

SYNCHRONISING OPEN FRAME THREE-PHASE DIESEL GENERATING SET

PERKINS 1860 kVA PRIME / 2046 kVA STANDBY

50 Hz · 380–415 V · 0.8 pf
UK assembled synchronising open set · Model PL1860ZS

PRIME (PRP)

1860 kVA
1488 kWe

STANDBY (ESP)

2046 kVA
1637 kWe

CURRENT @ 400 V

2685 A
per phase, 0.8 pf

ENGINE

4016-61TRG1
Perkins 61.1 L · 16V T/CAC



A UK-assembled open-frame generating set built around the Perkins 4016-61TRG1 ElectropaK and a Leroy Somer LSA523S5 alternator. Configured as a dual-duty machine: Prime Power for continuous or variable-load site use, and Standby / Emergency Power for automatic mains-failure backup. The open skid is intended for plant rooms, compounds and weather-protected locations where maximum service access and a compact footprint are required.

RATINGS & ELECTRICAL OUTPUT — 50 HZ, 3-PHASE, 4-WIRE

Parameter	Prime PRP	Standby ESP	380 V	400 V	415 V	Notes
Apparent power	1860 kVA	2046 kVA	—	—	—	ISO 8528
Active power (0.8 pf)	1488 kWe	1637 kWe	—	—	—	Net electrical
Line current / phase	—	—	2824.9 A PRP	2684.7 A PRP	2587.4 A PRP	At 0.8 pf
Standby current / ph	—	—	3107.4 A ESP	2953.2 A ESP	2846.1 A ESP	At 0.8 pf
Frequency / speed	50 Hz	50 Hz	—	—	—	1,500 r/min
Voltage regulation	±1 %	±1 %	—	—	—	Steady state, AVR
Power factor	0.8 lag	0.8 lag	—	—	—	Standard 3-phase
Circuit breaker	3000 A	3000 A	—	—	—	3-pole MCCB + CTs

RATING DEFINITIONS

PRIME POWER (PRP) — ISO 8528-1

Unlimited running hours in a variable-load application in place of a mains supply. Average load factor over 24 hours not to exceed 70% of the PRP rating. A 10% overload is available for 1 hour in any 12 hours of operation.

STANDBY / EMERGENCY (ESP) — ISO 8528-1

Available under variable load in the event of a utility outage. No overload capability is permitted on the ESP rating. Typical annual utilisation is limited; intended for automatic mains-failure duty, not continuous baseload.

TYPICAL APPLICATIONS

- Industrial & manufacturing**
Process lines, workshops, batch plant, factories needing either prime site power or standby cover.
 - Healthcare & care**
Clinics, care homes and support services where a tested standby source is specified.
 - Agriculture & rural**
Grain stores, dairies, pumping and remote sites with limited grid capacity.
- Commercial buildings**
Offices, retail, hotels, data rooms and mixed-use sites with automatic mains-failure duty.
 - Construction & hire**
Open-set prime power for compounds, towers and temporary works (weather protection required).
 - Utilities & infrastructure**
Pumping stations, comms, water treatment and critical plant rooms.

PRIME AND STANDBY CONFIGURATION — SUPPLIED AS ONE DUAL-DUTY PACKAGE

This data sheet covers the OPEN generating set in both Prime and Standby duty. The mechanical package is common. Duty is selected at build: Prime sets include engine glow-plug / pre-heat for reliable cold starting on variable-load sites; Standby sets include a mains-powered coolant heater and mains battery charger so the set is always ready for automatic start on utility failure. Both duties use the Deep Sea 8610 synchronising controller, 3000 A motorised three-phase MCCB, tropical radiator and an 8-hour insulated bunded base fuel tank.

ENGINE — PERKINS 4016-61TRG1 ELECTROPAK

Manufacturer	Perkins Engines (UK design)	Gross power PRP	1648 kWm / 2208 hp
Model	4016-61TRG1	Gross power ESP	1774 kWm / 2377 hp
Configuration	6 cylinder, vertical in-line	Net power PRP	1558 kWm
Cycle / combustion	4-stroke, direct injection	Net power ESP	1684 kWm
Aspiration	Turbocharged, air-to-air CAC	Cooling	Liquid, tropical radiator
Bore × stroke	160 × 190 mm	Coolant capacity	215 litres (engine package)
Displacement	61.12 litres	Oil capacity	237 litres
Compression ratio	13.6 : 1	Electrical system	12 V DC negative earth
Rated speed	1,500 r/min (50 Hz)	Starting	Heavy-duty lead-acid battery
Rotation (flywheel)	Anti-clockwise	Combustion air (PRP)	approx. 37 m³/min
Governor	Mechanical	Exhaust flow (ESP max)	approx. 37 m³/min
Emissions class	Fuel-optimised	Max exhaust temp.	approx. 450–520 °C

