

**Specification Manual**  
**of**  
**the Generators at Buxton site 2**

## HV Switchgear Container

Purpose Built 40ft hi-cube HV switchgear container with heating, lighting and power installed.

The container is mounted on a raised frame with access steps. It is lined out with 50mm rock wool insulated panels and accommodates high level louver with fan and low level louver for natural air flow.

The container is split into two sections with dividing wall/door:

Control Room for Grid interface incorporating the consumer unit, desk/chair with PC and UPS installed and single rear entrance door. Single door opens into the Switch Room.

Switch Room to house the 33kV ABB switchgear. Double doors at front and single door opening into the Control Room.

<b>1</b>	<b>Switchgear Container Installation Comprises:-</b>
Drawing:	Container built to approved drawing 40-SGC-001
Dimensions:	12200 L x 3100 W x 3250 H (mm)
RAL:	Container RAL 6005 Moss Green
Container Door Key:	Kason KHC 602
<b>2</b>	<b>Switch Room</b>
Lighting:	3 x twin Ansell vapour proof fittings (2 emergency)
	2 x single Ansell vapour proof fittings
	2 x two-way light switches
	Emergency key switch
Power:	RCD protected double socket
Heating:	13A switched fuse spur
	2KW convection heater (wall mounted)
Ventilation:	2 x aluminium weather louvers
	Vent Axia 315mm/4/1 single phase plate fan
	Grasslin volt free variable thermostat (to control Vent Axia fan)
	3A switched fuse spur

<b>3</b>	<b>Control Room</b>
Distribution Board:	Schneider 4way TPN c/w 125 Amp main switch
	6 x Schneider MCB's various fitted
Lighting:	2 x twin Ansell vapour proof fittings (1 emergency)
	One-way light switch
	Emergency key switch
Power:	8 x double socket
Heating:	13A switched fuse spur
	2kW convection heater (wall mounted)
<b>4</b>	<b>Operations Area</b>
Operations Area:	Lockable Key Safe (wall mounted) (Safe Door Key No. 026)
	Lockable Glazed Noticeboard (900x900mm) (door key has black fob no number)
	Wall mounted computer desk, operators chair
PC:	Dell Outlet Optiplex 5040 SFF PC Intel Core i5-6500 Processor, Windows 10. Dell Professional P2414H 24" Display
UPS:	Socomec 6kVA Itys UPS Single Unit, Single Phase 6kVA @ 15 minutes Serial No. 4I16250191
Router:	3G/4G 2860LN Router with 3m USB cable, Whisper Box IP Address: 185.101.120.146
CCTV:	Avigilon M1300 19" Monitor Avigilon VMA-AS1-8P4-UK HD Video

## HV Switchgear – ABB

1 off 33kVA ABB Safe Ring HV Switchboard housed within purpose built switchgear container.

<b>1</b>	<b>ABB Switchgear (installed by ABB)</b>	
	C-DNO Connection Board	2016 11811780001
	-M- DNO Connection Board	2016 11818120002
	-V DNO Connection Board	2016 11811790002
	CVVV- Transformer Feeder	2016 11812200001
	-V Transformer Feeder	2016 11812210002

## Control System / G59 Mains Protection Relay - PCS

<b>1</b>	<b>Remote Communication and Load Summation Control Panel (RCLSP)</b>	
	1 x 800mm x 600mm x 210mm wall mounting enclosure	
	1 x ComAp IM-NTC BB Base Box Controller (site load value monitoring & integration)	
	1 x ComAp IBNT Internet Bridge (Broadband Interface)	
	1 x ComAp ILB+ Local Bridge (SRD Interface)	
	2 x 8 way Ethernet Switch (Local & Remote PC Interface)	
	1 x 230/240VDC PSU	
	1 Set of Control Miniature Circuit Breakers	
	1 Set of Can Bus Interface Terminals	
<b>2</b>	<b>Communication Cabling</b>	
	Belden 3106A Canbus Communication Cabling between all generators and from first generator to RCLSP. CAT 5E Industrial Ethernet Communication Cable from each generator to RCLSP.	
<b>3</b>	<b>Mains Protection Relay</b>	
	ComAp MainsPro G59-3 Protection Relay (Over/Under Volts, Over/Under HZ & Vector Shift)	S/N: 15124BD6

## Auxiliary Board / Cable Schedules / Cable Tests

External Distribution Board connected to one of the transformers for all auxiliary supplies, and connections from this board to each generator.

