

380VDC 6-Lamp Ballast Retrofit



Installation and User's Manual

380VDC SIX LAMP BALLAST MODEL: NB380-T832-06-ISBL

Rev. 040114

Please contact Customer Support at 1-800-24VOLTS for further information.





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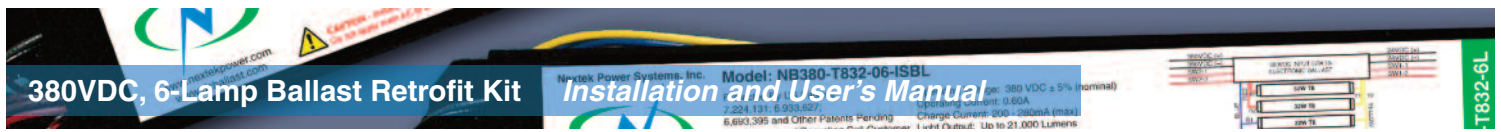
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ABOUT NEXTEK POWER SYSTEMS

Nextek Power Systems AC/DC integration technology represents a breakthrough in on-site electrical management, combining the availability of AC power with the quality and efficiency of a DC supply.

NEXTEK PRODUCT BENEFITS

- Easy conversion of AC lighting fixtures to DC-powered units
- Easy conversion of AC grid power into DC power for commercial building applications
- Highly efficient management of peak loads
- Future-proof lighting and other systems to be developed
- Nextek Power Systems Direct Coupling® Technology, directly connects clean power generated at a building to its electronic loads inside cutting down on over-all power consumption, boosts electricity generated and stored on-site, and delivers a robust renewable energy ready network.

DISCLAIMER

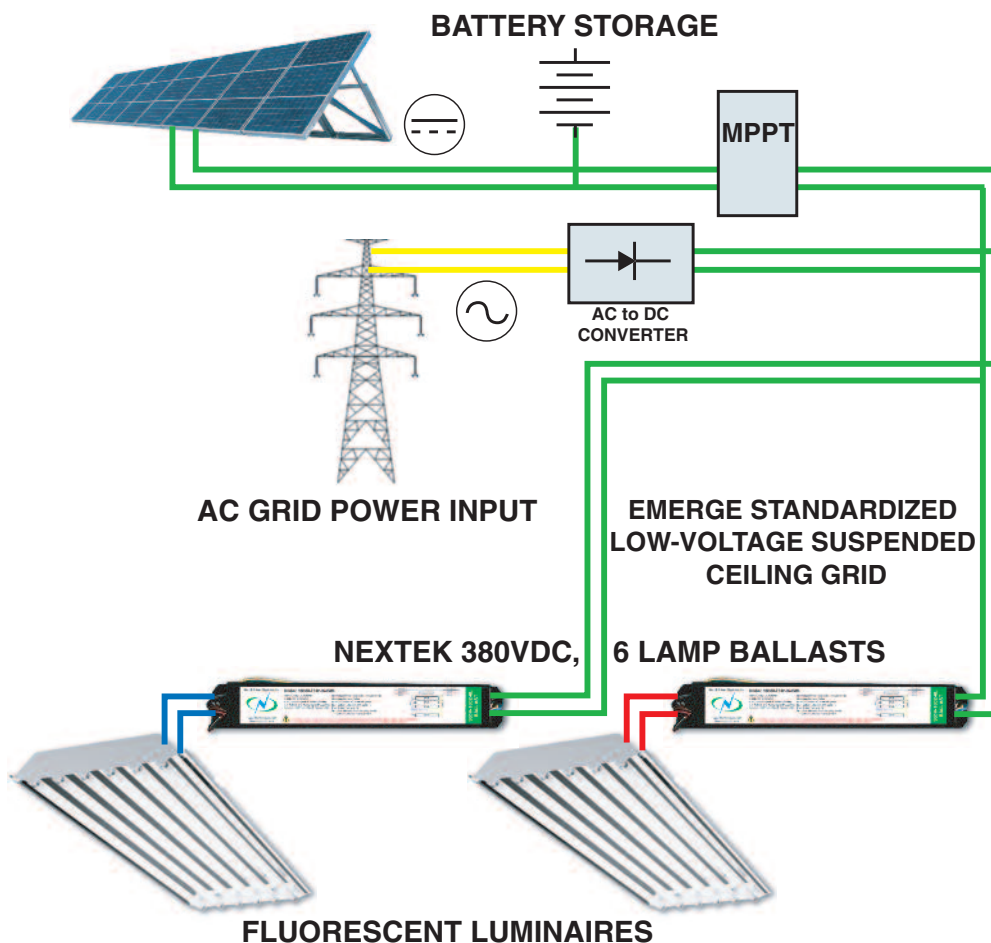
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INTRODUCTION

