Installation & Operating Manual
Ver. 1.5.2

PowerLok Rack PDUs

POWERLOK

RACK POWER DISTRIBUTION

Contents

Introduction

PowerLOK Rack PDUs are a next generation product for the mission critical industry. All PowerLOK PDUs are engineered, tested, and manufactured in the United States. Gateview Technologies automated manufacturing processes ensure that our customers' servers run reliably in the 24/7 mission critical industry. PowerLOK's Fast-Response and Select Model program makes it easy to get what you need when you need it.

Safety Precautions

Specific safety precautions for this product are as follows:

- All precautions should be taken to guarantee a safe work and operational environment. General safety precautions must be observed during all aspects of operation of equipment described in this document. Failure to comply with the safety warnings, procedures, and guidelines presented in this document is in violation of the safety standards of design, manufacture, and intended use of this equipment.
- You are responsible for following the safety guidelines and warnings presented in this document for this equipment. Individuals using Gateview Rack PDUs are expected to follow all the noted warnings and safety precautions necessary for safe operation of the equipment in your environment. Gateview Technologies assumes no liability for failure to comply with these requirements.
- Rack PDUs are intended for indoor use only in a controlled environment that adhere to the operating temperatures within this manual. Any use outside of these constraints may void the warranty.
- Rack PDUs rated for 240/415VAC may be fitted with a NEMA L22-20 or L22-30 plug that is rated for a higher voltage. Caution must be taken to assure that the rating of the Rack PDU and the supply voltage match.
- **The total capacity of equipment connected to the Rack PDU CANNOT EXCEED the maximum load rating of the Rack PDU.**

⚠️ **DANGER**
HAZARDOUS VOLTAGE, CURRENT, AND ENERGY LEVELS ARE PRESENT IN THIS PRODUCT. INTERNAL CIRCUITS CAN HAVE HAZARDOUS VOLTAGES PRESENT EVEN WITH PDU CIRCUIT BREAKERS IN THE OFF POSITION. DO NOT OPERATE THE PRODUCT WITH THE COVER REMOVED.

Professionals installing and operating Rack PDUs are advised of the following:

- Do not try to modify the Rack PDU in anyway, including the input plug, power whip and receptacles.
- Do not drill into or attempt to open any part of the Rack PDU enclosure. There are no serviceable parts inside the Rack PDU.
- Do not attempt to use the Rack PDU if any part of it is damaged.
- Rack PDUs rated 30A and greater contain magnetic-hydraulic circuit breakers. Circuit breaker equipped PDUs must be mounted vertically.
- Do not mount the Rack PDU to an unstable enclosure or surface.

Equipment grounding

To minimize electrical shock hazard, the Rack PDU chassis/enclosure is connected to the electrical earth ground pin of the Rack PDU plug. The input power cable must be plugged into an industry electrical code compatible receptacle which provides connection to the facility electrical safety ground.

Product Specifications

The following section gives the mechanical and electrical specifications of the Rack PDU.

Mechanical Specifications

Chassis dimensions in inches and (mm). See specifications for complete outline drawings.

Vertical PDU	Length	Width	Depth
24L	23.98 (609)	2.18 (55.37)	2.00 (50.80)
36L	35.98 (914)		
41L	40.98 (1041)		
46L	45.98 (1168)		
72L	72.00 (1829)		
82L	82.00 (2083)		

Electrical Specifications

PDU Utility Wiring Configuration	Line Current Rating	UL / CSA Line Current Rating*	Number of Wires	Wire Gauge	Operating Temperature
208V 1PH	20A	16A	3	12	0°C - 60°C (32°F - 148°F)
	30A	24A		10	
120V/208V WYE 3PH	20A	16A	5	12	
	30A	24A		10	
240V/415V WYE 3PH	20A	16A	5	12	
	30A	24A		10	
	60A	48A		6	
208/240V DELTA 3PH	30A	24A	4	10	
	35A	30A		8	
	50A	40A		6	
	60A	48A		6	

* Per the National Electrical Code (NEC) and Canadian Electrical Code (CEC) requirements, when in service, the line current is to be limited to 80% of the PDU's plug rating.

Rack PDUs rated 30A-60A line current contain 20A circuit breakers for receptacle group protection. The circuit breakers are UL-489 Listed and rated 5 or 10kAIC depending on model.

Packaging

Rack PDUs are shipped in molded 1.8 EPS foam and 200 double-wall corrugated cartons.

72L Package	Dimensions	Approx. Ship Weight	Lifting Handles	Maximum PDUs per pallet	Maximum height per 44" x 82" pallet
1-pack	79 x 11 x 5	17	No	48	65" (12 levels)
2-pack		35		96	
3-pack	79 x 22 x 5	52	Yes	72	
4-pack		68		96	

82L Package	Dimensions	Approx. Ship Weight	Lifting Handles	Maximum PDUs per pallet	Maximum height per 44" x 92" pallet
1-pack	89 x 11 x 5	19	No	48	65" (12 levels)
2-pack		37		96	

72" PDU packaging example:

