

# HITACHI

Inspire the Next<sup>1</sup>

## Industrial Monolithic UPS System

Range: 600 kVA to 30 kVA



i6et UPS  
System



Exceptional safeguard against Power Disruption



## About Hitachi Hi-Rel Power Electronics

Hitachi Hi-Rel Power Electronics Private Limited, which is being recognized as one of the pioneers in power electronics domain, is a leading manufacturer of Industrial UPS. With a vision of "To be recognized as the most trusted Power Electronics Company by supplying superior products and services", Hitachi Hi-Rel has

garnered a significant level of trust in Indian UPS market segment and continue to offer world class power electronics products, value added services & customized solutions. It has state-of-the art manufacturing facility at Sanand near Ahmedabad in Gujarat-India.

## About i6et Industrial Monolithic UPS System

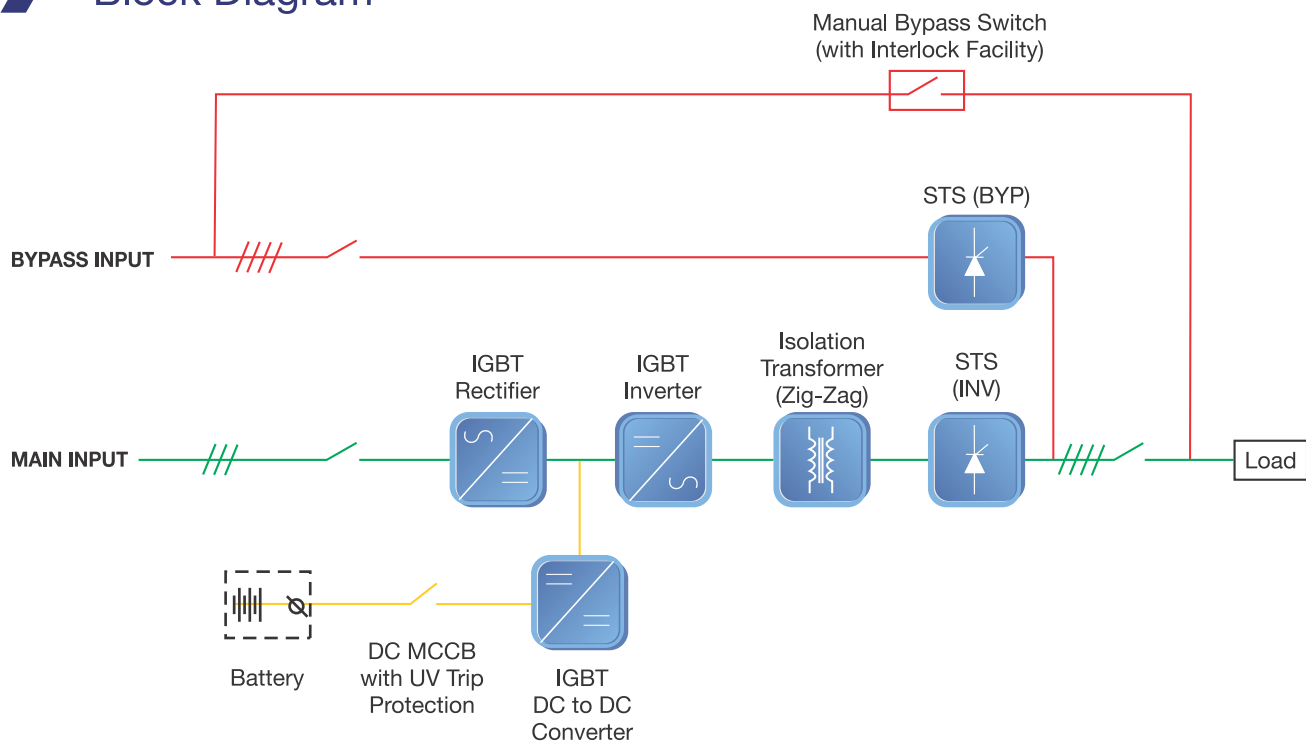
i6et industrial monolithic UPS has IGBT based rectifier & inverter with inbuilt isolation transformer, bi-directional static switch. This offers true online double conversion power technology (VFI SS 11 - voltage and frequency independent in accordance with IEC 62040-3).

