PROJECT SPECIFICATION FOR MINIATURE SUBSTATIONS

1. SCOPE OF WORK

This specification covers the minimum requirements for the manufacture, testing and supply of **M**iniature **S**ub **S**tations (MSS), suitable for use in areas accessible to the public. The MSS supplied shall be new in all aspects and shall comply with the requirements of SANS 1029 Edition 3 2010 as well as this specification. Each MSS shall be supplied complete with the following:

1. Two sets of Unscreened Switchgear Connection systems (e.g. RICS-3133 up to 12 kV) suitable for connecting 3-core medium-voltage cable terminations to 630 A Type 3 system as per NRS 012 with bushings using M16 x 2 brass or stainless steel set screws
2. A prefabricated plinth (as per the principle of the drawing (1) which must incorporate and accommodate the width, height and be based on the basic design of the mini substations provided. It must also be extended to accompany the Mini Substations with a MV metering compartment)
3. One (1) complete set of switching handles for operating the switchgear (RMU).

2. GENERAL

SITE CONDITIONS:

Altitude:	1 738 meters above sea level.

Temperature:

Max:	35°C
Min:	-6°C

Humidity:

During the night:	100 % relative humidity
During the day:	25 % relative humidity

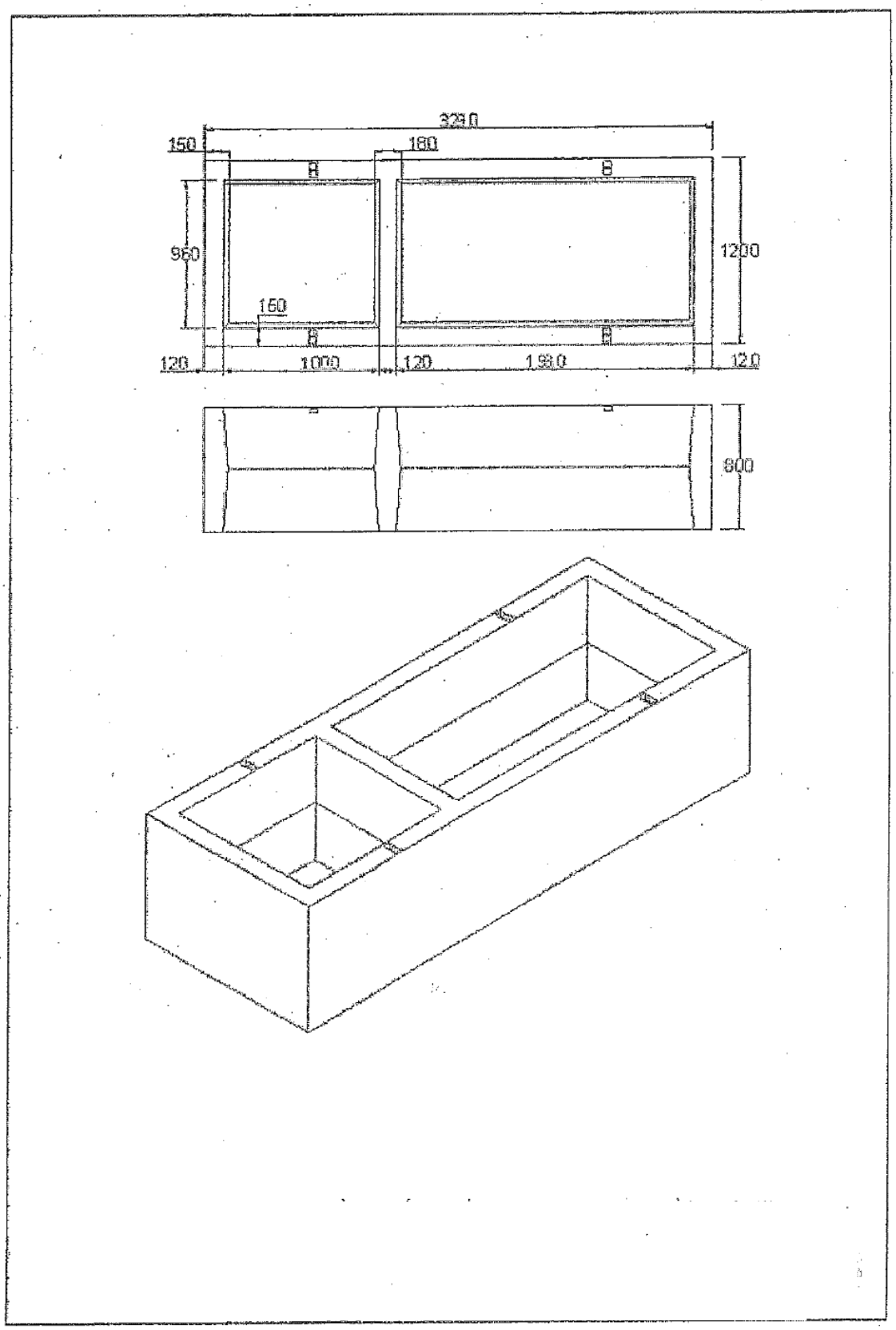
Lighting:

Severe lighting storms prevail.

Electrical System:

The Mini Substation must be able to be operated at ***dual voltage*** on either 11 000 or 6 600 Volt.

DRAWING NO.1



The MSS covered by this specification are as follows:

ITEM 1 - 6.6 & 11kV / 420 V 315 kVA with LV fuse arrangement
ITEM 2 - 6.6 & 11kV / 420 V 500 kVA with LV fuse arrangement
ITEM 3 - 6.6 & 11kV / 420 V 630 kVA with LV fuse arrangement
ITEM 4 - 6.6 & 11kV / 420 V 800 kVA with LV fuse arrangement
ITEM 5 - 6.6 & 11kV / 420 V 315 kVA with MCCB mounting plate
ITEM 6 - 6.6 & 11kV / 420 V 500 kVA with MCCB mounting plate
ITEM 7 - 6.6 & 11kV / 420 V 630 kVA with MCCB mounting plate
ITEM 8 - 6.6 & 11kV / 420 V 315 kVA with LV metering arrangement
ITEM 9 - 6.6 & 11kV / 420 V 315 kVA with MV metering & LV fuse arrangement
ITEM 10 - 6.6 & 11kV / 420 V 500 kVA with MV metering & LV fuse arrangement
ITEM 11 - 6.6 & 11kV / 420 V 630 kVA with MV metering & LV fuse arrangement
ITEM 12 - 6.6 & 11kV / 420 V 800 kVA with MV metering & LV fuse arrangement

