



Current State of the UPS Industry

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Current State of the UPS Industry:

Three Phase Uninterruptible Power Supply has become more compact, efficient, and easier to operate than previous models. How?

UPS Defined

UPS Design and Power Flow

APC Three Phase UPS Products

Battery Technology

Services and Maintenance Plans

Industry Best Practices

Challenges

Questions?

What are UPSs?

National Electrical Code

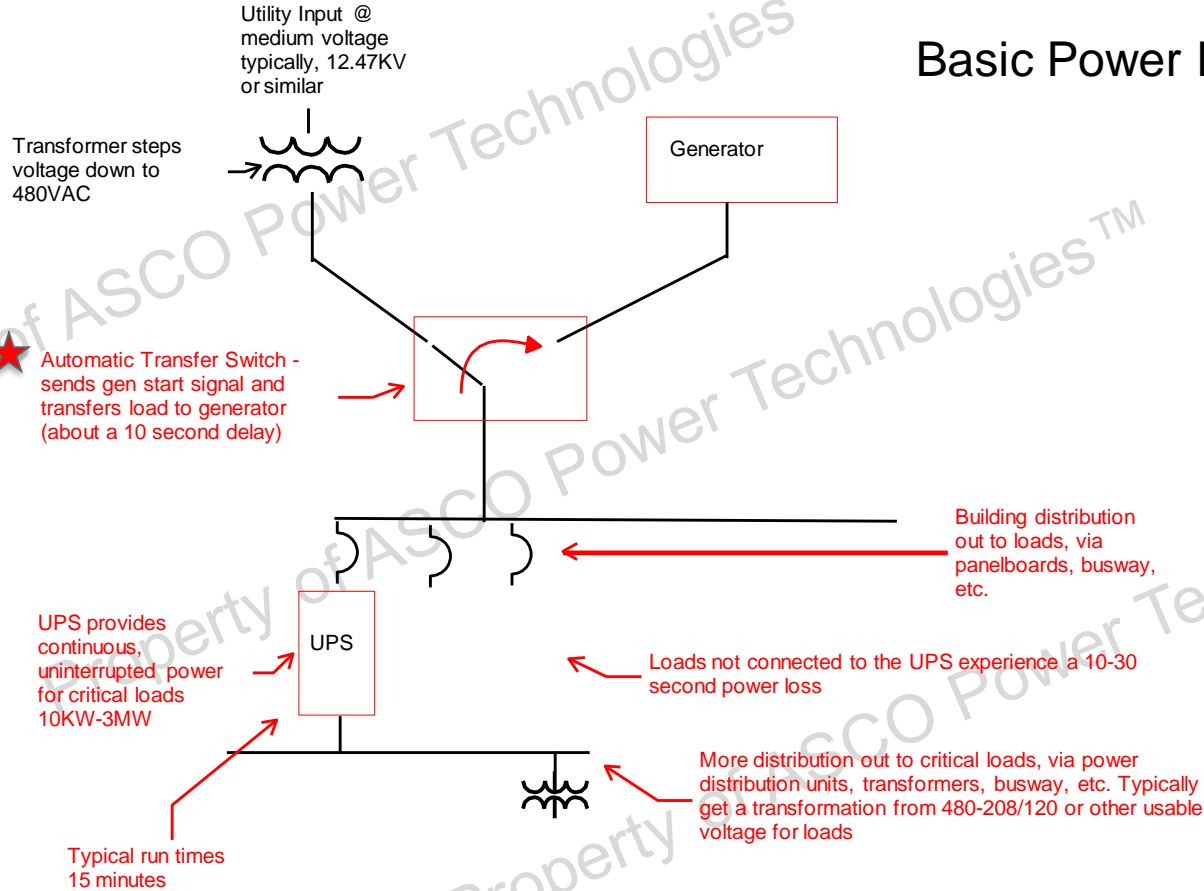
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Uninterruptible Power Supply. A power supply used to provide a highly regulated alternating current power to a load for some period of time in the event of a power failure.

Informational Note: In addition, it may provide a more constant voltage and frequency supply to the load, reducing the effects of voltage and frequency variations.



Basic Power Flow



Double Conversion UPS: Major Components

1. Rectifier
 - ✓ Converts power from AC current to DC current
2. Inverter
 - ✓ Converts power from DC current to AC current
3. DC Disconnect
 - ✓ Isolates DC power source from UPS system
4. Static Switch
 - ✓ Transfers power from UPS to main electrical supply
5. Maintenance Bypass Breaker
 - ✓ Isolates power from UPS to main electrical supply



APC Products

Three Phase UPS Systems



APC Products

Galaxy VS: 20-150kW (480V) 10-75kW (208V)

Modular Design:

1. Intelligence Module
2. Power Modules
3. Static Switch Module
4. Smart modular battery strings (optional)

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APC Products

Galaxy VM: 160-225kVA

Modular Design:

1. Intelligence Module
2. Power Modules
3. Static Switch Module

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APC Products

Galaxy VL: 200-500kW

Modular Design:

1. Compartmental design
2. Modular static switch
3. Power modules



APC Products

Symmetra PX: 10-500kW

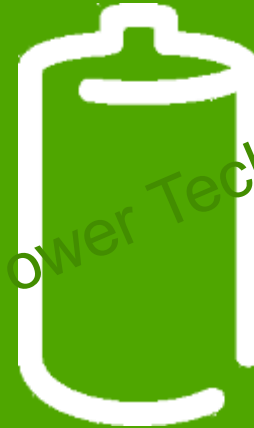
Scalable and Modular Design:

Each UPS has:

1. Modular static switch
2. Modular power modules
3. Modular batteries (internal up to 40kVA)
4. Compartmental communication connections



