

# BAL650C-4

Also known as BAL94C

## FLUORESCENT EMERGENCY BALLAST

750 Lumens

One or two-lamp emergency illumination for 4-pin fluorescent lamps (without internal starter) commonly used on electronic ballasts



## APPLICATION

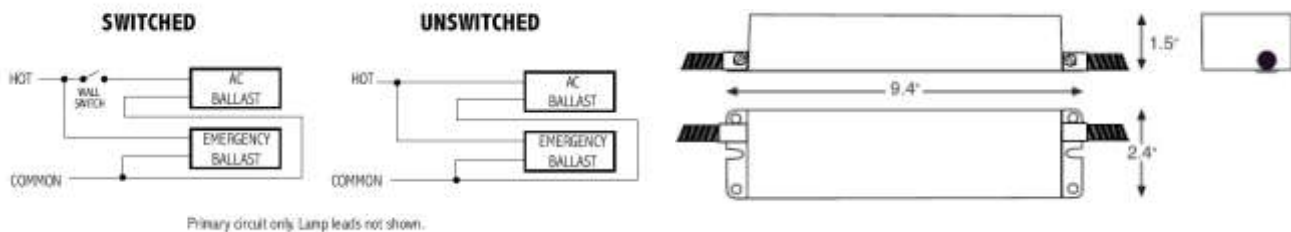
The BAL650C-4 fluorescent emergency ballast works in conjunction with an AC ballast to convert new or existing fluorescent fixtures into emergency lighting. The emergency ballast consists of a high-temperature nickel cadmium battery, charger and electronic circuitry in one compact white case. The BAL650C-4 can be used with one 13-42 W (4-pin) or two 13-39W (4-pin) twin, quad, or triple twin-tube compacts. It is also compatible with most one-, two-, or three-, and four-lamp electronic, standard, energy-saving and dimming AC ballasts. If used in an emergency-only fixture, no AC ballast is necessary. The BAL650C-4 is suitable for indoor locations and is not suitable for air handling heated air outlets or for wet or hazardous locations. For information about specific lamp and ballast compatibility, please call the factory.

## OPERATION

When AC power fails, the BAL650C-4 immediately switches to the emergency mode, keeping either one or two lamps illuminated at a reduced lumen output for a minimum of 90 minutes. When AC power is restored, the BAL650C-4 automatically returns to the charging mode.

## INSTALLATION

The BAL650C-4 does not affect normal fixture operation and may be used with either a switched or unswitched fixture. If a switched fixture is used, an unswitched hot lead must be connected to the emergency ballast. The emergency ballast must be fed from the same branch circuit as the AC ballast. The BAL650C-4 may be installed on top of or remote from the fixture. The emergency ballast may be remotely installed up to half the distance the AC ballast manufacturer recommends removing the AC ballast from the lamp or up to 50 feet, whichever is less. For simple visual inspection of the charging indicator light and easy operational testing, the test/monitor plate can be installed near the fixture wall switch. Or, it can be installed in the ceiling near the fixture to ensure an unobtrusive installation. Installation is not recommended with fixtures where the ambient temperature may fall below 0°C.



## UL AND CODE COMPLIANCE

The BAL650C-4 has been tested by Underwriters Laboratories in accordance with the standards set forth in UL924, "Emergency Lighting and Power Equipment," and is UL Listed for factory and field installation. Emergency illumination time exceeds the National Electrical Code (NEC), Life Safety Code (NFPA-LSC) and UL 90-minute requirements.

## BATTERY

Because high temperatures exist in fluorescent fixtures, the BAL650C-4 uses a specifically constructed, high-temperature nickel cadmium battery. This battery requires no maintenance and has a life expectancy of 7 – 10 years.

### EMERGENCY ILLUMINATION

Depending on the number of lamps (one or two), wattage and type of lamps selected, the BAL650C-4 produces 300 – 750 lumens initial emergency light output (contact factory for specific information on the lumen output for different lamps). If two-lamp operation is selected, light output is evenly divided between the lamps for better distribution of emergency illumination. Emergency lumen output will be less with one-lamp operation.

