

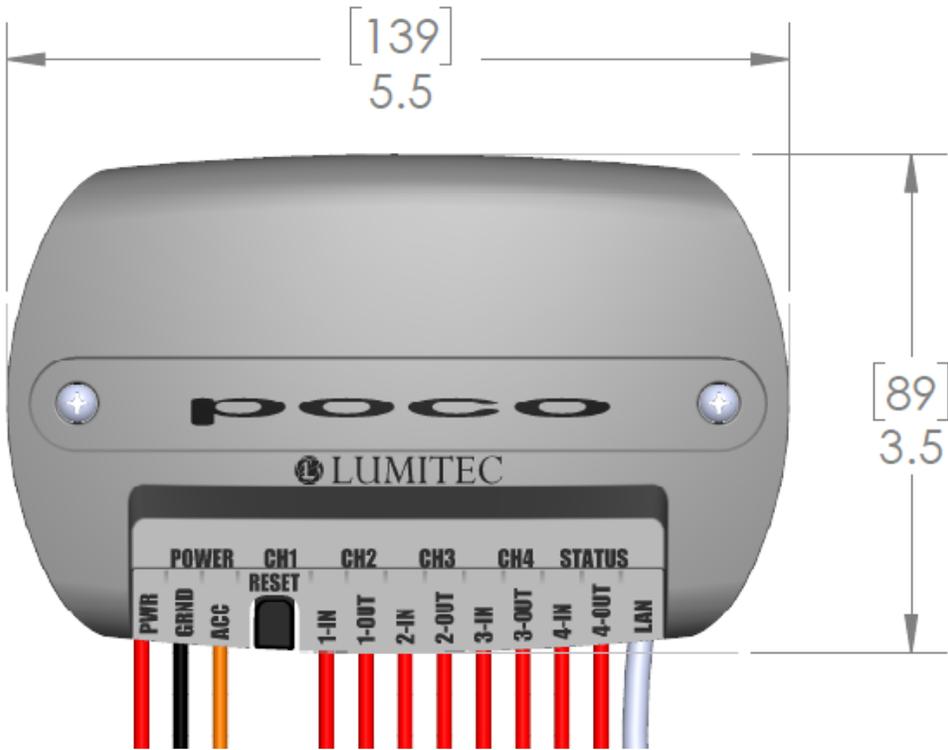
# POCO - User Manual

Document Version: 0.4 Draft, 5/01/19

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## What's Inside the Box

- 1 - Poco 4 Channel Digital Lighting Controller
- 2 - #6 1-1/4 inch Stainless Steel Screws
- 1 - Sealed IP65 RJ45 Network adapter cap



## Glossary

MFD	Multifunction Display. Typically a touch screen with graphical user interface connected to various vessel sensors and hardware

PLI	Power Line Instruction - Digital data sent from POCO over power wires to Lumitec lights to control color, intensity and displayed patterns
PWM	Pulse Width Modulation - Used to control the intensity of Non-PLI enabled lighting through the control of the power duty cycle
UI	User Interface typically displayed on MFD or other portable connected devices
TTP	Time Toggle Protocol - Lumitec's proprietary technology allowing for user selectable light modes within a light by toggling a standard toggle switch
Channel (CH)	One of (4) outputs on the switch hardware module
Device	A single specific light or other accessory
Clan	A PLI-level identifier for one or more devices. Clans are roughly organized around product families. See <a href="#">User Interface Setup</a> for list of Clans
Light Group	A single Device or multiple Devices defined by Clan & Channel for PLI lights or a Channel if the light group is a PWM dimmable of standard ON/OFF device
Spectrum	Mode built into some Lumitec Lights that is a continuous changing of light hues (starts with blue light, transitions to red, then transitions to green and then transitions back to blue over a 3 minute time period)
Omni-Llume switch	User interface switch that has the ability to modify color and brightness for the lights that are attached to it with a press and hold action
Scene	A set of commands sent to multiple light groups to create a custom lighting environment. Commands may include Intensity, Color, ON/OFF State, Etc.

## POCO Dimensions and Features

PWR	Positive 10-30 VDC POCO supply power. Line must be fused prior to connecting to POCO with 3 Amp ATC blade fuse or equivalent (Constant ON or Switched with ACC Line)
GRND	Negative 10-30 VDC POCO supply power
ACC	Positive 10-30 VDC, Low current enable line to turn POCO on from remote device (i.e. MFD) (Must be powered to enable Poco)

RESET	User Action	Function	Feedback
	Short-press while poco is running. Must release before 5s.	Reboot poco (no change to settings)	No indication while holding down button. After release button, status LED turns solid 'aqua' color while rebooting. Then resumes normal pattern.
	Press-hold for > 5s while poco is running, then release.	Restore WiFi/BLE/Eth settings. Reboot poco (no change to settings)  (no action until release, but LED provide feedback that you have held long-enough)	No indication while holding down button for the first 5 seconds, then rapidly blink Green/Blue until release button. After release button, status LED turns solid 'aqua' color while rebooting. Then resumes normal pattern.
	Press-hold while powering-on poco. Release before 5s	normal boot (no change to settings)	Status LED turns solid 'aqua' color while booting. Then resumes normal pattern.
	Press-hold while powering-on poco. Hold for > 5s.	Factory restore all. * Wipes otadata partition - which disables booting to any OTA partitions. <ul style="list-style-type: none"> <li>• Wipes internalfs (FAT) partition - which clears any user configuration.</li> <li>• Wipes nvs partition - which clears WiFi/BLE/Eth settings.</li> </ul>	Status LED turns solid 'aqua' color while waiting for user to keep holding button. There is no indication that user has held down button long-enough. After release button, Status LED continues solid 'aqua' color while booting. Then resumes normal pattern.
1-IN through 4-IN	Channel Input power. Line must be fused prior to connecting to POCO with 10 Amp ATC blade fuse or equivalent (14 AWG 300V 16 inch long cable)		
1-OUT through 4-OUT	Channel Output power to lighting circuit. Maximum 10 Amp load per channel. Maximum total load across all channels is limited to 40 Amps.  Load on channel must be only one of the following (Lumitec PLI enabled lighting / lighting capable of dimming (through PWM) / device requiring a standard ON-OFF circuit) (14 AWG 300V 16 inch long cable)		
LAN	Local Area Network connection. 10/100 Base T data connection to POCO. Standard CAT-5 cable with RJ45 connector required to plug into sealed network cable adapter. (18 inch long cable with Link light)		
POWER	Indicator - Illuminates Green if POCO is powered on, both PWR and ACC lines must have supply voltage between 10 and 30 VDC		
CH1	Indicator - Illuminates Red if power is supplied to Channel from fuse/breaker panel.		
CH2	Illuminates Green if power is supplied to Channel input and channel is turned on inside of POCO controller; PLI enabled lights may be OFF.		
CH3	Flashes Orange if PLI data is transmitted.		
CH4	Illuminates Orange if channel is dimmed through a PWM signal		
STATUS	Green blinking light indicates number of connected WiFi clients (1 blink = 0 clients, 2 blinks = 1 client, 3 blinks = 2 clients)  Blue blinking light indicates number of connected BlueTooth 4.0 clients (1 blink = 0 clients, 2 blinks = 1 client, 3 blinks = 2 clients)		

