



Eskom

Standard

Technology

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BOXES FOR SUBSTATIONS**

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1. Introduction

This document specifies Eskom's requirements for indoor and outdoor AC Distribution Boards used in Transmission, and outdoor Junctions Boxes used in Transmission and Distribution substations.

2. Supporting clauses

2.1 Scope

This document details the manufacturing of the following equipment;

- JB 0333
- JB 0602
- JB 0902
- JB 1100
- JB 1600
- JB 1700
- JB 1800
- PB 0100
- AC Board Type 1
- TDB Type 1
- TDB Type 2
- SDB Type 2
- 350A Plug Box
- MIB (Marshalling Interface Box)
- VRW20 Junction Box
- Transformer Marshalling Kiosk
- Fibre Optic JB
- 50kVA Mobile Generator Plug Box

Specific Technical A/B schedules are required to be completed by all suppliers. These technical requirements are specific for each Distribution Board and Junction Box.

2.1.1 Purpose

This specification provides potential suppliers with a framework against which their offered products will be adjudicated. Further, this specification shall be the technical basis for any supply contract to be awarded.

The purchaser intends awarding a supply and packaging, contract (Eskom National Contract, ENC) for the manufacturing of Distribution Boards and Junction Boxes, for use at Eskom substations.

Subsequent to the award of the ENC, once manufacture of any of the DB's or JB's commences, further technical considerations that may arise will be negotiated between the supplier and the purchaser. Once agreement of these technical considerations by the purchaser and the supplier has been reached upon, the revised master drawing will be added to the ENC. Additionally, a revised set of Technical A/B schedules will be completed and submitted by the supplier. Applicability

This document shall apply throughout Eskom Holdings Limited Divisions.

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2.2 Normative/informative references

Parties using this document shall apply the most recent edition of the documents listed in the following paragraphs.

2.2.1 Normative

- [1] VC 8003, Manually Operated Switches for Fixed Installations, SANS, Latest
- [2] VC 8006, Electric cables- flexible cords and flexible cables, SANS, Latest
- [3] VC 8075, Electric cables with extruded solid dielectric insulation for fixed installations (300/500 V to 1 900/3 300 V)–Parts 1-6, SANS, Latest
- [4] VC 8035, Earth-leakage protection units – Part 1 Fixed earth leakage protection units., SANS, Latest
- [5] VC 8036, Moulded-case circuit-breakers up to 125 A and up to 10kA., SANS, Latest
- [6] SANS 1213, Mechanical cable glands, SANS, Latest
- [7] SANS 1091, National Colour Standards for Paints, SANS, Latest
- [8] SANS 1507, Electric cables with extruded solid dielectric insulation for fixed installations (300/500 V to 1900/3 300 V), SANS, Latest
- [9] SANS 60947, Low-voltage switchgear and controlgear: Contactors and motor starters Electro-mechanical contactors and motor-starters, SANS, Latest
- [10] SANS 10142-1, The wiring of premises part 1: low-voltage installations, SANS, Latest
- [11] SANS 556-1, Low-Voltage Switchgear PART 1: Circuit-Breakers, SANS, Latest
- [12] SANS 156, Miniature Circuit-Breakers, SANS, Latest
- [13] SANS 1195, Busbars, SANS, Latest
- [14] SANS 60947-3, Low-voltage switchgear and controlgear. Part 3: Switches, disconnectors, switch-disconnectors and fuse combination units., SANS, Latest
- [15] SANS 1574, Electric flexible cores, cords and cables with solid extruded dielectric insulation Part 1: General, Part 3: PVC insulated cores and cables, Part 4: Rubber insulated cores and cords, Part 5: Rubber insulated cores and cables., SANS, Latest
- [16] SANS 60044, Instrument transformers, Part 1: Current transformers, SANS, Latest
- [17] SANS 60529, Degrees of protection provided by enclosures (IP Code), SANS, Latest
- [18] SANS 60614, Conduits for electrical installations – Specifications Part 1: General requirements, Part 2: Particular specifications for conduits Section 5: Flexible conduits., SANS, Latest
- [19] SANS 60865-1, Short-circuit currents – calculation of effects Part 1: Definitions and calculation methods., SANS, Latest
- [20] SANS 60947-2, Low-voltage switchgear and controlgear. Part 2: Circuit-breakers., SANS, Latest
- [21] QM-58, Supplier Contract Quality Requirements Specification, Eskom, Latest
- [22] 240-75655504, Corrosion protection standard for new indoor and outdoor Eskom equipment, components, materials and structures manufactured from steel standard, Latest
- [23] 240-55151908, AC Reticulation Application Design Guideline for Substations, Latest
- [24] 240-62629353, Specification for panel labelling, Eskom, Latest

2.2.2 Informative

- [25] 32-9, Definition of Eskom documents, Eskom Document Centre, Latest

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- [26] 32-644, Eskom documentation management standard, Eskom Document Centre, Latest
- [27] 474-65, Operating manual of the Steering Committee of Technologies (SCOT), Vinod Singh, Latest

2.3 Definitions

2.3.1 General

Definition	Description
Barrier	A part providing protection against direct contact from any usual direction of access (minimum IP2X) and against arcs from internal arc faults, if any.
Data Sheets	All drawings, tabulations, sketches, and relevant documentation which Eskom shall submit with an enquiry, to clearly indicate to a bidder or supplier the technical, electrical and physical requirements of the completed equipment.
Disconnecter	Mechanical switching device that:- <ul style="list-style-type: none"> a) For reasons of safety, provides in the open position, an isolating distance in accordance with specified requirements b) Is capable of opening and closing a circuit either when negligible current is broken or made, or when no significant change in the voltage across the poles of the disconnecter occurs, and c) Is capable of carrying currents under normal circuit conditions and of carrying for a specified time, currents under specified abnormal circuit conditions such as those of short circuit.
Padlocking facility	Part of the assembly or component that allows one to insert a padlock for locking purposes during maintenance.
Switch	Mechanical device that is capable of safely making, carrying and breaking currents under normal conditions (which may include specified operating overload conditions) and of carrying, for a specified time, currents under specified abnormal circuit conditions such as those of short-circuit
Switch disconnecter	Switch that, in the open position, satisfies the isolating requirements specified for a disconnecter.
The purchaser	Eskom Holdings Limited
The supplier	A successful tenderer, with whom a supply contract is placed. In other words, all tenderers are potential suppliers.

2.3.2 Disclosure classification

Controlled disclosure: controlled disclosure to external parties (either enforced by law, or discretionary).

2.4 Abbreviations

Abbreviation	Description
AC	Alternating current
CT	Current Transformer
DB	Distribution Board
DC	Direct Current
ENC	Eskom National Contract
FAT	Factory Acceptance Test

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Abbreviation	Description
GA	General Arrangement
IP	Ingress Protection
JB	Junction Box
LED	Light Emitting Diode
MCB	Miniature Circuit Breaker
MCCB	Moulded Case Circuit Breaker
MIB	Marshalling Interface Box
PTM&C	Protection, Telecommunication, Measurement and Control
SANS	South African National Standards
SDB	Station Distribution Board
TDB	Transformer Distribution Board
VTJB	Voltage Transformer Junction Box

2.5 Roles and responsibilities

The supplier is to take cognisance of the following with regards to the tender returnables. An incomplete tender submission will be deemed as non-compliant.

- a) An alternative offer shall only be considered if the main offer is compliant.
- b) Specific schedule A: The Purchaser's Requirements.
- c) Specific schedule B: Guarantees Technical Particulars (to be completed by the supplier).

The supplier shall not change the content of this document.

The supplier shall state clearly, for each clause that requires a statement of compliance in the A/B schedules. The supplier must respond by either stating "Comply" or "Do not Comply" and state any deviations. If a clause in the A/B schedule requires a statement of compliance and additional information, the supplier shall state clearly "Comply" and shall provide detail information or state "Do not Comply" and shall provide detail information. If a clause in the A/B schedule requires information only, the supplier shall provide the necessary information.

2.6 Legal Requirements

Eskom and its vendors are subject to the Occupational Health and Safety Act with regulations (Act No.85 1993 of the Republic of South Africa), Project and Construction Management Professions Act, (Act No. 48 of 2000 of the Republic of South Africa) as well as, the Engineering Profession Act (Act No. 46 of 2000 of the Republic of South Africa). All the equipment shall meet the requirements of the Act or the legislative requirements applicable to the territory in which the equipment shall be located. All equipment shall comply with the fundamental safety requirements of Clause 5 of SANS 10142-1. Distribution boards shall as a minimum be designed constructed and tested in accordance with the requirements of Clause 6.6 of SANS 10142-1. The design of AC distribution boards must comply with SANS 10142-1. All components used within DB's must comply with the compulsory standards and SANS. Any conflict between this specification and statutory requirements shall be brought to the attention of the purchaser for written clarification.

2.7 Process for monitoring

The equipment will be routine tested and inspected prior to requesting inspection by the purchaser's quality control group. The purchaser shall be advised not later than seven days before the due date for inspection and testing. Unless specified to the contrary, type testing shall consist of performing the tests on at least one sample of the design.

Tests shall be performed on equipment, which has not been the subject of previous type testing or at the purchaser's discretion on equipment which has been the subject of any modification, which could affect the performance of the equipment. A prototype inspection shall be performed to ensure that the equipment is of sound construction and, so far as can be ascertained, meets the requirement of this specification.

The final visual inspection by the purchaser's quality assurance representative shall be performed prior to dispatch to sites.

2.8 Related/supporting documents

This revision cancels and replaces revision no. 0 of document no. TSP41-599

3. Technical Specification

This specification defines the purchaser's requirements for the following equipment

- a) JB0333
- b) JB0602
- c) JB0902
- d) JB1100
- e) JB1600
- f) JB1700
- g) JB1800
- h) PB0100
- i) AC Board Type 1
- j) TDB Type 1
- k) TDB Type 2
- l) SDB Type 2
- m) 350A Plug Box
- n) MIB
- o) VRW20 – Metering CT insert
- p) VRW20 – Metering VT insert
- q) VRW20 – Double busbar isolator insert
- r) VRW20 – 6 Core CT insert
- s) VRW20 – VT insert
- t) Transformer Marshalling Kiosk
- u) Fibre Optic JB
- v) 50kVA Mobile Generator Plug Box

All JB's are outdoor junction boxes. The SDB, TDB, MIB and Plug Boxes are also outdoor equipment. The AC Board Type 1 is for indoor use only. All of the above equipment shall be constructed complete with the necessary connections, interconnecting wiring, circuit breakers, supporting steelwork, bolts, nuts, washers, labels and necessary sundries to provide a complete assembly. Nothing in this specification shall lessen the contractor's obligations detailed in any other documents forming part of the contract.

The latest revision of the supporting documents must be read in conjunction with this specification. However, in cases of conflict, the provisions of this specification shall take precedence.

3.1 Construction

Outdoor JB's (JB0333, JB0602, JB0902, JB1100, JB1600, JB1700, JB1800, 350A PB, Fibre Optic JB and PB0100) shall be fabricated from 3CR12 (corrosion resisting steel) with a minimum thickness of 1.6mm. Outdoor AC Boards (TDB Type 1, TDB Type 2, and SDB Type 2) shall be fabricated from 3CR12 (corrosion resisting steel) with a minimum thickness of 2mm. These boxes shall be vermin proof. The constructional specifications of the VRW20 JB are detailed in section 3.18 of this specification. The AC Board type 1 shall be constructed from 2mm mild steel. All outdoor equipment shall be manufactured with a minimum IP rating of 54. All indoor boards shall be manufactured with an IP rating of 53. All boxes must be seam welded. Cognisance shall be taken of the fact that any area where water or dirt can accumulate such as inadequate welds, bolted surfaces and sharp areas will result in accelerated corrosion. All doors shall have an earth stud. Outdoor AC Boards and JB's shall have a stainless steel earth stud. All individual metal parts used in the construction of the outdoor JB's and the AC boards must have an earth stud. Hexavalent chromium passivation is prohibited for all steel work including nuts and bolts that has been plated with zinc or cadmium. Trunking used in all JB's and AC Boards must be permanently secured using nuts and bolts. A summary indicating the constructional specifications of all JB's and AC Boards is shown in annexure V. The design of AC distribution boards shall comply to clause 5.1.1 of SANS 10142-1, which states that:-

It shall not be possible to touch any live part within arm's reach with the standard finger test

- a) During normal operation, or
- b) When a cover is removed, unless the cover is removed with the use of a tool or a key.

3.2 Doors

Each door shall be provided with a minimum of two non-ferrous handles of the wedge action type, capable of being padlocked in the fully closed position. A minimum of two non-ferrous hinges of substantial section and approved pattern shall be provided per door, together with an arrester bar. The door stay must be of hook and eye type and not window stay type. The hook must be made from a stainless steel rod that has a minimum diameter of at least 6mm. The eye and/or additional steelwork welded to the JB to accommodate the door stay must be constructed from 3mm 3CR12 Stainless steel. The door stay must be robust to withstand wind pressure.

Doors shall be provided with gaskets of neoprene or approved material. Rubber or felt gaskets are not acceptable. Doors shall be of the double step design. Plastic caps must be fitted into the holes pre-drilled for labels on doors for outdoor JB's. The dimensions of the holes to be drilled are indicated in Annexure U.

3.3 Anti-condensation heater and ventilation

A 220V AC, 30/40 watt heater unit must be installed in all outdoor boxes except where it is not indicated in the drawings, in order to prevent condensation. Silicone wires, un-insulated lugs and heat resistant sleeving must be used to terminate the heaters. Encapsulated heaters can be used. The heater terminals live part needs to be protected against electrocution.

3.4 Drainage

Each outdoor junction box shall be provided with at least one brass, copper or stainless steel gauze covered drain hole of minimum diameter 25mm and positioned at the lowest point of the box. The internal design of the box and the arrangement of components shall be such that drainage is not obstructed. Two drain holes of 6mm diameter shall be provided in the lower door-fold, at each end of the door.

3.5 Gland Plates and Din rails

Removable gland plates, made from 2mm 3CR12 (unpainted) pre-punched or drilled with the number of holes as shown on the drawing shall be provided for the outdoor structure mounted junction boxes. Removable gland plates, made from 2.5mm 3CR12 (unpainted) pre-punched or drilled with the number of holes as shown on the drawing shall be provided for the outdoor foundation mounted junction boxes. Hole plugs shall be provided for gland plates that are drilled. Gland plates made from 2mm zinc coated steel, and passivated blue must be provided for the indoor AC Board Type 1. This gland plate shall be drilled with the number of holes and fitted with hole plugs as shown on the drawing. Trivalent blue passivation shall be used for the indoor gland plates. All din rails employed in the construction of all outdoor boards and JB's shall be made from aluminium. For indoor boards din rails used can be made from galvanised steel/zinc coated steel which has been trivalent blue passivated. The SDB shall be supplied with 3mm unpainted galvanised steel gland plates. The VRW20 JB shall be supplied with a 2mm 304 brushed stainless steel gland plate.

