

# **ANNEXURE A**

## **TECHNICAL SPECIFICATIONS**

**SPECIFICATIONS**

## **STANDARD TECHNICAL SPECIFICATION: LV-013/1**

### **D C SUPPLY / BATTERY CHARGER**

#### **1. GENERAL INFORMATION**

This specification is for a 110/30 Volt DC supply unit for use with indoor switchgear, complete with batteries and battery charger.

##### **1.1 Supply information**

Supply voltage	:	230 Volt - 1 phase & Neutral
Frequency	:	50 Hz

##### **1.2 Service conditions**

Maximum temperature	:	40 ° C
Altitude	:	1200 m above sea level
Lightning conditions	:	Severe

##### **1.3 Standards**

NRS - 026:1993

#### **2. BATTERY CHARGER**

2.1 A microprocessor-based system for supervision and control of the charger shall be provided.

2.2 The LCD display shall be mounted on a waterproof tactile keyboard.

2.3 The system shall monitor battery DC voltages and currents, load DC voltages and currents and the input AC voltage.

2.4 The system shall record functions such as automatic boost, load tests and other events such as alarms, and adjustments made.

2.5 The system shall perform regular automatic load test of the battery circuit.

2.6 No incandescent type lamps are to be provided. LED's shall be used to display any alarm conditions and to indicate "float" or "boost" conditions.

2.7 The rating plate must be attached to the front panel.

#### **3. ALARM - GUIDELINES**

3.1 The equipment shall provide visual indication of the occurrence of an alarm and description of the fault.

3.2 For remote indication of an alarm two potential free contacts must be provided which are logic configured to indicate URGENT and NON-URGENT alarms.

3.3 The following alarms shall be provided:

- A. Earth fault. This alarm shall operate on a calibrated resistance to earth and shall be identified as a positive or negative fault.
- B. Mains fail. Identifying the absence of AC main supply. This alarm must be provided with a delay after restoration of AC main supply to prevent undue surges.
- C. Auto battery test fail. Indicating that the battery circuit or the test circuit has failed the self-test.
- D. Charger fails. Indicating that no current is flowing from the charger when the batteries are below float voltage.
- E. Undervoltage. Indicating that the battery circuit is below the minimum voltage.
- F. Overvoltage. Indicating that the charger has gone above the set voltage.

#### 4. **ADJUSTMENTS**

4.1 Voltages, currents, time delays, alarm settings and timers shall be adjustable from the front keyboard. These adjustment options must be protected by a password to prevent unauthorized changes.

#### 5. **CUBICLE**

5.1 **METALWORK.** Whether the charger is contained in an integral charger/battery unit or in a single cabinet, the cubicle shall be made from 1,6 mm mild steel sheet bent and welded to form a rigid and steady unit. If an integral cabinet is specified, the enclosure shall be accessible through two doors, and it shall provide separate compartments for the charger and the batteries. Adequate ventilation by convection for both compartments shall be provided.

If the charger is supplied separately from the battery storage cabin, the batteries shall be stored in a separate metal clad cabinet. The cubicle shall be manufactured to successfully host all the batteries for a 110Volt unit, with easy access for maintenance.

5.2 **PAINTWORK.** The metalwork shall be rust proofed and epoxy power coated.

#### 6. **BATTERY BANK**

6.1 The batteries shall be Nickel Cadmuim - submit Specifications

6.2 The batteries will have guaranteed leak proof poles with brass inserts. Connectors shall be solid copper, insulated bolts on type with stainless steel screws supplied.

- 6.4 The batteries shall be maintenance free according to DIN standards for 5 years in standby parallel operation.
- 6.5 The battery vent plugs shall be equipped with anti-flashback flame arrestors.
- 6.6 The batteries shall be suitable for operation at 0 to 55 degrees centigrade.
- 6.7 The battery capacity shall be respectively 17 Ah / 27 Ah / 29 Ah according to DIN 40734 standard.
- 6.8 The manufacturers specified float voltage shall be not more than 2.23 volts per cell to reach and maintain full capacity, with no boost, equalization, freshening or finishing charges recommended or required.
- 6.9 The batteries shall be similar or equal to the HBL and ALCAD range. Full details of construction and performance to be submitted with tender.

