

<b>Technical Specifications for 10kVA UPS System</b>		
<b>Sr. No.</b>		
<b>1</b>		
<b>2</b>	<b>Technology and Capability</b>	a) True <b>Online</b> configuration with <b>double conversion</b> UPS b) <b>DSP</b> based control. c) Possibility of enhancing UPS capacity / redundancy by operating UPS in <b>N+X Parallel Redundant Configuration(PRS)</b> . d) Capability of <b>Independent</b> battery bank operation of the UPS when operated in PRS. e) UPS should be designed at <b>Rated PF of 0.8 i.e. 10kVA / 8 kW</b> UPS rating. f) Dual Input design.
<b>3</b>	<b>Model Name &amp; Number</b>	
3.1	10 kVA / 8 kW	
<b>4</b>	<b>Input</b>	
4.1	Input facility -Phases / Wires	3-Phase / 4-Wire & Gnd (3Phase & Neutral + Ground)
4.2	Input Voltage Range	220/380V, 230/400V, 240/415V Range (Full Load) 176~276 / 305~477V Range (Derating to 50% Load) 120~175 / 208~304V
4.3	Nominal Input Frequency	50/ 60 Hz ( <b>Auto selectable</b> )
4.4	Input Frequency Range	45 to 65 Hz
4.5	Input Power Factor	> 0.95 (full load)
4.6	Generator Compatibility	Compatibility to genset supply required
4.7	Input Protection (Thru In-built 1P MCB)	Should be provided at the input of the UPS suitable for the full rated capacity of the UPS
<b>5</b>	<b>Output</b>	
5.1	Nominal Output voltage	220/230/240 VAC
5.2	Output Voltage Regulation	± 1 %
5.3	Nominal Output Frequency	50/60 Hz
5.4	Output Frequency Regulation	± 0.1Hz

5.5	Output Frequency Slew Rate	< 1 Hz / s
5.6	Output Wave Form	Pure sine wave
5.7	Output Voltage Distortion (THDu)	<2% (For Linear Load)
5.8	Crest Factor	3:1 On Full Load (Minimum)
5.9	Output Short circuit Protection	Electronic Protection
<b>6</b>	<b>Transient Response / Recovery</b>	
6.1	Transient Response: Dynamic Regulation for 10% to 90% step linear load	±7%
6.2	Transient Recovery to steady state condition after 10% to 90% step linear load	< 1 cycle
<b>7</b>	<b>Transfer Time</b>	
7.1	Transfer Time (Mode of operation)	Zero ms from Mains mode to Battery Mode Zero ms from Battery Mode to Mains mode
7.2	Transfer Time (Inverter to Bypass / Bypass to Inverter)	<1ms (Synchronized Mode)
7.3	<b>Automatic &amp; Bi-directional static by-pass (In-built)</b>	Bypass To Inverter ±10 % (Rated Voltage) Inverter To Bypass ±7 % (Rated Voltage)
7.4	<b>Maintenance Bypass</b>	1.In built manual bypass instead of optional. 2. Maintenance bypass cover removal sensing. 3.The maintenance bypass should provide for Hot-swap of the faulty UPS PWB for repairs / service.
<b>8</b>	<b>Efficiency (At Nominal Voltage &amp; Resistive Load up to kW rating of UPS)</b>	
8.1	Overall Efficiency (AC to AC) - Online (Double Conversion)	Upto 92% (at 100% load)
8.2	Overall Efficiency (AC to AC) - ECO Mode (Bypass feeding the load under normal conditions)	Upto 96% (at 100% load)