3.6 Instrument Transformers

Instrument transformers (i.e. current transformers) shall comply with IEC 60044-1. The rating of the instrument transformer shall ensure optimum performance of the indicated function. Secondary windings of current transformers shall be earthed at one point only to the earth bar. Instrument transformer rating plates shall be located on the sidewall of the DB and shall identify the phase to which the current transformer is connected.

3.7 Signal lamps

Signal lamps shall be of the multi-LED bayonet coupling type. Signal lamp lenses shall be coloured as follows:

- a) Supply 1 ON RED
- b) Supply 2 ON RED

3.8 Control Switches

The Control switch for the AC Board and SDB shall be Eskom type Comelectric or equivalent. An Equivalent Kraus and Naimer switch can be used for the AC Board type 1. The voltmeter selector switch must be of the type that does not have an "off" position. All other switches are indicated on the relevant drawings.

3.9 Corrosion Protection

After fabrication, metal surfaces including doors and removable covers shall be prepared and finished in accordance with corrosion protection standard 240-75655504. The exterior colour shall be dark grey, (semi-gloss) to G12 SANS 1091 Poly-Urethane coated. Interior colour shall be white gloss 1091 Poly-Urethane powder coated.

3.10 Damaged Paint Work

Paint work damaged during transportation and delivery shall be made good as per manufacturer repair specification at no cost to the purchaser. If site re-painting is necessary, the equipment and labels shall be carefully masked and any overpaint which occurs in spite of the masking must be removed. The cost for the repair of damage paint work will be directed to the transport company.

3.11 Nuts, Bolts, Washers

All nuts, bolts and washers used for the construction of outdoor JB's and DB's are to be stainless steel. Zinc plated and clear/blue passivated nuts and bolts can be used in the construction of the indoor AC Board Type 1. Where referred to as per drawings, brass bolts, nuts and washers must be used. Self-tapping screws shall not be used.

3.12 Base Frame

A base frame made of 2.5mm mild steel plate, hot-dip galvanized to SANS ISO 1461 shall be provided as per drawing for the outdoor foundation mounted boards, except the SDB. The SDB shall have a base frame made of 3mm mild steel plate, hot-dip galvanized to SANS ISO 1461. The base frame of the indoor AC Board shall be 2.5mm mild steel, painted black.

3.13 Wiring

All wiring shall be carried out in general-purpose 600/1000 V SANS approved multi-strand PVC wire. The cross sectional area of all wiring shall be suitable for the maximum expected current in any circuit. Joints or splices in internal wiring are not acceptable. Not more than two conductors shall be connected to any one side of a terminal and where two conductors are connected to a terminal, care must be taken to ensure that the conductors are of the same size and that lugs and ferrules are fitted to the conductors in such manner as to avoid reduction in clearances. More than one wire per lug shall not be allowed. Stripping of insulation is to be carried out so that no damage to conductors occurs. Wiring damaged (nicked) during the stripping process will be rejected. Stripping tools permitting the length of the "strip" to be preset shall be used. The "strip" shall be 1mm longer than the barrel of the terminating lug. All holes through which wiring must pass shall have their edges protected using circular grommets. Chamfered edges are not acceptable in order to prevent damage to wire insulation.

All control wiring shall be terminated with approved pre-insulated, crimped connectors. All lugs must match the type of termination on the equipment. All terminations shall be made with the tool recommended by the manufacturer of the lugs. Crimping tools shall be of the type, which will not release the termination during normal operation, until the conductor crimp has been correctly formed. All wires and cables larger than 6mm² shall be terminated with an approved lug. The lug shall be crimped with a hydraulically actuated die tool as recommended by the manufacturer of the lug. There shall be no bare wire exposed between a lug and the insulation of the wire to which it is crimped.

The lugs selected shall be the correct barrel size for the size of wire or cable with which they are to be used, and the dimensions of the tongue shall match the stud, screw or aperture of the terminal to which they will be connected. Sample crimped ends, selected at random, may be subjected to tests in situ, to prove their mechanical strength. Such tests will consist of an axial pull, equivalent to approximately 60% of the nominal-breaking load of the conductor only, applied by means of a spring balance or similar device. For the purpose of this specification, the force to be applied when testing crimped terminations on 2.5mm² shall be 270 N.

Bootlace lugs must be used on cables greater than 6mm², when terminating in MCB's. Electrical clearance between uninsulated copper bars, live to neutral and live to earth shall be not less than 20mm or shall be sufficiently shrouded/insulated with non-flammable insulation material. Warning labels shall be fitted on all doors giving direct access to live bus-bars or terminals.

Wiring leads shall be marked at both ends with an approved type of ferrule, permanently marked with black letters impressed on a white or yellow background. Interlocking slip-on type ferrules shall match the size of wire onto which they are fitted. Transparent ring wire sleeve holders with pre-printed markers can be used.

Ferrules shall be fitted so as to read from left to right on vertical terminal strips and to read from insulation to crimped lug in the case of switch and fuse connections. On horizontal terminal strips ferrules shall be fitted so as to read from bottom to top. Terminals shall be of a type and make approved by Eskom. Spring loaded terminals shall be used for wires ≤ 6mm². Pin lugs are not allowed. Only hook/lipped blade lugs must be used for termination in spring loaded terminals

Rail mounted spring loaded screw clamp type; the terminals shall be of the type which compresses the terminations between two plates by means of terminal screws.

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Where rail mounted stud type terminals are used; two terminal studs shall be provided for each "way" and shall be of sufficient length to accommodate two ring terminations in addition to a nut, plain and spring washer.

3.13.1 JB0333

2.5mm² panel wire and 80mm x 100mm trunking shall be used in the construction of the Junction Box. Care must be taken that all terminals of the door switches are adequately shrouded. The door switches will switch on an internal LED light mounted on the roof. 16mm² green/yellow earthing wire shall be used to bond the front and rear earth bar to the main earth bar. Looping between terminals shall be done in accordance to sheet 3 of the master drawing. The door housing the recessed MCB's must be hinged.

3.13.2 JB1100

The JB1100 has an identical external construction to the JB0333. Internally it consists only of 6 terminal rails, one isolator and two MCB's. This JB does not have control switches but does have door switches that will switch on an internal LED light. The number and type of terminals for each rail is shown in sheet 2 of the drawing 0.51/20249. The earth bars, gland plates and trunking arrangement is identical to the JB0333.

3.13.3 JB0602

2.5mm² panel wire and 25mm x 60mm trunking shall be used in the construction of the Junction Box.

3.13.4 JB0902

The JB0902 has an identical external construction to the JB0333. 4mm² panel wire and 80mm x 80mm trunking shall be used in the construction of the Junction Box. This JB has door switches that will switch on two internal LED lights, individually. The earth bar located on the top rear of the JB shall be connected to the bottom earth bar via a 16mm² wire.

3.13.5 JB1600

This JB has an identical external construction to the JB0602. However the insert plate consists only of terminals as indicated in the drawing 0.52/1205.

3.13.6 MIB

The junction box shall be of the totally enclosed foundation mounted type, fabricated from 3CR12 stainless steel with a minimum thickness of 2mm. The box shall be vermin proof and suitable for mounting outdoors. The junction box shall be manufactured with an IP54 rating and will comprise of 3 tiers. Each tier will have a front and rear access door. Doors shall be of the double step design and shall be removable. The construction of the JB must include door switches for all doors that will switch on all the lights located in the JB. Each tier must consist of two 300mm fluorescent lights.

These lights must be mounted above the terminal racks in the front and rear of each tier. The lights must be wired to terminals on the centre tier as indicated in the drawing.

A 220V AC, 40 watt heater unit must be installed in tier 1 and tier 3 of the junction box as shown in the drawing. The heaters must be wired to terminals on the centre tier as indicated in the drawing. The base frame must have ventilation holes as indicated in the drawings. The inner fold of the roof must have ventilation holes. These ventilation holes must be covered with a nonferrous gauze.

3.13.7 PB0100

Ferruling on wires between the MCB's and terminals shall be according to the MCB circuit number. 16mm² stranded copper wire shall be used on the line and load sides of the 63A MCB's. 4mm² must be used on all other circuits except on the relay supply and alarm circuits, where 1.5mm² panel wire can be utilised.

3.13.8 350A Plug Box

16mm² panel wire must be used on both the load and supply side of MCB 3. Electrical clearance between uninsulated copper bars, live to neutral and live to earth shall be not less than 20 mm or shall be sufficiently shrouded/insulated with non-flammable insulation material. Warning labels shall be fitted on all doors giving direct access to live bus-bars or terminals. Perspex covers must be fitted on all copper bars that are uninsulated. Flash/phase barriers must be provided on the load side of MCCB 9.

3.13.9 AC Board Type 1

The 4-pole contactors must have an AC-1 duty rating of at least 300A at 700⁰C. The 3-pole switch disconnectors must have an AC-21 duty rating >300A. The contactor shall have a side by side mechanical interlock. The switch disconnector shall be padlockable in the OFF position and must interlock with the door in the ON position. Table 1 below shows the minimum wire sizes to be used in the construction of the AC Board. Ferruling on wires between the MCB's and terminals shall be according to the MCB circuit number. The size of the copper bars from the collection bars via the switch disconnectors and contactors up until the main busbars shall have a cross-section of at least 20mm x 10mm.

Table 1: AC Board Type 1 – busbar/wiring sizes

MCCB/Isolator	Copper bar dimensions to main busbar	Cable size to main busbar	Cable size to stud terminals
Supply 1 (300A)	20mm x 10mm		
Supply 2 (300A)	20mm x 10mm		
160A		1 x 70mm ²	1 x 70mm ²
100A		1 x 35mm ²	1 x 35mm ²
80A		1 x 25mm ²	1 x 25mm ²
63A		1 x 16mm ²	1 x 16mm ²

Perspex covers shall be provided for all busbars in the front and rear of the DB. These perspex covers shall be fixed in position by bolts, in order to facilitate easy removal during maintenance. Labels must be attached to the perspex covers of both isolators indicating "Line" and "Load" sides. Bootlace lugs shall be used for terminating wires greater than 6mm² in MCB's. Insulated lugs shall be used for terminating wires 6mm² and smaller. Where cables are not enclosed in trunking, it shall be firmly fixed to prevent sagging or creeping. Where reverse connection (connecting line to the bottom of switchgear) is done, such as the incoming isolators, labels shall be provided that clearly indicate the "line" and "load" side of the switchgear.

3.13.10 Type 1 TDB

The Type 1 TDB must consist of a complete source-changeover assembly for two switch disconnectors. The manual source-changeover assembly shall have two 4-pole switch disconnectors that are mechanically interlocked. The mechanical interlock must prevent connection to both sources at the same time, even momentarily. The single 3-position rotary handle that controls the source-changeover assembly must have the following positions:-

- Source 1 ON
- OFF, and
- Source 2 ON

The load side of the source-changeover assembly must supply a set of 4 busbars (Red, White, Blue and Neutral). The minimum dimensions of the main busbars must be 25mm x 12.5mm. The supply side of the source-changeover assembly must be fitted with collection bars that have a minimum cross-sectional area of 25mm x 12.5mm. Table 2 below shows the minimum wire and copper bar sizes to be used in the construction of the TDB.

Table 2: TDB Type 1 – busbar/wiring sizes

Circuit	MCCB/Isolator	Copper bar dimensions to main busbar	Copper bar dimensions to MCCB's
1	Supply 1 (500A)	25mm x 12.5mm	
2	Supply 2 (500A)	25mm x 12.5mm	
3	250A		20mm x 8mm
4	250A		20mm x 8mm
5	250A		20mm x 8mm
6	160A		20mm x 5mm
7	160A		20mm x 5mm
8	25A		1 x 35mm ² wire
9	25A		1 x 35mm ² wire

3.13.11 TDB Type 2

Each supply circuit 1 & 2 shall consist of a 3-pole isolator and a 4-pole contactor. The 4-pole contactors must be mechanically and electrically interlocked. The load side of the contactors must supply a set of 4 busbars (Red, White, Blue and Neutral). The minimum dimensions of the main busbars must be 25mm x 5mm. The supply side of the isolators must be fitted with collection bars that have a minimum cross-sectional area of 20mm x 8mm. Table 3 below shows the minimum wire and copper bar sizes to be used in the construction of the TDB Type 2.

Table 3: TDB Type 2 – busbar/wiring sizes

Circuit	MCCB/Isolator	Copper bar dimensions to main busbar	Copper bar dimensions to MCCB's
1 & 3	Supply 1 (200A)	20mm x 8mm	
2 & 4	Supply 2 (200A)	20mm x 8mm	
5	160A		20mm x 5mm
8	25A		1 x 35mm ² wire
10	160A		20mm x 5mm

Phase/Flash barriers must be provided for all MCCB's. Spreaders must be installed on the load side of the 160A MCCB's. The front of the TDB shall be manufactured with an internal and external door. The operating handle of the isolators shall be interlocked with the internal door. Clearance between busbars (Phase to phase and phase to neutral) shall not be less than 20mm. The bolts extending from the busbars must also comply with the 20mm clearance gap. The rear of the TDB shall be fitted with a perspex cover which must cover the incoming terminals. The gap between the perspex cover and the busbar terminals must be at least 50mm.

3.13.12 SDB Type 2

The SDB Type 2 shall be constructed from 2mm 3CR12 stainless steel and shall have an IP rating of 65. The contactors used must have a mechanical interlock. All wires used for 3 phase supplies must be colour coded or colour coded sleeving must be used. Bootlace lugs must be used on all wires greater than 6mm² that is terminated on MCB's. The minimum size panel wire to be used on the supply and load sides of MCB's is shown in Table 4 below. Every din rail must have an earthing terminal. Aluminium din rails must be used for the construction of the SDB type 2.

Table 4: SDB Type 2 – wiring sizes

MCB rating	Supply side (from busbars)	Load side (to terminals)
100A	35mm ²	35mm ²
80A	25mm ²	25mm ²
63A	16mm ²	16mm ²

3.14 Labels

All external and internal labels on equipment shall bear inscriptions in English. All labels shall be horizontal and parallel to each other and to the equipment with which they are associated. All equipment which as shown in the schematic drawings including terminal rails has to be labelled. The lettering shall be legible when viewed from an angle of approximately 45° from any position (above, below, horizontal) with respect to the label. The width of exposed "black" in standard labels shall not be less than one seventh of the centre height of the letter. Standard vertical, medium lettering shall be used. Narrow or broad type faces are not acceptable. Upper case letters shall be used, except where conventional abbreviations or symbols require the use of both upper and lower case letters (e.g. kVar). The designated colours of the labels shall be as defined in SANS 1091. The labels of all equipment are indicated in the drawings. Standard type labels shall be in the following colours as specified:

- Warning labels: White lettering on a red background
- All other function designations: Black lettering on a white background

External and internal labels shall comply with the requirements of Eskom standard for labelling 240-62629353. Only engraved labels made of a 3 layer traffolyte sandwich board will be accepted. All labels located on doors shall be permanently attached using nuts and bolts. All indoor and outdoor AC boards shall have a permanent label stating the following:-

- Main busbar current rating
- Rated operating voltage
- kA rating of MCB'S/MCCB's

3.15 MCB Locking Brackets

All outgoing MCB's on the AC Board Type 1 and SDB Type 2 shall be fitted with a lockable bracket. The bracket must be designed such that the MCB can only be locked in the off position. The bracket used for indoor boards shall be made of mild steel which can swivel on a steel rod. The bracket used in the SDB Type 2 shall be made of 3CR12 stainless steel. See Annexure O for images of MCB locking brackets. All MCCB's used in the TDB's, SDB and AC Board type must have a padlocking facility. The padlocking facility must be incorporated in the rotary handle of the MCCB's.