TECHNICAL SPECIFICATIONS

1. NORMATIVE REFERENCES

The miniature substations shall be in accordance with the requirements of the following standard Specifications:

- S.A.N.S. 1029 - Miniature substations
- S.A.N.S. 1030 - Miniature substations
- S.A.N.S. 780 - Distribution transformers
- S.A.N.S. 555 - Transformer oil
- S.A.N.S. 833 - Bushings
- S.A.N.S. 763 - Galvanising
- S.A.N.S. 1091 - Paint colour
- B.S. 3938 - Current transformers
- B.S. 89 - Ammeters
- B.S. 638 - Welding cables

2. ADDITIONAL REQUIREMENTS

2.1 Types and dimensions

3.1.1 The general arrangement of the mini-subs shall be in accordance with a Type B layout and figure A1 and A2 of annex A.

3.1.2 The overall dimensions of mini-subs for ITEM 1 to 5 shall be in accordance with SANS 1029. The overall dimensions of mini-subs for ITEM 6 to 9 shall be stated by the supplier in schedule B.

2.2 Enclosure & roof

1.2.1 The mini-subs shall be internal arc classified (IAC) and therefore provision shall be made for securing the mini-sub to a concrete plinth using 4 x M16 x 40 mm set

screws. For this purpose, the mini-sub base shall be provided with 4 x external 5 mm thick (min) inherently corrosion resistant flanges with an M16 (∅17 mm) 'slotted' hole corresponding to the fixing centres shown in Annex C (standardised plinth) of SANS 1029.

1.2.2 Suitable external lifting eyes shall be provided to lift the entire mini-sub without the need to remove the roof for lifting / slinging purposes.

1.3 Transformer

1.3.1 The transformer primary nominal voltage shall be 6.6 kV and 11 kV dual ratio. The transformer primary and secondary windings shall be copper.

3.3.2 Each miniature substation shall be equipped with an oil-immersed, three phase, sealed, low loss transformer meeting the requirements as specified:

3.3.3 In addition to the standard fittings for minimum transformers as laid down in SANS 780 table 1, each transformer shall be equipped with the following:

- An off-circuit, padlockable, snap-action tapswitch, with positive indicating facilities.
- Drain valve with plug.
- Oil gauge
- Lifting lugs
- Filling hole which will be properly sealed to ensure no ingress of dirt or moisture.
- Earthing terminal

3.3.4 The MV terminals shall be equipped with epoxy resin bushings and the MV tails shall be terminated by means of 11 kV rated heatshrink terminations and RICS boots.

3.3.5 The four LV terminals shall be of the bare stem bushing type of adequate rating, connected to the LV busbars.

3.3.6 The transformer is to be thoroughly dried out and tested at the manufacturers works before delivery, the windings being submersed in oil, eliminating any need for further drying out and rendering the transformer ready for immediate service at full rated load.

3.3.7 The transformers shall carry SANS mark and be tested in accordance with SANS 780. Certified copies of test certificates shall be forwarded to the Employer as soon as possible after the tests have been carried out.

1.4 MV compartment (ITEM 1 to ITEM 9)

1.4.1 The MV compartment shall be equipped with a 11 kV non-extensible RMV type ring main unit, internal arc protected, comprising two incoming switches and a circuit breaker T-off with self powered IDMT protection relay with flagged indication for tripping.

1.4.2 SF6 type switchgear may be offered.

1.4.3 The ring main unit shall comprise 2 load break fault make isolating switches rated for 630A minimum and 1 x circuit breaker rated for 200A minimum.

3.4.4 The ring main shall be capable of being earthed, in which position all cores of the incoming cables shall be earthed through an earthing device.

3.4.5 Incoming interlocked cable test facilities are to be provided. The test terminals shall not be accessible whilst the switch is in the on position.

3.4.6 All switches shall have independent manual operating mechanisms with the necessary interlocks to ensure correct and safe operation, complete with operating handles etc., as required.

3.4.7 Padlocking facilities to lock any switch in the ON or OFF position, are to be provided.

3.4.8 Cable termination facilities shall be suitable for up to 185mm sq. three core heatshrink type onto horizontally mounted C type bushings, incorporating cable clamping facilities.

3.4.9 The unit shall meet the requirements of the following standards: Metal Enclosed switchgear: IEC 62271

3.4.10 General Purpose switches: IEC 60265

3.4.11 Disconnectors and earthing switches: IEC 60129 Switch Fuse Combination: IEC 60420

3.4.12 Common clauses: IEC 60694 Pressure of SF6 gas: 1.4 bar at 20 □C Cable bushings: DIN 47636

3.4.13 Degree of protection: - SF6 tank: IP 67 - Front cover: IP 2X - Cable cover : IP 3X Earth bar (external): 120 mm² Cu - Bolt dimension: M10

3.4.14 Thickness of Stainless Steel Tank: 3.0 mm

3.4.15 Electrical data

- Rated voltage: 12kV
- Short time withstand current (3 sec) : 20 kArms Breaking capacity for circuit breaker: 20 kArms
- Impulse withstand voltage : To earth and between phases: 95 kV Insulation level: - Power frequency 1 min: 28 kV
- Rated current for busbars: 630 A
- Rated current for isolator : 630 A, circuit breaker: 200A Cable test bushings with interlocked cover
- Cable support bars Manometer
- Operating handle long type
- Stored energy mech. for man.operation,
- Phase voltage indication and phasing test sockets.

3.4.16 Test certificates issued by a recognized testing authority shall be made available upon request.

3.4.17 Comprehensive manuals are to be provided, which clearly describe the installation, operation and maintenance of the unit.

3.4.18 Full operational manufacturer supported maintenance facilities with a full range of spare parts for the equipment offered as well as at least one fully trained technician shall be established in the Gauteng region.

