Powerstar Inc offers manual bypass switches for our line interactive and true online series of UPS's.

The manual bypass switch allows for the connected load to be powered directly from the source in the event of an UPS failure. This functionality is available regardless of the UPS state. On our true on-line versions a dynamic bypass is included as a standard. This option differs from the manual switch as outlined below.

Both the manual and the dynamic bypass pass options can be installed in the true online UPS's simultaneously.

Function	Manual Bypass	Dynamic Bypass
Auto switch to bypass in the event of a failure	No	Yes
Manual switch to bypass in the event of a failure	Yes	Yes
Supply power to the UPS when in bypass mode	Yes	Yes
Supply power to the load if UPS is Off	Yes	No

4-2011

Modes of Operation

A. Normal - The UPS is continuously supplied available utility power through the internally mounted bypass switch. The UPS output power is distributed to the critical AC load through the UPS output receptacles.

B. Bypass - The bypass switch shall allow a transfer of the critical AC load from the UPS inverter directly to the utility source.

The UPS does not need to be turned on for the bypass functionality to be available;

The bypass can be mounted in an external rack mount chassis or internal to the UPS.

The bypass power path does not protect the connected loads from disturbances on the utility.

On-Line UPS with Dynamic Bypass & Manual Bypass
Modes of Operation

Dynamic Bypass Switch Modes of Operation

Manual Bypass: Press the Standby/Manual Bypass button once while the UPS is in utility (AC) mode, the UPS will transfer the connected loads to the internal bypass. If the internal bypass is not available due to utility power problems, pressing this button once will be ignored. Bypass operation is indicated by an audible alarm and illuminated amber Bypass indicator.

Dynamic Bypass: The UPS provides an alternate path for utility power to the connected loads in the unlikely event of a malfunction. Should the UPS have an overload, over temperature or a failure condition, the UPS will automatically transfers the connected loads to bypass.

Manual Bypass Switch Modes of Operation

A. Normal - The UPS is continuously supplied available utility power through the internally mounted bypass switch. The UPS output power is distributed to the critical AC load through the UPS output receptacles.

B. Bypass - The bypass switch shall allow a transfer of the critical AC load from the UPS inverter directly to the utility source.

The UPS does not need to be turned on for the bypass functionality to be available;

The bypass can be mounted in an external rack mount chassis or internal to the UPS.

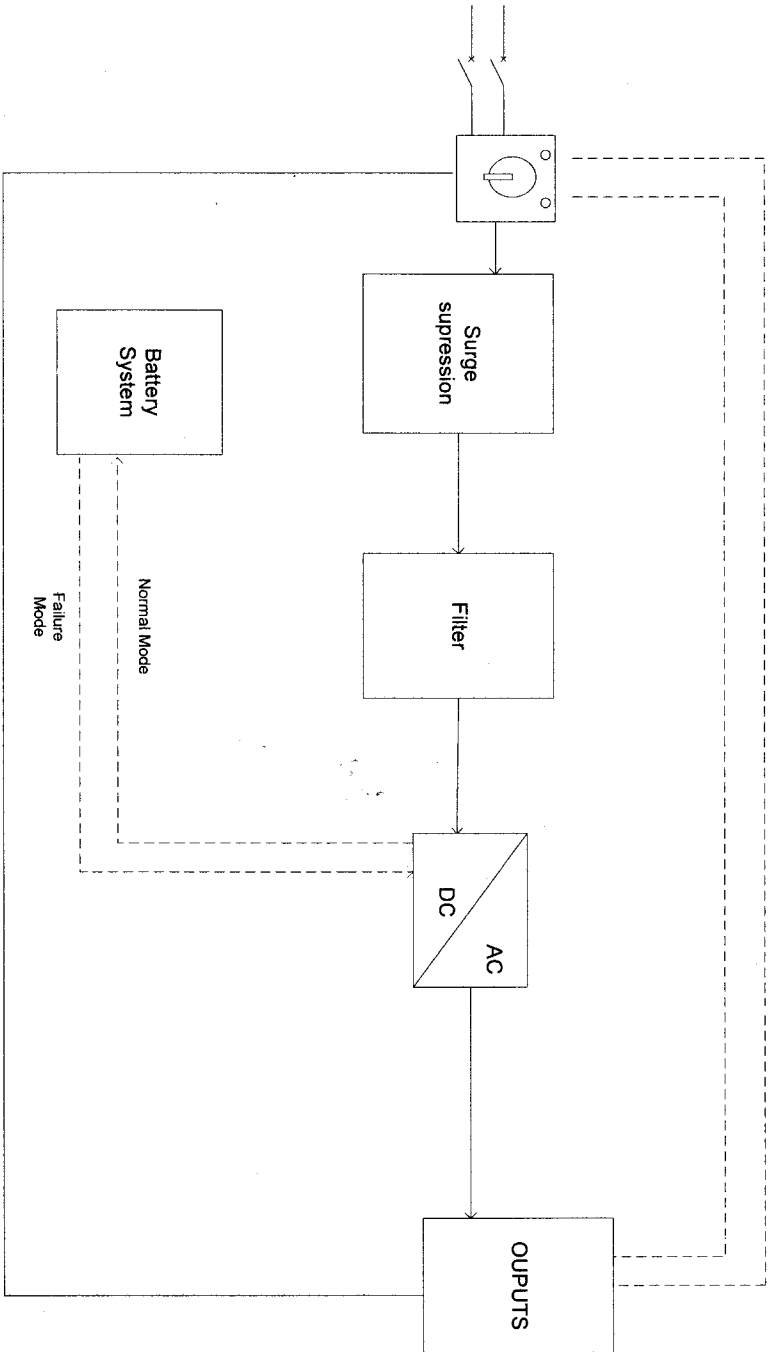*The bypass power path does not protect the connected loads from disturbances on the utility.*