Nextek Ballasts

- Nextek's **380VDC Ballast Retrofit Kit** converts existing luminaires from AC power to high efficiency, bus voltage Direct Current (DC) power by simply replacing the ballasts.
- Convert luminaires without replacing bulbs or system wiring. Nextek ballasts are sized to use pre-existing mounting holes and hardware too.
- The simple procedure takes only minutes to complete.
- Nextek's Maximum Power Point Tracking Controller is recommended for greatest system efficiency and control.

HIGH VOLTAGE DIRECT CURRENT INPUT FROM PV PANEL, HVDC GRID, OR OTHER DC POWER GENERATOR



Nextek ballasts in a Direct Current microgrid power system.

1.0 SAFETY

- 1.1 **SAVE THESE INSTRUCTIONS**– This manual contains important safety and operating instructions for the Nextek Ballast Retrofit Kit.

The following symbols are used throughout this manual to indicate potentially dangerous conditions or mark important safety instructions:



DANGER:

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.



WARNING:

Indicates a potentially dangerous condition. Use extreme caution when performing this task.



CAUTION:

Indicates a critical procedure for safe and proper operation of the controller.



NOTE:

Indicates a procedure or function that is important for the safe and proper operation of the controller.


- 1.2 Before using the Ballast Retrofit Kit, read all instructions and cautionary markings.
- 1.3 Electrical hazards are probably the most common hazards throughout the industry. Virtually all workplaces have electrical installations and use electricity.
- 1.4 It is very important that all industry employees be familiar with electrical hazards and know how to protect themselves when working on, near, or with electricity. In most cases, industry electrical and electronic equipment is designed for both maximum safety and efficiency. However, potentially hazardous conditions such as inadvertent contact with hazardous voltages may exist while performing servicing and maintenance, handling materials, or cleaning.
- 1.5 The improper use of electrical extension cords and portable electrical equipment can result in hazardous exposure.



1.6 **WARNING - RISK OF ELECTRICAL SHOCK**

- 1.6.1 This Ballast Retrofit Kit requires knowledge of fluorescent lighting luminaires electrical systems. If not qualified, do not attempt installation. Contact a qualified electrician.
- 1.6.2 This kit is intended only for use with luminaires located in dry locations (indoors).

