

The UK's Leading Technical Experts
in **Standby Power, Uninterruptible
Power Supplies and Combined Heat
& Power Systems**



Generator Technical Submittal Rev1

Project Reference – Green Park Reading

Prepared For – Lecter Ltd

Presented To – Mr Graham Bartlett

Date – 06/07/2021

Quotation Reference – 1045001

Contact – Trushar Desai



**GENERATORS
& UPS**

**COMBINED
HEAT & POWER**

**GENERATOR
RENTAL**

**POWER
CALL**

**MAINTENANCE
& MONITORING**

Generator Technical Submittal

Following your request for our technical submittal we now have pleasure in issuing this document.

When working with us on this project you can be assured of:

- Full technical and commercial support direct from the manufacturer.
- A dedicated project manager as a single point of contact for the entire project including a direct email address and phone contact number.
- Full risk assessments, method statements and project documentation as appropriate.
- You are working with an ISO 9001, 14001 & 18001 accredited company.

The information provided in this document is based off our quotation and the information we have been provided. Therefore, the following needs to be considered:

- The information given including drawings, dimensions and weights are preliminary and are subject to detailed final design.
- Final design will be completed on receipt of contract.
- Terms & Conditions, Lead times and other such information are not included within this document and can be found in the referenced quotation.

As a proven supplier of generator solutions throughout the UK, you can be assured that Shenton Group have the experience and resources to provide a practical and reliable solution.

If you have any questions or you, require further information, please do not hesitate to contact us. We are here to help.

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1. Technical Submittal Front Sheet

Trade Contractor:	Shenton Group	From: Roy Taylor	Andover, Hants
Trade Contractor Sub No:		Date:	06/07/2021
Document number	13288-SGP-XX-XX-TS-M-8000-S3-P01.Technical Submittal	Document Title	Standby Generator
Site Address	Building 450, Green Park, Longwater Avenue, Reading RG2 6GP	End Client	Three UK
Main Contractor	Lecter Ltd	Electrical Contractor	N/A
Consultant	Colin R. Hoare CJDP	Schedule number	2

Issue	Description	Date
-	For Approval	06/07/2021

Description:	Standby Generator		
Planned on Site Date:	TBC		

Approval (Note that this section is included for cases where it is expedient to provide a paper sign off of the front sheet)

Company	Sign	Date	Status	Comments

Comments list and Actions

Document	Page	Comment	Response

2. Scope Of Supply

Equipment to be supplied:

One Shenton Group open set diesel generator, model PHG550PeOS producing a maximum standby output of 550kVA at 400 Volts, 3 phase, 0.8 power factor, 50Hz @ 1500rpm with a prime power output of 500kVA to BS5000 and BS5514 standard.

Unless specifically detailed electrical and mechanical installation is not included and to be done by others.

System Description

The Generator system shall be used in conjunction with the mains supply and shall provide a standby supply in the event of a mains failure.

On receipt of a start signal from the LV switchboard, the generator will start and run up to normal speed and voltage, and then after a pre-set time, a signal will be given to the LV switchboard that the generator is ready to accept load and initiate a change over from the mains supply to the generator.

On return of mains supply, load will transfer back to mains, generator will enter cooling cycle for two minutes and then stop.

Acoustic Canopy 85dBA@1m

Acoustic Container to achieve a noise level of 85 dBA at 1 metre in assumed FFC from our (PHG550PeOS) powered generator set.

Alternator Box and Cabling to External Changeover

Alternator Box and Cabling from Alternator to the Changeover ATS

BMS Outputs

8-way relay board with volt free contacts.

Standalone ATS Panel with Loadbank IP Rated

Form 3A, IP55, RAL7035 Powder coat finish, Key lockable outer door with inspection window, Inner doors.

Firevalve shutdown

Shenton Group fire shutdown system incorporating a fire wire operated drop weight fire valve.

Delivery, Offloading & Positioning

Budget price, (subject to a detailed site survey) for delivery to Green Park Reading, offloading, and positioning of the generator by HIAB onto suitably prepared base, assuming free access for HGV vehicle, and final position is within the reach of the delivery vehicle's crane.

Timed or 'out of hours' deliveries, and any necessary positional skating etc. are available at extra cost upon request.

Please Note: we have not allowed for any standing time during deliveries nor for any manual/machine handling to position the generator over a challenging delivery route.

The ground surface needs to consist of a flat concrete base, otherwise skates will not work correctly.

BUDGETARY PRICE ONLY due to lack of delivery route information available at this time.

Shenton group reserves the right to quote for any extra work required to complete the delivery operation.

Site Acceptance Testing

Site acceptance testing of the generator using a standard resistive load bank.

Typical Test as follows: - Start set and run at various loads - 50% for 30 minutes; 75% for 30 minutes; 100% for 1 hour; 110% for 1 hour.

Additional Site Visit following Commissioning for Training Purposes

Provision of training for facility operating personnel covering operation of the equipment provided.

Price is per day for maximum of 4 operatives.

Commissioning (With in normal working hours)

" Standard commissioning of the Generator by a Shenton Group trained engineer using on-site load.

Please be aware this will involve short-planned power outages (for a maximum of 20 seconds) in order to test the changeover system.

This will be carried out during normal weekday working hours and assumes that all electrical installation work is fully completed.

Out of hours commissioning and load bank testing are available at an additional cost.

Training, if required, will be carried out during this period.

We include for first fill of lubricating oil and anti-freeze.

First fill of fuel prior to commissioning is available as an optional extra or should be provided by others.

Manuals and Drawings

2 No. copies of standard Test Certificates and Operating and Maintenance manuals.

1 No. copy to be in paper form and 1 copy in electronic form.

2 No. copies of the following drawings: - General Arrangement of the generator, General Arrangement of the control panel, Electrical Schematics of engine/panel wiring, Control philosophy, General Installation of the fuel system layout.

1 No. copy to be in paper form and 1 copy in electronic form.

First Fill of Fuel

A complete fill 1000 litres of the generator fuel tank carried out by Shenton Group after testing.

Project Liaison

Principle Supervisor single point of responsibility.

Powercare24 Generator Maintenance Contract

12-month service contract for standby generator including two service visits.

3. Specification Compliance

The Following points have been reviewed and found to be non-compliant, not applicable or Shenton Group have offered a more suitable alternative.

Specification Ref;

[illegible]

4. Generator Specification

GENERATOR

One Shenton Group open set diesel generator, model PHG550PeOS producing a maximum standby output of 550kVA at 400 Volts, 3 phase, 0.8 power factor, 50Hz @ 1500rpm with a prime power output of 500kVA to BS5000 and BS5514 standard.

ENGINE

PERKINS 2506C-E15TAG2 industrial diesel engine designed to comply with ISO3046, BS5514 and DIN6271, complete with water cooling system with temperate radiator, cooling fan, pulley guards, thermostatic control and gear driven water pump. Engine governing to Class A1. DC electric starting system with batteries, axial starter motor and regulated engine driven charging alternator.

Integrated control panel for manual / automatic operation complete with engine protection system giving automatic shutdown for fault conditions of low oil pressure and high engine temperature.

Mains powered, automatic battery charger.

Water jacket heater.

Output rated circuit breaker.

Stop solenoid energised to run.

Replaceable fuel, oil, and air filter elements.

ALTERNATOR

The alternator is brushless, screen protected, revolving field and self-regulating to BS4999, VDE0530 and IEC34-1. IP21 protection and class H insulation/temperature rises.

Voltage accuracy to +1% in static load condition and any power factor between 0.8 and unity.

Permissible alternator overloads are 300% for 10 seconds, 50% for 2 minutes and 10% for 1 hour in every 12 hours.

Radio suppression to BS800 and VDE0875, grade G.

BASE FRAME

Heavy duty fabricated steel base frame incorporating, bunded daily service base fuel tank, complete with contents indicator, fuel filter and flow and return lines.

Anti-vibration mounts fitted between the engine/alternator and base frame.

MECHANICAL DATA

Dimensions are 3200mm Length x 1300mm Width x 2250mm Height.

Weight is 3490Kg.

Fuel capacity is 1000 litres.

Fuel consumption is 81 litres/hour @ 75% load.

Autonomy is 12 hours @ 75% load.

5. Generator Data Sheet

Model: PHG550PeOS



GENERATORS AND UPS



- Intelligent Auto-Start Controller with Generator
- Monitoring and Protection Systems Suitable for Remote Starting or Connection with shentonggroup AMF Panel
- Battery Trickle Charger
- Thermostatically controlled Engine Heater
- Long Range Bunded Base Fuel Tank
- Ability to be Customised to Specific Requirements
- Output Circuit Breaker

GENERAL

Shenton Group Generators range from 10 to 2500kVA, and are built to a world-class standard. These remarkably competitive standby generators provide the most cost-effective solution for 'standard package' requirements.

A first-class range of diesel-powered generators for prime and standby power application which feature reliable components from leading manufacturers, these are premium products upon which your company can build its reputation.

Model PHG550PeOS

Standby Power	kVA	550
	kW	440
Prime Power	kVA	500
	kW	400
Rated Speed	r.p.m	1500
Voltage	V	400/230
Rated Power Factor	Cos Phi	0,8
Data Sheet Number	PHG550PeOS NS Rev 2	

Prime: This rating is for the supply of continuous electrical power (at variable load) in lieu of commercially purchased power. There is no limitation on the annual hours of operation and 10% overload power can be supplied for one hour in twelve hours.

Standby: This rating is for the supply of continuous electrical power (at variable load) in the event of a utility power failure. No overload is permitted. Max rating, is available for one in twelve hours

Note: Standard reference conditions: 25deg C (77deg F) air inlet temperature, 152.4m (500feet) above sea level, 60% relative humidity. All engine performance data based on the above mentioned maximum continuous ratings. Fuel consumption data at full load for diesel fuel with specific gravity of 0.85 and conforming to BS2869: 1998, class A2.