It has compatibility with SMFB, VRLA, Lead acid, Ni-CD, Lithium-ion batteries and has all kind of configuration options such as Capacity Enhancement

(CE), Parallel (N+1) and/or dual-bus (N+N) applications to provide the ultimate solution.

It has a relatively simple topology which offers an excellent value for money solution for critical industrial processes. It is normally regarded as the ultimate solution to power problems by providing both uninterrupted power backup and power conditioning. It protects the load from all AC utility supply anomalies i.e. Blackouts, Brownouts, Surges, Spikes, Dips, Harmonics etc.

## Block Diagram



"Monolithic" – it used to describe a system that is made up of single sub-systems (Rectifier, Battery charger, Inverter, Isolation transformer, Bi-Directional static switch etc.) with no intrinsic multiple modules. Monolithic UPS have less number of components, which increases the reliability and reduce the mean

time between failures (MTBF) that ultimately beneficial to user.

This design highly used to provide power protection for critical loads or precarious processes in parallel or dual-bus systems configurations.

## Key Highlights

### Improves Grid healthiness (IGBT RECTIFIER)

With integrated PFC (IGBT rectifier technology), the harmonic distortion on the input line significantly reduced (THDi <3%) and achieve input power factor near to unity (upto 0.99).

It is highly compatible with upstream without any additional filtering or over sizing.

### Galvanic Isolation Transformer (Inbuilt)

Double wound isolation transformer at the inverter output as part of the inverter circuit inside the UPS cabinet, provide galvanic isolation between the load and the battery with improved versatility in system configuration, allowing:

- Better load protection from DC/Battery problems
- Flexibility for common/independent input supply
- Bypass line protected against DC bus fault
- Better fault handling capacity between phase and neutral on load side

### Cater High Starting In-rush

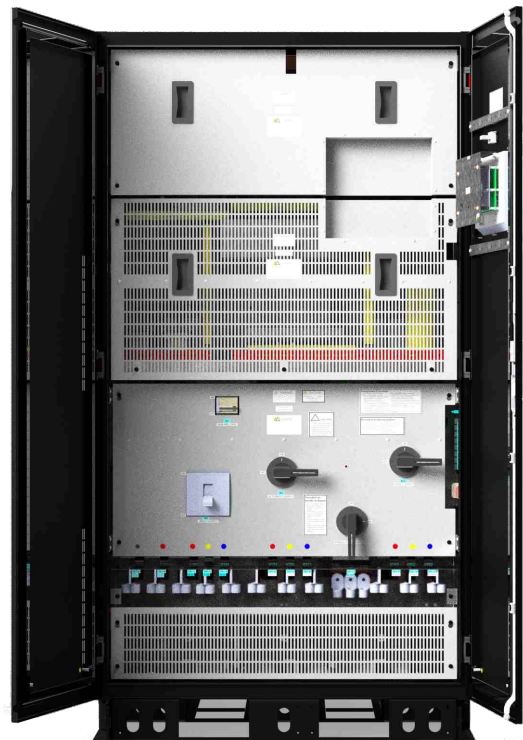
- Specially designed overload capacity which can smoothly support 6 to 8 times Direct-On-Line (DOL) starting torque requirement of motor.
- Avoid oversizing of UPS capacity.
- Reduce CAPEX.

### Low Footprint & High Efficiency with In-Built Transformer UPS

Low footprint UPS with In-Built isolation transformer is the rarest combination, where Hitachi can serve at 2.35m<sup>2</sup> for 600kVA floor space and up to 94% overall efficiency considering in-built transformer losses.

### Manual Bypass Operation with inter-locking facility

Manual bypass operation is make before break >> 0 msec break during transfer from inverter to bypass. This operation is provided with mechanical and electrical interlock to avoid the misoperation.



### Power Reliability

Hitachi dealt with different type of power problems and provided solutions for mission critical process applications. Hitachi UPS offers user-friendly solutions that can be adapted to any system structure and multi-level complexity & provide power without interruptions. This is achieved by precise design, redundant elements, eliminating common failure points. All the internal processes, parameters are controlled & supervised by digital signal processor (DSP).

