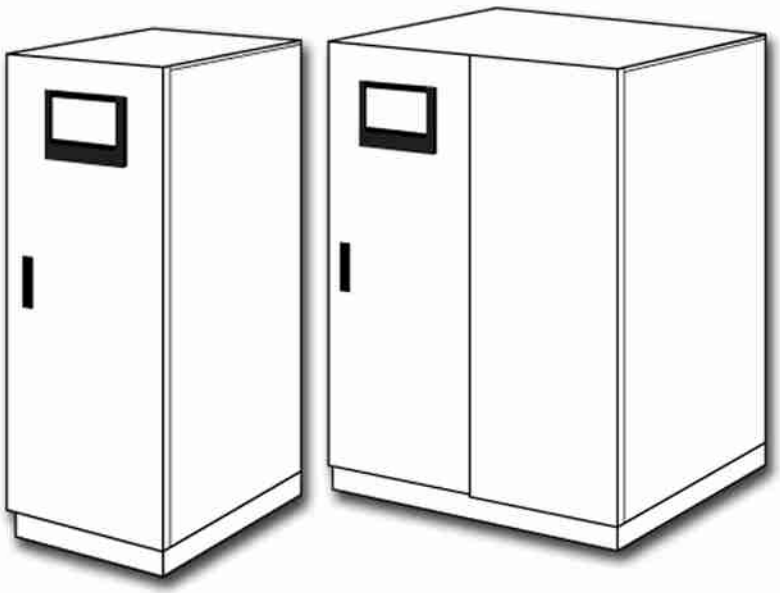
Super+ AR33 series

ACTIVE IGBT RECTIFIER BASED

INDUSTRIAL UPS SYSTEMS

Fully digital 5 KVA – 500 KVA

3 phase input & 3 phase output



Super+ series is a true online double conversion UPS system designed and manufactured to IEC standards based on the latest power electronic techniques using active front end IGBT based rectifier as an optimal and cost effective solution for the most demanding industrial applications. Designed for longer life, these systems feature PWM converter & inverter technology, DSP based digital controls, input/output galvanic isolation, parallel & hot standby redundancy options, rugged overload and fault clearing capabilities. For critical industrial applications, Super+ series ensures increased reliability & security and also provides excellent graphically generated large LCD man – machine user interface for monitoring the system status & parameters.

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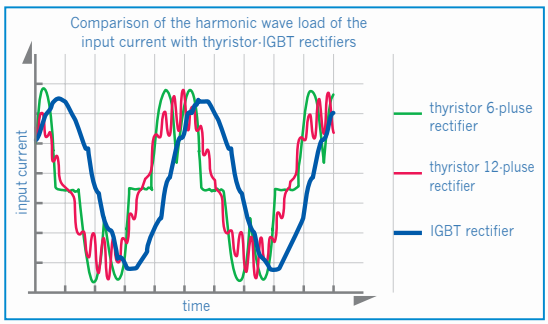
An ISO 9001 & 14001 certified company

WHY BUY UPS WITH ACTIVE IGBT BASED RECTIFIER FRONTEND??

Power quality issues with SCR based rectifier front-end

Single Phase and Three Phase controlled and uncontrolled SCR based rectifiers in a UPS Systems form a major source of current harmonics in the power distribution system. Single/three Phase SCR based rectifier input UPSs are usually quite common and are used in large numbers in a variety of equipment & applications. Hence pose a very serious harmonic threat at the 440V and 11kV power distribution system levels as well as inside the customer's commercial/industrial facilities. They are normally the main source of current harmonics that is being injected by them into the power distribution system and quite detrimental due to the predominant triplen harmonic content. Moreover, the SCR based rectifiers will have very poor input power factor and draws disproportionate current from the source.



Sinusoidal power input ensures distortion free rectifier operation

With stringent harmonic restrictions in the offing, on-line UPS systems will be required to comply with harmonic injection standards in future. This will result in a replacing of thyristor phase controlled converter or rectifier stage of a single/ three phase UPS by IGBT based power factor correction stage to ensure sinusoidal input current at unity power factor. This system is especially attractive at higher ratings.