3.5 MV CT & VT compartment (ITEM 6 to ITEM 9)

3.5.1 The mini-sub MV CT & VT compartment shall be fitted with 2 screened current transformers (CT's) and 3 screened single-phase voltage transformers (VT's) with the following characteristics:

a) CT's shall have Type C bushings for primary connections P1 and P2;
b) CT's shall be 60/30/5 A Class 1 with a burden of 10 VA;
c) VT's shall have Type A bushings for primary connection P1;
d) VT's shall be 11 kV/√3 : 6.6 kV/√3 : 110 V/√3 Class 1 with burden of 50 VA.

3.5.2 The secondary side of all CT's and VT's shall be terminated onto the test blocks to be provided in the LV metering compartment.

3.6 LV panel (ITEM 1 to ITEM 12)

3.6.1 A main LV circuit breaker shall be provided in the LV compartment between the transformer and the LV busbars. The circuit breaker shall be located on the right hand side of the LV compartment and shall be accessible from an end side door.

3.6.2 The main LV circuit breaker shall be current (PMS) and time (TMS) adjustable with utilization category B and rated for Ics = 100% Icu in accordance with SANS 60947-2.

3.6.3 The LV assembly shall be manufactured from Aluzinc and be unpainted.

3.7 LV panel (ITEM 1 to ITEM 4 & ITEM 9 to ITEM 12)

3.7.1 The LV panel shall be fitted with 400 A "Henley" type fuse holders and must be of the AEI Henley type. The arrangement shall accommodate 7 outgoing feeders with fuses for each phase and also a neutral link.

3.7.2 Fuse carriers will preferably be of the wedge type suitable to take fuses with slotted tags 82,55 mm fixing centers, e.g. Henley List No 30030 (250 amp). If the fuse carriers do not comply with the above requirements, it will be definitely stated.

3.7.3 The LV assembly shall be barricaded to prevent inadvertent contact with live components when withdrawing/inserting the fuse holders.

3.7.4 The general layout of the LV panel shall be as shown in figure 1.

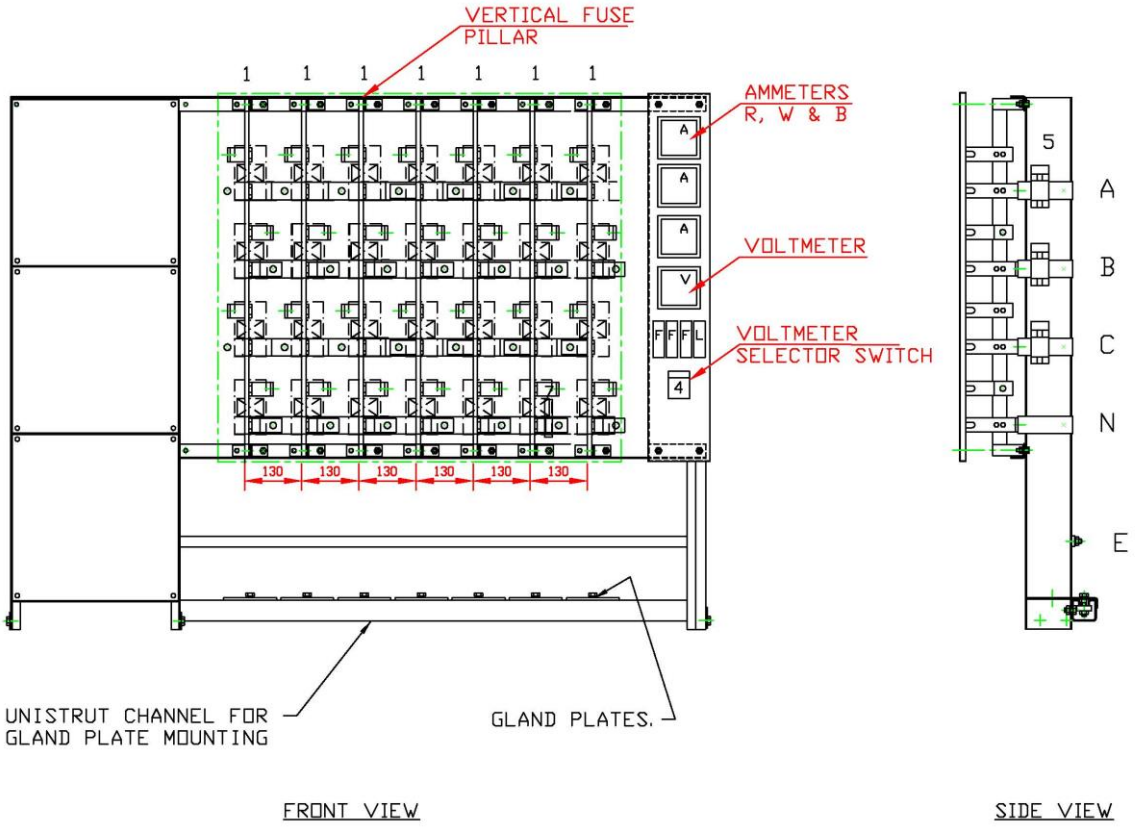


Figure 1 : LV panel layout with “Henley” fuse holders

3.8 LV panel (ITEM 5 to 7)

3.8.1 Customer panel

a) The LV busbars, earth bars and a gland plate arrangement shall be fitted in the LV customer panel.

b) The panel shall be designed and constructed for the use of large frame MCCBs as specified.

3.8.2 LV main circuit breaker protection relay settings

Where applicable the LV main circuit breaker protection relay shall be configured and set by the mini-sub manufacturer in accordance with the requirements.

3.8.2 MCCB mounting plate details

For mini-substations designed for the fitting of LV MCCBs, the LV feeder MCCB mounting plate and
barricade plates shall be provided.
The corrosion requirements for the MCCB mounting plate shall be manufactured from unpainted AluZinc.
The MCCB mounting plate shall be made of perforated plate “Round 60 degrees staggered" with thefollowing minimum specifications:

- Aperture = 7 mm
- Pitch of Aperture = 17 mm
- Thickness of material = 3 mm
- Minimum perforated area for Type B, L X W = 940 mm X 295 mm
- Minimum perforated area for Type A, L X W = 510 mm X 295 mm

Note: The council no longer accepts MCCB mounting rails for the LV MCCB mounting equipment which can only accommodate MCCBs having the same frame size.

