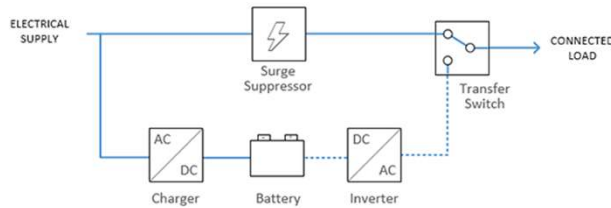




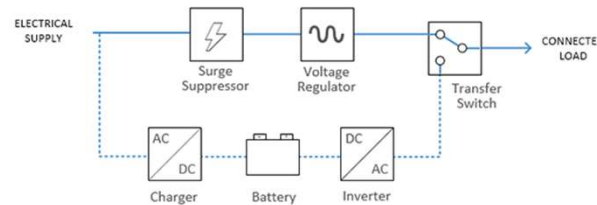
# Power Elite Partner Program - Single Phase UPS and PDU's

Jim Kupiec and Alex Garcia

# What is a UPS for? Why is backup power important?



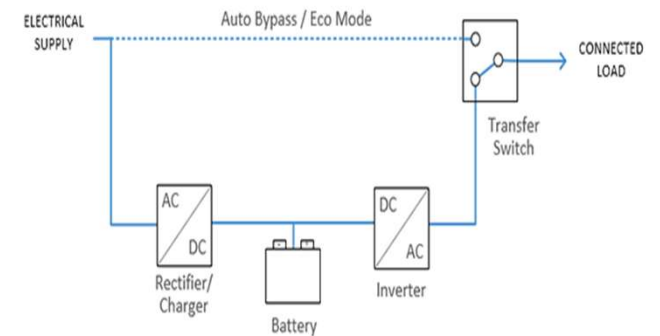
Stand By or Offline



Line-Interactive

An **uninterruptible power supply**, or UPS system, protects connected equipment from power problems and provides battery backup power during outages. Some UPS systems also regulate abnormal voltages.

Online or Double Conversion



# What is a UPS for? Why is backup power important?

## 1. Power failure

Also known as a blackout, this complete interruption of the electrical supply can be sparked by a variety of sources including utility equipment failures, storms, objects striking lines or poles, fire and human error. Equipment damage and data loss are common consequences.

## 9. Harmonic distortion

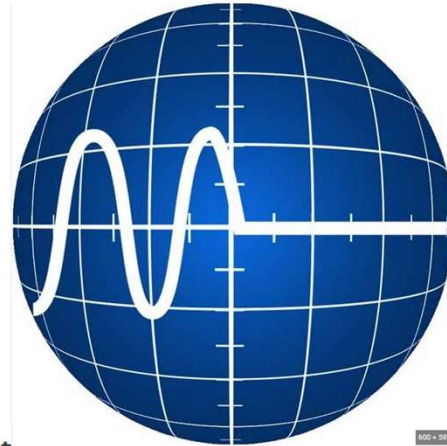
This distortion of the normal power wave is generally transmitted by unequal loads and can result in resonance, overload, and overheating of cables and equipment, among other problems.

## 8. Switching transient

These momentary changes in voltage or current that can damage equipment stem from lightning, switching of loads and capacitor banks, opening and closing of disconnects on energized lines, re-closure operations and tap changing on transformers.

## 2. Power sag

This sudden drop in the normal voltage level often results in serious equipment malfunctions and is usually caused by faults on the transmission or distribution network, connection of heavy loads or start-up of large motors.



## 3. Power surge

These very fast voltage variations are triggered by lightning, line or capacitor switching and disconnection of heavy loads. They destroy electronic components and lead to data processing errors, data loss and electromagnetic interference.

## 7. Frequency variation

The loss of stability in a power supply's normal frequency of 50 Hz or 60 Hz most often results from heavily loaded generators. The problem can cause motors to run faster or slower, leading to inefficiency, excess heat and degradation.

## 4. Undervoltage

Also termed a brownout, this voltage drop typically lasts from a few minutes to a few hours and is usually caused by overdemand or intentional "throttling" of electricity during peak demand. It can ruin computers and other electronic devices.

