ATX LED

100% DC low voltage

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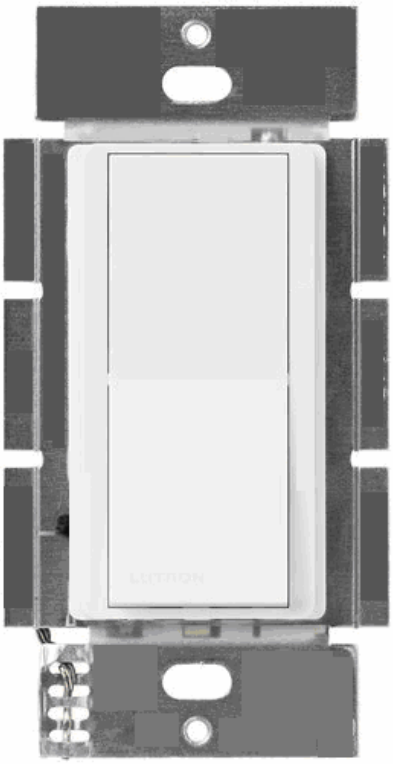
AL-WS-S4
AL-WS-DR4
AL-WS-DR4W

Decorator style DC switch

for loads up to 96 watts total

Optional WiFi and CCT



Product Description - 4 channel wall switch

This switch operates just like any standard residential light switch – however it takes 44-52v DC instead of 120VAC, and directly drives up to 96 watts of ATX LED line bulbs. This Decorator style switch in a standard residential style outline fits into any home, looks like any switch yet meets NEC article 411 for Low Voltage lighting.

Stand alone it operates as a simple switch for up to 15 LED's with 6 watts each or equivalent. Use AWG 16 or 18 to bring 44v to 52v from a central power supply over to the switches, then use AWG 18 or 20 to connect to your LEDs – no expensive tools are required to wire this device.

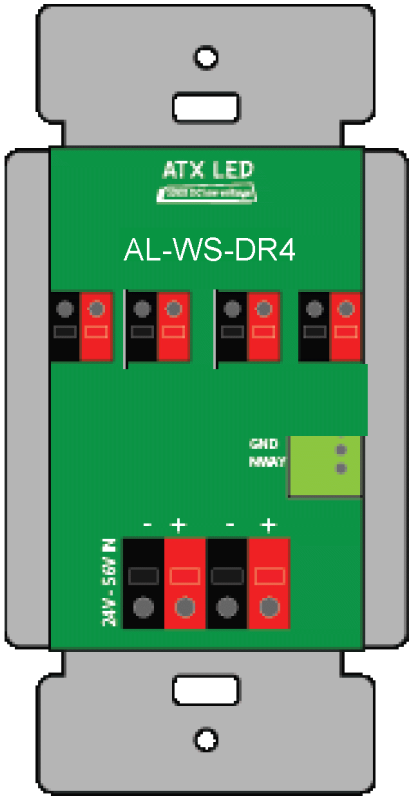
A proven rocker switch with momentary action leverages mass production of Decorator style switches, now for low voltage applications – a casual user requires no training, no App to use this switch.

The ATX LED standard wiring method for LEDs with this device (see our online wiring guide) allows after market upgrades to dimming, wifi controls and tunable white.