3.16 Earthing

All metal parts shall be connected individually and direct to the earth bar via a green 4mm² PVC copper conductor. All terminal rails should be fitted with an earthing terminal. All electrical components that have a provision for earth, must be earthed. Looping of the earth wire between metal parts will not be acceptable. Each metal part shall have its own earth connected to the earth bar or earth stud. A 40 x 40 x 3mm copper pad shall be brazed to the outside, of outdoor JB's and DB's as indicated in the relevant drawings. The copper earth pad and the M16 x 50 brass bolt are shown in detail 'a' in the drawings. All gland plates shall be earthed to the brass earthing stud by means of a braided tinned copper earthing strap with an effective copper cross-sectional area of 12 mm². The contact resistance between the main earth bar/stud and any earth stud located on doors, gland etc. must not exceed 0.1 ohms. All earth connections shall be as short as possible and shall not be coiled.

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3.17 MCB's and MCCB's

Miniature circuit breakers (MCB's) shall comply with the requirements of VC8036, SANS 556-1 and SANS 60947-2. DC MCB's are polarity sensitive. The MCB's specified for the Distribution Boards are specific due to the cascading principle being applied. All MCB's shall be wired with the source supply at the top, and the load supply at the bottom. MCCB's shall be fitted with rotary handles incorporating a padlocking facility.

3.18 VRW20 and Transformer Marshalling Kiosk – Construction

The junction boxes shall be constructed from 1,6mm Columbus Stainless 3CR12 steel or, as an option, from 304 stainless steel as indicated on sheets 1 and 2 of drawing D-DT-5406 and 0.52/30652. All dimensions shall be strictly adhered to. Should any small changes need to be made, this shall be done with the written approval of the appropriate Eskom technical specialist.

The junction box shall be fitted with a brass earthing stud of dimension M10 x 75mm and complying with brass quality specification 303. The stud shall be secured to the junction box with 6 brass nuts, 4 lock washers (brass) and 4 normal brass washers. This shall be done in the following order:

- a) Stud centred in junction box hole
- b) Lock washers fitted on each side
- c) Bolts fitted and fastened on each side
- d) A locking nut is fitted on each side
- e) Two washers fitted on each side
- f) Spring washer fitted
- g) Fixing nuts fitted

The brass stud shall have an electrical contact resistance with the junction box body of less than 0,1 ohms.

The rear back plate of the junction box shall have four mounting brackets welded onto it as per drawing.

The interior shall have four studs of dimensions M6 x 25mm welded to the back plate. The studs shall be centrally arranged inside the junction box to the dimension of the insert tray mounting holes. The studs shall be made from stainless steel.

All parts and fixtures shall be made from stainless steel 304, Columbus Stainless 3CR12 or brass. All welds shall be waterproof. The welds shall be completed with a MIG welder and 3CR12 or stainless steel wire.

Treatment of 3CR12 shall be done in accordance with the recommendations of Columbus Steel, selected details of which are included in Annex P.

The box shall be manufactured in such a manner that contamination from other metals, including steel, is not possible. Contamination would occur if, for example, an angle grinder that has just been used on mild steel was used in the manufacture of the box. Contamination can also occur if the box is left in an environment where metal particles can make contact with the box. Contamination is not permitted due to its corrosive effect on the Columbus Stainless 3CR12 and also causes rust to occur on the mild steel.

The box shall be protected from water and dust ingress to class IP53.

The box shall be painted and treated in accordance with corrosion protection standard 240-75655504. The box shall be texture powder coated of colour in accordance to SANS1091: Cloud Grey (NCS – 2305-R99B).

The junction box door shall be fixed to the body using two sturdy non-corroding hinges. The door lock shall be sturdy and made from a non-corroding material. The junction box door shall be earthed to the brass earth stud using green insulated 1000 VAC 2,5mm² multi strand copper wire. The contact resistance between the brass earth stud and any part of the gland plate and door shall be less than 0,1 ohms. The earth strap shall be long enough to allow the door to open fully.

The door shall be fitted with a quality gasket such that the sealing material shall always return to its original profile after compression. The material so used shall not deteriorate over the 15 year expected life span of the product.

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Four stainless steel J bolts (304 stainless steel or higher specification), with eight nuts and eight washers also manufactured from stainless steel, shall be provided inside the junction box in a plastic bag suitably fixed so as not to cause transport related damage to the interior.

Refer to the photographs in Annex Q for further details.

3.18.1 Gland Plate

The gland plate shall be made of 2mm thick 304 stainless steel. The plate shall have pre-punched cut-outs for the cable glands.

The gland plate shall have drainage/ventilation holes as indicated on the drawing. The drainage holes are included to allow for the venting of condensation and to drain off water that enters the junction box due to capillary action via the cable sheaths.

The gland plate shall be bolted to the junction box with stainless steel bolts. Spring washers shall be used between the junction box body and the fastening nut. The primary function of the spring washers is to allow for improved electrical connectivity between the gland plate and the junction box body.

In addition to the fastening bolts, the gland plate shall be earthed to the brass earthing stud by means of a braided tinned-copper earthing strap with an effective copper cross sectional area of 12mm².

The contact resistance between the brass stud and any part of the gland plate shall be less than 0,1 ohms.

3.18.2 Insert Trays

The VRW20 Junction Box insert trays shall be manufactured from 2mm thick Columbus Stainless 3CR12 steel or 304 stainless steel of the same thickness. The tray shall be mounted inside the junction box on the stainless steel studs provided.

The tray shall be bonded to the brass earthing stud using a 12mm² braided tinned-copper strap. The contact resistance between any part of the chassis or metal fixtures and the brass earth study shall be less than 0,1 ohms.

The insert trays shall be smooth powder coated to SANS 1091 colour white.

3.18.3 Terminal Blocks

Electrical terminal blocks, markers and terminal rails used on the insert trays shall comply with electrical terminal blocks specification 240-70413291. Terminal blocks shall be of the 10mm screw-clamp, spring-loaded insertion type (refer to Section 3.3.2 of 240-70413291).

The associated end caps, terminal spacers and labels shall be used. The mounting rails and fixing screws or rivets shall be rust proof, consistent with the requirements of the Columbus Stainless 3CR12 or 304 stainless steel.

3.18.4 Wiring, wire termination and wire marking

Wiring, wire termination and wire marking shall be done in accordance with standard 240-64636794.

All wiring shall be effected using 2.5mm² stranded copper wire. The wire shall be insulated to withstand 1000 VAC. Wiring shall be terminated using 2.5mm² (blue) insulated hook blade lugs. Straight-blade lugs may be used where the termination is to a MCB.

Wiring shall be routed in trunking of dimensions 40mm (W) x 60mm (H) in order to keep the wiring neat. The trunking for the VT insert (Section 4.3.5.5) shall use trunking of dimensions 40mm (W) x 40mm (H). The trunking shall be of the narrow-toothed type.

The wires shall be colour coded as follows:

- a) Red phase (RØ) – red insulation
- b) White phase (WØ) – white insulation

- c) Blue phase (BØ) – blue insulation
- d) Neutral (N) – grey or black insulation
- e) Earthing (E) – green/yellow insulation

3.18.5 Miniature Circuit Breakers for VRW20 JB

The MCBs shall be rated for 10A, curve C with a breaking capacity of at least 4,5kA.

Three single phase MCBs will be provided per circuit as specified. Each phase of the MCB will be able to operate independently of the others.

3.18.6 Insert tray variants

The insert tray shall be available in the following options:

3.18.6.1 Metering CT insert (D-DT-5401)

This is a non-standard/custom metering CT insert.

3.18.6.2 Metering VT insert (D-DT-5402)

This is a non-standard/custom metering VT insert. This item shall include twelve MCBs (i.e. four three phase circuits) in accordance with the requirements of Section 3.18.5.

3.18.6.3 Double bus bar isolator insert (D-DT-5403)

This tray is used as an interface between the protection panels and the busbar and line isolator secondary contact boxes. The tray makes provision for zone selection of bus zone CTs as well as busbar VT selection, routed via the busbar isolator secondary contacts.

3.18.6.4 Six core CT insert tray (D-DT-5404)

This is the standard CT insert tray, accommodating up to six CT cores from each of three post-type CTs.

3.18.6.5 VT insert (D-DT-5405)

This is the standard VT insert tray, accommodating eight circuits that are protected separately. Four circuits shall be routed from the first secondary winding of the VT and four shall be routed from the second secondary winding.

This item shall include twenty four MCBs (i.e. eight three phase circuits). MCBs shall be in accordance with the requirements of Section 3.18.5.

3.19 Fibre Optic JB

3.19.1 Construction

- a) Cable entry shall be possible only from the bottom.
- b) The cabinet dust and water ingress protection rating shall be in accordance with IP54 of IEC Publication 60529.
- c) The thickness of the material for the manufacture of the cabinet shall be 1,6mm 3CR12 stainless steel.
- d) The cabinet shall be of a welded construction and shall be fitted with front and rear doors.
- e) Mounting equipment brackets for 19" rack mounting equipment shall be provided in accordance with IEC Publication 60297 and fitted in the front of the cabinet in positions shown on the drawing. Provision shall be made so that these brackets are adjustable and can be mounted either in front of the cabinet or further back if required. These brackets shall be made from 3CR12 stainless steel.

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- f) The cabinet shall be fitted with 100mm x 60mm trunking on both sides of the cabinet, as shown on the drawing. The trunking shall not obstruct the mounting of equipment
- g) Each cabinet shall be supplied with a quantity of 10 chrome plated fixing screws and cage nuts, metric, of a suitable length for fixing the equipment shelves.
- h) Bolts shall be welded to the top and the bottom of both doors on the hinge side to which the braided earth straps are connected. Details are shown in the drawing. These bolts shall be covered or masked during the painting of the doors to keep the studs free of paint.
- i) Door locks shall be of the non-ferrous lever type with facilities the provision for the fitting of a padlock.
- j) Both doors shall be fitted with stiffeners to make the door more rigid.
- k) Doors shall be of the double step design.
- l) Doors shall be provided with gaskets of neoprene or an approved material. Rubber or felt gaskets are not acceptable.

3.19.2 Cabinet Plinth / Base Frame

- a) A suitable base frame/plinth made of 2.5mm mild steel plate hot-dip galvanized to SANS 121 ISO 1461 shall be provided as per drawing for the cabinet.
- b) Mounting holes, 8 x10 mm diameter, shall be provided in the mounting plinth.

3.19.3 Gland Plate

- a) Gland plate/inspection cover shall be fitted at the bottom of the cabinet. The gland plate/inspection cover shall be interchangeable.
- b) The gland plates and associated nuts welded to the gland plates shall be stainless steel.
- c) The gland plates shall be removable and pre-drilled. Holes shall be provided in the gland plates for fastening down to the cabinet.
- d) Pre-drilled holes shall be provided in one section of the gland plates for glanding cables to the gland plate. These holes shall be closed with plastic filler plugs. Details of the arrangement and holes of the gland plate are shown on the drawing. The other section of the bottom gland plate (inspection cover) shall remain blank.
- e) All nuts and bolts used for fixing earth straps to the gland plate and between the gland plate and the cabinet frame, shall be stainless steel
- f) Each gland plate that has been pre-drilled must consist of two M10 earthing studs with nuts, which must be welded to the gland plate. The earth stud shall protrude at the top and bottom of the gland plate, which will be fastened with bolts and welded to the gland plate.
- g) All gland plates must be bolted using M8 stainless bolts.
- h) The gland plates and inspection cover shall be fabricated from 2mm 3CR12 stainless steel.

3.19.4 Earthing

- a) The cabinet shall incorporate an earth bar running vertically on one side (left hand side when viewed from the front) of the cabinet as shown on drawing. This bar shall be fastened to the cabinet, using "bite" washers, which will ensure that the earth bar is metallically bonded to the cabinet.
- b) A perforated copper earth bar shall be provided with a minimum dimension 16 x 3mm and M6 tapped holes every 100mm.
- c) At the top and bottom of the earth bar, an M6 tapped hole shall be provided to facilitate an earth strap connection to the top and bottom gland plates.

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- d) All earth points are to be free of paint or any other non-conductive material.
- e) During the assembling of the cabinet, the braided copper earth straps shall be fitted with suitable lugs and “bite” washers to ensure a proper metallic bonding of all the cabinet parts.
- f) The earth bar, the mounting equipment brackets for 19” rack, and both front and back doors shall be connected to the gland plate using 12mm² tin-plated copper earth straps. These braided copper earth straps shall be as straight and as short as possible. The continuity between any part of the cabinet and the earthing straps all be 0,1 ohms or less.
- g) Each separate plate or loose steel construction must have a welded earth stud. These studs shall be fitted with a spring or a serrated washer, plain washer and the fastening nut.
- h) The earth studs on the doors and inside the panel shall be stainless steel.

3.20 50kVA Mobile Generator Plug Box

3.20.1 Construction

- a) The thickness of the material for the manufacture of the cabinet shall be 2 mm 3CR12 stainless steel.
- b) The cabinet dust and water ingress protection rating shall be in accordance with IP54 of IEC Publication 60529.
- c) The cabinet shall be of a welded construction and shall be fitted with front door.
- d) Each cabinet shall be supplied with a 125A 3P+N+E socket outlet with interlock switch.
- e) A 32mm cable slot shall be provided in the bottom of the cabinet enabling the door to close when a cable is used. Details are shown in the drawing.
- f) Door lock shall be of the non-ferrous lever type with facilities for the fitting of a padlock.
- g) Doors shall be provided with gaskets of neoprene or an approved material. Rubber or felt gaskets are not acceptable.
- h) Plug box to be provided with 4 x M8 raw bolts for mounting on the wall.

3.20.2 Earthing

- a) The cabinet shall incorporate an earth stud of 25mm on one side (left side when viewed from front) of the cabinet as shown on the drawing. The stud shall be secured to the junction box with 6 brass nuts, 4 lock washers (brass) and 4 normal brass washers. This shall be done in the following order:
 - Stud centred in cabinet hole
 - Lock washers fitted on each side
 - Bolts fitted and fastened on each side
 - A locking nut is fitted on each side
 - Two washers fitted on each side
 - Spring washer fitted
 - Fixing nuts fitted
- b) All earth points are to be free of paint or any other non-conductive material.
- c) The earth studs on the door and inside the panel shall be stainless steel.