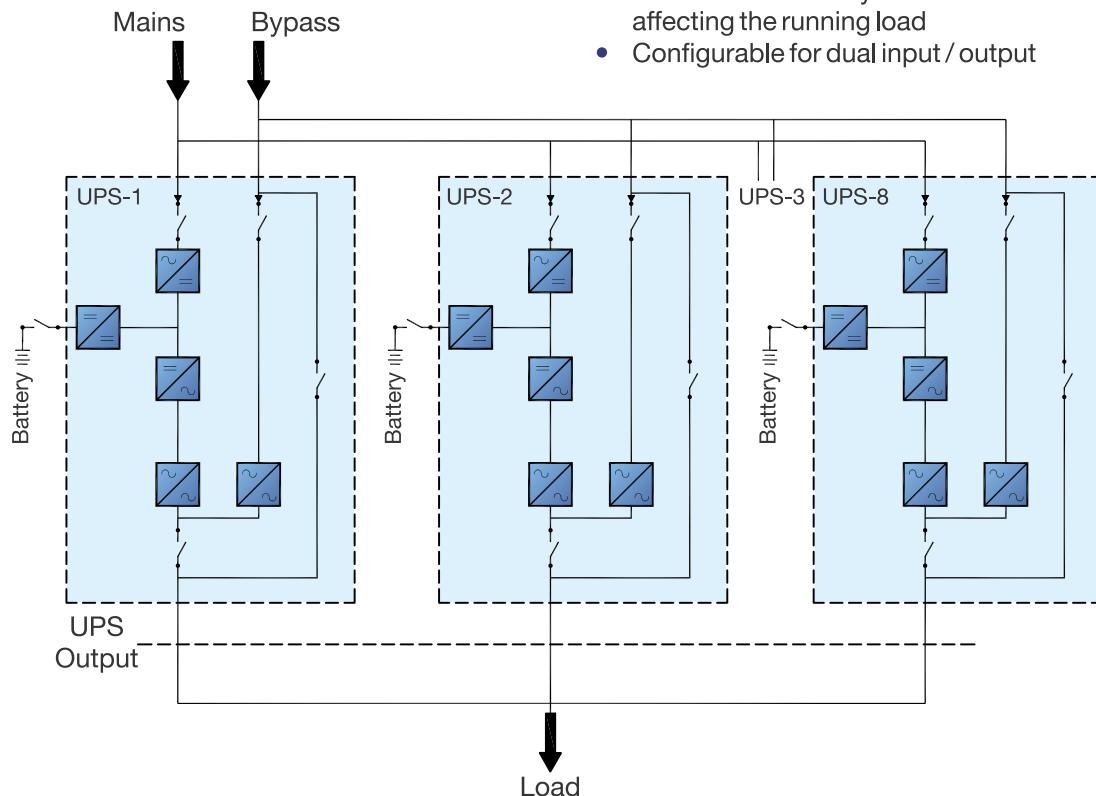
### Battery Bank Safety

- Hitachi UPS features are designed to get maximum battery life with safety.
- DC MCCB with Under voltage (UV) protection, provided in separate junction Box for fire safety and isolation purpose.
- Ripple current is controlled to ultra-low limit as battery is not directly connected to DC Bus.
- Battery is continuously monitored and automatically select desired charging mode.
- Hitachi UPS is having In-built Battery Management System (BMS). Which offers key features like auto battery test, weak battery bank detection. Battery deep discharge, battery over charge etc.
- Timer based boost charge facility available to equalize battery voltage during maintenance.

## Flexibility & Scalability (Solution upto 4.8 MVA)

Expand as you need without taking a shutdown - multiple UPS units can be added to enhance the UPS rating. This will ensure uninterrupted operations and continuous power to all your sensitive loads.

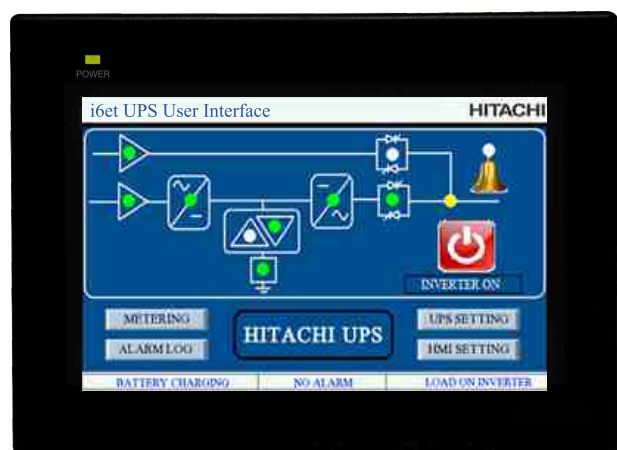
- Up to 8 UPS Systems can be configured as a parallel redundant system
- Provision to expand UPS units for future expansion at marginal cost and smaller dimensions
- N+1 redundancy can be achieved without external system static switch
- Maintenance of any individual unit / units without affecting the running load
- Configurable for dual input / output