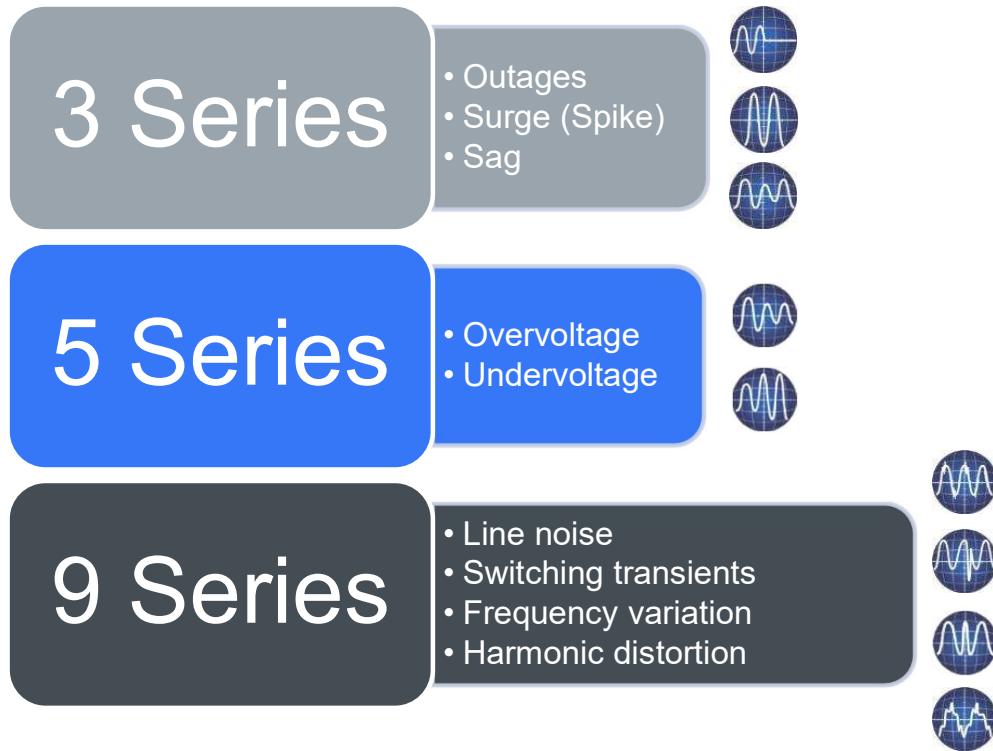
## 5. Overvoltage

Data loss, flickering of screens, and equipment damage are among the consequences of these momentary voltage increases generally caused by starting/stopping of heavy loads, poorly dimensioned power sources, and poorly regulated transformers.

## 6. Line noise

Electromagnetic interference or improper grounding most often produce these superimposed high frequency signals on the waveform, resulting in disturbances on sensitive electronic equipment, data loss and data processing errors.

# Eaton Nomenclature



# UPS Topology Review - Eaton Portfolio



Eaton 3S UPS

Eaton 5P UPS

Eaton 5PX G2 UPS

Eaton 9155 Marine UPS

Eaton 9155 UPS

Eaton 9355 UPS



Eaton 5PX UPS

Eaton 5S UPS

Eaton 5SC UPS

Eaton 9395 UPS family

Eaton 93PM UPS

Eaton 9PHD Marine UPS



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# UPS Topology Review - Eaton Portfolio



**TRIPP-LITE**  
by **EATON**

Eaton 9PX UPS

Eaton 9PXM UPS

Eaton 9SX Marine UPS

Eaton Emergency Lighting UPS

Eaton Ferrups FX UPS

Tripp Lite by Eaton UPS



Eaton 9SX UPS

Eaton BladeUPS

Eaton DIN rail UPS

*So many models,  
so **MANY**  
**SOLUTIONS!***



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# UPS Topology Review - Eaton Portfolio



## SmartPro Network Line:

- TOWER
  - SMART750XLA, SMART750SLT, SMART1050SLT, SMART1500SLT, SMART2200SLT & SMART3000SLT
- Rack/Tower
  - 500VA-5KVA range with Optional IP, Extended Run, mounting, etc.

