

# Smart-UPS On-Line

2<sup>nd</sup> Generation 3-10 kVA Offer – Technical Overview



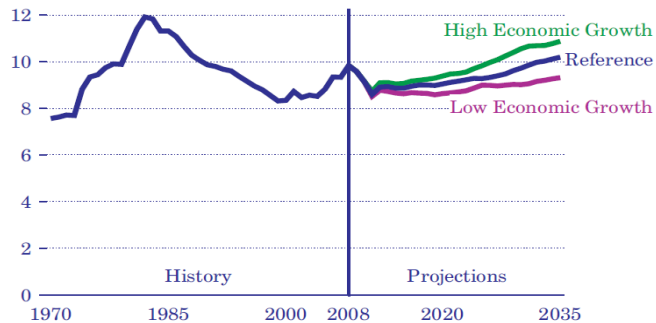
# Generation Comparison

Feature	SURT	SRT
Double Conversion On-Line Topology	●	●
Rack Tower Convertible	●	●
Smart Slot	●	●
Automatic Bypass	●	●
Hot Swap User Replaceable Batteries	●	●
Auto Detect External Battery Packs	●	●
Predictive Replacement Battery Date		●
Multi Color Backlight Graphical LCD		●
Unity Power Factor		●
Start Without Battery		●
ENERGY STAR® / Green Mode		●
Switched Outlet Groups		●
3 Year Warranty		●

# New Features

New Feature	Description
<b>Improved Power Factor</b>	The world first Unity power factor platform. Provides the ability to support greater load from a small footprint. 5 kVA units offer 0.85 pF (limited by input cord). 6-10 KVA units offer Unity 1.0 pF.
<b>Green Mode</b>	Units can be placed into green mode if higher efficiency operation is required (97%). In green mode, the load is powered directly from the utility feed. If power quality issues occur, the unit will switch to on-line mode. Switchover takes under 10 ms.
<b>ENERGY STAR® Qualified</b>	Units operate at 93.5% efficiency at 100% load, allowing it to surpass rigorous ENERGY STAR® qualifications.
<b>Efficiency Display</b>	The UPS estimates its efficiency under load conditions. This measure will read “NA” with no or very light loads.
<b>Energy Meter</b>	The UPS keeps a running measure of its power consumption. It is displayed in kilo-watt hours.

# Customers Demand Energy Efficiency





Average Annual U.S. Retail Electricity Prices in Three Cases 1970-2035 (2008 cents per kilowatt hour). Source: U.S. Energy Information Administration/Annual Energy Outlook 2010.


- Next generation On-Line products designed to meet customer requirements

- Energy Star compliant efficiency (93% efficient)
  - ~\$300 in annual saving for 10 kVA running at 75% load over unit that is 90% efficient
- Eco mode (97% efficiency)
- Switched Outlet Groups (scheduled “on” and “off” periods)
- Energy meter

# New Features, Cont...

New Feature	Description
<p data-bbox="170 282 579 321"><b>Graphical LCD Display</b></p> 	<p data-bbox="716 282 1717 539">Provides the perfect window into the added intelligence and offers the ability to configure the UPS without software. Two optional views are available – standard and advanced. The LCD is backlit to improve visual notification of warnings and alarms. The display can also rotate to improve visibility from the bottom of a rack.</p>
<p data-bbox="170 621 608 659"><b>Enhanced Smart Battery</b></p> 	<p data-bbox="716 621 1682 659">Battery management has been enhanced in several ways.</p> <ul data-bbox="716 675 1717 1370" style="list-style-type: none"><li data-bbox="716 675 1717 992">•The UPS can proactively project a battery replacement date. The date will adjust based on UPS operating temperature. {Notes – 1) Replace Battery indication is still THE Indicator when the battery needs to be replaced. The replace battery date is a projection for service maintenance. 2) The user should set the appropriate date at installation. 3) The unit will not project a replacement date within the warranty period unless the allowable temperatures have been exceeded.}</li><li data-bbox="716 1008 1717 1135">•The unit can indicate which specific battery(s) within the unit or associated battery pack needs to be changed</li><li data-bbox="716 1150 1717 1278">•If the overall battery system is past a certain age, the unit will recommend the replacement of multiple batteries.</li><li data-bbox="716 1293 1717 1370">•Auto detect battery packs. Status for up to 10 battery packs available, can support more (no status available).</li></ul>

