SPECIFICATION FOR THE SUPPLY, DELIVERY, INSTALLATION AND COMMISIONING OF 40KVA 1 HOUR BACK UP THREE PHASE UNITERRUPTIBLE POWER SUPPLY (UPS) SYSTEM

REVISIONS		
REV	DATE	APPROVED
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INDEX

1. SCOPE

This specification is for the supply, delivery, installation and commissioning of one 40kVA 1 hour back up three phase locally designed and manufactured uninterruptible power supply (UPS) system consisting of rectifier/charger, inverter, fully automatic static switch, manual bypass switch, batteries and remote alarm panel.

2. STANDARDS AND SPECIFICATION

2.1 The following standards and specifications are applicable and tenderers must ensure that all the UPS complies with the requirements laid down in such standards and specifications: -

S.A.B.S.	0111	:	Engineering drawings
S.A.B.S.	0142	:	Code of Practice for Wiring of Premises
S.A.B.S.	62040-1/2/3	:	Uninterruptible power systems
S.A.B.S.	1474-1988	:	Uninterruptible power systems

2.2 The maintenance work shall comply with the latest editions of the relevant South African Bureau of Standards or British Standards or International Electro technical Commission for Scientific and Industrial Research Publications and Reports.

2.3 Users of this specification must ensure that they are in possession of the latest issues of the above-mentioned standards

3. TECHNICAL INFORMATION REQUIRED

Tenderers shall complete a clause by clause statement of compliance with this specification and provide full technical specifications of the equipment offered Failure to comply with this requirement may preclude a tenderer from consideration.

4. ENVIRONMENTAL CONDITIONS

The UPS shall be rated for continuous operation under the following conditions :-

Altitude	:	-20 to 0 metres below sea level
Ambient temperature	:	0 deg.C to +40 deg.C
Relative humidity	:	As high as 95%
Lighting conditions	:	Severe with a maximum ground density of 11 flashes per square kilometre per annum
Exposure conditions	:	Salt laden industrial atmosphere damp.

5. DRAWINGS AND MANUALS

5.1 Certified drawings, instruction and maintenance manuals (3 sets) shall be supplied within 30 days of final product shipment from the tenderer factory. Final drawings shall be available in DXF format and AutoCAD 14 at no extra charge Documentation must be submitted in WORD97 or later format.

6. INFORMATION AND METHOD OF TENDERING

6.1 Tendering shall be in accordance with Protekon (PTY) LTD Tender Form.

6.2 Tenderers shall submit their main offers in accordance with the requirements of this specification. Deviations from the requirements of this specification, which are of a minor nature and do not depart materially, will be considered at the discretion of Protekon (PTY) LTD. The acceptance of alternative tenders will be considered only if a main tender is submitted as part of the tender document.

6.3 All documents forming part of the tender shall be firmly bound. No loose documents will be considered. Failure to comply with the above requirements may preclude a tender from consideration.

6.4 All tender documents shall be presented in a clear format with index, uniquely numbered pages and cross-referenced. The total number of pages shall be clearly stated in the index.

6.5 Type test reports/certificates shall be issued or certified by the SABS or other test authority recognised by the SABS. This recognition shall accompany the tender. Failure to comply with the above requirements may preclude a tender from consideration

7. TECHNICAL REQUIREMENTS

Input:

Voltage	-	400V Three Phase 4-wire
Voltage Variation	-	+10%-15%
Frequency	-	50Hz
Freq. Variation	-	$\pm$5%

Output:

Voltage	-	400V Three Phase 4-wire
Regulation	-	$\pm$1% (Steady state no load to full load)
	-	$\pm$5% (Dynamic with 100% load application)
Frequency	-	50Hz
	-	$\pm$0.05% (Free Running)

	-	±2% (Synchronized to mains)
Waveform	-	Sinusoidal
THD	-	3% with Linear Load
Overload Capability	-	150% for 10 seconds
Crest factor ratio	-	3:1
Efficiency (input to Output)	-	89%
Noise Level (at 1 metre)	-	Less than 50 dBA up to 40kVA
Fault Indications	-	By means of internal buzzer and LED Indications on front panel

8. SERVICES AND RESPONSIBILITY FOR WORK

8.1 Builders work such as, cutting of holes for cabling installing cable ladder etc. shall be carried out by the Contractor. Protekon (PTY) LTD will only be responsible for structural alterations if required.

8.2 The tenderer shall be responsible for the complete installation of the UPS together with relevant electrical controls, power circuitry and interconnecting cables. All materials used, and workmanship, shall be of the highest quality, and carried out to the full satisfaction of Protekon (PTY) LTD.

8.3 The tenderer shall be responsible the rigging and positioning of the UPS into the building.

8.4 The tenderer must exercise care so as to not damage the UPS and the building when rigging into position and during transportation.