FUEL CONSUMPTION — 1,500 R/MIN, PERKINS PUBLISHED DATA

Load point	g/kWh	Litres / hour	Approx. 8 h use	Duty reference
Standby (ESP)	195	401 L/h	—	Standby rating
100 % prime (PRP)	194	371 L/h	≈ 2968 L	Full prime load
75 % prime	192	275 L/h	≈ 2200 L	Typical average load
50 % prime	192	198 L/h	≈ 1584 L	Light / standby test
25 % prime	186	89 L/h	≈ 712 L	Light load running

Fuel figures are engine manufacturer data at 1,500 r/min on distillate diesel to the relevant BS / EN specification, and will vary with site altitude, ambient temperature, fuel quality, load profile and installation. The standard base tank is an insulated bunded 8-hour tank with contents gauge, typically sized around 75 % prime load. Bulk tanks, bunded day tanks and automatic fuel-transfer systems are available.

ALTERNATOR — LEROY SOMER LSA523S5

Manufacturer	Leroy Somer (Nidec)	Continuous rating 40 °C	1860 kVA class (2046 ESP)
Model	LSA523S5	Frequency / speed	50 Hz / 1,500 r/min
Type	Brushless, 4-pole, self-excited	Voltage range	380 / 400 / 415 V star
Winding	2/3 pitch, 6-wire (12-wire opt.)	THD (no-load, typ.)	< 2.5 – 3.5 %
Bearings	Single bearing, SAE coupled	THD (linear load, typ.)	< 5 %
Insulation	Class H	Waveform THF / TIF	< 2 % / < 50
Enclosure	IP23, drip-proof, self-cooled	Overspeed	2,250 r/min
AVR (typical)	R150 shunt (±0.8 to ±1 %)	Altitude (std derate)	≤ 1,000 m asl

CONTROL, PROTECTION & ELECTRICAL PACKAGE

Controller	Deep Sea DSE8610	Circuit breaker	3000 A motorised 3-pole MCCB
Function	Sync + load share + AMF	Current transformers	Fitted as standard
Display	Back-lit LCD + LED alarms	Emergency stop	Set-mounted E-stop
Sensing	3-ph generator & 3-ph mains	Engine protection	HET, over/under speed
Current	Generator / load CTs	Electrical protection	V, Hz, I, battery
Modes	Stop / Manual / Auto / Test	Remote start	Input available
Event log	10 events (configurable)	Outputs	Fuel, crank, configurable
PC software	DSE Configuration Suite	Control voltage	24 V DC

DSE8610: auto-start, check-sync, kW / kVA load-share, closed-transition and peak-lop control, 3-phase V / Hz / I monitoring, oil pressure, coolant temperature, fuel level, battery volts, hours-run, pre-heat and warning/shutdown protection. Configured by front panel or PC.

STANDARD SPECIFICATION — OPEN SET

- Perkins 4016-61TRG1 diesel engine with tropical radiator, fan and matrix guards, radiator drain valve
- Air, fuel and lubricating-oil filters; industrial exhaust silencer and flexible bellows
- Inboard anti-vibration mounts (AVMs) between engine/alternator and fabricated steel baseframe
- Leroy Somer LSA523S5 single-bearing alternator, Class H, IP23, AVR regulated
- Deep Sea 8610 synchronising / load-share controller with 3-phase generator and mains sensing
- 3000 A three-phase MCCB with current transformers and set-mounted emergency stop
- 12 V DC control system and heavy-duty lead-acid starting battery
- Insulated bunded 8-hour base fuel tank with contents gauge
- High engine-temperature and over / under-speed protection
- Works test to ISO 8528 with test certificate issued with the set
- PRIME BUILD: engine glow plugs / cold-start aid for reliable starting on variable-load prime sites
- STANDBY BUILD: mains-powered engine coolant heater and mains battery charger so the set remains warm and the battery charged while on standby
- Open skid construction — no acoustic canopy — for plant-room or compound installation with free cooling airflow
- Powder-coated / industrial finish baseframe designed for forklift / sling handling points as built
- Operation and maintenance documentation pack
- UK assembly and pre-delivery inspection before despatch
- Free mainland UK delivery on the PL1860 open set (offloading by others unless HIAB is specified)

OPTIONAL EXTRAS & SYSTEM UPGRADES

ACOUSTIC / SITE

Weather canopy or container conversion; residential silencers; attenuation packs; plant-room acoustic treatment advice.