## Standalone Line Interactive Product Families:

- AVR
  - (AVRT450U, AVR550U, AVR650U, AVR650UM, AVR700U, AVR750U, AVR750UTAA & AVR900U)
- ECO
  - (ECO1000LCD/ECO1300LCD/ECO1500LCD)
- HOSPITAL
  - (OMNISMART350HG, SMART700HG, SMART700HGL, SMART1200XLHG, SMART1200XLHGL)
- OMNI
  - (ISO/LCD/SMART/VS SERIES 350-1500VA RANGE TOWER w/ SMART550USB2)
- VS
  - (VS450T, VS650T, & VS900T)
- SMART PRO/GAMER
  - (SMART600PSGLCD, SMART1000PSGLCD, SMART1200PSGLCD & SMART1500PSGLCD)

## Smart Online:

- TOWER
  - SU700XLCD – SU3000XLCD, SUIINT1000LCD2U - SUIINT3000LCD2U
- Rack/Tower
  - SU750RTXLCD2U, SU750RTXLCD2UN..... SU3000RTXLCD2U and SU3000RTXLCD2UN

# 9PX lithium-ion UPS line overview

## 120V (default), 100V, 110V, 115V, 125V RT models

Catalog number	Rating (VA/Watts)	Input connection	Output connections	Dimensions (H x W x D), in.	Weight, lb.
9PX1500RT-L	1500 / 1350	5-15P, 8 ft.	(8) 5-15R	3.41 (2U) x 17.32 x 17.72	35.5
9PX2000RT-L	2000 / 1800	5-20P, 8 ft.	(1) L5-20R, (6) 5-20R	3.41 (2U) x 17.32 x 23.83	50.6
9PX3000RT-L	3000 / 2400	L5-30P, 8 ft.	(1) L5-30R, (6) 5-20R	3.41 (2U) x 17.32 x 23.83	52.7

## Global UPS, 208V (default), 230V, 240V RT models

Catalog number	Rating (VA/Watts)	Input connection	Output connections	Dimensions (H x W x D), in.	Weight, lb.
9PX1500GRT-L	1500 / 1350	C14	(8) C13	3.41 (2U) x 17.32 x 17.72	34.8
9PX2200GRT-L	2200 / 2000	C20 / L6-20P	(8) C13, (2) C19	3.41 (2U) x 17.32 x 23.83	48.6
9PX3000GRT-L	3000 / 2400	C20 / L6-20P	(8) C13, (2) C19	3.41 (2U) x 17.32 x 23.83	50.2

## 120V (default), 100V, 110V, 115V, 125V RT network card bundles

Catalog number	Rating (VA/Watts)	Input connection	Output connections	Dimensions (H x W x D), in.	Weight, lb.
9PX1500RTN-L (includes NETWORK-M2 network card)	1500 / 1350	5-15P, 8 ft.	(8) 5-15R	3.41 (2U) x 17.32 x 17.72	36.5
9PX2000RTN-L (includes NETWORK-M2 network card)	2000 / 1800	5-20P, 8 ft.	(6) 5-20R, (1) L5-20R	3.41 (2U) x 17.32 x 23.83	51.6
9PX3000RTN-L (includes NETWORK-M2 network card)	3000 / 2400W*	L5-30P, 8 ft.	(6) 5-20R, (1) L5-30R	3.41 (2U) x 17.32 x 23.84	53.7

\*2400W at 100% load for UPS only; 2700W at 100% load for UPS + EBMs

## Global UPS, 208V (default) 200V, 208V, 220V, 230V, 240V models

Catalog number	Rating (VA/Watts)	Input connection	Output connections	Dimensions (H x W x D), in.	Weight, lb.
9PX6K-L	6000 / 5400*	L6-30P, 10 ft. Hardwire	(2) L6-30R (2) L6-20R Hardwire	5.12 x 17.33 x 28.43	81.2

\* Derated at 200, 208, 220V. See 9PX6K-L technical specifications for full information.