## User-friendly Operation - For Touch Screen - ( Optional )

Conventional design of fault diagnostics units, LED mimic, membrane switches are replaced by latest multi-coloured touch screen display, which also support multi-language selection.

7" Touch Screen LCD Display interface offers more ergonomic operation. It projects the real time status, RMS metering, alarms and faults of all sections. There is no need to have separate fault diagnostic unit. It also has remote monitoring facility and embedded event logger up to 999 events stamping with date & time.



## Hot System Expansion

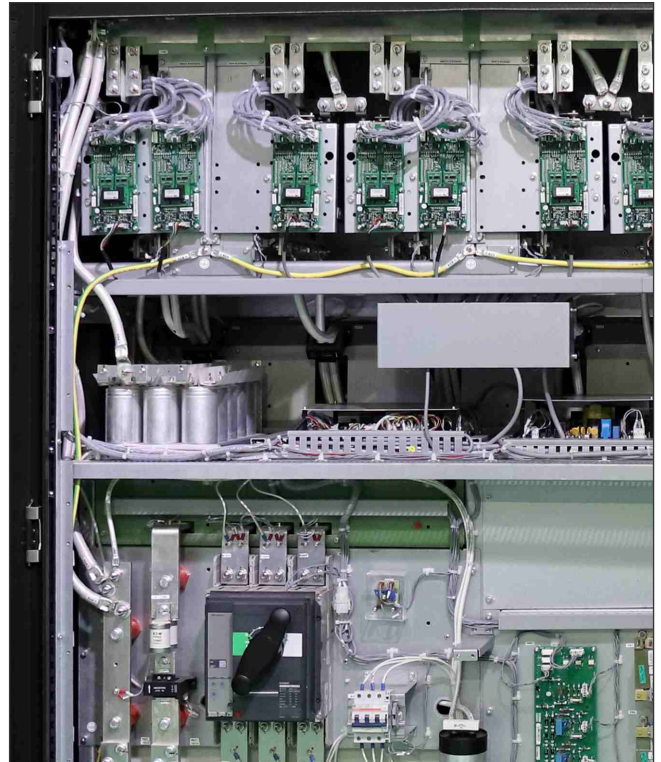
UPS panels can be added on line to existing system without taking shutdown or transferring load to bypass. This ensures maximum availability of power to load, even during maintenance and system expansion.

## Simplified Maintenance

- An advanced diagnostic system - helps the user to locate the exact fault and remedy for the problem.
- Front access for sub-assembly, cards and fans to reduce Mean Time to Repair (MTTR).
- Hessel free Data import/export through USB.

## Key Features

- Hitachi serves solution up to 4.8 MVA
- Advanced Dual core 32 Bit Floating DSP and CAN bus architecture
- Insensitive to input phase sequence
- Protection against Input surge voltage
- Unity Input power factor
- Wide input voltage and frequency range
- Compatible with generator set
- Temperature compensated battery charging
- Intelligent BMS (Battery Management System)
- Space Vector Modulation (SVM) technology
- Integrated galvanic isolation transformer
- Protection against dead short circuit, overload & overcharging
- Auto transfer re-transfer facility with bi-directional Static switch
- Manual bypass switch (MBS) with Inter-lock facility
- 7" TFT – Touch screen display with online status of UPS operation
- Parallel / N+1 redundancy / capacity enhancement (upto 8 units)
- 100% regeneration in AC mode & optional in battery mode
- Low footprint
- G3 conformal coating for all PCB's



## Long Life Components

Frequent replacement of components are costly and recurring in terms of cost of the parts as well as charges payable to the personnel for the job. It will also call for a system shutdown leading to production losses. Hitachi UPS systems are built with long life components and by planning the replacements it is possible to reduce the down time costs. The fan and capacitors are also long life parts that need replacement at very long intervals. The fuses need to be changed at the time of battery replacement. All these features contribute to substantial reduction in maintenance costs.