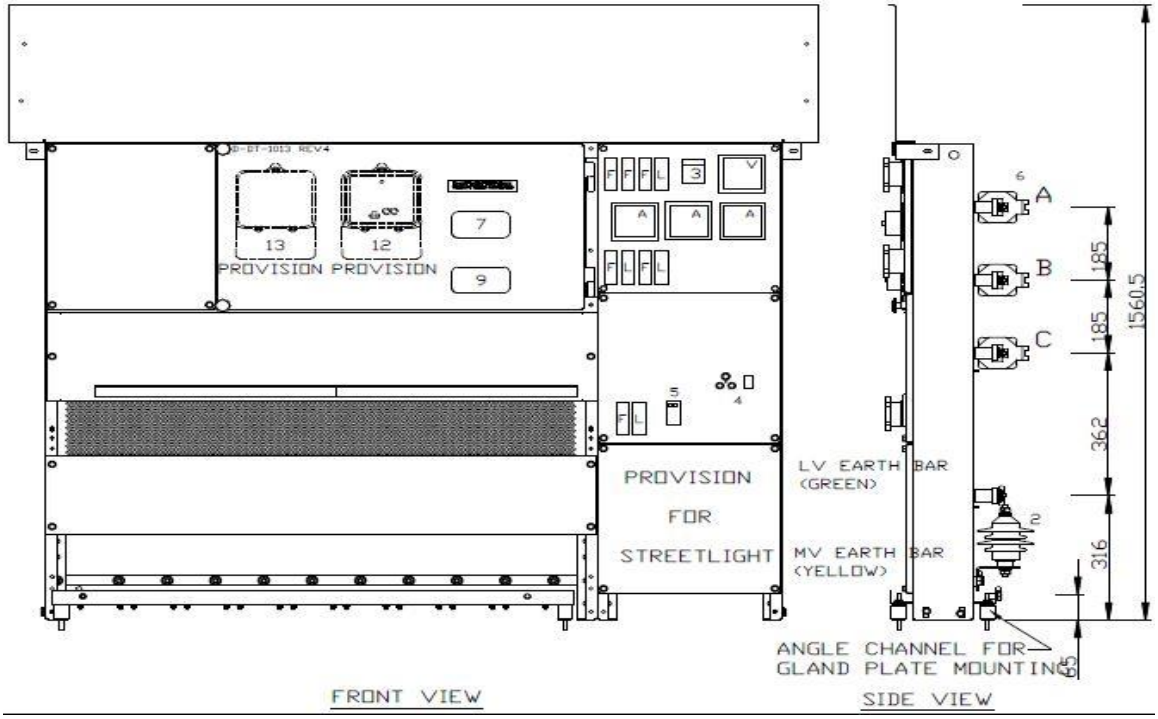


Figure 2 : LV panel layout with MCCB mounting plate

3.9 LV panel (ITEM 8)

3.9.1 The LV panel shall be designed to accommodate 8 sets of 3 (i.e. 24 in total) single-phase “Ferraris” type kWh meters.

3.9.2 An 80 A single pole Curve C 10 kA circuit breaker located adjacent to the meter must be directly wired from the busbars using 35mm² conductor that is insulated with the associated phase colour.

3.9.3 The output of each circuit breaker shall be connected to the appropriate Ferraris type meter in the LV compartment.

3.9.4 The output of each Ferraris Type meter shall be connected to an associated terminal (**to accommodate up to 35mm² copper insulated cables**) to be located at the bottom of the LV compartment.

3.8.5 The general layout of the LV panel shall be as shown in figure 2.

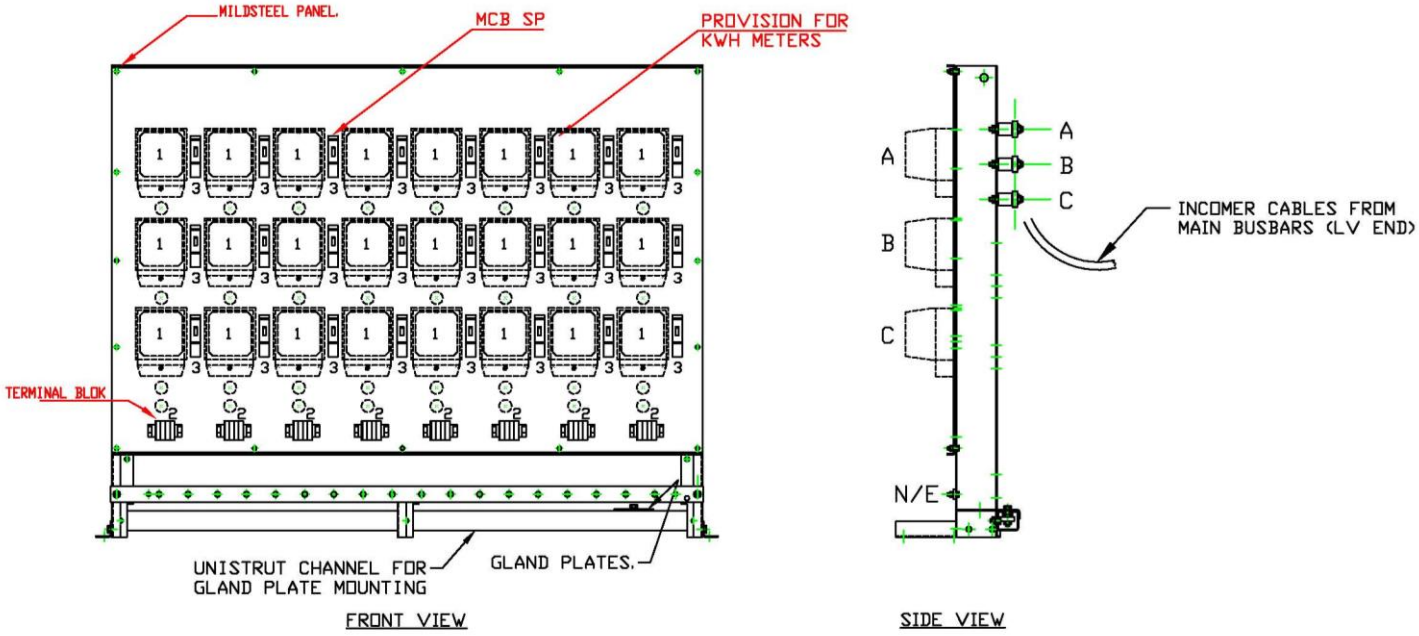


Figure 2 : LV panel layout with single-phase meters

3.10 MV metering compartment (ITEM 9 to ITEM 12)

3.10.1 A separate MV metering compartment shall be provided that is accessible by means of a door located between the MV and LV compartments.