9. DETAIL TECHNICAL REQUIREMENTS

a. AC-to-DC Battery Charger/Rectifier

i. The AC-to-DC battery charger/rectifier shall be designed to convert the incoming primary Ac power to regulated filtered DC power which shall supply the battery under all mains conditions specified in clause 4

ii. The charger shall provide sufficient current to charge the batteries at the C/10 rate for all input mains conditions up to –15% of nominal input voltage

iii. The battery shall be kept in a fully charged state i.e. continuously floating across the charger.

iv. Battery ripple current shall be no more than 7% of the 3 hour ampere/hour rating of battery.

b. Standby Batteries

i. The batteries shall be of the lead acid maintenance free type providing a standby time of 60 **minutes** for the 20kVA
ii. Battery times are for the full load rating of the specified unit.
iii. Batteries are to be housed in steel, epoxy coated enclosures matching to the UPS.
iv. Expected battery life of the batteries offered must be specified.

c. DC-to-AC Inverter

i. The DC-to-AC Inverter (hereafter referred to as the inverter) shall be designed to convert the DC supply from the rectifier or the battery specified in 5.2 to an AC Output supply as specified under paragraph 4.
ii. The inverter shall maintain a high conversion efficiency at the rated load.
iii. The inverter DC cut-off shall be no less than 1.67 volts/cell

d. Protection

i. The UPS shall have surge protection fitted. Tenderers shall state what protection is fitted.
ii. The AC input shall be protected by a circuit breaker on the following input circuitry:
Reserve (static switch) input
Rectifier/Charger input
iii. The battery/rectifier shall be protected by a fuse or circuit breaker from inverter fault currents.
iv. The inverter shall be protected by electronic current limiting.

e. Static Switch

i. The UPS shall have a static switch rated to supply the full load continuously.
ii. The static switch must be capable of supplying 1000% for 5 cycles in order to clear any type of load fault.
iii. If the inverter output becomes unavailable or goes out of tolerance, the static switch must transfer the load to mains without interruption. The static switch should automatically retransfer the load back to the inverter if the voltage returns to within tolerance.
iv. The automatic transfer to the mains must be inhibited if the mains are not within a specified tolerance of nominal (normally $\pm$15%) or if the inverter output and mains are not in phase.

f. Indications, Controls and Alarms

The unit should be equipped with a Mimic Panel with LED Status indications of:

- ***** Mains power
- ***** Rectifier status
- ***** DC link status
- * Inverter status
- * Static switch condition
- * Reserve supply
- * Output switch position
- * Battery switch position
- * Bypass switch position

The unit shall include a LCD display with the following features:

- * True RMS phase voltages, line voltages and currents of mains input, reserve supply and UPS output
- * All DC parameters
- * Unique customer configurable identifier
- * Real time clock
- * Active alarm indication
- * Comprehensive password protection
- * Interactive keypad, allowing UPS control and easy scrolling through menus
- * One thousand event log file (only accessible through the serial port)
- * Audible alarm
- * Full networking features (using UPS Interfacing software and a SNMP UPS network adapter)
- * Remote alarm panel (optional)
- * Software configurable alarm relays
- * Full serial and modem communication capability
- * Remote monitoring of UPS service history and alarms, via dail-out facility (optional, with modem)
- * Monitoring by dial in software (optional, requires modem and a direct dedicated telephone line)

10. QUALITY ASSURANCE

10.1 All inspection and testing procedures shall be developed and controlled under the guidelines of the seller's quality system. This system must be registered to ISO 9001 which is regularly reviewed and audited by a third party registrar.

10.2 All incoming material shall be inspected and/or tested for conformance to

quality assurance specifications.

10.3 All sub-assemblies shall be inspected and/or tested for conformance to vendor's engineering and quality assurance specifications.

11. TESTS TO BE PREFORMED

11.1 Functional checks shall be performed on site.

11.2 A "HI-POT" dielectric withstand test shall be performed on all busbar work and cables from phase to phase and phase to ground. The voltage level used for this test depends on the product's nominal AC voltage.

11.3 Component devices shall be functionally operated in circuits as shown on electrical diagrams or as called for by specific test instructions.

11.4 Instruments, meters, protective devices and associated controls shall be functionally tested.

11.5 Warning plates, isolation barriers, and mechanical interlocks must provide sufficient safety/isolation for personnel and equipment.

11.6 Warning labels and nameplates must be present, legible and clearly visible to advise personnel of all possible hazards.

11.7 Isolation barriers must be in place to protect personnel from touching live medium voltage components in an area that otherwise does not have power supplied to it.

11.8 Operation of mechanical and electrical interlocks will be tested on site after installation of the unit.

12. COMMISSIONING AND ACCEPTANCE

12.1 After completion, the whole installation will be inspected by Protekon (PTY) LTD and commissioned By the Contractor.

12.2 The Contractor shall make good to the satisfaction of Protekon (PTY) LTD, any deficiencies, which may arise during inspection and commissioning.

12.3 Only after the whole of the installation has been tested and commissioned by the Contractor, and passed as satisfactory by Protekon (PTY) LTD, will it be accepted by Protekon (PTY) LTD.

13. GUARANTEE AND MAINTENANCE

13.1 The successful tenderer will be required to guarantee and maintain the complete installation (as called for in this project specification) for a period of 12 months after date of acceptance of the installation by Protekon (PTY) LTD.

13.2 The tenderer shall make good any defects, due to inferior material and workmanship, which may arise during the maintenance period.

14. SPARE PARTS

14.1 Recommended spare parts list and prices shall be supplied with the tenderers bid. Also, the address of the manufacturer's closest parts stocking location in South Africa and a required spares list.

15. ADDITIONAL INFORMATION

The tenderer shall supply the following additional information:

- Availability and value of Spares Holding
- Backup Support Provided (Service Centres, Technicians etc)
- Warranty Details (12 Month on-site warranty required)
- Maintenance Contracts Available
- Full broshures/specifications of the UPS and Batteries offered.
- All other details to support the offer