

**Please read completely before installing.**

It is important to read these guidelines completely to understand how LED tape lighting works and how it can be configured, cut to size, connected, and installed so you can properly design your lighting layout.

**Installing tape lighting is an easy DIY project. However, basic wiring skills and tools for stripping, splicing, and connecting wires are required.**

**IMPORTANT**

- Use only with low-voltage 12-volt DC constant voltage power supplies. *Never connect LED tape light directly to 120-volt household power.*
- Do not power LED tape while coiled on reel, as the LEDs will overheat. *The mounting surface will act as a heat sink to dissipate heat.*
- Do not stare directly into the LED lights when illuminated.
- Never connect more than one power supply to a run of LED lighting.
- Do not install tape light where it can come in direct contact with water. Do not use long term in high humidity environments.
- Use only insulated staples and plastic clips to secure cords and wires.
- Route and secure wires so they will not become pinched or damaged.
- Use certified CL2 or better cabling for wire runs inside walls.
- Do not install 12-volt DC wiring in the same runs as 120-volt AC power.

**All wiring must be in accordance with national and local electrical codes, low-voltage Class 2 circuit. If you are unclear as to how to install and wire this product, consult a qualified professional.**

**Planning**

RibbonFlex Pro LED lighting is designed for indirect lighting applications. The LEDs themselves are not intended to be seen directly by the eye. Every installation is unique, and the desired lighting effect is based primarily upon personal preference. Installation location, wall colors, mounting angles, and the light's reflection off walls, surfaces, and objects will affect the final lighting appearance. Subtle adjustments to the positioning and angle of the LED tape can greatly impact the overall lighting effect.

**Installation considerations**

- How will you switch your LED lighting on and off?
- Do you want to be able to dim your lighting?
- What is the best layout configuration for your installation?
- Where will you locate your power supply?
- What are the best ways to mount the tape lighting?
- How will you cut, connect, and conceal the wires to your lighting?

**Choosing a power supply**

Power supplies come in various sizes with different wattages and are often referred to as transformers, AC/DC adaptors, or LED drivers. RibbonFlex Pro LED tape operates on low voltage and requires a power supply to convert 120-volt household AC power to 12-volt DC power.

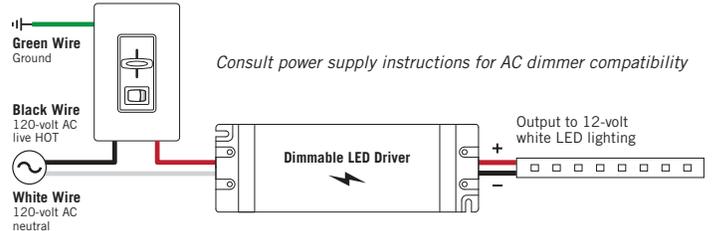
- Never connect RibbonFlex LED Tape Lighting directly to 120-volt household power
- Never use both a 120-volt and a 12-volt dimmer in the same circuit
- Only use RibbonFlex with Armacost Lighting approved LED drivers and power supplies. Using other power supplies will void warranty

**The type of power supply you choose will be based on how you want to turn on/off or dim your lighting.**

**Using Standard 120-volt AC dimmers** (e.g., Lutron® style)

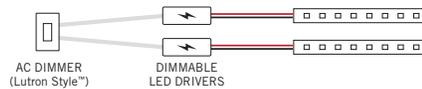
To use an AC dimmer, your Armacost Lighting LED driver/power supply must clearly state on the packaging and case label that it is dimmable with 120-volt AC dimmers. Using a 120-volt dimmer with a power supply model that is NOT dimmable will damage the power supply.

*Typical wiring diagram when used with an AC dimmer*



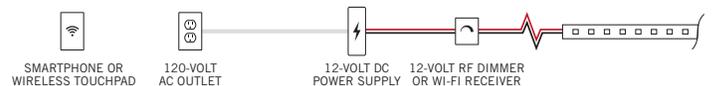
*When using a 120-volt AC dimmer, the Dimmable LED Driver/Power Supply must be direct wired to household current.*

Large lighting applications may require the use of multiple LED drivers/power supplies. For synchronized on/off and brightness control of LED lighting on multiple power supplies, connect a 120-volt AC dimmer to multiple Armacost Lighting Dimmable LED Drivers.

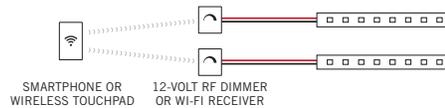


**Using Armacost Lighting 12-volt LED dimmers**

If installing an in-wall AC dimmer isn't practical, choose an Armacost low-voltage, 12-volt dimmer. These dimmers connect on the low-voltage side anywhere between your power supply and LED lighting. Wireless model options are available, useful in situations where installing new wiring can be difficult. Choose from RF designer-style touch pads or Wi-Fi® controllers that work with any smartphone.



For large lighting applications and multi-zone lighting control, use multiple Armacost 2-in-1 or Wi-Fi LED dimmers. To learn more, visit [armacostlighting.com](http://armacostlighting.com).



**For simple on/off control** (no dimming)

If an AC outlet controlled by a wall switch is not available for your power supply, use an Armacost Lighting Wireless Switch. This device adds switched outlet convenience without running any new wires.



**RV, boat, and solar system applications**

LED tape lighting can be powered directly by 12-volt battery.



*A 12-volt LED dimmer can also be used with battery powered systems.*

# Power supply size

## Determining your wattage requirements

LED tape light power requirements are stated in watts and are based on several factors, including your design configuration. RibbonFlex Pro can be installed in a series (strips connected or wired end-to-end) or in an array (multiple legs of LED strips or series of strips wired directly to a single power supply).

TYPICAL DESIGN CONFIGURATIONS	
<b>Straight Run</b> Only one end of the LED strip is powered. Multiple strips can be connected in a series for a continuous run. LEDs farther away from the power supply may appear dimmer due to voltage drop, especially if longer wires are used in between to connect strips.	
<b>Center Feed/Loop Back</b> Either power two equal legs of tape lighting from the center or loop back and power both ends of the LED tape. These configurations will produce more consistent brightness and color over the length of the strip. A loop back is excellent for room perimeter tray ceiling or cove lighting.	
<b>Array</b> An array uses two or more legs of various lengths wired to a power supply in a parallel connection. You will need to calculate total wattage used in an array to guard against overloading the power supply.	

Choosing a higher wattage power supply does not necessarily mean you can run longer lengths of LED tape light. However, it will allow for more lighting legs in an array design. Exceeding the maximum lengths in the chart at the end of this manual will cause LEDs farthest from the power supply to appear dimmer when at 100% brightness due to voltage drop. Using a higher wattage power supply will not reduce the effect of voltage drop.

### How to calculate total wattage required in lighting system

Using the chart below, determine the watts used in each leg of lighting. A straight run is considered one leg. A center feed is two equal length legs of lighting. An array can have many legs. Include only the lengths of LED tape in your calculation, not the connecting wires.

Add together the watts used in each leg of lighting to get total watts required. Note this is when lighting is at 100% full brightness and when it will use the most watts energy.

Approximate watts used per meter at full brightness														
30 LEDs/meter														
Meters	0.5	1	1.5	2	2.5	3	3.5	4	5	6	7	8	9	10
Feet	1.6	3.3	4.9	6.6	8.2	9.8	11.5	13.1	16.4	19.7	23.0	26.2	29.5	32.8
Watts used	2.3	4.5	6.5	8.5	10.3	12.0	13.5	15.0	17.3	19.2	20.5	21.6	22.3	23.0
60 LEDs/meter														
Meters	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5				
Feet	1.6	3.3	4.9	6.6	8.2	9.8	11.5	13	14.8	16.4				
Watts used	5	9	13	16	19	22	24	25	27	28				
120 LEDs/meter														
Meters	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5				
Feet	1.6	3.3	4.9	6.6	8.2	9.8	11.5	13	14.8	16.4				
Watts used	8	15	21	27	32	36	40	43	46	48				

- Watts used is the power consumed by your LED lighting system, not the watt rating of a power supply.
- Always choose a power supply rated at or greater than your needs.
- Due to voltage drop, longer lengths of LED tape will average fewer watts per foot than shorter lengths.
- To accurately measure watts used by your LED lighting system, use a multimeter. Watts are calculated by multiplying volts by amps used in your LED system.