4. Testing

All instruments used for testing shall be of suitable quality and of sufficient accuracy for the particular test application. Eskom reserves the right to request instruments that have been certified by the National Calibration Service. The cost of obtaining such certificates shall be for the supplier's account. In order to enable Eskom to witness tests, the contractor shall inform Eskom in writing at least three weeks prior to commencement of type testing and at least two weeks prior to routine testing.

4.1 Type testing

When specified, prior to routine production, a prototype of each type of unit shall be provided for type testing to establish performance characteristics and to demonstrate compliance with all requirements of this specification. The contractor shall draw up a prototype test schedule for Eskom approval prior to prototype testing. The cost of a prototype unit shall be for the account of the supplier. Eskom representatives shall witness type tests at the supplier's works. Eskom will at the same time examine the prototype with regard to mechanical construction, layout and labelling. Type tests at the supplier's works shall include operational tests and wiring tests and any additional tests that may be required by Eskom.

In the event of any changes that may be necessary after type testing of a prototype, written approval shall be obtained from Eskom prior to the introduction of such changes. Repeated type tests as a result of changes in the design shall be at Eskom's discretion.

4.2 Routine testing

The supplier shall, at his works, subject each unit to routine tests. The supplier shall draw up a routine test schedule for Eskom's approval prior to routine testing.

Witnessing of routine tests shall be left to the discretion of Eskom's Group Technology Quality Management. In the event of routine tests not being witnessed, Eskom reserves the right to request verification of any test results.

The routine tests shall include operational tests, wiring tests and any additional tests requested by Eskom.

4.3 Operational tests

The units shall be subjected to operational tests, sufficient in number and scope to prove that the equipment fully complies with the operational, protection and alarm requirements of this specification.

The number and scope of the operational tests shall be agreed upon between the supplier and Eskom during type testing of the prototypes.

4.4 Continuity tests

The wiring shall be tested for continuity where the continuity test shall give a reading of less than 0.1 Ω . Where MCB's are used, they shall be all switched ON.

The wiring insulation to earth as well as between unique circuits shall be checked with a 500 V DC insulation resistance tester. Ensure that a reading of infinity ohms is obtained between any part of the circuit and the chassis and also any separate circuit. The test must be performed with the MCB in the OFF and ON positions, where applicable. This test shall also be applied between each individual circuit.

Infinity with a 500 V DC insulation resistance tester shall be greater than 20 M Ω .

The insulation resistance tester must be periodically tested and calibrated by an accredited test laboratory. The supplier or sub-contractor shall be able to provide proof that these tests are performed at least once in six months. A test certificate shall accompany each unit.

4.5 Test certificates

The test certificates shall be kept on file with the supplier for the duration of the contract period. A copy of the test certificate shall be supplied with each order.

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- a) The test certificate shall as a minimum have the following information:
- b) Type of product tested
- c) Person performing the test
- d) Date of test
- e) Signature
- f) Continuity test reading – detail the worst reading in ohms
- g) Insulation resistance test reading – detail the worst reading in ohms
- h) Item serial no
- i) Test meter detail – type, serial number, date of last accuracy test

5. Packaging

The products ordered shall be packed in high specification impact resistant corrugated cardboard or a wooden crate. A waterproof outer plastic covering shall be used for the AC Board Type 1. This shall ensure that the equipment is protected from damage in the event of a light drizzle as well as protected from bumps and scratches that could occur from normal handling and transport. The package shall be clearly labelled with the sub-station name, full delivery address, Eskom and supplier order number, despatch date and the contents of the package. Stainless steel (304 or higher) “J” bolts, complete with washers and nuts, shall be packaged inside the outdoor junction boxes in a plastic bag secured internally.

6. Drawings

The construction of the JB’s and the DB’s shall be according to the approved Eskom Drawings. However if the construction of the JB’s and DB’s differ from Eskom Master Drawings then then general arrangement drawings (GA’s) from the supplier must be submitted to Eskom, for approval, prior to construction. Table 5 indicates the master drawing numbers for the JB’s and DB’s.

Table 5: Master Drawing numbers for JB’s and DB’s

Drawing Name	Drawing No.	Revision
JB0333	0.52/20249 Sheet 1	13
	Sheet 2	9
	Sheet 3	11
	Sheet 4	8
	Sheet 5	2
	Sheet 6	2
Drawing Name	Drawing No.	Revision
JB0602	0.52/1186	16
JB0902	0.52/30107	0
JB1100	0.52/20249 Sheet 2	9
JB1600	0.52/1205	8
JB1700	0.52/20365	6
JB1800	0.52/20397	3
PB0100	0.52/20251	6
350A Plug Box	0.52/30074	1
AC Board Type 1	0.52/20250 Sheet 0	2
	Sheet 1	10

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Drawing Name	Drawing No.	Revision
	Sheet 2	9
	Sheet 3	10
	0.52/20250 Sheet 4	2
TDB Type 1	0.52/20252 Sheet 1	6
	Sheet 2	6
TDB Type 2	0.52/20253 Sheet 1	5
	0.52/20253 Sheet 2	6
SDB Type 2	0.54/08596	0
MIB	0.52/30075	0
Fibre Optic JB	0.52/30079	0
VRW20 metering CT insert	D-DT-5401	4
VRW20 metering VT insert	D-DT-5402	4
VRW20 Double busbar isolator insert	D-DT-5403	3
VRW20 6 Core CT insert tray wiring key diagram	D-DT-5404	3
VRW20 VT insert tray layout	D-DT-5405 Sheet 1	3
VRW20 VT insert tray wiring key diagram	D-DT-5405 Sheet 2	3
VRW20 junction box constructional detail diagram	D-DT-5406 Sheet 1	3
VRW20 junction box construction gland plate detail diagram	D-DT-5406 Sheet 2	2
Transformer Marshalling Kiosk	0.52/30652	0
50kVA Mobile generator plug box	0.52/30617	0

7. Authorization

This document has been seen and accepted by:

Name and surname	Designation
G Topham	Corporate Specialist (Engineering Protection)
V Msibi	Chief Technologist Protection
H Sithole	Senior Engineer Protection
Keineetse Rankunyane	Secondary Plant Manager (Transmission Western Grid)
David Sehloho	Secondary Plant Manager (Transmission Eastern Grid)
Avhafani Luvhengo	Secondary Plant Manager (Transmission Central Grid)
Selby Madau	Secondary Plant Manager (Transmission Northern Grid)
Humbulani Tshisevhe	Secondary Plant Manager (Transmission North East Grid)
Ellan Phaahla	Secondary Plant Manager (Transmission North West Grid)
Gilbert Valentyn	Secondary Plant Manager (Transmission Southern Grid)
Rohan Wessels	Secondary Plant Manager (Apollo DC Grid)
Bosaletse Mpesi	Secondary Plant Manager (Free State Grid)
Regi George	Secondary Plant Manager (Northern Cape Grid)

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8. Revisions

Date	Rev	Compiler	Remarks
Oct 2019	3	A Majozi	Business requirement and added the 50kVA mobile generator interface plug box
Nov 2014	2	A Majozi	Removed manufacturer specified product.
Oct 2013	1	K Naicker	First issue

9. Development team

The following people were involved in the development of this document:

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10. Acknowledgements

Not applicable.

Annex A – Specific Technical A/B Schedule for JB0333

No	Items	Schedule A				Schedule B
		Description	Rating	Code/Standard	Manufacturer	
1	Labels	Labels are to be attached for each component, and MCB's. Labels must be fixed with nuts and bolts. Section 3.14		Eskom Standard 240-62629353		
2.1	Isolator Switches	2P Type S316R and C302R	32A	Comelectric or Equivalent		
2.2	Single Pole MCB's	(1P MCB's) x 9 Curve C – 5kA	10A			
2.3	Single Pole MCB's	(1P MCB) x 1 Curve C – 5kA	16A			
2.4	Single Pole MCB's	(1P MCB) x 2 Curve C – 5kA	2A			
3	Doors	The door stay shall be off the hook and eye type, not window stay. Doors shall be fitted with stiffeners. See section 3.2		Comply		
4	Heater		40w at 230 VAC	Comply		
5	Casing/ construction	The casing must be foundation mounted according to drawings 0.52/20249. Fabricated from 3CR12 with minimum thickness of 1.6mm. Stainless steel nuts and bolts must be used.		Comply – IP54		
6	Packaging	Refer to section 5 of the Technical Specification		Comply		
7	Wiring and cabling	Refer to Technical Specification, 3.13 and 3.13.1		Comply		
8	Copper Earth pad and brass bolt	(40 X 40 X 3mm) Earth pad and brass bolt as indicated in detail 'a' of drawing		Comply		
9	Gland Plates	To be manufactured from 2mm 3CR12 stainless steel. The removable gland plates must be pre-drilled and a supplied with blanks. The gland plate shall comprise of 4 sections.		Comply		
10	Terminals	M10/10RS (x 376) WFF 35 (x 6)		Comply	Entrelec/Weid muller/Elmex or Equivalent	
11	Earth bar	Pre-drilled main, front and rear earthbar as shown in drawings and supplied with stainless steel nuts, bolts and washers.		Comply		
12	Internal Light	Door switches shall be provided on each door to switch on a LED light (330mm).		Comply		

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Annex B – Specific Technical A/B Schedule for JB1100

No	Items	Schedule A				Schedule B
		Description	Rating	Code/Standard	Manufacturer	
1	Labels	Labels are to be attached for each component, and MCB's. Labels shall be permanently fixed with nuts and bolts. Section 3.14		Eskom Standard 240-62629353		
2	MCB's					
2.1	Isolator	2P	10A			
2.2	Single Pole MCB's	(1P MCB's) x 2 Curve C – 5kA	2A			
3	Doors	The door stay shall be off the hook and eye type, not window stay. Doors shall be fitted with stiffeners. See section 3.2		Comply		
4	Heater		40 W at 230 VAC	Comply		
5	Casing/ construction	The casing must be foundation mounted according to drawings 0.52/20249. Fabricated from 3CR12 with minimum thickness of 1.6mm. Stainless steel nuts and bolts must be used.		Comply IP54		
6	Packaging	Refer to section 5 of the Technical Specification		Comply		
7	Wiring and cabling	Refer to Technical Specification, 3.13 and 3.13.2		Comply		
8	Copper Earth pad and brass bolt	(40 X 40 X 3mm) Earth pad and brass bolt as indicated in detail 'a' of drawing		Comply		
9	Gland Plates	To be manufactured from 2mm 3CR12 stainless steel. The removable gland plates must be pre-drilled and a supplied with blanks. The gland plate shall comprise of 4 sections.		Comply		
10	Terminals	M10/10RS (x 350) WFF 35 (x 6)		Comply	Entrelec/Weid muller/Elmex or Equivalent	
11	Earth bar	Pre-drilled main, front and rear earthbar as shown in drawings and supplied with stainless steel nuts, bolts and washers.		Comply		
12	Internal Light	Door switches shall be provided on each door to switch on a LED light (330mm).		Comply		

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Annex C – Specific Technical A/B Schedule for JB0602

		Schedule A				Schedule B
No	Items	Description	Rating	Code/Standard	Manufacturer	
1	Labels	Labels are to be attached with nuts and bolts for each component, and MCB's. Refer to section 3.14 of Technical Specification		Eskom Standard 240-62629353		
2	MCB's					
2.1	Single Pole MCB's	(1P MCB's) x 12 Curve C – 5kA	10A			
2.2	Single Pole MCB's	(1P MCB) X 1 Curve C – 5kA	2A			
2.3	Triple Pole MCB's	(3P MCB's) x 1 Curve C – 5kA with NC contact (see drawing 0.52/1186)	16A			
3	Doors	The door stay must be of hook and eye type not window stay. See section 3.2		Comply		
4	Casing/ construction	The casing must be structure mounted according to drawings 0.54/6731. Fabricated from 3CR12 with minimum thickness of 1.6 mm. Stainless steel nuts and bolts must be used.		Comply – IP54		
5	Packaging	Refer to Technical Specification, 5		Comply		
6	Wiring and cabling	Refer to section 3.13 and 3.13.3 of Technical Specification		Comply		
7	Copper Earth pad and brass bolt	(40 X 40 X 3mm) Earth pad and brass bolt as indicated in detail 'a' of drawing		Comply		
8	Gland Plates	To be manufactured from 2mm 3CR12 stainless steel. The removable gland plate must be pre-drilled and a supplied with blanks.		Comply		
9	Terminals	M10/10RS (x 34) D6/8.ST.RS (x 3) WFF35 (x4)			Entrelec, Elmex, Weidmuller or Equivalent	
10	Earth bar	Pre-drilled earthbar as shown in drawings and supplied with stainless steel nuts, bolts and washers.		Comply		
11	"J" Bolts	4 x (85x12) Stainless steel "J" Bolts to be supplied (8 nuts and 8 washers)		Comply		

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Annex D – Specific Technical A/B Schedule for JB0902

		Schedule A				Schedule B
No	Items	Description	Rating	Code/Standard	Manufacturer	
1	Labels	Labels are to be attached with nuts and bolts for each component, and MCB's. Refer to Section 3.14 of Technical Specification		Eskom Standard 240-62629353		
2.1	Single Pole MCB's	(1P MCB's) x 75 – Curve C – 5kA	10A			
2.2	Single Pole MCB's	(1P MCB's) x 6 – Curve C – 5kA	32A			
2.3	Double Pole MCB	(2P MCB) X 2 – Curve C – 5kA	2A			
2.4	Triple Pole MCB	(3P MCB's) x 5 – Curve C – 5kA with Auxiliary contacts (see drawing 0.52/30107)	10A			
2.5	Link MCB's	1P X 2				
3	Doors	The door stay must be of hook and eye type not window stay. See section 3.2		Comply		
4	Heater		40 W at 230 VAC	Comply		
5	Casing/ construction	The casing must be structure mounted according to drawings 0.52/1208. Fabricated from 3CR12 with minimum thickness of 1.6 mm. Stainless steel nuts and bolts must be used.		Comply – IP54		
6	Packaging	Refer to Section 5 of the Technical Specification		Comply		
7	Wiring and cabling	Refer to section 3.13 and 3.13.4 of the Technical Specification		Comply		
8	Copper Earth pad and brass bolt	(40 X 40 X 3mm) Earth pad and brass bolt as indicated in detail 'a' of drawing		Comply		
9	Gland Plates	To be manufactured from 2mm 3CR12 stainless steel. The removable gland plate must be pre-drilled and a supplied with blanks.		Comply		
10	Terminals	M10/10RS (x 137)		Comply	Entrelec/Elmex or Equivalent	
11	Earth bar	Pre-drilled earthbar as shown in drawings and supplied with stainless steel nuts, bolts and washers.		Comply		

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Annex E – Specific Technical A/B Schedule for JB1600