1.0 SAFETY

- 1.6.3 Install this kit only in non-IC luminaires that have similar features and dimensions as the photographs and/or drawings shown here.
- 1.6.4 The ballast supplied with this kit is intended for use with instant-start lampholders. Lampholders marked with a circle "I" meet these requirements. Tombstone pins in the lampholder should be shorted.
- 1.6.5 To prevent wiring damage or abrasion, do not expose wiring to edges of sheet metal or other sharp objects.
- 1.6.6 Only those open holes indicated in the photographs and/or drawings may be made or altered as a result of kit installation. Do not leave any other open holes in an enclosure of wiring or electrical components.
- 1.6.7 A listed Class 1 380VDC output supply, such as a 380VDC bus line, may be used as a power source for the *Nextek* 380VDC ballast.
- 1.6.8 These *Nextek* 380VDC ballasts are intended for use only with non-IC luminaires (not intended for Insulation Contact).
- 1.6.9 Before wiring 380VDC supply to ballasts, remove any old AC wiring, including any ground wires, between the line voltage ballast and the nearest junction box.
- 1.7  **DANGER – TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, CAREFULLY FOLLOW THESE INSTRUCTIONS**
 - 1.7.1 Do not disassemble or attempt to repair the ballasts. There are no user serviceable parts inside *Nextek* ballasts.
 - 1.7.2 Install external fuses/breakers as required.
 - 1.7.3 Disconnect power to the luminaire before installing the ballasts, removing old ballasts or wiring, or otherwise working with the unit.
- 1.8 **INSTALLATION SAFETY PRECAUTIONS**
 - 1.8.1 Mount the Ballast Retrofit Kit indoors only. Prevent exposure to the elements.
 - 1.8.2 Power connections must remain tight to avoid excessive heating from a loose connection.
 - 1.8.3 Use properly sized conductors and circuit interrupters.
 - 1.8.4 The *Nextek* Ballast Retrofit Kit is to be connected to DC circuits only.




2.0 STANDARDS AND REQUIREMENTS

2.0 STANDARDS AND REQUIREMENTS

- 2.1 All DC cable types must meet all local and national codes
- 2.2 Shut off all DC circuit breakers or fuses before installing any unit into the field.

3.0 REGULATORY INFORMATION

- 3.1  **NOTE:** This section contains important information for safety and regulatory requirements.
- 3.2 The Ballast Retrofit Kit should be installed by a qualified technician according to the electrical rules of the country in which the product will be installed.
- 3.3 Nextek ballasts comply with the following EMC standards:
 - 3.3.1 Immunity: EN61000-6-2:1999
 - 3.3.2 Emissions: EN55022:1994 with A1 and A3 Class B1
- 3.4 A means shall be provided to ensure all the poles are disconnected from the power supply. This disconnection shall be incorporated in the fixed wiring.
- 3.5 **FCC Requirements:**

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by Nextek Power Systems, Inc. for compliance could void the user's authority to operate the equipment.

Note:

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 18 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communication. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment on and off, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

4.0 INSTALLATION QUALIFICATIONS

- 4.1 Installation work and electrical wiring of permanently-connected power units must be performed only by qualified service personnel in accordance with all applicable codes and standards, including fire-rated construction.

5.0 BALLAST FEATURES AND SPECIFICATIONS

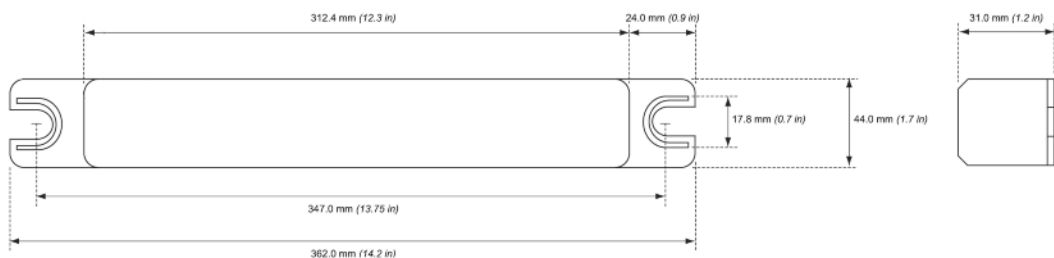
5.1 Features

- Tri-stage dimming that allows for 0%, 33%, 66%, and 100% of the lamps to be lit.
- Simple Mechanical / Smart Switch configurable with NO/NC
- > 97% efficient
- Class 2 safe 24VDC/250mA out for powering ballast accessories, e.g. Smart Switches and emergency/ backup ballasts.
- Auxiliary Output supply of 24VDC / 250mA to power smart switches
- Simple Mechanical / Smart Switch configurable
- Works at 10-65°C ambient, perfect for Highbay applications
- Low cost 6-lamp class ballast
- Type 1, Class P, Sound rated A
- UL 935, UL E242233 / CUL listed; CSA 22.2