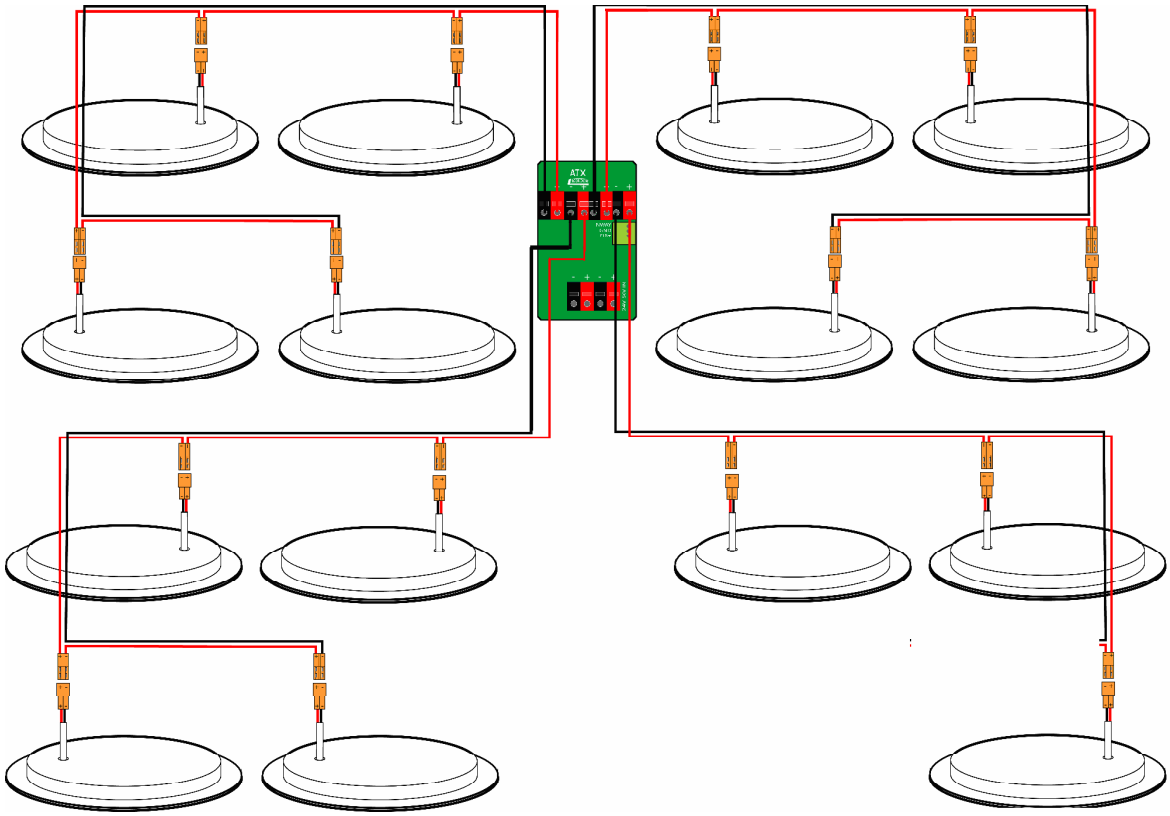
Upgrade any time from simple On/Off to dimming to smart controls for Home Automation

Specifications

Power source connection	Spring Terminal block for AWG 16 to 24
LED load connectors	Spring Terminal block for AWG 18 to 24
LED direct current controlled output	The input voltage, including any voltage drop, is managed and delivered flicker-free to the LEDs
Input voltage range	44v to 52 volts
Standby power consumption	50 milliwatts
Conversion efficiency	Over 95%
Protection	Reverse protection and static protection
Operating Temperature	0°C ~ 50°C
Size	108H (metal) 70H (case) x 34 D x 42 W mm
Dimming	Optional
FCC and interference	All outputs are RF filtered for minimal interference
Maximum output voltage	Input minus 4 volts
Minimum output voltage	7.5 volts
Hot Swap	Yes – can unplug and connect LEDs with power applied.

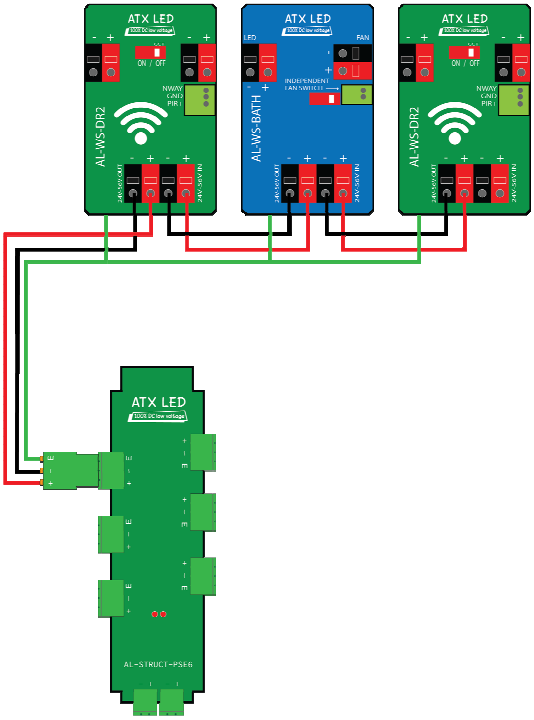


Wiring Example AL-WS-S4 AL-WS-DR4 AL-WS-DR4W



Powering the AL-WS-S4

Power the switch via the + and - input connectors, 48 to 56v is recommended.