In line with our policy of continuous development, we reserve the right to change specification without notice.

Generator Technical Data Sheet for

Model: PHG550PeOS



GENERATORS AND UPS



ENGINE		
Rated Output	kWm	452
Manufacturer		Perkins
Model		2506C-E15TAG2
Engine Type		Diesel 4 Strokes-Cycle
Aspiration Type		Turbo charged & intercooled
Cylinders Arrangement		6 in line
Bore & Stroke	mm	137 x 171
Displacement	L	15
Cooling System		Water
Compression Ratio		16.0:1
Fuel Consumption 100% PRP	l/h	106
Fuel Consumption 75% PRP	l/h	81
Fuel Consumption 50% PRP	l/h	55
Total Oil Capacity	L	62
Total Coolant Capacity	L	58
Governor	Type	Electronic
Air Filter	Type	Dry Paper Cartridge
Battery Capacity	Ah	2 x 200
Battery Voltage	V	24

Perkins engines have a proven reputation within the generator industry, providing high levels of reliability and low cost of ownership. Perkins actively pursues product support excellence providing a consistent quality of support across the globe. shentonggroup have used Perkins engines as our first choice product, for many years and found them to be solid, reliable and readily accepted products.

Generator Technical Data Sheet for

Model: PHG550PeOS



GENERATORS AND UPS



ALTERNATOR

Manufacturer		Mecc Alte
Model		ECO 40-3S/4
Poles		4
Frequency	Hz	50
Insulation Class		H
Efficiency at 75% load class H 400v	%	94.6
Reactance Xd''	%	11.4
Short Circuit Current Capacity	%	>300
Heat Dissipation 400v	W	22833
Radio Interference		EN50081-1, EN50082-1, VDE0875K
Waveform Distortion (THD) at Full Load	%	2.4
Enclosure (according IEC-34-5)		IP 21
Weight of Complete Generator	Kg	1171
Cooling Air Requirement	m3/min	54
Overload	%	1 in 6 hours
Overload per 20 sec	%	300
Exciter System		Auxilliary Winding
Voltage Regulator		DSR
Voltage regulation Performance +/-	%	1
Coupling		Flexible Disk

Mecc Alte has sixty years of experience in the electromechanical field, and is today at its height in the world production of synchronous alternators. Committed daily to research, development and updating activities, Mecc Alte is a testimony to constant improvement in all areas such as technology, organisation and quality. The company has ISO 9001 certification, awarded in 1996 and ISO 14001 since 2010. With 54.000 square meters of factory area, almost 850 employees and a turnover of approximately 130 million euro, Mecc Alte is a well-established company ready to challenge the markets in every product sector.

Generator Technical Data Sheet for

Model: PHG550PeOS



GENERATORS AND UPS

APPLICATION DATA

Exhaust System

Maximum Exhaust Temperature	°C	550
Exhaust Gas Flow	M3/min	98
Maximum Allowed Back Pressure	kPa	6.8

Air Flows

Intake Air Flow	m3/h	2196
Cooling Air Flow	m3/s	11
Available Air Restriction	KPa	0.125

Fuel System

Fuel Oil Spec		DIESEL
Fuel Tank Capacity	L	1000
Autonomy @ 75% load	Hrs	12

Dimensions/Weight

Length	mm	3200
Width	mm	1300
Height	mm	2250
Weight excluding fuel	Kg	3490
Sound Pressure Level @ 7 mtrs	dB(A)	-

Electrical

Output Circuit Breaker	Type	MCCB
	Model	ABB T6N
Max Load Current at 400V .8 p.f.	Amps	793

Generator Technical Data Sheet for

Model: PHG550PeOS



GENERATORS AND UPS



SG7410DS GENERATOR CONTROLLER

The SG7410DS is an Auto Start Control Module. Monitoring an extensive number of engine parameters, the modules will display warnings, shutdown and engine status information on the back-lit LCD screen, illuminated LEDs, remote PC. The modules include USB, RS232 and RS485 ports as well as dedicated DSENet® terminals for system expansion. The module is compatible with electronic (CAN) and non-electronic (magnetic pick up/alternator sensing) engines and offers an extensive number of flexible inputs, outputs and engine protections so the system can be easily adapted to meet the most demanding industry requirements. The full list of features includes enhanced event and performance monitoring, remote communications and dual mutual standby.

CONTROL PANEL DISPLAY FEATURES

Engine RPM	Generator Output Current
Engine Oil Pressure	Earth current
Coolant temperature	Output kW
Battery Volts	Load level %
Run Hours/ No of starts	Output kVA
Fuel level	Power factor
Generator output Voltage	Load kVAr
Frequency	kWh/kVAh/kVArh

SG7410DS is a branded Deep Sea Electronics controller, customized to shentonggroup's specific requirements. shentonggroup has a long history of collaboration with Deep Sea Electronics, and endorse their products with confidence. Our experience has proved this is the market-leading controller having a perfect mix of complex capability and user simplicity.

6. Engine Data Sheet

2500 Series 2506C-E15TAG2 Diesel Engine – ElectropaK

478 kWm at 1500 rpm
490 kWm at 1800 rpm

The 2500 Series engine has been developed using the latest engineering techniques and builds on the strengths of the already very successful 2000 Series family and addresses today's uncompromising demands within the power generation industry. Developed from a proven heavy-duty industrial base these products offer superior performance and reliability.

The 2506C-E15TAG2 is a turbocharged and air-to-air charge-cooled, 6 cylinder diesel engine. Its premium features provide economic and durable standby duty, exceptional power-to-weight ratio resulting in exceptional fuel consumption and low gaseous emissions and advanced overall performance and reliability making this the prime choice for today's power generation industry.

Economic power

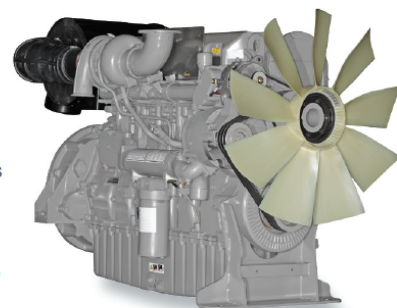
- Mechanically operated unit fuel injectors with advanced electronic control, combined with carefully matched turbocharging, give excellent fuel atomisation which leads to exceptional low fuel consumption

Reliable power

- Developed and tested using the latest engineering techniques and finite element analysis for high reliability
- Low oil usage and low wear rates
- High compression ratio ensures clean rapid starting in all conditions
- Perkins global product support is designed to enhance the customer experience of owning a Perkins powered machine. We deliver this through the quality of our distribution network, extensive global coverage and a range of Perkins supported OEM partnership options. So whether you are an end-user or an equipment manufacturer our engine expertise is essential to your success

Compact, clean and efficient power

- Exceptional power to weight ratio and compact size gives optimum power density for ease of installation and more cost effective transportation
- Designed to provide excellent service access for ease of maintenance



Product support

- Perkins actively pursues product support excellence by ensuring our distribution network invest in their territory – strengthening relationships and providing more value to you, our customer
- Through an experienced global network of distributors and dealers, fully trained engine experts deliver total service support around the clock, 365 days a year. They have a comprehensive suite of web based tools at their fingertips covering technical information, parts identification and ordering systems, all dedicated to maximising the productivity of your engine
- Throughout the entire life of a Perkins engine, we provide access to genuine OE specification parts and service. We give 100% reassurance that you receive the very best in terms of quality for lowest possible cost .. wherever your Perkins powered machine is operating in the world

Certified against the requirements of EU 2007 legislation for non-road mobile machinery, powered by constant speed engines (EU 97/68/EC Stage II)

Engine Speed (rev/min)	Type of Operation	Typical Generator Output (Net)		Engine Power			
				Gross		Net	
		kVA	kWe	kWm	bhp	kWm	bhp
1500	Prime Power	500	400	451	605	435	583
	Standby Power	550	440	495	664	478	641
1800	Prime Power	500	400	458	615	435	583
	Standby Power	563	450	514	689	490	657

The above ratings represent the engine performance capabilities to conditions specified in ISO 8528/1, ISO 3046/1:1986, BS 5514/1. Derating may be required for conditions outside these; consult Perkins Engines Company Limited.

Generator powers are typical and are based on an average alternator efficiency and a power factor (cos. θ) of 0.8. Fuel specification: BS 2869: Part 2 1998 Class A2 or ASTM D975 D2. Lubricating oil: 15W40 to API CI4.

Rating Definitions

Prime Power: Power available at variable load with a load factor not exceeding 80% of the prime power rating. Overload of 10% is permitted for 1 hour in every 12 hours' operation.

Standby Power: Power available in the event of a main power network failure up to a maximum of 500 hours per year of which up to 300 hours may be run continuously. Load factor may be up to 100% of standby power. No overload is permitted.

Photographs are for illustrative purposes only and may not reflect final specification.