## Power supply location and voltage drop

The shorter the wire leads between the power supply and the LED lighting, the brighter and more consistent your lighting will be – do not coil excess wire. If the LEDs farthest from the power supply appear dimmer, it is probably due to voltage drop. Voltage drop is the gradual decrease in voltage that occurs from your power supply to your LED lighting. Voltage drop only becomes undesirable if you notice the brightness in one area of your lighting is objectionably different than in another area. As a practical approach, test your LED lighting prior to final installation. If voltage drop appears to be an issue, use thicker, heavier gauge wires, divide or power strips from both ends (see loop back and array configurations) or use less lighting. To learn more visit [armacostlighting.com/voltagedrop](http://armacostlighting.com/voltagedrop) for an easy-to-use online voltage drop calculator.

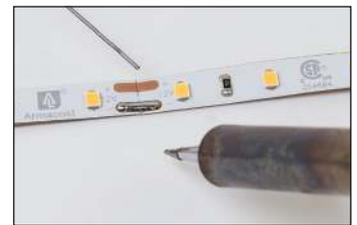
## Cutting, connecting, and wiring

There are two methods for connecting power wires and splicing together two pieces of LED tape lighting: soldering or using Armacost Lighting SureLock Connectors.

Soldering is a sure method for making strong, reliable electrical connections. For tips on how to solder RibbonFlex Pro, visit [armacostlighting.com/installation](http://armacostlighting.com/installation).



Wire Lead Connection



Splice Connection

Soldered connections are required for marine and RV applications due to vehicle movement and vibrations.

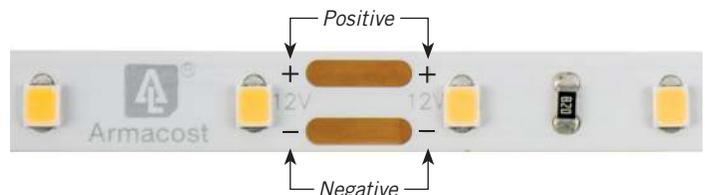
Wherever possible, it is recommended that you connect any needed 12-volt power wires to your tape lighting before installing.

### How to cut tape light

- Whether you are soldering wires or using connectors, cut the LED tape with scissors directly in the center of the copper pad as shown in position "A" below.
- You can also cut the tape at position "B," but do not use connectors on these tape light joints. You can solder wires to these joints.



**IMPORTANT:** Always use the + / - indicators printed on the tape light to maintain the same polarity (+ to + and - to -).



## Using SureLock™ Connectors

SureLock Wire Lead Connectors are used for going around corners or, when cut in half, to create two power leads or jumper cables to bridge gaps in order to get tape lighting to other areas.



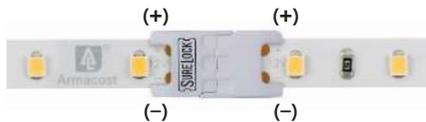
To increase the wire length between two LED strips, simply cut the connector wire in two, and splice in the length of wire needed. 18 gauge or heavier wire is generally recommended. Do not coil excess wire; shorter lengths and thicker wire will mean less voltage drop and higher brightness.



Be sure all wire splice connections are secure and sealed. Options include soldering, electrical tape, crimp connectors, terminal blocks, wire nuts, etc.

## SureLock Splice Connectors

SureLock Splice Connectors are used to join two strips, creating a continuous run of LED lighting.

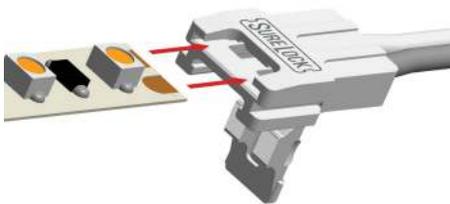


If the + / - marks do not line up, flip the tape and use the opposite end for proper alignment.

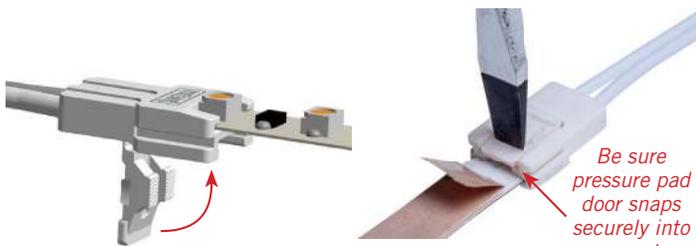
## Installing SureLock Connectors

**SureLock Connectors – both the wire lead and splice models – connect to the copper pads on cut sections of LED tape light. Connect to clean copper pads. Do not use connectors on soldered joints.**

- Carefully peel back a small section of the 3M® adhesive tape paper backing – remove only the paper, not the adhesive underneath.
- With the connector in an upright position (logo facing up), carefully insert the LED tape into the channel grooves, as shown below.