### SPECIFICATION

Emergency lighting shall be provided by using a standard fluorescent fixture equipped with a Howard BAL650C-4 emergency ballast. This emergency ballast shall consist of a high-temperature, maintenance-free nickel cadmium battery, charger and electronic circuitry contained in one 9 3/8" x 2 3/8" x 1 1/2" white metal case with 2' lengths of flexible conduit at each end. A test/monitor plate with a solid-state charging indicator light to monitor the charger and battery, a single-pole test switch and installation hardware shall be provided. The emergency ballast shall be capable of operating One or Two 6W – 28W Tubular fluorescent lamps; One or Two 13W – 32W and One 40W – 42W 4-pin Compact fluorescent lamps (with no integral starters) in the emergency mode for a minimum of 90 minutes. The BAL650C-4 shall produce 300-750 lumens initial emergency light output, have 3.5 Watts of input power, have a 14.4 Watt-hour battery capacity and comply with emergency standards set forth by the current NEC. The emergency ballast shall be UL Listed for installation on top of or remote from the fixture and shall be warranted for a full five years from date of purchase.

### WARRANTY

Model BAL650C-4 is warranted for five (5) full years from date of purchase. This warranty covers only properly installed Howard emergency ballasts used under normal conditions. For the warranty period Howard will, at its option, repair or replace without charge, a defective emergency ballast provided it is returned to the factory, and our inspection determines it to be defective under terms of the warranty. Repair or replacement, as stated above, shall constitute the purchaser's exclusive warranty, which does not extend to transportation, installation, labor, or any other charges; nor does it apply to any equipment of another manufacturer used in conjunction with the emergency ballast.

### PRODUCT SUMMARY

<b>UL LISTED</b> Factory or Field Installation	<b>DUAL VOLTAGE INPUT</b> 120/277VAC 60 Hz	<b>BATTERY</b> High Temperature Maintenance-Free Nickel-Cadmium Battery 7-10 Year Life Expectancy	<b>TEMPERATURE RATING (AMBIENT)</b> 0°C TO 50°C (32°F TO 112°F)
<b>ILLUMINATION</b> 90 Minutes	<b>AC INPUT CURRENT</b> 280mA		<b>DIMENSIONS</b> 9.4" X 2.4" X 1.5" (238mm x 60mm x 38mm) 2' (610mm) Flexible conduit Mounting center 8.9" (226mm)
<b>INITIAL LIGHT OUTPUT</b> 300-750 Lumens	<b>AC INPUT POWER RATING</b> 3.5 Watts	<b>BATTERY CHARGING CURRENT</b> 280mA	
<b>FULL WARRANTY</b> 5 Years (NOT pro-rata)	<b>TEST SWITCH</b> Single pole	<b>RECHARGE TIME</b> 24 Hours	<b>WEIGHT</b> 2.1lbs (1kg)
		<b>CHARGING INDICATOR LIGHT</b> LED	



**CAUTION** :Contains nickel-cadmium rechargeable battery. Must be recycled or disposed of properly.



## Installation Instructions

When using this lighting device the safety precautions should be followed at all times.

### PLEASE READ CAREFULLY AND FOLLOW ALL INSTRUCTIONS FOR YOUR OWN SAFETY

1. This device is designed for factory or field installation in either the ballast channel or on top of the fixture and can be used only with indoor fixtures. It is not suitable for use in air handling fixtures, near heated air outlets, or wet and/or hazardous locations. Do not install this unit near gas or electric heaters.
2. Prior to installation, battery connector must be open to prevent high voltage from being present on output leads (red & yellow).
3. This device is designed for use with:
  - a. One or two 6W – 28W tubular fluorescent lamps with no integral starter; or
  - b. One 13W – 42W 4-pin compact fluorescent lamp with no integral starter
  - c. Two 13W – 32W 4-pin compact fluorescent lamps with no integral starter
4. Please ensure the electricity connections conform to the National Electrical Code and local regulations if applicable.
5. To reduce the risk of electric shock, disconnect all normal and emergency power supplies including the battery connector before servicing.
6. This device is designed for factory or field installation in either the ballast channel or on top of the indoor fixtures. Do not install this device near gas or electric heaters.
7. An unswitched power source of 120 or 277 v, 60Hz is required for Battery Pack operation.
8. The battery is sealed, non-maintenance, and is not replaceable in the field. Please contact manufacturer for information on service. Do not attempt to service the battery please.
9. Do not use accessory equipment that is not recommended by manufacturer. Failure to do so may cause unsafe conditions. Servicing should only be performed by qualified service personnel.
10. This product should not be used for anything other than its intended use.
11. All service should be performed by qualified personnel.