# New Features, Cont...

New Feature	Description
<b>Flash Upgradeable Firmware</b>	Each unit has flash memory that allows for firmware upgrades. A firmware update wizard will be available to facilitate easy update. Initially the update wizard will work with the serial port only (NMC to follow). Load must be off for upgrade to occur.
<b>Switched Outlet Group(s)</b> 	The switched outlet group may be operated independently from the main UPS outlets. This allows for non-critical load shedding, reboot of hung equipment, & sequenced start-up & shutdown.
<b><u>Start without Battery</u></b>	<b>Units can be started without a charged battery. This enables units to be restarted immediately after a prolonged power outage instead of waiting for the battery to be recharged.</b>

# New Features, Cont...

New Feature	Description
<b>Embedded NMC</b>	<p>The NMC is now embedded in the unit. An Ethernet port and Universal IO port are on the rear of the unit. The Universal IO port can host a temperature probe (included), an optional temperature/humidity probe, or a relay IO dongle. The unit continues to feature a smart card slot. The slot can be used to host other network management cards including:</p> <ul style="list-style-type: none"><li>AP9630 – Ethernet port</li><li>AP9631 – Ethernet port, universal IO port, and USB</li><li>AP9335TH: APC Temperature &amp; Humidity Sensor</li><li>AP9810: APC Dry Contact I/O Accessory</li><li>AP9624: UPS Interface Expander</li></ul>
<b>3 Year Warranty on Electronics</b>	Battery warranty remains at 2 years.

# Competitor Comparisons

Feature	Competitors	APC Benefit
Power Density	X	More real power per kVA from .9pf to Unity pf.
Embedded Network Management Card	X	Embedded card frees up the smart slot so customers can add accessories for additional communication options.
Predictive Battery Replacement	X	Customers can replace battery prior to failure. Clearly identifies batteries needing replacement.
Graphical LCD with Multicolor Backlight	X	At a glance real time UPS status. Visible alarm warnings.
Operate without Charged Battery	X	Ability immediately protect equipment when power returns.
ENERGY STAR® / Green Mode	Some models	High operating efficiency reduces utility. The ENERGY STAR logo makes it easy for consumers to identify and purchase energy efficient products.
Switched Outlet Groups	Some models	Discrete reboot of hung devices, sequenced on/off, and load shedding to preserve on-battery runtime.
3 Year Warranty on Electronics	Some Models	Additional year of warranty protection for electronics provides peace of mind.



