

**HI-REL**  
Powering Growth

INDUSTRIAL  
UNINTERRUPTIBLE  
POWER SUPPLY  
(UPS) SYSTEMS

**iA** series

# The most advanced **UPS** technology

**Hi-Rel** is in the business of industrial UPS systems since 1987 and is an approved supplier with all the major consultants as well as to leading industries. The first UPS Company in the country to win ISO : 9001 certification, our manufacturing facilities are one of the finest in the country. A comprehensive support network that covers the entire country is always at your disposal.

We offer the most appropriate technology and complete, customized, system-solutions for every demanding application for providing high quality power to critical applications.

## **i4 series parallel redundant UPS system.**



## **Salient Feature of the *i4* series Technology**

- Input reactors to minimize AC mains notching.
- Automatic Battery Charging Float / Boost mode selection with current limit.
- High efficiency IGBT based inverter.
- Specially designed output transformer for PWM operation.
- Sinusoidal – PWM operation with direct AC feedback – handles nonlinear loads upto CF 3:1 with <5% THD.
- High branch fuse clearing ability (upto 30% rated fuse)
- Microprocessor based digital control and redundant control power supplies
- RS232C interface and programmable potential free contacts are standard.
- Programmable static switch with upto +/- 6% synchronization window.
- Comprehensive LED mimic and LCD + keypad enable
  - Date – Time stamped event recording – last 20 events logged in non volatile memory
  - Programming & Monitoring of various system parameters.
- Front access oriented layout.
- PC based Monitoring, Control & Reporting unit (optional)
  - Monitors the system performance with automatic generation of daily, weekly reports.
  - Automatic service call fax generation with fault and alarm log details.
  - Higher level connectivity with DCS/PLC through MODBUS protocol.
  - Monitoring on LAN through SNMP
  - Battery Monitoring System.
- A large array of options available including 12 pulse charger, IP53 deg protection, Parallel or Hot standby Redundancy, Redundant cooling fans and more...

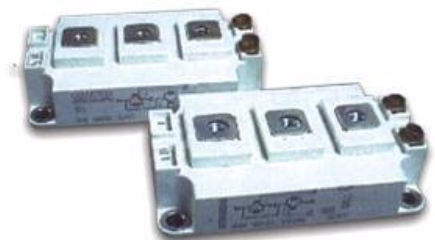
**i4** series

UPS systems are specifically designed to provide secure power to mission critical loads in Refineries, Petrochemicals, Power Generation, Steel and Process Industries as well as for critical data processing applications.

These units adopt the most advanced technology available and comfortably surpass the specifications required in all grueling applications.

Three Phase Input – single phase output unit are available in rating from 5kva-160kva and are custom built to your exact specifications.

## **IGBT modules in the inveter of an i4 Series UPS**



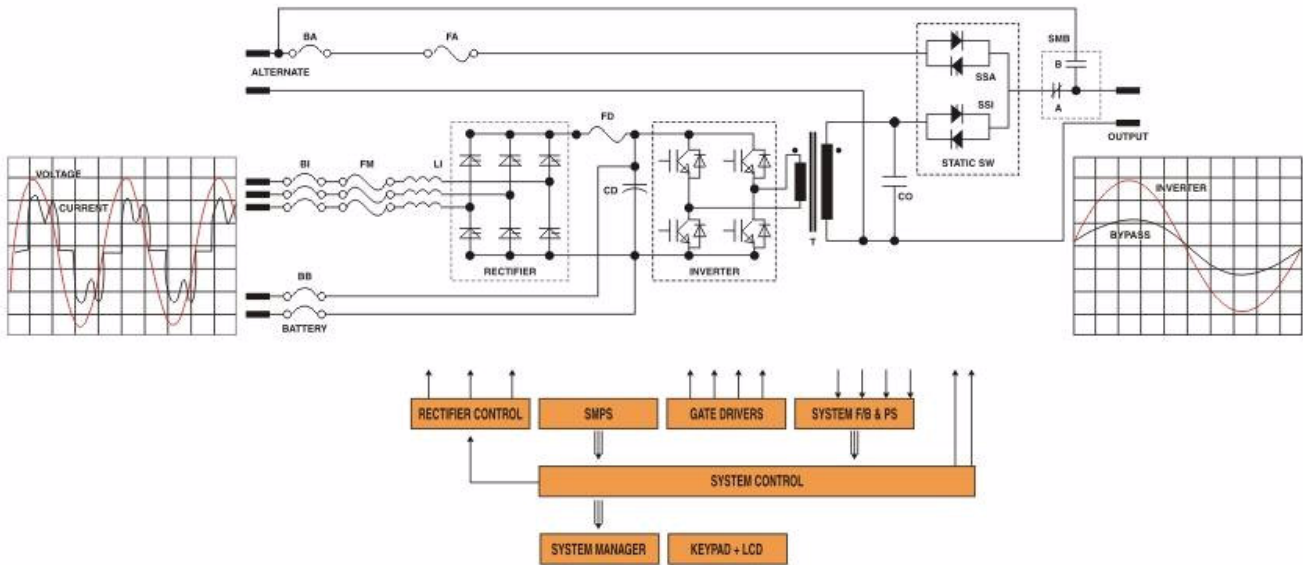
## **System Control Board of an i4 Series UPS - The Microprocessor based digital control advantage !**



