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|  | Hkkjrh; izkS|ksfxdh laLFkku enzkl psUuS 600 036  **INDIAN INSTITUTE OF TECHNOLOGY MADRAS Chennai 600 036**  HkaMkj ,oa Ø; vuqHkkx  **STORES & PURCHASE SECTION**  Email: adstores@iitm.ac.in  nwjHkk"k% ¼044½ 2257 8285@8286@8287@8288 QSDl% ¼044½ 2257 8292  Telephone : (044) 2257 8285/8286/8287/8288 FAX: (044) 2257 8292 | Description: TUV-ISO logo-2009 |

A.V. SUDARSANAM SPS/RC/UPS/Tech Enq./2015-16/SPL

DEPUTY REGISTRAR (S & P) Date: 16.03.2015

Due Date: 06.04.2015

Time : 5.00 P.M

Dear Sir/Madam,

Quotations are invited for procurement of UPS (rating from 2 kVA to 30 kVA) under **Rate Contract** basis for the technical specifications as given in our website. Dealers must submit an authorized dealership certificate from the manufacturer for each brand quoted by them, otherwise the quotation will be summarily rejected.

For each model, kindly make arrangements to deliver one sample along with Batteries to the **Head, Central Electronics Centre (CEC), IIT Madras, Chennai 600036** for necessary Testing and Technical evaluation **on or before** **06.04.2015 @ 5.00 P.M. Those who have already furnished their models for evaluation are also to deliver the same again. For any technical clarification, please contact, CEC, and the contact No.044 2257 4947.**

To consider your products under Rate Contract, kindly furnish the technical particulars along with Product Catalogue/s, Test Certificates and list of clients for the following UPS configurations in the prescribed formats (available in our web site [**www.tender**](http://www.tender)**s.iitm.ac.in**) for each and every model separately to the **Head, Central Electronics Centre, IIT Madras,** with a copy to the undersigned on or before **06.04.2015 @ 5.00 P.M**

1. 2 kVA, 3 kVA,& 5 kVA – True Online Sine wave output with 30 minutes backup and 1 hour back-up.

2. 10 kVA, 15 kVA, 20 kVA & 30 kVA – True Online Sine wave output with 30 minutes backup and 1 hour back-up with provision for 3 phase input and 1 phase output, 3 phase input and 3 phase output.

**The UPS and Batteries must function as per the specifications at room temperature without Air-Conditioners.**

You may please note that, short-listing of suppliers for particular model/s for receiving of the commercial quote will be made only after testing and technical evaluation of the model/s.

Yours faithfully,

Sd/-

Deputy Registrar (S & P)

# TECHNICAL SPECIFICATIONS

**2kVA UPS True On Line, Sine wave Output**

**Technology:**

PWM technology in True on-line operation, employing double conversion method using MOSFETs / IGBTs.

**Method of Inversion:**

Adaptive pulse width modulation or weighted pulse width modulation with high Frequency switching (>10 kHz for MOSFETs and >5kHz for IGBTs).

**Test Parameters:**

1. Input Voltage Range @ F.L : 170V-270V AC

2. Input Power Factor @ F.L : > 0.95

3. Input Frequency Variation : 50 Hz ± 5%

4. Total Energy storage capacity of Battery (in one string) @ F.L and @ Non-A/C environment

|  |  |  |
| --- | --- | --- |
| Backup time | Watt Hr. required | |
| 48 V Bus | 72 / 96 V Bus |
| For 30 min | > 2016 Watt Hr | > 2304 Watt Hr |
| For 60 min | > 3120 Watt Hr | > 3648 Watt Hr |

5. AC Output Voltage and steady state Regulation @ FL : 230V AC; better than ± 1%

6. Transient Voltage Regulation at Step Load : < 5%

7. Maximum deliverable continuous Output Power : > 1600W

8. Output Frequency : 50 Hz 4% (Synchronous to mains)

50 Hz 0.5% (Free running)

9. Efficiency

(i) Battery mode : > 80%

(ii) Mains mode : > 80%

10. THD @ F.L : < 3% (for linear load);

< 5% (for nonlinear load)

11. Crest Factor @ F.L : > 3 : 1

12. Over Load Duration @ 110%, 125% and 150% of F.L : 5 min, 1 min and 2 sec respectively

13. Static bypass switch: Bi-directional with change over time less than 10 milliseconds in free running mode and instantaneous in synchronous mode from Inverter to Bypass and vice-versa.