Advantages of having IGBT based active rectifier front- end

Technical advantages

- Complies IEEE 519
- Offers a built-in input power factor correction (PFC) which improves the input PF to near unity (>0.99). Conventional Thyristor based rectifier front end provide input PF as low as 0.6.
- Inject very low harmonic input currents back in to the source. This input current harmonics (THDi) is limited to less than 5% and can even be further improved upon. Conventional Thyristor based rectifier fronted pump as high as 50% harmonic current to the source.

User's Advantages

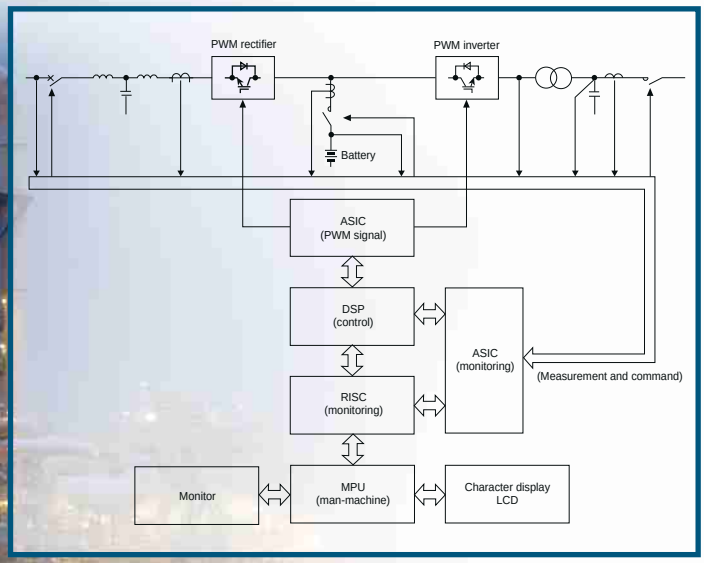
- Reduces the current consumption and saves considerable energy. This will also have an effect on the tariff pattern and max demand charges.
- Reduces capacity requirement of cables, standby generators as well as stabilizers. Conventional thyristorised rectifier based UPS demand of nearly 200% plus capacity to compensate for low input PF and high input harmonics.
- Helps avoiding over heating of all upstream and downstream current carrying cables and transformers and other components in the distribution systems.
- Reduces the wear and tear of all components / equipments connected in the same power source and hence avoids pre-matured ageing of such components /equipments
- Reduces stray tripping of breakers and protection relays
- Ensures optimum utilization of power source, as reactive power is brought down to very low values by improving PF and by reducing harmonics.
- Avoid flickers, sags and surges in the distribution network.

For further information please contact **LIVELINE ELECTRONICS** ● Ph:+91-33-24772094 Email: info@livelineindia.com