All information in this document is substantially correct at time of printing and may be altered subsequently.
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 THE HEART OF EVERY GREAT MACHINE

7. Alternator Data Sheet



GENERATOR TYPE ECO 40-3S/4

Document : DS024A/1

issue 010 date 21/03/2014

Electrical Characteristics										
Frequency		Hz	50				60			
Voltage (parallel star)		V	380	400	415	440	415	440	460	480
Rated power class H		kVA	500	500	500	460	540	580	600	600
		kW	400	400	400	368	432	464	480	480
Rated power class F		kVA	450	450	450	414	484	520	540	540
		kW	360	360	360	331	387	416	432	432
Regulation with		DER1	±1% with any power factor and speed variations between -5% +30%							
Insulation class			H							
Execution			Brushless							
Stator winding			12 ends (nameplate data : 800V-50Hz Series Star, 960V-60Hz Series Star)							
Rotor			with damping cage							
Efficiencies class H	4/4	%	94,4	94,6	94,5	94,2	95	95,3	95,5	95,6
(see graph. for details)	3/4	%	94,6	94,8	94,7	94,4	95,2	95,5	95,7	95,8
	2/4	%	93,7	93,9	93,7	93,4	93,9	94,5	94,7	94,9
	1/4	%	90,2	90,3	90,1	89,8	90,5	90,7	90,9	91,1
Reactances (f. l.cl. F)	Xd	%	322	250	167	105	430	370	322	250
	Xd'	%	21,8	21	19,4	18,4	23,5	22,9	21,8	21
	Xd''	%	12,1	11,4	10,2	9,7	14,1	13,4	12,1	11,4
	Xq	%	122	108	102	92	145	136	122	108
	Xq'	%	122	108	102	92	145	136	122	108
	Xq''	%	27,7	26,4	25,8	24,3	29,5	28,6	27,7	26,4
	X ₂	%	18,4	16,7	15,7	13,8	20,2	19,4	18,4	16,7
	X ₀	%	3,2	3	2,7	2,5	3,8	3,6	3,2	3
Short Circuit Ratio	Kcc		0,31	0,40	0,60	0,96	0,23	0,27	0,31	0,40
Time Constants	Td'	sec.	0,14							
	Td''	sec.	0,021							
	Tdo'	sec.	2,80							
	Tα	sec.	0,031							
Short Circuit Current Capacity		%	>300				>350			
Excitation at no load		Amp.	0,6	0,7	1	1,2	0,4	0,5	0,6	0,7
Excitation at full load		Amp.	3,6	3,5	3,9	4	3	3,1	3,2	3,4
Overload (long-term)		%	1 hour in a 6 hours period 110% rated load							
Overload per 20 sec.		%	300							
Stator Winding Resistance (20°C)		Ω	0,0106							
Rotor Winding Resistance (20°C)		Ω	5,176							
Exciter Resistance (20 °C)		Ω	Rotor : 0,317				Stator : 8,85			
Heat dissipation at f.l.cl.H		W	23729	22833	23280	22658	22737	22884	22618	22092
Telephone Interference			THF < 2%				TIF < 40			
Radio interference			EN61000-6-3, EN61000-6-2. For others standards apply to factory							
Waveform Distors.(THD) at f. load	LL/LN	%	2,4 / 2,5							
Waveform Distors.(THD) at no load	LL/LN	%	2,6 / 2,5							
Mechanical characteristics										
Protection			IP 21 (other protection on request)							
DE bearing			6322							
NDE bearing			6318.2RS							
Weight of wound stator assembly		kg	428							
Weight of wound rotor assembly		kg	274,6							
Weight of complete generator		kg	1171							
Maximun overspeed		rpm	2250							
Unbalanced magnetic pull at f.l.cl.F		kN/mm	6,5							
Cooling air requirement		m³/min	54				64,8			
Inertia Constant (H)		sec.	0,175				0,210			
Noise level at 1m/7m		dB(A)	94 / 82				98 / 88			

All technical data are to be considered as a reference and they can be modified without any notice.

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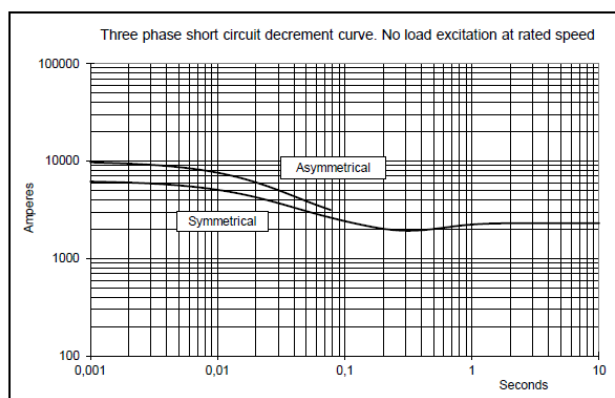
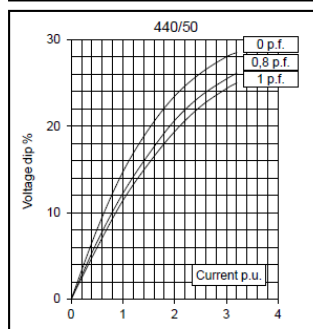
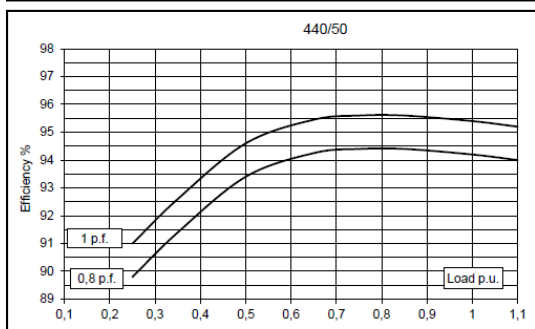
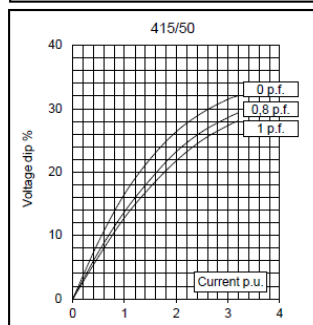
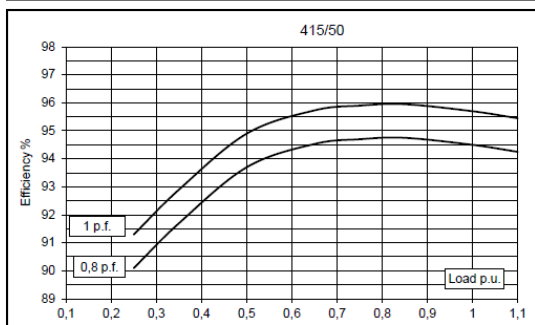
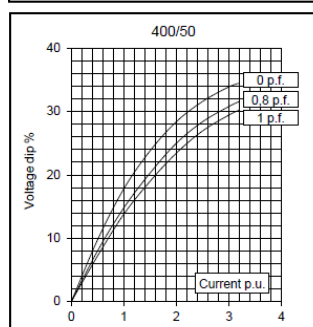
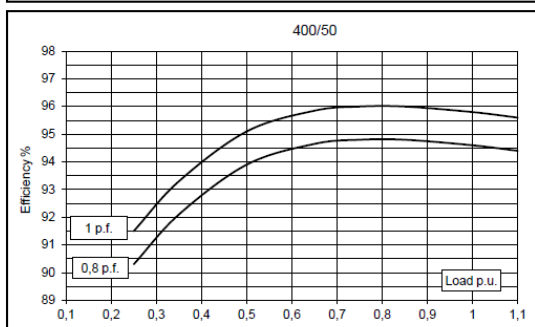
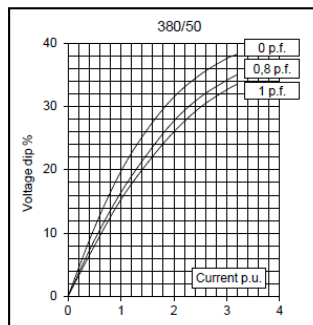
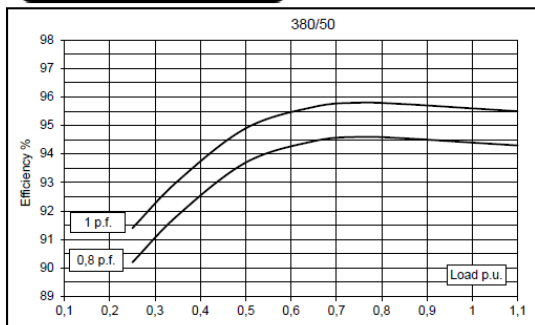


GENERATOR TYPE ECO 40-3S/4

Document : DS024A/2

issue 009 date : 21/03/2014

50 Hz



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8. Acoustic Canopy 85dBA@1m

85dBA@1m CONTAINER SPECIFICATION

- Corrugated steel sides.
- Mono pitched flat steel water shedding roof.
- Acoustic lining on walls and ceiling with perforated sheet steel inner skin.
- Standard chequer plate steel inner floor fully welded to create 75mm deep internal bund.
- 4-point top/base lifting facility depending on application.
- 2 x Single leaf access doors complete with lockable slam type door furniture, internal push button panic release & restraining door stays.
- 1 x Cable entry via sidewall or banded floor penetration, supplied with a 5mm thick aluminium gland plate.
- 3 x Stainless steel earth bosses provided, 1 x Internal & 2 x External.

Note – Container requires a concrete plinth with flat float finish to +/- 3mm all over.

Note – It is your own responsibility to ensure the structural and acoustic suitability of the plinth.

CONTAINER DIMS (in mm) – 4600 L x 2450 W x 2900 H

Approx. Weight – 3,675kg

ATTENUATOR SPECIFICATION

Note – Supplied loose for transportation.

- Side, externally mounted cooling air inlet attenuator, air entering end and sides of attenuator.
- End, externally mounted cooling air outlet attenuator.
- Flat sheet steel outer skin acoustically rated inner lining and perforated sheet steel inner skin to both casing and internal splitters.
- Fitted with fixed blade weather louvres and bird mesh.

INLET DIMS (in mm) + 1100 to Width

Approx. Weight – 500kg

OUTLET DIMS (in mm) + 1200 to Length, Approx. Weight – 775kg

PAINT FINISH

- Container finish painted externally in 2 pack epoxy/acrylic to BS4800 or RAL colour*.
- Internally painted white.
- Floor painted black.
- Underside of base finished in bitumen based anti-corrosive paint system.
- Life to first major maintenance – up to 10 years.

*Note – Excluding the use of metallic and pearlescent colours.

FLEXIBLE DUCT

- 1 x Flexible radiator connection duct made from a flame retardant polyester material to comply with BS5867 Part 2.

EXHAUST SYSTEM

Note – Supplied loose for transportation.

- Roof mounted mild steel exhaust gas silencer system finished in heat resistant paint.
- Internal connecting pipework between engine bellows and silencer.