No	Items	Schedule A				Schedule B
		Description	Rating	Code/Standard	Manufacturer	
1	Labels	Labels are to be attached for each component, and MCB's.		Eskom Standard 240-62629353		
2	Doors	The door stay must be of hook and eye type not window stay. See section 3.2		To be specified by supplier for the purchaser's approval		
3	Casing/ construction	The casing must be structure mounted according to drawings 0.52/1205. Fabricated from 3CR12 with minimum thickness of 1.6 mm. Stainless steel nuts and bolts must be used.		Comply IP54		
4	Packaging	Refer to Technical Specification, 5		Comply		
5	Wiring and cabling	Refer to section 3 of Technical Specification.		Comply		
6	Copper Earth pad and brass bolt	(40 X 40 X 3mm) Earth pad and brass bolt as indicated in detail 'a' of drawing		Comply		
7	Gland Plates	To be manufactured from 2mm 3CR12 stainless steel. The removable gland plate must be pre-drilled and a supplied with blanks.		Comply		
8	Terminals	KULT1/WDU10SL/M10/10RS (x 55) WFF35/SPT35 (X2)		Comply	Entrelec/Elmex /Weidmuller	
9	Earth bar	Pre-drilled earthbar as shown in drawings and supplied with stainless steel nuts, bolts and washers.		Comply		
10	"J" Bolts	4 x (85x12) Stainless steel "J" bolts supplied with box		Comply		

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Annex F – Specific Technical A/B Schedule for JB1800

No	Items	Schedule A				Schedule B
		Description	Rating	Code/Standard	Manufacturer	
1	Labels	Labels are to be attached with nuts and bolts for each component, and MCB's. Refer to section 3.14 of the Technical Specification		Eskom Standard 240-62629353		
2	MCB's	1 x 2P – 5kA – Curve C 1 x 1P – 5kA – Curve C	10A 2A			
3	Doors	The door stay must be of hook and eye type not window stay. See section 3.2		Comply		
4	Heater		30w at 230 VAC	Comply		
5	Casing/ construction	The casing must be structure mounted according to drawings 0.52/20397. Fabricated from 3CR12 with minimum thickness of 1.6mm. Stainless steel nuts and bolts must be used.		Comply – IP54		
6	Packaging	Refer to section 5 of the Technical Specification		Comply		
7	Wiring and cabling	2.5mm ² wire. Refer to section 3.13 of Technical Specification		Comply		
8	Copper Earth pad and brass bolt	(40 X 40 X 3 mm) Earth pad and brass bolt as indicated in detail 'a' of drawing		Comply		
9	Gland Plates	To be manufactured from 2mm 3CR12 stainless steel. The 3 removable gland plate must be pre-drilled and a supplied with blanks.		Comply		
10	Terminals	M10/10RS (x 190)		Comply	Entelec/Elmex /Weidmuller	
11	Earth bar	Pre-drilled earthbar as shown in drawings and supplied with stainless steel nuts, bolts and washers.		Comply		
12	"J" Bolts	4 x (100x12) Stainless steel "J" Bolts supplied with box		Comply		

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Annex G – Specific Technical A/B Schedule for JB1700

		Schedule A				Schedule B
No	Items	Description	Rating	Code/Standard	Manufacturer	
1	Labels	Labels are to be attached with nuts and bolts for each component, and MCB's. Refer to section 3.14 of the Technical Specification		Eskom Standard 240-62629353		
2	Switches	LOR – S316RDB CS – C302R			Comelectric or equivalent	
3	MCB's	1 x 2P – 5kA – Curve C 2 x 1P – 5kA – Curve C 1 x 1P – 5kA – Curve C	10A 10A 2A			
4	Doors	The door stay must be of hook and eye type not window stay. See section 3.2		Comply		
5	Heater		30 W at 230 VAC	Comply		
6	Casing/ construction	The casing must be structure mounted according to drawings 0.52/20365. Fabricated from 3CR12 with minimum thickness of 1.6mm. Stainless steel nuts and bolts must be used.		Comply- IP54		
7	Packaging	Refer to Technical Section 5		Comply		
8	Wiring and cabling	2.5mm ² . Refer to section 3.13 of the Technical Specification		Comply		
9	Copper Earth pad and brass bolt	(40 X 40 X 3mm) Earth pad and brass bolt as indicated in detail 'a' of drawing		Comply		
10	Gland Plates	To be manufactured from 2mm 3CR12 stainless steel. The 3 removable gland plate must be pre-drilled and a supplied with blanks.		Comply		
11	Terminals	M10/10RS (x 161) SPF35/WFF35 (x4)		Comply	Entrelec/ Elmex/ Weidmuller	
12	Earth bar	Pre-drilled earthbar as shown in drawings and supplied with stainless steel nuts, bolts and washers.		Comply		
13	"J" Bolts	4 x (100x12) Stainless steel "J" Bolts supplied with box		Comply		

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Annex H – Specific Technical A/B Schedule for MIB

No	Items	Schedule A				Schedule B
		Description	Rating	Code/Standard	Manufacturer	
1	Labels	Labels are to be attached for each terminal rail. Labels are indicated on the drawing		Eskom Standard 240-62629353		
2	Base Frame	Galvanised mild steel (100 x 50 x 3) The U Channel must be turned around in the front and rear as indicated in the drawings. The U channel must have ventilation holes as indicated in the drawings.		Comply		
3	Doors	The door stay must be of hook and eye type, not window stay. See section 3.2		Comply		
4	Casing/ construction	The casing must be foundation mounted according to drawings 0.52/30075. Fabricated from 3CR12 with minimum thickness of 2mm. Stainless steel nuts and bolts must be used.		Comply – IP54		
5	Packaging	Refer to section 5 of the Technical Specification		Comply		
6	Copper Earth pad and brass bolt	(40 X 40 X 3 mm) Earth pad and brass bolt as indicated in detail 'a' of drawing		Comply		
7	Gland Plates	To be manufactured from 2mm 3CR12 stainless steel. The removable gland plates must be pre-drilled and a supplied with blanks.		Comply		
8	Terminals Trunking	M10/10RS x 888 150mm x 100mm – Narrow slot		Comply	Entrelec/Elmex /Weidmuller	
9	Earthing	Pre-drilled earthbar as shown in drawings and supplied with stainless steel nuts, bolts and washers. Refer to section 8.16 of the Technical Specification		Comply		

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Annex I – Specific Technical A/B Schedule for PB0100

No	Items	Schedule A				Schedule B
		Description	Rating	Code/Standard	Manufacturer	
1	Labels	Labels are to be attached with nuts and bolts for each component. Refer to section 3.14 of Technical Specification.		Eskom Standard 240-62629353		
2	Plug/ Socket	A single phase switched socket outlet where the switch shall be the 16A MCB.	16 A at 230 VAC	To be specified by supplier for the purchaser's approval		
3	Door	The door stay must be of hook type not window stay. See section 3.2		Comply		
4	Casing/ construction	The casing must be pole mounted according to drawings 0.52/20251. Fabricated from 3CR12 with minimum thickness of 1.6mm. Stainless steel nuts and bolts must be used.		Comply – IP54		
5	Packaging	Refer to section 5 of the Technical Specification		To be specified by supplier for the purchaser's approval		
6	Wiring and cabling	Refer to Technical Specification, 3.13 and 3.13.7		Comply		
7	Copper Earth pad and brass bolt	(40 X 40 X 3mm) Earth pad and brass bolt as indicated in detail 'a' of drawing		Comply		
8	Gland Plate	To be manufactured from 2mm , 3CR12 stainless steel. The removable gland plate must be pre-drilled and supplied with blanks.		Comply		
9	MCB 3	4P MCB – Curve C + 4P 30mA RCD (Asi)	63A			
	MCB's (5-12)	1P MCB – Curve C	20A			
	MCB 13	1P MCB – Curve C	16A			
	MCB 14	3P MCB – Curve C	63A			
10	Terminals	WFF35 or SPT35 (X12) – Circuits 1,2 & 14 WDU10SL / Kult 1(G) – Circuits 5-12 Knife switch terminal x2 for alarm circuit.			Weidmuller/ Elmex/ Entrlec	
11	Earth Bar	Pre-drilled earthbar as shown in drawings and supplied with stainless steel nuts, bolts and washers.		Comply		

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Annex J – Specific Technical A/B Schedule for 350A Plug Box

		Schedule A				Schedule B
No	Items	Description	Rating	Code/Standard	Manufacturer	
1	Labels	Labels are to be attached for each component. Refer to section 3.14 of the Technical Specification		Eskom Standard 240-62629353		
2	Plug/ Socket	A single phase switched socket outlet where the switch shall be the 16A MCB.	16 A at 230 VAC	To be specified by supplier for the purchaser's approval		
3	Door	The door stay must be of hook type not window stay. See section 3.2		Comply		
4	Casing/ construction	The casing must be pole mounted according to drawings 0.52/30074. Fabricated from 3CR12 with minimum thickness of 1.6mm. Stainless steel nuts and bolts must be used.		Comply – IP54		
5	Packaging	Refer to section 5 of the Technical Specification		Comply		
6	Wiring and cabling	Refer to Technical Specification, 3.13 and 3.13.8		Comply		
7	Copper Earth pad and brass bolt	(40 X 40 X 3mm) Earth pad and brass bolt as indicated in detail 'a' of drawing		Comply		
8	Gland Plate	To be manufactured from 2mm , 3CR12 stainless steel. The removable gland plate must be pre-drilled and supplied with blanks.				
9	MCB 3	2P MCB + 30mA Earth leakage unit	63A 15kA			
	MCB's (5 & 6)	1P MCB – Curve C – 15kA	25A			
	MCB 7	1P MCB – Curve C – 15kA	16A			
	MCB 9	3P MCCB with electronic tripping module settable from 1 to 0.7 In	400A			
10	Busbars	20 x 10mm busbars shall be used as indicated in the drawings.		Comply		
11	Earth Bar	Pre-drilled earthbar as shown in drawings and supplied with stainless steel nuts, bolts and washers.		Comply		

Annex K – Specific Technical A/B Schedule for AC Board Type 1

		Schedule A				Schedule B
No	Items	Description	Rating	Code/Standard	Manufacturer	
1.1	Labels (Equipment)	Labels are to be attached with nuts and bolts for each component, lights, relays, MCB's and switches, etc. Refer to section 3.14 of Technical Specification.		Eskom Standard 240-62629353		
1.2	Labels (Application Drawing)	A single 300mm x 300mm label is required for indicating all outgoing MCB's stating its destination according to the drawing. Sheet 3		Comply		
2	MCB's			Must comply to SANS 1574		
2.1	Control Circuit MCB's	The tripping curve must be type C. 10kA (EN 60898-1)				
2.2	MCB's (1-3, 17, 24, 31, 40, 48-50)	The tripping curve must be type C. 10kA (EN 60898-1). 2P + Vigi	16A			
2.3	MCB's (4-11, 14-16, 21-23, 28-30, 36-39, 45-47, 51-55)	The tripping curve must be type C. 10kA (EN 60898-1). 1P	20A			
2.4	MCB's (15-16)	The tripping curve must be type C. 10kA (EN 60898-1). 1P	25A			
2.5	MCB's (18,19,26,27)	The tripping curve must be type C. 10kA (EN 60898-1). 4P + Vigi	63A			
2.6	MCB's (20,25)	The tripping curve must be type C. 10kA (EN 60898-1). 3P	25A			
2.7	MCB's (32,33)	The tripping curve must be type C. 10kA (EN 60898-1). 3P	63A			
2.8	MCB's (34-36, 41, 42)	The tripping curve must be type C. 10kA (EN 60898-1). 3P	80A			
2.9	MCB's (43,44)	The tripping curve must be type C. 10kA (EN 60898-1). 3P	100A			
2.10	MCCB's (60,61)	NSX160B + M/LOGIC 2.2 With rotary handle	160A ADJ			
3.1	Relays	Auxiliary relays	250 VAC			
3.2	Phase Fail Relay	Phase fail relay (3 phase) with overvoltage and under voltage function				
4.1	Voltmeter	Range 0-400VAC	400 VAC			
4.2	Voltage selection	Single phase selection				

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	switch					
4.3	Ammeter	0-250A				
5	Supply selector switch			Comelectric or equivalent		
6	Contactors	4 Pole contactor with mechanical interlock	≥ 300A			
7	Switch Disconnectors	3 Pole. AC21 duty >300A		Comply		
8	Indication Lights	Red indication lights must be used	230 VAC	Comply		
9	Casing/ construction	The AC board to be 2mm mild steel and must be suitable for floor mounting. The top of the panel must be completely sealed,		Comply		
10	Packaging	See section 5 of Specification		Comply		
11	Wiring and cabling	Refer to Technical Specification, 3.13 and 3.13.9		Comply		
12	Terminals	Weidmuller / Elmex / Entrelec as indicated in Drawing 0.52/20250		Comply		
13	Padlocking facility	MCB locking brackets made out of mild steel for all outgoing MCB's.		Comply		
14	Gland Plate	To be constructed of 3mm mild steel, zinc plated and trivalent blue passivated. Position of holes is shown in drawing. Bottom entry only for cables		Comply		
15	Base Frame	Galvanised mild steel (100 x 50 x 3)		Comply		
16	Earth Bar	Pre-drilled earthbar to be provided and supplied with stainless steel nuts, bolts and washers.		Comply		
17	Busbars	20 x 10mm		Comply		
18	Nuts and Bolts	Cadmium coated and trivalent blue/clear passivated		Comply		
19	Earthing	See section 3.16 of specification		Comply		
20	MCB locking brackets	See section 3.15 of specification		Comply		

Annex L – Specific Technical A/B Schedule for TDB Type 1

		Schedule A				Schedule B
No	Items	Description	Rating	Code/Standard	Manufacturer	
1.1	Labels (Equipment)	Labels are to be attached with nuts and bolts for each component, lights, relays, MCB's and switches, etc. Refer to section 3.14 of Technical Specification.		Eskom Standard 240-62629353		
1.2	Labels (Application Drawing)	Labels are required for all outgoing MCB's stating its destination according to the Eskom Drawings. Sheet 2		Comply		
2	MCB's			Must comply to SANS 1574		
2.1	Heater Circuit MCB	1P MCB - Trip Curve C	2A			
2.2	Complete Source Change over assembly	With Compact INS500 – 4P	500A			
2.3	MCCB's (3-5)	NSX250N + Micrologic 2.2 – 3P With rotary handle	250A			
2.4	MCCB's (6-7)	NSX160N + TM160D – 3P With rotary handle	160A			
2.5	MCB (8)	3P MCB – Trip curve C	100A			
2.6	MCB (9)	3P MCB – Trip curve D	25A			
3	Phase/Flash Barriers	Must be installed for all MCCB's		Comply		
4	Spreaders	Must be installed on the load side of the NSX250N MCCB's		Comply		
5	Casing/ construction	The casing must be foundation mounted according to drawings 0.52/20252. Fabricated from 3CR12 with minimum thickness of 2mm. Stainless steel nuts and bolts must be used.		Comply		
6	Packaging	Refer to section 5 of the Technical Instruction		Comply		
7	Wiring and cabling	Refer to Technical Specification 3.13 and 3.13.10		Comply		
8	Padlocking facility	MCCB's must have rotary handles incorporating padlocking facility.		Comply		