7. **GENERAL**

- 7.1 A reference list with contact person shall be supplied with tender documents.
- 7.2 Supply full details regarding service centers and guarantees.

8. **DOCUMENTATION**

Supply two (2) complete sets of instruction manuals with detailed description of the microprocessor controller operation, installation and commissioning instructions and with electronic and power schematic diagrams of the analogue cards and the charger.

END OF SPECIFICATION 1

## **STANDARD TECHNICAL SPECIFICATION: LV-013/1**

### **D C SUPPLY / BATTERY CHARGER**

#### **GUIDELINES**

#### **110V -10 A Single Battery Charger**

##### **Scope**

This Specification is for a single battery charger suitable for charging batteries from a nominal 400/230 V 50 Hz alternating current supply suitable for use in the Primary, secondary and satellite substations.

##### **Standards**

**SANS 1652: 2004     Battery chargers – industrial type**

##### **Requirements**

The battery charger shall comply with the requirements of SANS 1652 and this specification. Completion of Schedule B is compulsory.

**1. The battery charger shall provide DC power for a 15 panel MV (11 kV) switchboard having the following functions:**

- a) Relay energizing
- b) Alarm and charger mode indication signaling
- c) Operation of trip coil and contractors
- d) Operation of close coils and contactors
- e) Control circuits supply and interlocking circuits
- f) Supervision and control of protection circuits
- g) Operation of 11 kV switchgear motor-driven isolators

**1. The battery charger shall provide DC power for a 15 panel MV switchboard having the following functions:**

- h) Operation of emergency lights
- i) Stand-by duties such as emergency operation of solenoid-operated

**2. The battery charger shall have the following control and supervisory functions:**

- a) Load control
- b) Charger boost control via SCADA and local controls

- c) Alarm systems
- d) Indication of DC and AC voltages and current
- e) Continual battery monitoring after power failure
- f) Automatic calculation of Ah capacity
- g) Control two parallel chargers and loads and
- h) Charger protection

3. The battery charger shall be provided with the following alarm features:

- a) Charger-fail alarm. The alarm contacts shall be marked: "Charger fail alarm 1" and "Charger fails alarm 2".
- b) Charger low battery voltage. The alarm contacts shall be marked: "Low volt alarm 1" and "Low volt alarm 2".
- c) Charger earth fault alarm. The alarm contacts shall be marked: "Earth fault 1" and "Earth fault 2".

Supervisory and control

The following telecontrol functions are required:

### **1. Alarms**

- a) DC Fail
- b) Low DC Volts
- c) High DC Volts
- d) AC fail
- e) DC Earth Fault
- f) Battery Loss

### **2. Indications**

- a) Charger on float
- b) Transducer Output (volts)
- c) Transducer Output (current)

### **3. Control**

- a) Boost Charge (On / Off)

### **Tests**

Testing requirements are to be performed in accordance with the specification listed in Standards.

Copies of type test performed by a SANS accredited testing facility must be submitted with the tender.