3.10.2 The door used to access the MV metering compartment shall have a separate padlock facility for meter reading purposes and shall be labeled “Revenue Maximum Demand Meter”.

3.10.3 A 13-way test block, 2 fuse holders with 2A HRC fuses and 1 neutral link shall be fitted in the MV metering compartment.

3.10.4 All wiring from the MV CT & VT compartment shall be terminated onto the 13-way test block which will be labeled accordingly.

3.10.5 The MV metering compartment shall make provision for fitting an electronic maximum demand billing meter, which shall be fitted by Mogale City.

4 Earthing

The metallic parts of a mini-sub shall be bonded together and connected to the mini-sub earth. Where the metallic parts are bonded using bonding conductors, this shall be done using either a 70mm^2 tinned copper braid or copper conductor.

FIGURE 3 : MSS WITH MV METERING

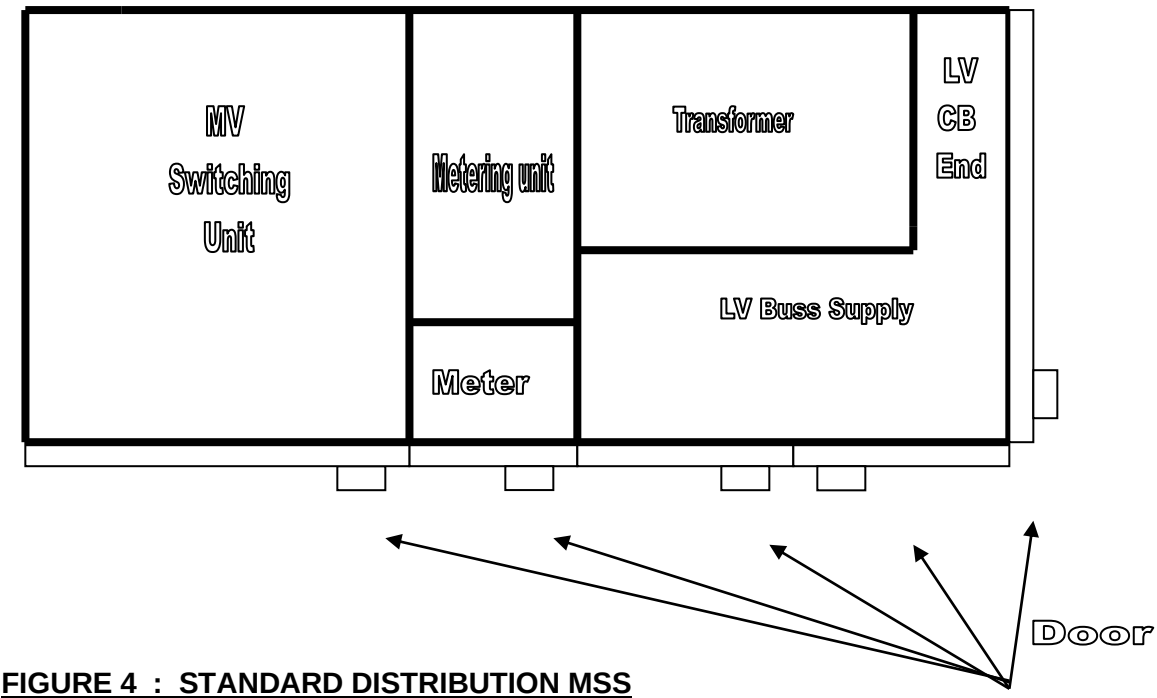
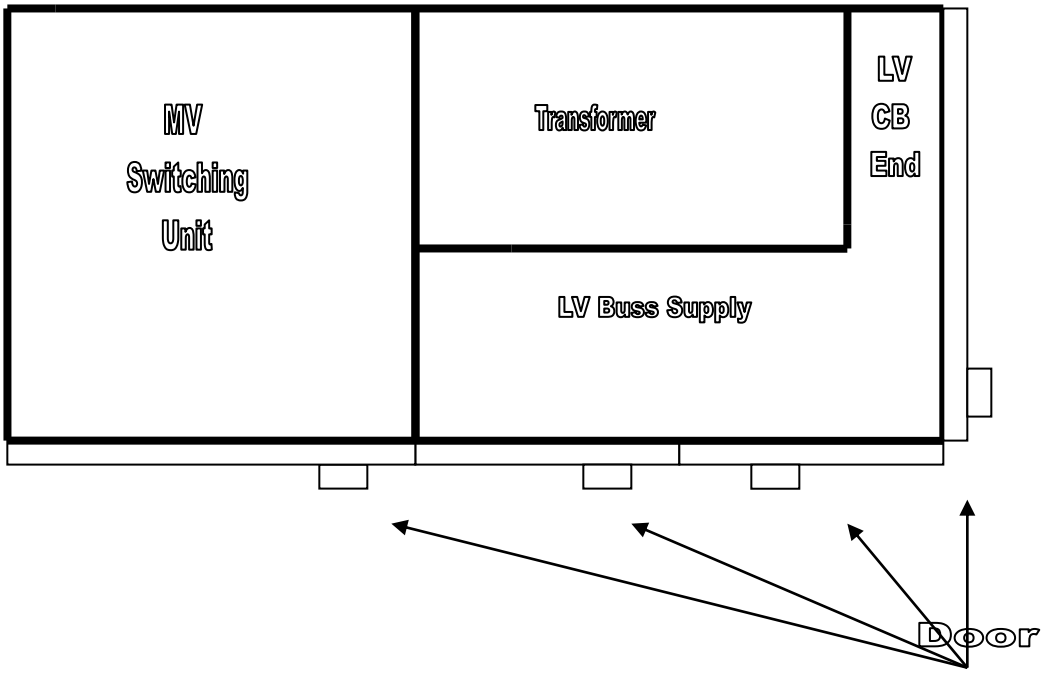


FIGURE 4 : STANDARD DISTRIBUTION MSS



PROTECTION SETTINGS FOR G WIC1-2 RELAY SUPPLIED WITH RMU'S IN TYPE B MINIATURE SUBSTATIONS

1. All RMU's supplied in Type B mini-subs shall be installed, wired, configured and tested so that they are ready for commissioning prior to delivery to Mogale City;

2. The protection relay "self driven type" shall be configured in accordance with the latest SANS 1029 regulations and programmed accordingly.