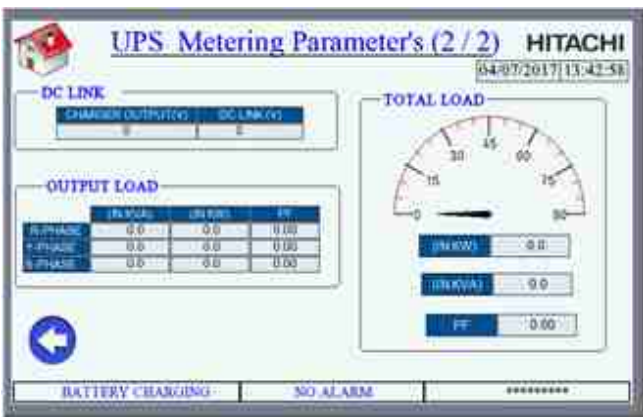
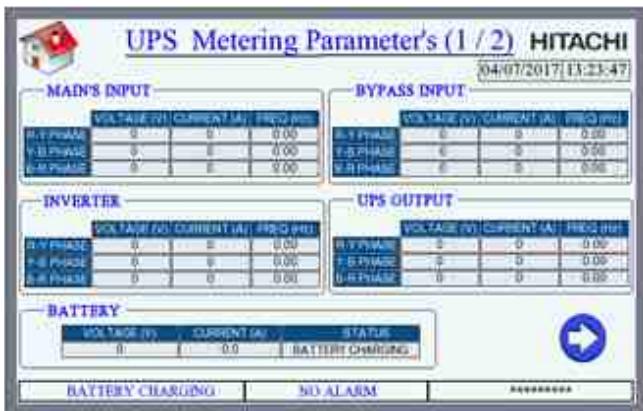
## Benefits

- Protects critical machineries against grid power issues
- Lower input power requirement
- Require low floor space for installation
- Suitable for floated or grounded neutral load
- User-friendly access expandability
- Battery bank safety
- Resilience for longer time
- Reduce system downtime
- Increase productivity

Low Maintenance Cost due to Longer Life Components

Item	Life	Lifetime of UPS														
		1 yrs	2 yrs	3 yrs	4 yrs	5 yrs	6 yrs	7 yrs	8 yrs	9 yrs	10 yrs	11 yrs	12 yrs	13 yrs	14 yrs	15 yrs
Relay, Timer etc.	15 yrs	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
Al Electrolytic Capacitor	8 yrs	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
Control Power Source Unit	15 yrs	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
Colling Fans	5 yrs	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
Memory Backup Battery	5 yrs	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
Fuse ( Main Circuit, Aux. Circuit)	8 yrs	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→

## Touch Screen Display



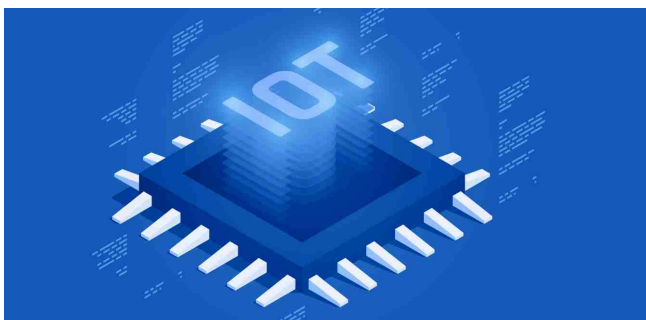
Metering	
<b>Current</b>	<b>Frequency</b>
Mains input	Mains input
Battery charge/discharge	Inverter
Inverter	Bypass
Bypass	Output
Output	<b>Power</b>
<b>Voltage</b>	Load kVA
Mains input	Load kW
Battery charge/discharge	Load PF
Inverter	UPS kVA
Bypass	UPS kW
Output	UPS PF
Major Alarms	
<b>Mains</b>	<b>DC</b>
Mains Fail	Over Voltage
Under Voltage	<b>Inverter</b>
Over Voltage	Under Voltage
Frequency out of band	Over Voltage
Out of phase	Overload
<b>Static Switch</b>	Overload trip
Load on Bypass	IGBT Limb trip
No sync	Over Temperature
SSW error	<b>Battery</b>
<b>Bypass</b>	Over Voltage
Under Voltage	Low Voltage
Over Voltage	End of Discharge
Frequency out of band	Discharging
LED Indication	
Mains Input	Inverter Operation
Bypass Input	Load on Inverter
Rectifier Operation	Load on Bypass
Booster Operation	Synchronization
Charger Operation	Common Alarm