# Communication Ports



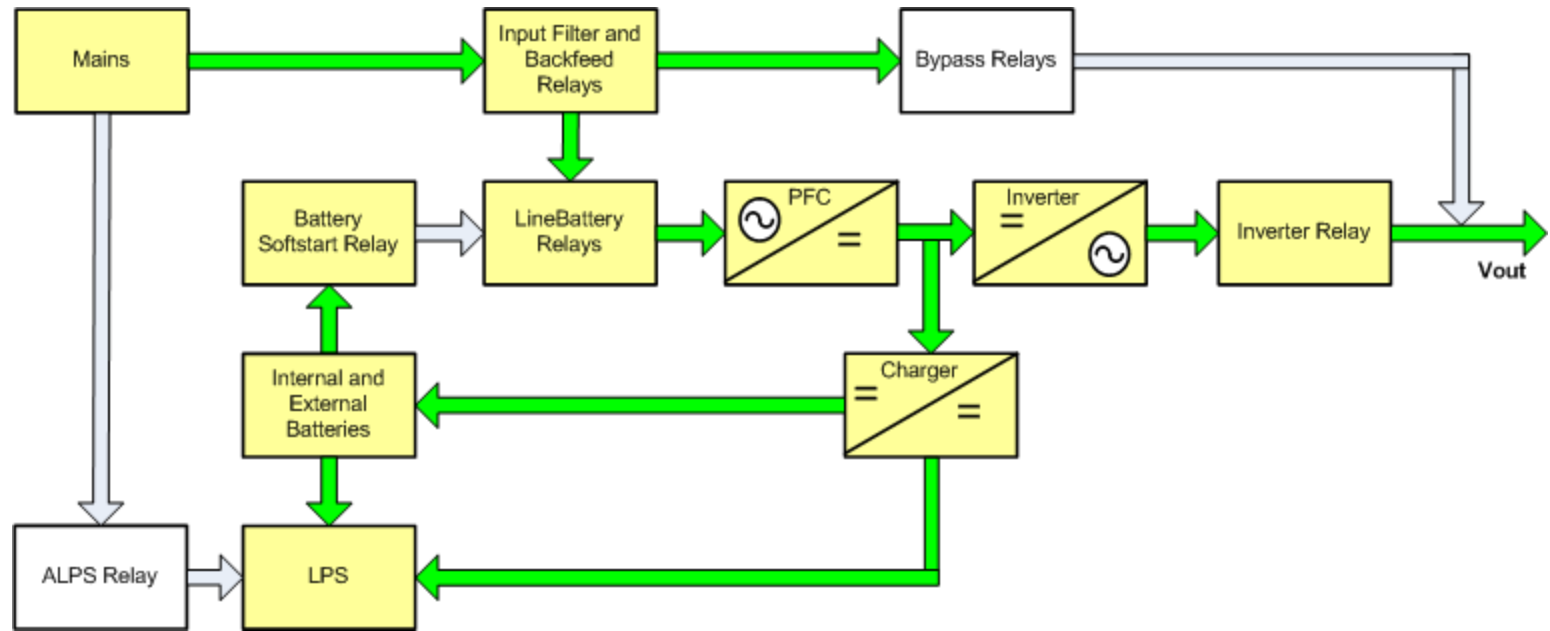
## 5-10 kVA Units

- All units have (1) serial connection port, (1) USB port, (1) Ethernet port, and (1) Universal IO port.
  - All units use Micro-link protocol, for this reason the serial port is RJ45 style to differentiate it non Micro-link models.
  - Customers using UPS-D (UPSlink) require a converter card, the **AP9620**.

