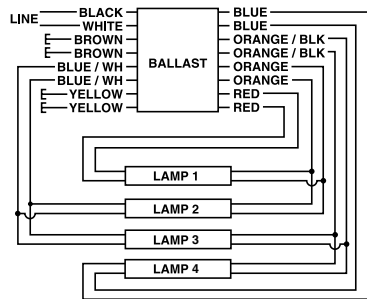


Diagram 7

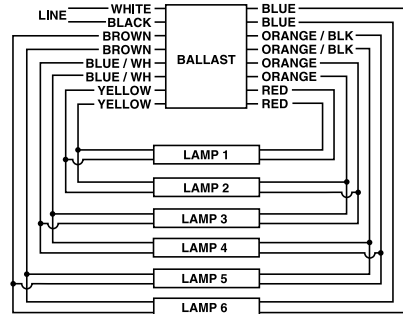
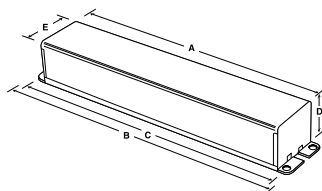


Diagram 8



### MAX-3 SERIES HIGH OUTPUT SIGN BALLASTS DIMENSION CHART

Ref. #	A	B	C	D	E
1	13 <sup>3</sup> / <sub>16</sub> "	14 <sup>5</sup> / <sub>16</sub> "	13 <sup>3</sup> / <sub>4</sub> "	2 <sup>43</sup> / <sub>64</sub> "	3 <sup>3</sup> / <sub>16</sub> "
2	15 <sup>9</sup> / <sub>16</sub> "	16 <sup>11</sup> / <sub>16</sub> "	16 <sup>1</sup> / <sub>8</sub> "	2 <sup>43</sup> / <sub>64</sub> "	3 <sup>3</sup> / <sub>16</sub> "

#### Diagrams Notes:

Note 1: When operating a two-lamp ballast on one lamp insulate each yellow lead.

Note 2: When operating a three-lamp ballast on two lamps insulate each yellow and blue/white lead.

Note 3: When operating a four-lamp ballast on three lamps insulate each yellow blue/white, and brown lead.

- Instant start for maximum energy savings
- Simplified wiring for fewer connections
- Universal input voltage
- Parallel Lamp Operation

Catalog Number	Total Lamp Footage	Start Temp (°F)	Input Voltage	Max. Input Watts	Max. Line Current (A)	Wiring Diagram	Dimen. Chart Ref.	Weight (lbs.)
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**T12HO UP TO 8' IN LENGTH OR T8HO UP TO 6' IN LENGTH - 120 to 277 Volts - 50/60 Hz**

**ONE TO TWO LAMP BALLASTS**

ESB216-12	2' min. - 16' max.	-20	120	134	1.12	10	1	4.2
			277	130	0.47			

**ONE, TWO, THREE OR FOUR LAMP BALLASTS**

ESB432-14	4' min. - 32' max.	-20	120	280	2.34	11	2	7.4
			277	274	0.99			

**FOUR, FIVE OR SIX LAMP BALLASTS**

ESB848-46	8' min. - 48' max.	-20	120	408	3.41	12	3	9.7
			277	395	1.47			

**T12HO UP TO 8' IN LENGTH OR T8HO UP TO 8' IN LENGTH - 120 to 277 Volts - 50/60 Hz**

**ONE, TWO, THREE OR FOUR LAMP BALLASTS**

ESB1040-14	10' min. - 40' max.	-20	120	341	2.85	11	3	10
			277	331	1.25			

Consult [www.signasign.com](http://www.signasign.com) for complete specification information

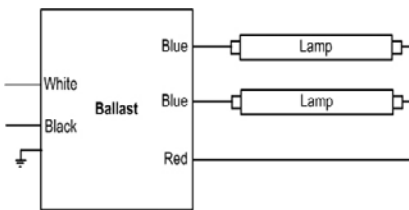


Diagram 10

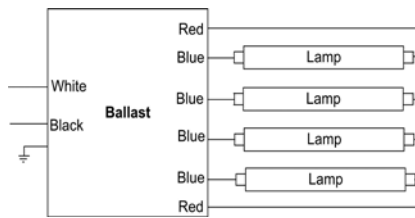


Diagram 11

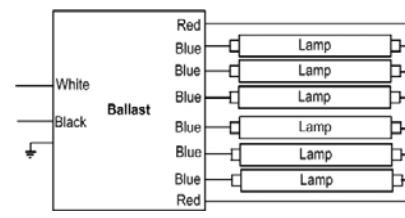
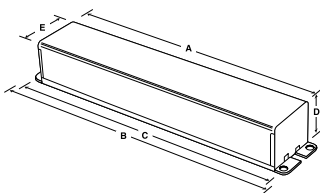


Diagram 12



**ELECTRONIC SIGN BALLASTS  
DIMENSION CHART - STANDARD CASE (INCHES)**

Ref. #	A	B	C	D	E
1	10 <sup>37/64</sup> "	11 <sup>45/64</sup> "	11 <sup>9/64</sup> "	1 <sup>3/4</sup> "	3 <sup>3/16</sup> "
2	13 <sup>3/16</sup> "	14 <sup>5/16</sup> "	13 <sup>3/4</sup> "	2 <sup>43/64</sup> "	3 <sup>3/16</sup> "
3	15 <sup>9/16</sup> "	16 <sup>11/16</sup> "	16 <sup>1/8</sup> "	2 <sup>43/64</sup> "	3 <sup>3/16</sup> "

**Diagrams Notes:**

When Operating less than the maximum number of lamps, insulate unused blue leads.