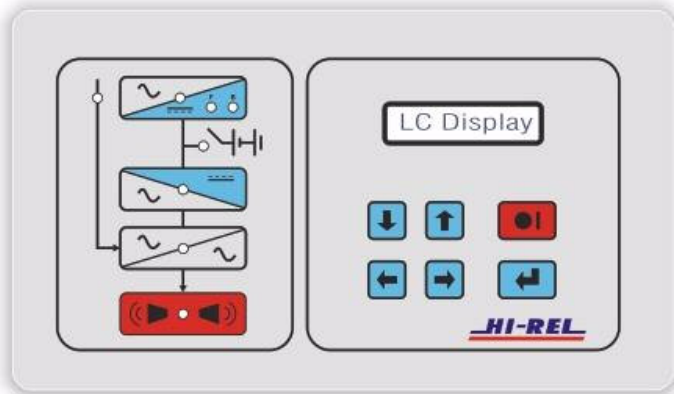
# UPS Circuit Configuration



## Block Diagram



## ALARMS, INDICATIONS AND METERING



### METERS-DIGITAL-LC DISPLAY :

VOLTAGE & CURRENT METERS : Mains, alternate, batt, inverter & load

FREQUENCY METERS : Alternate, inverter

### ALARMS-TEXT READOUT-LC DISPLAY:

INPUT : Over voltage, under voltage

DC : Over voltage

BATTERY : Discharging, under voltage

INVERTER : Over voltage, under voltage overload, disconnected

ALTERNATE : Over voltage, under voltage, frequency out of limit

STATIC SW : Transfer to alternate

### TRIPS-TEXT READOUT-LC DISPLAY

End of battery discharge

IGBT limb 1 fault / IGBT limb 2 fault

Overload (Inverse Time)

Over temperature

CPU fault

**Note: All alarms and trips initiate an audible warning**

# Technical Specifications

<b>MAINS INPUT</b>	
Voltage	415 V (+) 10% (-) 15%
Frequency	50 Hz $\pm$ 6%
<b>DC BUS</b>	
Voltage Range	304 - 434 V
Max DC Bus Ripple (without Battery)	2% RMS
Max DC Bus Ripple (with Battery)	1% RMS
Recommended Number of Cells	
- SMF / LATB	175-180
- Ni-Cad	273-277
<b>OUTPUT</b>	
Nominal Voltage (1 Phase)	220/230/240 V 110/115/120 V
Load Power Factor -Rated	0.8
Load Power Factor -Range	0.6 to Unity
Voltage Regulation	
-Steady State	$\pm$ 1%
-100% Step Loading	$\pm$ 5% typical
-Recovery Time to 98%	< 20 ms
Overload	
125%	15 minutes
110%	60 minutes
150%	60 seconds
Branch Fuse Clearing Ability	30% Rated (Semiconductor Type Fuse)
Frequency	50 Hz
Bypass Synchronization Window	$\pm$ 1% to $\pm$ 6% (Field Programmable)
Internal Oscillator	$\pm$ 0.1%
Slew Rate	1 Hz / seconds
Total harmonic Distortion	
-Linear Load	< 2.5%
-Non Linear Load(CF 3 : 1)	< 5%

