GENERATOR COMPLETE WITH SOUND ATTENUATION - SCHEDULE OF REQUIREMENTS

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

	GENERATOR SET		1	2	3
1	Designation & Labelling		Ikageng Police Station		
2	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		
3		Alternator	Stamford/Caterpillar/Leroy Somer 400/230V, 50Hz @ 1500rpm, directly coupled to diesel engine with insulation level 'H'		
4		Exhaust System	Dual silencer and exhaust required		
5		Arrangement	Within sound attenuated Canopy - 65dBA @7m		
6		Change-over Panel	Auto change-over panel located in LV room		
7		Ventilation/Acoustic System	Provided at intake and outlet, inclusive of louvers		
8	Performance Characteristics	Power Rating	240KW prime power rating at 0.8 pf		
9		Maximum Single Step load	144 kW (60%) from cold start		
10		Alternator Rating	Power Rating ÷ 0.8 + 10% for harmonics caused by non-linear loads		
11		Nominal Output Voltage	400/230V, 3 phase, 4 wire adjustable from 346V to 415V nominal voltage for all load conditions.		
12		Frequency	50 Hz		
13		Neutral Earthing	Solidly earthed		
14		Voltage Distortion Across Phases	Not to exceed 1% of the open circuit voltage		
15		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		
16		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		
17		Voltage Modulation Amplitude	2% ie. $(U_{max} - U_{min} \times 100) / (U_{nom})$		
18		Steady State Speed Regulation	Not greater than 4% deviation from nominal under all loading conditions		
19		Transient Speed Regulation And Recovery Time	Not greater than 6.5% deviation from nominal under all loading conditions with recovery within 2 seconds		
20	Overload Characteristics	Set Overload Capacity	110% of continuous prime power full load rating at rated voltage for 1 in 12 hours		
21		Alternator	Minimum 250% ful load at rated voltage for 5 seconds		
22	Fuel System	Bulk Fuel Tank	1000Litre free standing bulk tank complete with piping and hand pump		
		Day Fuel Tank	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)		
23		Fuel Shutoff	Individual fusible links above set to operate gravity shutoff valve and both valves monitored by generator system.		
24		Fuel Transfer	Duplex pumps and solenoid valves controlled via central controller. Level transducers in all tanks		
25		Fuel Filtering	Duvalco Semi Bulk Fuel Management sytem		
26		Fuel Filling Station	Lockable fill point cabinet located externally with fill alarm, tank contents guage, overflow drain.		
27	Control Panel	Physical dimensions (maximum)	1500(w)x2500(l)x1800(h)		
28		Controller	Deep Sea		
29		Incoming arrangement	185mm.² Cu PVC SWA ECC cable or 2No. 95mm.² Cu PVC SWA ECC cable		
30		Protection Circuit breaker	Schneider or equivalent		
31		Displays for hours run and electrcial paramters	Digital		
32	Additional Equipment	Rigging Equipment	Welded lifting lugs and jacking pads		
32		Base	skid mounted with duplex anti-vibration mounting		
33		Batteries	Delco maintenance free on hot dip galvanised stand ith clear perspex cover. Capacity for four consecutive cranking cycles (20s on and 10s off), and full operating supply to control systems		
34		O&M Manual	Three complete sets hardcopy. One complete set electronically		
35	Testing	Factory	Control functionality, protection devices and alarms, including verification of sensing devices and transducers as requested by the Engineer		
36			Cold start and load acceptance tests		
37			Full load and Maximum load tests for sufficient duration to verify set capacity. Suitable load banks to be provided as required		
38			Substanttiation of transient voltage dip by test or certified graphical documentation to approval of the Engineer		
39			Transient voltage and speed performance verification tests		
40		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.		
41	General	Colour	Generator Sets - minimum two coats of two pack epoxy paint - Blue		
42		Dimensions	Refer to layout drawing		
43		Accoustic Control	Acoustic louvres and attenuation to reduce noise levels to within 55 dBA @ 7m from generator room		
44		Signage	Statutory & rating and diagram plate		
45		Emmisions	To comply with the Tier 2 emissions standards as defined by the United States Environmental Protection Agency (EPA) or the equivalent European Stage IIIA Standards		
46		Loads	Typically lighting and star delta starting ventilation motors		

REV	DESCRIPTION	BY	DATE	CHKD
0	Original issue	MH	10/05/24	MH

ENGINEER: SN	DRAWN: MH	DATE: 10/05/24	CHKD	P.SIZE A3
DRAWING No.: 601			REV 0	SCALE nts
FILE NAME:		SHEET: 1 of 2		

TITLE: **Ikageng Police station**

Generator Schedule

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		GENERATOR	1	2	3
47	Fault Conditions	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)		
56	Alarm & Insication	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		Alterator 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)		
69	User Programmable Parameters	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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