**Marking, labeling and packaging:** required in accordance with the SANS 1654 specification.

**Documentation:** required in accordance with the SANS 1652 specific

**The battery charger shall provide DC power for a 15 panel MV (11 kV) switchboard**

**110V Ni-Cad batteries: according to SANS 1632-2**

Schedule A: Purchaser's specific requirements

Item	DESCRIPTION	UNIT	Schedule A
	<b>Requirements</b>		
4.1.1	Detail of cells/battery offered		
	a) Battery manufacturer?		x
	b) Country of manufacture?		X
	c) Make type/model number of cell?		X
	d) Guarantee period of battery offered?		
	e) Life expectancy of battery?		X
	Number of cells in battery		X
4.1.2	Method used to indicate electrolyte level?		X
4.1.3	Grade of battery water recommended?		X
4.1.4	Volume of electrolyte reserve per cell?	Litres	X
4.2.1	Duty cycle	Hours	8
	System particulars		
	a) Normal load current	A	12 MV Switches
	b) nominal voltage	V	110
	c) Float voltage per battery?	V	X
	d) operating power/capacity	A.h	As specified
	e) type of charger-constant voltage		Yes
4.2.1.4	f) Minimum permissible operating voltage?	V	102
4.2.1	Rated battery capacity Crt offered at:		
	a) Applicable discharge time?	A.h	X
	b) Applicable reference electrolyte temp?	Deg C	X
	c) Applicable end-of-discharge voltage?	V	X
4.2.1.5	Calculations to support battery sizing?		X
4.2.5.1	Value of short-circuit current?	A	X
4.2.2	Relative density of electrolyte for charged new battery?		X
	Voltage per cell in fully charged state?	Vx	
	For floating battery operation		
	a) Limit of electrolyte relative density?		X
	b) Limits of individual cell voltage		X
4.2.2	Recommended frequency of equalizing charges?	Hours	X
4.2.3	Expected life of battery	Years	X
	End-of-life capacity	Ah	
	Capacity deterioration with age	% / Year	
4.2.6.1	Effects of maximum ripple current on battery life?		x

Compulsory to submit with tender document

### **Battery Specification Brochures and Maintenance instruction manuals**

Supply two (2) complete sets of instruction manuals with detailed description of the **Maintenance procedure**, installation and commissioning instructions.

SIGNATURE OF TENDERER: .....

**110V DC BATTERIES**

Schedule A: Purchaser's specific requirements 1

Item	DESCRIPTION	UNIT	Schedule A
	<b>Requirements</b>		
4.2.7	Cell type and construction		
	Material of which jar or container is made?		X
	Overall dimensions of container		
	Height?	mm	X
	Width?	mm	X
	Depth?	mm	X
	Total mass of cell complete with electrolyte?	kg	X
	Battery voltage when fully charged	V	X
	Battery voltage at 25 Deg C on 8-hour discharge at rated 8-hour current?	V	X
	Battery operating voltages:		
	1) Discharged?	V	X
	2) Normal float?	V	X
	3) Boost charge?	V	X
	Internal resistance of battery at 25C when fully charged (new condition):		
	Per cell?	ohms	X
	Complete battery	ohms	X
	Ampere-hour efficiency of new battery?	%	-
	Watt-hour efficiency of new battery?	%	X
	Maximum recommended charging current?	A	X
	Trickle charge to keep battery charged?	A	X
4.3	Are battery stands required		Yes
	Stands to be located in:		Battery room
	Detail of stand offered?		X
5 and 6.3.2.1 (d)	Type test results to be included in the tender and required for:		
	a) Capacity test?		X
	b) Suitable for floating battery operation?		X
	c) Endurance cycle discharge test?		X
	d) Charge retention test?		X
	e) Short-circuit current test?		X
	f) Internal resistance test?		X

Compulsory to submit with tender document

**Battery Specification Brochures and Maintenance instruction manuals**

Supply two (2) complete sets of instruction manuals with detailed description of the **Maintenance procedure**, installation and commissioning instructions.

SIGNATURE OF TENDERER: .....

## 110V DC BATTERIES

Schedule A: Purchaser's specific requirements 2

Item	DESCRIPTION	UNIT	Schedule A
	<b>Requirements</b>		
5 (D)	Tests required to be performed as acceptance test?		Capacity test
6.2.2	Inspection required after delivery		Yes
6.2.3	List of maintenance equipment and tools recommended?		X
	List of maintenance equipment and tools supplied		
	Inter-cell connections		Yes
	Instruction card		Yes
	<b>Maintenance/instruction manuals</b>		Yes
	Hydrometer		Yes
	Cell voltmeter		Yes
	Electrolyte test tube		Yes
	Cell bridging connector		Yes
	In what condition is battery to be supplied?		Fully charged?
	Recommended maintenance program?		X
6.3.2.1	<b>Quantity of maintenance/Instruction manuals</b>		2
6.3.1	Recommendations for battery room?		X

Compulsory to submit with tender document

### Battery Specification Brochures and Maintenance instruction manuals

Supply two (2) complete sets of instruction manuals with detailed description of the **Maintenance procedure**, installation and commissioning instructions.