14. Temperature and Humidity

(i) Operating Temperature Range : upto 40ºC

(ii) Humidity : upto 95% Rh

15. Noise level (at 1 meter) : < 45 dB

16. Conformance to Standards

(i) EMC Standards : IEC 801 - 2,3,4,5

(ii) Emission Standard : EN55022 Class B

(iii) Safety Standard : EN 50091-1

**Battery Charger Operation:**

Float-cum-boost charger with automatic boost/trickle charger modes with current limiting features. It’s characteristics shall be such as to match the float/ boost charging of the batteries as per battery characteristic, for battery life enhancement. High frequency chargers preferred.

**Protection Features:**

a) Isolation - Output shall be fully isolated from mains and with surge /spike suppressors incorporated.

b) Current limiting, over load and Short circuit protection.

c) Phase locking mechanism with mains frequency.

d) Over voltage / Under voltage protection.

e) All other protection systems as required for safety of the system.

**Other Features:**

1. Cold start feature under full load condition.

2. Standard hardware / software support for serial communication interface and SNMP / Web monitoring.

3. Auto shut down and energy saving features.

4. Temperature compensated battery charging for battery life enhancement.

3. Automated battery testing and advanced battery management features.

4. Sufficient ventilation and forced air cooling through fans.

5. Documentation/Manuals support for component level Servicing.

6. Serviceability at component level.

7. Spares and accessories deliverable along with UPS for Servicing.

## Warranty and AMC:

1. 3 years Warranty Period for UPS as well as Batteries.

2. Comprehensive AMC covering the batteries, after the expiry of warranty period for the configurations

(i) to (iv) given below.

**Important instructions:**

a) Separate quote is invited for each one of the following configurations:

(i) with built- in isolation transformer and 30 minutes back up time.

(ii) with built- in isolation transformer and one hour back up time.

(iii) with external isolation transformer and 30 minutes back up time.

(iv) with external isolation transformer and one hour back up time.

b) Batteries must be SMF type of following make:

Hitachi, Panasonic, Global Yuasa, Yuasa, Base or Rocket.

c) Quote should indicate the Model/Series Name and Model Number of UPS

# TECHNICAL SPECIFICATIONS

**3kVA UPS True On Line, Sine wave Output**

**Technology:**

PWM technology in True on-line operation, employing double conversion method using MOSFETs / IGBTs.

**Method of Inversion:**

Adaptive pulse width modulation or weighted pulse width modulation with high Frequency switching (>10 kHz for MOSFETs and >5kHz for IGBTs).

**Test Parameters:**

1. Input Voltage Range @ F.L : 170V-270V AC

2. Input Power Factor @ F.L : > 0.95

3. Input Frequency Variation : 50 Hz ± 5%

4. Total Energy storage capacity of Battery (in one string) @ F.L and @ Non-A/C environment

|  |  |  |
| --- | --- | --- |
| Backup time | Watt Hr. required | |
| 96 V Bus | 192 V Bus |
| For 30 min | > 2880 Watt Hr | > 2880 Watt Hr |
| For 60 min | > 6240 Watt Hr | > 4608 Watt Hr |

5. AC Output Voltage and steady state Regulation @ FL : 230V AC; better than ± 1%

6. Transient Voltage Regulation at Step Load : < 5%

7. Maximum deliverable continuous Output Power : > 2400W

8. Output Frequency : 50 Hz 4% (Synchronous to mains)

50 Hz 0.5% (Free running)

9. Efficiency

(i) Battery mode : > 83%

(ii) Mains mode : > 85%

10. THD @ F.L : < 3% (for linear load);

< 5% (for nonlinear load)

11. Crest Factor @ F.L : > 3 : 1

12. Over Load Duration @ 110%, 125% and 150% of F.L : 5 min, 1 min and 2 sec respectively

13. Static bypass switch: Bi-directional with change over time less than 10 milliseconds in free running mode and instantaneous in synchronous mode from Inverter to Bypass and vice-versa.

14. Temperature and Humidity

(i) Operating Temperature Range : upto 40ºC

(ii) Humidity : upto 95% Rh

15. Noise level (at 1 meter) : < 45 dB

16. Conformance to Standards

(i) EMC Standards : IEC 801 - 2,3,4,5

(ii) Emission Standard : EN55022 Class B

(iii) Safety Standard : EN 50091-1

**Battery Charger Operation:**

Float-cum-boost charger with automatic boost/trickle charger modes with current limiting features. It’s characteristics shall be such as to match the float/ boost charging of the batteries as per battery characteristic, for battery life enhancement. High frequency chargers preferred.