## Mounting

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## NOTICE

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POCO should be mounted in a location that is not exposed to extreme temperature conditions. This device is rated for operation at ambient temperatures between 0 F (-18 C) and 120 F (50 C) and is sealed against water ingress per IP65 standards. To prevent standing water, it is recommended to mount the POCO device on a vertical surface protected from continuous water exposure.

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- Using the included hardware, you can surface mount the device close to a breaker panel or fuse block.
- Pre-drill mounting holes with appropriately sized bit depending on material. Typically a #32 (.116 inch) or 3mm bit can be used for pre-drilling for the #6 self tapping screws.
- Ensure screw holes do not interfere with anything on the opposite side of the mounting surface.
- The location must allow room for routing, connection of all cables, visibility of LED indicators and access to depress the reset button.

## Connections

### Supply

Poco must be powered with a 10-30 VDC supply independently fused with a 3 Amp ATC blade fuse or equivalent (Not Provided). Connect the red power wire to the positive + battery terminal and connect the black wire to the negative - battery terminal. The orange wire can be used for remote powering of POCO when connected to compatible devices that have a low current output. In cases where remote switching is not used, connect red and orange power wires together to enable power to the device.

### Inputs

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## NOTICE

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POCO is designed to switch DC voltages between 10 and 30 volts. Switching ALL AC line voltages or DC voltages higher than 30V is not permitted and failure to adhere to the input voltage requirement can cause serious injury and death.

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Each channel is independently powered and switched inside the POCO device allowing for many different wiring methods depending on system requirements. Each input line must be fuse protected prior to the POCO digital switch with a 10 Amp ATC or equivalent protection device. Input voltage must be between 10 VDC and 30 VDC. Switching of AC or high voltage lines is not permitted without properly rated relay and integral flyback diode. Contact Lumitec for further information. POCO comes with 16 inches (400 mm) 14 AWG wire for each channel input. Use appropriately sized and sealed crimp terminals to connect with channel supply.

### Outputs

Each channel is capable of switching a 10 Amp load powered within 10 and 30 VDC. POCO comes with 16 inches (400 mm) 14 AWG wire for each channel input. Use appropriately sized and sealed crimp terminals to connect with each channel load. See [System Design Considerations](#) for further information on lighting system architecture.

### Wired Network

In order to use the 10/100 Base T network connection for communicating, the POCO device must be connected with a standard ethernet cable (not included) to a device that acts as a DHCP server. Most MFD manufacturers have a DHCP server built into the touch screen and supply

multiple network ports for interfacing with networked devices. If all network ports are used for other system components, a network switch must be used to split the network traffic between two or more networked devices.

## System Design Considerations

In most cases channels should be designated either a Lumitec PLI channel, standard PWM dimming channel or standard ON/OFF channel. Lumitec PLI controlled lighting reaches its fullest potential when this rule is followed. Lumitec PLI lighting has the ability to create "virtual circuits" where lighting on each PLI channel can be addressed with commands specific to each family of lights. For example, Underwater lighting can be attached to the same channel as Lumitec Mirage lighting and Spreader lighting as well as other families of lights. Because each are digitally controlled over the two power wires you are able to communicate with light families independently as if they were setup on multiple toggle switches.

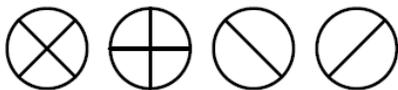
Quick Tips:

- Lighting that is not PLI enabled on a channel that also has PLI enabled lights will stay in the ON state without dimming control when other lighting is sent PLI commands. This works well for situations where you want to connect a non-PLI Aurora Dome Light to the same circuit as PLI enabled lights. This setup will only work if the attached non-PLI lights have low internal capacitance. Lumitec lights that will work in this configuration include Courtesy and Accent lighting as well as the Touch Dome Light and Aurora Dome Light.
- IF PWM dimming control is being used on a channel, PLI enabled lights on that channel will respond as standard lights without digital color control
- PWM dimming control is not compatible with some loads such as relays. For these situations, ensure all commands sent to these commands are ON/OFF only commands (see [UI setup](#) for further information)

## Various System Configurations

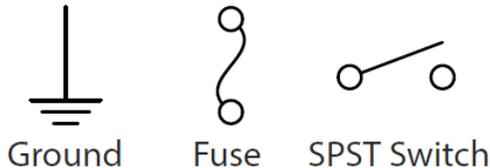
These schematics are intended to be used as general guidelines. Wiring requirements will vary from vessel to vessel.

### DIFFERENT LIGHT TYPES

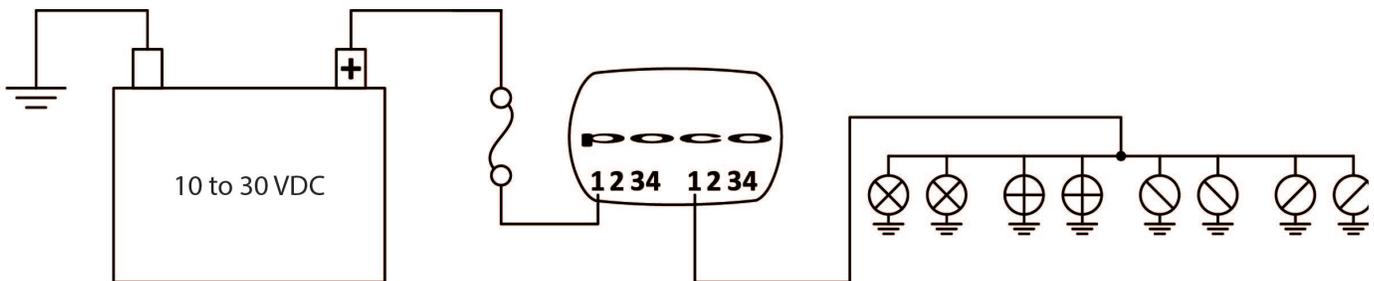


(e.g., Down Light, Rail Lights, Underwater Lights, Etc.)