**CAUTION** :Contains nickel-cadmium rechargeable battery. Must be recycled or disposed of properly.



NOTE: All the branch circuit wiring has to be ready as well as an unswitched source of power before the fixture is installed. Confirm the same branch circuit will run the emergency ballast and AC ballast.

CAUTION: Inverter connector has to be opened for preventing high voltage on output leads (red & yellow). Only connect the inverter connection after the installation process is complete and AC power is supplied to the emergency ballast.

1. AC power has to be off before installation.
2. Choose the right wiring diagram to connect the emergency ballast to AC ballast and lamp(s).
3. The emergency ballast can be used with one, two, three or four lamp fixtures and operates no more than two lamps in emergency mode. Study the wiring schematics carefully.
4. Follow diagram 1 to connect the emergency ballast and test plate. Please ensure that the electrical connections conform to the National Electrical Code and local regulations if applicable. Install the test plate close to the fixture or at a remote location within 50 feet (recommended). The emergency ballast should either be installed at half the distance recommended by the AC ballast manufacturer (to install the AC ballast away from the lamps) or at a distance within 50 feet, which is smaller. If there is no AC ballast, then the emergency ballast needs to be mounted at a distance within 50 feet.
5. The emergency ballast has to be connected to an unswitched 120VAC or 277VAC power source with no exception. Other voltages are not accepted. Do not join the inverter connector until the fixture is completely installed and supply AC power to the emergency ballast.
6. An additional unswitched hot wire (120VAC or 277VAC) has to be run to the junction box and connected to the emergency ballast in cases of switched fixtures.
7. The battery needs to be charged for a minimum of two hours in order to do a short-term test of the emergency function. A full 24 hour charge is needed for a long-term emergency function testing.
8. Search in readily visible location and place the label with "CAUTION: This Unit Has More Than One Power Supply Connection Point. To Reduce The Risk Of Electric Shock, Disconnect Both The Branch Circuit-Breakers Or Fuses And Emergency Power Supplies Before Servicing."

NOTE: SWITCH BOX IS NOT SUPPLIED

#### OPERATION:

THE CHARGING INDICATOR LIGHT WOULD BE ON TO INDICATE THE BATTERY IS BEING CHARGED WHEN AC POWER IS APPLIED.

THIS EMERGENCY BALLAST WOULD FUNCTION AND OPERATE ONE (OR TWO LAMPS AT REDUCED ILLUMINATION) WHEN THE AC POWER IS FAILED

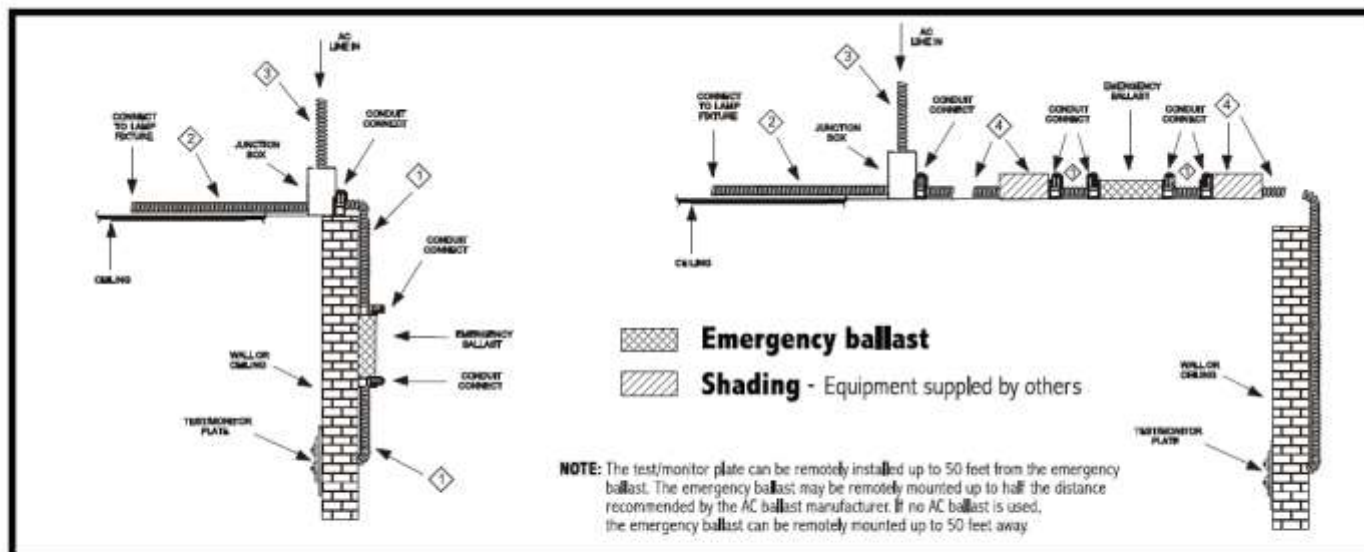
THIS EMERGENCY BALLAST WILL OPERATE 6 WATT TO 42 WATT LAMPS AT LEAST 90 MINUTES.



