

GENERATOR COMPLETE WITH SOUND ATTENUATION - SCHEDULE OF REQUIREMENTS

SYSTEM VOLTAGE AND FREQUENCY	400 Volts, 50 Hz
SITE LOCATION	Kwa Zulu Natal
CLIMATIC CONDITIONS	Altitude 1788m Ambient Temperature 5°C to 40°C Relative Humidity 95%
DESIGNATION	Msinsini Police station

GENERATOR SET		1	2	3
1	Designation & Labelling	Msinsini Police Station		
2-7	Overview	Diesel Engine	Perkins/Caterpillar/Volvo/Cummins Installed within sound attenuated canopy on duplex steel base plate with anti-vibration engine/base and base/floor mounts	
		Alternator	Stamford/Caterpillar/Leroy Somer 400/230V, 50Hz @ 1500rpm, directly coupled to diesel engine with insulation level 'H'	
		Exhaust System	Dual silencer and exhaust required	
		Arrangement	Within sound attenuated Canopy - 65dBA @7m	
		Change-over Panel	Auto change-over panel located in LV Kiosk (generator signal to start up by PV Inverter)	
		Ventilation/Acoustic System	Provided at intake and outlet, inclusive of louvers	
		8-19	Performance Characteristics	Power Rating
Maximum Single Step load	144 kW (60%) from cold start			
Alternator Rating	Power Rating + 0.8 + 10% for harmonics caused by non-linear loads			
Nominal Output Voltage	400/230V, 3 phase, 4 wire adjustable from 346V to 415V nominal voltage for all load conditions.			
Frequency	50 Hz			
Neutral Earthing	Solidly earthed			
Voltage Distortion Across Phases	Not to exceed 1% of the open circuit voltage			
Steady State Voltage Variation	Not greater than 1.5% (from nominal) between 0 and 100% full load with specified speed variation and through unity to 0.8pf lagging			
Transient Voltage Dip And Recovery Time	Not greater than 10% deviation from steady state nominal voltage and will recover to within 1.5% of the nominal voltage within 250 milliseconds for step load as specified			
Voltage Modulation Amplitude	2% ie. $(U_{max} - U_{min} \times 100) / (U_{nom})$			
Steady State Speed Regulation	Not greater than 4% deviation from nominal under all loading conditions			
Transient Speed Regulation And Recovery Time	Not greater than 6.5% deviation from nominal under all loading conditions with recovery within 2 seconds			
20-21	Overload Characteristics	Set Overload Capacity	110% of continuous prime power full load rating at rated voltage for 1 in 12 hours	
		Alternator	Minimum 250% full load at rated voltage for 5 seconds	
22-26	Fuel System	Bulk Fuel Tank	None	
		Day Fuel Tank	990 Litre Base mounted welded double skin steel tank comprising - fill connection, vent pipe/breather, sludge drain connection, sight glass level indicator, feed connection, strainer, electronic level gauge (5 preset alarms and level monitoring)	
		Fuel Shutoff	Individual fusible links above set to operate gravity shutoff valve and both valves monitored by generator system.	
		Fuel Transfer	Duplex pumps and solenoid valves controlled via central controller. Level transducers in all tanks	
		Fuel Filtering	Duvalco Semi Bulk Fuel Management system	
		Fuel Filling Station	Lockable fill point cabinet located externally with fill alarm, tank contents gauge, overflow drain.	
27-31	Control Panel	Physical dimensions (maximum)	1500(w)x2500(l)x1800(h)	
		Controller	Deep Sea	
		Incoming arrangement	185mm. ² Cu PVC SWA ECC cable or 2No. 95mm. ² Cu PVC SWA ECC cable	
		Protection Circuit breaker	Schneider or equivalent	
		Displays for hours run and electrical parameters	Digital	
32-34	Additional Equipment	Rigging Equipment	Welded lifting lugs and jacking pads	
		Base	skid mounted with duplex anti-vibration mounting	
		Batteries	Delco maintenance free on hot dip galvanised stand with clear perspex cover. Capacity for four consecutive cranking cycles (20s on and 10s off), and full operating supply to control systems	
		O&M Manual	Three complete sets hardcopy. One complete set electronically	
35-40	Testing	Factory	Control functionality, protection devices and alarms, including verification of sensing devices and transducers as requested by the Engineer Cold start and load acceptance tests Full load and Maximum load tests for sufficient duration to verify set capacity. Suitable load banks to be provided as required Substantiation of transient voltage dip by test or certified graphical documentation to approval of the Engineer Transient voltage and speed performance verification tests	
		Site	Full functional test of generation system as installed in conjunction with associated set loads and systems, inclusive of all fuels, lube oils and consumables. System synchronisation and load acceptance - Suitable load banks to be provided as required. On completion of all testing, the fuel system shall be full, and lube oil levels shall be full.	
		Colour	Generator Sets - minimum two coats of two pack epoxy paint - Blue	
		Dimensions	Refer to layout drawing	
		Acoustic Control	Acoustic louvers and attenuation to reduce noise levels to within 65 dBA @ 7m from generator room	
41-46	General	Signage	Statutory & rating and diagram plate	
		Emmissions	To comply with the Tier 2 emissions standards as defined by the United States Environmental Protection Agency (EPA) or the equivalent European Stage IIA Standards	
		Loads	Typically lighting and star delta starting pump motors and inverter batteries	

