

Thank you for purchasing Waveform Lighting's T8 LED tube light. Please carefully read the installation instructions prior to installation and use.

ALWAYS OBSERVE ELECTRICAL SAFETY PRECAUTIONS. INSTALLATION SHOULD ONLY BE PERFORMED BY QUALIFIED INDIVIDUALS WITH KNOWLEDGE OF LAMP FIXTURE OPERATION AND INSTALLATION. IF YOU ARE NOT QUALIFIED OR NOT COMFORTABLE, SEEK A QUALIFIED ELECTRICIAN'S ASSISTANCE.

IMPORTANT: LAMP ENDS AND LAMPS ARE FRAGILE. PRIOR TO INSTALLATION, INSPECT EACH BULB AND CONFIRM THAT IT WAS NOT DAMAGED DURING SHIPMENT OR HANDLING. REMOVE THE PROTECTIVE COVER FROM EACH OF THE LAMP ENDS AND ENSURE THE PINS ARE NOT DAMAGED. **DO NOT INSTALL OR USE LAMPS WITH DAMAGE AS THIS CAN POSE A FIRE AND SHOCK RISK.** CONTACT US IMMEDIATELY FOR A REPLACEMENT.

Our T8 LED lamps are designed to be compatible with a wide range of 4-foot T8 fluorescent fixtures, including those that have been modified or rewired for LED tube light installations. The three compatible configurations are shown below:

Method	Description	Wiring Diagram	Pros	Cons
"With Ballast"	Keeps fluorescent ballast in fixture, simply install in place of old fluorescent bulb. Fluorescent ballast must be on compatibility list (below).		<ul style="list-style-type: none"> • Very quick & easy installation • No electrical rewiring work needed • Fluorescent tubes can still be used in the fixture 	<ul style="list-style-type: none"> • Ballast failure may require rewiring in future • Lower overall system efficiency due to ballast inefficiencies
"Direct Wire", single ended (Ballast Bypass)	Removes or bypasses the fluorescent ballast, and directly connects line voltage to just one end of the LED tube.		<ul style="list-style-type: none"> • Higher system efficiency due to elimination of fluorescent ballast • Works with non-shunted tombstones only 	<ul style="list-style-type: none"> • Requires removal of ballast and additional electrical work • Fluorescent tubes no longer compatible with fixture
"Direct Wire", double ended (Ballast Bypass)	Removes or bypasses the fluorescent ballast, and directly connects line voltage to both ends of the LED tube.		<ul style="list-style-type: none"> • Higher system efficiency due to elimination of fluorescent ballast • Works with shunted and non-shunted tombstones 	<ul style="list-style-type: none"> • Requires removal of ballast and additional electrical work • Fluorescent tubes no longer compatible with fixture

WARNING:

- Carefully read the installation instructions and product labels before installing the T8 LED tube light.
- Risk of fire or electric shock. Improper installation can result in electric shock or fire.
- Rated for use in dry or damp locations only. Do not use where directly exposed to water or weather. Not-submersible (not water tight).
- Turn off all power to the fixture before inspection, installation, or removal.
- Do not open or disassemble the LED tube – no user-serviceable parts inside.

"With Ballast" Installation Instructions

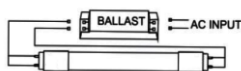
This T8 LED tube light product can be used with certain fluorescent fixtures without rewiring the fixture to remove or bypass the fluorescent ballast. The fluorescent ballast inside the fixture **MUST** be one of the approved model numbers listed below. **DO NOT** install this T8 LED tube light into a fixture with a non-approved fluorescent ballast.

If your fluorescent fixture contains a fluorescent ballast that is not listed below, follow the instructions on the reverse side for "Direct Wire" installation instructions (ballast bypass).