CAUTION :Contains nickel-cadmium rechargeable battery. Must be recycled or disposed of properly.



## DIAGRAM 1



- ① - Flexible conduit (supplied) to connect ballast wire
- ② - Existing conduit to run existing wire to lamp holder (AC ballast on junction box). If AC ballast is on reflector, run yellow, and blue wires from emergency ballast through this conduit
- ③ - AC line in
- ④ - Conduit and junction box (not supplied), necessary for remote installation

### MAINTENANCE:

NOTE: SERVICES SHOULD ONLY BE PERFORMED BY QUALIFIED PERSONNEL.

THE EMERGENCY BALLAST SHOULD BE CHECKED PERIODICALLY TO CONFIRM FUNCTIONING AND THE FOLLOWING SCHEDULE IS RECOMMENDED

- 1) TO INSPECT THE CHARGING INDICATOR EVERY MONTH AND CONFIRM THAT IS ILLUMINATED.
- 2) PUSH THE TEST SWITCH FOR 30 SECONDS TO ENSURE THE EMERGENCY BALLAST IS FUNCTIONING, RECOMMENDED TO PERFORM THIS TEST EVERY 30 DAYS.
- 3) PERFORMING A LONG-TERM (90 MINUTE BATTERY DISCHARGE) IN EVERY YEAR. ONE OR TWO LAMPS SHOULD BE OPERATED FOR NO LESS THAN 90 MINUTES.



**CAUTION :** Contains nickel-cadmium rechargeable battery. Must be recycled or disposed of properly.





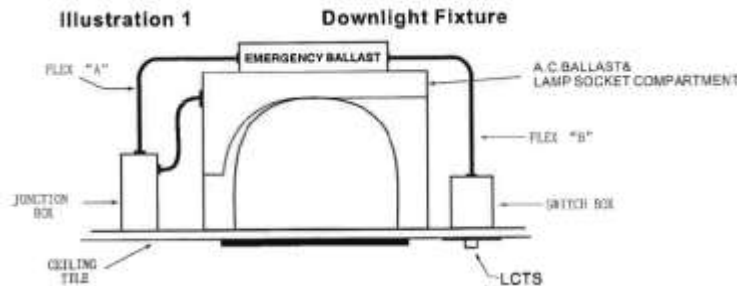
Wiring information for ballast with LED Combo Test Switch (LCTS)  
For ballasts where indicator light and test switch are not separate.

## INSTALLATION INSTRUCTIONS

**CAUTION:** Before installing, make certain the A.C. power is off and the **EMERGENCY BALLAST'S** unit connector is disconnected.

### 1. MOUNTING THE EMERGENCY BALLAST(BATTERY PACK)

When used with ceiling mounted down light fixtures, the **EMERGENCY BALLAST** should be mounted on the fixture above the ceiling. The flex conduit marked "A" should be wired into the ballast lamp compartment or to an electrical junction box on the fixture which allows access to the ballast/lamp connection. Refer to illustration 1 for typical mounting.