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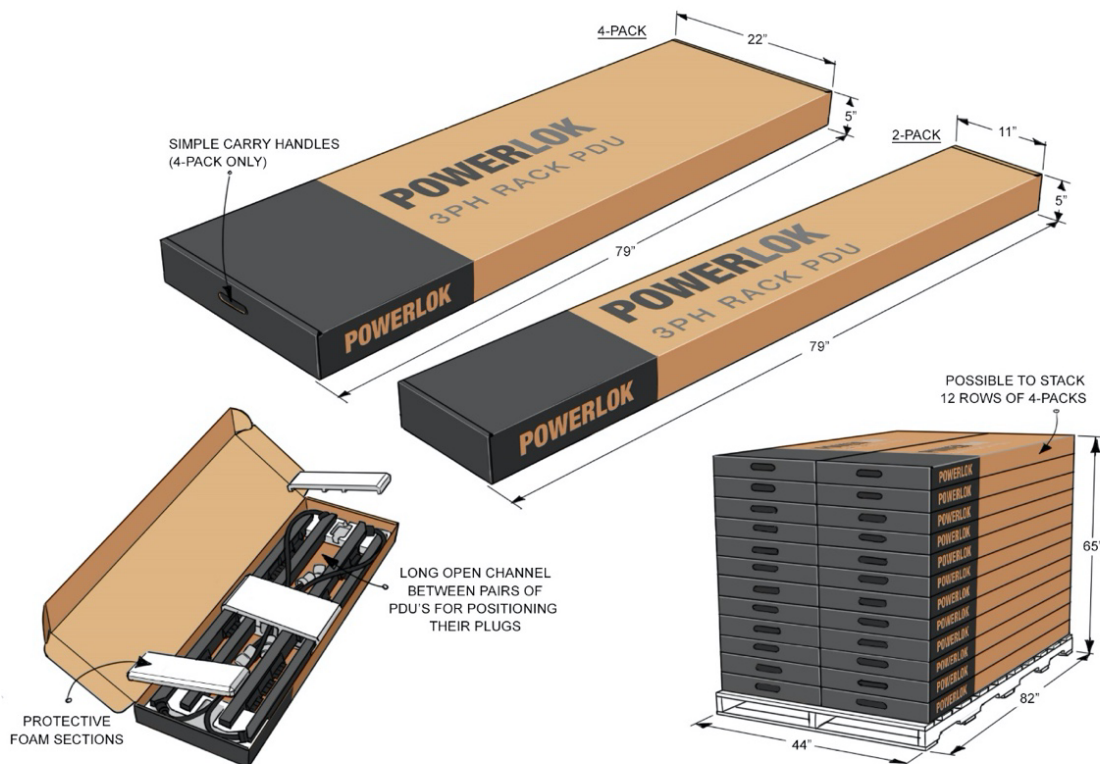
Regulatory Compliance

Product Safety

Rack PDUs have been safety tested and certified to the following standards:

- USA UL 60950-1
- CAN/CSA 22.2 No. 60950-1
- Canada ICES-003 (A) / NMB-003 (A)
- FCC Part 15 Class A compliant
- RoHS compliant
- NOM Addendum

USA Notification

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their own expense.

Canadian Notification

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Installation

Installation of Rack PDUs into a server rack is performed by using the buttons that are already attached to the back surface of the Rack PDU. These buttons mate with keyhole slots located in the server rack.

Mounting button detail: **Key slot example:**
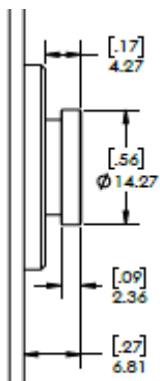
Alternately, Rack PDU mounting buttons may be removed (attached with #6-32 screws) and a customer supplied bracket designed for Rack PDU mounting may be attached. The attachment screws can be re-used. A customer supplied #6-32 screw should not penetrate the Rack PDU chassis more than 1/8".

Power Monitoring

PowerLOK models with monitoring include a local touchscreen display and ethernet communication.
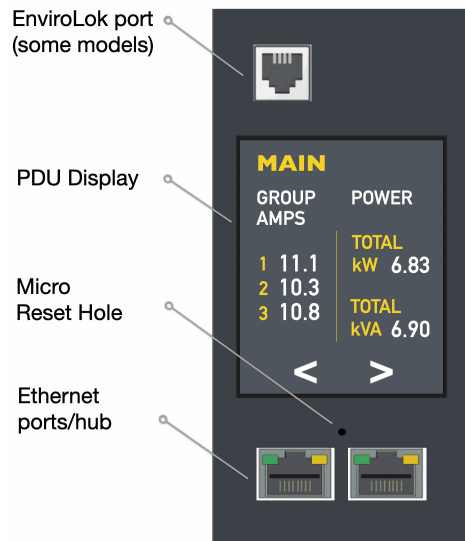
Monitoring accuracy
- Voltage: ± 0.5% at nominal
- Current: ± 1.0% of measurement from 250 mA – 1A
- Current: ± 0.5% of measurement from 1A – 30A

The touchscreen can rotate 180 degrees. The illustration below is a 30A 120/208V 3PH PDU example with EnviroLOK and SwitchLOK devices installed. Highlighted devices only appear on PDU display when installed.

Ethernet Communication

The Rack PDU is equipped with two RJ45 10/100Base-T Ethernet ports to attach to an existing local area TCP/IP network. This connection allows access to the Rack PDU via a web browser or SNMP manager. The two RJ45 connectors that are bidirectional; therefore, the user can connect to either port to set up the PDU on the network. 12 PDUs can be connected in series by daisy chaining.

PDU Addressing Modes

The Rack PDU supports the following methods of **IPv4 addressing**:

Mode	Description	Comment
Linked local	IPv4 link-local addresses are assigned to address block 169.254.0.0 - 169.254.255.255	This addressing mode supports attaching a host PC/laptop directly to the Rack PDU without requiring a switch, router or DHCP server.
DHCP	The Rack PDU network configuration is provided by the DHCP server.	The local touchscreen display will publish the IP address assigned to the Rack PDU by the DHCP server.
Static IP	**Default PDU network configuration** **IP address:** 192.168.1.254 **Subnet Mask:** 255.255.255.0 **Gateway:** 192.168.1.1	The static IP can be changed using the web browser.