- Use a gentle, side-to-side motion while inserting to make sure the tape light is seated fully inside the connector.
- Once the lighting is seated, push to close and securely lock the pressure pad door. If needed, put the tape and connector upside down on a hard surface and use a flat head screwdriver to close and lock the door in place.



Once tape is fully inside connector, close and lock pressure pad door.

Use a flat head screwdriver to securely lock door if necessary.

Follow the same basic instructions when using SureLock Splice Connectors.

To view an online video tutorial, visit [armacostlighting.com/surelock](http://armacostlighting.com/surelock).

## Surface preparation and installation

**Before removing the 3M paper backing, test the LED strip in the space you intend to light. Once the paper backing is removed and the lighting is fully installed, you cannot reposition or move the LED tape light to another location. The tape may not stick securely.**

Do not power LED tape while coiled on reel, as the LEDs will overheat. It is normal for the tape to feel warm to the touch when holding it. Once installed, the mounting surface will act as a heat sink to dissipate heat.

Power the LED tape light and temporarily hold or tape into position with painter's tape – do not remove the 3M paper backing. Do not stare directly into the LEDs.

Try various angles and positions to get the desired level of illumination and lighting appearance. If the LEDs create undesirable bright spots on walls or reflections, reposition the tape light strip farther away from surfaces or try a different mounting angle.

See placement options for under cabinet lighting on page 4.



## Going around corners

Although LED tape lighting is thin and flexible, it is not designed to make sideways or lateral bends and turns, which can damage the lighting. Use a SureLock Connector to go around corners or create soft bends with a loop that will make the tape lighting change direction sideways.

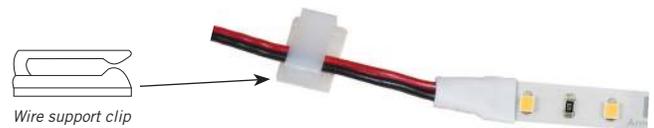


Using a SureLock Wire Lead Connector to make a corner turn



Use loop bend technique for coves and above cabinet installations

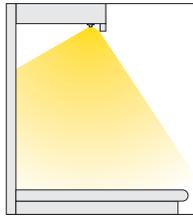
- Mounting surfaces should be smooth, clean, completely dry, dust free and above 60°F (15 °C) before installing/sticking the LED tape strip in place. Thoroughly clean all mounting surfaces with isopropyl alcohol. Do not use common rubbing alcohol and household cleaners, which may leave behind residues.
- For best adhesion, lightly sand the surface where you will mount the tape lighting with fine grit sandpaper (150-300 grit). Sand in a circular motion rather than straight-line motion.
- When installing on painted surfaces, paint should be fully cured based on manufacturer's cure time.
- Be careful not to peel off the 3M adhesive from LED strip; just remove the tan paper backing.
- 3M sticky back tape requires pressure to activate the adhesive. Working from one end to the other, firmly press the tape down with your fingers, taking care not to press on the individual LEDs.
- Support power wire leads, especially when mounting under cabinets and shelves.



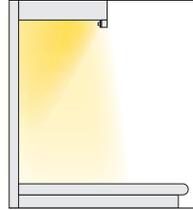
Wire support clip shown, Armacost item # 910100

## Placement options for under cabinet lighting

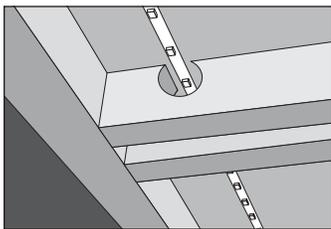
For maximum light output, mount the LED tape towards the front of the cabinet with LEDs facing down. To focus light on the work surface and also light your backsplash, position the tape light an inch or two back from the front of the cabinet. This mounting position works best with dull or matte finished surfaces.



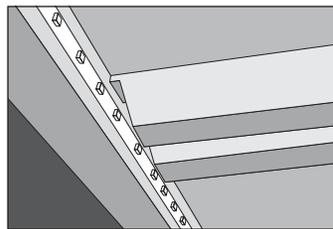
If your countertop is reflective, install the LED tape lighting on the inside back of the cabinet lip frame with the LEDs facing towards your backsplash. This method helps eliminate unwanted light reflections and bright spots reflecting off your countertop. Because of the wide beam angle of the tape light, this mounting position will still provide ample lighting.