5.2 Technical Specifications

Operating Voltage:	380 VDC (nominal) ±10%	Dimming:	Tri-level
Operating Current:	0.60 Amp @ 380V DC	Dimensions:	W=1.7" H=1.2" L=14.2" (44mm x 31mm x 362mm)
Operating Temperature:	10°C-65°C	Weight:	1.5 lbs.
Maximum Ballast Factor:	1.14	Construction:	Steel
Peak Efficiency:	> 97%	Operated With:	F32T8, F32T8ES, FB032, FB32*
Crest Factor:	< 1.5	All specifications are subject to change without notice. *For wattages other than 32, please contact Nextek Power Systems, Inc. at 1-877-24VOLTS	

5.3 Enclosure Diagram



5.4 Kit contents:

1. Ballast
2. These instructions
3. Wire nuts: 18 for six-lamp ballast conversion
4. Cable ties (6)
5. Labels to be affixed to exterior of luminaire:

Luminaire Conversion Retrofit

This luminaire contains a 380V DC input ballast

Nextek Power Systems
461 Burroughs St, Detroit, MI 48202
www.nextekpower.com


Use only with 380VDC Class 1 Power Unit
Do not connect to line voltage

6.0 GENERAL REQUIREMENTS

- 6.1 Every work environment should provide a safe place for every employee, which includes protecting the employee from electrical hazards such as fault currents to ground.
- 6.2 When an electrical ground fault occurs, the current flows through the path having minimum impedance to ground. It is imperative that an employee does not inadvertently become the conductor of the current.
- 6.3 Two approved methods of protecting the worker from a ground fault, in addition to other requirements for equipment-grounding conductors, are:
 - 6.3.1 Use of ground fault circuit interrupters (GFCI)
 - 6.3.2 An assured equipment grounding conductor program
- 6.4 Installers should be advised:
 - 6.4.1 These installation instructions are for use by qualified personnel only.
 - 6.4.2 The equipment contains DC voltages.
 - 6.4.3 ➤ **NOTE:** Installers must reference the National Electric Code (NEC) sections 250 or 690, when required, to ensure proper system wiring and grounding compliance. In addition, all state and federal Occupational Safety and Health Administration (OSHA) guidelines and regulations must be followed.
 - 6.4.4 ➤ **NOTE:** Installers must reference the specific site scope and project drawings for additional information and considerations, including the system layout and any related electrical drawings.
 - 6.4.5 The mounting location is important to the performance and operating life of the unit. The environment must be dry and protected from water ingress.
 - 6.4.6 The installation is straightforward, but it is important each step is done correctly and safely. A mistake can lead to dangerous voltage and current levels. Be sure to carefully follow each instruction in this section. Read all instructions first before beginning installation.
 - 6.4.7 The installation instructions are for installation of a negative grounded system. National Electrical Code (NEC) requirements are noted on occasion for convenience, however, the installer should have a complete understanding of NEC and UL requirements for photovoltaic installations.
 - 6.4.8 ➤ **NOTE:** The retrofit assembly is accepted as a component of a fluorescent luminaire where the suitability of the combination shall be determined by CSA or authorities having jurisdiction.



6.0 GENERAL REQUIREMENTS

6.4.9  **NOTE:** Inspect wiring and components for damage when drilling for installation of retrofit assembly hardware.