Basic wiring and operation

By default – the AL-WS-S4, AL-WS-DR4, AL-WS-DR4W operates stand alone – no WiFi connection is required. Connect up to four LED outputs to your LED's.

Constant Current LED operation

For up to 15 standard LEDs with 660 mA each – connect 1 to 4 in series to each output – the count does not need to match. Up to 90 watts is possible with 44 to 52 volts input and 15 leds with 9 volts each,.

Alternatively, with the DR4W, up to 10 Tunable White LEDs can be connected.

Constant Voltage LED operation

Note that CV leds use resistors that waste about 20% of the energy – so more Lumens are possible with DCC leds than CV – but if CV is what you have (Like LED strip lights) then CV mode must be used. The DR2 will detect CV mode at 12, 24 or 48 volts. Note: use a 52v power supply for 48v CV operation. For maximum power output, connect 12 volt strips in series to reach 36 volts.

Maximum power with LED strips:

Strip Voltage	Max power with series wiring and 3 watts/ft (both LED outputs used, 51volt supply)	Max power with parallel wiring and 3 watts per ft
12 volts	3x series = 36 watts = 12 ft	16 watts = 5 ft
24 volts	2x series = 55 watts = 18 ft	32 watts = 10 ft
48 volts	55 watts = 18 ft	55 watts = 18 ft

Auto Calibration – First time Power up

Each time this device turns an LED on, it tests if the connection has been changed, light added, light removed, light replaced. If a change is detected, the switch will recalibrate itself. This is a sequence of light levels that determine the features and abilities of the connected LEDs. It can detect Constant Voltage LEDs, Constant Current LEDs, LED strips and Fans. This also occurs when a new switch is installed for the first time. Please wait 1 minute after initial power on, or after changing any LED, for the sequence to complete. Turn the LED off to complete the calibration. After that phase – the result is stored in on-board EEprom and will be updated for temperature and aging changes over time. You can force the device to factory defaults from the switch front if needed (see table below)

Recommended ETL listed LED's

LED rated watts	Type	Model	Size inches *	LED rating	Max Count	Total power output Watts	Note
6	Flat Ceiling	P023R6	3 / 5	660 mA	15	90	4x 4 series
6	Flat Ceiling	P023R6 CCT	3 / 5	660 mA	10	60	2x 5 in series
12	Flat Ceiling	P023R11	6 / 7.5	1440 mA	15	90**	4x 4 in series
12	Flat Ceiling	P023R11 CCT	6 / 7.5	1440 mA	10	60**	2x 5 in series
6	Recessed	DL-120	1 / 5	660 mA	15	90	4x 4 in series
6	Recessed	DL-120 CCT	1 / 5	660 mA	10	60	2x 5 in series
6	Gimbal Spot	MS31008	3	660 mA	15	90	4x 4 in series
6	Bulb	ATX-A60	E26	660 mA	15	90	4x 4 series
6	Bulb	ATX-C35	E12	660 mA	15	90	4x 4 series
6	Bulb	E26-48v6w	E26	120 mA	15	90	15x Parallel
14	Closet	FMMCL 18 840 S1 M4	18	360 mA	4	56	1 per channel
7	Closet	FMMCL 840 S1 M4	7	360 mA	8	56	4x 2 in series
12	Linear	P023S12	18	1440mA	32 ft	90**	4x 4
12	Linear	P023S12 CCT	18	1440mA	16 ft	60**	2x 5 series
35	Strip	GL-24-LH99A DC48v	195	700 mA	40 ft	90	1 per channel
35	Strip	GL-24-LJ01A DC48v CCT	195	700 mA	30 ft	60	2
6	Outdoor Small	ODB6	5	660 mA	15	90	4x 4 series

*size 3 / 5 means 3 inch light source and 5 inch trim diameter
** these 12 watt LEDs will operate at 6.5 watts each when used with the DR2 at 720 mA.

Any 24 or 12 volt CV strip can be connected, the DR2 will detect a CV strip LED and operate in CV mode. For best results, connect 12 volt strips in series to reach 48 volts (4 in series) or connect 24 volt strips 2 in series.

Note: 360 mA LED with 6 watts – 2 per channel, 4 total, 360 mA LED with 9 or 12 watts – one per channel, two total. Contact us for information on our Doubler device to support 300/360 mA LEDs.

LED connections

Wifi and 15 non tunable LEDs (90 watts)

Order the default option The switch will control 15 LEDs with the same brightness. From 1 to 15 LEDs can be connected, and all will have the same current.