The Rack PDU supports the following methods of **IPv6 addressing**:

Mode	Description	Comment
SLAAC	StateLess Address Auto Configuration. The PDU sends a request to the router for a prefix, then uses it's own MAC address and prefix to generate an IP address.	Router must be capable of Router Advertisements. Alternatively, an independent router advertisement daemon on the network may respond to the PDU while in SLAAC mode. For Linux boxes, refer to 'RADVD'
Static	**Default 2603:6011:8904:9900:7a:491d:dc1a:f074, Prefix 2603:6011:8904:9900, 48 bit length**	IPv6 address field takes the full address including prefix. This address may be changed in the web browser.

Web server address settings page:

Connecting PowerLOK to a Network

Linked local

Once the user is connected to the network, go to the touchscreen display to identify the factory assigned linklo IP address. IPv4 link-local addresses are assigned to address block 169.254.0.0 - 169.254.255.255. Open a new browser tab and enter the linklo IP address: 169.254.70.53, as an example, to access the web browser.
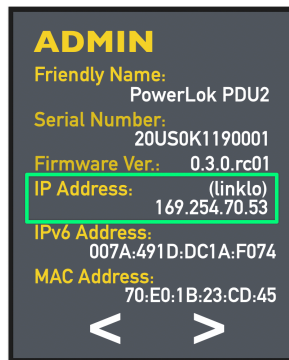
Access to the Rack PDU's web server
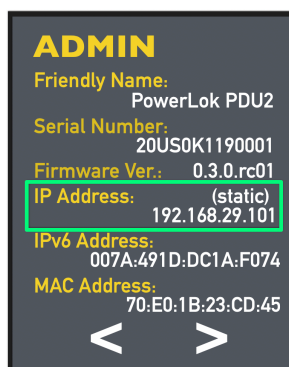
Default credentials are:
Username: administrator
Password: password
Credentials may be changed in the admin section.

Static IP

The following section describes how to set the user's computer for a static IP. The PDU has a static IP of 192.68.29.101 as shown in the touchscreen example below:

Web Browser

The Rack PDU is equipped with a web browser accessible over IP. To access, open a browser window and enter the PDU IP address. If the PowerLok web page does not appear, the PDU is not connected, or the network does not recognize the PDU. See section: How to connect your PC/laptop with Linked local and

Static IP option or call your network administrator. For each data type, historical graphing or historical logs can be viewed.

Real time plus historical graphing

POWERLOK   Rating: 20A 208V 3PH   Friendly Name: RACK D112-A PD

PowerLok   SwitchLok   EnviroLok   Admin ⌄

PowerLOK Summary
Levels NOW

TOTAL kW / kVA		7.54 / 8.54
INTERNAL TEMP		41°C
SENSOR A TEMP / Rh		72°F / 38%
SENSOR B TEMP / Rh		71°F / 37%
SENSOR C TEMP / Rh		68°F / 35%
SENSOR D TEMP / Rh		95°F / 42%
GROUP AMPS	1	12.2
	2	10.3
	3	10.8
LINE AMPS	A	22.2
	B	20.3
	C	20.8
GROUP kW / kVA	1	2.51 / 2.63
	2	2.42 / 2.58
	3	2.54 / 2.64
LINE kW / kVA	A	3.20 / 3.33
	B	3.31 / 3.45
	C	3.83 / 3.88
GROUP PF / VOLTS	1	0.98 / 208
	2	0.97 / 207
	3	0.94 / 207
LINE PF	A	0.98
	B	0.97
	C	0.94

PowerLok Historical Graphs / Log
Levels over past two week period

TOTAL kW / kVA ⌄   GROUP kW / kVA ⌄   GROUP AMPS ⌄   GROUP PF / VOLTS ⌄

PEAK	5.94 kW	9.45 kVA
NOW	5.76 kW	5.54 kVA

Time Interval: 8 hrs.

7.2
5.8
4.2
2.8
1.4
0

-2 WEEKS   -1 WEEK   NOW

INTERNAL PDU TEMP ⌄

PEAK	45C
NOW	41C

○ Fahrenheit
● Celsius

Set Alarm 60 °C [Apply]   Time Interval: 8 hrs.

75
60
45
30
15
0

-2 WEEKS   -1 WEEK   NOW

Software version: 2.1.0 PowerLok 2021 All Rights Reserved.

PowerLok Settings ⌄

Amperage Alarm Setting

Primary Only 80%	⬜
Primary Redundant 40%	⬛
Primary Redundant 45%	⬜
Enable Custom	⬜
Set Custom %	n/a
Manage SwitchLok	⬛ ⓘ

SwitchLok Master Control ⌄

Master Switch: On/Off	●	ⓘ
Master Reboot:	RUN	ⓘ
kVAh Reset:	CLEAR	ⓘ
Start Delay (s):	0	ⓘ
Sequence Delay (s):	2	ⓘ
Off-On Delay (s):	4	ⓘ
Utility Apply Delay (s):	140	ⓘ

Sequence Actions Explained ⌄

Events

✓ 2021-10-14 3:40 PM Line A Over-current cleared (34.5%, 40%)