## 9PX 6 kVA lithium-ion extended battery module (EBM) and accessories

Catalog number	Description	Rack size	Weight, lb.
9PXEBM192RT-L	Extended battery module for 9PX6K-L	2U	79
EBMCBL192-L	EBM cable extension, 6 feet (1.8 meters)		



# Why lithium-ion?

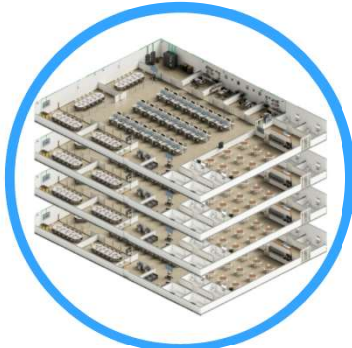
## 9PX lithium-ion vs VRLA battery

Characteristic	VRLA	Lithium-ion	Lithium-ion benefit
Average battery lifespan	3 to 5 years	8 to 10 years	2x to 3x longer life
Weight	Lithium-ion advantage: 20% lighter UPS, >40% lighter EBM		Easier installation/save time
EBM footprint	3U	2U	Saves U space for critical equipment
Warranty	3 years	5 years	2 years more warranty coverage
Increased runtime	Lithium-ion advantage: 2x to 3x more runtime @ full load		Decreased cost per runtime minute
BMS (Battery management system)	No	Yes	Improves reliability and performance; actively monitors temperature and charge
Battery replacement cost	>\$1000*	\$0	\$0 OpEx expenditure/reduced TCO

\*Battery and labor cost for one replacement.

# D-IT Product Portfolio

Helping Enterprises Operate at Scale



Offices



Server rooms



Network operation center



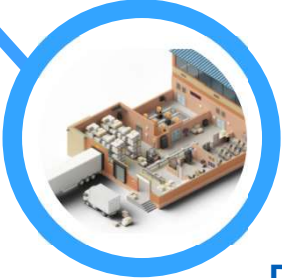
Edge computing



Network closets



Data centers



Distribution facilities

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# D-IT portfolio

## Home office, entertainment



- ① Portable charger
- ② Monitoring software
- ③ Monitor mount
- ④ Docking station
- ⑤ Ethernet cable
- ⑥ Desktop UPS
- ⑦ Surge protector
- ⑧ Wallmount monitor mount
- ⑨ Gaming UPS

# D-IT Product Portfolio

## Retail



10 Not pictured: network closets

### Standard retail

- 1 Surge suppressor
- 2 Tower UPS
- 3 Wallmount enclosure with rackmount UPS
- 4 HDMI cables for digital signage
- 5 Wallmount enclosure with rackmount UPS for security
- 6 Monitor mounts and wallmount surge suppressor
- 7
- 8 Power strips
- 9 Charging cart

### Other retail needs

- UPS for outdoor security
- Remote monitoring
- Network connectivity devices
- Locking floor standing racks
- Rackmount UPSs
- Charging cables
- Power cords
- Ethernet cables
- Wifi enclosures

# D-IT portfolio

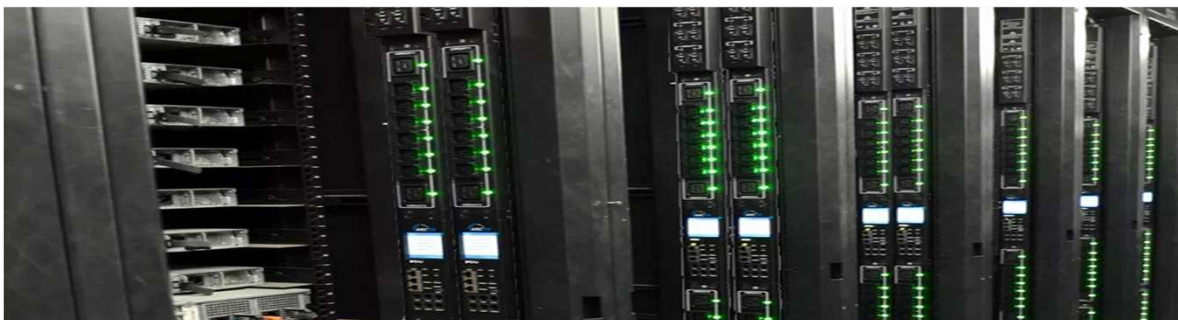
## Server room



- 1 Modular UPS
- 2 Maintenance bypass
- 3 Enclosure with locking doors
- 4 BladeUPS
- 5 Power management software
- 6 Rackmount UPS
- 7 Cybersecure network card
- 8 Environmental monitoring sensor
- 9 Cable management
- 10 0U PDUs