Wifi and 10 Tunable White LEDs (60 watts)

Order the CCT option. Each Tunable White LED has a warm and a cool string of LEDs inside. The AL-WS-DR4W will then balance the two strings to produce the desired color. The Color and brightness can be set locally by the switch or remotely by wifi.

Momentary Main Switch operation

Function	Seconds	How to trigger
On / Off	0.5 max	Push the switch down for under ½ second. The light will turn on and off each time you press.
Adjust Color Temperature	< 45	Hold the button down – move the slider. The Slider now controls the color temperature – each time you move the slider – the 45 second timeout is extended.
Reset to defaults: - Recalibrate the LED currents - Set switches to On/Off style	45	Press and hold the button for 45 seconds. The switch will enter self calibration mode the next time the light is turned on. Self Calibration will also be done if the number of LEDs attached changes. The switch method will change back to On/Off type
Restore to Momentary Operation	< 0.5 x 5	After factory default, press the button 5 times with less than 0.5 seconds each to change from On/Off to Momentary operation.
Put WiFi into pairing mode	Until light level change	Set the slider to minimum dim, press and hold the switch down for about 7 seconds – the lights will step up to 50% and the WiFi chip will enter pairing mode. If already connected to wifi – nothing happens.

Remote Switch Functions – Momentary style

The remote (3-Way) switch can be either momentary or On/Off. If it is the momentary style, then use this table.

Function	Seconds pressed	How to trigger
On / Off	0.5 max	Push the switch down for under ½ second. The light will turn on and off each time you press.
Remote Dimming	< 10	Press and hold the button to dim down, then up. To dim down again, release and press. Do not hold longer than 15 seconds.
Return to On/Off style	45 seconds	Should the switch get confused and act in momentary mode when the physical switch is On/Off – simply leave On for 45 seconds and the system will correct the error.
Changing from On/Off to Momentary	0.5 x 5	If a AL-WS-DR2 with a momentary switch is operating in On/Off style – then press the rocker 5 times briefly – it will switch to Momentary operation.

Remote Switch Functions – On/Off style

Function	"Flips"	How to trigger
Remote Dimming		Not supported
Changing from On/Off to Momentary	5	If a AL-WS-DR2 with a momentary switch is operating in On/Off style – then press the rocker 5 times briefly – it will switch to Momentary operation.
Return to On/Off style	45 seconds	Should the switch get confused and act in toogle mode when the switch is On/Off – simply leave On for 15 seconds and the system will correct the error.

Default Operation – WiFi enabled

By default – the AL-WS-DR4W operates stand alone – no WiFi connection is required. Connect the dual LED outputs to your LED's. For up to 15 standard LEDs with 660 mA each – connect 1 to 4 in series to each driver – the count does not need to match.

The device is calibrated for operation when you install it. After power up – you will see a 20 second ON time with the lights at different dim levels while it learns the capability of the attached LEDs in your installation. After that phase – the result is stored in on-board EEprom and will be updated for temperature and aging changes over time. You can force the device to factory defaults from the switch front if needed (see table below)

WiFi as Remote Switch

WiFi commands to the light operate as a kind of 3-way switch. The WiFi command override the physical switch settings. If the On/Off type of switch is used – then the physical Up/Down will not represent the On/Off status of the bulb. Therefore, if the light is turned on or off with WiFi, the next flip of either the built-in or remote 3-way switch will turn the light off or on as intended. For this reason – some people prefer the momentary switch for the main and remote switches. The type can be changed by the end user.

CCT option (Color Temperature)

The CCT option selects allows tunable white operation. Tunable White LEDs can be adjusted from 2700K to 5000K and are connected as shown in our wiring diagram. If you are in CCT (tunable white) mode and use 8 fixed color LEDs, you will see odd behavior, the lights will not be all at the same dim level.

3-Way Options and wiring

The N-Way input has several functional options. A simple low cost switch or alarm contact can be used to activate this. The options are: 3-Way, and Fan Control.

3-Way Operation (On/Off remote switch)

Simply connect an AWG24 (solid CAT-3 or better is recommended) between the N-WAY pins and a remotely installed standard On/Off wall switch. If more control switches are needed – use a dual pole 3-Way setup, 4-Way is also possible. No controller is required; an unlimited number of switches can control one light. See our online application note for 3-Way switching. The N-Way input is has an internal pull-up – so a connection to ground will change state. The state of the N-Way input is XOR'd with the physical switch. See our 3-Way instruction manual (http://atxled.com/pdfr) for details.