**Protection Features:**

a) Isolation - Output shall be fully isolated from mains and with surge /spike suppressors incorporated.

b) Current limiting, over load and Short circuit protection.

c) Phase locking mechanism with mains frequency.

d) Over voltage / Under voltage protection.

e) All other protection systems as required for safety of the system.

**Other Features:**

1. Cold start feature under full load condition.

2. Standard hardware / software support for serial communication interface and SNMP / Web monitoring.

3. Auto shut down and energy saving features.

4. Temperature compensated battery charging for battery life enhancement.

3. Automated battery testing and advanced battery management features.

4. Sufficient ventilation and forced air cooling through fans.

5. Documentation/Manuals support for component level Servicing.

6. Serviceability at component level.

7. Spares and accessories deliverable along with UPS for Servicing.

## Warranty and AMC:

1. 3 years Warranty Period for UPS as well as Batteries.

2. Comprehensive AMC covering the batteries, after the expiry of warranty period for the configurations

(i) to (iv) given below.

**Important instructions:**

a) Separate quote is invited for each one of the following configurations:

(i) with built- in isolation transformer and 30 minutes back up time.

(ii) with built- in isolation transformer and one hour back up time.

(iii) with external isolation transformer and 30 minutes back up time.

(iv) with external isolation transformer and one hour back up time.

b) Batteries must be SMF type of following make:

Hitachi, Panasonic, Global Yuasa, Yuasa, Base or Rocket.

c) Quote should indicate the Model/Series Name and Model Number of UPS

# TECHNICAL SPECIFICATIONS

**5kVA UPS True On Line, Sine wave Output**

**Technology:**

PWM technology in True on-line operation, employing double conversion method using MOSFETs / IGBTs.

**Method of Inversion:**

Adaptive pulse width modulation or weighted pulse width modulation with high Frequency switching (>10 kHz for MOSFETs and >5kHz for IGBTs).

**Test Parameters:**

1. Input Voltage Range @ F.L : 180V-270 V AC

2. Input Power Factor @ F.L : > 0.95

3. Input Frequency Variation : 50 Hz ± 5%

4. Total Energy storage capacity of Battery (in one string) @ F.L and @ Non-A/C environment

|  |  |
| --- | --- |
| Backup time | Watt Hr. required |
| 192 V Bus |
| For 30 min | > 4608 Watt Hr |
| For 60 min | > 7680 Watt Hr |

5. AC Output Voltage and steady state Regulation @ FL : 230V AC; better than ± 1%

6. Transient Voltage Regulation at Step Load : < 5%

7. Maximum deliverable continuous Output Power : >4000W

8. Output Frequency : 50 Hz 4% (Synchronous to mains)

50 Hz 0.5% (Free running)

9. Efficiency

(i) Battery mode : > 87%

(ii) Mains mode : > 85%

10. THD @ F.L : < 3% (for linear load);

< 5% (for nonlinear load)

11. Crest Factor @ F.L : > 3 : 1

12. Over Load Duration @ 110%, 125% and 150% of F.L : 5 min, 1 min and 2 sec respectively

13. Static bypass switch: Bi-directional with change over time less than 10 milliseconds in free running mode and instantaneous in synchronous mode from Inverter to Bypass and vice-versa.

14. Temperature and Humidity

(i) Operating Temperature Range : upto 40ºC

(ii) Humidity : upto 95% Rh

15. Noise level (at 1 meter) : < 45 dB

16. Conformance to Standards

(i) EMC Standards : IEC 801 - 2,3,4,5

(ii) Emission Standard : EN55022 Class B

(iii) Safety Standard : EN 50091-1

**Battery Charger Operation:**

Float-cum-boost charger with automatic boost/trickle charger modes with current limiting features. It’s characteristics shall be such as to match the float/ boost charging of the batteries as per battery characteristic, for battery life enhancement. High frequency chargers preferred.

**Protection Features:**

a) Isolation - Output shall be fully isolated from mains and with surge /spike suppressors incorporated.

b) Current limiting, over load and Short circuit protection.

c) Phase locking mechanism with mains frequency.

d) Over voltage / Under voltage protection.

e) All other protection systems as required for safety of the system.

**Other Features:**

1. Cold start feature under full load condition.

2. Standard hardware / software support for serial communication interface and SNMP / Web monitoring.

3. Auto shut down and energy saving features.

4. Temperature compensated battery charging for battery life enhancement.

3. Automated battery testing and advanced battery management features.

4. Sufficient ventilation and forced air cooling through fans.

5. Documentation/Manuals support for component level Servicing.

6. Serviceability at component level.

7. Spares and accessories deliverable along with UPS for Servicing.

## Warranty and AMC:

1. 3 years Warranty Period for UPS as well as Batteries.