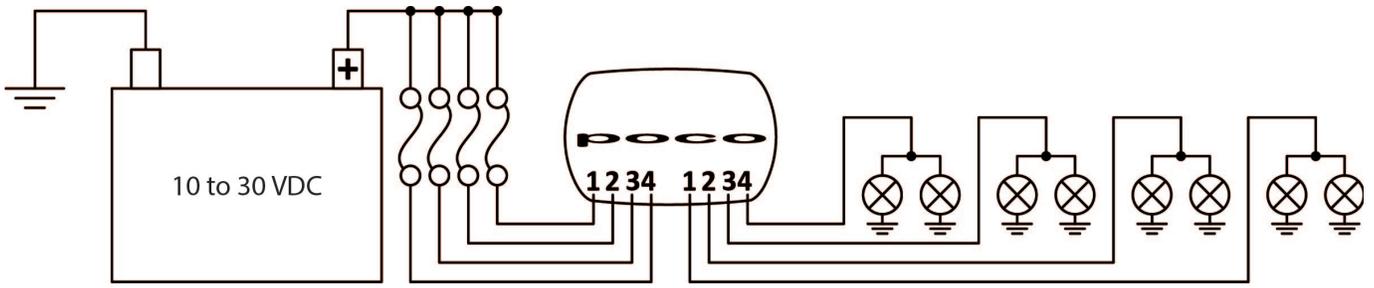
### SYMBOL REFERENCE



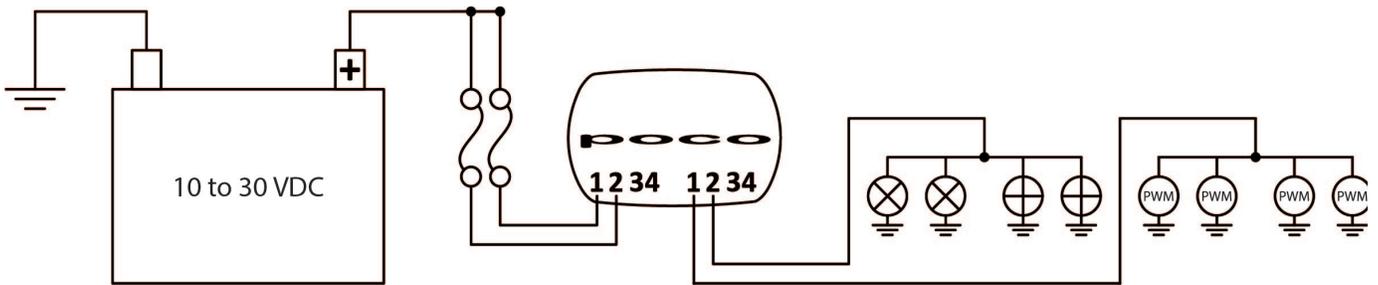
### Use of a single channel to control multiple light types within the lighting system



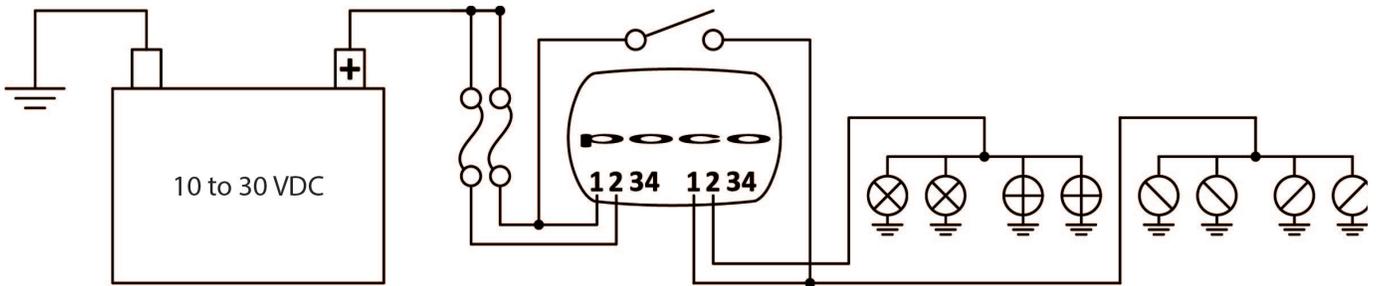
### Use of different channels to allow isolated control of a set of similar light types within the system



**Use of different channels to allow isolated control of PLI and PWM lighting**

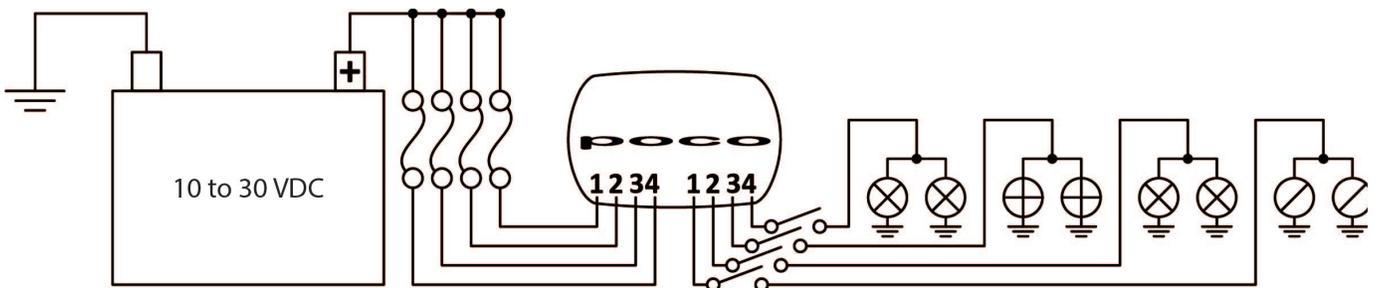


**Use of an SPST switch on a channel to allow for redundant mechanical control of a set of lights within the system allowing for standard Lumitec TTP control or digital PLI control**