6.5 Recommended Tools

6.5.1 This installation may require the following, depending on the installation of specific ballasts and existing wiring:

#2 and #0 Phillips screwdrivers

Slotted screwdriver

Wire strippers

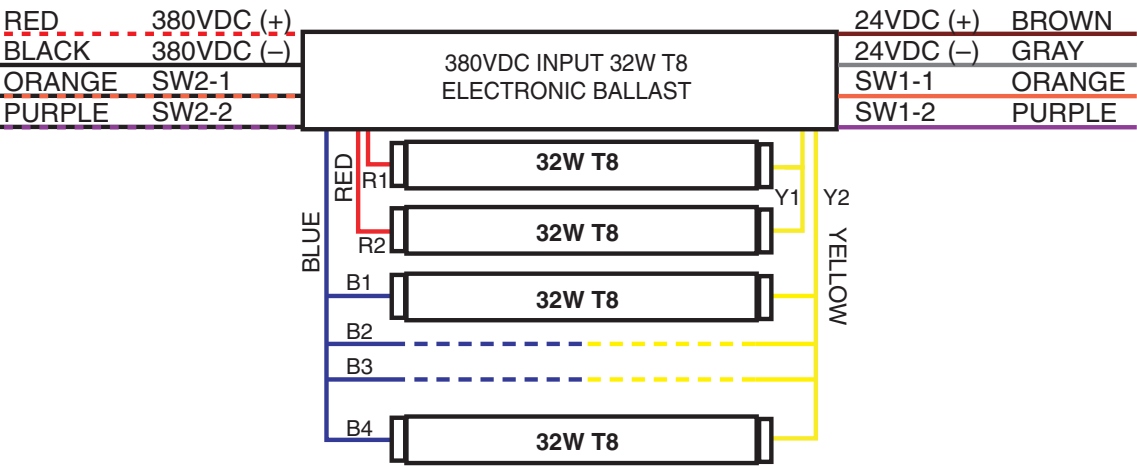
Wire cutters

Pliers

7.0 INSTALLATION PROCEDURE

7.1 380VDC 6-LAMP BALLAST MODELS

380VDC 6-LAMP BALLAST WIRING DIAGRAM



7.1.1 **NOTE:** If an AC ballast has been previously installed in the location, refer to the Nextek Ballast Retrofit Kit Installation and User Manual for ballast removal procedures. The manual is available for download at www.nextekpower.com.

7.1.2 **WARNING - Shock Hazard**

At the supply panel, disconnect power to the luminaire(s).

WARNING - Risk of fire or electric shock. Luminaire wiring and electrical parts may be damaged when drilling for installation of unit. Check for enclosed wiring and components.

7.1.3 **CAUTION:** Gain access to the ballast wiring enclosure and remove all line voltage wiring between existing ballast and the nearest junction box, including any ground wires and armored cable. If the luminaire was powered by line voltage from an adjacent luminaire, remove any line voltage wiring between the luminaires. Cap off any exposed live leads with included wire nuts.

- 7.1.4 Cut control wires going to the line voltage ballast, if present.
- 7.1.5 Cut the lampholder wires at the ballast, and strip the cut ends to wire nut specifications.
- 7.1.6 Remove the old line voltage ballast.

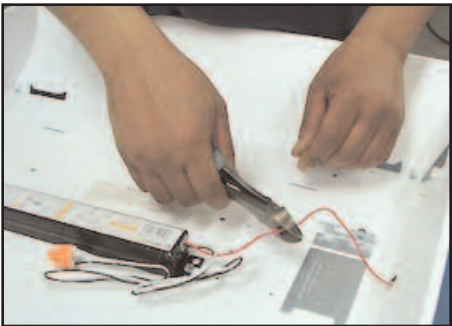


Figure 7.1.4

7.0 INSTALLATION PROCEDURE

- 7.1.7 Mount the new *Nextek* 380VDC ballast using existing studs or screws. If necessary, secure ballasts using appropriately sized sheet metal screws. If no existing hole or stud exists at the correct mounting location, use a self-tapping sheet metal screw.