## Remote communications (Optional)

### Option-1: SNMP / Web-based monitoring

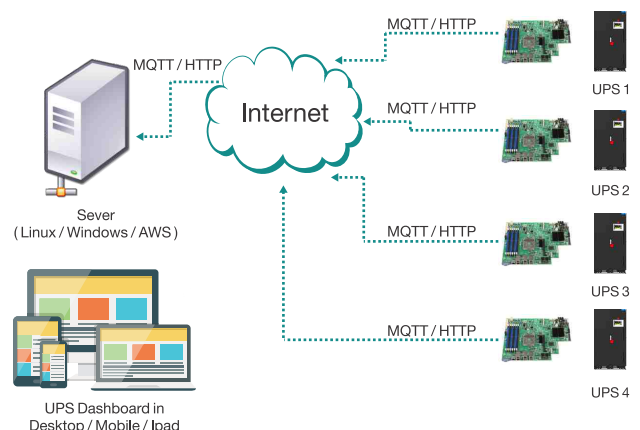
The UPS can be connected to a Local Area Network via the in-built SNMP card. A monitoring device on the customer's LAN makes it possible to constantly monitor the performance and parameters of the entire system.

### Option-2: IoT Facility



### Monitoring UPS health remotely over the internet

- Remote diagnosis
- Generate warning and alerts
- Uptime improvement
- Provide data for failure analysis
- Secure online tool for live UPS & battery health monitoring
- Numerical and graphical data presentation
- Report generation
- Notification of alerts through SMS/Email/Web App
- Data record retention



## Technical Specifications

Nominal power [kVA]	600	500	400	300	250	200	160
Active power [kW] @ 30°C	600	500	400	300	250	200	160
Active power [kW] @ 40°C	540	450	360	270	225	180	144
Flexibility & Scalability	Up to 8 Units (In PR, CE, N+1, Eco Mode Configuration)						
UPS Topology	Active front end IGBT rectifier & IGBT inverter						
Advance control hardware	Advanced dual core 32 bit floating DSP and CAN bus architecture						
<b>INPUT</b>							
Rated voltage [V]	380 / 400 / 415 V AC, 3P 3W						
Voltage tolerance [V]	400 ± 20% @ full load1						
Frequency [Hz]	50Hz ±12% (60Hz optional)						
Power factor	>0.99						
Harmonic current distortion [THDi]	<3%						
Soft start	0 - 100% in 120 sec. (selectable)						
<b>BATTERIES</b>							
Voltage Range	399 to 621V DC						
Type	Suitable for SMFB / VRLA / Ni-Cd / LAT Battery / Li-Ion Battery						
Charger Type	Automatic float cum boost type (In line with battery type)						
<b>BATTERY SAFETY</b>							
DC MCCB for Battery Bank	Available with under voltage (UV) trip facility						
Temperature compensation at float	Battery manufacturer's recommendation: -18mV / °C / 12V unit (reference at 25°C)						
<b>OUTPUT</b>							
Rated voltage [V]	380 / 400 / 415 V AC 3P + N (selectable)						
Output termination	3P + N, 4W						
Static regulation	±1%						
Dynamic response	±5% in 10 msec						
Voltage distortion [THDv]	<1% with linear load; <3% with non-linear load						
Crest factor [Ipeak/Irms]	3 : 1						
Frequency stability on battery	0.1%						
Nominal Frequency	50Hz (60Hz optional)						
Overload capacity @ 40°C temperature	250% for 100 msec; 200% for 7 sec; 150% for 1 min.; 125% for 10 min.; 110% for 60 min.						
Galvanic Isolation Transformer	Integrated double wound, Zig-Zag galvanic isolation transformer (in-built)						
Double conversion efficiency	up to 94% (with isolation transformer losses)						
Inbuilt Special Protections	Insensitive to input phase sequence; Input surge protection; Dead short circuit protection						
Loading capability	100% Unbalanced load; Regenerative load; Leading and lagging power factor						
Emergency Power Off (EPO)	Available						
Manual Bypass Switch (MBS)	Make before break type switch with inter-lock facility						
<b>OVERALL SPECIFICATIONS</b>							
Weight [kg]	3500 kg	3000 kg	2500 kg	2200 kg	1900 kg	1700 kg	1600 kg
Dimensions (HxWxD) [mm]	1954x2240x1050		2150x1540x1050		2050x1100x1050		
Ambient temperature for UPS Panel	0 °C to 40°C						
Recommended temperature for Battery	20 °C to 25°C						
Relative humidity	95% non-condensing						
Altitude	1000 meter from MSL (higher altitude design on request)						
Display	7" Multi-colored touch screen LCD with multi-language selection (optional)						
Communications + Remote signaling	Modbus (RS485) + 6 nos dry contacts (field configurable)						
Colour	Black grey RAL 7021						
Noise level at 1 m [dBA]	< 70 dBA						
IP rating	IP20 (higher IP on request)						
PCB cards protection	G3 conformal coating						
Ventilation	Forced air cooling						
Cable Entry	Bottom (top entry optional)						
Moving the UPS	Pallet jack						
Standards	Safety IEC 62040-1; EMC & RFI IEC 62040-2; Testing / Classification in accordance with IEC 62040-3; IP Protection IEC 60529						