<b>1</b>	<b>Auxiliary Board Specification</b>
	1 off 630A External Distribution Board S/No: 1601500/2
Drawing:	Constructed to drawing 1601500 Rev1
RAL:	RAL 6005 Moss Green
	<p><u>Section 1 Mains Incomer:</u> 1no 630A 4-Pole MCCB complete with LSI protection, with copper bus-bar connections to vertical bus-bars. Complete with inner cover and overall door affording IP55 Protection.</p> <p><u>Section 2 Outgoing Devices:</u> 8no 40A 3 Pole MCCB + 40A Neutral Bar, connected to vertical bus-bars. Complete with inner covers and individual doors affording IP55 Protection.</p> <p><u>Section 3 Cable Way</u></p> <p><u>Section 4 Outgoing Devices:</u> 4no 40A 3 Pole MCCB + 40A Neutral Bar, connected to vertical bus-bars 4no 16A 2 Pole MCB 1no 32A 30ma 4 Pole RCBO – wired to 32A 3P+N+E Panel Socket (IP67) 1no 16A 30ma 2P “C” RCBO – wired to 16A 1P+N+E Panel Socket (IP67) MCB, s and RCBO housed in a single compartment, positioned behind plastic windows, affording an ingress protection of IP55</p> <p><u>Top and Vertical Bus-bars:</u> 630A TP&amp;N rated air insulated clamped Bus-bar system manufactured from plain HDHC copper mounted in substantial supports.</p> <p><u>Connections:</u> Auxiliary Board connection to Transformer 3 Auxiliary Board connections to Generators 1-7</p>
<b>2</b>	<b>Cable Schedules</b>
	Generators 1 – 7 Transformers
<b>3</b>	<b>HV Power Cabling</b>
	Tests Completed by Sterling Power Group

## Generator Containers

7 off purpose built 40ft containers to accommodate HMW-2200-T5 MTU16V4000G63 open set generators.

The containers are acoustically designed to achieve 68db(A)@1m(FFC) noise specification.

<b>1</b>	<b>Generator Container Specification:-</b>
Drawing:	Left Hand Generator Breaker - Built to approved drawing no. LH-000-GC
	Right Hand Generator Breaker – Built to approved drawing no. RH-000-GC
Dimensions:	Container only: 8300mm (L) x 3300mm (W) x 3400mm (H)
	Container with Attenuators: 15250mm (L) x 3300mm (W) x 3400mm (H)
RAL:	Container RAL 6005 Moss Green
Container Door Key:	See Generator Container List
Generator:	Himoinsa HMW-2200-T5 STD 2200kVA V400/50Hz AS20 (refer to section 6)
	Landon Kingsway 1" Fire Valve (70°C thermal link)
	Landon Kingsway free fall fire valve position indicator single phase mercury switch
Consumer Unit:	1 x Schneider 4way TPN c/w 125A Main Switch
	1 x Schneider 32A 3 pole MCB
	1 x Schneider 32A 1 pole MCB
	1 x Schneider 6A 1 pole MCB
Power:	1 x RCD protected double socket
	1 x 32A supply to generator control panel
Lighting:	4 x twin Ansell vapour proof fittings (2 emergencies)
	2 x 2-way light switches
	1 x Emergency key switch (plastic)
Diesel Spill Kit:	50L Superior Maintenance Spill Kit holdall

## Generators – Himoina

7 off HMW-2200-T5 Open Skid Generators manufactured by Himoina and built with MTU 16V4000G63 emissions optimised engine with special application.

Rated at 2307kVA for Prime Power and 2546kVA for Standby Power.

Set mounted radiator designed for high end temperatures 34°. Mecc Alte ECO 46-2L/4 alternator, oil primer and centrifuge fitted as confirmed by MTU, set mounted 4000A 4P motorised breakers.

Open Skid Generators supplied by Himoina and installed within purpose built acoustic containers supplied by Ocktcom Ltd.

1	Generator Specification
Model:	Himoina Open Generating Set – HMW-2200-T5 STD 2200KVA V400/50HZ AS20
Drawing:	Left hand breaker - built to drawing code: HMW-2200-Ocktcom-IZ Rev 02
	Right hand breaker – built to drawing code: HMW-2200-Ocktcom Rev 03
Power:	Standby Power 2541kVA / 2033kw (MTU 3D STOR APPLICATION)
	Prime Power 2303kVA / 1842kw
Voltage:	400V 3Ph 50Hz
Engine:	MTU 16V4000G63
Engine Speed:	1500rpm
Starting System:	24V Electric with Optima yellow top maintenance free batteries and battery isolator
Engine Governor:	ADEC
Alternator:	Mecc Alte ECO46 2L/A with MAUX excitation
Control Panel:	AS5 with Free Issue ComAp IG-NTC-BB + IntelliVision 5 components
Radiator:	Tecno Group TG00094AA UK ambient 30m3/s reduced airflow radiator with electric powered cooling fan
Power Box:	CP6
Air Circuit Breaker Panel 4 Pole	4000A Schnieder model NW04 motorised H2 100kA with Micrologic 6.0A trip unit



Breaker Key:	See Generator Summary List and Site Key Log
Heater:	Thermostatically controlled 9kW 400V 3 phase water jacket heater with circulating pump
Battery Charger:	Deep-sea DSE9470 10A mains battery charger
	Automatic Engine Pre-lubrication Pump
	Set mounted 2000A neutral earthing contactor with CT
	Fuel return cooler
	Centrifugal oil filter (MTU)
	Primary water separator filter

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## Transformers

4 off Transformers at 400V to 33KV with impedance and extended LV gland box each housed within a purpose built bund tray.