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9	Gland Plate	To be constructed of 2mm 3CR12 Stainless steel. The removable gland plate must be pre-drilled and supplied with blanks.		Comply		
10	Base Frame	Galvanised mild steel (100 x 50 x 3)		Comply		
11	Earth Bar	Pre-drilled earthbar to be provided with stainless steel bolts and nuts.		Comply		

Annex M – Specific Technical A/B Schedule for TDB Type 2

		Schedule A				Schedule B
No	Items	Description	Rating	Code/Standard	Manufacturer	
1.1	Labels (Equipment)	Labels are to be attached with nuts and bolts for each component, lights, relays, MCB's and switches, etc. Refer to section 3.14 of Technical Specification.		Eskom Standard 240-62629353		
1.2	Labels (Application Drawing)	Labels are required for all outgoing MCB's stating its destination according to Eskom Drawings. Sheet 2		Comply		
2	MCB's			Must comply to SANS 1574		
2.1	Control Circuit MCB	Three pole MCB (x 1). The tripping curve must be type C	6A			
2.2	Incoming supply MCB	Four pole MCB (x 1), which must handle short circuit current of 10 kA, at 400VAC. The tripping curve must be type C	63 A			
2.3	MCB's (1-36)	Single pole MCB (x 36). The tripping curve must be type C	16A			
2.4	MCB's (37-60)	Double pole MCB (x 24) + Vigi	16A			
3.1	Relays	AC Fail Relay	250 VAC			
3.2	Phase Fail Relay	Phase fail relay (3 phase)				
4.1	Isolators	3 Pole – AC21A – 200A	200A			
4.2	Contactors	4 Pole – AC1 > 200A + Mechanical Interlock	200A			
5	Plug Module	2 x single phase switched socket outlet	16 A at 230 VAC	Must be SANS approved		
6	Indication Lights	Red indication lights must be used	230 VAC	LED		
7	Casing/ construction	The casing must be foundation mounted according to drawings 0.52/20253. Fabricated from 3CR12 with minimum thickness of 2mm. Stainless steel nuts and bolts must be used.		Comply		
8	Packaging	Refer to section 5 of the Technical Specification		Comply		
9	Wiring and	Refer to Technical Specification 3.13		Comply		

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	cabling	and 3.13.11				
10	Padlocking facility	MCCB's must have rotary handles incorporating padlocking facility.		Comply		
11	Gland Plate	To be constructed of 2mm 3CR12 Stainless steel. The removable gland plate must be pre-drilled and supplied with blanks.		Comply		
12	Base Frame	Galvanised mild steel (100 x 50 x 3)		Comply		
13	Earth Bar	Pre-drilled earthbar to be provided with stainless steel nuts and bolts		Comply		

Annex N – Technical A/B schedule for Station DB- Type 2

Items	Description	Units	Schedule A	Schedule B
1	Isolators			
1.1	Manufacturer		***	
1.2	Type		***	
1.3	Manufacturer's specification required		Yes	
1.4	Number of poles	3	Comply	
1.5	Current rating	320A	Comply	
1.6	Voltage rating	400 VAC	Comply	
1.7	Number of Isolators	2	Comply	
1.8	Rated impulse withstand voltage		***	
1.9	Rated making capacity		***	
1.10	Rated breaking capacity		***	
2	Contactors			
2.1	Manufacturer		***	
2.2	Type		***	
2.3	Manufacturer's specification required		Yes	
2.4	Number of poles	4	Comply	
2.5	Current rating	315A (AC 1)	Comply	
2.6	Coil Voltage rating	230 VAC	Comply	
2.7	Rated impulse withstand voltage		***	
2.8	Rated making capacity		***	
2.9	Rated breaking capacity		***	
2.10	Number of Contactors	2	Comply	
2.11	Interlocking (Mechanical & Electrical)		Yes	
2.12	Quantity of auxiliary contacts	See Drawing	Comply	
3	Voltage and Current Metering			
3.1	Voltage selection switch			
3.1.1	Manufacturer		***	
3.1.2	Type (No off position)		***	
3.1.3	Manufacturer's specification required		Yes	
3.1.4	Voltage rating		***	
3.1.5	Number of poles	See Drawing	***	
3.1.6	Quantity of voltage selection switches	2	Comply	

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Items	Description	Units	Schedule A	Schedule B
3.2	Voltmeter			
3.2.1	Manufacturer		***	
3.2.2	Type		***	
3.2.3	Manufacturer's specification required		Yes	
3.2.4	Voltage rating	0 – 230 VAC	Comply	
3.2.5	Quantity of volt meters	2	Comply	
3.3	MCB's			
3.3.1	Manufacturer		***	
3.3.2	Type		***	
3.3.3	Rated voltage	230 VAC	Comply	
3.3.4	Rated current	6A	Comply	
3.3.5	Rated short-circuit current rating	10 kA	Comply	
3.3.6	Number of poles	3	Comply	
3.3.7	Quantity of MCB's	2	Comply	
3.4	Ammeter			
3.4.1	Manufacturer		***	
3.4.2	Type		***	
3.4.3	Manufacturer's specification required		Comply	
3.4.4	Current rating	0 - 250A	Comply	
3.4.5	Number of ammeters	2	Comply	
3.5	Current transformer			
3.5.1	Manufacturer		***	
3.5.2	Type		***	
3.5.3	Manufacturer's specification required		Yes	
3.5.4	Turns ratio	250 / 1A	Comply	
3.5.5	Quantity of current transformers	2	Comply	
4.	Control Circuit			
4.1	LED indication light			
4.1.1	Manufacturer		***	
4.1.2	Type		***	
4.1.3	Colour		Red	
4.1.4	Voltage rating	230 VAC	Comply	
4.1.5	Quantity of LED's	2	Comply	

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Items	Description	Units	Schedule A	Schedule B
4.2	MCB's			
4.2.1	Manufacturer		***	
4.2.2	Type		***	
4.2.3	Rated voltage	230 VAC	Comply	
4.2.4	Rated current	6 A	Comply	
4.2.5	Rated short-circuit current rating	10 kA	Comply	
4.2.6	Number of poles	2	Comply	
4.2.7	Quantity of MCB's	2	Comply	
4.3	Supply Switch			
4.3.1	Manufacture	Comelectric or equivalent	Comply	
4.3.2	Type	S304X	Comply	
4.3.3	Rated voltage	230 VAC	Comply	
4.4	Auxiliary relays			
4.4.1	Manufacturer		***	
4.4.2	Type		***	
4.4.3	Rated voltage	230 VAC	Comply	
4.4.4	Number of Auxiliary contacts	See Drawing	Comply	
4.4.5	Normally open	1	Comply	
4.4.6	Normally closed	1	Comply	
4.4.7	Quantity of relays	2	Comply	
5.	Heater Circuit			
5.1	Heater			
5.1.1	Manufacturer		***	
5.1.2	Type		***	
5.1.3	Rated voltage	230 VAC	Comply	
5.1.4	Rated power	40 W	Comply	
5.2	MCB			
5.2.1	Manufacturer		***	
5.2.2	Type		***	
5.2.3	Rated voltage	230 VAC	Comply	
5.2.4	Rated current	2 A	Comply	
5.2.5	Rated short-circuit current rating	10 kA	Yes	
5.2.6	Number of poles	1	Yes	

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Items	Description	Units	Schedule A	Schedule B
5.2.7	Quantity of MCB's	1	Yes	
6.	Load circuit MCCB's			
6.1	160A MCCB's			
6.1.1	Manufacturer		***	
6.1.2	Type		***	
6.1.3	Rated voltage	400 VAC	Comply	
6.1.4	Rated current	160 A	Comply	
6.1.5	Rated short-circuit current rating		***	
6.1.6	Overload / Short-circuit protection	Electronic	Comply	
6.1.7	Number of poles	3	Comply	
6.1.8	Quantity of MCB's	2	Comply	
6.19	Phase/Flash Barriers	Load and supply sides	Comply	
6.2	100A MCB's			
6.2.1	Manufacturer		***	
6.2.2	Type – Curve C		***	
6.2.3	Rated voltage	400 VAC	Comply	
6.2.4	Rated current	100 A	Comply	
6.2.5	Rated short-circuit current rating (IEC 60898-1)	10 kA	Comply	
6.2.6	Number of poles	3	Comply	
6.2.7	Quantity of MCB's	3	Comply	
6.3	80A MCB's			
6.3.1	Manufacturer		***	
6.3.2	Type – Curve C		***	
6.3.3	Rated voltage	400 VAC	Comply	
6.3.4	Rated current	80 A	Comply	
6.3.5	Rated short-circuit current rating (IEC 60898-1)	10 kA	Comply	
6.3.6	Number of poles	3	Comply	
6.3.7	Quantity of MCB's	3	Comply	
6.4	63A MCB's			
6.4.1	Manufacturer		***	
6.4.2	Type – Curve C		***	
6.4.3	Rated voltage	400 VAC	Comply	

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Items	Description	Units	Schedule A	Schedule B
6.4.4	Rated current	63 A	Comply	
6.4.5	Rated short-circuit current rating (IEC 60898-1)	10 kA	Comply	
6.4.6	Number of poles	3	Comply	
6.4.7	Quantity of MCB's	2	Comply	
6.5	63A MCB's + RCD's			
6.5.1	Manufacturer		****	
6.5.2	Type – Curve C		Comply	
6.5.3	Rated voltage	400 VAC	Comply	
6.5.4	Rated short-circuit current rating (IEC 60898-1)	10kA	Comply	
6.5.5	Number of poles	4	Comply	
6.5.6	Quantity of MCB's	8	Comply	
6.5.7	RCD Manufacturer		***	
6.5.8	RCD Type	Asi – selective	Comply	
6.5.9	RCD – Number of poles	4	Comply	
6.5.10	RCD – Rated voltage	400 VAC	Comply	
6.5.11	RCD – Rated current	63 A	Comply	
6.5.12	RCD - Sensitivity	300 mA	Comply	
6.5.13	Quantity of RCD's	8	Comply	
7	Terminals			
7.1	Manufacturer	Weidmuller/Elmex	Comply	
7.2	Type (WFF35 / SPT35(G) x 64) or equivalent	WFF35 / SPT35(G)	Comply	
7.3	Type (WDU10SL / Kult 1(G) x 4) or equivalent	WDU10SL/KULT1(G)	Comply	
8	Dimension of unit			
8.1	Width	2400mm	Comply	
8.2	Depth	800mm	Comply	
8.3	Height (including base frame excluding roof)	2200mm	Comply	
9	Minimum material thickness			
9.1	Construction and manufacturing of assemblies with the use of 3CR12	2mm	Comply	

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Items	Description	Units	Schedule A	Schedule B
	corrosion resisting steel.			
9.2	Gland Plates (Galvanised mild steel)	3mm	Comply	
9.3	Supporting Structures	3mm	Comply	
9.4	Cover Plates	2mm	Comply	
9.5	Removable Covers	2mm	Comply	
9.6	Doors	2mm	Comply	
9.7	Equipment Mounting Panels	2mm	Comply	
9.8	Lifting Bracket – Seam Welded	See Drawing	Comply	
9.9	Nuts and bolts – Stainless steel		Comply	
10	Degree of Protection			
10.1	Outdoor Enclosure – Seam Welded	IP65	Comply	
10.2	Operating Front External Doors Open	IP2X	Comply	
11	Electrical characteristics			
11.1	Rated operating voltage	400 VAC	Comply	
11.2	Rated Insulation voltage	1000VAC	Comply	
11.3	Number of phases and Neutral	3 + N	Comply	
11.4	Earthing	Solid	Comply	
12	Base Frame			
12.1	Height	100mm	Comply	
12.2	Minimum material thickness	3mm	Comply	
13	Door Hinges and Door Stays			
13.1	Make (Non corroding metal). See Section 3.2		Comply	
14	Busbars			
14.1	General			
14.1.1	number of phases (poles)	3	Comply	
14.1.2	neutral busbar required		Yes	
14.1.3	neutral cross sectional area (100 % of phases busbar cross sectional area)		Yes	
14.1.4	number of bars per phase (pole)	1	Comply	
14.1.5	Main busbar insulation	No insulation	Comply	
14.1.6	busbar material	HD Copper	Comply	

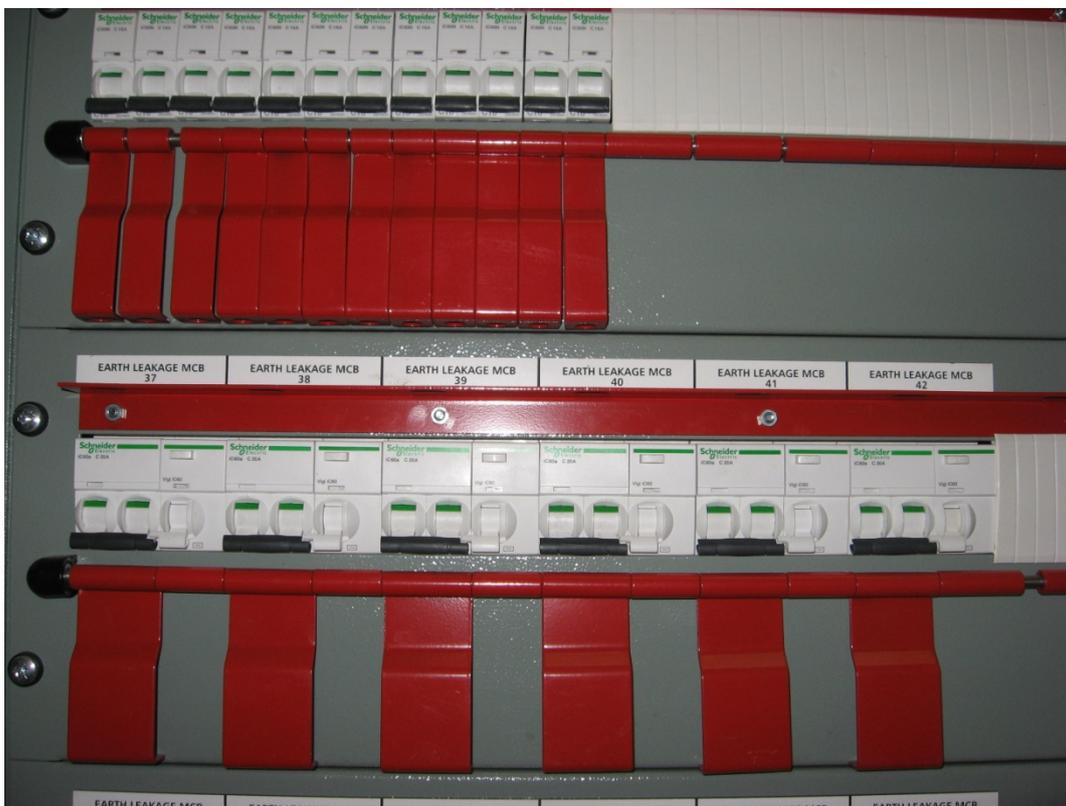
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Items	Description	Units	Schedule A	Schedule B
14.1.7	busbar profile	Rectangular	Comply	
14.1.8	Distribution busbar insulation	Colour coded (Air shrink)	Comply	
14.2	Minimum clearance in air			
14.2.1	phase to earth (pole to earth)	25mm	Comply	
14.2.2	phase to phase (pole to pole)	25mm	Comply	
14.2.3	creepage distance to earth over supports or insulators	25mm	Comply	
14.3	Supports for main busbars			
14.3.1	manufacturer		***	
14.3.2	type		***	
14.3.3	material (mechanical properties required)		***	
14.4	Electrical parameters of main and distribution busbars			
14.4.1	rated current (Main Busbar)	A	***	
14.4.2	rated current (Distribution Busbar)	A	***	
14.5	Cross-sectional area of main , distribution and collection busbars			
14.5.1	main phase busbar	mm ²	***	
14.5.2	main neutral busbar	mm ²	***	
14.5.3	distribution phase busbar	mm ²	***	
14.5.4	distribution neutral busbar	mm ²	***	
14.5.5	collection busbar	mm ²	***	
15	PE conductor			
15.1	Minimum cross sectional area of earth bar	150mm ²	Comply	
15.2	Method of identification of earthing wire	Green/Yellow		
15.3	Method of fastening doors, individual metal plates, terminal rails, etc to earth bar with 6 mm ² cross-sectional area conductor	Individually and direct. All doors must have a stainless steel stud.	Comply	
15.4	External Brass Earth studs at both ends; which must be connected to the earth bar	M16x50 brass bolt fitted with 2 brass flat washers and 2 brass nuts	Comply	
16	Power wiring - minimum panel wire size required on both sides (supply and load) of MCB's			
16.1	100A MCB	35mm ²	Comply	