When battery packs are remote mounted, the remote distance cannot exceed 1/2 of the distance from ballast to lamp(s) specified by the A.C. ballast manufacturer. Under no circumstances should the battery pack exceed a distance 50' from the lamp.

### 2. INSTALLING THE LED COMBO TEST SWITCH(LCTS)

Cut the single gang switch box into the ceiling tile adjacent to the fixture within reach of the **EMERGENCY BALLAST** flex marked "B". After mounting the switch box, connect flex "B" to the box and route all leads inside the box.

Refer to illustration 1 for typical mounting.

### 3. WIRING

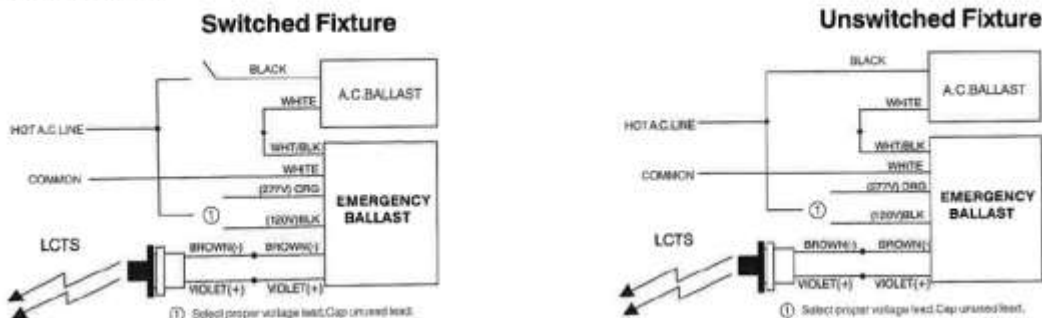
A. The **EMERGENCY BALLAST** and A.C. Ballast **must** be on the same branch circuit.

B. This **EMERGENCY BALLAST** requires an **unswitched** A.C. Power source of either 120 or 277 volts; therefore, when used with switched fixtures, input to the **EMERGENCY BALLAST** must be wired ahead of the switch.

Refer to Illustration 2 (next page) for switched and unswitched fixture wiring diagrams.

C. Refer to the wiring diagrams on the back page for proper wiring. For wiring diagrams of ballasts not shown, consult customer service.

Illustration 2



Wiring information for ballast with LED Combo Test Switch (LCTS)  
For ballasts where indicator light and test switch are not separate.

#### 4. LABELS

Attach the appropriate labels adjacent to the **LCTS**. Annotate Re-lamping label for lamp type and wattage. The 'Caution' and the 'Re-lamping' labels must be on the fixture in a readily visible location to anyone attempting to service the fixture

**INSURE WIRING IS IN ACCORDANCE WITH NATIONAL ELECTRICAL CODE AND LOCAL REGULATIONS.**

#### 5. COMPLETING INSTALLATION

When the installation is complete, switch the A.C. power ON and join the EMERGENCY BALLAST' S unit connector.

#### OPERATION

**General**-This unit is primarily designed to be used with compact fluorescent lamp down light fixtures. It will wire in conjunction with the existing A.C. Ballast(s) and lamp(s) to provide the emergency function. It can also be wired for emergency only operation. The **LCTS** light is offered in a standard single gang switch box for installation adjacent to the fixture.

**Normal Mode** - A.C. power is present. The A.C. ballast operates the fluorescent lamp(s) as intended. The **LCTS** will be lit providing a visual indication that the **EMERGENCY BALLAST** is in the standby charging mode.

**Emergency Mode** -The A.C. power fails. The **EMERGENCY BALLAST** senses the A.C. power failure and automatically switches to the Emergency Mode. One or two lamp illuminate, at reduced output, for a minimum of 90 minutes. When the A.C. Power is restored, the **EMERGENCY BALLAST** switches the system back to the Normal Mode and resumes battery charging.

#### TESTING & MAINTENANCE

Pressing the red lens on the **LCTS** turns off the light on the **LCTS** and forces the unit into emergency mode. This interrupts power to the emergency lamps only. The emergency lamp is now being lit by the **EMERGENCY BALLAST** unit and will be less bright than the other lamps in the system. To simulate a "BLACKOUT" use the circuit breaker to turn off A.C. Power.