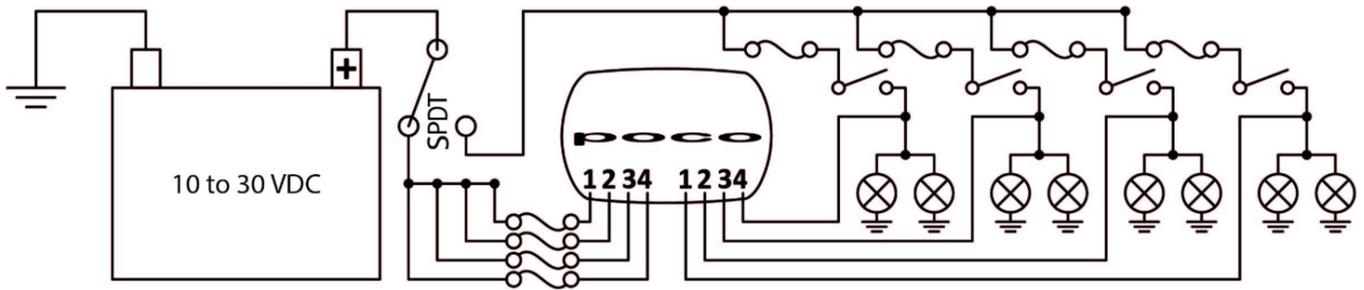


**Use of an SPST switch on each channel to allow for standard Lumitec TTP control as well as digital PLI control (non-redundant)**

\*POCO will need to be configured with startup commands to turn on all 4 channels by default to use this connection method. See [Startup Switch](#) in UI configuration.



Use of an SPDT switch prior to all lighting circuits to allow for redundant mechanical control of entire lighting system with one switch



## User Interface

### Release Notes and Known Issues

UI Version: 2.0

- No method to change WiFi AP SSID or password. Default is poco-xxxx and lumitec561.

### User Interface Components



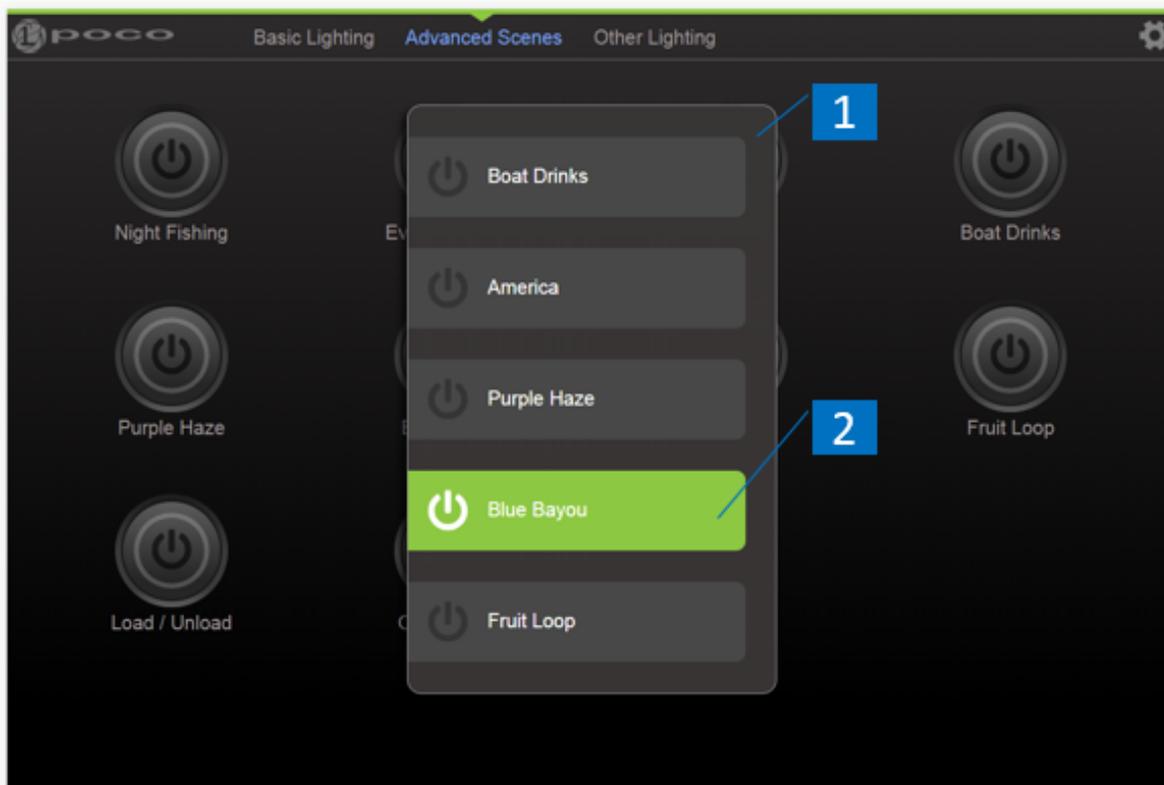
### Switch Panel

1	Active switch page
2	User named and configured switch pages
3	Configuration and setup
4	Switch that has been turned on (Blue highlighted icon)
5	Switch that has the ability to be modified from default intensity and color with a press and hold of the button (Notice ring around power logo) Switch has been configured as an Omni-lume in switch setup
6	Switch is either latching or momentary ON/OFF with no ability to modify (Notice NO ring around power logo)



**Omni-lume Widget**

1	Switch modification popup when appears when a Omni-lume switch is pressed and held
2	Light color modification rings, press for desired color
3	Light intensity modification
4	Play and Pause pattern (available of Spectrum and Dual Color lights)

