

Annexure B (KEBU_SPEC_008)

TECHNICAL SCHEDULES A AND B FOR
LOW VOLTAGE DISTRIBUTION PANELS (SINGLE AND DOUBLE TRANSFORMER PANELS)

Schedule A: Keetmanshoop Electricity Business Unit specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Clause	Description		Schedule A	Schedule B
1		General			
	1.1	Manufacturer		xxxxxxxxxx	
	1.2	Manufacturer's type designation		xxxxxxxxxx	
	1.3	Erongo RED stock code			
	1.4	Panel type (Single/double transformer panel)		Single & Double	
	1.5	Transformer Rating(s)	kVA	up to 800kVA	
	1.6	Floor-mounted enclosure		Required	
	1.7	LV Panel delivered fully assembled and completely wired		Required	
2		Rating and Service Conditions			
	2.1	Rated operating voltage	V	420/240V ± 10%	
	2.2	Configuration		3-phase, 4 wire system	
	2.3	Rated frequency	Hz	50	
	2.4	Symmetrical short-circuit rating for 2 seconds	kA	25	
	2.5	Phase busbar rating	A	1200 - 1500	
	2.6	Neutral bar rating	A	1200 - 1500	
	2.7	Location (indoors/outdoors)		Indoors	
	2.8	Altitude (AMSL)	m	1500	
	2.9	Ambient air temperature range	°C	-5 to +45	
	2.10	Relative humidity range	%	10 to 95	
	2.11	Pollution conditions		Light for indoor enclosures	
3	3.1	Physical Characteristics			
	3.1.1	Suitable lifting arrangement built into design		Yes	
	3.1.2	Any special lifting requirements?		xxxxxxxxxx	
	3.1.3	LV Panel manufactured from non-flammable material		Yes	
	3.1.4	Cable entry at the bottom		Yes	
	3.2	Enclosure characteristics			
	3.2.1	- Material type		Mild steel	
	3.2.2	- Thickness	mm	3	
		Typical Dimensions of the panel			
	3.2.3	- Height	mm	1700mm	
	3.2.4	- Width	mm	2100mm	
	3.2.5	- Depth	mm	500mm	
	3.2.6	Total weight of panel	kg	xxxxxxxxxx	
	3.2.7	Packaging dimensions (HxWxD)	mm	xxxxxxxxxx	
	3.2.8	Front/rear access to enclosure		Front only	
3.2.9	Gland plate facility requirements:				
3.2.9	- up to four 4-core 95mm to 150mm cables		Required		
3.2.10	- Material type		Mild steel / Aluminium		
3.2.11	- Thickness	mm	No distortion with cable terminations, 2mm minimum		
3.2.12	Ingress protection rating		IP2X		
4		Busbars (per transformer panel)			
	4.1	Busbar material			
	4.1.1	- Phase busbars		Tinned copper	
	4.1.2	- Neutral bar		Tinned copper	
	4.1.3	- Earth bar		Tinned copper	
	4.2	Size of busbars			
	4.2.1	- Phase busbars	Yes/No	Yes	
4.2.2	- Neutral bar	Yes/No	Yes		
4.2.3	- Earth bar	Yes/No	Yes		

Item	Clause	Description		Schedule A	Schedule B	
5	4.3	Busbar arrangement requirements				
	4.3.1	- phase busbars aligned horizontally at the top and staggered vertically		Yes		
		- neutral and earth bar aligned at the bottom of the Panel		Yes		
		- phase busbars to be staggered such that all connections are visible / accessible to allow for IR scanning		Yes		
		Minimum Fault level withstand rating of phase Busbar Holders		25kA		
		Neutral to earth bar link	Yes/No	Yes		
		Joints and tee-offs (bolts, nuts, washers)		two bolts per joint or Tee-off		
		Colour coding		Red, White, Blue and Black (Neutral)		
		Earth bar and earth terminal requirements		Refer to detail spec		
		Busbar links to separate incoming transformer breakers in case of Double		Yes		
		Outgoing Distributor Units / Breakers				
		5.1	Provision of feeder circuit breakers per transformer section		Required	
		5.1.1	- Fault level withstand rating		25kA	
		5.1.2	- Outgoing Distribution feeder breakers (160-250A 3 pole) adjustable range		6	
		5.1.3	- Outgoing Distribution feeder breakers (80A 3 pole 25kA) adjustable range		1	
		5.1.4	- Outgoing Spare Distribution feeder breaker space (No breakers installed)		xxxxxxxxxx	
		5.2	Outgoing cables exits below		Required	
		5.3	MCCB terminals suitable for connection of up to 150mm cable		Required	
		5.4	Phase cable terminals dual marked		Required	
		5.6	Locking facilities	Yes/No	Refer to detail spec	
		5.7	Powder coating		Orange polyester, SANS 1091 B26)	
		5.8	Circuit labels provided	Yes/No	Refer to detail spec	
		5.9	Rating plate fitted		Required	
	6		Electrical Characteristics			
			6.1	Provision for 1 incoming MCCB's per transformer panel / section		Required
		6.2	Provision for 6 outgoing MCCB's per transformer panel . Section		Required	
		6.3	Incoming circuit-breaker characteristics			
		6.3.1	- Manufacturer		xxxxxxxxxx	
		6.3.2	- Manufacturer's type designation		xxxxxxxxxx	
		6.3.3	- Applicable standard		SANS 156	
		6.3.4	- Number of poles		3	
		6.3.5	- Number of positions (on & off)		2	
		6.3.6	- Nominal voltage rating	V	415	
		6.3.7	- Dimensions - HxWxD	mm	xxxxxxxxxx	
		6.3.8	- Adjustable current ratings	A	500-1250	
		6.3.9	- Rated short-circuit breaking capacity at 415V	kA	40	
		6.3.10	- Catalogue to be provided with tender documentation		Yes	
		6.4	Outgoing feeders			
		6.4.1	- Protective device type		MCCB	
		6.4.2	- Manufacturer		xxxxxxxxxx	
		6.4.3	- Manufacturer's type designation		xxxxxxxxxx	
	6.4.5	- Applicable standard		SANS 156		
	6.4.6	- Usage class		xxxxxxxxxx		
	6.4.7	- Dimensions				
	6.4.7.1	Height	mm			
	6.4.7.2	Width	mm			
	6.4.7.3	Depth	mm			
	6.4.8	- Rated operating current (Outgoing feeders)	A	160-250		
	6.4.9	- Rated short circuit breaking capacity at 415V	kA	25		
	6.4.10	- Catalogue to be provided with tender documentation		Yes		
		Note: Other characteristics shall be in conformity with the applicable technical specifications, if any, or with the applicable standards.				