SILENCER DIMS (in mm) + 925 to Height Approx. Weight - 250kg

ELECTRICAL PACKAGE SPECIFICATION

- 3 x 1500 mm LED lights c/w diffusers - 1off with a 3hr D.C. backup.
- 2 x metal clad switches.
- 1 x 13amp switched socket outlet with RCCD.
- 1 x Single-phase distribution board.
- 16A or 32A single phase auxiliary power supply to generator control panel.
- 2 x bund float switches wired back to generator control panel.

All wiring in galvanised conduit to current IEE regulations.

9. Alternator Box and Cabling to External Changeover

Alternator Box and Cabling from Alternator to the Changeover ATS.

10.BMS Outputs

DSE 2157_8-way relay board with volt free contacts to allow, but not limited to, the following outputs to a BMS: -
Mains available; Generator running; Low fuel; Fail to start alarm; Starting battery charger failure alarm; Crankcase heater control and alarm; Emergency stop button lock of; Emergency shutdown operated; Common alarm.



DSE2157 DSENET® OUTPUT EXPANSION MODULE

The DSE2157 is an output relay expansion module for use with DSENet® compatible control modules. The DSE2157 has been designed to extend a host module's output capabilities.

A maximum of 10 DSE2157's can be connected to an individual module at any one time. All outputs are configurable via the host controller.

The additional output capabilities of the DSE2157 give OEMs the flexibility to meet increasingly complex industry specifications. The module incorporates 'DIN' rail and chassis mountings allowing convenient fixing into a panel.

The module will work up to 1 KM (0.6miles) from the host control module.

ENVIRONMENTAL TESTING STANDARDS

ELECTRO-MAGNETIC COMPATIBILITY

BS EN 61000-6-2
EMC Generic Immunity Standard for the Industrial Environment
BS EN 61000-6-4
EMC Generic Emission Standard for the Industrial Environment

ELECTRICAL SAFETY

BS EN 60950
Safety of Information Technology Equipment, including Electrical Business Equipment

TEMPERATURE

BS EN 60068-2-1
Alt/Ac Cold Test -30 °C
BS EN 60068-2-2
Bb/Be Dry Heat +70 °C

VIBRATION

BS EN 60068-2-6
Ten sweeps in each of three major axes
5 Hz to 8 Hz @ +/-7.5 mm,
8 Hz to 500 Hz @ 2 gn

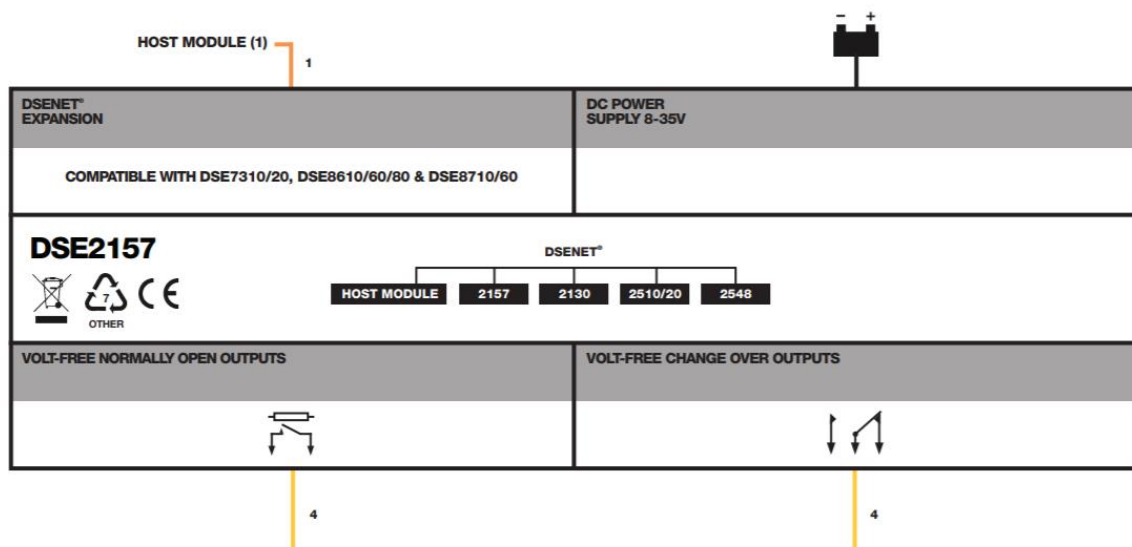
HUMIDITY

BS EN 60068-2-30
Db Damp Heat Cyclic 20/55 °C
@ 95% RH 48 Hours
BS EN 60068-2-78
Cab Damp Heat Static 40 °C
@ 93% RH 48 Hours

SHOCK

BS EN 60068-2-27
Three shocks in each of three major axes
15 gn in 11 ms

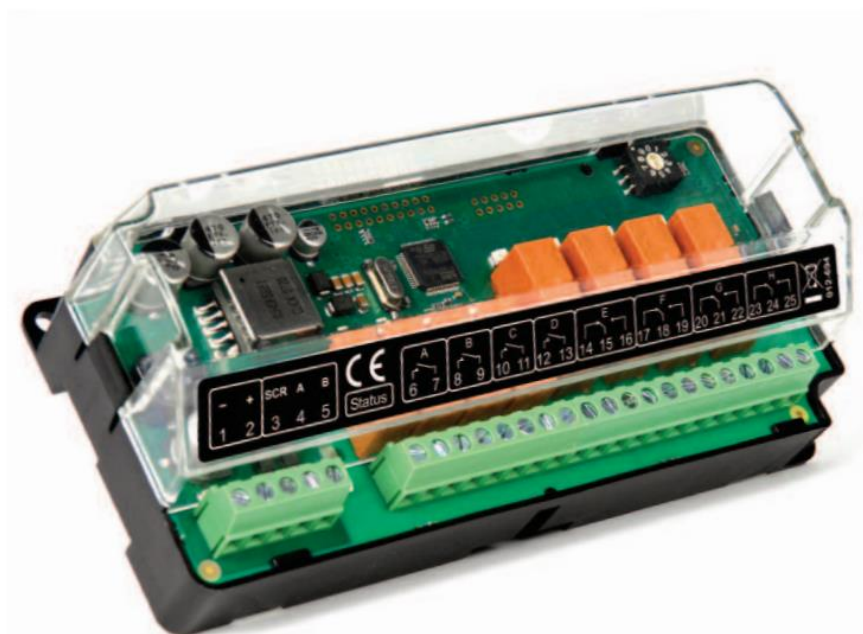
COMPREHENSIVE FEATURE LIST TO SUIT A WIDE VARIETY OF GEN-SET APPLICATIONS





DSE2157

DSENET[®] OUTPUT EXPANSION MODULE



KEY FEATURES

- Power On/Link Lost LED ID SWITCH
- 10 expansion modules can be connected to 1 host controller at a time
- 8 configurable relay contacts with LED indicators:
 - 4 Normally Open (N/O)
 - 4 Change Over (C/O)
- Terminal strip connection for quick and easy set-up

ID SWITCH

The rotary ID switch is used to select the address of the DSE2157 expansion module, as the host control module is capable of giving instructions to a number of DSE2157 expansion modules at the same time.

SPECIFICATION

DC SUPPLY

CONTINUOUS VOLTAGE RATING
8 V to 35 V Continuous

CRANKING DROPOUTS

Able to survive 0 V for 50 mS, providing supply was at least 10 V before dropout and supply recovers to 5 V. This is achieved without the need for internal batteries. LEDs and backlight will not be maintained during cranking.

MAXIMUM OPERATING CURRENT
325 mA at 12 V, 152 mA at 24 V

MAXIMUM STANDBY CURRENT
70 mA at 12 V, 32 mA at 24 V

AUXILIARY RELAY CONTACTS
2 Amp DC rated voltage free

DIMENSIONS

OVERALL
165 mm x 76 mm x 49 mm
6.5" x 3" x 1.9"

RELATED MATERIALS

TITLE

DSE2157 Installation Instructions
DSE2157 Operator Manual

PART NO'S

053-034
057-083

DEEP SEA ELECTRONICS PLC UK

Highfield House, Hunmanby Industrial Estate, Hunmanby YO14 0PH
TELEPHONE +44 (0) 1723 890099 **FACSIMILE** +44 (0) 1723 893303
EMAIL sales@deepseapl.com **WEBSITE** www.deepseapl.com

DEEP SEA ELECTRONICS INC USA

3230 Williams Avenue, Rockford, IL 61101-2668 USA
TELEPHONE +1 (815) 316 8706 **FACSIMILE** +1 (815) 316 8708
EMAIL sales@deepseausa.com **WEBSITE** www.deepseausa.com

11. Control panel 7410



DSE7410/20 MKII

AUTO START & AUTO MAINS FAILURE CONTROL MODULES

DSE7410 MKII



DSE7420 MKII



KEY FEATURES

- 4-Line back-lit LCD text display
- Multiple Display Languages
- Five key menu navigation
- LCD alarm indication
- Heated display option available
- Customisable power-up text and images
- DSENet expansion compatibility
- Data logging facility upto 20 parameters
- Internal PLC editor
- Protections disable feature
- Fully configurable via PC using USB, RS232, RS485 and ethernet communication
- Front panel configuration with multi-level PIN protection
- Power save mode
- 3 phase generator sensing and protection
- 3 phase mains (utility) sensing and protection (DSE7420 MKII only)
- Automatic load transfer control (DSE7420 MKII only)
- Generator current and power monitoring (kW, kVar, kVA, pf)
- Mains current and power monitoring (kW, kVar, kVA, pf) (DSE7420 MKII only)
- kW and kVar overload and reverse power alarms
- Over current protection
- Unbalanced load protection
- Independent earth fault protection
- Breaker control via fascia buttons
- Fuel and start outputs configurable when using CAN
- 6 configurable DC outputs

- 2 configurable volt-free relay outputs
- 6 configurable analogue/digital inputs
- Support for 0 V to 10 V & 4 mA to 20 mA sensors
- Support for 3 kΩ resistive sensors
- 8 configurable digital inputs
- Configurable 5 stage dummy load and load shedding outputs
- CAN, MPU and alternator frequency speed sensing in one variant
- Real time clock
- Manual and automatic fuel pump control
- Engine pre-heat and post-heat functions
- Engine run-time scheduler
- Engine idle control for starting & stopping
- Fuel usage monitor and low fuel level alarms
- Simultaneous use of RS232, RS485 & ethernet communication ports
- True dual mutual standby using RS232 or RS485 for accurate hours balancing.
- MODBUS RTU & TCP support with configurable MODBUS pages.
- SNMP GET, SET and TRAP support built in.
- Advanced SMS messaging (additional external modem required)
- Start & stop capability via SMS messaging
- 3 configurable maintenance alarms

- Compatible with a wide range of CAN engines, including tier 4 engine support
- J1939-75 support & CAN alarm ignore function
- Uses DSE Configuration Suite PC Software for simplified configuration
- Licence-free PC software
- IP65 rating (with supplied gasket) offers increased resistance to water ingress
- Modules can be integrated into building management systems (BMS) using MODBUS RTU & TCP
- Configurable CAN parameters to read and display CAN information from external CAN devices.