2. Comprehensive AMC covering the batteries, after the expiry of warranty period for the configurations

(i) to (iv) given below.

**Important instructions:**

a) Separate quote is invited for each one of the following configurations:

(i) with built- in isolation transformer and 30 minutes back up time.

(ii) with built- in isolation transformer and one hour back up time.

(iii) with external isolation transformer and 30 minutes back up time.

(iv) with external isolation transformer and one hour back up time.

b) Batteries must be SMF type of following make:

Hitachi, Panasonic, Global Yuasa, Yuasa, Base or Rocket.

c) Quote should indicate the Model/Series Name and Model Number of UPS

# TECHNICAL SPECIFICATIONS

**10kVA UPS True On Line, Sine wave Output (3 ø i/p & 1 ø o/p)**

**Technology:**

PWM technology in True on-line operation, employing double conversion method using MOSFETs / IGBTs.

**Method of Inversion:**

Adaptive pulse width modulation or weighted pulse width modulation with high Frequency switching (>10 kHz for MOSFETs and >5kHz for IGBTs).

**Test Parameters:**

1. Input Voltage Range @ F.L : 374V-506 V AC

2. Input Power Factor @ F.L : > 0.95

3. Input Frequency Variation : 50 Hz ± 5%

4. Total Energy storage capacity of Battery (in one string) @ F.L and @ Non-A/C environment

|  |  |
| --- | --- |
| Backup time | Watt Hr. required |
| 240 V Bus |
| For 30 min | > 9600 Watt Hr |
| For 60 min | > 15600 Watt Hr |

5. AC Output Voltage and steady state Regulation @ FL : 230V AC; better than ± 1%

6. Transient Voltage Regulation at Step Load : < 5%

7. Maximum deliverable continuous Output Power : > 8000W

8. Output Frequency : 50 Hz 4% (Synchronous to mains)

50 Hz 0.5% (Free running)

9. Efficiency

(i) Battery mode : > 84%

(ii) Mains mode : > 89%

10. THD @ F.L : < 3% (for linear load);

< 5% (for nonlinear load)

11. Crest Factor @ F.L : > 3 : 1

12. Over Load Duration @ 110%, 125% and 150% of F.L : 5 min, 1 min and 2 sec respectively

13. Static bypass switch: Bi-directional with change over time less than 10 milliseconds in free running mode and instantaneous in synchronous mode from Inverter to Bypass and vice-versa.

14. Temperature and Humidity

(i) Operating Temperature Range : upto 40ºC

(ii) Humidity : upto 95% Rh

15. Noise level (at 1 meter) : < 45 dB

16. Conformance to Standards

(i) EMC Standards : IEC 801 - 2,3,4,5

(ii) Emission Standard : EN55022 Class B

(iii) Safety Standard : EN 50091-1

**Battery Charger Operation:**

Float-cum-boost charger with automatic boost/trickle charger modes with current limiting features. It’s characteristics shall be such as to match the float/ boost charging of the batteries as per battery characteristic, for battery life enhancement. High frequency chargers preferred.

**Protection Features:**

a) Isolation - Output shall be fully isolated from mains and with surge /spike suppressors incorporated.

b) Current limiting, over load and Short circuit protection.

c) Phase locking mechanism with mains frequency.

d) Over voltage / Under voltage protection.

e) All other protection systems as required for safety of the system.

**Other Features:**

1. Cold start feature under full load condition.

2. Standard hardware / software support for serial communication interface and SNMP / Web monitoring.

3. Auto shut down and energy saving features.

4. Temperature compensated battery charging for battery life enhancement.

3. Automated battery testing and advanced battery management features.

4. Sufficient ventilation and forced air cooling through fans.

5. Documentation/Manuals support for component level Servicing.

6. Serviceability at component level.

7. Spares and accessories deliverable along with UPS for Servicing.

## Warranty and AMC:

1. 3 years Warranty Period for UPS as well as Batteries.

2. Comprehensive AMC covering the batteries, after the expiry of warranty period for the configurations

(i) to (iv) given below.

**Important instructions:**

a) Separate quote is invited for each one of the following configurations:

(i) with built- in isolation transformer and 30 minutes back up time.

(ii) with built- in isolation transformer and one hour back up time.

(iii) with external isolation transformer and 30 minutes back up time.