<b>9</b>	<b>Overload</b>	
9.1	Inverter Overload capacity	≤105% continuous,106% ~ 110% 600sec,111% ~ 125% 300sec,126% ~ 150% 30 sec,>150% Immediate
<b>10</b>	<b>Display Panel (In-build LC Display &amp; LED )</b>	
10.1	<b>Measurements</b> (On LCD)	Input: Voltage / Frequency,Bypass: Voltage / Frequency,Output: Voltage / frequency,Battery: Remaining time / Battery Level Indicator,Load: Percentage / Load Level Indicator,Battery Voltage Capacity/Status/Test Result,System Date/Time Setting,Current Time,PFC Fuse Open,Battery Temperature Too High,Battery Over Charge,Battery Out of Date,INV Short Circuit,Output Breaker Off
10.2	<b>Fault Indication</b> (On LCD)	Main Input Sequence Fault,Power Module General Fault,Battery Ground Fault,Bypass Static Switch Fault,System General Fault,Parallel Fault,Provide Bypass O/P Even If UPS Fault,
10.3	<b>Indications</b> (LED)	Normal-Green/Battery-Orange/Bypass-Green/Fault-Red
<b>11</b>	<b>Alarms</b>	
11.1	Audible Alarms	Battery Low beep / DC Fault beep/ UPS Overload beep/ o/p short ckt fault beep/ Shutdown beep
<b>12</b>	<b>Battery Backup / Battery Bank &amp; Charger</b>	
12.1	Backup Required	1 Hr
12.2	Battery Bank Voltage	240 V DC or higher
12.3	Battery Bank VAh (Vendor to include battery sizing calculations with tender)	1 Hr backup
12.4	Batteries Type	Sealed Maintenance Free (SMF) - 12V Cells
12.5	Battery Makes	Amara Raja / Exide
12.6	Number of Battery Banks	Maximum Two Banks in parallel

12.7	Minimum Charger Rating (Including internal / external)	The charger should be able to deliver charging current equivalent to 10% of Battery Ah rating offered. (In case of external chargers, suitable monitoring of the chargers should be provided in the UPS. Also all external chargers taking AC input must have PFC - Power factor correction)
12.8	Charger type / Charging Method & Charging Voltages	<b>Constant Voltage Constant Current</b> Solid state <b>SMPS</b> charger Float Charge 270V±(2V) Boost Charge 280V±(2%V)
12.9	Battery recharge time (After complete discharge) to 90% capacity	10-12 hours
12.10	Battery Housing (Vendor to provide the GA drawings of the offered Battery Rack)	Should be compact and space saving <b>MS steel open racks</b> complete with interconnectors
12.11	Battery End Cell Voltage	1.75 V/cell
<b>13</b>	<b>Interfaces</b>	
13.1	Serial Communication RS232 Port (Option of USB Port should be available)	RS2323 Port should be provided as standard in the UPS. However there should be provision for USB port also in the UPS.
13.2	REPO(Remote Emergency Power OFF) / ROO(Remote ON - OFF) Port	Provide both onsite & remote EPO to shutdown UPS when emergency situation happens. REPO Port with a user-supplied switch
13.3	Interface to NMS (Network Management System) - To be quoted as option	SNMP (IPV6) Card for connecting the UPS to LAN thru Ethernet port & monitoring thru NMS should be available (The cost of SNMP Card / NMS software to be quoted separately)
13.4	Interface to BMS (Building Management System) - To be quoted as option	ModBus Card for connecting to UPS to BMS thru RS485 & monitoring thru BMS

13.5	Interface to DCS (Distributed Control System) - To be quoted as option	Relay I/O Card or PFC (Potential free contacts) for connecting to UPS to DCS / PLC / SCADA system for communicating UPS operating status
<b>14</b>	<b>Restart / Testing Capability</b>	
14.1	Cold Start	UPS should start up On AC Supply (Mains) without DC Supply (Batteries) On DC Supply (Batteries) without AC Supply (Mains)
14.2	Automatic Restart	UPS should start up automatically on mains resumption after battery low shutdown
14.3	Self Diagnosis	UPS should be capable to carry out self test of Rectifier / Charger /Battery & Inverter module during start-up
<b>15</b>	<b>Physical</b>	
15.1	Operating Temperature	0 to 40 deg C
15.2	Storage Temperature	-20 to 40 deg C
15.3	Operating Humidity	0% ~ 95%RH (No Condensing)
15.4	Operating Altitude	0-3000m (0 To 10000ft)
15.5	Type of Cooling	Forced Air
15.6	Noise Level	< 55 dbA at 1 meter distance
15.7	Form Factor	Rack & Tower mountable
15.8	Air Filters	UPS should have internal anticorrosion air filters for dust filtration( <b>Optional</b> )
15.9	Dimension (w x d x h) in mm	To be furnished by the vendor
15.10	Weight - in kg	To be furnished by the vendor
15.11	Reliability	MTBF greater than 100000 hours
15.12	Packaging Material / Vibration Withstand & Drop	Recyclable (No CFC) & 1. Vibration testing as per ISTA -1G Non-operational with Packing