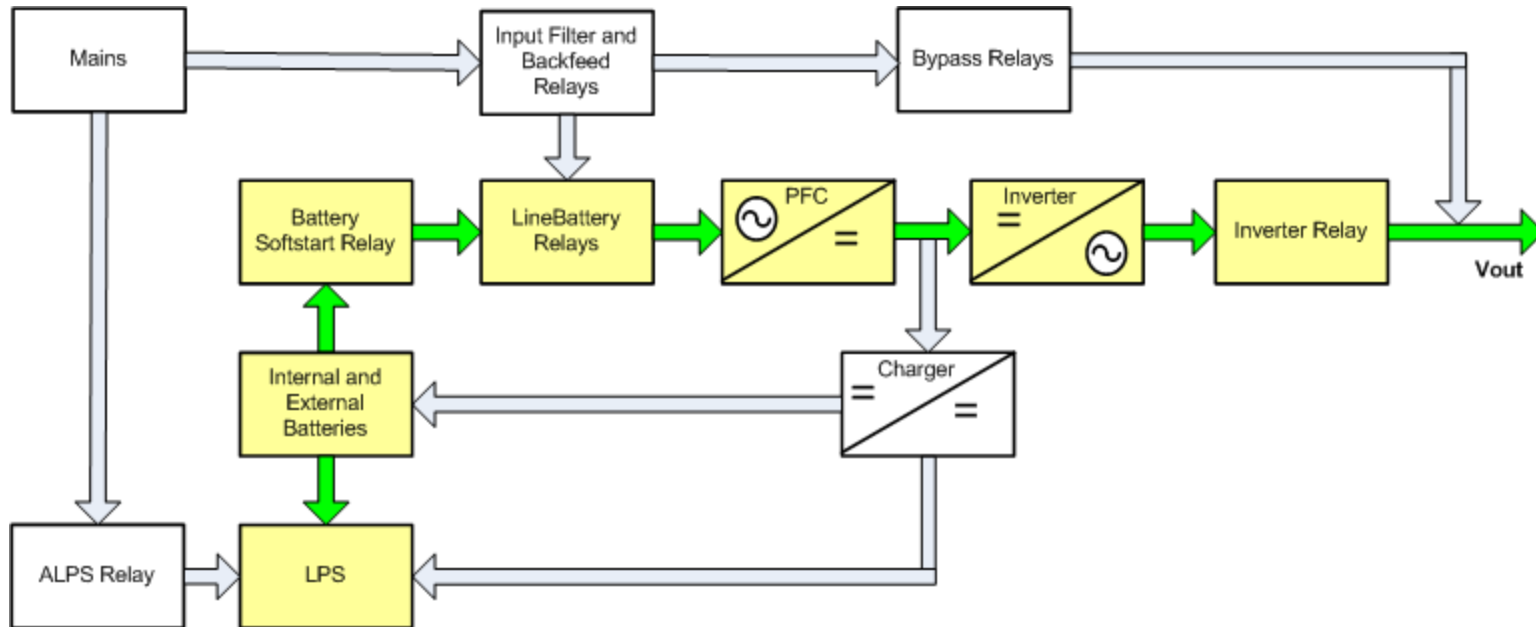
## 3 kVA Units

- Equipped with a Ethernet port enabling cloud communication. Cloud communication enabled via firmware update (available 2016).