4-2011
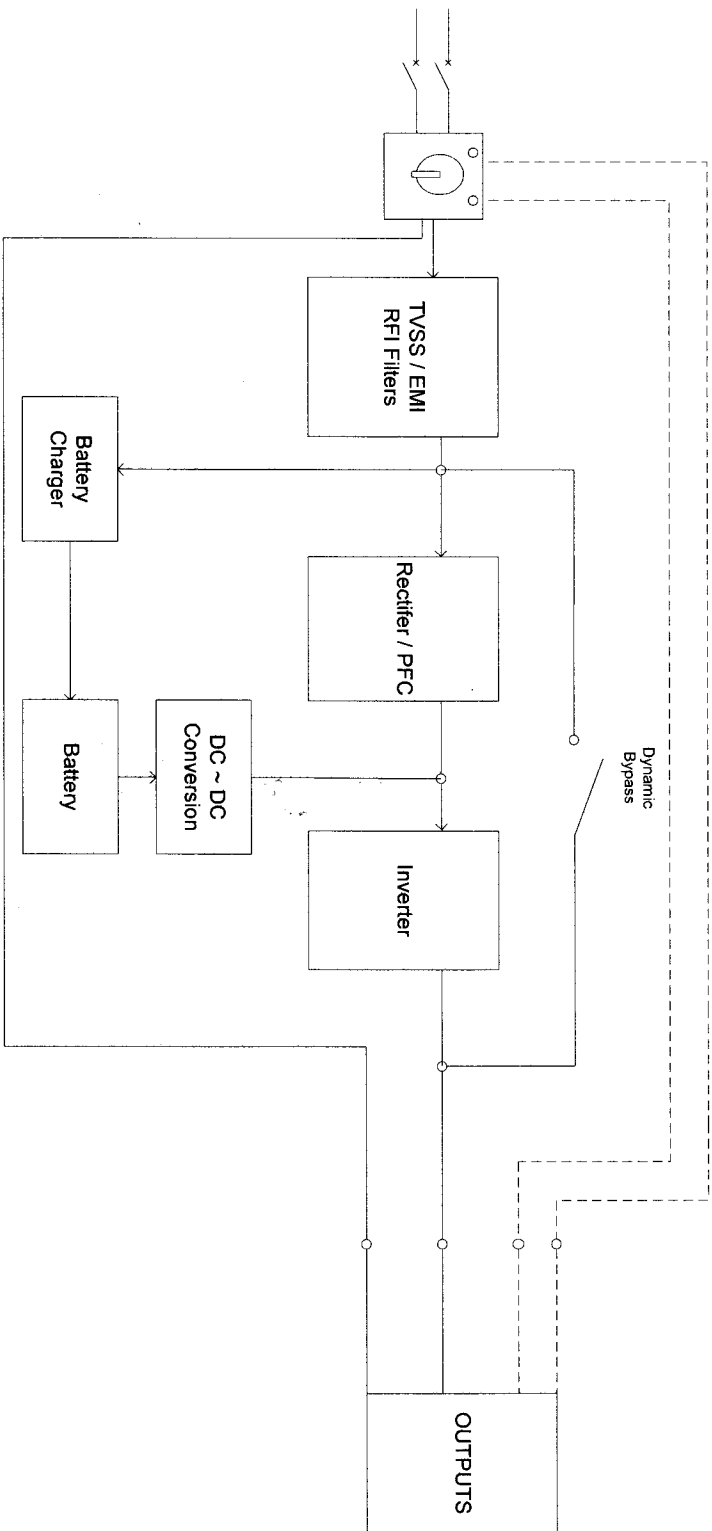
Double Conversion On-Line UPS

In the Double Conversion On-Line design, failure of the input AC does not cause activation of the transfer switch, because the input AC is charging the backup battery source which provides power to the output inverter. Therefore, during an input AC power failure, on-line operation results in no transfer time. Both the battery charger and the