Real time plus historical logs

POWERLOK   Rating: 20A 208V 3PH   Friendly Name: RACK D112-A PD

PowerLok   SwitchLok   EnviroLok   Admin ⌄

PowerLOK Summary
Levels NOW

TOTAL kW / kVA		7.54 / 8.54
INTERNAL TEMP		41°C
SENSOR A TEMP / Rh		72°F / 38%
SENSOR B TEMP / Rh		71°F / 37%
SENSOR C TEMP / Rh		68°F / 35%
SENSOR D TEMP / Rh		95°F / 42%
GROUP AMPS	1	12.2
	2	10.3
	3	10.8
LINE AMPS	A	22.2
	B	20.3
	C	20.8
GROUP kW / kVA	1	2.51 / 2.63
	2	2.42 / 2.58
	3	2.54 / 2.64
LINE kW / kVA	A	3.20 / 3.33
	B	3.31 / 3.45
	C	3.83 / 3.88
GROUP PF / VOLTS	1	0.98 / 208
	2	0.97 / 207
	3	0.94 / 207
LINE PF	A	0.98
	B	0.97
	C	0.94

PowerLok Historical Graphs / Log
Levels over past two week period

TEMPERATURE ⌄   [Graph / Log]

		A	B	C	D	Log Scale
	NOW	82 F	62 F	82 F	106 F	10 sec.
TODAY	-00:00:10	82 F	62 F	82 F	106 F	
TODAY	-00:00:20	82 F	62 F	82 F	106 F	1 min.
TODAY	-00:00:30	82 F	62 F	82 F	106 F	10 min.
TODAY	-00:00:40	82 F	62 F	82 F	106 F	
TODAY	-00:00:50	82 F	62 F	82 F	106 F	30 min.
TODAY	-00:01:00	82 F	62 F	82 F	106 F	1 hr.
....	....					
-1 DAY	-00:00:10	82 F	62 F	82 F	106 F	8 hr.
-1 DAY	-00:00:20	82 F	62 F	82 F	106 F	1 day
-1 DAY	-00:00:30	82 F	62 F	82 F	106 F	

HUMIDITY (Rh) ⌄

		A	B	C	D	Log Scale
	NOW	38	35	38	32	10 sec.
TODAY	-00:00:10	38	35	38	32	
TODAY	-00:00:20	38	35	38	32	1 min.
TODAY	-00:00:30	38	35	38	32	10 min.
TODAY	-00:00:40	38	35	38	32	
TODAY	-00:00:50	38	35	38	32	30 min.
TODAY	-00:01:00	38	35	38	32	1 hr.
....	....					
-1 DAY	-00:00:10	38	35	38	32	8 hr.
-1 DAY	-00:00:20	38	35	38	32	1 day
-1 DAY	-00:00:30	38	35	38	32	

PowerLok Settings ⌄

Amperage Alarm Setting

Primary Only 80%	⬜
Primary Redundant 40%	⬛
Primary Redundant 45%	⬜
Enable Custom	⬜
Set Custom %	n/a
Manage SwitchLok	⬛ ⓘ

SwitchLok Master Control ⌄

Master Switch: On/Off	●	ⓘ
Master Reboot:	RUN	ⓘ
kVAh Reset:	CLEAR	ⓘ
Start Delay (s):	0	ⓘ
Sequence Delay (s):	2	ⓘ
Off-On Delay (s):	4	ⓘ
Utility Apply Delay (s):	140	ⓘ

Sequence Actions Explained ⌄

Events

✓ 2021-10-14 3:40 PM Line A Over-current cleared (34.5%, 40%)

Admin section of the web browser

Admin ∨

Network Admin

X

PDU Friendly Name:

Model Number:	PL8204D-10C	MAC Address:	70-B3-D5-A7-0F-AC
Serial Number:	20USK15190001	Port Speed:	100 Mbps
Firmware Version:	0.0.3.rc02	Hardware Version:	1.1.2

FTP Enabled ⬤

Settings

IPv4 Addressing Mode

Linked Local ◯   DHCP ◯   Static IP ⬤

IP Address [ ]   **IPv4 DNS Servers**
Subnet Mask [ ]   Primary DNS [ ]
Default Gateway [ ]   Secondary DNS [ ]

IPv6 Addressing Mode ⬤ Enable

IP Addresses: FE90::2D0:B8EE:ETC6:653C
                FE90::2D0:B8EE:ETC6:653C

SLAAC ◯   Static ◯

IP Address [ ]   Primary DNS [ ]
Prefix [ ]   Secondary DNS [ ]
Prefix Length [ ]   Default Gateway [ ]

Time Servers

NTP [ ]   MON, 11 OCT 2021 3:28:40 PM EDT

Web Access Settings

Enable HTTP ◯   Port: [ ]   AUTO
Enable HTTPS ◯ Port: [ ]   FE90::2D0:B8EE:ETC6:653C