KEY BENEFITS

- Automatically transfers between mains (utility) and generator (DSE7420 MKII only) for convenience.
- Hours counter provides accurate information for monitoring and maintenance periods
- User-friendly set-up and button layout for ease of use
- Multiple parameters are monitored & displayed simultaneously for full visibility
- The module can be configured to suit a wide range of applications for user flexibility
- PLC editor allows user configurable functions to meet user specific application requirements.

SPECIFICATIONS

DC SUPPLY

CONTINUOUS VOLTAGE RATING
8 V to 35 V Continuous
5 V for up to 1 minute

CRANKING DROPOUTS

Able to survive 0 V for 100 ms, providing supply was at least 10 V before dropout and supply recovers to 5 V. This is achieved without the need for internal batteries. LEDs and backlight will not be maintained during cranking.

MAXIMUM OPERATING CURRENT
510 mA at 12 V, 240 mA at 24 V

MAXIMUM STANDBY CURRENT
330 mA at 12 V, 160 mA at 24 V

CHARGE FAIL/EXCITATION RANGE
0 V to 35 V

GENERATOR & MAINS (UTILITY)

VOLTAGE RANGE
15 V to 415 V AC (Ph to N)
26 V to 719 V AC (Ph to Ph)

FREQUENCY RANGE
5.5 Hz to 75 Hz

MAGNETIC PICKUP

VOLTAGE RANGE
±0.5 V to 70 V

FREQUENCY RANGE
10,000 Hz (max)

INPUTS

DIGITAL INPUTS A TO H
Negative switching

ANALOGUE INPUTS A, B, E & F
Configurable as:
Negative switching digital input
0 V to 10 V sensor
4 mA to 20 mA sensor
Resistive sensor

ANALOGUE INPUTS C & D
Configurable as:
Negative switching digital input
Resistive sensor

OUTPUTS

OUTPUT A & B (FUEL & START)
15 A DC at supply voltage

OUTPUTS C & D
8 A AC at 250 V AC (Voll-free)

AUXILIARY OUTPUTS E, F, G, H, I & J
2 A DC at supply voltage

DIMENSIONS

OVERALL
245 mm x 184 mm x 51 mm
9.6" x 7.2" x 2.0"

PANEL CUT-OUT
220 mm x 160 mm
8.7" x 6.3"

MAXIMUM PANEL THICKNESS
8 mm
0.3"

STORAGE TEMPERATURE RANGE
-40°C to +85 °C
-40 °F to +165 °F

OPERATING TEMPERATURE RANGE
NON-HEATED DISPLAY VARIANT
-30°C to +70 °C
-22 °F to +158 °F

HEATED DISPLAY VARIANT
-40 °C to +70 °C
-40 °F to +158 °F

RELATED MATERIALS

TITLE

DSE7410 MKII & DSE7420 MKII Installation Instructions
DSE7410 MKII & DSE7420 MKII Operator Manual
DSE7410 MKII & DSE7420 MKII Configuration Suite PC Manual

PART NO.

053-191
057-263
057-262



DSE7410/20 MKII

AUTO START & AUTO MAINS FAILURE CONTROL MODULES

The DSE7410 MKII is an Auto Start Control Module and the DSE7420 MKII is an Auto Mains (Utility) Failure Control Module suitable for a wide variety of single, diesel or gas, gen-set applications.

Monitoring an extensive number of engine parameters, the modules will display warnings, shutdown and engine status information on the back-lit LCD screen, illuminated LEDs, remote PC and via SMS text alerts (with external modem).

The DSE7420 MKII will also monitor the mains (utility) supply. The modules include USB, RS232, RS485 and Ethernet ports as well as dedicated DSENet terminals for system expansion.

Both modules are compatible with electronic (CAN) and non-electronic (magnetic pick-up/alternator sensing) engines and offer an extensive number of flexible inputs, outputs and extensive engine protections so the system can be easily adapted to meet the most demanding industry requirements.

The extensive list of features includes enhanced event and performance monitoring, remote communications & PLC functionality.

Dual mutual standby is now available on both the DSE7410 MKII & DSE7420 MKII using RS232 or RS485 communications. This provides for a simpler and more convenient installation with more advanced features such as true hours balancing.

The modules also feature SNMP functionality for connection to SNMP systems.

The modules can be easily configured using the DSE Configuration Suite PC software. Selected front panel editing is also available.

ENVIRONMENTAL TESTING STANDARDS

ELECTRO-MAGNETIC COMPATIBILITY

BS EN 61000-6-2
EMC Generic Immunity Standard for the Industrial Environment
BS EN 61000-6-4
EMC Generic Emission Standard for the Industrial Environment

ELECTRICAL SAFETY

BS EN 60950
Safety of Information Technology Equipment, Including Electrical Business Equipment

TEMPERATURE

BS EN 60068-2-1
Ab/Aa Cold Test -30 °C
BS EN 60068-2-2
Bb/Ba Dry Heat +70 °C

VIBRATION

BS EN 60068-2-6
Ten sweeps in each of three major axes
5 Hz to 8 Hz at 4-7.5 mm,
8 Hz to 500 Hz at 2 g

HUMIDITY

BS EN 60068-2-30
Db Damp Heat Cyclic 20/55 °C
at 95% RH 48 Hours
BS EN 60068-2-78
Cab Damp Heat Static 40 °C
at 93% RH 48 Hours

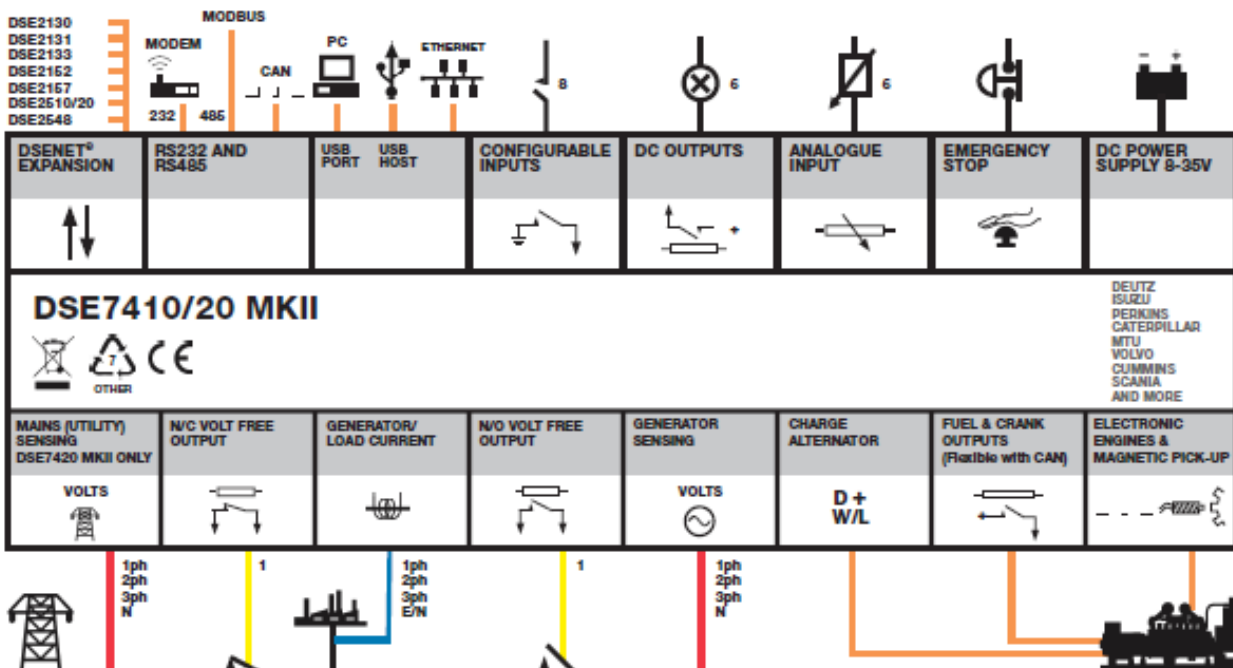
SHOCK

BS EN 60068-2-27
Three shocks in each of three major axes
15 gn in 11 ms

DEGREES OF PROTECTION PROVIDED BY ENCLOSURES

BS EN 60529
IP65 - Front of module when installed into the control panel with the supplied sealing gasket.

COMPREHENSIVE FEATURE LIST TO SUIT A WIDE VARIETY OF GEN-SET APPLICATIONS



12. Standalone ATS Panel with Loadbank IP Rated

Free-standing LV Panel

H2100 x W1800 x D900 approx.