## PDU- What is a PDU?

- A power distribution unit (PDU) is a device for distributing electrical power in a data center. The most basic PDUs are large power strips without surge protection. They are designed to provide standard electrical outlets for data center equipment and have no monitoring or remote access capabilities. More advanced PDUs provide real-time monitoring and remote access capabilities.



- PDUs manage and distribute electricity and are normally installed directly onto a rack. The power source could be alternating current/AC (some offer DC as well). It can come from an uninterruptible power supply, a utility power supplier, or a generator or other secondary power source. PDUs are also designed for power requirements that are typically much larger than home or office power strips and surge protectors.
- Power distribution units ensure an organization's IT infrastructure and data center are adequately powered. Organizations also use PDUs to monitor power efficiency and uptime. Marketquest.biz estimated the global PDU market size to be nearly \$1.4 billion in 2021 and predicted it will grow to over \$1.6 billion by 2028.

## PDU- Most common types

---

### *THE 5 MOST COMMON TYPES OF PDU-*

- 1-BASIC: No feature sets. Basic 'plug & outlet' design w/ UL cert*
- 2-LOCAL METERED: Basic PDU with exception of Current(AMP) meters*
- 3-IP MONITORED: Local metered; adds on IP connectivity for reporting remotely/alerts.*
- 4-IP SWITCHED: IP Monitored; adds on 'Switched' or individual power outlet control. Additional models may come with power consumption reporting per outlet(PIPS) as well.*
- 5-ATS/AUTO TRANSFER SWITCH: Can range from BASIC to IP switched in functionality. Always are horizontal form factor. These PDU allow for single power supply devices to connect into multiple power sources/hosts.*

## *PDU - Top 10 considerations when purchasing a PDU:*

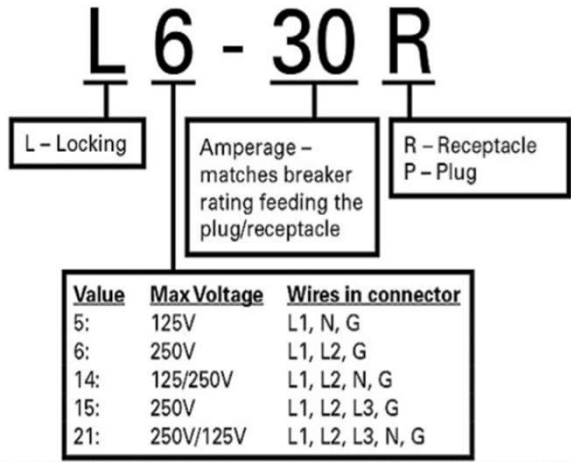


- 1. Type of mount**
- 2. Amperage**
- 3. Voltage**
- 4. Single- or 3-Phase power**
- 5. Plug type**
- 6. Power cord length**
- 7. Receptacle count/type**
- 8. Local metered**
- 9. Remote monitoring**
- 10. Remote switching**





# PDU Plug/Outlet options



*What everyone knows about power...*

***As we learned on UPS, more amperage/voltage means more power/KW/capacity available!***

# Eaton PDU Selectors(Pre, Custom & Cross)

**EATON**  
Powering Business Worldwide

Home > Rack PDU Selector

Would you like one of our representatives to contact you? [Yes, please contact me](#)

Home Tools Contact Us

Eaton's rack mounted power distribution units, called ePDUs, provide power to IT equipment within a rack and include a variety of features designed to save time, save money and reduce risk. Eaton offers a tiered portfolio of ePDUs with capabilities ranging from basic power distribution to advanced power management and precision control. Use our rack PDU selector below to help choose the right solution for your specific IT needs.