Download Certificate   Enabled when HTTPS is enabled

PC Settings for Static IP on a Network

Step 1: Go to Control Panel
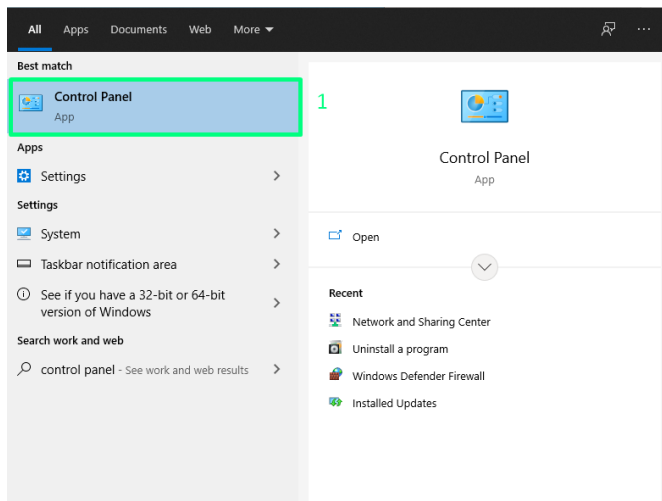
Step 2: Select network and internet
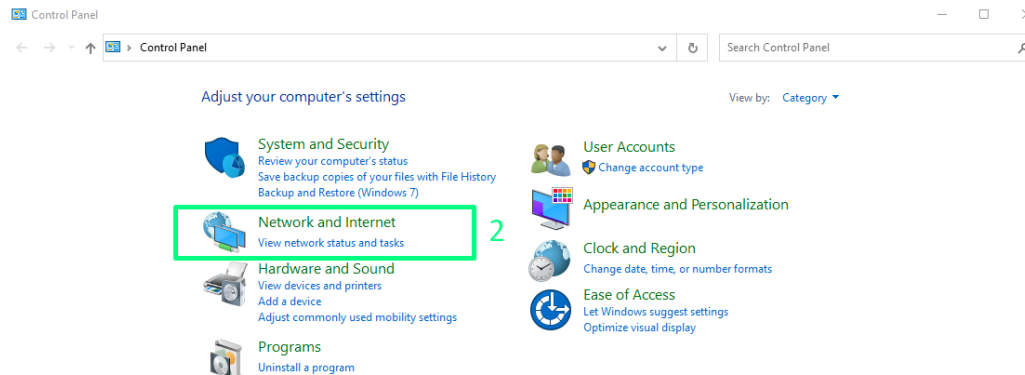
Step 3: Select Network and Sharing Center
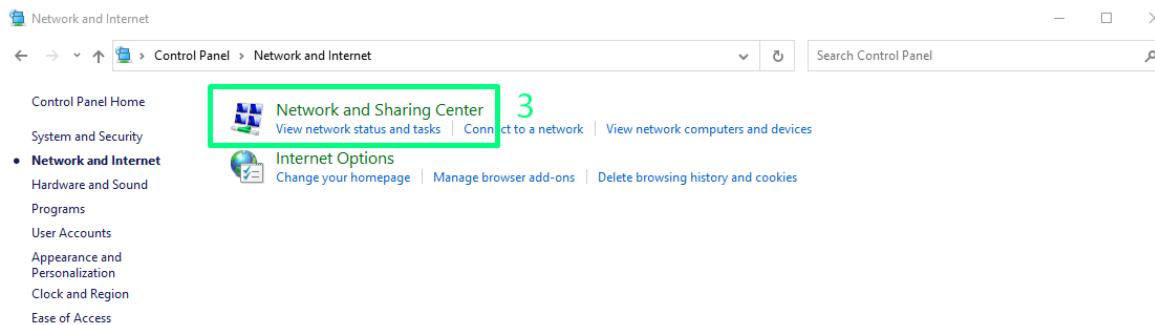
Step 4: Select Ethernet
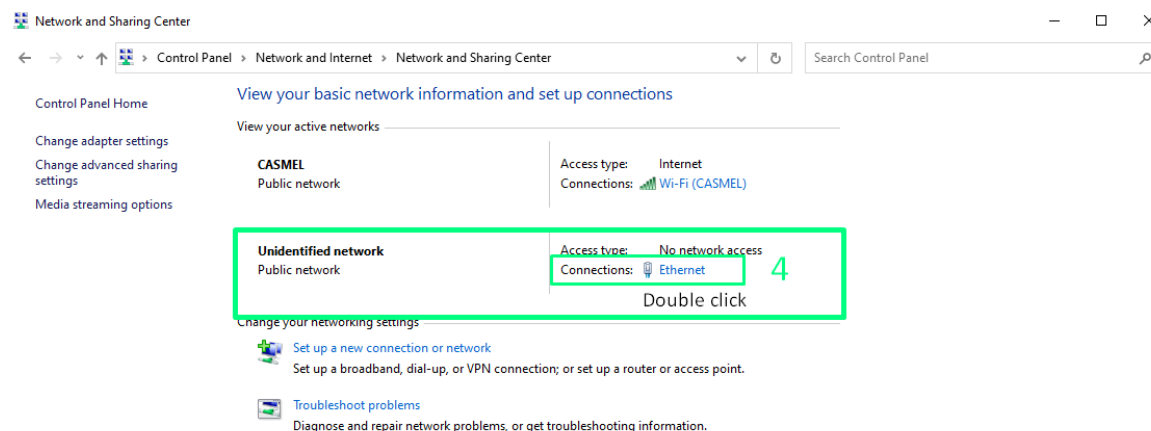