SIGNATURE OF TENDERER: .....

## 110V DC BATTERIES

Schedule A: Purchaser's specific requirements

Item	DESCRIPTION	UNIT	Schedule A
	<b>Requirements</b>		
1.2	Service conditions		
4.1.1	AC supply:		
	Number of phases		Three or single-phase
	Nominal AC supply voltage	V	400/230
	Nominal system frequency	Hz	50
4.1.1.4	Earthing of ac input		Solid earthing
4.1.2.1	Charger input protection		OC & EF
4.1.3.4	Input supply disconnected device		Isolator
4.2.1.1	Battery output requirements		Ni-cad, Table 2
4.2.1.2	Type of battery		Ni-cad
	Number of cells		As specified
	Ampere-hour capacity	A	As specified
	Maximum output voltage	V	132.0
	Minimum output voltage	V	101.75
	Output voltage setting at full load	V	117
4.2.2	Output voltage adjustment		Automatic
4.2.4	Charger to operate in parallel		No
4.2.8.2	Rated output current of charger?	A	X
	Max current for float charge?	A	X
	Max current for boost charge?	A	X
	Max current for equalizing charge?	A	X
	Max current for initial charge?	A	X
4.2.10	d.c. earthing system		Insulated earth
4.3.5	Method of indicating abnormal conditions		Visual and audible, as well as telecom requirements
4.3.7	Test facility for LED		Yes
4.3.8	Alarm indicators to remain on till manually reset		Yes
4.3.9	Audible alarm requirements		Charger fail Low volt alarm Earth-fault alarm
4.3.10	Type of alarm display offered?		X
4.3.11	Number of alarm aux contacts required		One

Compulsory to submit with tender document

### Battery Specification Brochures and Maintenance instruction manuals

Supply two (2) complete sets of instruction manuals with detailed description of the **Maintenance procedure**, installation and commissioning instructions.

SIGNATURE OF TENDERER: .....

**Note: ALL batteries shall be hosted in a metal cabinet apert from the charger.**

## BATTERY CHARGERS

Schedule A: Purchaser's specific requirements

Item	DESCRIPTION	UNIT	Schedule A
	<b>Requirements</b>		
4.3.13	Supervisory alarms, indications and control required for local and SCADA		Alarm and indication: Charger output failure Low DC voltage High DC voltage AC alarm DC earth fault Battery loss Charger on float Charger on boost
4.3.13	Type of instruments required		Input ac voltmeter Input ac ammeter Output dc voltmeter Output dc ammeter
4.4.1.2	Transformers: electrostatic screen required		Yes
4.4.6	Maximum noise level	db	SANS 0103
4.5.1.1	Enclosure type:		Floor mounted
4.5.1.3	Access for cable		Side entry
4.5.1.3	Access for maintenance		Front
4.5.1.6	Forced ventilation		No
4.5.1.7	Method of handling		X
4.5.4.3	Type of connectors offered		X
4.5.4.4	Conductor size ac input	A	X
	Conductor size dc output	A	X
4.5.7.4	Detail of gland plates on drawing?		X
4.5.9.1	Standard for kiosk?		X
4.5.9.2	Quality system?		X
4.6.2.1	Fault level of input:		5kA
4.6.2.3	Reverse connection protection?		X
4.7	Abnormal service conditions: altitude	M	<1800
4.9.4	Type of paint/coating offered?		X
4.9.5.1	Color of external surface		Specify
4.9.5.2	Color of internal surface?		X
4.10.2	Availability of spares?		X
5	Test certificates: type- and routine test certificates submitted with tender		Required
5.7.1	Guaranteed power efficiency?		X
6.2.1	Method of attaching labels?		X
6.4.1	Instruction labels required		Yes
6.4.2	Purchaser ID required		Yes
6.5	Required number of copies of documentation		One

Compulsory to submit with tender document

**Battery Charger (110Volt Tripping Unit) Specification Brochures and Maintenance instruction manuals**

Supply two (2) complete sets of instruction manuals with detailed description of the battery Tripping unit's microprocessor controller operation, installation and commissioning instructions and with electronic and power schematic diagrams of the analogue cards and the charger.

