

**Specification Manual**  
**of**  
**the Generators of the Redditch Site**

## 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 side entrance door. Single door opens into the Switch Room.

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

<b>1</b>	<b>Switchgear Container Installation Comprises:-</b>
Drawing:	Container built to approved drawing 40-SGC-BX-RE-001 08-04-16
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
	8 x double socket
Heating	13A switched fuse spur
	2kW convection heater (wall mounted)
<b>4</b>	<b>Operations Area</b>
	Lockable Key Safe (wall mounted) (Safe door key no. 186)
	Lockable Glazed Noticeboard (900x900mm) (door key - black fob, no number)
	Wall mounted computer desk, operator's 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. 4I16250182
Router	3G/4G 2860LN Router with 3m USB cable, Whisper Box
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 11884690001
	-M- DNO Connection Board	2016 11843820001
	-V DNO Connection Board	2016 11884700001
	CVVV- Transformer Feeder	2016 11884710001
	-V Transformer Feeder	2016 11884720001
<b>2</b>	<b>ABB Site Acceptance Testing</b>	
	Site Acceptance Testing CMV Panel Redditch 1	
	Site Acceptance Testing CVVV-VV panel Redditch 2	

## Control System / G59 Protection Relay/ SATS - PCS

<b>1</b>	<b>Remote Communication and Load Summation Control Panel (RCLSP)</b>
Drawing:	Redditch Gen Control Upgrade PCS 6928-100 RevA PCS 6928-200
	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 53 Industrial Ethernet Communication Cable from each generator to RCLSP.
<b>3</b>	<b>Mains Protection Relay</b>
	ComAp MainsPro - Mains Decoupling Protection Relay (Datasheet)
	ComAp MainsPro G59-3 Protection Relay (Over/ Under volts, over/under HZ & Vector Shift) S/N: 16024C6B
<b>4</b>	<b>Detailed Test Programmes</b>
	FFR, STOR, Switchboard, Generators 1-10

## Auxiliary Board / Cable Schedules / HV 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</b>
	1 off 630A External Distribution Board S/No: 161500/3
Drawing:	Constructed to drawing 1601500 Rev1
RAL:	RAL 2002 Red
	<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>
<b>2</b>	<b>Cable Schedules</b>
	Generator Power Cables 1 – 10 Transformer Power Cables 1 - 5 Earth Cable Schedule Auxiliary Power Cables
<b>3</b>	<b>HV Power Cable Tests</b>
	Tests completed & Land & Power Link/001 TX/001 TX/002 TX/003 TX/004 TX/005

## Transformers

5 off 4MVA Oil Immersed Power Transformers at 400V to 33KV with impedance and extended LV gland box housed within 5 purpose built bund trays.

1	Transformer Specification	Serial Numbers
	5 off 4MVA GBE Oil Immersed Power Transformers EB3036.4000 Three Phase 4MVA 33KV 400V 50Hz	11625.1/1 11625.1/2 11625.1/3 11625.1/4 11625.1/5
Drawing:	GBE Layout drawing A13709	
Dims:	2600 x 2600 x 2800mm	
RAL:	7031 Blue Grey	
Type:	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	
2	Transformer Bund Specification	
Drawing:	Constructed to drawing TB-4000-000	
RAL:	7031 Blue Grey	

## HIMOINSA GENERATORS

10 off Himoinsa HMW-2200-T5 Containerised Generators built with MTU 16V4000G63 exhaust emission 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.

	<b>Generator Specification</b>
Model:	Himoinsa 40' Containerised Genset – HMW-2200-T5 C40 2200KVA V400 AS20
Drawing:	Left hand breaker - built to drawing code: P-0501-15-DWG-MD-02
	Right hand breaker – built to drawing code: P-0501-15-DWG-MD-01
Container:	40' container to 80dBA at 1m at 110% load free field conditions at 32° Bunded container floor with optical alarm
RAL:	Container painted to RAL 2002
Container door key:	All generator containers at Redditch KEYA K211
Breaker Key No:	See Generator Summary List and Site Key Log
Energisation key no.	MS1
Power:	Standby Power 2541kVA / 2033kw (MTU 3D STOR APPLICATION)
	Prime Power 2303kVA / 1842kw
Voltage:	400V 3Ph 50Hz
Engine:	MTU 16V4000G63 Exhaust Emission Optimised Engine
Engine Speed:	1500rpm
Alternator:	Mecc Alte ECO46 2L/4A with MAUX excitation and anti-condensation heater Meccalte alternator AVR
Radiator:	Techno Group TG00094AA Contained within a separate compartment with multiple low noise variable speed cooling fans
Power Box:	CP6



Control Panel:	AS5 with Free Issue ComAp IG-NTC-BB + Intelivision 5 components mounted in container wall adjacent to generator ACB location
Air Circuit Breaker Panel:	4 Pole 4000A Schnieder model NW04 motorised H2 100kA with Micrologic 6.0A trip unit, mounted in container wall compartment with external lockable access door
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
	13A RCD protected double socket
	Internally mounted 2000A neutral earthing contactor with CT
	Fire valve
	Fuel cooler

HICKMAN  
SHEARER

## Fuel System

4 off 30,000 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.

	Fuel Tank Specification	Serial Numbers
	4 off 30,000L Fuel Tank with feed and return points	15012965 15012966 15012967 15012968
Drawing:	Constructed to drawing WG-SD-EBD6600-OCKTCOM-A001	
Dimensions:	7150 x 2300 x 2560 mm	
RAL:	6005 C5M	
Tank Fittings:	IPU Diesel Defence DD50 On-tank Fuel Polisher System fitted into cabinet	
	Ocio 50-60Hz 4-20mA Tank Level Monitoring System wired into ARCL240VC	
	230V 3-in-1 Tank/Bund/Overfill Alarm wired into ARCL240VC	
	Afriso Unimes Mechanical Tank Contents Gauge	
Pipe Fittings:	1" flow and return diesel fuel lines all air tested at 3 bar	
	½" Boss Brass Ball Valves	

## 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)