(iv) with external isolation transformer and one hour back up time.

b) Batteries must be SMF type of following make:

Hitachi, Panasonic, Global Yuasa, Yuasa, Base or Rocket.

c) Quote should indicate the Model/Series Name and Model Number of UPS

# TECHNICAL SPECIFICATIONS

**10kVA UPS True On Line, Sine wave Output (1 ø i/p & 1 ø o/p)**

**Technology:**

PWM technology in True on-line operation, employing double conversion method using MOSFETs / IGBTs.

**Method of Inversion:**

Adaptive pulse width modulation or weighted pulse width modulation with high Frequency switching (>10 kHz for MOSFETs and >5kHz for IGBTs).

**Test Parameters:**

1. Input Voltage Range @ F.L : 180V-270 V AC

2. Input Power Factor @ F.L : > 0.95

3. Input Frequency Variation : 50 Hz ± 5%

4. Total Energy storage capacity of Battery (in one string) @ F.L and @ Non-A/C environment

|  |  |
| --- | --- |
| Backup time | Watt Hr. required |
| 240 V Bus |
| For 30 min | > 9600 Watt Hr |
| For 60 min | > 15600 Watt Hr |

5. AC Output Voltage and steady state Regulation @ FL : 230V AC; better than ± 1%

6. Transient Voltage Regulation at Step Load : < 5%

7. Maximum deliverable continuous Output Power : > 8000W

8. Output Frequency : 50 Hz 4% (Synchronous to mains)

50 Hz 0.5% (Free running)

9. Efficiency

(i) Battery mode : > 84%

(ii) Mains mode : > 89%

10. THD @ F.L : < 3% (for linear load);

< 5% (for nonlinear load)

11. Crest Factor @ F.L : > 3 : 1

12. Over Load Duration @ 110%, 125% and 150% of F.L : 5 min, 1 min and 2 sec respectively

13. Static bypass switch: Bi-directional with change over time less than 10 milliseconds in free running mode and instantaneous in synchronous mode from Inverter to Bypass and vice-versa.

14. Temperature and Humidity

(i) Operating Temperature Range : upto 40ºC

(ii) Humidity : upto 95% Rh

15. Noise level (at 1 meter) : < 45 dB

16. Conformance to Standards

(i) EMC Standards : IEC 801 - 2,3,4,5

(ii) Emission Standard : EN55022 Class B

(iii) Safety Standard : EN 50091-1

**Battery Charger Operation:**

Float-cum-boost charger with automatic boost/trickle charger modes with current limiting features. It’s characteristics shall be such as to match the float/ boost charging of the batteries as per battery characteristic, for battery life enhancement. High frequency chargers preferred.

**Protection Features:**

a) Isolation - Output shall be fully isolated from mains and with surge /spike suppressors incorporated.

b) Current limiting, over load and Short circuit protection.

c) Phase locking mechanism with mains frequency.

d) Over voltage / Under voltage protection.

e) All other protection systems as required for safety of the system.

**Other Features:**

1. Cold start feature under full load condition.

2. Standard hardware / software support for serial communication interface and SNMP / Web monitoring.

3. Auto shut down and energy saving features.

4. Temperature compensated battery charging for battery life enhancement.

3. Automated battery testing and advanced battery management features.

4. Sufficient ventilation and forced air cooling through fans.

5. Documentation/Manuals support for component level Servicing.

6. Serviceability at component level.

7. Spares and accessories deliverable along with UPS for Servicing.

## Warranty and AMC:

1. 3 years Warranty Period for UPS as well as Batteries.

2. Comprehensive AMC covering the batteries, after the expiry of warranty period for the configurations

(i) to (iv) given below.

**Important instructions:**

a) Separate quote is invited for each one of the following configurations:

(i) with built- in isolation transformer and 30 minutes back up time.

(ii) with built- in isolation transformer and one hour back up time.

(iii) with external isolation transformer and 30 minutes back up time.

(iv) with external isolation transformer and one hour back up time.

b) Batteries must be SMF type of following make:

Hitachi, Panasonic, Global Yuasa, Yuasa, Base or Rocket.

c) Quote should indicate the Model/Series Name and Model Number of UPS

# TECHNICAL SPECIFICATIONS

**15kVA UPS True On Line, Sine wave Output (3 ø i/p & 1 ø o/p)**

**Technology:**

PWM technology in True on-line operation, employing double conversion method using MOSFETs / IGBTs.

**Method of Inversion:**

Adaptive pulse width modulation or weighted pulse width modulation with high Frequency switching (>10 kHz for MOSFETs and >5kHz for IGBTs).