Note: install the upside down. Turning the switch UP opens the circuit and turns the light on if the main switch is down. See the Momentary vs On/Off tables above for more info

Door Jam Operation

A simple Normally Open door alarm switch can be wired to the N-Way input. Then – when the door opens – the light will go on.

Trouble Shooting

If the LEDs do not turn on at full brightness, or flash – please check common causes;

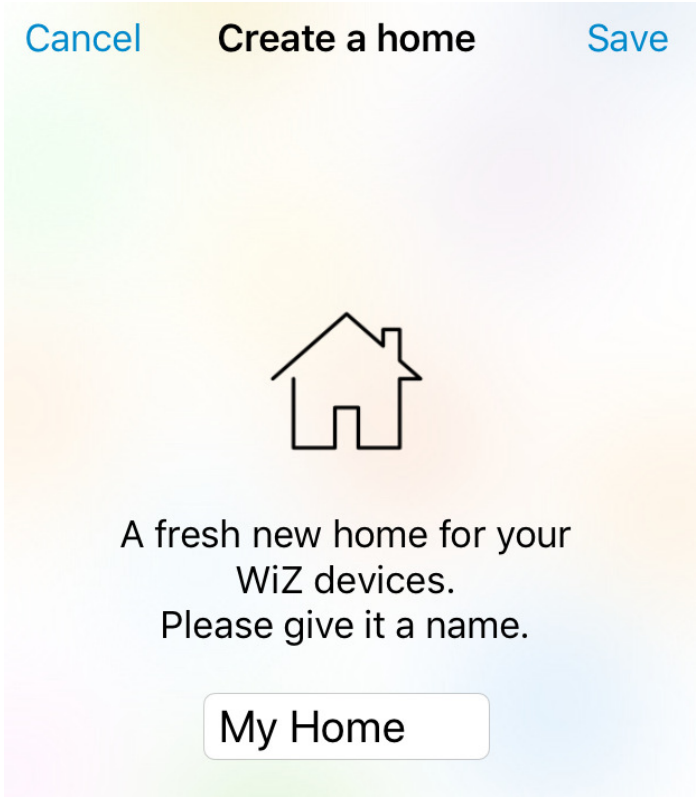
1. Flashing the first time the light is turned on, or if the number of LEDs per side changes, is part of self calibration, please wait 1 minute for this to complete.
2. If no light – then the number of series LEDs is exceeded. The forward voltage of the LEDs is too great. The delivered voltage is between 7 and 42 volts (with a 48 v supply) or 46 volts (with a 52 volt supply). Check the forward voltage of the LEDs and add them up. For example, a 6 watt 360 mA bulb has 18 volts forward, a 6 watt 660 mA bulb is 9v.

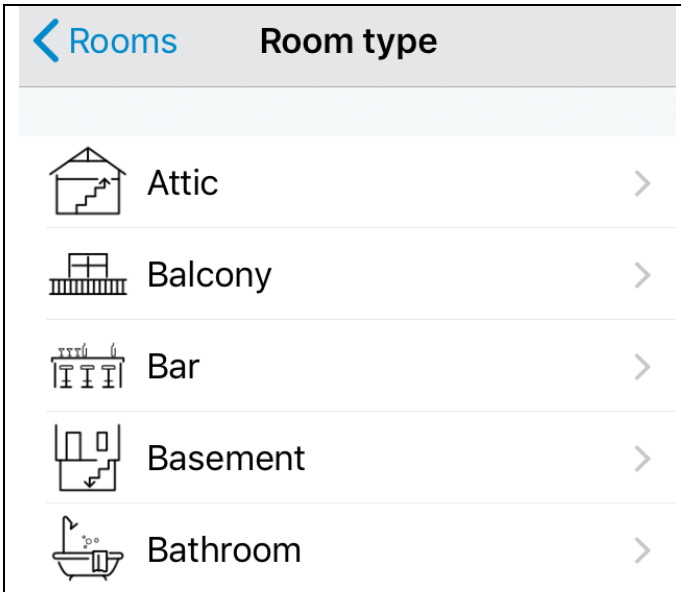
   if your LEDs add up to more than 42 or 46 volts - they will not turn on at full brightness, and might not turn on at all.
3. Cross wiring. If the + of one side is connected via the LED to the – of the other side – then the LEDs will cycle on/off every 4 seconds.
4. If CCT LEDs are used and the CCT switch is Off – the colors will not change, and the LEDs will operate at 12 watts instead of 6 watts – it could be intended by the installer to operate at 12 watts per bulb for example with a P023R11 6 inch fixture. Operating a 6 watt fixture at 12 watts. will decrease bulb life and could overload the home run to the power distribution panel.
5. If cable is used that is not copper (see CCA anywhere on the box ?) then there will be substantial loss in the wire. Please do not use CCA type wire of any kind