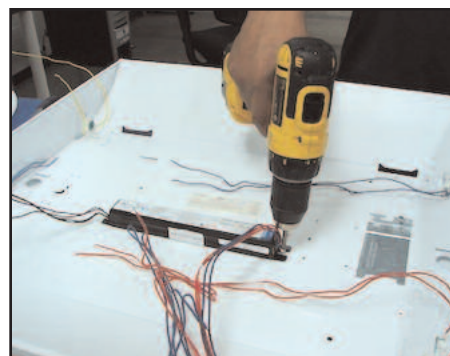



Figure 7.1.7

- 7.1.8 For pre-existing mounting studs or holes:
- 7.1.8.1 Carefully align the ballast slot to one mounting hole or stud and insert a sheet metal screw with a star washer. The washer is for enclosure to fixture grounding purposes.
 - 7.1.8.2 Do not tighten the screw completely. Leave a 1/4" (6 mm) gap between the mounting surface and screw head.
 - 7.1.8.3 Carefully align the ballast slot to one mounting hole or stud and insert a sheet metal screw.
 - 7.1.8.4 When the ballast is properly positioned, tighten both (2) screws.
 - 7.1.8.5 Proceed to step 7.1.10.
- 7.1.9 For a surface with no pre-existing mounting studs or holes:
- 7.1.9.1 Place a mark on the mounting surface for one of the mounting holes in accordance with the luminaire manufacturer's instructions or drawings.
 - 7.1.9.2 Use a self-tapping sheet metal screw to insert the first screw at the mark.
 - 7.1.9.3 Do not tighten the screw completely. Leave a 1/4" (6 mm) gap between the mounting surface and screw head.
 - 7.1.9.4 Mark the second mounting hole location for the ballast.
 - 7.1.9.5 Carefully align the ballast slot to the second mounting hole and insert a sheet metal screw.
 - 7.1.9.6 When the ballast is properly positioned, tighten both (2) screws.
- 7.1.10  **WARNING** - Risk of fire or electric shock. Luminaire wiring and electrical parts may be damaged when drilling for installation of Fluorescent conversion kit. Check for enclosed wiring and components.

7.0 INSTALLATION PROCEDURE

7.1.11 LAMPHOLDERS:

- 7.1.11.1 If existing lampholders have a wire shunting the pins, go to step 7.1.10.
- 7.1.11.2 If existing lampholders are not shunted, then shunt the lampholders with external wire.

7.1.12 Connect the lampholder lead wires from the new Nextek ballast as shown on the Ballast Rewiring Schematic to the lampholder wires from the luminaire using wire nuts.

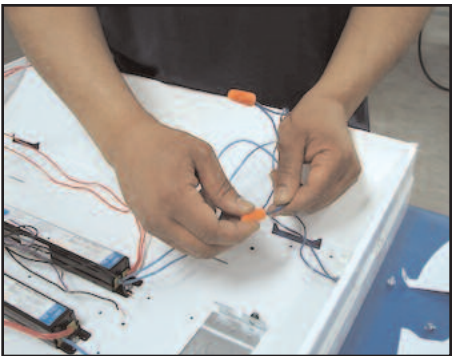
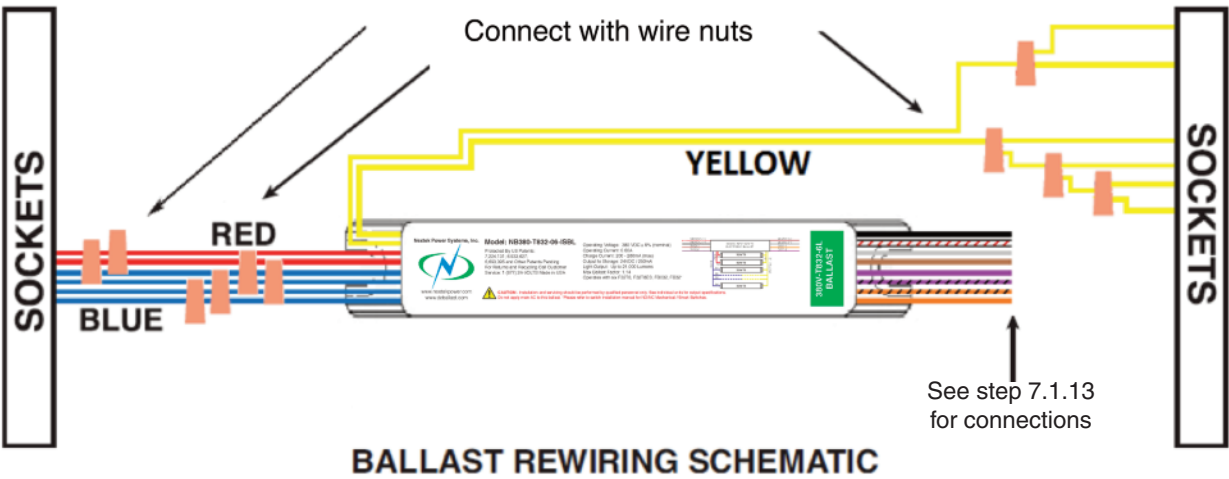


