GROWERTALKS

Features

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Do You Have the Electricity for LEDs?

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What voltage is the best to go with for my application?

We suggest going with the highest voltage available at your facility, which will also be the most efficient. By using a higher voltage for your application, you can lower driver and conductor losses, and increase efficiencies.

What voltage do I have in my building?

Since there are so many field combinations of voltages, an experienced electrician is needed to evaluate your particular site/facility to determine what you have available. The most common voltages will be:

Single phase:

- 120/240V

3 phase:

- 208/120V
- 480/277V (most common in the United States)
- 600/347V (most common in Canada)
- 400V (special applications)

With the power supplies listed above, what voltage can I use to run my LEDs?

Once you know what voltage you have in your building, you can move forward with deciding what voltage to use to power your LEDs. If you want a specific voltage installed, transformers can be used to supply voltages that aren't currently installed in your facility. We always recommend speaking with an electrician before deciding what voltage to use to run your LEDs.

With the help of an electrician, and depending on the voltage you have available at your facility, you can use the following voltages to power your LEDs:

- 120V/240V
- 120V/208V
- 277V

- 347V
- 400V
- 480V

Please note that not all models are available in all voltages. Please refer to spec sheets for further information or speak with a lighting professional. Also, just because you have a 3-phase service doesn't mean you have access to voltages that can be used with LEDs—please consult a local electrician for more information.

What's the difference between single-phase and 3-phase power supply?

3-phase supply:

- Has three live wires (or lines) and possibly one neutral wire
- Generally supplied to commercial and industrial facilities
- It will typically be 480/277V or 600/347V
- This also depends on your facility design and transformers used

Single-phase supply:

- Has two live wires (or lines) and one neutral wire
- Generally supplied to residential or small commercial facilities
- Is typically 120/240V in North America

What's the difference between a single-phase load and 3-phase load?

3-phase load:

- Some equipment, such as motors or fans, require connections to all three lines from a three-phase supply
- This equipment would be classified as a "3-phase load"
- This equipment requires a 3-phase supply to operate

Single-phase load:

- Other equipment, like LEDs, only require connection to either two lines or one line and neutral
- This equipment would be classified as a "single-phase load"
- This equipment can be powered by either a "single-phase supply" or a "3-phase supply"

What's the difference between a "Line-to-Neutral Voltage" and a "Line-to-Line Voltage"?

Both single-phase and 3-phase supplies can be configured so that single phase-loads receive either a Line-to-Neutral Voltage or a Line-to-Line Voltage.

In a single-phase supply system, the lower voltage (typically 120V) will be the Line-to-Neutral Voltage, which is the voltage between one of the lines and the neutral. The higher voltage (typically 240V) will be the Line-to-Line Voltage. It will be twice the Line-to-Neutral Voltage and is the voltage measured between the two lines.

In a 3-phase supply system, the lower voltage (typically 277V or 347V) will be the Line-to-Neutral Voltage, which is the measured voltage between one of the three lines and the neutral. The higher voltage (typically 480V or 600V) will

be the Line-to-Line Voltage. It will be 1.73 times the Line-to-Neutral Voltage and is the voltage between any two of the three lines.

Can I use a single-phase LED if I have 3-phase power supply?

In a 3-phase supply, you have the capability of using all three phases for loads such as motors, fans and other industrial equipment. Since LEDs operate on single phase, you can take advantage of a 3-phase supply using either one or two legs of the supply to provide either a single-phase line to neutral connection or a single-phase line to line connection.

Figure 1 helps to demonstrate how you can use a single-phase power supply through a 3-phase power supply to power your LEDs configured using a Line-to-Neutral Voltage and a Line-to-Line Voltage.

What's the importance of a stable power source and what are the detrimental results of brownouts, blackouts, etc.?

A brownout is a low-voltage condition when the voltage drops. Drivers/ballasts have a voltage range where they can tolerate a certain percentage of brownouts. Operating the driver outside of this range can be detrimental to the driver/ballasts and reduce its lifetime. It's important to consider having your power monitored in your facility. Monitoring your power quality and voltage variation allows corrective measures to be taken to improve the power quality.

Blackouts are when power is turned off then on again, either momentarily or for prolonged periods of time. This could potentially be an issue. Re-striking HID lamps more than two times a day can also be detrimental to the driver. If blackouts are a frequent occurrence at your facility, consider contacting your utility company to resolve the issue (or consider installing an uninterrupted power supply [UPS] or generator system).

Are there any specific wiring instructions for LEDs?

LEDs can be wired in the same way as traditional HID lights, based on the voltage required by the LED (i.e., 120, 208, 240, 277, 347, 400). Some LEDs can accommodate multiple voltages, whereas others are voltage-specific. The voltage range will be noted on the product label. An LED with a product label stating "120V-240V" will accept any one of these three voltages 120, 208 or 240 and will automatically sense the supplied voltage to ensure the same output to the LEDs, regardless of the input voltage. A luminaire with a product label stating "277V" will only accept a voltage of 277V. LEDs that have dimming capability may require separate control wires in order to control the output of the light.

Pictured: Hybrid (HPS + LED) installation using P.L. Light Systems' NXT2 and HortiLED Top luminaires.

Do I need to compensate for inrush currents on LEDs or HID lights when I'm wiring my facility?

Inrush current is one of many characteristics that an electrical engineer will take into account when designing an electrical installation.

Is there an inrush current I need to be aware of when providing circuit breakers for my LEDs?

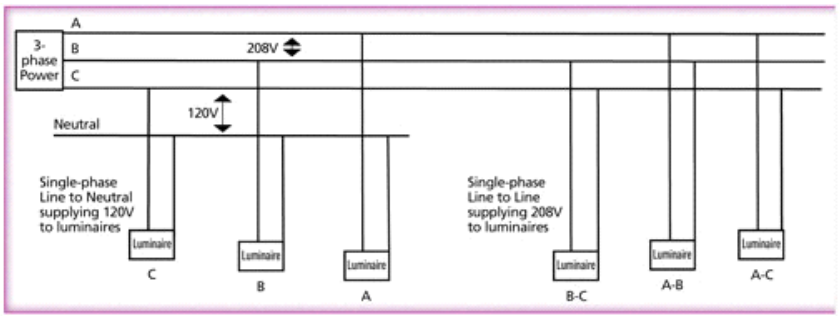
Inrush current occurs in all electronic devices due to their electrical characteristics. The magnitude of the inrush

current is based on the design of the electronics and the load. This inrush value needs to be provided by the manufacturer of the LED in order for an engineer to determine the correct electrical equipment to use in the installation. Electrical engineers will select breakers and other electrical devices using inrush as one of many variables in order to design an electrical system that will function correctly.

If inrush isn't considered when selecting and sequencing the installation of breakers, nuisance tripping can occur and, in some cases, fusing of contacts on contactors. It's always recommended to consult an electrical engineering company when designing a crop cultivation facility.

How to get started with your application:

Never assume what voltage you have and always consult with an experienced electrician who can help you make decisions about what voltage to use. **GT**



Pictured above left:An existing HPS lighting installation (P.L. Light Systems' NXT-LP luminaires) being retrofitted to a hybrid application with every other HPS luminaire being replaced with LEDs (P.L. Light Systems' HortiLED Top 2.0SQ luminaires).

Above right, Figure 1. This diagram demonstrates how you can use a single-phase power supply through a 3-phase power supply to power your LEDs configured using a Line-to-Neutral Voltage and a Line-to-Line Voltage.

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