

SOTR FOR UPS AND BATTERY UNIT

1. SCOPE

This statement of requirement covers the design, manufacturing, testing and on-board commissioning of the UPS and Battery Units for onboard equipment. The design is to be catered for the most adverse of the environmental and electrical conditions. The equipment shall conform to specifications mentioned therein.

2. SCOPE OF SUPPLY

3/5KVA UPS with Battery Rack

3. INPUT SUPPLY VOLTAGE

The range of input supply available onboard is 230V, 50 Hz, 1 Phase with insulated Neutral (no neutral available onboard)

4. DESIGN AND FUNCTIONAL REQUIREMENTS

(a) **CAPACITY: 3 / 5 KVA** , 230V, 50 Hz, 1 Ph input supply / 230V, 50 Hz, 1 Ph, output supply , pure sine wave on line UPS. The discharge load will be 3/5 KVA for 30 minutes.

(b) **CONTROL AND MONITORING INDICATION** :Following control and indication requirements are to be provided:-

- (i) Suitable MCB – Incoming supply
- (ii) Suitable MCB - Outgoing supply
- (iii) Lamp indication-Incoming supply ON
 - Outgoing supply ON
 - Battery under charging
 - Battery charged
 - Battery down.

Any other indication recommended by OEM

(c) **MCB** – MCB shall be of current limiting type, type approved for naval use are to be used. Each MCB shall incorporate overload protection as per respective current range.

(d) **BATTERY TYPE** - Maintenance free Lead Acid batteries of reputed make only to be used.

(e) **BACK UP** : Battery back of 30 minutes duration is to be provided at full load.

5. **INTERNAL WIRING** : Only LFH (Low Fire Hazards) cables are to be used for internal wiring.

6. COMPONENTS/INSTRUMENTS

a) All components used shall be DQA(N) type approved for use on-board frigate class ships.

b) Miniature circuit breakers shall have adequate capacity to safely make/break the peak short circuit current.

- c) Provision for by-pass switch be provided to cater for main supply in case of failure of UPS
- d) Batteries are to be provided in separate rack
- e) Requirement of suitable protection against under recharge / over recharge of batteries to be provided

7. **GOVERNING SPECIFICATIONS**

UPS should be Design, manufacture and tested as per following governing specifications

- (a) NES- 501 - General Requirement for the design of Electro-technical Equipment's.
- (b) NES – 507 - Requirement for materials and finishes for Electro-technical Equipment.
- (c) NES - 723 - Tally plates and Design plates.
- (d) DGS - 251 - Painting (powder coating)
- (e) JSS - 55555 - Environmental tests methods for Electrical and Electronics Equipment's
- (f) MIL-461- E / F - EMI/EMC - Electromagnetic Compatibility.
- (g) DGS/EED/VI/1535/R6 - Cable Glands.

8. **CONSTRUCTION** :

- (a) **ENCLOSURE** : The UPS and Battery rack is to be fabricated from MS sheet (14 SWG) drip proof screen protection . The doors are to be provided with fasteners and door stoppers All bolts, nuts, washers, etc. used in the panels are to be cadmium plated to inhibit corrosion. Door is to be provided with EMI/EMC rubber gasket all round. Front door of panel to have mechanical locking arrangement when in open condition. Door opening knob of distribution panel to have proper mechanical stowage arrangement. Flash guard of Hylem sheet to be provided to cover MCBs and Bus bars completely. The UPS and battery rack are to be separate.
- (b) **ENCLOSURE PROTECTION** : IP-55
- (c) **VIBRATION STANDARD**: 5-33 HZ. (Conforming to specification JSS 55555).
- (d) **INSULATION**: F – Class or of high grading to be used.
- (e) **EMI/EMC REQUIREMENT**: The equipment shall meet EMI/EMC requirements
 - a. as per spec.MIL-STD-461E/F. The following EMI/EMC tests are to be conducted on UPS:- CE101, CE102, CS101,CS114,CS115, RE101,RE102 ,RS101 and RS102

- (f) **MOUNTING**: The UPS shall be suitable for bulkhead mounting on suitable shock mounts and battery rack deck mounted . The shock mounts shall be supplied along with the equipment. Internal rubber shock absorbers are to be used between plate containing MCB and Power Panel body.
- (g) **CABLE ENTRY GLANDS**: - Cable entry glands are of mild steel for body and naval brass for nut and their sizes shall conform to specification DGS/EED/VI/1535/R6 / NES 512 part 11 . These are to be supplied along with the main equipment for incoming and outgoing cables. Cable entry glands are to be fitted on detachable gland plate by the supplier. However gland nut shall be left undrilled.
- (h) **TERMINALS**:
- a. Bolted type terminals and crimping lugs of electrolytic copper are to be supplied for all incoming and outgoing cables.
 - b. All terminals should be easily and safely accessible for connection purpose and checking control voltage if needed.
 - c. Adequate space is to be provided inside the UPS Panel for bending and termination of incoming and outgoing cables.
- (i) **COMPONENTS, MATERIAL AND FINISH** :
- a. Contactors and all other components shall be type approved for use on-board frigate class ships.
 - b. The quality of material and nature of finish shall conform to specification NES-507.
 - c. Only LFH (Limited Fire Hazards) cables are to be used for internal wiring .
 - d. Standard specification and grade of the material of each component used to be indicated in the binding drawing.
- (j) **PAINTING** :- Powder coating - Admiralty Grey conforming to specification DGS-251.
- (k) **TYPE TESTING, TEST & TRIALS** : UPS and Battery Rack is to be submitted for Electrical type test, Environmental tests and EMI/EMC Test as detailed below. Type Test observations, if any, are to be carried out on balance UPS and Battery Rack.
- (l) **ELECTRICAL TYPE TEST**: Following Electrical type tests are to be carried out as specified in spec.NES-511 :-
- a. Withstand voltage test – (clause 0501 to 0511)
 - b. Insulation Resistance test – (clause 0519 to 0523)
 - c. Short circuit test
 - d. Temperature rise test
 - e. Thorough fault test
 - f. Any other test recommended by the supplier.
- (m) **ENVIRONMENTAL TESTS** :A list of limited environmental tests (which do not drive the equipment to yellow banding) required to be conducted as per JSS 55555 Requirements: