

JOHANNESBURG WATER (SOC) Ltd.
BULK WASTEWATER
PARTICULAR SPECIFICATION
E24 : ELECTRICAL BATTERY TRIPPING
UNIT



Johannesburg Water (SOC) Ltd.
PO Box 61542
Marshalltown
2107




DOCUMENT CONTROL SHEET

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Prepared	Senior Electrical Engineer	B Pieterse	August 2019	
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PARTICULAR SPECIFICATION: VOLUME E20: ELECTRICAL BATTERY TRIPPING UNIT

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E24.1 SCOPE

This section covers the design, manufacture, test, pack and deliver, install and commissioning requirements for a Battery Tripping Unit (BTU) to be used in conjunction with MV switchgear.

E24.2 STANDARDS AND SPECIFICATIONS

E24.2.1 Particular standards to be read in conjunction with this specification

The latest edition, including all amendments up to date of tender of the following particular national specifications, publications and codes of practice shall be read in conjunction with this specification and shall be deemed to form part thereof:

- 1) SANS 60146 : Semiconductor converters.
- 2) SANS 1652 : Battery chargers - Industrial type.
- 3) SANS 60896-22 : Stationary lead-acid batteries Part 22: Valve regulated types - Requirements
- 4) SANS 62485 : Safety requirements for secondary batteries and battery installations
- 5) SANS 60076 : Power transformers.
- 6) SANS 60529 : Degrees of protection provided by enclosures (IP code).
- 7) SANS 60947-2 : Low-voltage Switchgear and Control gear Part 2 Circuit breakers
- 8) SANS 1091 : National colour standard.

E24.2.2 Particular specifications to be read in conjunction with this specification

This specification shall be read in conjunction with the latest edition the following specifications:

- 1) G01 : PARTICULAR SPECIFICATION FOR COLOUR CODES.
- 2) G02 : PARTICULAR SPECIFICATION FOR CORROSION PROTECTION.
- 3) E08 : WIRING

E24.3 GENERAL REQUIREMENTS

- 1) The BTU will be an indoor, free standing, floor-mounted unit;
- 2) The BTU will be a naturally air-cooled, designed for continuous operation in the specified ambient temperature. Ventilation louvers shall be installed in the in the casing;
- 3) The BTU shall be housed in mechanically reinforced sheet steel cubical. The thickness of sheet steel shall be 2.0 mm for load bearing members and 1.6 mm for other sides;
- 4) The cubical shall be dust and vermin proof;
- 5) The degree of protection will be IP42;
- 6) All doors on the cubical shall be hinged and shall have a locking agreement;
- 7) All door mounted parts/items as well as parts/items mounted inside the cabinet shall be provided with individual labels with their designation engraved;
- 8) A cable gland plate shall be provided for incoming / outgoing cables;
- 9) Electrical indicating instruments shall be mounted flush on the door with only the flange projecting. The instrument dial shall be white with black numbers and lettering;
- 10) The BTU will be complete with internal wiring, including input and output terminals. The components shall be liberally sated. Standard colour code practice shall be followed, with the use of ferrules for numbering and identification of wires. Copper conductor of suitable size shall be used;
- 11) Each cubicle will undergo a through process of derusting cleaning, application of red oxide

primer paint followed by two coats of BS 631 Light Grey synthetic enamel paint.

E24.4 BTU PARAMETERS

If not otherwise stated in the specific specification, the BTU will be specified as follow:

E24.4.1 Rating

The charger shall be provided with load limiting feature for protection against overload.

- 1) Permanent Load : 4A
- 2) Ripple Content : 1% or lower
- 3) Battery : Ni-Cad (22Ah)

E24.4.2 Incoming supply

The BTU shall be protected against voltage surges by voltage suppressor devices.

- 1) Input Voltage : 110, 230, 260 VAC Single phase
- 2) Frequency : 45 to 65 Hz
- 3) Maximum Supply Demand : 250VA

E24.4.3 Duty

The BTU shall employ two battery-charging states i.e. Float charge and the Boost charge.

- 1) The Float mode of the charger shall be fully automatic type during operation on auto mode. However, necessary provision of manual operation control shall also be provided in addition to auto control with required auto/manual selector switch etc. in the event of failure of auto control. The Float charge shall supply the DC load of the substation and trickle charge the batteries up to full capacity. For this condition, the float charge mode shall be designed to float charge the batteries and supply DC load of the substation at constant voltage.
- 2) When the AC supply fails, the batteries will supply the substation DC load and will discharge gradually. The batteries will be charged in the Boost mode. Boost mode shall have adequate rating to quick charge the battery fully within 10 hours after an AC failure. While boost charging the batteries, the charger will also supply the DC load of the substation.

E24.4.4 Output

Suitable ripple filtering circuits shall be provided to give a smooth DC output. The DC output shall be free from switching surges, transients etc.

- 1) Steady State Output Voltage : 34.08V
- 2) Steady State Output Current : 5A (current limit)
- 3) Ripple Content : 1% or lower

E24.5 GENERAL PROVISION

- 1) AC input ON/OFF main switch (double pole);
- 2) Neon indicating lamp for AC supply 'ON' indication (After main AC fuse).
- 3) Double wound impregnated naturally air cooled single phase transformer with taps at 110V, 230V and 360V on primary side;
- 4) Full wave half controlled rectifier bridge comprising of silicon diodes and silicon controlled rectifiers (SCR) with R/C surge suppressor network;
- 5) Ammeter for measuring DC output current of charger;

- 6) Auto/ manual mode selector switch;
- 7) Battery test function;
- 8) Volt meter for measuring DC output voltage (battery voltage);
- 9) DC output ON/OFF switch;

E24.6 PROTECTION AND ANNUNCIATION:

Following protection with LED alarm indicating lamp and a NO/NC potential free contact shall be included.

- 1) Float charging;
- 2) Boost charging;
- 3) Charge Failed;
- 4) Battery Volts Low.

E24.7 DOCUMENTATION AND DRAWINGS

Necessary product information, booklets, drawings circuit diagram operating and maintenance manuals, etc. should be submitted. One set of each of detailed dimensional drawings, commissioning and operating instructions manual, literature, write up and test certificates of bought out items shall be supplied with the each BTU.

E24.8 ACCEPTANCE / ROUTINE TESTS

The following test shall be carried out by the manufacturer on each BTU prior to delivery

1. Visual inspection and dimensions;
2. Checking of wiring and continuity of circuits;
3. Ripple content measurement;
4. No load test;
5. Load test;
6. Operational tests for protection, alarm, indication;
7. Auto/Manual operation test.

E24.9 MEASUREMENT AND PAYMENT

<u>Item</u>	<u>Unit</u>
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Supply and delivery of Battery Tripping Unit.....	No
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The unit of measure shall be the number of BTU's supplied and delivered.

The tendered rate shall include all costs related to the manufacture, supply and delivery of the BTU's (as detailed in the schedule of quantities), including additional requirements detailed in the detail specification.

Separate items will be scheduled in the schedule of quantities for different types and sizes, defined by the Ah rating of the BTU's.

<u>Item</u>	<u>Unit</u>
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Install BTU's	No
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The unit of measure shall be the number of BTU's installed.

The tendered rate shall include full compensation for installing, testing and commissioning of the BTU's as specified.

Separate items will be scheduled in the schedule of quantities for different types and sizes, defined by the Ah rating of the BTU's.