inverter convert the entire load power flow in this design resulting in reduced efficiency with its associated increased heat generation. This UPS provides nearly ideal electrical output performance. Additionally this type of UPS can act as a frequency converter, typically converting between 50 Hz and 60 Hz.

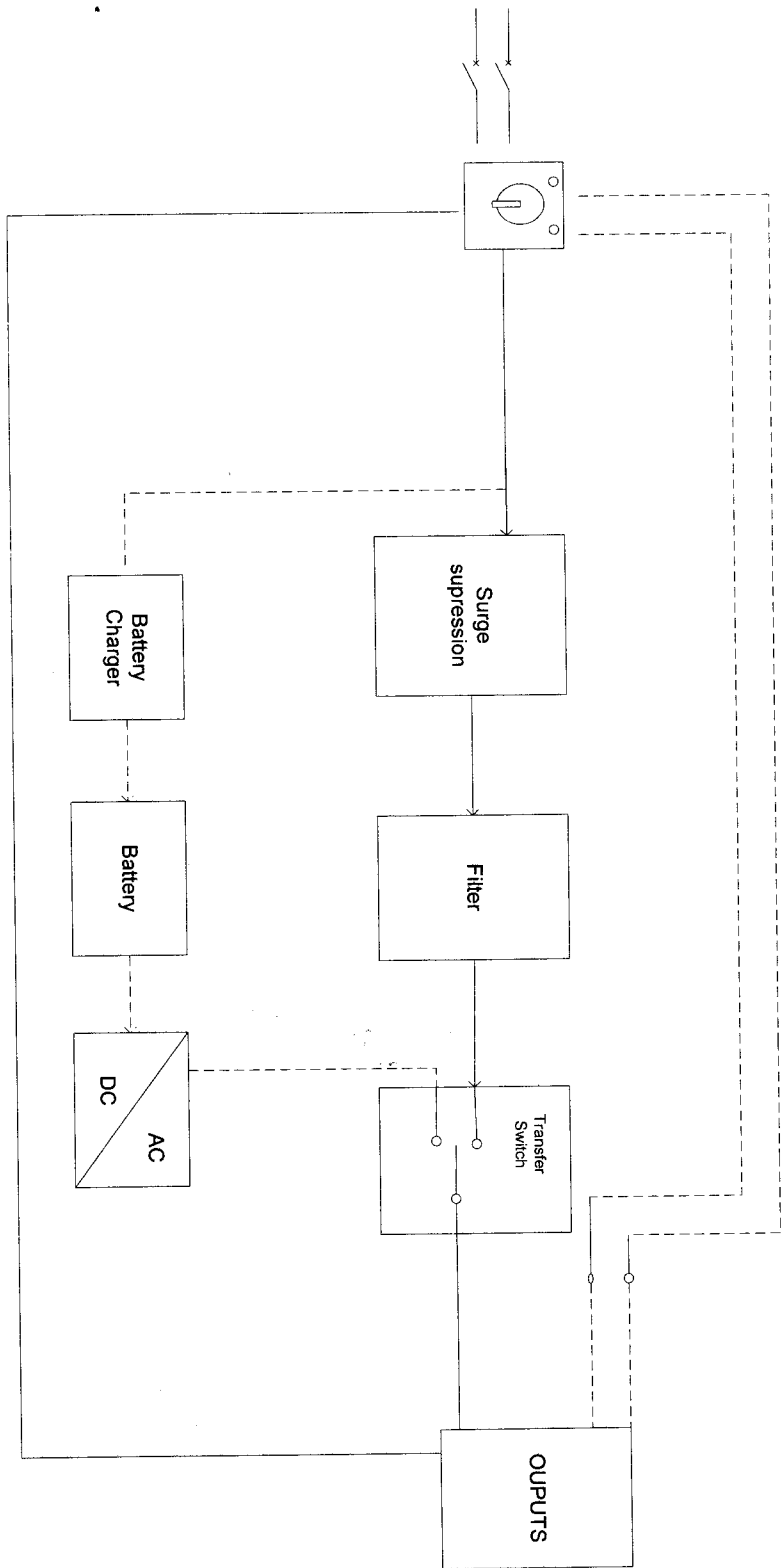Examples of this type of UPS are the PS3300, PS6006, PS10000 series UPS.