**Test Parameters:**

1. Input Voltage Range @ F.L : 415V ± 15%

2. Input Power Factor @ F.L : > 0.93

3. Input Frequency Variation : 50 Hz ± 5%

4. Total Energy storage capacity of Battery (in one string) @ F.L and @ Non-A/C environment

|  |  |
| --- | --- |
| Backup time | Watt Hr. required |
| 240 V Bus |
| For 30 min | > 15600 Watt Hr |
| For 60 min | > 24000 Watt Hr |

5. AC Output Voltage and steady state Regulation @ FL : 230V AC; better than ± 1%

6. Transient Voltage Regulation at Step Load : < 5%

7. Maximum deliverable continuous Output Power : > 12000W

8. Output Frequency : 50 Hz 4% (Synchronous to mains)

50 Hz 0.5% (Free running)

9. Efficiency

(i) Battery mode : > 84%

(ii) Mains mode : > 89%

10. THD @ F.L : < 3% (for linear load);

< 5% (for nonlinear load)

11. Crest Factor @ F.L : > 3 : 1

12. Over Load Duration @ 110%, 125% and 150% of F.L : 5 min, 1 min and 2 sec respectively

13. Static bypass switch: Bi-directional with change over time less than 10 milliseconds in free running mode and instantaneous in synchronous mode from Inverter to Bypass and vice-versa.

14. Temperature and Humidity

(i) Operating Temperature Range : upto 40ºC

(ii) Humidity : upto 95% Rh

15. Noise level (at 1 meter) : < 45 dB

16. Conformance to Standards

(i) EMC Standards : IEC 801 - 2,3,4,5

(ii) Emission Standard : EN55022 Class B

(iii) Safety Standard : EN 50091-1

**Battery Charger Operation:**

Float-cum-boost charger with automatic boost/trickle charger modes with current limiting features. It’s characteristics shall be such as to match the float/ boost charging of the batteries as per battery characteristic, for battery life enhancement. High frequency chargers preferred.

**Protection Features:**

a) Isolation - Output shall be fully isolated from mains and with surge /spike suppressors incorporated.

b) Current limiting, over load and Short circuit protection.

c) Phase locking mechanism with mains frequency.

d) Over voltage / Under voltage protection.

e) All other protection systems as required for safety of the system.

**Other Features:**

1. Cold start feature under full load condition.

2. Standard hardware / software support for serial communication interface and SNMP / Web monitoring.

3. Auto shut down and energy saving features.

4. Temperature compensated battery charging for battery life enhancement.

3. Automated battery testing and advanced battery management features.

4. Sufficient ventilation and forced air cooling through fans.

5. Documentation/Manuals support for component level Servicing.

6. Serviceability at component level.

7. Spares and accessories deliverable along with UPS for Servicing.

## Warranty and AMC:

1. 3 years Warranty Period for UPS as well as Batteries.

2. Comprehensive AMC covering the batteries, after the expiry of warranty period for the configurations

(i) to (iv) given below.

**Important instructions:**

a) Separate quote is invited for each one of the following configurations:

(i) with built- in isolation transformer and 30 minutes back up time.

(ii) with built- in isolation transformer and one hour back up time.

(iii) with external isolation transformer and 30 minutes back up time.

(iv) with external isolation transformer and one hour back up time.

b) Batteries must be SMF type of following make:

Hitachi, Panasonic, Global Yuasa, Yuasa, Base or Rocket.

c) Quote should indicate the Model/Series Name and Model Number of UPS

# TECHNICAL SPECIFICATIONS

**15kVA UPS True On Line, Sine wave Output (3 ø i/p & 3 ø o/p)**

**Technology:**

PWM technology in True on-line operation, employing double conversion method using MOSFETs / IGBTs.

**Method of Inversion:**

Adaptive pulse width modulation or weighted pulse width modulation with high Frequency switching (>10 kHz for MOSFETs and >5kHz for IGBTs).

**Test Parameters:**

1. Input Voltage Range @ F.L : 415V ± 15%

2. Input Power Factor @ F.L : > 0.93

3. Input Frequency Variation : 50 Hz ± 5%

4. Total Energy storage capacity of Battery (in one string) @ F.L and @ Non-A/C environment

|  |  |
| --- | --- |
| Backup time | Watt Hr. required |
| 240 V Bus |
| For 30 min | > 15600 Watt Hr |
| For 60 min | > 24000 Watt Hr |

5 a. AC Output Voltage and steady state Regulation @ FL : 415V AC; < 1% (for balanced load)

< 2% (for 100% unbalanced load)

5 b. Phase displacement : < 1º (for balanced load)

< 2º (for 100% unbalanced load)