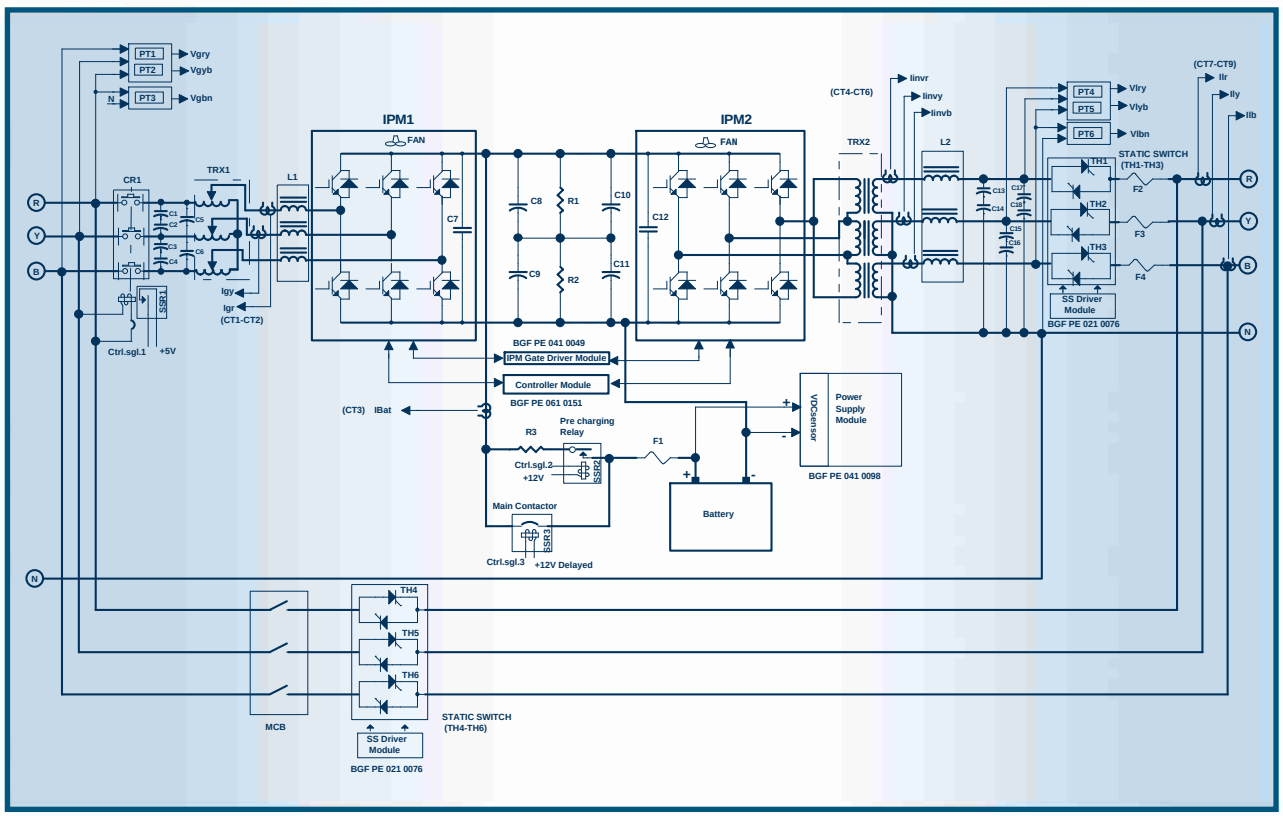
SALIENT FEATURES OF SUPER+

- IEC 62040 compliant
- Rugged industrial design
- Very high AC-AC efficiency
- True front access
- Digital control using DSPs
- IGBT based active rectifier
- Near unity input PF
- < 5% input current harmonics
- Both end galvanic isolation
- Redundant fans
- Back feed ptotection
- Large graphic LCD display
- Fully rated static switch
- Manual bypass switch
- Bypass line SCVS+IT
- RS485, LAN or modbus / profibus
- True redundancy options
- Potential free contacts
- Custom built to highest standards

CONTROL BLOCK DIAGRAM



ALL IGBT UPS POWER CIRCUIT



GENERAL TECHNICAL PARTICULARS

Power Ratings	5 KVA - 500 KVA
UPS Topology	True online, double conversion, conforms to IEC 62040-1-2-3
Overall efficiency (AC-AC)	Better than 90% for 30% to 100% load

Active rectifier front-end	
Topology	Three Phase Active Rectifier
Converter system	High frequency IGBT PWM rectifier
Voltage variation	320 V AC - 480 V AC, 3-Phase, 4wire system
Frequency variation	50 Hz +/- 6%
Current Distortion (THD)	Better than 5% at full load for grid voltage harmonics less than 3%
Power Factor	Near unity starting from 30%-100% load
Efficiency	Better than 90% from 50% to 100% load
Cooling	Forced air cooling
Surge protection capability	Conforms to IEC 61643 – I & II

DC Link	
Voltage	360V nominal or optionally, 384V
Voltage Variation	depending on battery voltage