Manual Bypass

Dynamic Bypass

TVSS / EMI RFI Filters

Battery Charger

Rectifier / PFC

Battery

DC ~ DC Conversion

Inverter

OUTPUTS

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Cage Code 0ZAP8		BYPASS BLOCK DIAGRAM On-Line Double Conversion UPS

SIZE	Drawn by: PEK	DWG NO		REV A
SCALE N/A	4-26-2011		SHEET	1 OF 3

The Line Interactive UPS

The Line Interactive UPS, illustrated in Figure 2, is the most common design used. In this design, the battery-to-AC power converter (inverter) is always connected to the output of the UPS. Operating the inverter in reverse during times when the input AC power is normal provides battery charging. When the input power fails, the transfer switch opens and the power flows from the battery to the UPS output. With the inverter always on and connected to the output, this design provides additional filtering and yields reduced switching transients when compared with the Standby UPS topology. In addition, the Line Interactive design usually incorporates a tap-changing transformer. This adds voltage regulation by adjusting transformer taps as the input voltage varies. Voltage regulation is an important feature when low voltage conditions exist, otherwise the UPS would transfer to battery and then eventually down the load. This more frequent battery usage can cause premature battery failure. However, the inverter can also be designed such that its failure will still permit power flow from the AC input to the output, which eliminates the potential of single point failure and effectively provides for two independent power paths. High efficiency, small size, low cost and high reliability coupled with the ability to correct low or high line voltage conditions make this the dominant type of UPS in the 0.5-5k VA power range. Examples of this type UPS is the PS6000, PS1500 and PS2200 series.

| Surge supression | Filter |
| Battery System |
| DC / AC |
| OUPUTS |

Normal Mode

Failure Mode

Powerstar Inc
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Gaithersburg, MD 20877

BYPASS BLOCK DIAGRAM
Line Interactive UPS

		SIZE	Drawn by:		DWG NO		REV
Cage Code 0ZAP8			PEK				A
		SCALE	N/A		4-26-2011	SHEET	3 OF 3

The Standby UPS

The Standby UPS is the most common type used for Personal Computers. In the block diagram illustrated, the transfer switch is set to choose the filtered AC input as the primary power source (solid line path), and switches to the battery / inverter as the backup source should the primary source fail. When that happens, the transfer switch must operate to switch the load over to the battery / inverter backup power source (dashed path). The inverter only starts when the power fails, hence the name "Standby." High efficiency, small size, and low cost are the main benefits of this design. With proper filter and surge circuitry, these systems can also provide adequate noise filtration and surge suppression.
Examples of this type of UPS is the PS502 series.

Surge supression

Filter

Transfer Switch

Battery Charger

Battery

DC / AC

OUPUTS

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Information herein is proprietary to Powerstar Inc. and cannot be reproduced in any manner without prior written approval	BYPASS BLOCK DIAGRAM Standby UPS				
	SIZE	Drawn by: PEK	DWG NO		REV
Cage Code 0ZAP8	SCALE N/A	4-26-2011	SHEET	2 OF 3	A