Form 3A

IP55

RAL7035 Powder coat finish

Rain canopy

key lockable outer door with inspection window

Inner doors

Cable entry:

Mains Incomer - In Base (right section)

Generator - In Top (through cable way panel on rear of panel)

Site Load - Out Base (middle section)

Load Bank - In Base/Low level

Left Section (Load Bank)

Schneider Fixed Pattern NSX630N 4 Pole MCCB c/w

Micrologic 5.3 trip

Rotary handle

Shunt trip

Extended front terminals

Middle Section (ATS)

DSE 334 ATS Controller

DSE 160 self-seeking PSU

Control MCB's, relays etc as required.

Schneider Fixed Pattern NSX630N (50KA) 4 Pole MCCB (Mains) c/w

Micrologic 6.3A (LSIG) Trip unit

Motor operator

Mechanical and Electrical interlock

Schneider Fixed Pattern NSX630N (50KA) 4 Pole MCCB (Generator) c/w

Micrologic 6.3A (LSIG) Trip unit

Motor operator

Mechanical and Electrical interlock

Extended HDHC CU bars to accept 3 x 240mm SWA per phase (Site Load)

Right Section (Mains Incomer)

Schneider Fixed Pattern NSX630NA 4 Pole MCCB c/w

Rotary handle

Extended front terminals

Extended HDHC CU bars to accept 3 x 240mm SWA per phase (Mains).

13. Firevalve shutdown

Fire shutdown system incorporating a fire wire operated drop weight fire valve, connected into the fuel supply line of the generator, complete with fusible link(s) above the engine, optional wall mounted quick release button and tilt switch for remote indication of fire valve operation.



Free Fall Fire Valves, Supplied by FEL Valves



The FEL Valves range of Free Fall Fire Valves are suitable for installation in either horizontal or vertical pipe work, and are designed to provide a positive, 100% shut off when used as a fuel isolating valve. Free Fall Valves may also be used as a fuel 'dump' valve, whereby the valve will open on actuation.

A standard Free Fall Valve assembly comprises of a valve, lever and weight, together with a fitting kit.

All standard valves are manufactured in cast iron to ASTM A126 Gr B and are approved by both the American Gas Association and Canadian Gas Association, as well as being 'UL' Listed. All valves are suitable for use with fuel oils and gases at pressures up to 14 bar. Valves with screwed connections have bsp parallel threads, whilst flanged valves are available with either BS 4504 PN 16 flange drillings or to ANSI 125.

FEL Free Fall Fire Valves are also available with carbon or stainless steel body and plug materials.

Standard Fire Valves are supplied with a '650 Lubricating Compound', which is a general purpose sealant, suitable for hydrocarbons, other [Lubricating Compounds](#) are available, if you are unsure of the suitability of the 650 Compound for your specific application, please contact us for further details.

Free Fall Valves may be actuated mechanically or electrically. The majority of installations use mechanical actuation by fusible link, therefore each Fire Valve is supplied with a [Fire Valve Kit](#), available in three sizes, Small (15 to 50mm nb valves), Medium (65 to 100mm nb valves) and Large (125 to 200mm nb valves). Kits contain varying numbers of [Pulley Wheels](#), [Stainless Steel Cable](#), [Fusible Links](#), [Warning Signs](#), [Cable Connectors](#) and [Tension Springs](#), any of which may be purchased as individual products.

Electrically actuated Fire Valve systems utilise a standard valve, lever and weight, however an electrical [Release System](#) is used, essentially, allowing actuation by making or breaking an electrical circuit. The installation of a valve mounted [Mercury Switch](#), [Electro Mechanical Release](#) or [Wall Mounted Changeover Switch](#) may provide remote signalling of the Fire Valve status, or allow direct switching of electrical equipment where applicable.

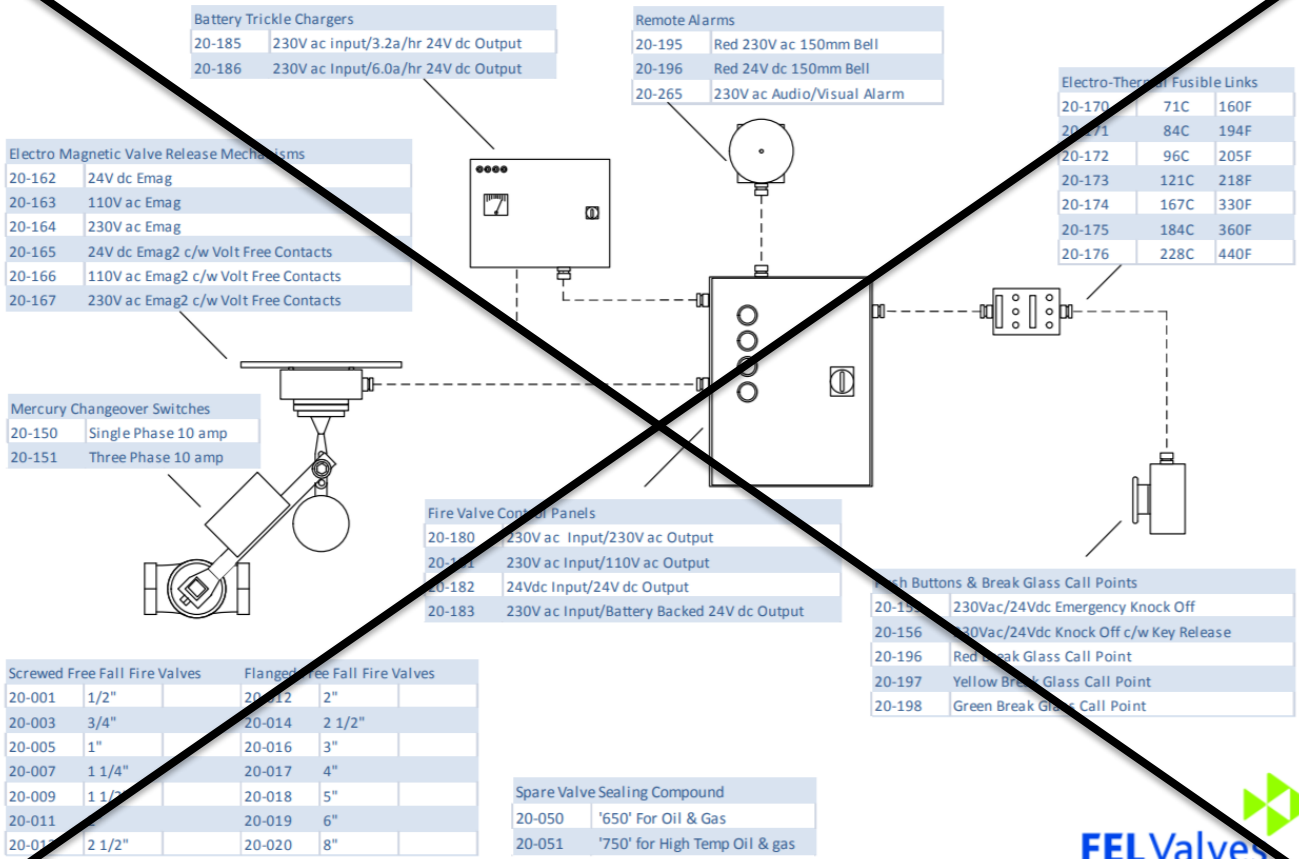
Data Sheets: [Screwed Valves](#) [Flanged Valves](#) [Price List](#) [Fire Valve Solution Centre](#)

Double click on any of the highlighted '[Key Words](#)' for additional information.

Ordering Information

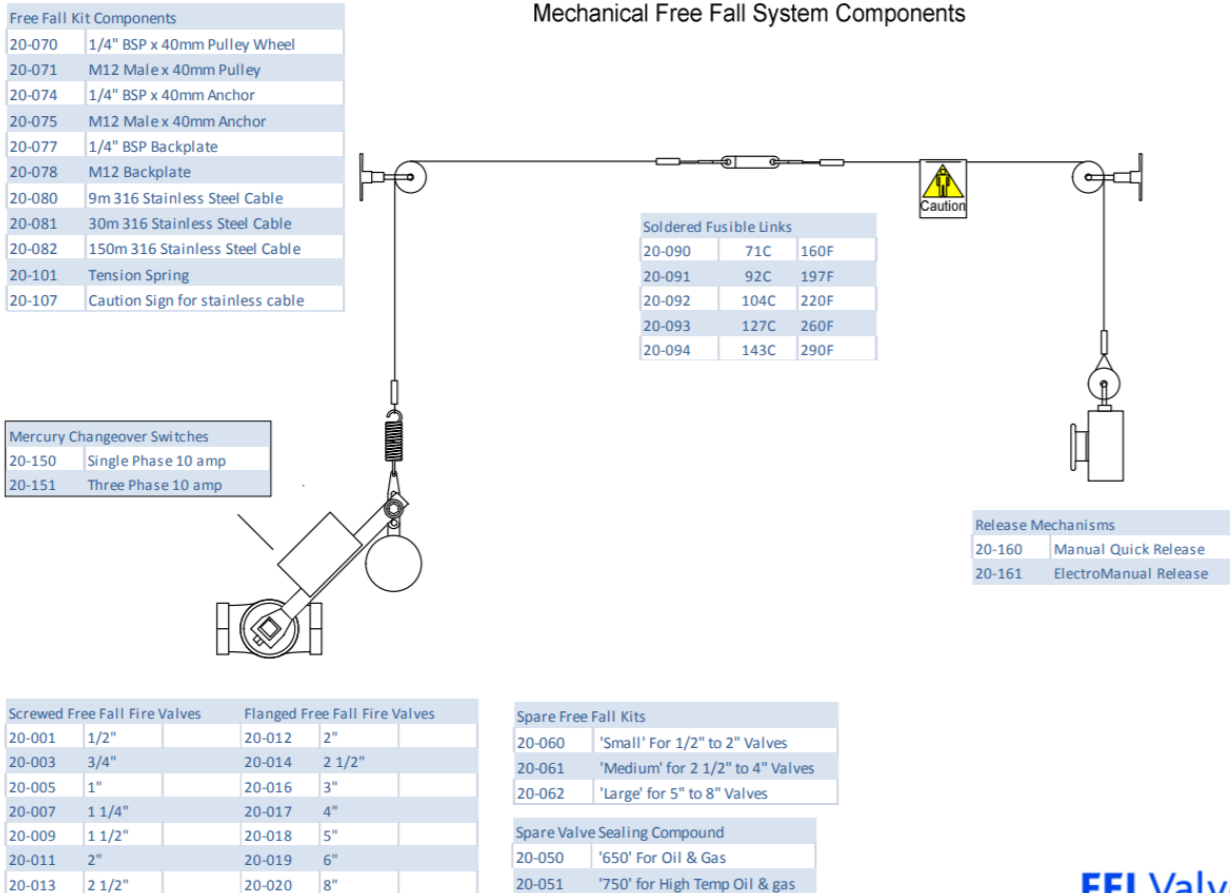
Tel: 01565 733137. Fax 01565 733841. E-mail: sales@felvalves.com Web: www.felvalves.com
 Valves Ltd., 96 Pickmere Lane, Wincham, Northwich, Cheshire, UK. CW9 6EB