Step 5: Select Properties and then Options
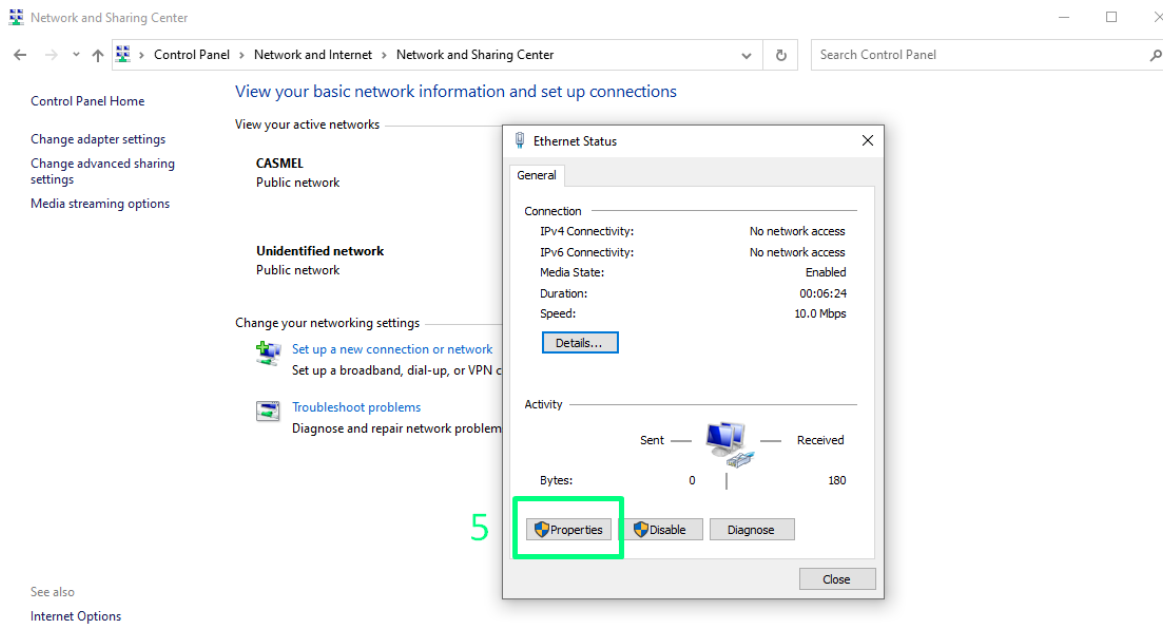
Step 6: Select Internet Protocol Version 4 (TCP/IPv4)
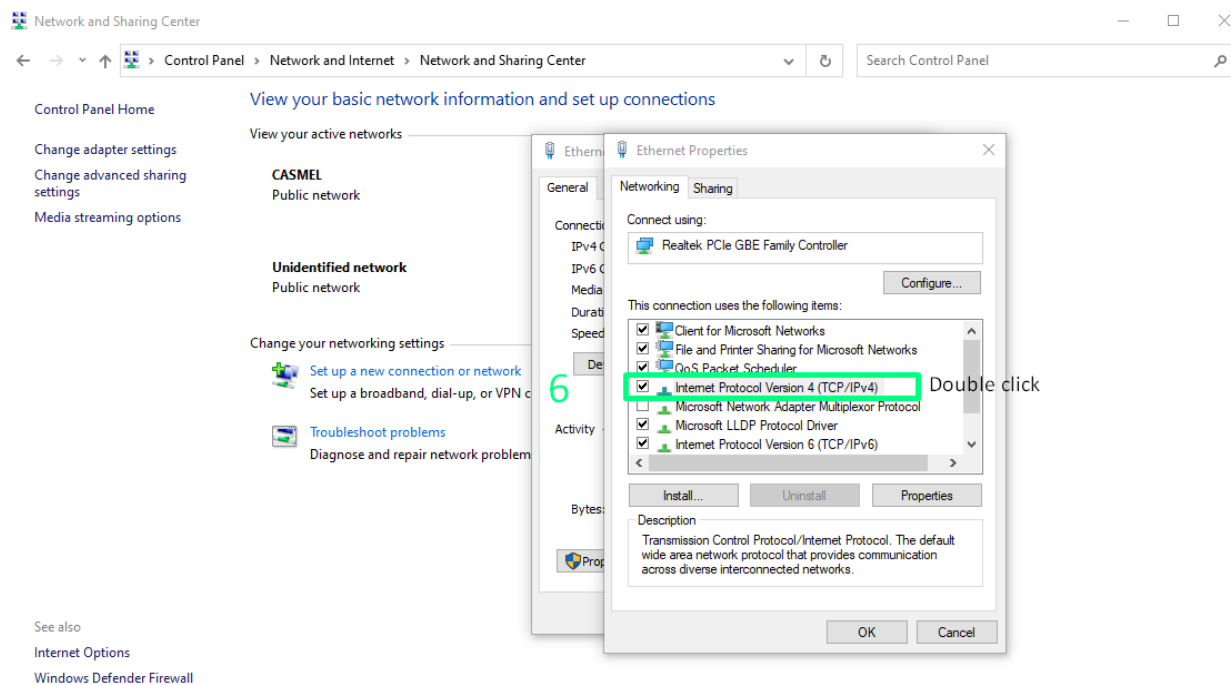
Step 7: Enter IP address, Subnet mask and Default gateway with numbers as shown and select OK.
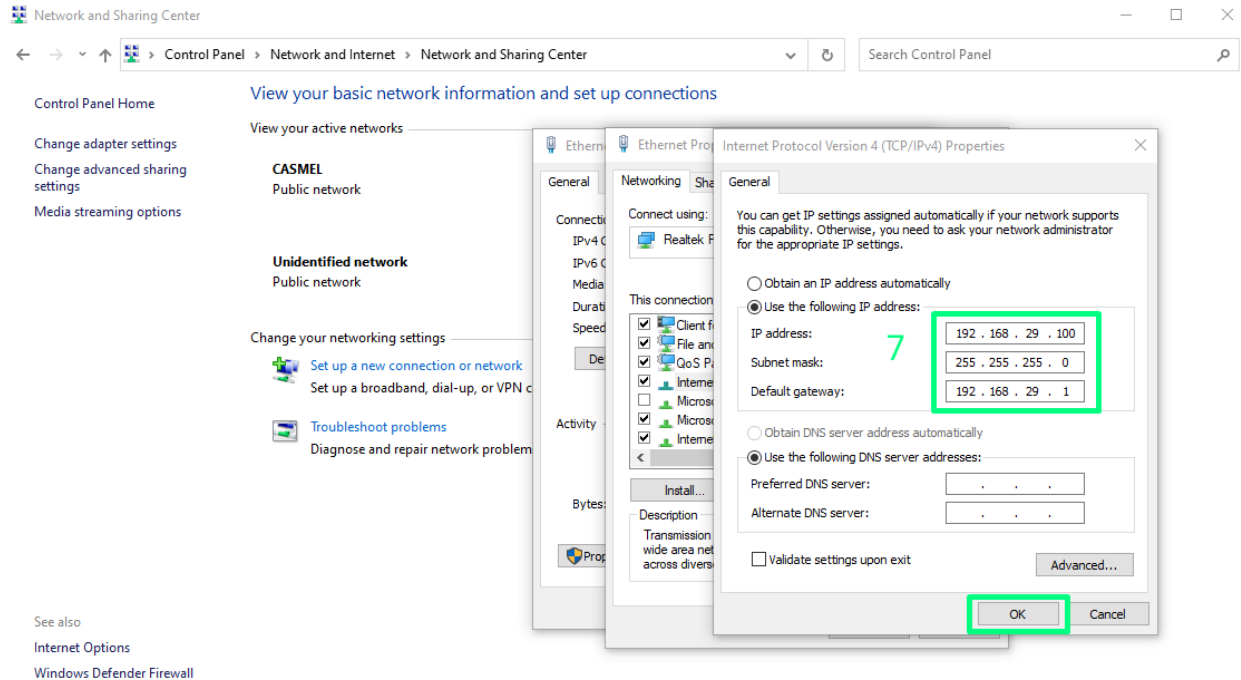
This completes all the necessary steps to configure for static IP.