Output inverter	
Topology	Three Phase Full bridge Inverter
Inverter system	High frequency IGBT PWM inverter
Output Voltage	380V-415VAC, 3-Phase, adjustable with transformer
Output voltage tolerance	+/-1%
Power Factor	0.8 (lag) to 1
Output Frequency	50Hz, +/-0.1% free running mode & 50 Hz, +/- 6% mains synchronized
Voltage Distortion	Better than 3% for linear loads Better than 5% for nonlinear loads
Transient recovery	Shall return to steady state condition in less than 100ms after a disturbance
Transient Voltage regulation	Better than +/- 5%
Crest factor	3:1
Efficiency	Better than 90% from 50% to 100% load
Cooling	Forced air cooling
Overload on inverter	125% of the rated output for 10 minutes. 150% of the rated output for 60 sec.

Bypass arrangements	
Static switch	Automatic static bypass. Static switch automatically switches the load to the reserve power supply for the mains whenever there is failure in inverter supply to the load
Switching time from inverter to bypass	
1. Inverter over load	Over lapped transfer
2. Manual command	Over lapped transfer
3. Inverter failure	< 2ms in main synchronized
Switching time -bypass to inverter both auto and manual	Over lapped transfer
Manual bypass switch	Make before break switch to isolate the UPS completely electrically

GENERAL TECHNICAL PARTICULARS

Annunciations & protections		
Communication port	● RS232/ TCP - IP	
Protections	-Input under voltages -Input over voltages -Output under voltages -Output over voltages -Battery over charging	-Input in-rush current protection through soft start -Output overload -Output short circuit -Battery under voltage -DC Over voltage
System controls & LCD display	MIMIC of the system power flow diagram as SLD of the ups will be provided on UPS panels front door with long lifeLED 's integrated with the single line diagram to indicate the operating status of different components/selection of the UPS.	
Metering display on LCD	● Input line to line voltage ● Input per phase current ● Output line to line voltage ● Output per phase current ● Battery voltage ● Battery current	● Output frequency ● Input frequency ● Faults
Alarm massages through LCD display	Extensive alarm messages are provided for various fault conditions. An audible alarm is also provided which will get activated in tandem with alarm conditions.	

Mechanicals	
Protection class	IP-20 (IP-41 & IP-42 as options)
Paint shade	RAL 7035 or any other as option
Cable entry	Bottom
Dimensions & weight	As most of the systems as customized, data available only after detail engineering

Environmental	
Maximum ambient	50 deg. C (All batteries rated for 20 degree unless stated otherwise.)
Humidity	95% RH
Noise level by UPS	Better than 60 dB at a distance of 1m from the body of the UPS

INSTALLATION GUIDELINES

1) Since the UPS is designed as truly front access type, rear maintenance space is not required. However, users are advised to consult with Liveline engineers on this.

2) The UPS is forcibly cooled by fan. Be sure to take dust proof measures.

3) The UPS is designed for use within the room temperature up to 50 degree centigrade. However, air conditioners will ensure long & reliable trouble free operation. The recommended service temperature is +18 to 27 degrees.

4) The bottom pit system is adopted as standard for wiring the input & output of the UPS. Be sure to install cable pits.

5) Be sure to ground the UPS. Exclusive grounding is recommended.

Consult the battery vendor on battery installation requirements and recommendations.

OPTIONAL FEATURES

1. Integrated battery monitoring systems

Effective battery monitoring delivers real benefits to any organisation that needs reliable backup power systems. It decreases your risk and increases your confidence by way of identifying faults and weakness in the battery bank/cells early. It allows the users to take preventive & replacement actions in advance so as to avoid the total failure of the back up system.

2. Integrated UPS performance & PQ analyser

Optimal power quality & UPS performance analysis can result in increased mission-critical uptime, cost savings, equipment efficiency and overall facility reliability. Further, power quality data is an absolute necessity when something goes wrong and the source of the problem must be investigated, whether upstream or downstream of the UPS. When a fault or other anomaly occurs, the analyser allow you to quickly troubleshoot, and enable continuous monitoring, data collection, analysis, reporting and more.

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