3. A routine check shall be included on the test certificate that confirms the relay switch settings as pre-programmed by the supplier.

1. ENERGY PLANNING & CUSTOMER SERVICES: MOGALE CITY

MINI SUBSTATION SCHEDULES A & B

Schedule A: Purchaser's specific requirements
Schedule B: Particulars of equipment to be supplied

1	2	3	Unit	4	5
Item	**Clause**	**Description**		**Schedule A**	**Schedule B**
1	4.1.1.1	Nominal MV voltage (Dual)	kV	11/ 6,6	xxxxxxxxx
2	4.1.1.5	Rated lightning impulse withstand voltage level (MV equipment)	kV	List 3	xxxxxxxxx
3	4.1.2.8	Rated supply voltage of closing and opening devices and auxiliary and control circuits		N/A	xxxxxxxxx
4	4.1.3.2	Rated maximum power of the mini-sub	kVA	ITEM 1 – 9	xxxxxxxxx
5	4.2.1.3	Service conditions: a) Humidity b) Ambient air pollution		98% Medium	N/A
6	4.2.2.1.1	Mini-sub type		Type B	
7	4.2.2.1.4	Mini-sub design		Modular	xxxxxxxxx
8	4.2.2.1	State overall dimensions of minisub		xxxxxxxxx	_____
9	4.5.1	SABS permit no. for manufacture of transformer		xxxxxxxxx	_____
10	4.5.1	Load losses	W	xxxxxxxxx	_____
11	4.5.1	No-load losses	W	xxxxxxxxx	_____
12		X/R ratio		xxxxxxxxx	_____
13	4.2.2.2.1	Base type (if not steel)		N/A	xxxxxxxxx
14	4.2.2.2.3	Is a base with a removable section required ?		No	xxxxxxxxx
15	4.2.2.4.2	Are roof lifting lugs required ?		No	xxxxxxxxx
16	4.3.1	Enclosure material		Mild steel	_____
17	4.3.2	LV assembly, material of structural parts		AZ150	xxxxxxxxx
18	4.4.2.3	Is a lock protection facility required ?		Yes	xxxxxxxxx
19	4.4.2.4	Is a 10 mm allen cap screw required ?		Yes	xxxxxxxxx
20	4.5.2	Method of sealing the cover (i.e. welded or bolted).		Welded	xxxxxxxxx
21	4.5.2	Flat plate (e.g. glass, clear polycarbonate) oil level indicator fitted in accordance with SANS 780		Yes	xxxxxxxxx
22	4.5.3	Positioning of transformer bushings		N/A	xxxxxxxxx
23	4.6.2	Is black epoxy tar paint required ?		Yes	N/A
24	4.6.3.1	Suitable paint or coating system used to protect against		xxxxxxxx	_____

		corrosion			
25	4.6.3.2	Corrosion protection for mild steel		xxxxxxxx	_____
26	4.6.3.3	Corrosion protection for 3CR12		N/A	xxxxxxxxx
27	4.6.4	Paint colour		Light stone	xxxxxxxxx
28	6.1.4	LV earth busbar, if required		No	xxxxxxxxx
29	6.1.5	Is a separate earthing configuration required ?		No	xxxxxxxxx
30	6.2.1	Barriers to be metallic		No	xxxxxxxxx
31	6.2.2.1	Equipment required in MV compartment		As per spec.	xxxxxxxxx
32	6.2.2.4	CT ratios		16 – 52 (primary)	xxxxxxxxx
33	6.2.2.5	Protection CT type and class		xxxxxxxxx	_____
34	6.2.3.2	Type of MV cables to be terminated		PILCSTDA	xxxxxxxxx
35	6.2.3.2	Number of cores of MV cables to be terminated		3-core	xxxxxxxxx
36	6.2.3.2	Size of MV cables to be terminated	mm^2	185	xxxxxxxxx
37	6.2.5.1	Are earth fault indicators required?		Yes	xxxxxxxxx
38	6.3.2.1	Cables from the LV bushing of the transformer to the LV busbars to be flame retardant.		Yes	xxxxxxxxx
39	6.3.3.2.2	State finishing method		xxxxxxxxx	_____
40	6.3.3.2.5	Method of busbar colour coding		xxxxxxxxx	_____
41	6.3.3.2.8	Number of outgoing LV feeder bays		As per spec.	xxxxxxxxx
42	6.3.3.3.1	Provide a separate LV earth busbar ?		No	xxxxxxxxx
43	6.3.3.3.5	Gland plate arrangement as indicated in figure C.9 to be provided ?		No	xxxxxxxxx
44	6.3.3.3.10	Gland hole diameters, if not 65 mm and 52 mm		N/A	xxxxxxxxx
45	6.3.3.4.3	Are MCCB's to be used?		As per spec.	xxxxxxxxx
46	6.3.3.4.4	Number and rating of each MCCB		N/A	xxxxxxxxx
47	6.3.3.4.5	Are vertical fuse pillars to be used ?		No	xxxxxxxxx
48	6.3.3.4.6	Number of fuse pillars and the fuse rating of each fuse pillar ?		N/A	xxxxxxxxx
49	6.3.3.5.1	Provide LV ammeters for all three phases ?		Yes	xxxxxxxxx
50	6.3.3.5.2	Provide one voltmeter with a selector switch to enable any one of the phase voltages to be read ?		Yes	xxxxxxxxx
51	6.3.3.5.4	Provide metering for outgoing circuits ?		As per spec.	xxxxxxxxx
52	6.3.3.5.5	Provide main LV switch-disconnector in the LV compartment in order to isolate the LV busbars from the transformer ?		No	xxxxxxxxx
53	6.3.3.5.6	Provide main LV circuit-breaker in the LV compartment in order to isolate the LV busbars from the transformer ?		Yes	xxxxxxxxx
54	6.3.3.5.7	Provide a single-phase 16 A three-pin socket-outlet in accordance with SANS 60884-1 ?		Yes	xxxxxxxxx
55	6.3.3.5.8	Provide an LV compartment lamp holder in accordance with SANS 61184 ?		Yes	xxxxxxxxx
56	6.3.3.5.9	Standardised street lighting panel to be provided ?		Yes	xxxxxxxxx
57	6.3.3.5.10	Transformer unit shall be fitted with a top oil thermoelectric temperature sensing element ?		Yes	xxxxxxxxx
58	6.3.3.5.10	The maximum allowable temperature	^oC	105	xxxxxxxxx
59	6.3.3.6.1	Auxiliary circuit wiring details		Supplier to specify details	xxxxxxxxx