<b>1</b>	<b>Transformer Specification</b>	
	2MVA GBE Transformer 1	S/No: 11369.3
	4MVA GBE Transformer 2	S/No: 11369.2-1
	4MVA GBE Transformer 3	S/No: 11369.2-3
	4MVA GBE Transformer 4	S/No: 11369.1-4
Drawing:	2MVA - GBE Layout drawing A13658	4MVA - GBE Layout drawing A13709
Dims:	2MVA – 2100 x 2200 x 1800mm	4MVA - 2600 x 2600 x 2800mm
Type:	EB3036.2000/ EB3036.4000 Oil Immersed, Free breathing UK Std Step Up Transformer with Oil Conservator and Copper Windings	
	Detachable Cooling Radiators	
	Oil site glass, Dehydrating breather, Thermometer Pocket,	
	Air filled MV Cable box with removable steel gland plate,	
	No.3 MV Elastimold Bushings 400A Interface B	
	Air filled LV Cable box with aluminium gland plate	
	Extended Cable Connections and Extended LV Cable Box	
	Buchholz Relay	
RAL:	7031 Blue Grey	
<b>2</b>	<b>Transformer Bund</b>	
Drawing:	2MVA Bund Constructed to drawing TB-2000-000	
	4MVA Bund Constructed to drawing TB-4000-000	
RAL:	7031 Blue Grey	

## Fuel System

2 off 40,000 Litre Fuel Tank manufactured and constructed to BS799 Part 5, compliant with PPG2 environmental regulations for above ground fuel tanks.

Each tank is fitted with a DD50 fuel polishing system to avoid diesel bug, which will rotate the diesel oil over a monthly period.

Each tank is fitted with bund alarm, overfill alarm and contents gauge with adjustable volt free level alarm.

Each tank is fitted with 4 flow and 4 return connections, access chamber, spare sockets and vent. Each fuel tank and the single skin pipework have been pressure tested in compliance with PPG2 regulations and all associated valves fitted to enable isolation of fuel tanks.

We have fitted a fire valve per generator mounted with a thermal link in each generator container.

	<b>Fuel Tank Specification</b>
	<b>40,000L Fuel Tank (2 off)</b> S/No: 51476 and 51477
Drawing:	Constructed to drawing FT-40K-000 Pressured Tested to 0.238 bar
Dimensions:	Rectangular double skinned storage tank Ext 2471 H x 6000 L x 2980 W (mm) Int 2433 H x 5900 L x 2856 W (mm)
RAL:	Fuel Tank RAL 6005 Moss Green
Fuel Fill Cabinet Key:	CH501
Tank Fittings:	IPU Diesel Defence DD50 On-tank Fuel Polisher System
	Ocio 50-60Hz 4-20mA Tank Level Monitoring System
	CTS Mains Operated Alarm v3 SWS10008 Series with relays and probes 1" brass inline Y filter
Pipe Fittings:	1" flow and return diesel fuel lines all air tested at 3 bar
	½" Boss Brass Ball Valves
	Landon Kingsway 1" Freefall Fire Valve with Mercury Switch (see generator container)

## General Site Information

<b>1</b>	<b>Earth System Design</b>
	Completed by CU Technical Services Ltd
<b>2</b>	<b>CCTV / Security Alarm System</b>
	1 x Avigilon 2.0C-H4PTZ-DP30 2.00MPX 1080P WDR Day/Night, 30X, pendant dome camera
	6 x Avigilon 2.0C-H4SL-B01-IR H4 SL Fixed bullet camera W/L Catcher 2.0mpx
	Pyronix Alarm System including 6 Photoelectric Beam Sensors, Gate Keypad and Control Panel (Executive Alarms)
<b>3</b>	<b>Acoustic and Palisade Fencing</b>
	Noisevac Absorptive barrier to one face with Reflective face to rear
<b>4</b>	<b>Diesel Spill Kits</b>
	240L Superior oil-only Spill Kit 2 wheeled bin
	50L Superior Maintenance Spill Kit holdalls (per Generator container)