Electro-Mechanical Free Fall System Components



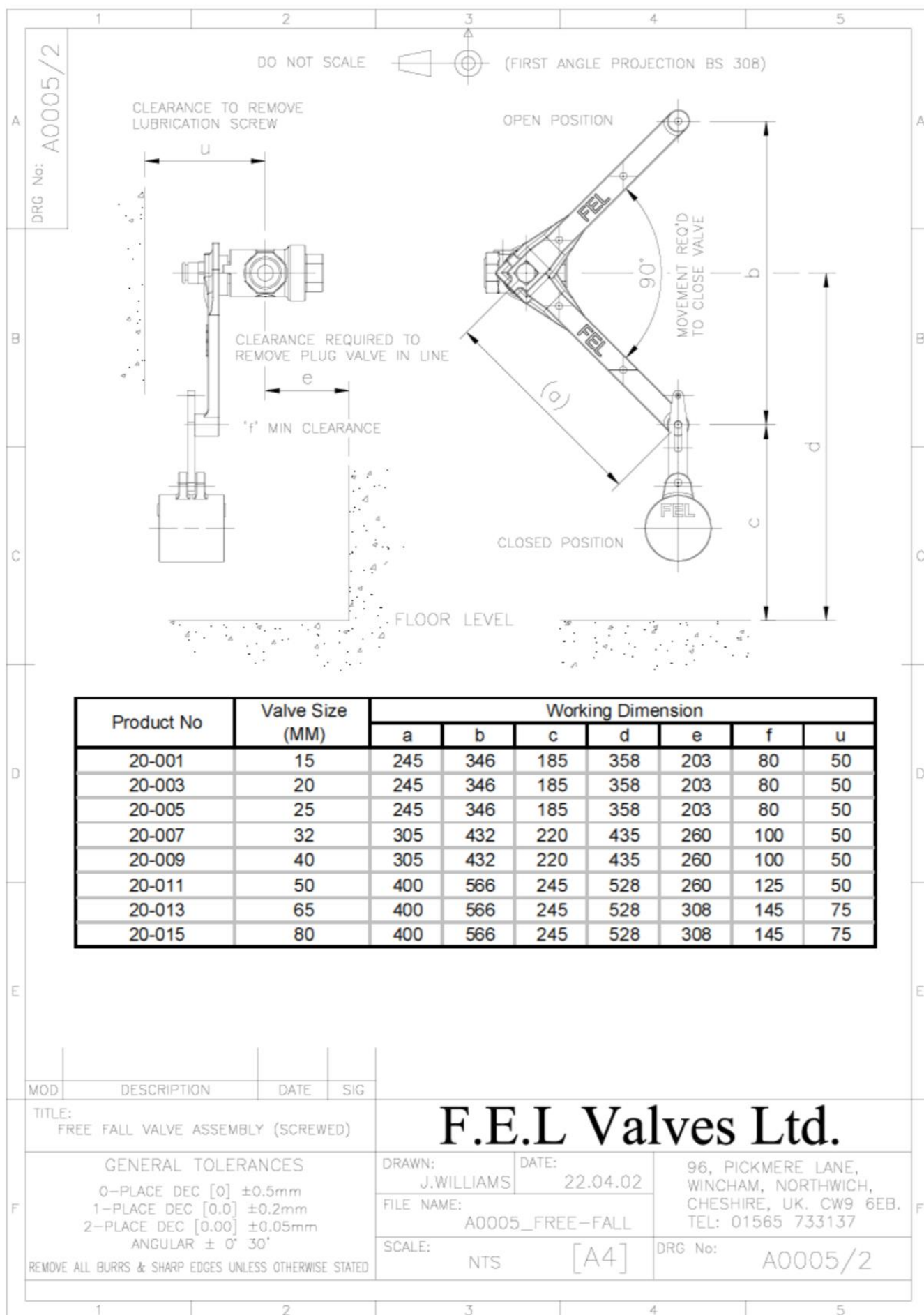
FELValves

Mechanical Free Fall System Components



FELValves

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DO NOT SCALE (FIRST ANGLE PROJECTION BS 308)																																																															
A				A																																																											
B				B																																																											
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D	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">Product No</th> <th rowspan="2">Valve Size (MM)</th> <th colspan="4">Valve Dimension</th> </tr> <tr> <th>C</th> <th>V</th> <th>Z</th> <th>KG</th> </tr> </thead> <tbody> <tr> <td>20-001</td> <td>15</td> <td></td> <td>88</td> <td>95</td> <td></td> </tr> <tr> <td>20-003</td> <td>20</td> <td></td> <td>88</td> <td>95</td> <td></td> </tr> <tr> <td>20-005</td> <td>25</td> <td>59.5</td> <td>88</td> <td>108</td> <td>2</td> </tr> <tr> <td>20-007</td> <td>32</td> <td>58.7</td> <td>124</td> <td>127</td> <td>3.3</td> </tr> <tr> <td>20-009</td> <td>40</td> <td>58.7</td> <td>124</td> <td>127</td> <td>3.3</td> </tr> <tr> <td>20-011</td> <td>50</td> <td>79.4</td> <td>141</td> <td>152</td> <td>6</td> </tr> <tr> <td>20-013</td> <td>65</td> <td>99.2</td> <td>194</td> <td>171</td> <td>8.8</td> </tr> <tr> <td>20-015</td> <td>80</td> <td>106.4</td> <td>201</td> <td>194</td> <td>15.4</td> </tr> </tbody> </table>				Product No	Valve Size (MM)	Valve Dimension				C	V	Z	KG	20-001	15		88	95		20-003	20		88	95		20-005	25	59.5	88	108	2	20-007	32	58.7	124	127	3.3	20-009	40	58.7	124	127	3.3	20-011	50	79.4	141	152	6	20-013	65	99.2	194	171	8.8	20-015	80	106.4	201	194	15.4	D
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Free Fall Valve Operating and Maintenance Instructions

INSTALLATION.

- 1/) Secure the lever to square on valve plug using the fixing screw provided and ensure that the valve operates freely prior to installation.
- 2) Ensure that the chosen position will allow full valve closure and access for in situ installation.
- 3) Attach the weight and slider assembly to the front face of the lever using the 8mm bolt provided.
- 4) Determine the cable route and overall distance, such that the fusible link is sited within 1 metre directly above the firing point of the burner/exhaust etc
- 5) Install anchor and pulleywheels, fix cable to anchors and to fusible link using cable connectors provided. Run cable from the fusible link through the pulley wheels and attach to the valve tension spring. This should be extended before fixing to the slider. Also ensure that the warning notice is placed in a prominent position.
Ensure that the angular deflection of the cable is no more than 20 degrees from vertical on run from the valve to the first pulley wheel.
- 6) Test the operation of the valve by releasing the cable from the anchor fixing point and observe the closing action of the valve. The valve is fully closed when the lug on the valve plug is hard against the finger stop.
The cable must run freely and be free from kinks. The fusible link and caution sign must not restrict the closing operation.

ROUTINE MAINTENANCE.

Where the service permits, the valve should be partially or fully operated once to ensure free operation and to determine the effort required.

For frequently operated valves maintenance merely consists of two or three turns of the combination screw or, if gun injection, several strokes of the lever and opening and shutting of the valve a minimum of three times to distribute the sealing compound evenly around the plug at three monthly intervals. It is difficult to be specific how often the valve should be recharged with sealing compound, since this is determined by the frequency of operation, type of service, pressure and temperature.

INJECTION OF COMPOUND

When the combination screw has reached its limit (screwed down fully), this indicates that the valve needs recharging with sealing compound. When using sticks or lightweight compound gun, remove the combination screw, insert a stick or partially fill the compound reservoir in the plug, replace the combination screw and screw down.

This operation may need repeating several times. When using the high-pressure gun, attach the nozzle to the injection nipple and give several steady strokes of the lever.

Valves must be either fully open or fully closed whilst they are being charged.

INDICATION OF FULL CHARGING

The first indication of the valve becoming fully charged is an increase in the effort required to rotate the combination screw or with the high-pressure gun, an increase on the effort required on the lever.

METHOD OF INJECTION

Where the number of valves to be charged is small i.e. 1-15 valves, especially if they are in smaller sizes, stick or lightweight gun injection can be successfully used. For larger sizes use of the high-pressure gun is recommended.

VALVE LEAKAGE

Leakage through the valve indicates that the valve requires injection of sealing compound or that it needs opening and closing a minimum of three times to distribute the compound evenly.

OPERATING TORQUE

Should a valve become jammed or unusually stiff to operate, this can be cured by the injection of sealing compound. If this is ineffective it will be necessary to dismantle the valve, clean the components and recharge with sealing compound. Details and diagrammatic information regarding valve strip and rebuild procedures are available upon request.

14. Powercare24 Generator Maintenance Contract

12-month service contract for standby generator including two service visits.