ELECTRICAL

4-pole MCCB; motorised breaker; AMF / ATS panel; synch / load-share (DSE86xx class); earth-fault; dual voltage; socket kits.

FUEL

Bulk bunded tanks; automatic fuel transfer; polishing; water-in-fuel alarms; extended-run base tanks; HVO compatibility advice.

STARTING & HEATING

Additional battery set; battery isolator; jacket water heater upgrade; oil-sump heater; anti-condensation heater on alternator.

MONITORING

Remote monitoring & control — fuel, performance, alarms and start/stop from off-site; SMS / cloud options.

EMISSIONS / FUEL

Guidance on fuel-optimised operation, HVO blends and local planning / environmental constraints.

HYBRID / OFF-GRID

Battery storage, UPS and solar-hybrid packages to cut run hours and fuel on prime or remote sites.

INSTALLATION KIT

Flue / extract design, flexible exhaust, wall flashings, drip-trays, cable containment, plinth design.

INSTALLATION ENVELOPE, ENVIRONMENT & COMPLIANCE

Set type	Open frame / skid (no canopy)	Design ambient	Tropical radiator (hot climate)
Typical L × W × H	Issued on GA drawing	Standard altitude	≤ 1,000 m (derate above)
Typical wet weight	Issued on GA drawing	Works test	ISO 8528 load test
Engine dry weight	approx. 1,200 kg (ElectropaK)	Genset standard	ISO 8528
Engine package L×W×H	2,657 × 1,120 × 1,718 mm	Alternator std.	IEC 60034 / ISO 8528-3
Fuel tank	8 h insulated bunded base	Engine std.	ISO 3046 / ISO 8528
Noise (open set)	Plant-room / compound use	Wiring	BS 7671 installation practice
Cooling air	Free inlet & discharge required	Handling	Fork / lift points as built

- Open sets are not weatherproof. They must be installed in a ventilated plant room, container or weather-protected compound with correct combustion-air, cooling-air and exhaust routes.
- Noise from an open set is significantly higher than a canopied machine. Where neighbours, planning or workplace noise limits apply, specify a silent canopy, container or acoustic room.
- Final dimensions, wet weight, tank litres, exhaust flange size and cable-entry details are confirmed on the general arrangement drawing issued with the quotation / order acknowledgement.
- Ratings are at 25 °C, 100 kPa, 30 % RH unless stated. Site derate applies for altitude, temperature and poorly ventilated rooms — GES Power Ltd will calculate this at survey.
- A 10 % overload on Prime is available for 1 hour in 12. Standby (ESP) has no overload. Do not apply ESP as a continuous rating.

Why specify GES Power Ltd

Family-run UK specialists in diesel generation. We do not just sell a skid — we size, build, deliver, install, commission and look after the set for its working life.

REASONS CLIENTS CHOOSE GES POWER LTD

1 One accountable UK partner

Supply, installation, electrical connection, commissioning and aftercare sit in one company. You are not passed between a seller, an electrician and a service agent when the set is on site.

2 Genuine Perkins-powered, UK-assembled sets

British-built Perkins and Caterpillar powered generators from small commercial units through to 2,000 kVA industrial machines. This 1860 / 2046 kVA open set is assembled and works-tested in the UK before it leaves.

3 Right-sized, not oversold

We design the package around your actual load, starting kVA, ambient, fuel strategy and budget. That avoids wasted capital, excess fuel burn and hire-set overspend.

4 Prime and standby from one platform

The same open set can be built for continuous / prime site duty or automatic standby. Glow plugs, coolant heaters, battery chargers, ATS and remote monitoring are selected to match how you will actually run the machine.

5 Turnkey installation nationwide

Site survey, plinth and location advice, HIAB offload and positioning, certified electrical installation to BS 7671, exhaust and extract systems, bulk fuel tanks and fuel-transfer, cable containment and making-good.

6 Commissioning that is more than a start-up

Functional testing of AMF / ATS, protection settings, load proving, customer training and a documented handover so your team know how to run, test and call for help.

7 Planned maintenance, not breakdown roulette

Prime and standby service schedules, genuine filters and parts, annual black-start / blackout tests and load-bank testing to prove the set still carries the building when the grid fails.