Supply two (2) complete sets of instruction manuals with detailed description of the **Maintenance procedure**

Test certificates: type- and routine test certificates submitted with tender

END OF SPECIFICATION 2

## **COMPULSORY NOTES AND INFORMATION ON SPECIFICATIONS AND MATERIAL OFFERS**

### 10 MANUALS

- 10.1 All equipment must be supplied with instruction manuals which must be detailed enough to enable the electricity supply authority staff to install, maintain, test, configure and use each item of equipment.
- 10.2 Drawings which are required to test, configure, maintain or use the equipment must be contained in the instruction manuals as per clause 12. The equipment must comply with SANS.

### 11 TRAINING

Training must be provided free of charge, by the supplier of the traffic signal equipment, at a venue provided by the electricity supply authority. A comprehensive schedule of the training, which will be provided, must be submitted with the bid documents. This training must cover at least the following if applicable:

- 1. the installation procedure of the equipment
- 2. the operation of the equipment specially data based
- 3. The installation and operation of the software, typical application of the software in the programming of the controllers for use in the specific electricity supply authority.

### 12 TECHNICAL DATA AND DRAWINGS

It is compulsory that full technical data and dimensional drawings must be included in the tender documents of all material offered. Items offered must also be clearly marked in the data sheets.

### 13 WARRANTY

The equipment offered shall be warranted free from defects in workmanship and materials for a period of at least twelve (12) months from date of final commissioning or delivery. Any failures shall be repaired or replaced at the bidder's expense during the 12 months warranty period.

### 14 CERTIFICATES

Bidders must submit Eskom SANS, BS and IEC certificates of the equipment offered.

### 15 GENERAL

Only new manufactured equipment will be accepted.

## 16 SUPPLIERS

If the bidder is not the manufacturer, it is the responsibility of the bidder to ensure that he has a credit agreement as well as a after sales agreement with his supplier (Company) from which he will be sourcing the product.

## 17 AFTER SALE SERVICE

The bidder shall supply all details regarding their after-sale service on the equipment offered.

## 18 SAMPLES

No Samples are required. Delivery of substandard material or equipment will result in no approval of payment and the return of the product offered. The Bid Evaluation committee might require samples from the shortlisted bidders for technical evaluation before recommendation.

## 19 ALTERNATIVE OFFERS

No Alternative offers on specifications of material will be considered.

## 20 LOCAL CONTENT

Local Content on material or products will be in accordance with the Department Trade and Industry where applicable.

No imported product will be excepted unless no manufacturing company exists in South Africa.

Local content does not refer the base address in area of jurisdiction of suppliers

## 21 PRICE ESCALATION CLAUSE

The tender appointment prices shall be the ordering prices after adjudication and Contract Price Adjustment shall be clearly defined such as SEIFSA indices, CPI, ROE, Foreign Currency Components such as rates on which tender is based, Custom duties percentage, forward cover and the relevant clauses must find expression in the tender submitted.

SEIFSA indices, CPI, ROE, Foreign Currency Components such as rates on which tender is based, Custom duties percentage, forward cover and the relevant clauses shall be included then in the Service level agreement when adjudication is successful.

All quantities will be verified after adjudication, Quantities may differ after adjudication on purchase orders.

## 22 CANCELTATION CLAUSE

The delivery of substandard material or equipment or refrain from supplying it within the required timeframe will result in cancelation of the contract and the second highest scorer will be appointed.

## 23 COLOUR OF BATTERY CHARGERS AND BETERY KIOSKS

The Battery Chargers must be light grey or stone

**END OF SPECIFICATION**