Item	Clause	Description		Schedule A	Schedule B
	6.5	Measuring instruments			
		a) Current transformers:			
	6.5.1	- Manufacturer		xxxxxxxxxx	
	6.5.2	- Manufacturer's type designation		xxxxxxxxxx	
	6.5.3	- Applicable standards		SANS / IEC 60044-1	
	6.5.4	- Rated burden	VA	Not less than 5VA	
	6.5.5	- Rated transformation ratio	A	500/1000-5	
	6.5.6	- Accuracy class	Class	1	
	6.5.7	- Number of current transformers per transformer section		3	
		b) Ammeters:			
	6.5.8	- Manufacturer		xxxxxxxxxx	
	6.5.9	- Manufacturer's type designation		xxxxxxxxxx	
	6.5.10	- Applicable standard		xxxxxxxxxx	
	6.5.11	- Scale	A	% instantaneous & scale with MD indication	
	6.5.12	- Accuracy class		xxxxxxxxxx	
	6.5.13	- Dimensions	mm	xxxxxxxxxx	
	6.5.14	- Number of ammeters	No	3	
		c) Voltmeter			
	6.5.15	- Manufacturer		xxxxxxxxxx	
	6.5.16	- Manufacturer's type designation		xxxxxxxxxx	
	6.5.17	- Applicable standard		xxxxxxxxxx	
	6.5.18	- Scale		0-450V	
	6.5.19	- Accuracy class		xxxxxxxxxx	
	6.5.20	- Dimensions		xxxxxxxxxx	
		d) Voltmeter commutator			
	6.5.21	- Manufacturer		xxxxxxxxxx	
	6.5.22	- Manufacturer's type designation		xxxxxxxxxx	
	6.5.23	- Applicable standard		xxxxxxxxxx	
	6.5.24	- Number of positions		7 Position	
		e) Electronic Maximum Demand (MD) Meter per transformer section			
	6.5.25	- MD Meter required per transformer section		Yes	
	6.5.26	- Manufacturer		Elster 1700	
	6.5.27	- Manufacturer's type designation		xxxxxxxxxx	
	6.5.28	- Applicable standard		xxxxxxxxxx	
	6.5.29	- Accuracy class		xxxxxxxxxx	
	6.5.30	- Rated voltage	V	230/400	
	6.5.31	- Rated current	A	5A secondary	
		f) Power meter (Energy Analyser)			
	6.5.32	- Manufacturer		xxxxxxxxxx	
	6.5.33	- Manufacturer's type designation		xxxxxxxxxx	
		(All catalogues / documentation shall be provided on equipment being supplied)			
	6.5.34	Comply with earthing requirements		Refer to detail spec	
	6.5.35	Comply with wiring and connection requirements		Refer to detail spec	
7		Documentation			
	7.1	Type test certificates	Sets	1	
	7.2	Proposed routine test certificates	Sets	1	
	7.3	Drawings	Sets	2	
	7.4	Circuit diagrams	Sets	2	
	7.5	Installation, operating and maintenance instructions	Sets	2	
	7.6	Details of special tools required	Sets	2	
	7.7	Detailed spare-parts list provided	Sets	2	
8		Miscellaneous			
	8.1	Comply with packaging requirements		Yes	
	8.1	Training provided		Yes	
	8.1	Quality management accreditation		Yes	
	8.1	Environmental management accreditation		Yes	