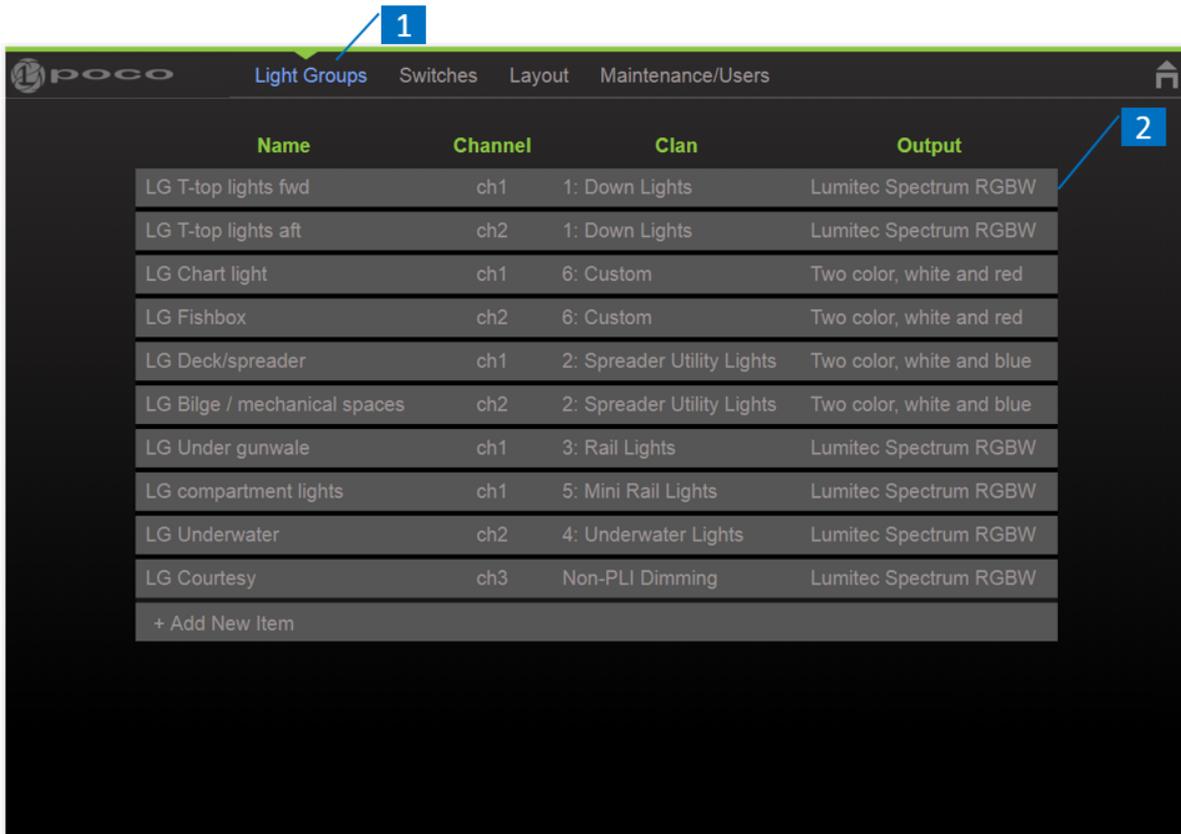


### Switch Chooser Widget

1	Switch Chooser popup appears when a Switch Chooser button is pressed and held A quick press of a switch chooser button will activate the first button in the list
2	Highlighted switch showing that switch is activated

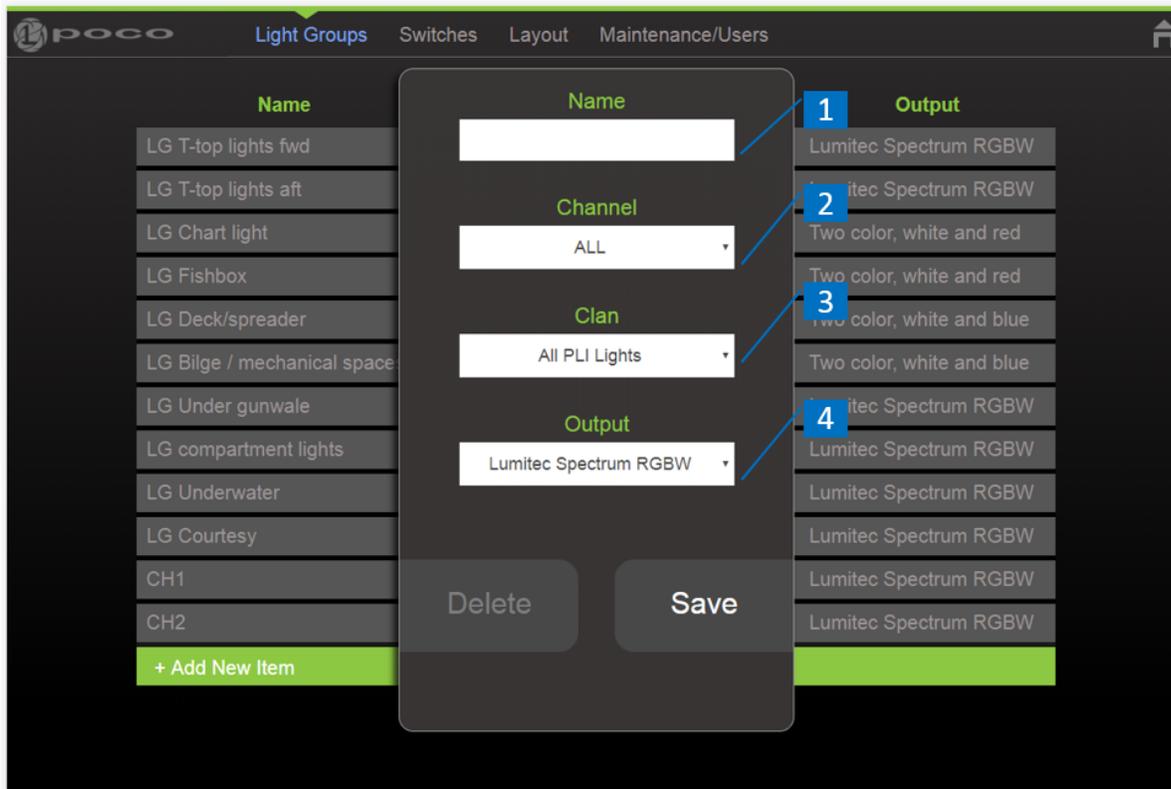
## User Interface Setup

### Light Groups



**List of configured Light Groups**

1	First step in system configuration is to define the "Light Groups"
2	Select a row to edit or select "+ Add New Item" to create a new "Light Group"