6. Transient Voltage Regulation at Step Load : < 5%

7. Maximum deliverable continuous Output Power : > 12000W

8. Output Frequency : 50 Hz 4% (Synchronous to mains)

50 Hz 0.5% (Free running)

9. Efficiency

(i) Battery mode : > 84%

(ii) Mains mode : > 89%

10. THD @ F.L : < 3% (for linear load);

< 5% (for nonlinear load)

11. Crest Factor @ F.L : > 3 : 1

12. Over Load Duration @ 110%, 125% and 150% of F.L : 5 min, 1 min and 2 sec respectively

13. Static bypass switch: Bi-directional with change over time less than 10 milliseconds in free running mode and instantaneous in synchronous mode from Inverter to Bypass and vice-versa.

14. Temperature and Humidity

(i) Operating Temperature Range : upto 40ºC

(ii) Humidity : upto 95% Rh

15. Noise level (at 1 meter) : < 45 dB

16. Conformance to Standards

(i) EMC Standards : IEC 801 - 2,3,4,5

(ii) Emission Standard : EN55022 Class B

(iii) Safety Standard : EN 50091-1

**Battery Charger Operation:**

Float-cum-boost charger with automatic boost/trickle charger modes with current limiting features. It’s characteristics shall be such as to match the float/ boost charging of the batteries as per battery characteristic, for battery life enhancement. High frequency chargers preferred.

**Protection Features:**

a) Isolation - Output shall be fully isolated from mains and with surge /spike suppressors incorporated.

b) Current limiting, over load and Short circuit protection.

c) Phase locking mechanism with mains frequency.

d) Over voltage / Under voltage protection.

e) All other protection systems as required for safety of the system.

**Other Features:**

1. Cold start feature under full load condition.

2. Standard hardware / software support for serial communication interface and SNMP / Web monitoring.

3. Auto shut down and energy saving features.

4. Temperature compensated battery charging for battery life enhancement.

3. Automated battery testing and advanced battery management features.

4. Sufficient ventilation and forced air cooling through fans.

5. Documentation/Manuals support for component level Servicing.

6. Serviceability at component level.

7. Spares and accessories deliverable along with UPS for Servicing.

## Warranty and AMC:

1. 3 years Warranty Period for UPS as well as Batteries.

2. Comprehensive AMC covering the batteries, after the expiry of warranty period for the configurations

(i) to (iv) given below.

**Important instructions:**

a) Separate quote is invited for each one of the following configurations:

(i) with built- in isolation transformer and 30 minutes back up time.

(ii) with built- in isolation transformer and one hour back up time.

(iii) with external isolation transformer and 30 minutes back up time.

(iv) with external isolation transformer and one hour back up time.

b) Batteries must be SMF type of following make:

Hitachi, Panasonic, Global Yuasa, Yuasa, Base or Rocket.

c) Quote should indicate the Model/Series Name and Model Number of UPS

# TECHNICAL SPECIFICATIONS

**20kVA UPS True On Line, Sine wave Output (3 ø i/p & 1 ø o/p)**

**Technology:**

PWM technology in True on-line operation, employing double conversion method using MOSFETs / IGBTs.

**Method of Inversion:**

Adaptive pulse width modulation or weighted pulse width modulation with high Frequency switching (>10 kHz for MOSFETs and >5kHz for IGBTs).

**Test Parameters:**

1. Input Voltage Range @ F.L : 415V ± 15%

2. Input Power Factor @ F.L : > 0.95

3. Input Frequency Variation : 50 Hz ± 5%

4. Total Energy storage capacity of Battery (in one string) @ F.L and @ Non-A/C environment

|  |  |
| --- | --- |
| Backup time | Watt Hr. required |
| 240 V Bus |
| For 30 min | > 15600 Watt Hr |
| For 60 min | > 24000 Watt Hr |

5. AC Output Voltage and steady state Regulation @ FL : 230V AC; better than ± 1%

6. Transient Voltage Regulation at Step Load : < 5%

7. Maximum deliverable continuous Output Power : >16000W

8. Output Frequency : 50 Hz 4% (Synchronous to mains)

50 Hz 0.5% (Free running)

9. Efficiency

(i) Battery mode : > 84%

(ii) Mains mode : > 89%

10. THD @ F.L : < 3% (for linear load);

< 5% (for nonlinear load)

11. Crest Factor @ F.L : > 3 : 1

12. Over Load Duration @ 110%, 125% and 150% of F.L : 5 min, 1 min and 2 sec respectively

13. Static bypass switch: Bi-directional with change over time less than 10 milliseconds in free running mode and instantaneous in synchronous mode from Inverter to Bypass and vice-versa.