2. ENERGY PLANNING & CUSTOMER SERVICES: MOGALE CITY

MINI SUBSTATION SCHEDULES A & B (continued)

60	6.4.4	Transformer vector group		Dyn11	xxxxxxxxx
61	7.5.2	Paint thickness to be verified to SANS 2808		Yes	xxxxxxxxx
62	8.1.1	Method for attaching labels		xxxxxxxxx	_____
63	8.4.3	Primary voltage, secondary voltage and kVA to be stencilled on the front, centre.		Yes	xxxxxxxxx
64	8.4.4	Stock number stencilled on the side or rear of the mini-sub.		Yes	xxxxxxxxx
65	8.4.7	Colour of main circuit designation labels		xxxxxxxxx	_____
66	8.4.7	Method of fixing and removal of main circuit designation labels		xxxxxxxxx	_____
67	8.5	Any other notices, nameplates or labels required ?		No	xxxxxxxxx
68	8.6.1	Documentation to be supplied with the tender		See enquiry details	xxxxxxxxx
69	8.6.5	Any other diagrams		No	xxxxxxxxx
70	9.1	Method used to attach and detach the supports		xxxxxxxxx	_____

3. ENERGY PLANNING & CUSTOMER SERVICES: MOGALE CITY

RMU SCHEDULES A & B

Schedule A: Purchaser's specific requirements
Schedule B: Particulars of equipment to be supplied

1	2	3		4	5
Item	**Clause**	**Description**		**Schedule A**	**Schedule B**
B.1	4.1.2 (b)	The ambient air pollution level		Level IV	xxxxxxxxx
B.2	4.2.1	Rated voltage	kV	12	xxxxxxxxx
B.3	4.3.1.5	Is an indoor or outdoor unit required?		Mini-sub	xxxxxxxxx
	4.3.2	Is an extensible or non-extensible unit required?		Non-extensible	xxxxxxxxx
	4.3.3.2	Degree of protection of outdoor kiosk offered		xxxxxxxxx	N/A
	4.3.3.3	Degree of protection of the ring main unit offered		xxxxxxxxx	
	4.3.4	The configuration of the ring main unit		SD-SD-CB or SD-CB-SD	xxxxxxxxx
	4.3.5.1	Separate cable test facilities required for switch-disconnectors	Yes/No	Yes	xxxxxxxxx
	4.3.5.1	Separate cable test facilities required for switch-fuse combinations	Yes/No	N/A	xxxxxxxxx
	4.3.5.1	Separate cable test facilities required for circuit-breakers	Yes/No	No	xxxxxxxxx
	4.3.5.3	Type of cable test facility offered ?		xxxxxxxxx	_____
	4.3.5.4	Cable test facilities to be interlocked with associated earth switch and padlockable	Yes/No	Yes	xxxxxxxxx
	4.3.9.1	Are interlocks with remote equipment required?	Yes/No	No	xxxxxxxxx
		If yes, state:			
		a) type required		N/A	xxxxxxxxx
		b) auxiliary supply details		N/A	xxxxxxxxx
		c) interfacing details of remote equipment		N/A	xxxxxxxxx
	4.3.9.2	State details of interlocks with remote equipment offered		xxxxxxxxx	N/A
	4.3.10.2	Specify insulating medium		SF6	_____
	4.3.10.3	Specify the interrupting technology of switch- disconnectors and circuit –breakers		SD = SF6 CB = Vacuum	_____
	4.3.14.1	IAC of AFLR		IAC A-B FLR 0.5 s in mini-sub	xxxxxxxxx
B.4	4.4.1.3	Rated normal current of a switch disconnector	A	630 A	xxxxxxxxx

RMU SCHEDULES A & B (continued)

Item	NRS 006 clause	Description		Schedule A	Schedule B
B.4	4.4.2.2	Is remote tripping and closing of the switch disconnector required?	Yes/No	No	xxxxxxxxx
		If yes, provide details of preferred auxiliary supply:		N/A	N/A
		Voltage	V	xxxxxxxxx	N/A
	4.4.2.3	Method of remote tripping and closing of the switch disconnector offered		xxxxxxxxx	N/A
		Auxiliary supply details:		N/A	N/A
		Voltage	V	xxxxxxxxx	N/A
B.5	4.5.2.1	Transformer load to be protected	kVA	ITEM 1 to 9	xxxxxxxxx
	4.5.3.3	Type of fuse links offered		xxxxxxxxx	N/A
	4.5.3.3	Dimension of fuse links offered	Mm	xxxxxxxxx	N/A
	4.5.3.4	Rated current of fuse-link		N/A	xxxxxxxxx
	4.5.3.5	The maximum permissible fuse-link rating		xxxxxxxxx	N/A
	4.5.3.6	Type of striker required		xxxxxxxxx	N/A
	4.5.5.2	Is remote tripping and closing of the switch of a switch-fuse combination required		No	xxxxxxxxx
		If yes, provide details of preferred auxiliary supply:		N/A	N/A
		Voltage	V	N/A	xxxxxxxxx
	4.5.5.3	Method of remote tripping and closing of the switch of a switch-fuse combination offered		xxxxxxxxx	N/A
		Auxiliary supply details:		N/A	N/A
		Voltage	V	xxxxxxxxx	N/A
B.6	4.6.1.3	Rated normal current of a circuit-breaker	A	200 A or 630 A	xxxxxxxx
	4.6.2.2	Alternative CT ratios for 200 A circuit-breaker		16-52 A	xxxxxxxx
	4.6.2.3	Alternative CT ratios for 630 A circuit-breaker		16-52 A	xxxxxxxx
	4.6.2.4	Specify protection CT type and class		xxxxxxxxx	_____
	4.6.2.7	Details of protection relays		WIC1-2	xxxxxxxxx
	4.6.2.12	Specify details of how the minimum earth fault pick-up current shall be independent of the CT ratio selected		xxxxxxxxx	_____