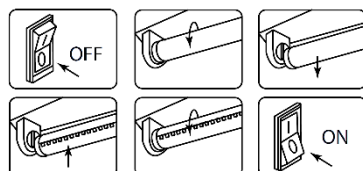
GE GE132MAX-G-347	PHILIPS ADVANCE IOPA-2P32-N	UNIVERSAL B232PUNVHE-B	HOWARD INDUSTRIES EPH4/32IS/MV/SC/HE
GE GE-132-MV-N	PHILIPS ADVANCE IOP-2P32-HL-N	UNIVERSAL B232IUNVHEH-A	KEYSTONE KTEB-232-UV-IS-N-P
GE GE132MVPS-H	PHILIPS ADVANCE IOP-2PSP32-N	UNIVERSAL B332IUNVHE-A	KEYSTONE KTEB-332-UV-IS-N-P
GE GE240PS-MV-N	PHILIPS ADVANCE IOPA-3P32-N	UNIVERSAL B332IUNVHP-A	KEYSTONE KTEB-432-UV-IS-N-P
GE GE232-120RES-B	PHILIPS ADVANCE IOPA-4P32-N	UNIVERSAL B332IUNVEL-A	EIKO PM-2X32T8-UNV-IS
GE GE259MAX-G-N	PHILIPS ADVANCE ICN-4P32-N	UNIVERSAL B432PUNVHE-A	EIKO PM-3X32T8-UNV-IS-H
GE GE232-MV-N	PHILIPS ADVANCE REB-4P32-SC	UNIVERSAL B432IUNVHE-A (A0001)	EIKO PM-4X32T8-UNV-IS
GE GE232MAX-G-N	PHILIPS ADVANCE VEL-4P32-SC	UNIVERSAL B432IUNVHE-A (51376510-D)	HALCO EP232IS/MV/HE
GE GE232MAX-G-N-DIYB	OSRAM SYLVANIA QTP 2X32T8/UNV ISN-SC	UNIVERSAL B432IUNVHE-A (1418CU4101B)	HALCO EP432ISUNVE
GE GE259MAX-G-N-DIYB	OSRAM SYLVANIA QHE 2X32T8/UNV ISN-SC	ESPEN VE2P32MVHIPE 11068	DAMAR 1688B
GE GE332MAX-G-N-DIYB	OSRAM SYLVANIA QHE 2X32T8/UNV PSN-MC	ESPEN VE2P32MVHIPHE 11069	DAMAR 1688D
GE GE332MAX-G-H	OSRAM SYLVANIA QTP 3X32T8/UNV ISN-SC	ESPEN VE2P32MVHPPE 11080	DAMAR 3654C
GE GE432MAXP347-N	OSRAM SYLVANIA QHE 3XLED32T8/UNV ISN-SC	ESPEN VE3P32MVHIPE 11070	PLUSRITE BAF232IS/MV
GE GE432MAX-G-N	OSRAM SYLVANIA QHE 3X32T8/UNV ISH HT-SC	ESPEN VE4P32MVHPPE 11086	PLUSRITE BAF332IS/MV
GE GE432MAXG-N-DIYL	OSRAM SYLVANIA QHE 3X32T8/UNV PSN-SC	ESPEN VE4P32MVHIPE 11072	ACT 3P32ISUNVE
PHILIPS ADVANCE REZ-2S32-SC	OSRAM SYLVANIA QHE 4XLED32T8/UNV ISN-SC	ESPEN VE4P32MVHIPHE 11073	ACT 4P32ISUNVE
PHILIPS ADVANCE ICN-2P32-N	OSRAM SYLVANIA QHE 4X32T8/UNV ISN-SC	ESPEN VE432120MIP	ULTRASAVE UT232347
PHILIPS ADVANCE IOPA-2P32-LW-N	OSRAM SYLVANIA QTP 4X32T8/UNV ISN-SC	HOWARD INDUSTRIES EP2/32IS/MV/MC/HE	ROBERTSON ISL432T8HEMV 3P20160
PHILIPS ADVANCE IOP-2PSP32-LW-N	UNIVERSAL B232IUNVHP-N	HOWARD INDUSTRIES EPL2/32IS/MV/MC/HE	

RISK OF ELECTRIC SHOCK OR FIRE: THIS LED TUBE LIGHT SHOULD **NOT** BE USED WITH ANY FLUORESCENT BALLASTS THAT ARE NOT LISTED ABOVE. DO NOT INSTALL THE LED LAMP IN A FIXTURE WITH A FLUORESCENT BALLAST THAT IS NOT INCLUDED IN THE LIST AS THIS CAN POSE A FIRE AND SHOCK RISK.

Installation Diagram



Installation Guide



Installation Steps

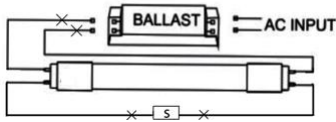
1. Switch-off power to the fixture.
2. Remove diffuser (if provided).
3. Remove the existing fluorescent lamps from the fixture by rotating 90 degrees and sliding it out.
4. Slide the LED tube light into the lampholders, and rotate the LED tube light 90 degrees until securely mounted. The "Waveform Lighting" logo should face outwards.
5. Re-install diffuser (if removed in step 2).
6. Switch on power to the fixture.

“Direct Wire” Installation Instructions (Ballast Bypass)

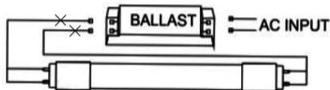
This T8 LED tube light can also be used in a “Direct Wire” configuration, in which the fixture has its fluorescent ballast removed or bypassed. To convert a fixture with a fluorescent ballast to a “Direct Wire” fixture, the fixture must be rewired so that the lampholders connect directly to line voltage. This T8 LED tube light can operate either with live and neutral wires connected to either just one end (“Single Ended”), or both ends (“Double Ended”) of the lamp.

1. Disconnect power to fixture and ensure that power is OFF using a multimeter or other approved method to confirm.
2. After confirming that the power to the fixture is disconnected, remove the diffuser (if provided), and remove the fluorescent lamps by rotating the lamps 90 degrees, then gently sliding out of the lampholders.
3. Rewire the fixture to bypass the ballast according to the following diagrams:

If bypassing a **magnetic ballast with starter**: disconnect the wires between the ballast and inductive starter and lampholders (at points marked X below)



If bypassing an **electronic ballast**: disconnect the wires between the ballast and lampholders (at points marked X below)



4. Connect the lampholder wires directly to a branch circuit, using one of the following configurations:

	Single-Ended Direct-Wire	Double-Ended Direct-Wire
<p>Single Lamp</p>		
<p>Multiple Lamps</p> <p>(Diagram for four lamps shown. Use similar parallel wiring for two and three lamp fixtures.)</p>		

5. Slide the LED tube light into the lampholders, and rotate the LED tube light 90 degrees until securely mounted. The "Waveform Lighting" logo should face outwards.
6. Install diffuser (if removed in step 2).
7. Switch on power to the fixture.

WARNING: Do not use fluorescent lamps in fixtures that have been rewired for “Direct Wire” LED tube installations. Mark modified fixtures with the included labels to avoid inadvertent installation of fluorescent tubes.