Input Plug: Select... Function: Select... Form Factor: Select... Output Receptacle: Select... Advanced Filters: Select... Part Number: E.g. EM119-10

Reset Filters

Reference Number: Load Saved Search

102 Results

Compare Selected Save this Search

Select	Part Number	Input Plug	Output Receptacle	Function	Form Factor	List Price	
<input type="checkbox"/>	EMA333-10 *Top Seller	L21-30P	(1) 5-20R, (21) C13 Outlet grip, (6) C19 Outlet grip	Managed	0U	From \$1876	<a href="#">More Details +</a>
<input type="checkbox"/>	EMi310-10 *Top Seller	L21-30P	(1) 5-20R, (30) C13 Outlet grip, (6) C19 Outlet grip	Metered Input	0U	From \$1384	<a href="#">More Details +</a>
<input type="checkbox"/>	EMAT08-10 *Top Seller	5-15P	(8) 5-15R	Managed	1U	From \$821	<a href="#">More Details +</a>
<input type="checkbox"/>	EBA201-10 *Top Seller	L14-30P	(24) 5-20R	Basic	0U	From \$1026	<a href="#">More Details +</a>


Quickly find PDU solutions for your specific IT environment.


[Eaton ePDUs Selector Link](#)


*Use your Selector guides on each site to determine the best comparable or initial PDU solution for your client!*


# Input Plug Type-


Input Plug ? Function ? Form Factor ? Output Receptacle ? Advanced Filters ? Part Number  
Select... Select... Select... Select... Select... E.g. EMI119-10


 **5-15P**  
120V, 1-phase, 15A


 **5-20P**  
120V, 1-phase, 20A


 **L5-20P**  
120V, 1-phase, 20A


 **L5-30P**  
120V, 1-phase, 30A


 **L6-20P**  
208V, 1-phase, 20A


 **L6-30P**  
200-240V, 1-phase, 30A


 **L14-30P**  
120/240V, split phase, 30A


 **L15-30P**  
200-240V, 3-phase, 30A


 **L21-20P**  
120/208V, 3-phase, 20A


 **L21-30P**  
120/208V, 3-phase, 30A


 **CS8365**  
200-240V, 3-phase, 50A


 **Hardwired**

 **IEC C20**  
230v, 1 Phase 16A

 **IEC 532P6W**  
240/415V, 3-phase, 30A

 **IEC 332P6W**  
250V, 1-phase, 30A

 **IEC 360P6W**  
250V, 1-phase, 60A

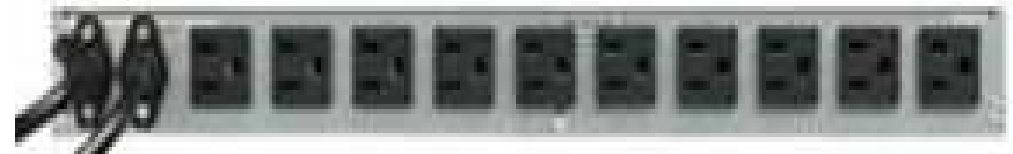
 **IEC 460P9W**  
250V, 3-phase, 60A

## FEATURE FOCUS-ATS PDU

- *ATS Power Distribution units provide dual/2 input lines of power source to a set of outlets(A & B Feed).*
- *A Feed is 'Main' power source while B Feed is 'Secondary' power source.*
- *Power sensing technology allows for transfer where line power is better quality.*
- *Typical Applications include both Dual AC Mains and UPS(1+1 Redundancy) for power input.*
- *Personal Tech Advisory: When using 2 UPS, always utilize Online Topology UPS systems!*

### Feature Focus: PDUMH20HVATNET

- A** Built-In LX Platform Interface
- B** Digital Amp Meter
- C** Primary Power Source Inlet (C20)
- D** Secondary Power Source Inlet (C20)
- E** 8 x C13 Switched Outlets
- F** 2 x C19 Outlets
- G** All-Metal Housing



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