How to setup the PDU with the Static IP to the router

To setup the PDU for your router follow these steps:

Step 1: Use the command prompt and type ipconfig to view the assigned IP address.

Step 2: To setup the PDU with the IP address in the address block, I used: 192.168.1.10. To determine if the IP address in not in use, type arp-a command as shown below:

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Step 3: Open the web server using your IP address and open the Admin section to select Edit.

Step 4: Enter your IP address, subnet mask and default gateway and then select Apply Settings.

This should complete the necessary steps to configure for the router. Connect the PDU to the router, open a browser and enter the static IP address to access the PowerLok web server.

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Time Server

The Rack PDU may be configured to retrieve the UTC time value from an NTP time server. It does this once upon bootup and displays the value in the admin section. The IP address 216.239.35.0 is set as default.
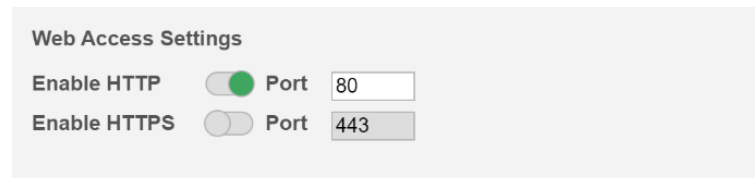
Time Servers

NTP `216.239.35.0` UTC 11-08-2021 20:39:21

Time Server configuration in admin settings.

HTTP \ HTTPS

The web user interface may be configured to use standard HTTP or TLS (HTTPS). HTTPS loads slower, but makes encrypted connections. Browser clients may display a warning about an invalid certificate, but data is still encrypted. Port settings may be changed here as well, but this should be done with caution as non-default ports may be forgotten. Changes to HTTP\HTTPS require a reboot to take effect.

Web Access Settings

Enable HTTP   Port `80`
Enable HTTPS   Port `443`

HTTP \ HTTPS configuration in admin.

SNMP

The Rack PDU provides an SNMP interface for the purpose of monitoring data externally. These data can be used to respond to events such as over current, over temperature, and other critical conditions. All three versions of SNMP are supported by this device and are configured via admin section of the web interface.

'Host Access Limited' allows you to allow only access from particular IP addresses. Enable it and configure the IP address to use this function.

Authorization and Privacy are specific to SNMPv3. Authorization options are SHA-1 or MD5-95 while Privacy options are DES-CBC and AES-128-CFB.

SNMP defaults are shown in the image.

SNMP Settings

Security Type
V3   V2c   V1

Listen Port	161
Read Comm.	gateview
Write Comm.	gateview

Host Access Limited

IP Address Host 1	0.0.0.0	IPv4	::	IPv6
IP Address Host 2	192.168.0.6	IPv4	::	IPv6
IP Address Host 3	0.0.0.0	IPv4	::	IPv6

SNMP V3

| USM User | user |
| Context Name | gateview |

Enable Authorization
Authorized Algorithm
SHA   MD5
Authorized Password `passauth`

Enable Privacy
Private Algorithm
DES   AES
Private Password `passpriv`

SNMP configuration within admin

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Duplicating Rack PDU Configurations

Rack PDU configurations may be easily duplicated by copying values to the clipboard and pasting in other PDU admin sections. Editing the text directly is not recommended.