Figure 7.1.10



7.1.13 Connect the switch control wires (purple, orange, purple/black stripe, and orange/black stripe) to switch as described in the Switch Wiring Tables below. If no switching is desired then cap off the orange wires and purple wires with wire nuts separately.

Switch Type	Switch's First Contact	Switch's Second Contact
Normally Open ¹	Purple(SW1) Purple/Black striped (SW2)	Gray (SW1 & SW2)
Normally Closed	Orange(SW1) Orange/Black striped (SW2)	Purple and Gray (SW1 & SW2)

Simple Switch Wiring Table

NOTE¹: The Orange and Orange/Black Striped wires are unused, cap off with wire nuts.

7.0 INSTALLATION PROCEDURE

Switch Type	Pwr in +	Pwr in –	Switch’s First Contact	Switch’s Second Contact
Normally Open ²	Brown	Gray	Purple(SW1) Purple/Black striped (SW2)	Gray (SW1 & SW2)
Normally Closed	Brown	Gray	Orange(SW1) Orange/Black striped (SW2)	Purple and Gray (SW1 & SW2)

Smart Switch Wiring Table

➤ **NOTE²:** The connection to Gray is not necessary if the Switch is internally grounded.

- 7.1.14 The Brown and Gray wires are for the Auxiliary 24VDC supply. The supply is designed for 24VDC low power devices like smart switches or the Nextek Power Systems Emergency Ballast. The polarity for the 24VDC supply is the brown lead is +24VDC and the gray lead is -24VDC. If the Auxiliary supply is not required, then cap off the brown and gray leads individually.
- 7.1.15 Connect Nextek 380 Volt DC ballast input leads (black wire (-380VDC) and white stripped red wire (+380VDC) to a suitably-rated 90°C conduit enclosed 380VDC bus line) inside the luminaire with no exposed wiring (wire must be in conduit) on the outside of the luminaire.
- 7.1.16 Ballast is grounded to the enclosure and thus the luminaire. Connect the ground wire to the luminaire via the luminaire’s grounding terminal/screw.
- 7.1.17 Replace any covers or diffusers removed during the conversion installation.
- 7.1.18 Plug any unused openings in the luminaire created by the removal of branch wiring.
- 7.1.19 Affix the included sticker to outside of luminaire near ballast access cover.
- 7.1.20 Connect the power wire from the luminaire to a 380VDC bus line.
- 7.1.21 Set Dimming Control to operate as follows:

Switch Type / Dim Level	0%	33%	66%	100%
NO	SW1 Open SW2 Closed	SW1 Closed SW2 Open	SW1 Open SW2 Closed	SW1 Closed SW2 Closed
NC	SW1 Closed SW2 Closed	SW1 Open SW2 Closed	SW1 Open SW2 Closed	SW1 Open SW2 Open



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