<b>OPERATING CONDITIONS</b>	
Ambient Temperature	45°C (50°C Optional)
Altitude	1000 Metres from MSL
Humidity	95% Non condensing
Atmosphere	Non Corrosive, Dust Free, Freely Ventilated
Audible Noise at 1 Metre from Panel Front	55 dBA to 74 dBA (Depending on Rating & System Configuration)
<b>ENCLOSURE</b>	
Construction	CRCA Steel Sheet
Protection Class	IP 41. (IP 53 Optional)
Finish (Powder Coated)	RAL 7032 (Other Colours Optional)
Ventilation	Forced Air (Internal Fans)
Cable Entry	Bottom (Top Optional)

## Options

Complete Custom Engineered System Solutions available options include:

- Input Power Factor Near Unity
- Input Harmonics < 5%
- Parallel or Hot Standby Redundancy
- Input Isolation Transformer
- 12 Pulse Rectifier
- Input Harmonics Filters
- Fan Redundancy (Upto 80 kVA)
- Bypass Line Regulator
- AC Distribution Panels
- PC Based Monitoring & Recording Unit
- RS -485 Communication Port
- Monitoring on LAN through SNMP
- Battery Monitoring System
- Remote Annunciator
- Automatic Server Shutdown Kit
- DCS Connectivity through MODBUS / PROFIBUS Protocol
- 220V DC Bus Voltage
- 50°C Ambient in IP 41 Enclosure

KVA	KW	Height* (mm)	Width (mm)	Depth (mm)	Weight (Kg)
5	4	1300	700	750	250
7.5	6	1300	700	750	250
10	8	1300	700	750	300
15	12	1500	700	750	300
20	16	1500	700	750	350
25	20	1900	800	850	500
30	24	1900	800	850	500
35	28	1900	800	850	600
40	32	2100	800	850	700
45	36	2100	800	850	800
50	40	2100	1600	850	850
60	48	2100	1600	850	950
75	60	2100	1600	850	1150
80	64	2100	2400	850	1350
90	72	2100	2400	850	1500
100	80	2100	2400	950	1550
105	84	2100	2400	950	1600
110	88	2100	2400	950	1600
120	96	2100	2400	950	1650
130	104	2100	2400	950	1650
150	120	2100	2400	950	1650
160	128	2100	2600	950	2000

**Note:** Overall dimensions, weight, audible noise, heat generation, module height etc. depend upon the system configuration and options required.

Also available on request:

Bypass line equipment SCVS-SSVS-CVCF

In the spirit of continuous improvement, specification are subject to change without notice

## Branches :

- Mumbai : 022-28395980 M : 099876 86256 email : sales\_bom@hirel.net
- Delhi : 011-26464517 M: 099586 92379 email :sales\_del@hirel.net
- Kolkata : 033 - 24646525 M: 097484 84880 email : sales\_cal@hirel.net
- Hyderabad : 040 - 27813156/3159 M : 099592 22392 email: sales\_hyd@hirel.net
- Bangalore : 080 - 23344761 M: 097400 00614 email: sales\_bang@hirel.net
- Chennai : 044 - 24414023 M: 097899 79385 email : sales\_chennai@hirel.net
- Pune : 020 - 24331686/ 24334026 email: sales\_pune@hirel.net
- Hubli : M: 097400 00612 email: hirel\_hubli@yahoo.co.in

\* Height of canopy & Top Fan Box are not included in the mentioned height.



**HI-REL**  
Powering Growth

## Hi-Rel Electronics Limited

B-117 & 118, G.I.D.C. Electronics Zone, Sector - 25, Gandhinagar - 382 044, Gujarat, India.  
Tel : +91 79 2328 7180/81, Fax : +91 79 2328 7182 Mail : contact@hirel.net  
Web : www.hirel.net