\*For wider tolerance conditions apply.

## Options

- Input isolation transformer
- Earth fault detection
- Ambient temperature 50°C
- Bypass Panel : Servo Voltage Stabilizer (SCVS)
- Additional 6 nos potential free contacts
- TCP IP, Profibus & SNMP
- Closed enclosure for Battery bank
- Customized UPS cabinet colour

## Technical Specifications

Nominal power [kVA]	120	100	80	60	40	30
Active power [kW] @ 40°C	108	90	72	54	36	27
Flexibility & Scalability	Up to 8 units (In PR, CE, N+1, Eco mode configuration)					
UPS Topology	Active front end IGBT rectifier & IGBT inverter					
Advance control hardware	Advanced dual core 32 bit floating DSP and CAN bus architecture					
<b>INPUT</b>						
Rated voltage [V]	380 / 400 / 415 V AC, 3P 3W					
Voltage tolerance [V]	400 ± 20% @ full load <sup>1</sup>					
Frequency [Hz]	50Hz ±12% (60Hz Optional)					
Power factor	>0.99					
Harmonic current distortion [THDi]	<3%					
Soft start	0 - 100% in 120 sec. (selectable)					
<b>BATTERIES</b>						
Voltage Range	399 to 621V DC					
Type	Suitable for SMFB / VRLA / Ni-Cd / LAT Battery / Li-Ion Battery					
Charger Type	Automatic float cum boost type (In line with battery type)					
<b>BATTERY SAFETY</b>						
DC MCCB for Battery Bank	Available with under voltage (UV) trip facility					
Temperature compensation at float	Battery manufacturer's recommendation: -18mV / °C / 12V unit (reference at 25°C)					
<b>OUTPUT</b>						
Rated voltage [V]	380 / 400 / 415 V AC 3P + N (selectable)					
Output termination	3P + N, 4W					
Static regulation	±1%					
Dynamic response	±5% in 10 msec					
Voltage distortion [THDv]	<1% with linear load; <3% with non-linear load					
Crest factor [I <sub>peak</sub> /I <sub>rms</sub> ]	3 : 1					
Frequency stability on battery	0.1%					
Nominal Frequency	50Hz (60Hz optional)					
Overload capacity @ 40°C temperature	150% for 1 min.; 125% for 10 min.; 110% for 60 min.					
Galvanic Isolation Transformer	Integrated double wound, Zig-Zag galvanic isolation transformer (in-built)					
Inbuilt Special Protections	Insensitive to input phase sequence; Input surge protection; Dead short circuit protection					
Loading capability	100% Unbalanced load; Regenerative load; Leading and lagging power factor					
Manual Bypass Switch (MBS)	Make before break type switch with inter-lock facility					
<b>OVERALL SPECIFICATIONS</b>						
Ambient temperature for UPS Panel	0 °C to 40°C					
Recommended temperature for Battery	20 °C to 25°C					
Relative humidity	95% non-condensing					
Altitude	1000 meter from MSL (higher altitude design on request)					
Display	LCD Display with LED mimic					
Communications + Remote signaling	Modbus (RS485) + 6 nos dry contacts (field configurable)					
Colour	Black grey RAL 7021					
Noise level at 1 m [dBA]	< 70 dBA					
IP rating	IP20 (higher IP on request)					
PCB cards protection	G3 conformal coating					
Ventilation	Forced air cooling					
Cable Entry	Bottom (top entry optional)					
Moving the UPS	Pallet jack					
Standards	Safety IEC 62040-1; EMC & RFI IEC 62040-2; Testing / Classification in accordance with IEC 62040-3; IP Protection IEC 60529					