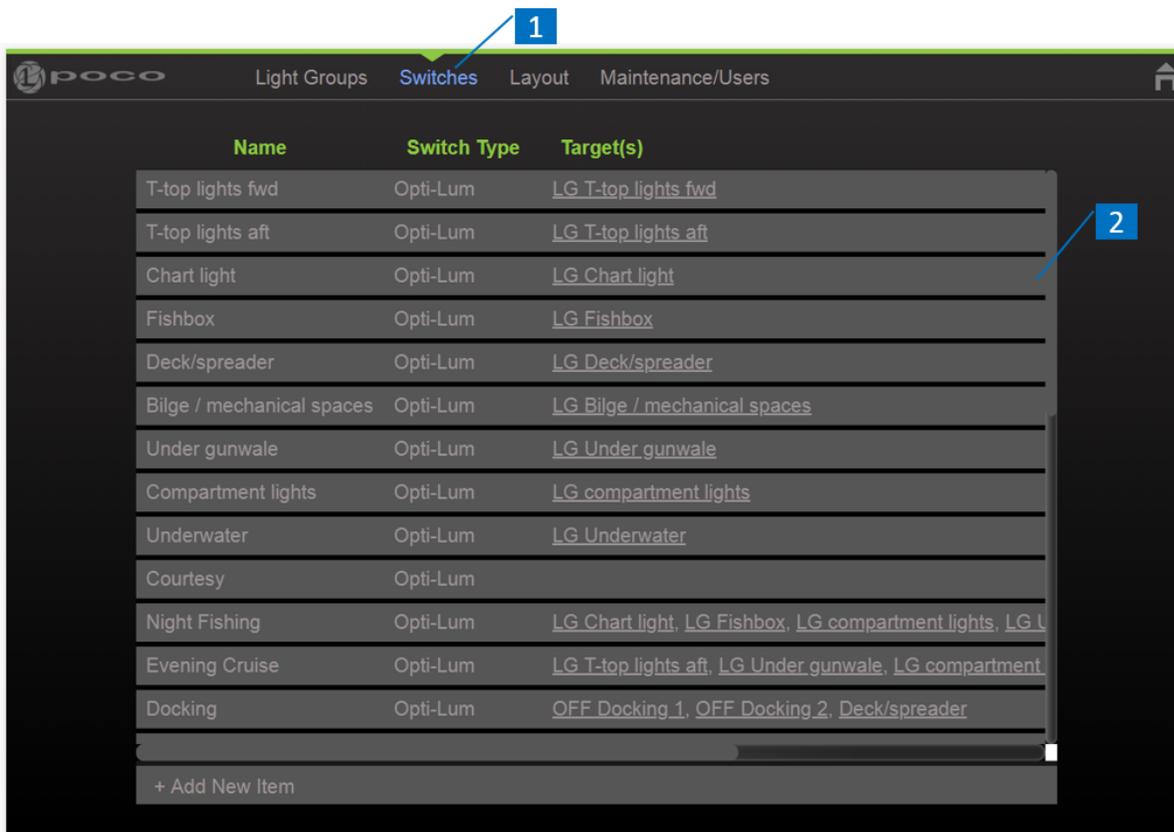


### Add/Edit a Light Group

1	User Configurable "Light Group" Name, Using a prefix like "LG" may help with future setup
2	Hardware output channel on POCO. Gives the ability to send a command to all channels or each individual channel (1-4)
3	A PLI-level identifier for one or more devices. Clans are roughly organized around product families. Allows commands to be sent to all Clans or individual Clans in the list below.
4	Color capability of lights built into light group. This is the property that provides the correct color options for a light when defining the color to be turned on. For example a 2 color flood light may only have the capability to have white or blue light so a white and blue color wheel will be presented when setting the color of this light rather than the full color spectrum wheel.

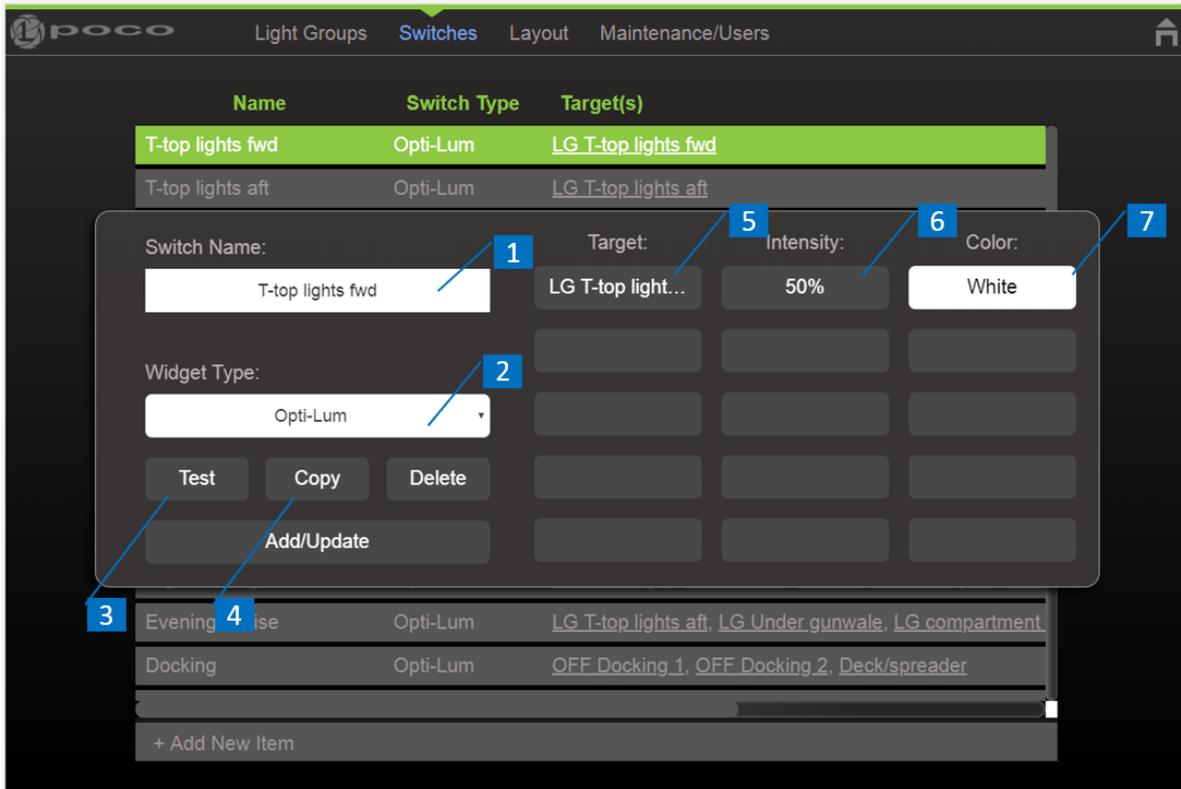
Clan	Family of Lights
1	Flush Mount Down Lights ( Mirage, Orbit, Shadow, ) (1- color, 2-color, 4 color, Spectrum)
2	Spreader Lights and Utility Lights (Capri, Caprera, Nevis, Ibiza, Perimeter Light) (White/Red or White/Blue)
3	Rail Lights (12 inch long) (Spectrum)
4	Underwater Lights (SeaBlaze X2) (Spectrum or Dual Color)
5	Mini Rail (6 inch long) (Spectrum)