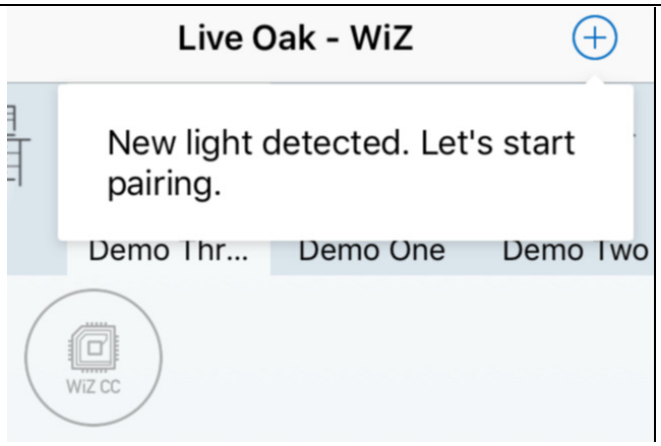
Wiz Connected Light App Setup

Install the Wiz app on your phone. Create a home, create a room, and then click to add a light. Enter pairing mode using the method above. Note – if the device has been paired before – you will have to enter pairing mode twice for this to work. Once in pairing mode – it will take up to 2 minutes to complete. Note – you will need at least one operating SSID (wifi network) on 2.4ghz for this device to work. Also note – in step 4 – wifi network name – click on the "eye" icon to see your SSID Password and insure that it is correct.

Search for Wiz Connected in the App store – install it

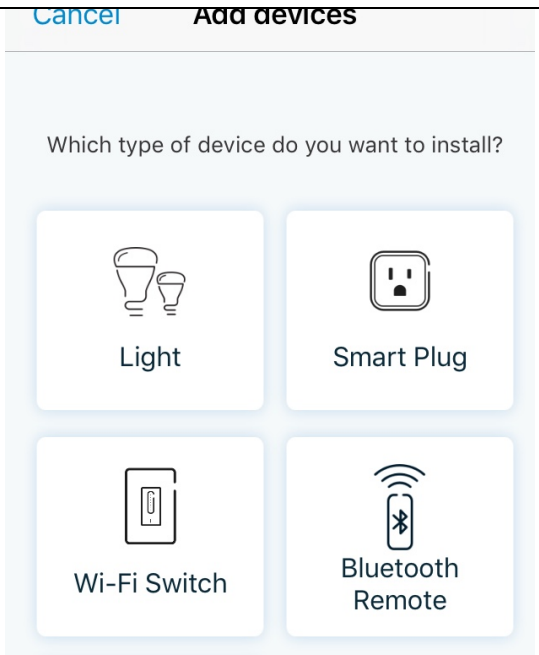




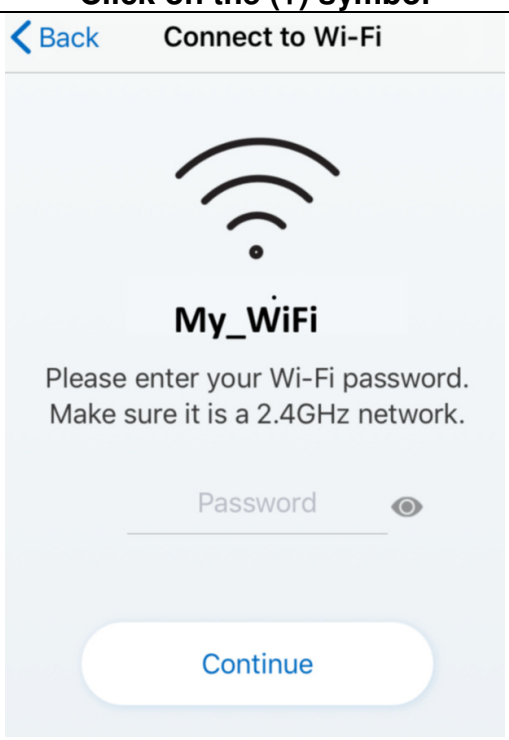


Use the + button connect
(this this does not appear –
try a 2.4 ghz network)