Continuous run mounting of LED tape lighting is achieved by drilling a 1/2 in. hole through cabinet side frame lips. When mounting on the back side of the front frame lip, use a multi-tool oscillating saw to make small vertical cuts in the dividers to create slots that allow the tape lighting to pass from one cabinet to another.



Tape light installed through a drilled hole.



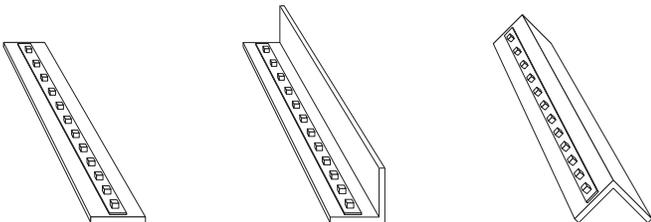
Tape light installed through a slot cut into cabinet divider.

Create a visual barrier when mounting under a cabinet or shelf with no lip to conceal the LED tape light strip. Use a piece of angle trim, quarter round molding, or any type of trim desired to hide the LEDs.



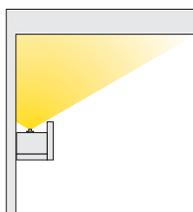
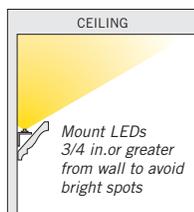
## Above Cabinet Uplighting

Most cabinet tops have uneven surfaces. To create beautiful, indirect uplighting over cabinets, simply mount RibbonFlex Pro on any rigid strip (e.g., thin lattice or corner guard molding) and place on top of cabinets. Angle the strip position to achieve the desired illumination.



## Cove Lighting

Try different mounting positions to get your desired lighting effect. For a seamless glow with no bright light spots, keep LED tape light strip at least 3/4 in. away from walls.



## Troubleshooting

### Tape light strip does not light

- Make sure your LED power supply is receiving 120-volt power.
- Confirm you have maintained correct polarity (+ to + and - to -) when joining LED strips and when connecting to the 12-volt power supply.
- Check all tape light connections and any switch or dimmer connections from the power supply to the LED tape light. Consider testing with a multimeter to ensure light strip is receiving 12-volt power.

### Only part of the LED tape light strip is lit

- Check connections to the part of the strip that is not lit.
- Confirm that you have maintained correct polarity to the unlit section.
- RibbonFlex Pro is made with three LEDs connected as one series. If you experience a partial failure, you can carefully cut out the damaged section and splice in a new section as needed to repair.

### LED tape lights blink on and off

- Your power supply is not adequate for the length of LED tape light you are powering. Install a higher wattage power supply or reduce watts used by shortening the lengths of your LED tape lighting.

### LEDs farthest from the power supply are noticeably dimmer

- This is the result of voltage drop. Decrease the length of the 12-volt power feed wires or use thicker power feed wires between the 12-volt power supply and the tape lighting.
- Use shorter lengths of LED tape lighting. Refer to **Configuration options** in these guidelines. Consider a different configuration.

Visit [armacostlighting.com/installation](http://armacostlighting.com/installation) for additional installation tips and FAQs.

Configuration	30 LEDs/meter		60 LEDs/meter		120 LEDs/meter	
	Length	Watts used	Length	Watts used	Length	Watts used
Straight run	32.8 ft. (10m)	~23	16.4 ft. (5m)	~28	16.4 ft. (5m)	~48
Center feed / Loop back	65.6 ft. (20m)	~46	32.8 ft. (10m)	~56	32.8 ft. (10m)	~96
Array	Varies based on layout and max wattage of power supply					

Input voltage..... 12-volt DC  
 Beam angle..... 120°  
 LED light source..... High Power SMD 2835

See product packaging or visit [armacostlighting.com](http://armacostlighting.com) for additional product-specific information.

## Limited three-year warranty

Improper installation, abuse, or failure to use this product for its intended purpose will void warranty. This warranty only applies when all components, including LED power supplies, have been provided by or approved for use by Armacost Lighting. The warranty does not cover labor or any other costs or expense to remove or install any defective, repaired or replaced products.



Baltimore, Maryland

[armacostlighting.com](http://armacostlighting.com)