Test

15.13	Standard Package of UPS to include the following minimum accessories	<ol style="list-style-type: none"> <li>1. UPS</li> <li>2. CD - Monitoring Software</li> <li>3. RS232 Cable</li> <li>4. Tower Stand - For use as Tower</li> <li>5. Brackets for mounting in 19" IT Server / Networking Rack</li> <li>6. UPS to Battery bank connecting Cable</li> <li>7. User Manual</li> </ol>
15.14	Parallel Configuration	UPS should have capability for parallel 4 units.
15.15	Grounding	UPS should have grounding arrangement
<b>16</b>	<b>Certifications</b>	
16.1	Manufacturer	<b>QMS:</b> As per ISO 9001: 2008 <b>EMS:</b> As per ISO 14001: 2004 <b>OSHAS:</b> As per ISO 18001: 2007
16.2	Product Safety Certifications (Mandatory)	<b>ESD: IEC61000-4-2: level4</b> <b>RS : IEC61000-4-3: level3</b> <b>EFT: IEC61000-4-4: level4</b> <b>SURGE: IEC61000-4-5: level4</b> <b>CS: IEC61000-4-6: level3</b> <b>IEC 61000-2-2</b> <b>EN 62040-2</b> <b>EN 61000-3-2</b>
16.3	ROHS compliance	UPS should be ROHS compliance
16.4	Preferred Brands	Emerson, Socomec, Delta, APC
16.5	Battery Brands	Quanta, Exide

**Technical Specifications f**

<b>Sr. No.</b>	<b>Specifications</b>
<b>1</b>	<b>Capacity (in kVA / kW)</b>
<b>2</b>	<b>Technology and Capability</b>
<b>3</b>	<b>Input</b>
3.1	Input facility -Phases / Wires
3.2	Input Voltage Range
3.3	Nominal Input Frequency
3.4	Input Frequency Range
3.5	Input Power Factor
3.6	Input Protection (Thru In-built 1P MCB)
<b>4</b>	<b>Output</b>
4.1	Nominal Output voltage
4.2	Output Voltage Regulation
4.3	Nominal Output Frequency
4.4	Output Frequency Regulation
4.5	Output Frequency Slew Rate
4.6	Output Wave Form
4.7	Output Voltage Distortion (THDu)
4.8	Crest Factor
4.9	Output Short circuit Protection
<b>5</b>	<b>Transient Response / Recovery</b>
5.1	Transient Response: Dynamic Regulation for 10% to 90% step linear load

5.2	Transient Recovery to steady state condition after 10% to 90% step linear load
-----	--



<b>6</b>	<b>Transfer Time</b>
6.1	Transfer Time (Mode of operation)
6.2	Transfer Time (Inverter to Bypass / Bypass to Inverter)
6.3	<b>Automatic &amp; Bi-directional static by-pass (In-built)</b>
6.4	<b>Maintenance Bypass</b>
<b>7</b>	<b>Efficiency (At Nominal Voltage &amp; Resistive Load)</b>
7.1	Overall Efficiency (AC to AC) - Online (Double Conversion)
7.2	Overall Efficiency (AC to AC) - ECO Mode (Bypass feeding the load under normal conditions)
<b>8</b>	<b>Overload</b>
8.1	Inverter Overload capacity
<b>9</b>	<b>Display Panel (In-built LC Display &amp; LED )</b>
9.1	<b>Measurements</b> (On LCD)
9.2	<b>Fault Indication</b> (On LCD)
9.3	<b>Indications</b> (LED)