ENGINEER:	DRAWN:	DATE:	CHKD:	P.SIZE:	TITLE:
SN	MH	7/06/24		A3	Msinsini Police station
DRAWING No.:	REV:	SCALE:			Generator Schedule
23044_602	0	nts			
BY:	DATE:	CHKD:	FILE NAME:	SHEET:	1 of 2
0	07/06/24				
REV	DESCRIPTION	BY	DATE	CHKD	



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GENERATOR	1	2	3
Fault Conditions	47 High Engine Temperature	shutdown and alarm (audible and output)	
	48 Low Oil Pressure	shutdown and alarm (audible and output)	
	49 Overspeed	shutdown and alarm (audible and output)	
	50 Underspeed	shutdown and alarm (audible and output)	
	51 Low Coolant Level	shutdown and alarm (audible and output)	
	52 High A/C Volts	shutdown and alarm (audible and output)	
	53 Low A/C Volts	shutdown and alarm (audible and output)	
	54 Emergency Stop	shutdown and alarm (audible and output)	
55 Failure to Start	shutdown and alarm (audible and output)		
Alarm & Indication	56 Set Not in Automatic Mode	indication (flashing led and output)	
	57 Low Fuel Level	indication (flashing led) and alarm (audible and output)	
	58 Water Jacket Heater Faulty	indication (flashing led) and alarm (audible and output)	
	59 Manual Start	indication (flashing led)	
	60 Manual Stop	indication (flashing led)	
	61 Mains Available	indication (flashing led) plus output to auto changeover panel	
	62 Mains	indication (flashing led) plus output to auto changeover panel	
	63 Alternator Available	indication (flashing led) plus output to auto changeover panel	
	64 Alternator on Load	indication (flashing led) plus output to auto changeover panel	
	65 Alternator run down period complex	indication (flashing led) plus output to auto changeover panel	
	66 Low Battery Volts	indication (led) and alarm (audible and output)	
	67 Fuel Valves Closed	indication (flashing led) and alarm (audible and output)	
	68 Room Temperature	indication (flashing led) and alarm (audible and output)	
User Programmable Parameters	69 Alternator Undervoltage (<V)	0 to >V	
	70 Alternator Overvoltage (>V)	<V to 600V	
	71 Under / Over Voltage Delay	0 to 60 seconds	
	72 Start Delay	0 to 60 seconds	
	73 Crank Delay	0 to 60 seconds	
	74 Run up Delay	0 to 60 seconds	
	75 Run on Timer	0 to 60 seconds	
	76 Mains Return Timer	0 to 60 seconds	
	77 Load Transfer Delay	0 to 60 seconds	
	78 Engine Under Speed	50 to 6000 rpm	
	79 Engine Over Speed	50 to 6000 rpm	
	80 Number of Start Attempts, Maximum Crank Time	1 to 10, 1 to 60 seconds	
	81 Low Battery Voltage	8 to 30V	
	82 Overload, Overload Delay	0.5 to 9000kW, 0 to 60 seconds	
	83 Alternator Underfrequency (<f)	0 to >f	
	84 Alternator Overfrequency (>f)	<f to 130Hz	
	85 Under / Over Frequency Delay	0 to 60 seconds	
86 Voltage Window - Difference Between Gen and Bus	0 to 300V		
87 Phase Window -Difference between Gen and Bus	0 to 90°		
88 Dwell Time	0 to 25.0 seconds		
89 Synchronization Timeout	0 to 1800 seconds		

Notes

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DRAWING No.:			REV:	SCALE:	
23044_602			0	nts	Generator Schedule
REV:	DESCRIPTION	BY:	DATE:	CHKD:	FILE NAME:
0	Original Issue	MH	16/10/24	MH	2 of 2



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