**Initial Testing** -Allow the unit to charge for approximately 1 hour, and then press the **LCTS** to conduct a short discharge test. Allow a 24 hour charge before conducting a 1 1/2 hour test.

This **EMERGENCY BALLAST** is a maintenance free unit, however, periodic inspection and testing is required. NFPA 101, Life Safety Code, outlines the following schedule:

**Monthly** - Insure that the **LCTS** is illuminated. Conduct a 30 second discharge test by depressing the **LCTS**. One or two lamps should operate at reduced output.

**Annually** - Insure that the **LCTS** is illuminated. Conduct a full 1 1/2 hour discharge test. The unit should operate as intended for the duration of the test.

## WIRE DIAGRAMS FOR 2-LAMP EMERGENCY OPERATION

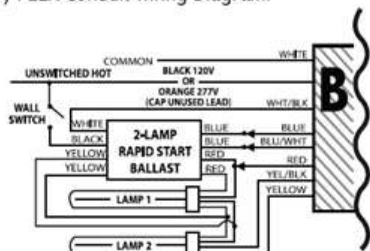
EMERGENCY BALLAST AND AC BALLAST MUST BE FED FROM THE SAME BRANCH CIRCUIT

TYPICAL SCHEMATICS ONLY. MAY BE USED WITH OTHER BALLASTS. CONSULT THE FACTORY FOR OTHER WIRING DIAGRAMS

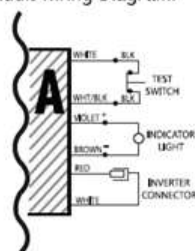
### Two-lamp emergency operation for lamps up to 32W

#### A. TWO (2) FOUR PIN COMPACT LAMP RAPID START BALLAST

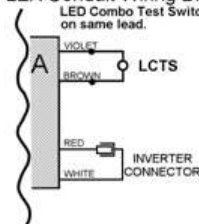
1.B) FLEX Conduit Wiring Diagram:



2.A) FLEX Conduit Wiring Diagram:

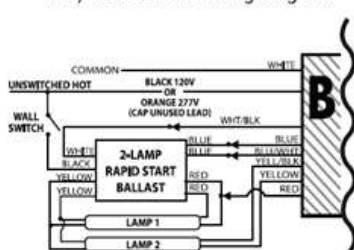


2. A) FLEX Conduit Wiring Diagram:  
LED Combo Test Switch (LCTS)  
on same lead.

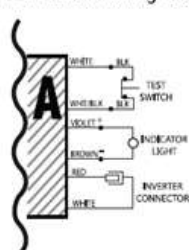


#### B. TWO (2) LAMP RAPID START BALLAST

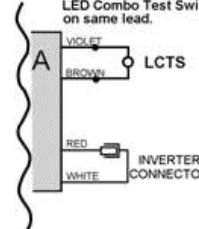
1.B) FLEX Conduit Wiring Diagram:



2.A) FLEX Conduit Wiring Diagram:



2. A) FLEX Conduit Wiring Diagram:  
LED Combo Test Switch (LCTS)  
on same lead.





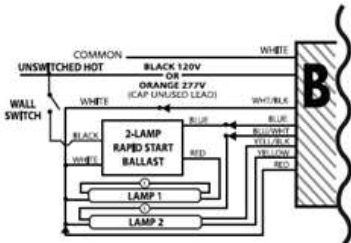
## WIRE DIAGRAMS FOR 1-LAMP EMERGENCY OPERATION

EMERGENCY BALLAST AND AC BALLAST MUST BE FED FROM THE SAME BRANCH CIRCUIT

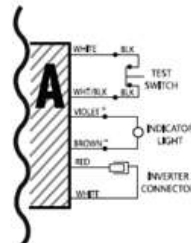
TYPICAL SCHEMATICS ONLY. MAY BE USED WITH OTHER BALLASTS. CONSULT THE FACTORY FOR OTHER WIRING DIAGRAMS

### C. TWO (2) LAMP PREHEAT BALLAST (Lamp 2 operates in emergency mode)

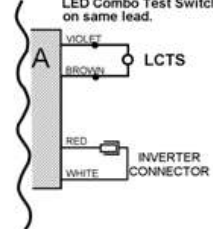
1.B) FLEX Conduit Wiring Diagram:



2.A) FLEX Conduit Wiring Diagram:

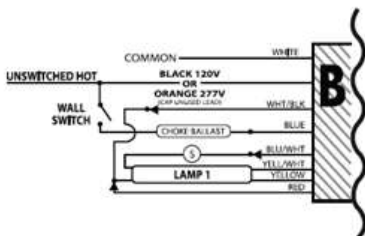


2. A) FLEX Conduit Wiring Diagram:  
LED Combo Test Switch (LCTS)  
on same lead.

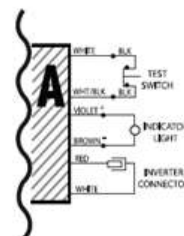


### D. ONE (1) LAMP CHOKE BALLAST

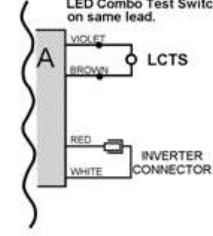
1.B) FLEX Conduit Wiring Diagram:



2.A) FLEX Conduit Wiring Diagram:

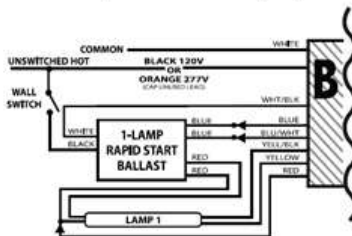


2. A) FLEX Conduit Wiring Diagram:  
LED Combo Test Switch (LCTS)  
on same lead.

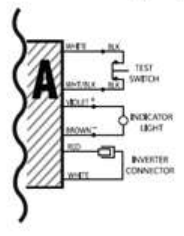


### E ONE (1) RAPID START BALLAST

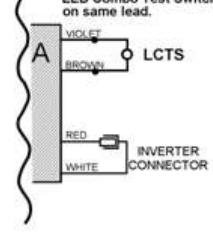
1.B) FLEX Conduit Wiring Diagram:



2.A) FLEX Conduit Wiring Diagram:

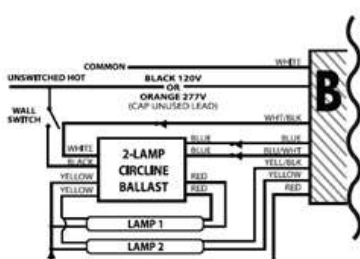


2. A) FLEX Conduit Wiring Diagram:  
LED Combo Test Switch (LCTS)  
on same lead.

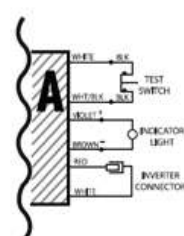


### F. TWO (2) LAMP RAPID START BALLAST (Lamp 2 operates in emergency mode)

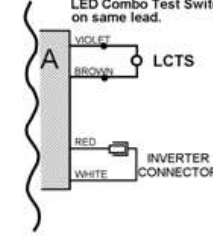
1.B) FLEX Conduit Wiring Diagram:



2.A) FLEX Conduit Wiring Diagram:



2. A) FLEX Conduit Wiring Diagram:  
LED Combo Test Switch (LCTS)  
on same lead.



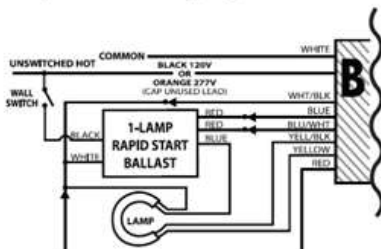
## WIRE DIAGRAMS FOR 1-LAMP EMERGENCY OPERATION

EMERGENCY BALLAST AND AC BALLAST MUST BE FED FROM THE SAME BRANCH CIRCUIT

TYPICAL SCHEMATICS ONLY. MAY BE USED WITH OTHER BALLASTS. CONSULT THE FACTORY FOR OTHER WIRING DIAGRAMS

**G. ONE (1) LAMP CIRCLINE RAPID START BALLAST**

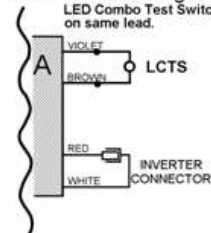
1.B) FLEX Conduit Wiring Diagram:



### 2.A) FLEX Conduit Wiring Diagram:

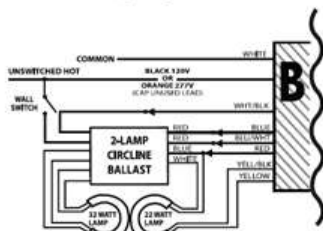


2. A) FLEX Conduit Wiring Diagram:  
LED Combo Test Switch (LCTS)  
on same lead.



**H. TWO (2) LAMP CIRCLINE RAPID START BALLAST (22 watt lamp operates in emergency mode)**

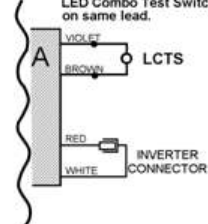
1.B) FLEX Conduit Wiring Diagram:



### 2.A) FLEX Conduit Wiring Diagram:

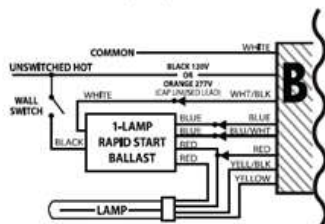


2. A) FLEX Conduit Wiring Diagram:  
LED Combo Test Switch (LCTS)  
on same lead.



**I. ONE (1) FOUR PIN COMPACT LAMP RAPID START BALLAST**

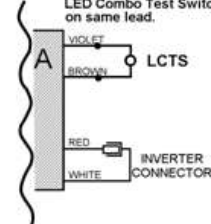
1.B) FLEX Conduit Wiring Diagram:



### 2.A) FLEX Conduit Wiring Diagram:

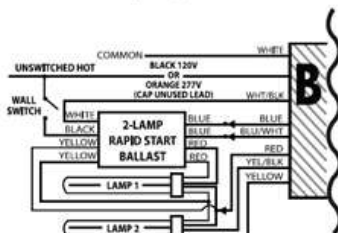


2. A) FLEX Conduit Wiring Diagram:  
LED Combo Test Switch (LCTS)  
on same lead.



**J. TWO (2) FOUR PIN COMPACT FLUORESCENT LAMP RAPID START BALLAST (Lamp 2 operates in emergency mode)**

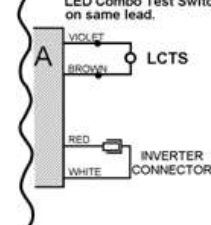
### 1.B) FLEX Conduit Wiring Diagram:



### 2.A) FLEX Conduit Wiring Diagram:



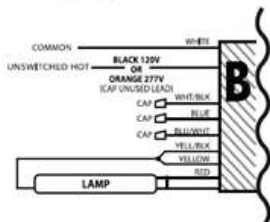
2. A) FLEX Conduit Wiring Diagram:  
( LED Combo Test Switch (LCTS)  
on same lead.



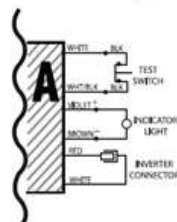
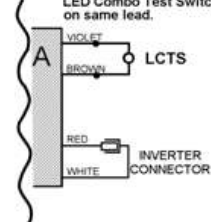
## WIRE DIAGRAMS FOR EMERGENCY-ONLY FIXTURES

### K. ONE (1) LAMP WITHOUT AC BALLAST

1.B) FLEX Conduit Wiring Diagram:

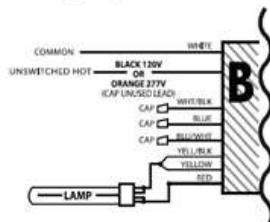


2.A) FLEX Conduit Wiring Diagram:

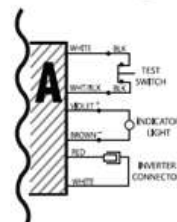
2. A) FLEX Conduit Wiring Diagram:  
LED Combo Test Switch (LCTS)  
on same lead.

### L. ONE (1) FOUR PIN COMPACT LAMP WITHOUT AC BALLAST

1.B) FLEX Conduit Wiring Diagram:



2.A) FLEX Conduit Wiring Diagram:

2. A) FLEX Conduit Wiring Diagram:  
LED Combo Test Switch (LCTS)  
on same lead.