<sup>1</sup>For wider tolerance conditions apply.

## Options

- Input isolation transformer
- Earth fault detection
- Ambient temperature 50°C
- Bypass Panel : Servo Voltage Stabilizer (SCVS)
- Additional 6 nos potential free contacts
- TCP IP, Profibus & SNMP
- Closed enclosure for Battery bank
- Customized UPS cabinet colour



## Serving entire gamut of Industries

We have rich experience in supplying power electronics products for mission critical applications in various industries for critical data processing applications and back-up technology for demanding applications.



### Plastic

- Extruder Machine
- Injection Moulding Machine
- Blow moulding Machine
- Pipe Extrusion Machine
- TAP Plants



### Packaging & Printing

- Multi-Layer Printing Machine
- Packaging Machine
- Digital Printing Machine



### Textile

- Yarn Machine (Warping Process)
- Knitting Machine
- BOPP, PPE
- Embroidery Machine



### Automobile & Ancillaries

- CNC – VMC – HMC Machine
- Drilling & Grinding Machine
- Robotics & Automation



### Food and Beverages

- Compressor
- HVAC
- Packing



### FMCG

- Robotics & Automation
- Packaging Line



### Glass & Ceramic

- Kiln Machine
- Robotics
- Sizing & Policing Machine



### Pharma & Healthcare

- Formulation / API Process Machinery
- Laminar Air Flow (LAF)
- Air Handling Units (AHU)
- Lab Equipment



### Data Centers

and many more...

## Customer Support

“Have peace of mind with Hitachi Hi-Rel flexible and nimble footed, 24 X 7 service”

### Hitachi Hi-Rel service program includes:

#### On Site Installation, Supervision and Commissioning

- Provides comprehensive check at user site to ensure trouble free installation of product
- Our technical experts give recommendations to the site engineer or electrical contractor and supervise the UPS installation before load power-up
- Offers commissioning services along with site acceptance test report



#### Training

- On site training for safe & efficient operation of equipment
- Training at factory (optional)
  - Course-1 : Operation, System Principle, Hands on Training, Predictive and Preventive Maintenance – 3 days training
  - Course-2 : Predictive and Preventive Maintenance, Hardware, Settings, UPS System Panel & Batteries Troubleshooting & Repair Services – 5 days training



#### Preventive Maintenance Services (AMC, CMAC & Extended warranty)

- Ensures safe and reliable operation
- Contracts includes cleaning, measurements of various parameters, calibrations, functional tests, event log and power quality analysis, battery health check, hardware and software upgrades supported by Field Service Report.
- Maintenance plan is one of the most cost-effective actions that can preserve initial investment and ensures business continuity.
- Ensure optimal performance and to protect critical application from potential downtime.



#### Break Down Maintenance & EMERGENCY CALL

- In the event of an emergency call, our service expert, located as close to your site as possible, guarantees a quick intervention time with the help of 24x7-365 days.
- With the help of powerful diagnostics software, quick troubleshooting is possible by a service expert, which guarantees a short MTTR (Mean Time to Repair).
- Corrective actions are performed (Part replacement, adjustments and upgrades of software's etc.)
- Helpline number for service support - (080) 6112 0800



\*Service program is separate from equipment supply and subject to applicable terms and conditions.



## Contact us

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#### Gandhinagar Facility:

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e-gallery

In the spirit of innovation, specifications and features are subject to change without notice.