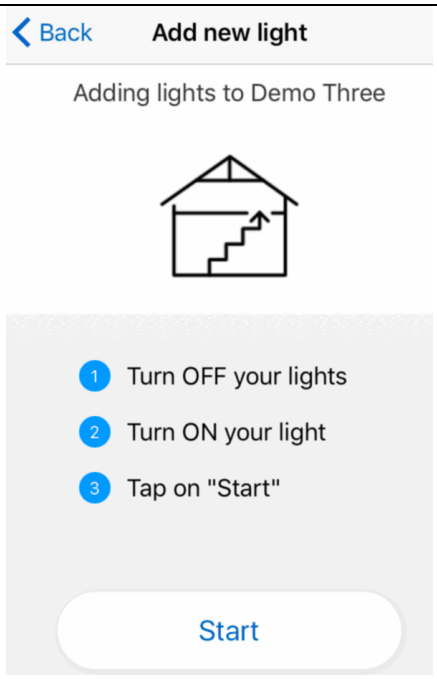
Click on the (+) symbol



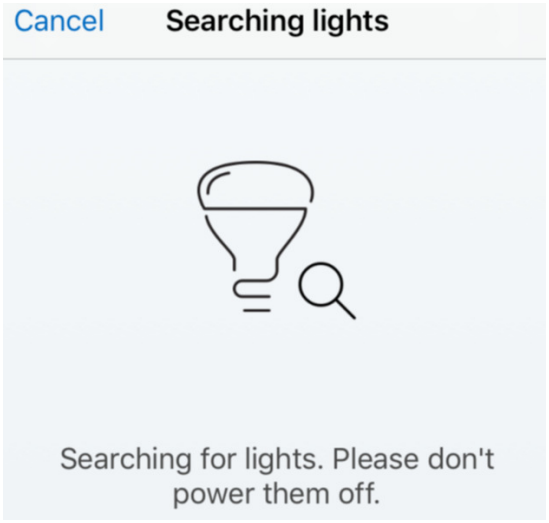
Click on the “WiFi-Switch” tab



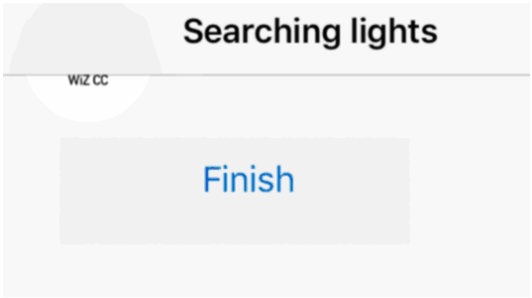
Enter your WiFI Password



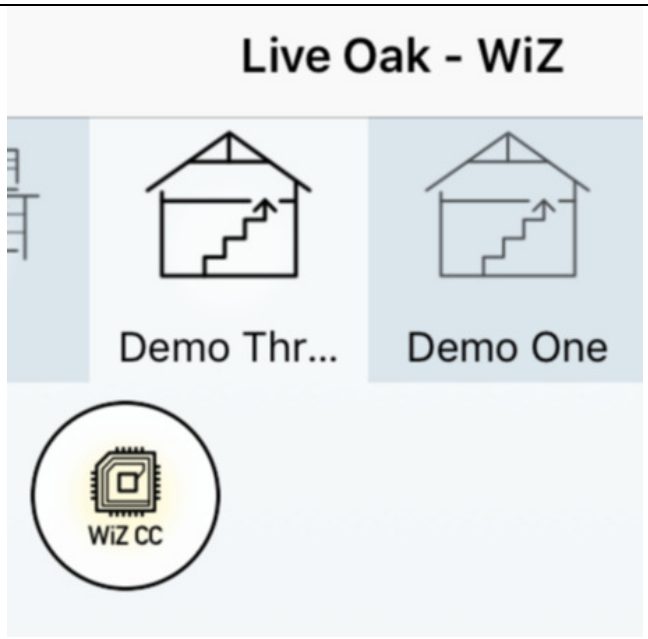
Power off/on then click start



Wait for the search to finish



New device found



You can now control the light. Next step is in the Amazon Alexa App to add this light to voice control