5. *ENERGY PLANNING & CUSTOMER SERVICES: MOGALE CITY*

RMU SCHEDULES A & B (continued)

Item	NRS 006 clause	Description		Schedule A	Schedule B
	4.6.3.3	Is remote tripping and closing required?	Yes/No	No	xxxxxxxxx
		If yes, state preferred auxiliary supply details:			
		Voltage	V	N/A	xxxxxxxxx
		Current	A	N/A	xxxxxxxxx
	4.6.3.4	Method of remote tripping and closing offered		xxxxxxxxx	N/A
		Auxiliary supply specifications:			
		Voltage	V	xxxxxxxx	N/A
		Current	A	xxxxxxxxx	N/A
B.7	4.7.2	Busbars extensible on which side?		N/A	xxxxxxxxx
	4.7.3	Method used to extend busbars		xxxxxxxxx	N/A
	4.7.5	Insulation medium of the busbar chamber?		xxxxxxxxx	_____
B.8	4.8.2	Type and size of cable(s)		XLPE / PILC 185 mm^2	xxxxxxxxx
	4.8.6	Type and number of cable (s)		1 per SD	xxxxxxxxx
B.9	4.9.1.1	Are load monitoring facilities required?		No	xxxxxxxxx
	4.9.1.4	Accuracy class and burden (VA) of the current transformer offered		xxxxxxxxx	N/A
	4.9.1.6	Does electronic ammeter make provision for communication with the remote terminal unit (RTU) for telecontrol (SCADA) purposes?	Yes/No	No	xxxxxxxxx
	4.9.1.7	Type of ammeter (or multi-meter) offered		xxxxxxxxx	N/A
	4.9.2.1	Is ring main unit equipped with a remote terminal unit (RTU)	Yes/No	No	xxxxxxxxx
	4.9.2.2	Is the ring main unit equipped with a white indication lamp	Yes/No	N/A	xxxxxxxxx
	4.9.2.3.2	DC voltage		N/A	xxxxxxxxx
B.10	4.10.5	Quantity of SF_6		xxxxxxxxx	_____
	4.10.6	Details of SF_6 gas recovery and replenishing		xxxxxxxxx	_____
B.11	4.11.1	Maximum earth fault current	kA	20 (1 second)	xxxxxxxxx
B.12	4.12.1	Indication of type of live circuit, if applicable		xxxxxxxxx	_____
	4.12.1	Voltage detection system details, if applicable. State type of live circuit indication		xxxxxxxxx	_____

6. *ENERGY PLANNING & CUSTOMER SERVICES MOGALE CITY*

RMU SCHEDULES A & B (continued)

1	2	3		4	5
Item	**Clause**	**Description**		**Schedule A**	**Schedule B**
B.13	4.13.1	Is earth fault indication required?	Yes/No	Yes	xxxxxxxxx
	4.13.1	Type of earth fault indication offered?		xxxxxxxxx	_____
B.14	4.14.1	Is a kiosk required?	Yes/No	xxxxxxxxx	_____
B.15	4.15.1	Is a steel raising base required?		xxxxxxxxx	_____
	4.15.2	Is a gland plate required?		xxxxxxxxx	_____
	4.15.3	An additional raising base		xxxxxxxxx	_____
	4.15.3	Height of the additional raising base		xxxxxxxxx	_____
C.16	4.16.3	Type of waterproofing sealant offered		xxxxxxxxx	_____
	4.16.4	Recommended types of tools to install and maintain unit		xxxxxxxxx	_____
B.17	4.17.1	State method used for attaching the rating plates		xxxxxxxxx	_____
B.18	4.18.6	Is a special coating system required	Yes/No	No	xxxxxxxxx
	4.18.9	State type of material offered for the RMU. Kiosk and raising base (where applicable)		xxxxxxxxx	_____
B.19	5.1.3	Quantity already installed in South Africa		xxxxxxxxx	_____
	5/1/5	State details of accrediting body and proof of accreditation		xxxxxxxxx	_____
	5.2.3	Room dimensions and cable trench requirements		xxxxxxxxx	_____
B.20	6.1	State method used for attaching labels		xxxxxxxxx	_____
B.21	6.2.1	Colour of main circuit designation label		Orange	xxxxxxxxx
	6.2.1	Method used for the fixing and removal of main circuit designation labels		xxxxxxxxx	_____
B.22	6.4.4	Supply ring main units with mimic indication?	Yes/No	xxxxxxxxx	_____
B.23	6.5.6	Details of information to be included on warning sign		N/A	xxxxxxxxx
B.24	7.1	List of recommended spares		xxxxxxxxx	_____
B.25	8.2(g)	Summary of completed type tests with report numbers and relevant test standard numbers required?		xxxxxxxxx	_____
	8.2(h)	Full set of type test reports required?	Yes/No	Yes	xxxxxxxxx
	8.2(i)	Proof of the test laboratory's accreditation required? Proof that accreditation body is an MRA signatory of ILAC		Yes Yes	xxxxxxxxx xxxxxxxxx

1	2	3		4	5
Item	**Clause**	**Description**		**Schedule A**	**Schedule B**
	8.2(k)	Copy of the current transformer factory routine test certificate required?	Yes/No	Yes	xxxxxxxxx
	8.2(l)	Copies of the latest available technical catalogue(s) required?	Yes/No	Yes	xxxxxxxxx
	8.2(m)	Number of sets of installation operation and maintenance manuals if more than one set is required		1	xxxxxxxxx