One standard service including visual inspection, test run off-load. An on-load test will be completed if permitted.

One major service including visual inspection, oil and filter change, test run off-load.

An onload test will be completed if permitted.

Maintenance visits are completed during normal working hours.

24-hour emergency call out cover is included with 4-hour response for 'Red Alert' calls.

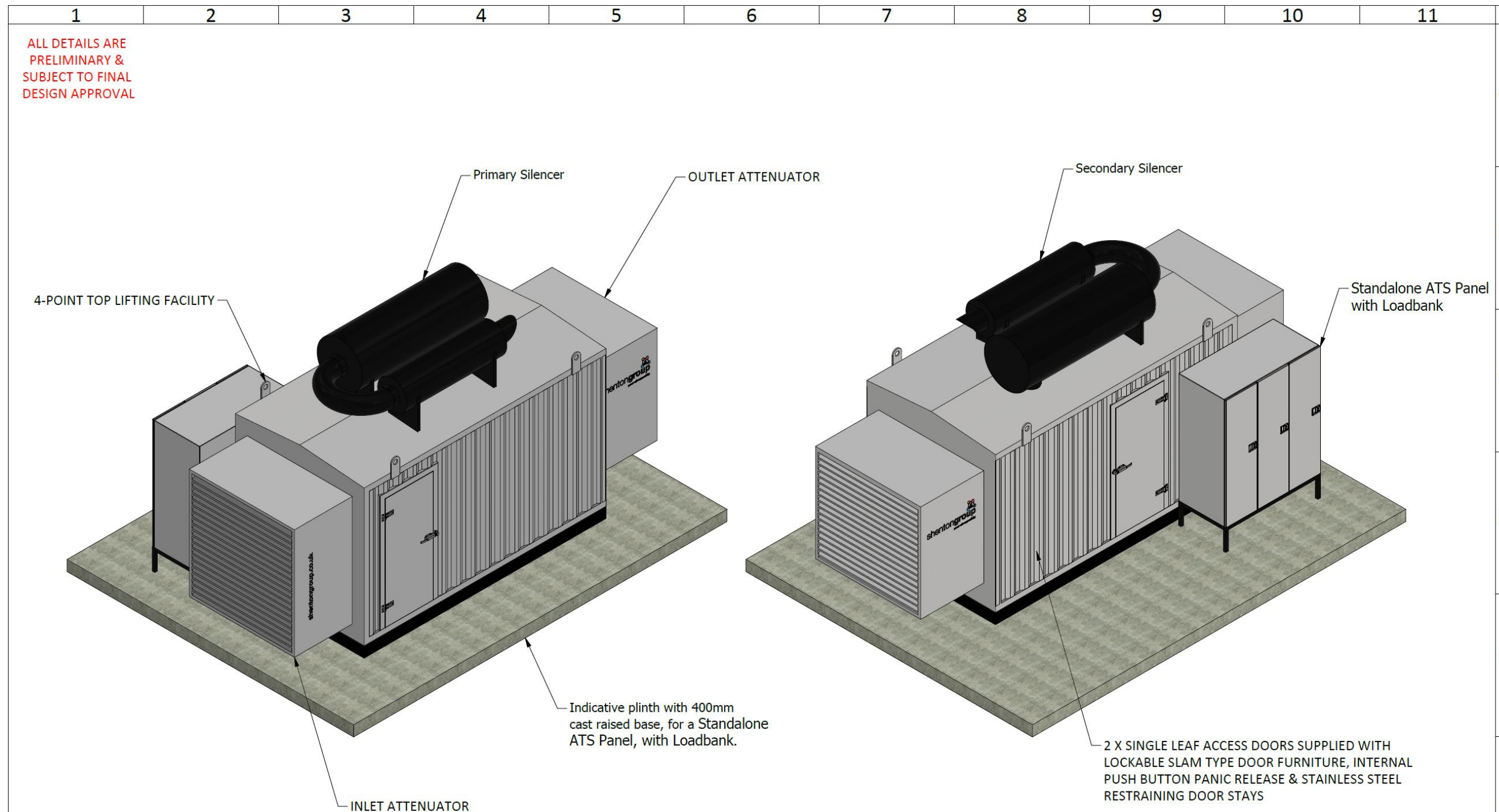
All consumables used during these service visits are excluded from the contract and charged as extra.

Visual inspection and testing (where authorised) of standalone AMF panel is included in contract.

If AMF panel is part of switchboard this is excluded from the contract, and we recommend this is maintained and tested by an independent Switchgear maintenance company.

If you wish to cancel your contract after the 14 days cooling off period, the full value of the contract will be chargeable and non-refundable.

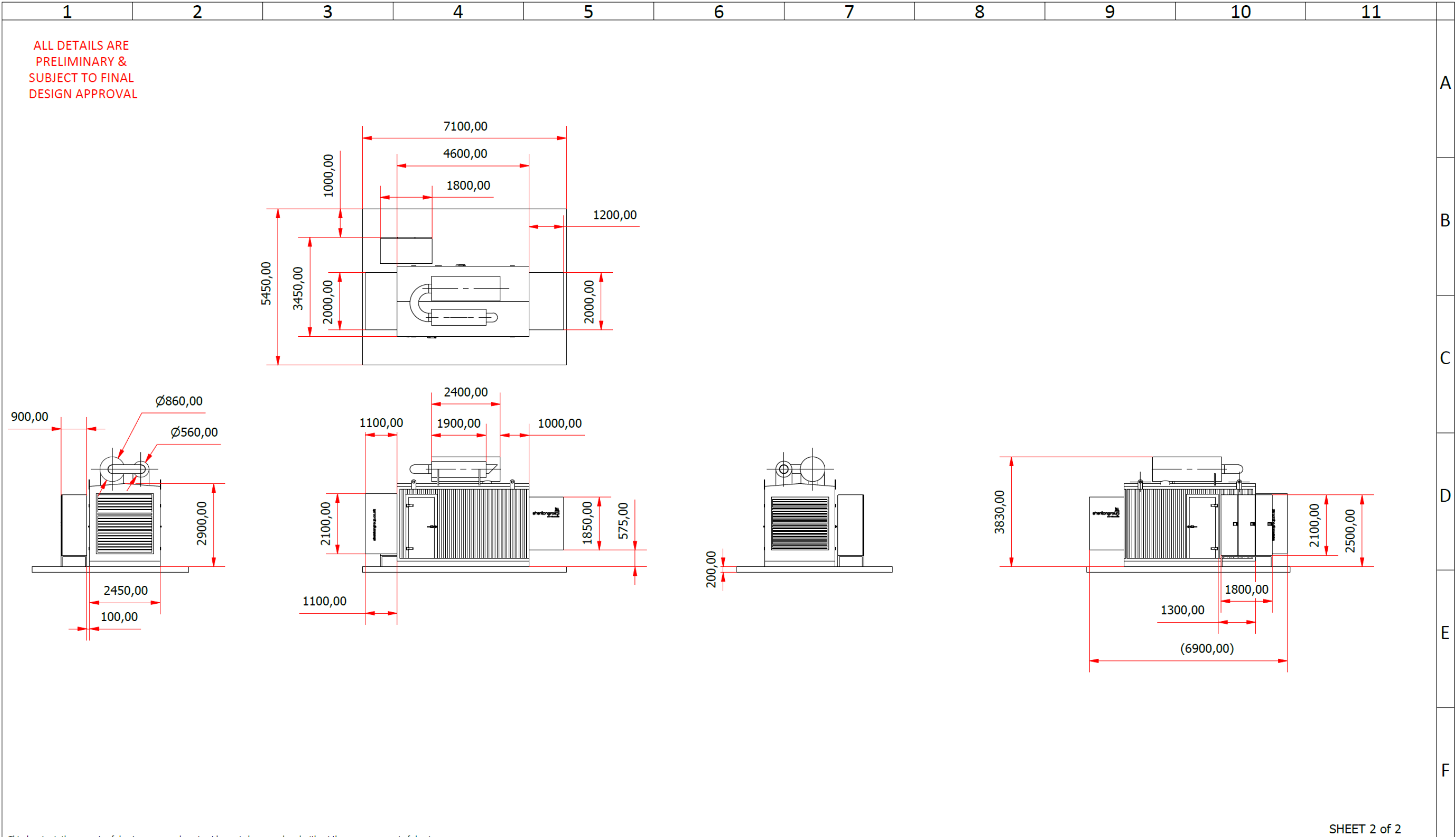
15. Canopy GA



SHEET 1 OF 2

This drawing is the property of shentongroup, and must not be copied or reproduced without the express consent of shentongroup.

 shentongroup power with responsibility Shenton Group, Shenton house, Walworth road, Walworth business park, Andover, UK. SP10 5LH t: 0844 888 444 5, f: 0844 888 444 6, e: info@shentongroup.co.uk, w: www.shentongroup.co.uk ©COPYRIGHT Shenton Group is a trading style of Shenton Global Ltd.								TITLE:	Generator Container GA	
								PROJECT:	Green Park_Reading	
		P02	S3	06/07/21	Container changed & ATS panel added		RDR	REF:	CUSTOMER:	Lecter Associates Ltd
		P01	S3	16/04/21	First Issue		RDR	DATE:	SHENTON DRAWING No:	13288-SGP-XX-XX-M3-M-2002
		REV	STATUS	DATE	DESCRIPTION		DRAWN	APPROVED	CLIENT DRAWING No:	



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P02		06/07/21	Container changed & ATS panel added	RDR		
P01	S3	16/04/21	First Issue	RDR		
REV	STATUS	DATE	DESCRIPTION	DRAWN	APPROVED	

TITLE: Generator Container GA	
PROJECT: Green Park_Reading	
REF:	CUSTOMER: Lecter Associates Ltd
DATE: 16/04/21	SHENTON DRAWING No: 13288-SGP-XX-XX-M3-M-2002
	CLIENT DRAWING No:

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