Duplicate Settings within admin

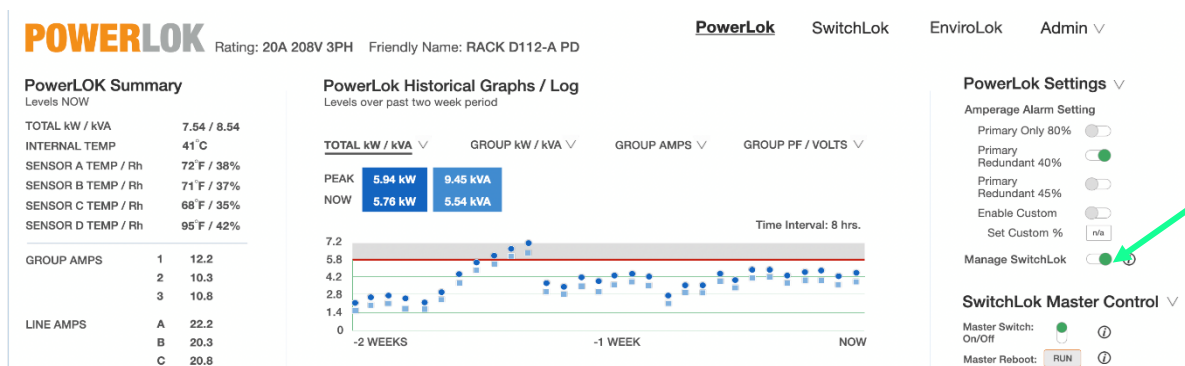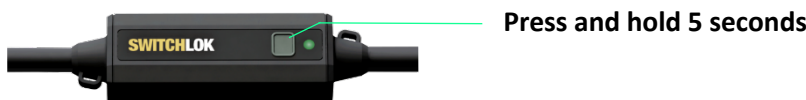Control-V paste or right-click, select 'paste'

Duplicate Settings within admin

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SwitchLOK

SwitchLOK devices allow electronic switching and monitoring capabilities of PDU outlets. They communicate wirelessly with associated PDUs equipped with SwitchLOK support.

Pushbutton

LED

SwitchLOK cord

LED meaning

LED Action	LED Color	Meaning
Fast Blink	Green	Not associated or joined with PDU
Slow Blink	Green	SwitchLOK is in joining mode, ready to be accepted from PDU Web interface
Continuous	Green	SwitchLOK is successfully joined with PDU
Continuous	Red	SwitchLOK relay is open

For PDUs equipped with SwitchLOK support, SwitchLOK devices may be joined, or associated with a PDU using the web interface. To join PDU and SwitchLOK, connect the SwitchLOK device to AC power. Press and hold the SwitchLOK pushbutton for 5 seconds, then release. LED should enter a slow blink state whereby it is ready to connect to the PDU. Access the PDU's web interface, activating the 'Manage SwitchLOK' slider.

Press and hold 5 seconds

POWERLOK Rating: 20A 208V 3PH   Friendly Name: RACK D112-A PD

PowerLok   SwitchLok   EnviroLok   Admin ∨

PowerLOK Summary
Levels NOW

TOTAL kW / kVA	7.54 / 8.54
INTERNAL TEMP	41°C
SENSOR A TEMP / Rh	72°F / 38%
SENSOR B TEMP / Rh	71°F / 37%
SENSOR C TEMP / Rh	68°F / 35%
SENSOR D TEMP / Rh	95°F / 42%

GROUP AMPS	1	12.2
	2	10.3
	3	10.8
LINE AMPS	A	22.2
	B	20.3
	C	20.8

PowerLok Historical Graphs / Log
Levels over past two week period

TOTAL kW / kVA ∨   GROUP kW / kVA ∨   GROUP AMPS ∨   GROUP PF / VOLTS ∨

PEAK	5.94 kW	9.45 kVA
NOW	5.76 kW	5.54 kVA

Time Interval: 8 hrs.

7.2
5.8
4.2
2.8
1.4
0

-2 WEEKS   -1 WEEK   NOW

PowerLok Settings ∨

Amperage Alarm Setting

Primary Only 80%
Primary Redundant 40%
Primary Redundant 45%
Enable Custom
Set Custom %   n/a

Manage SwitchLok

SwitchLok Master Control ∨

Master Switch: On/Off
Master Reboot: RUN

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SwitchLOK in the join state will appear in this list. Select 'Add' to join SwitchLOK with this PDU. At this time, a friendly label, RU, and ID may be assigned. A 'Test Reboot' may be done to prove the SwitchLOK is joined with the PDU.

Notes:

- SwitchLOK devices will remain in the join-ready state for up to 1 hr after which it will exit this state.
- Joined SwitchLOK devices may be 'removed' at any time from the PDU web interface

Once SwitchLOK is joined, selecting the SwitchLOK link at the top of the page will show a list of joined devices. They may be controlled by the Master control on the right pane, individually selected for group actions using the orange circles in the Control column or expanded individually to reveal detailed controls.

Firmware updating

For firmware update, please contact tech support: **support@gateview.com** or visit our website and contact the support team from the live chat: http://www.gateview.com/

Firmware is upgraded locally through the ethernet port on the PDU.

For a current SNMP MIB (Management Information Base) list, please contact your PowerLOK reseller.

Limited Warranty

Warranty Replacement Procedure: All product warranty procedures are conditional upon the warranty information set forth in Gateview Technologies Terms and Conditions for a term of three (3) years from the shipment of the product. Gateview Technologies will provide a replacement product if it is defective in accordance with the following: This warranty does not apply to normal wear and tear or damage resulting from misuse, abuse, or neglect. No service or maintenance is required and there are no serviceable parts inside of the product. Do not attempt to open the Rack PDU or the customer will void the warranty.

The customer should ensure prior to use whether this product is suitable, adequate, or safe for the use intended. Since individual applications are subject to great variation, Gateview Technologies makes no representation or warranty as to the suitability or fitness of these products for any specific application and Gateview Technologies is not responsible for equipment damaged by incorrect communication on the part of the customer between the customer and Gateview Technologies.

The customer will incur the cost of shipping the defective product to Gateview Technologies, and, if a replacement is necessary, Gateview Technologies will reimburse the customer for shipping and subsequently ship a replacement product within fourteen (14) days of receipt of the defective product. If replacement of the product is not necessary, Gateview Technologies reserves the right to deny reimbursement for the shipping of the product returned from the customer.

Notices

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