<b>10</b>	<b>Alarms</b>
10.1	Audible Alarms

<b>11</b>	<b>Battery Backup</b>
11.1	Backup Required
11.2	Battery Bank Voltage
11.3	Battery Bank VAh (Vendor to include battery sizing calculations with tender)
11.4	Batteries Type
11.5	Battery Makes
11.60	Battery Housing (Vendor to provide the GA drawings of the offered Battery Rack)
<b>12</b>	<b>Restart / Testing Capability</b>
12.1	Cold Start
12.2	Automatic Restart
12.3	Self Diagnosis
12.4	Parallel Configuration
12.5	Grounding
<b>13</b>	<b>Certifications</b>
13.1	Manufacturer
13.2	Preferred UPS Brands
13.3	Battery Brands

**or 10kVA UPS System**

**10kVA**

**10kVA**

- a) True **Online** configuration with **double conversion** UPS
- b) **DSP** based control.
- c) Possibility of enhancing UPS capacity / redundancy by operating UPS in **N+X Parallel Redundant Configuration (PRS)**.
- d) Capability of **Independent** battery bank operation of the UPS when operated in PRS.
- e) UPS should be designed at **Rated PF of 0.8 i.e. 10kVA / 8 kW** UPS rating.

3-Phase / 4-Wire & Gnd (3Phase & Neutral + Ground)

220/380V, 230/400V, 240/415V  
Range (Full Load) 176~276 / 305~477V  
Range (Derating to 50% Load) 120~175 / 208~304V

50/ 60 Hz (**Auto selectable**)

45 to 65 Hz

> 0.95 (full load)

Should be provided at the input of the UPS suitable for the full rated capacity of the UPS

220/230/240 VAC

± 1 %

50/60 Hz

± 0.1Hz

< 1 Hz / s

Pure sine wave

<2% (For Linear Load)

3:1 On Full Load (Minimum)

Electronic Protection

±7%

< 1 cycle

Zero ms from Mains mode to Battery Mode  
Zero ms from Battery Mode to Mains mode

<1ms (Synchronized Mode)

Bypass To Inverter  $\pm 10\%$  (Rated Voltage)  
Inverter To Bypass  $\pm 7\%$  (Rated Voltage)

1. In built manual bypass instead of optional.
2. Maintenance bypass cover removal sensing.
3. The maintenance bypass should provide for Hot-swap of the faulty UPS PWB for repairs / service.

**d up to kW rating of UPS)**

Upto 92% (at 100% load)

Upto 96% (at 100% load)

$\leq 105\%$  continuous,  $106\% \sim 110\%$  600sec,  $111\% \sim 125\%$  300sec,  $126\% \sim 150\%$  30 sec,  $> 150\%$  Immediate

Input: Voltage / Frequency, Bypass: Voltage / Frequency, Output: Voltage / frequency, Battery: Remaining time / Battery Level Indicator, Load: Percentage / Load Level Indicator, Battery Voltage Capacity/Status/Test Result, System Date/Time Setting, Current Time, PFC Fuse Open, Battery Temperature Too High, Battery Over Charge, Battery Out of Date, INV Short Circuit, Output Breaker Off

Main Input Sequence Fault, Power Module General Fault, Battery Ground Fault, Bypass Static Switch Fault, System General Fault, Parallel Fault, Provide Bypass O/P Even If UPS Fault,

Normal-Green/Battery-Orange/Bypass-Green/Fault-Red

Battery Low beep / DC Fault beep/ UPS Overload beep/  
o/p short ckt fault beep/ Shutdown beep

1 Hr
240 V DC or higher
1 Hr backup
Sealed Maintenance Free (SMF) - 12V Cells
Amara Raja / Exide
Should be compact and space saving <b>MS steel open racks</b> complete with interconnectors
UPS should start up On AC Supply (Mains) without DC Supply (Batteries) On DC Supply (Batteries) without AC Supply (Mains)
UPS should start up automatically on mains resumption after battery low shutdown
UPS should be capable to carry out self test of Rectifier / Charger / Battery & Inverter module during start-up
UPS should have capability for parallel 4 units.
UPS should have grounding arrangement
<b>QMS:</b> As per ISO 9001: 2008 <b>EMS:</b> As per ISO 14001: 2004 <b>OSHAS:</b> As per ISO 18001: 2007
Emerson,Socomec,Delta,APC,GE
Quanta,Exide