### Switches



**List of configured Switches**

1	Second step in system configuration is to define the "Switches" and Scenes
2	Select a row to edit or select "+ Add New Item" to create a new "Switch"

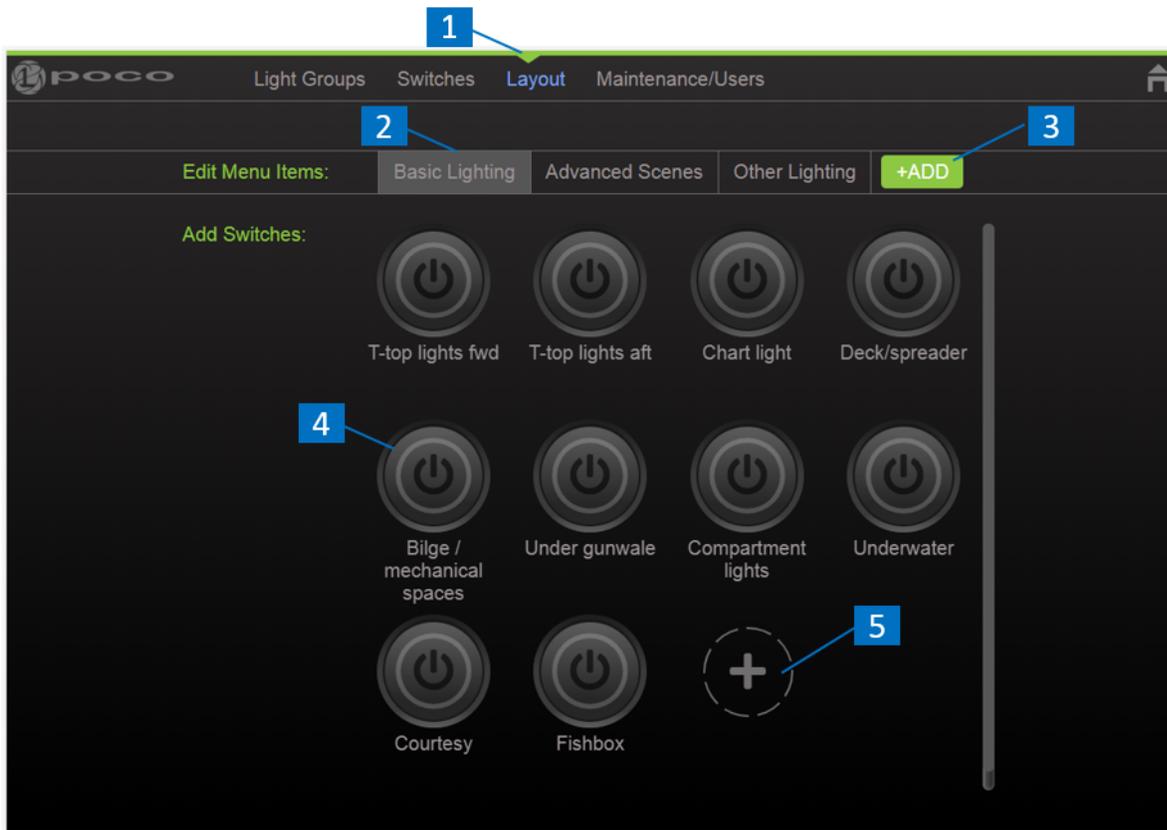


### Add/Edit a Switch

1	User Configurable "Switch" Name
2	Type of Switch to define button action. See switch types in the list below
3	Push to test commands in list, push again to issue off command to targets in list
4	Push to create a copy of current switch and begin editing
5	Light Group or Switch Selection. Light Groups are allowed to have intensity and color properties, switches can not have any modification properties and are only activated in the order they appear in the list
6	Light Intensity Selection 0% - 100%
7	Color and Pattern Selection

Switch Type	Action
Omni-Llume	Works like a standard on/off toggle switch but has the ability to modify color and brightness for the lights that are attached to it with a press and hold action of the button
Latching On-Off	Standard toggle switch, Press button to turn On, Press again to turn Off
Momentary	Standard Momentary switch, Press button to turn On, Release to turn Off. (Example: a Horn button)
Switch Chooser	Acts as a folder to store previously defined switches that may have similar functionality. Works like a standard on/off toggle switch for the first switch in the list but has the ability to turn on and off other switches with a press and hold action of the button