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Items	Description	Units	Schedule A	Schedule B
16.2	80A MCB	25mm ²	Comply	
16.3	63A	16mm ²	Comply	
17	Labelling			
17.1	Main Outdoor Label Holder – Made out of 3CR12,seam welded on roof		Comply	
17.2	Circuit designation labels (300mm x 315mm) to be provided in triplicate. (On each inner door)	See Drawing	Comply	
17.3	All components must be labelled according to the drawings		Comply	
18	Name plate			
18.1	All Assemblies shall have a nameplate stating at least the following: <ul style="list-style-type: none"> - Manufacturer's name - Manufacturer's address and contact number - Standard to which the assembly was manufactured - Main Busbar current rating - Rated operating voltage - IP rating doors open and doors closed 		Comply	
19	MCB Locking brackets			
19.1	All load MCB's must be fitted with 3CR12 locking brackets. MCCB's must have rotary handles.		Comply	

Annex O – MCB locking brackets



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Annex P – Treatment of Columbus Stainless 3CR12

The processes followed shall conform to that of Columbus Steel from whose guide the following general considerations were extracted. The supplier shall attach a description of the 3CR12 treatment process to their tender. This will be shared with Columbus Stainless to ensure that the process is to the correct standard. This includes but is not limited to pickling, passivation and coating. Further information may be obtained from the Columbus webpage.

P.1 Surface preparation

The surface must be as clean and as grease-free as possible. Surface preparation is to be done after the fabrication process.

P.1.1 Cleaning method – pickling

Mill scale and weld oxidation may be removed by pickling. Fabricated particles can be pickled by either full immersion in a pickling bath, if the size allows, or by pickling pastes. Pickling formulations should be based on nitric acid. Hydrochloric acid solutions should not be used. Pickling pastes can cause staining if allowed to dry. Contact times can be determined by experimentation, but should allow sufficient time to remove the scale and heat tint.

Although pickling is usually followed by passivation in order to achieve optimum corrosion resistance, passivation prior to coating can lead to paint adhesion problems. Fabricated articles can be coated straight after pickling provided that the pickled surfaces are thoroughly rinsed in cold water and dried thereafter.

P.1.2 Coating

The paint used must comply with the specification provided. It is advised that the paints used for a particular paint system be sourced from the same supplier. Due to the inherent smooth surface of Columbus Stainless 3CR12, a primer is essential.

Annex Q – VRW20 Photographs

Q.1 Junction box



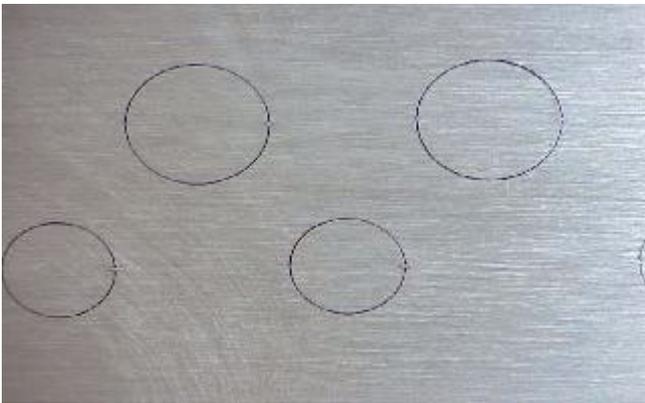
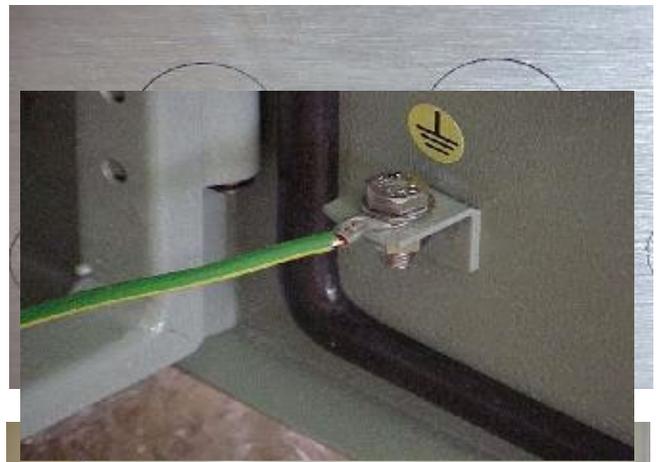
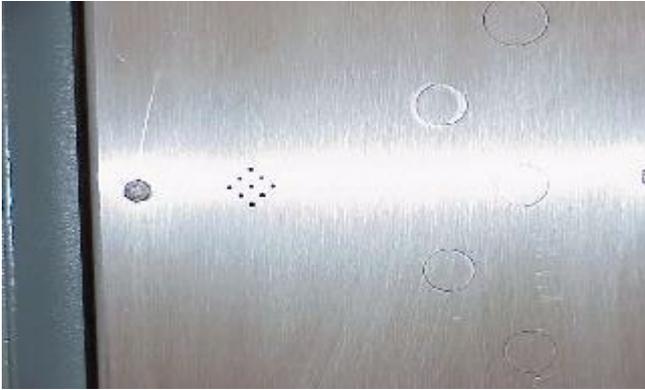
Q.2 Rear detail



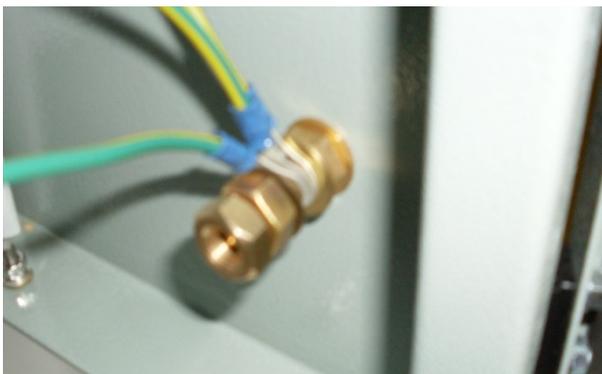
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Q.3 Gland plate detail



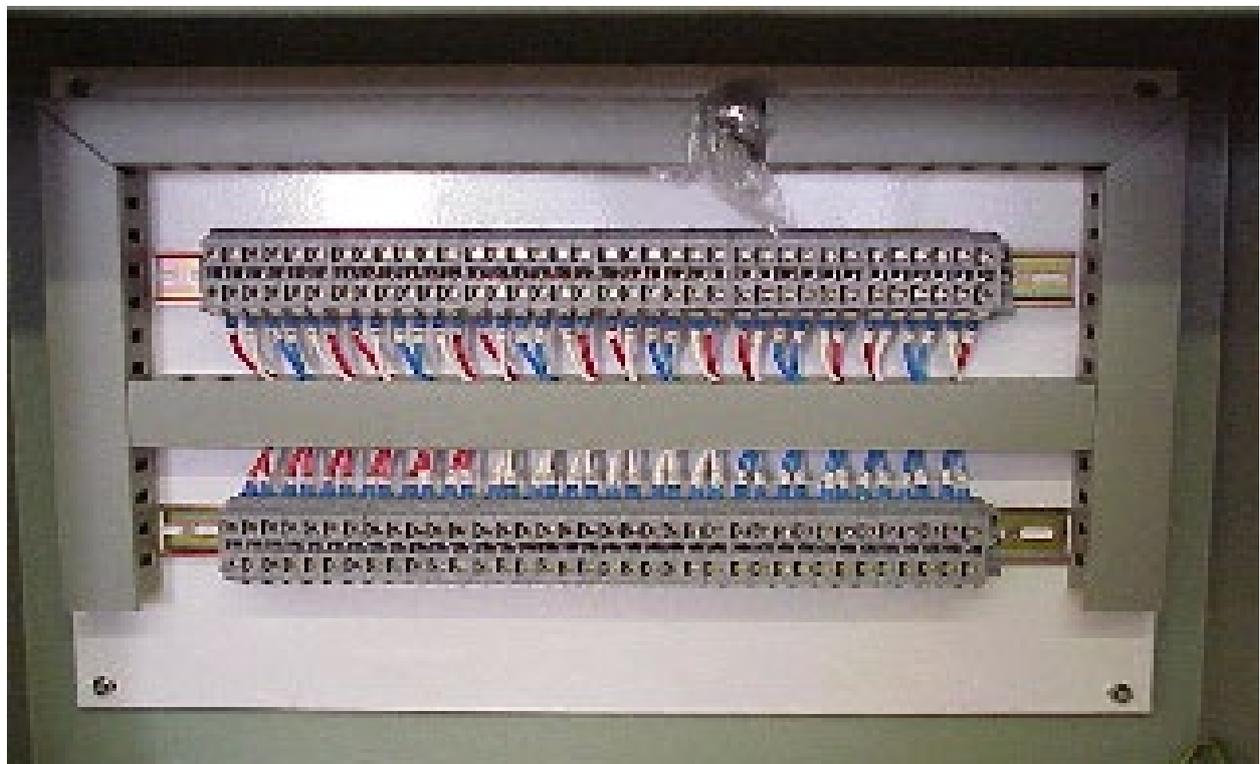
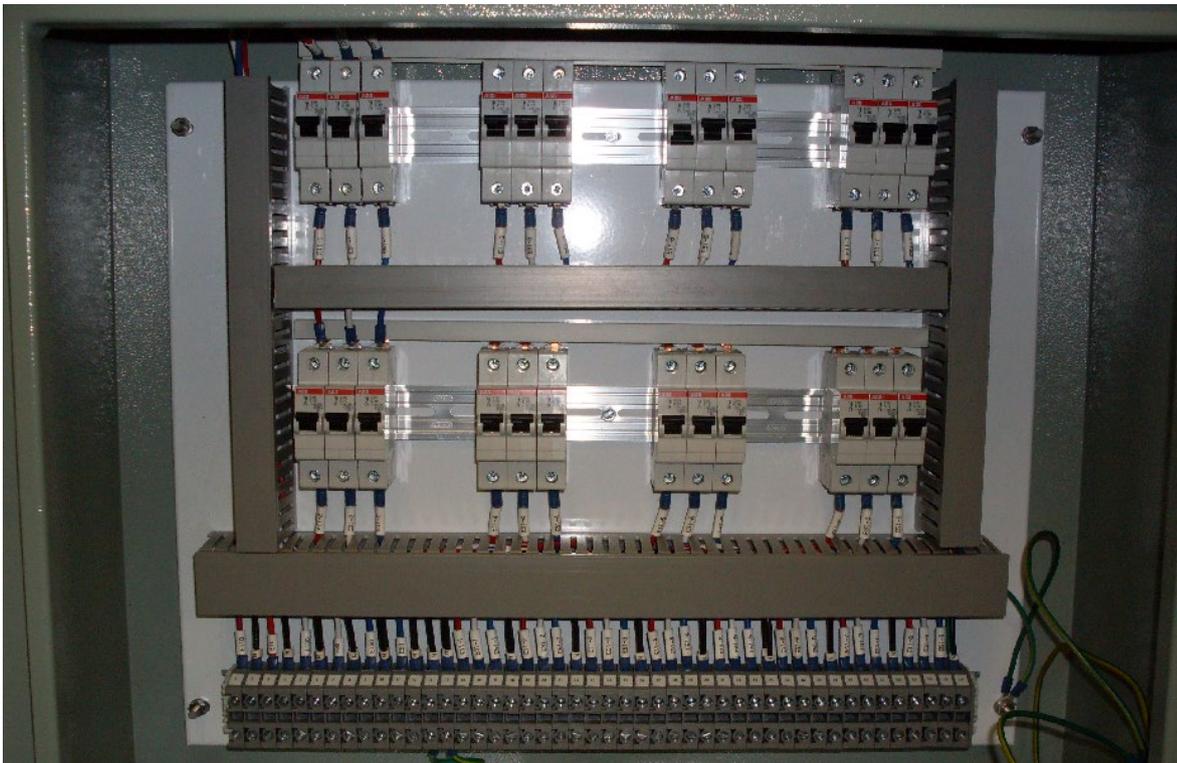
Q.4 Interior, earthing and hinging detail



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Q.5 8-circuit voltage transformer and 6-circuit current transformer inserts



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Annex R – List of items required on contract for the VRW20 JB