14. Temperature and Humidity

(i) Operating Temperature Range : upto 40ºC

(ii) Humidity : upto 95% Rh

15. Noise level (at 1 meter) : < 45 dB

16. Conformance to Standards

(i) EMC Standards : IEC 801 - 2,3,4,5

(ii) Emission Standard : EN55022 Class B

(iii) Safety Standard : EN 50091-1

**Battery Charger Operation:**

Float-cum-boost charger with automatic boost/trickle charger modes with current limiting features. It’s characteristics shall be such as to match the float/ boost charging of the batteries as per battery characteristic, for battery life enhancement. High frequency chargers preferred.

**Protection Features:**

a) Isolation - Output shall be fully isolated from mains and with surge /spike suppressors incorporated.

b) Current limiting, over load and Short circuit protection.

c) Phase locking mechanism with mains frequency.

d) Over voltage / Under voltage protection.

e) All other protection systems as required for safety of the system.

**Other Features:**

1. Cold start feature under full load condition.

2. Standard hardware / software support for serial communication interface and SNMP / Web monitoring.

3. Auto shut down and energy saving features.

4. Temperature compensated battery charging for battery life enhancement.

3. Automated battery testing and advanced battery management features.

4. Sufficient ventilation and forced air cooling through fans.

5. Documentation/Manuals support for component level Servicing.

6. Serviceability at component level.

7. Spares and accessories deliverable along with UPS for Servicing.

## Warranty and AMC:

1. 3 years Warranty Period for UPS as well as Batteries.

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# TECHNICAL SPECIFICATIONS

**20kVA UPS True On Line, Sine wave Output (3 ø i/p & 3 ø o/p)**

**Technology:**

PWM technology in True on-line operation, employing double conversion method using MOSFETs / IGBTs.

**Method of Inversion:**

Adaptive pulse width modulation or weighted pulse width modulation with high Frequency switching (>10 kHz for MOSFETs and >5kHz for IGBTs).

**Test Parameters:**

1. Input Voltage Range @ F.L : 415V ± 15%

2. Input Power Factor @ F.L : > 0.95

3. Input Frequency Variation : 50 Hz ± 5%

4. Total Energy storage capacity of Battery (in one string) @ F.L and @ Non-A/C environment

|  |  |
| --- | --- |
| Backup time | Watt Hr. required |
| 240 V Bus |
| For 30 min | > 15600 Watt Hr |
| For 60 min | > 24000 Watt Hr |

5 a. AC Output Voltage and steady state Regulation @ FL : 415V AC; < 1% (for balanced load)

< 2% (for 100% unbalanced load)

5 b. Phase displacement : < 1º (for balanced load)

< 2º (for 100% unbalanced load)

6. Transient Voltage Regulation at Step Load : < 5%

7. Maximum deliverable continuous Output Power : > 16000W

8. Output Frequency : 50 Hz 4% (Synchronous to mains)

50 Hz 0.5% (Free running)

9. Efficiency

(i) Battery mode : > 84%

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# TECHNICAL SPECIFICATIONS

**30kVA UPS True On Line, Sine wave Output (3 ø i/p & 1 ø o/p)**

**Technology:**

PWM technology in True on-line operation, employing double conversion method using MOSFETs / IGBTs.

**Method of Inversion:**

Adaptive pulse width modulation or weighted pulse width modulation with high Frequency switching (>10 kHz for MOSFETs and >5kHz for IGBTs).

**Test Parameters:**

1. Input Voltage Range @ F.L : 415V ± 15%

2. Input Power Factor @ F.L : > 0.93

3. Input Frequency Variation : 50 Hz ± 5%

4. Total Energy storage capacity of Battery (in one string) @ F.L and @ Non-A/C environment

|  |  |
| --- | --- |
| Backup time | Watt Hr. required |
| 360 V Bus |
| For 30 min | > 28800 Watt Hr |
| For 60 min | > 46800 Watt Hr |

5. AC Output Voltage and steady state Regulation @ FL : 230V AC; better than ± 1%

6. Transient Voltage Regulation at Step Load : < 5%

7. Maximum deliverable continuous Output Power : > 24000W

8. Output Frequency : 50 Hz 4% (Synchronous to mains)

50 Hz 0.5% (Free running)

9. Efficiency

(i) Battery mode : > 84%

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**30kVA UPS True On Line, Sine wave Output (3 ø i/p & 3 ø o/p)**

**Technology:**

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**Method of Inversion:**

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