### Layout

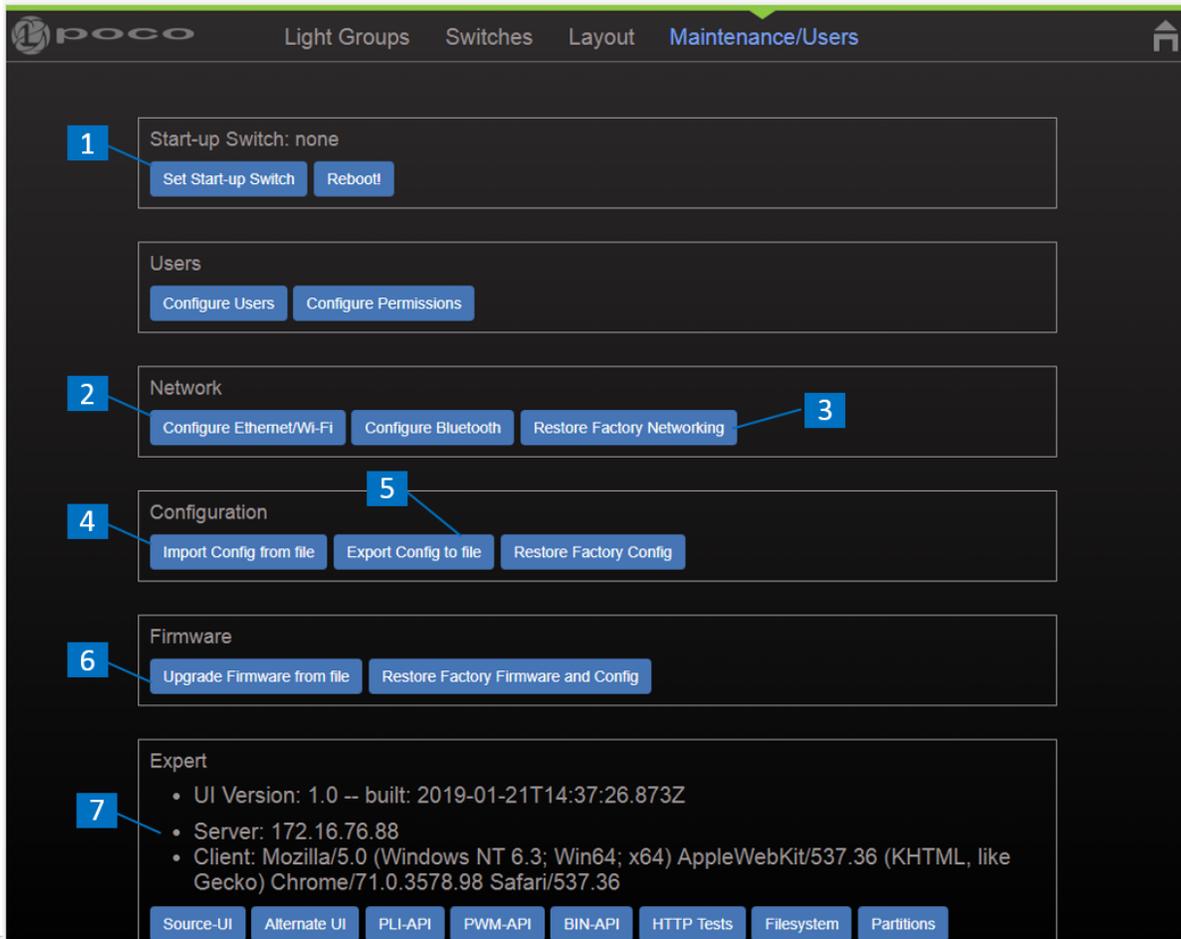


### Add/Edit a Layout

1	Layout configuration
2	Switch page name (Press and hold to edit or delete name)
3	Add new switch page
4	Press and hold to edit or delete switch
5	Add new switch to layout

### Maintenance

Default Maintenance pin is set to "0000". This can be changed but must be done by manually editing the configuration file. See exporting and importing configuration below.



## Maintenance Options

1	Startup Switch - This could be used to turn on some amount of lighting at power up like courtesy lighting or could be used to turn on all 4 channels as an ON/OFF switch when wired in series with SPST switches. This allows for rocker switches to be used as typical and PLI commands would modify the behavior of the connected lights.  note: Create and configure the switch as usual prior to selecting it here. Press reboot to test it.
2	By default POCO broadcasts as a WiFi access point (AP). The SSID is "poco-xxxx" where xxxx is a unique ID that is hardware dependent. Default password is "lumitec561". IP address for connecting to poco (AP) is 192.168.4.1 (some devices may support accessing poco via <a href="http://poco.local">http://poco.local</a> )  WiFi can be disabled here. Connection can also be configured for connecting POCO to existing WiFi network (STA mode).
3	Restores networking settings to factory default (note: reverts to default of currently booted factory app).
4	Import Config file. File type must be .json
5	Export current config file. This is a good way to backup and/or copy this configuration to another unit.
6	Upgrade POCO Firmware using a xxx_ota.bin file supplied by Lumitec.
7	POCO Server Information

## Tips and Tricks

1. Only five commands are allowed per switch but switches can be nested to create a switch with many commands. Take note that it takes time to issue commands over the power lines so the more commands that are attached to a switch the more lag there will be from the

issuing of the first command to the issuing of the last command. If an advanced scene is being created it may be helpful to create a switch to turn off various lights and then nest this switch as the first command of a switch that can then issue four additional commands to turn lights on.

2. In some instances it may be desirable to define a simple PWM single color light such as Lumitec's accent lights as an RGBW Spectrum light so that if it is attached to a switch that creates a lighting scene. The lighting scene color may be adjusted via an Omni-Lume switch. The accent light will not change color but by identifying the light group as a RGBW Spectrum Light it will not prevent the full color Spectrum Wheel from being displayed. If a switch is defined with Spectrum Lights and a 2-color White/Blue light the only options for color changing with a press and hold of the Omni-Lume button will be white and blue because the switch picks the least common color that the lights are capable of producing.

## Network Setup

### Poco as a WiFi access point

The Poco by default serves as a WiFi access point (AP). This connection is good for updating firmware and importing and exporting configuration file as well as testing and configuration. The SSID is "poco-xxxx" where xxxx is a unique ID that is hardware dependent. Default password is "lumitec561". WiFi can be disabled under the Ethernet/WiFi configuration on the maintenance page. WiFi IP address for connecting to server is 192.168.4.1 some devices may support <http://poco.local>

### Poco connecting to an existing access point

The wireless connection can also be configured for connecting Poco to existing WiFi network on the Ethernet/WiFi configuration page. IP address given will depend on DHCP server and can be determined from Access point connection status page.

### Bluetooth

Poco is compatible with Bluetooth 4.0 supported Android and iOS devices with an application downloadable from Apple App Store or Google Play Store. Search for "Lumitec Poco"

## Firmware Update

Firmware update must be completed with a WiFi or Ethernet connection from a device that contains the firmware file. The device used for update can be a computer, tablet or phone with Chrome, Firefox or Safari browsers. Standard MFDs do not have the ability to perform this upgrade.

Select "Upgrade Firmware from File" under the Maintenance / Users page within the configuration of Poco.