Item No.	SAP No.	Description	Quantity
Junction boxes – Main contract items			
10	0175713	VRW20 Junction box with 8 circuit VT insert. (Fitted) (Complete JB) Material: 3CR12. (Drawings D–DT–5406 and D–DT–5405)	
20	0175712	VRW20 Junction box with 6 circuit CT insert. (Fitted) (Complete JB) Material: 3CR12. (Drawings D–DT–5406 and D–DT–5404)	
30	0212591	VRW20 Junction box with double busbar isolator insert. (Fitted) (Complete JB) Material: 3CR12. (Drawing D–DT–5406 and D–DT–5403)	
40	0186950	VRW20 Junction box with 8 circuit VT insert. (Fitted) (Complete JB) Material: 304 stainless steel. (Drawings D–DT–5406 and D–DT–5405)	
50	0186961	VRW20 Junction box with 6 circuit CT insert. (Fitted) (Complete JB) Material: 304 stainless steel. (Drawings D–DT–5406 and D–DT–5404)	
60	0185255	VRW20 Junction box with double busbar isolator insert. (Fitted) (Complete JB) Material: 304 stainless steel. (Drawing D–DT–5406 and D–DT–5403)	
Non-standard/custom components and spares			
100	0011410	VRW20, 304 stainless steel gland plate with pre-punched holes for cables. (Drawing D–DT–5406)	
110	0011411	VRW20, 304 stainless steel gland plate, unpunched bar bolt mounting holes. (Drawing D–DT–5406)	
120	0011412	VRW20 Junction box with metering CT insert. (Fitted) (Complete JB). Material: 3CR12. (Drawings D–DT–5406 and D–DT–5402)	
130	0011408	VRW20 Junction box with metering VT insert. (Fitted) (Complete JB). Material: 3CR12 . (Drawing D–DT–5406 and D–DT–5402)	
140	0011621	VRW20 Junction box complete with unpunched (blank) insert. (Fitted) (Complete JB) Material: 3CR12. (Drawing D–DT–5406)	

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150	0011384	VRW20 3CR12 6 circuit CT insert. (Insert only). (Drawing D-DT-5404)	
160	0011622	VRW20 3CR12 8 circuit VT insert. (Insert only). (Drawing D-DT-5405)	
170	0168772	VRW20 3CR12 Double busbar isolator insert. (Insert only). (Drawing D-DT -5403)	
180	0011625	VRW20 3CR12 Metering circuit CT insert. (Insert only). (Drawing D-DT-5401)	
190	0011623	VRW20 3CR12 Metering circuit VT insert. (Insert only). (Drawing D-DT-5402)	
200	0011409	VRW20 3CR12 blank insert, painted white, no pre punched holes bar the 4 corner mounting holes. (Insert only). (Drawing D-DT-5406)	
210	0186964	VRW20 Junction box with metering CT insert. (Fitted) (Complete JB). Material: 304 stainless steel. (Drawings D-DT-5406 and D-DT-5401)	
220	0186965	VRW20 Junction box with metering VT insert. (Fitted) (Complete JB). Material: 304 stainless steel. (Drawings D-DT-5406 and D-DT-5402)	
230	0186972	VRW20 Junction box complete with unpunched (blank) insert. (Fitted) (Complete JB) 304 stainless steel. (Drawing D-DT-5406)	
240	0186968	VRW20 6 circuit CT insert. 304 stainless steel. (Insert only). (Drawing D-DT -5404)	
250	0186969	VRW20 8 circuit VT insert. 304 stainless steel. (Insert only). (Drawing D-DT-5405)	
260	0186970	VRW20 Double busbar isolator insert. 304 stainless steel. (Insert only). (Drawing as per D-DT-5403)	
270	0186966	VRW20 metering circuit CT insert. 304 stainless steel. (Insert only). (Drawing D-DT-5401)	
280	0186967	VRW20 metering circuit VT insert. 304 stainless steel. (Insert only). (Drawing D-DT-5402)	
290	0186971	VRW20 Junction box, blank 304 stainless steel insert, painted white, no pre punched holes, bar the 4 corner mounting holes. (Insert only). (Drawing D-DT-5406)	

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Annex S – Technical A/B schedule for VRW20 and TMK Junction Boxes

Item	Description	Schedule A	Schedule B
1	Cabinet Details – Section 3.18		
a)	Manufactured from	Columbus Stainless 3CR12 – 1.6mm or 304 stainless steel option.	
b)	Hinge make and type.	Specify	
c)	Lock make and type.	Specify	
d)	Brass stud as per drawing, quality 303.	Comply	
e)	Earth strap to gland plate .	12mm ² tinned braided copper strap.	
f)	Door earth.	2,5 mm ² 1000Vac green insulated multi-strand copper wire.	
g)	Optional louver for door with gauze and splash plate. (No cost option)	Comply	
h)	Type of door gasket.	Specify	
i)	Expected lifetime of gasket & deformation properties. Please add extra detail to back up claim.	Furnish proof of claim	
j)	Paint to SANS 1091 colour G29, texture coating (interior and exterior)	Comply	
k)	The cabinet shall conform to the IP53 rating or IP33 where louvers are provided on the door	Comply	
l)	A permanent label shall be fixed to the box detailing the suppliers name, physical address, contact telephone number, date of manufacture and serial number. This label shall be fitted on the inside of the door.	Comply	
2	Gland plate – Section 3.18.1		
a)	Manufactured from	304 brushed stainless steel – 2mm	
b)	Pre-punched or drilled cable cut outs, push out type or with hole plugs.	Specify method	
c)	Drainage holes as per technical drawing.	Comply	
d)	Gland plate secured with stainless steel bolts (M6 x 20mm) Spring washers to be fitted between bolt and cabinet to improve earthing.	Comply	
e)	Earth gland plate to Brass earthing rod.	12mm ² tinned braided copper strap.	
f)	Trivalent passivation used as anti-corrosion	Yes/No	
3	Insert tray – Section 3.18.2		
3.1	General requirements		

Item	Description	Schedule A	Schedule B
a)	Manufactured from	Columbus Stainless 3CR12, 2mm or 304 stainless steel option.	
b)	Tray mounted on M6 x 25mm stainless steel stud, spring washer and bolt.	Comply	
c)	Paint specification to 240-75655504 SANS 1091 white, smooth coating.	Comply	
d)	Earth insert tray to brass earthing rod.	12mm ² tinned braided copper strap.	
4	Terminals – Section 3.18.3		
a)	Type of mounting	Rail	
b)	Manufacturer and type (Entrelec/Weidmuller/Elmex)	10mm Screw clamp, spring loaded terminal in accordance with 240-70413291 (to Eskom approval)	
5	Wiring – Section 3.18.4		
a)	Wire thickness mm ²	2.5	
b)	Type of termination	Crimped lug	
c)	Manufacturer (To Eskom approval)	In accordance to section 3.13	
d)	Wiring identification	By slip-on ferrule. All wiring done by hand inside and outside module is to be labelled on both ends.	
e)	Manufacturer (To Eskom approval)	Specify	
f)	Trunking of dimensions 40mm x 60mm to be supplied except for the VT insert (Section 3.18.6.5) where 40mm x 40mm trunking will be used.	Comply	
6	Miniature Circuit breakers – Section 3.18.5		
a)	Manufacturer (To Eskom approval)		
b)	Rating A	10	
c)	Curve	C	
d)	Breaking capacity kA	3	
7	Insert variants		
a)	All five stipulated options to be offered. See section 3.18.6	Comply	
2	Corrosion protection – Refer to section 3.9 of specification	Comply	

Item	Description	Schedule A	Schedule B
8	Labelling, packaging, marking and transport		
8.1	Label		
a)	Junction box labelled as per Section 3.14	Comply	
8.2	Packaging		
a)	Corrugated cardboard covering with plastic wrap. See section 5	Comply	
8.3	Marking		
a)	Refer to section 5 of specification	Comply	

Annex T – Technical A/B Schedule for Fibre Optic JB

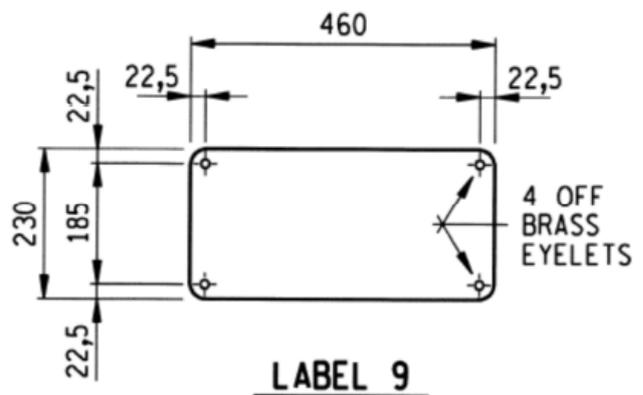
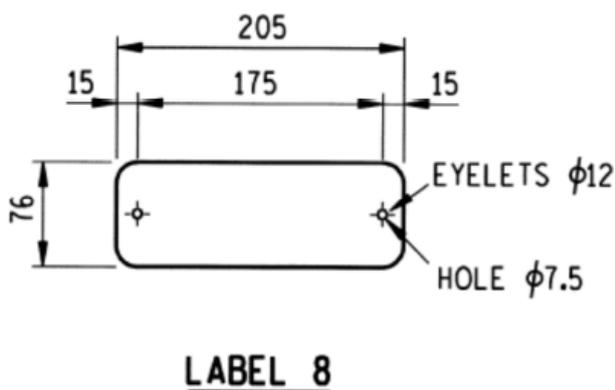
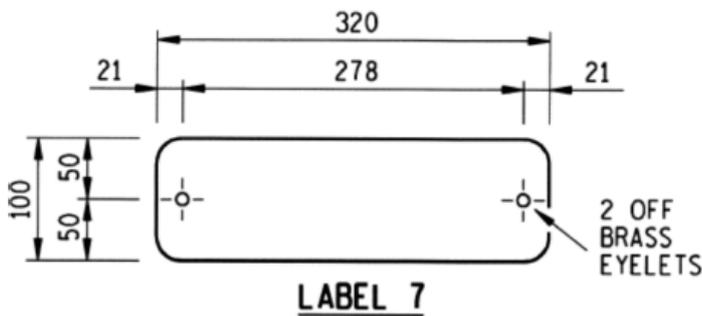
No	Items	Description	Schedule A	Schedule B
1	Gland Plates	Refer to section 3.19.3 of specification	Comply	
1.1		Gland plate must be 2mm 3CR12 stainless steel	Comply	
1.2		To be provided on the bottom of the cabinet and will consist of an inspection cover and gland plate.	Comply	
2	Ingress Protection	IP54	Comply	
3	Construction	Refer to section 3.19.1 of the specification	Comply	
3.1		Each cabinet shall be supplied with 10 chrome plated fixing screws and cage nuts.	Comply	
3.2		Fabrication 1.6mm 3CR12 Stainless steel.	Comply	
3.3	Dimensions	Refer to Drawings	Comply	
3.4		19" rack mounting equipment brackets shall be 3R12 stainless steel.	Comply	
3.6		All nuts and bolts shall be stainless steel.	Comply	
4	Base Plate / Plinth	Refer to section 3.19.2 of the specification	Comply	
5	Earthing	Refer to section 3.19.4 of the specification	Comply	
6	Corrosion Protection	Refer to section 3.9 of the specification	Comply	
7	Packaging and Labelling	Refer to section 5 of the specification	Comply	
8	Drawings received	0.52/30079 Sheet 0 Rev 0	Yes	

Annex U – Technical A/B Schedule for 50kVA Mobile Generator Plug Box

No	Items	Description	Schedule A	Schedule B
1	Socket Outlet	125A 3P+N+E with interlock switch	Comply	
2	Ingress Protection	IP54	Comply	
3	Construction	Refer to section 3.20.1 of the specification	Comply	
3.1		Each cabinet shall be supplied with 4 x M8 raw bolts.	Comply	
3.2		Fabrication 2mm 3CR12 Stainless steel.	Comply	
3.3	Dimensions	Refer to Drawing	Comply	
3.4		A 32mm cable slot shall be provided in the bottom of the cabinet enabling the door to close when a cable is used. Details are shown in the drawing.	Comply	
3.5		Door lock shall be of the non-ferrous lever type with facilities for the fitting of a padlock.	Comply	
4	Earthing	Refer to section 3.20.2 of the specification	Comply	
5	Corrosion Protection	Refer to section 3.9 of the specification	Comply	
6	Packaging and Labelling	Refer to section 5 of the specification	Comply	
7	Drawings received	0.52/30617 Sheet 1 Rev 1	Yes	

Annex V – Dimension of holes for enameled labels

	Label Type	Diameter of holes	Distance between holes. centre to centre - Horizontal	Distance between holes. centre to centre - Vertical
JB0333	7	12mm	278	
JB0602	7	12mm	278	
JB0901	7	12mm	278	
JB1100	7	12mm	278	
JB1600	7	12mm	278	
JB1700	7	12mm	278	
JB1800	7	12mm	278	
PB0100	8	7.5mm	175	
TDB Type 1	7	12mm	278	
TDB Type 2	7	12mm	278	
SDB Type 2	9	12mm	278	
350A Plug Box	8	7.5mm	175	
MIB	8	7.5mm	175	
VTJB0700	9	12mm	415	185
PB Type BH	8	7.5mm	175	
TDB Type 3A	9	12mm	415	185
TDB Type 4A	9	12mm	415	185
SDB Type 1	9	12mm	415	185



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Annex W – Summary of constructional specifications

Equipment	Constructional Material	IP Rating	Gland Plate	Indoor / Outdoor	Nuts and bolts
JB 0333	3CR12 – 1.6mm	IP54	3CR12 – 2.5mm	Outdoor	Stainless steel
JB 0602	3CR12 – 1.6mm	IP54	3CR12 – 2mm	Outdoor	Stainless steel
JB 0902	3CR12 – 1.6mm	IP54	3CR12 – 2.5mm	Outdoor	Stainless steel
JB 1100	3CR12 – 1.6mm	IP54	3CR12 – 2.5mm	Outdoor	Stainless steel
JB 1600	3CR12 – 1.6mm	IP54	3CR12 – 2mm	Outdoor	Stainless steel
JB 1700	3CR12 – 1.6mm	IP54	3CR12 – 2mm	Outdoor	Stainless steel
JB 1800	3CR12 – 1.6mm	IP54	3CR12 – 2mm	Outdoor	Stainless steel
PB 0100	3CR12 – 1.6mm	IP54	3CR12 – 2mm	Outdoor	Stainless steel
AC Board Type 1	Mild Steel – 2mm	IP53	Zinc coated – 2mm	Indoor	Mild steel – plated
TDB Type 1	3CR12 – 2mm	IP54	3CR12 – 2.5mm	Outdoor	Stainless steel
TDB Type 2	3CR12 – 2mm	IP54	3CR12 – 2.5mm	Outdoor	Stainless steel
SDB Type 2	3CR12 – 2mm	IP65	3mm galvanised steel	Outdoor	Stainless steel
350A Plug Box	3CR12 – 1.6mm	IP54	3CR12 – 2mm	Outdoor	Stainless steel
MIB	3CR12 – 2mm	IP54	3CR12 – 2.5mm	Outdoor	Stainless steel
VRW20	3CR12 or 304 – 1.6mm	IP54	304 s/s – 2mm	Outdoor	Stainless steel
Fibre Optic JB	3CR12 – 1.6mm	IP54	3CR12 – 2.5mm	Outdoor	Stainless steel
AC Board Type 4	Mild Steel – 2mm	IP53	Zinc coated – 2mm	Indoor	Mild steel – plated
50kVA Mobile Generator Plug Box	3CR12 – 2mm	IP54	-	Outdoor	Stainless steel
VTJB 0700	3CR12 – 1.6mm	IP54	3CR12 – 2mm	Outdoor	Stainless steel

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