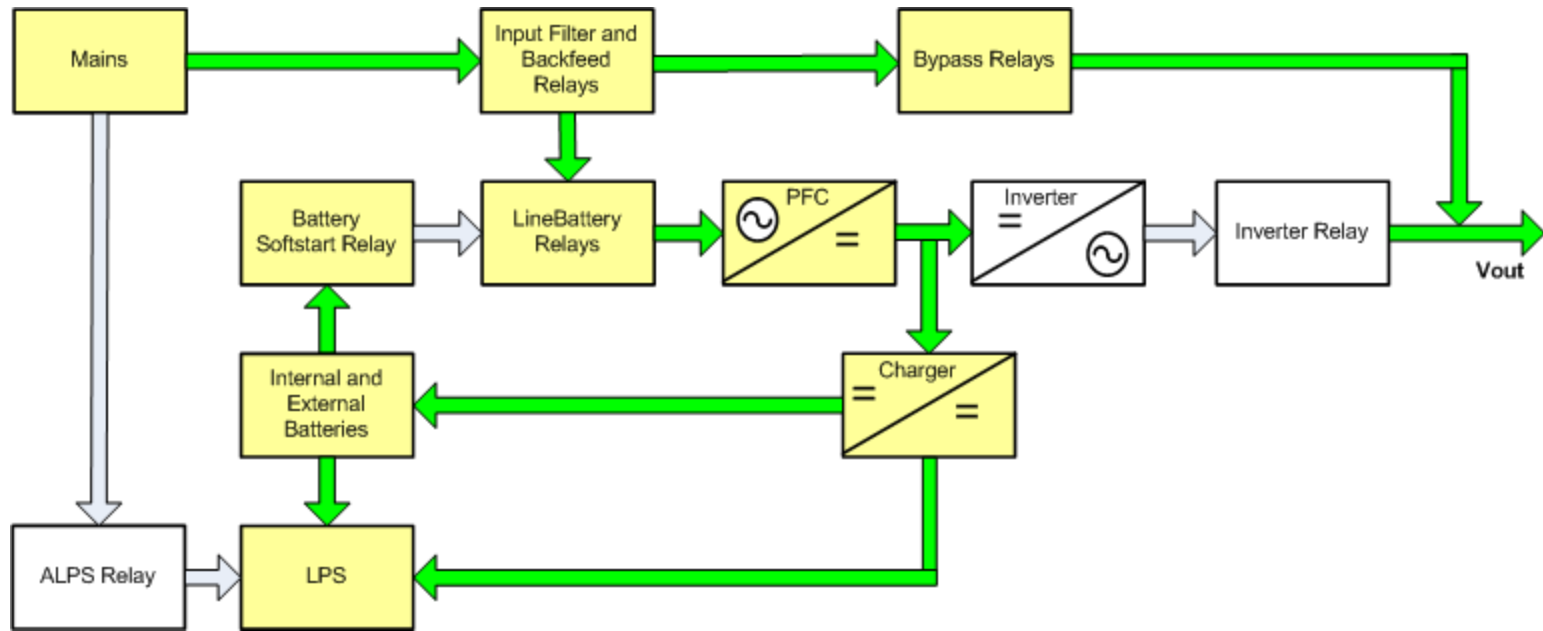
# On Line



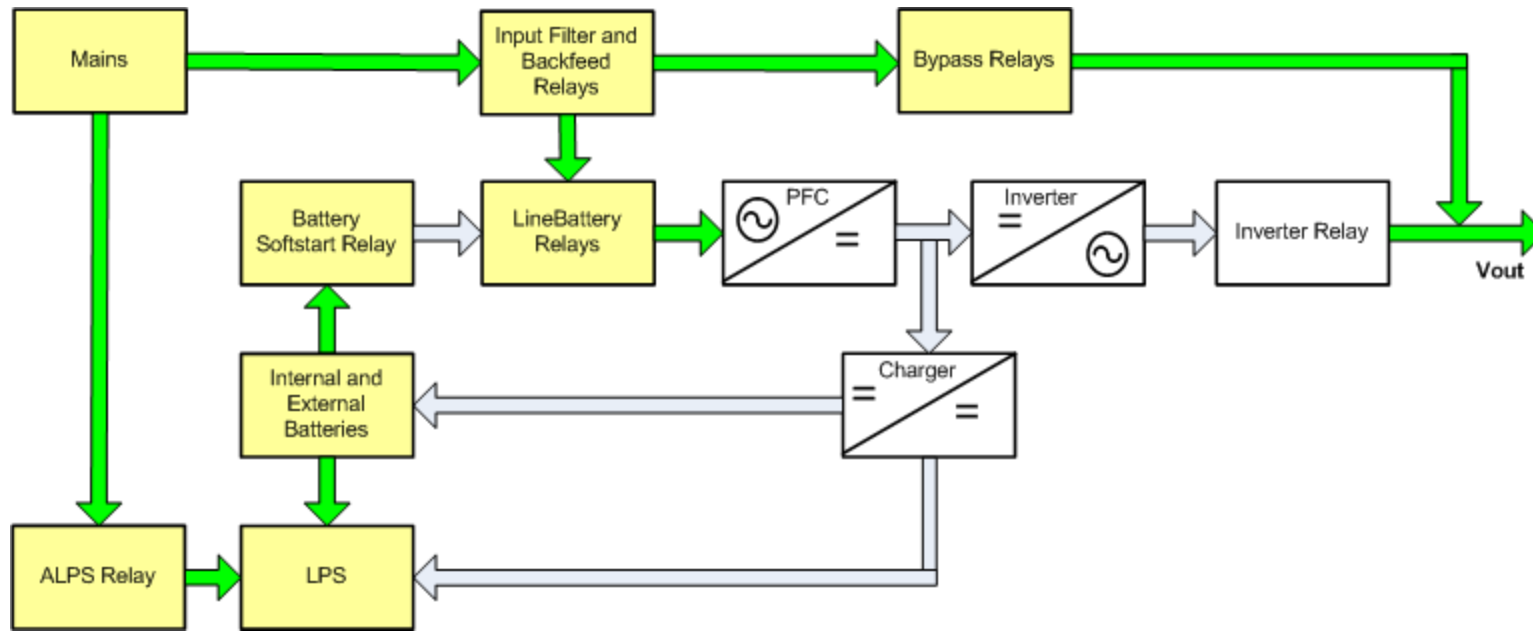
# On Battery



# Green Mode



# Failure Bypass



# Switched Outlet Configuration

- Models have up to 3 switched outlet groups or where applicable, 1-2 groups & main UPS (un-switched) outlets.
- Each group can be independently controlled to turn off, turn on, shutdown, or reboot (shutdown & restarted).
- Additionally each group can be turned off or on in a specified sequence.
- Critical devices should be connected to the main outlets or to the same group for ease of configuration.



The main UPS outlets act as a master switch. Outlets must be on for the switched outlet groups to be active. If the switched outlet groups are not configured, all of the outlets will provide battery back-up power.

# Summary

- Next Generation 3-10 kVA On-Lines are available in 2015.
- Next Generation 1-3 kVA 120V variants will follow later starting in 2016.
- APC continues to innovate in next gen On-Line platform
  - More features than competitive offers
  - Unity Power Factor
  - Best in class energy efficiency