Stored Electrical Energy for UPS Systems



Schneider
Electric

Battery Technology

VRLA: Industry Standard

Each VRLA battery cabinet has:

1. DC Disconnect Breaker
2. Matching Cabinet to UPS
3. Remote Capabilities
4. Monitoring Capabilities



Battery Technology

Lithium-Ion: Industry Newcomer

Each Lithium-ion battery cabinet has:

1. DC Disconnect Breaker
2. Matching Cabinet to UPS
3. Remote Capabilities
4. 4 levels of monitoring (standard)



Service and Maintenance Considerations

Topics

- 1) UPS Downtime Preventions
- 2) Battery Failure Preventions
- 3) 7x24 Service and Maintenance Considerations

Service and Maintenance Considerations

UPS Downtime Preventions

UPS downtime must be proactive, not reactive:

1. Preventative Maintenance Plans
2. Emergency Dispatch Options
3. Warranty Options
4. Spare parts



Service and Maintenance Considerations

Battery Failure Preventions

Battery failure can be mitigated:

1. Preventative Maintenance Plans
2. Emergency Dispatch Options
3. Warranty Options



Service and Maintenance Considerations

7x24 Service and Maintenance Considerations

Keep your downtime limited by 7x24 options:

1. 7x24 Startup and Assembly
2. 7x24 On-site Response to Factory Warranty
3. 7x24 On-site Response to Preventative Maintenance Plans



Industry Best Practices

Testing Considerations

Functionality is critical:

1. Factory Testing Considerations
2. Load Bank Testing Considerations
3. On-site Commissioning Considerations



Challenges

Industry-wide Challenges

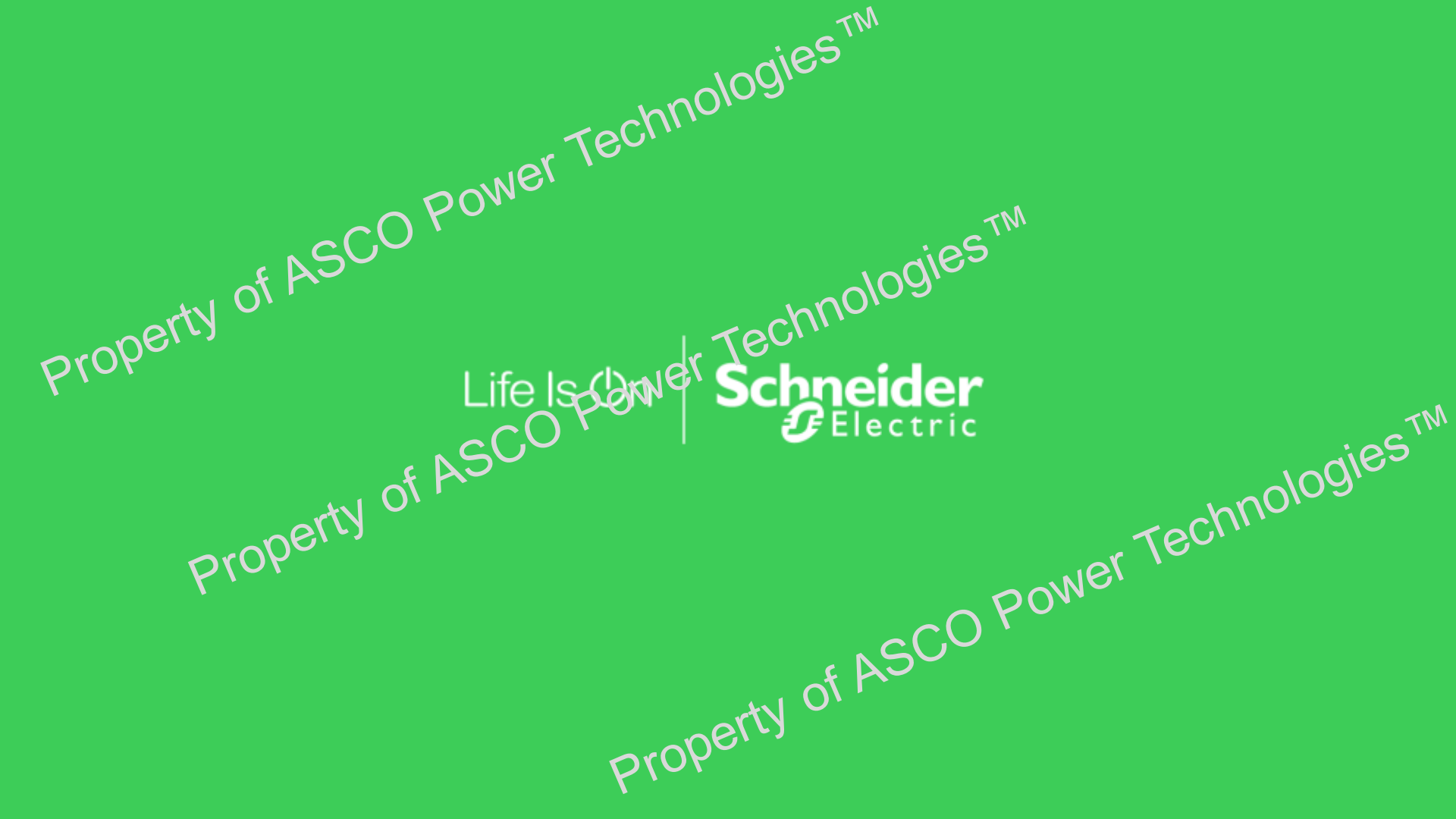
The UPS industry continues to face challenges:

1. Availability
2. Service Technician Shortages
3. Price Increases



Questions?

Thank you for your time!



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