8 Repair, fault-finding and 24/7 support

Power cuts and failed starts do not keep office hours. Engineers operate nationwide from Chesterfield with common Perkins and control-system spares. Critical-site response is part of the offer, not an afterthought.

9 Life-extension and compliance support

Controller upgrades, remote monitoring, exhaust and extract redesign, fuel polishing, battery replacement, and help meeting insurer, healthcare and facilities-management test regimes.

10 Wider power systems, not just a diesel

ATS / AMF and synchronising panels, UPS, off-grid battery and solar-hybrid packages, and installation into vehicles or vessels. The generator can sit inside a larger resilience scheme.

11 Plain commercial terms

Clear quotations, free mainland UK delivery on this PL1860 open set, and a family-run team you can actually speak to on 01246 380525. Established 2016 with more than twenty years' combined industry experience.

12 Return on the investment

Reduced downtime, fewer emergency hire invoices, lower fuel through correct sizing, and a maintained asset that holds value. The set is only half the product — the service wrap is the other half.

FULL SERVICE WRAP AVAILABLE WITH THIS GENERATING SET

Load assessment & kVA sizing

Site survey & plant-room design

Open or canopied build options

HIAB delivery & positioning

Certified electrical installation

AMF / ATS panel supply & wire-in

Exhaust, flue & extract systems

Bulk fuel tanks & transfer

Remote monitoring & telemetry

Training & documented commission

Planned service agreements

Load-bank & black-start testing

24/7 breakdown attendance

Genuine parts & service kits

Controller / ATS upgrades

Hybrid battery & off-grid packages

Talk to an engineer before you buy

Written for every type of client — facilities managers, contractors, farmers, healthcare estates and industrial engineers. If you are unsure about Prime versus Standby, open versus silent, ATS, exhaust routing or a service contract, call us. We will size the set and quote the installation as well as the machine.

01246 380525

GES Power Ltd · Unit 2 Cavendish Business Park, Chesterfield S41 9EY · Nationwide UK · Out-of-hours power-failure support

SYNCHRONISING THIS SET — MAINS AND MULTI-SET

This Z-series machine is a live-parallelising set. It is not a break-before-make AMF generator. The DSE8610 matches voltage, frequency, phase angle and phase sequence to a live bus, then closes the motorised breaker. Once closed, kW (governor bias) and kVAr (AVR bias) are controlled independently.

CHECK-SYNC WINDOW (SITE-TUNED ON COMMISSION)

Parameter	Typical window	Purpose
Voltage match	±10 % (often ±5 %)	Limit inrush and AVR fight
Frequency / slip	±0.2 Hz	Limit the kW bump at close
Phase angle	±10° (often ±7°)	Limit coupling torque
Phase sequence	Must match	Reverse phase is a short
Dead-bus close	Bus < ~20–30 V	First set onto a dark board

FOUR DUTIES THIS SET IS BUILT FOR

- Island / isolated plant — first set dead-bus closes; following GES Z-sets sync to the generator bus.
- Closed-transition AMF — on DNO return the set syncs to mains, ramps load back, then opens. No second outage.
- Generator-to-generator — isochronous kW and kVAr share with other Z-sets. Load-demand start/stop and N+1.
- Peak lopping / shaving — run in parallel with a healthy DNO. Import CT holds site import at a kW target; the set takes only the peak.

UK NETWORK INTERFACE

Any scheme that can run in parallel with the DNO is a G98/G99 generating installation, including peak lop that never exports. GES scopes loss-of-mains (U/O volts, U/O frequency, ROCOF or vector shift), reverse-power, G100 export limit if required, and 3-pole vs 4-pole neutral with the ICP/DNO. Witness test documentation is produced with the switchgear package.

PEAK LOPPING – HOW GES SETS THE LOOP

Peak lopping is not standby. The DNO is healthy. Site import is measured on a CT (or MID / Modbus meter) ahead of the generator incomer. When import stays above the target for the start delay, this set starts, syncs and ramps on until import falls back to the target. A second Z-set is added automatically if the peak keeps rising. A minimum-load floor (typically 30–40 % of prime) prevents wet stacking on a short peak.

SWITCHGEAR GES SUPPLIES WITH THIS SET

- Set-mounted DSE8610 with motorised 3-pole MCCB/ACB — electrically closed only inside the check-sync window.
- Optional DSE8660 / DSE8680 mains and bus controller for multi-set plants and import/export control.
- Hi-spec motorised ATS 40 A–3,200 A, with or without bypass, where a closed-transition or life-safety board is required.
- BS 8519 dual-line / bypass ATS for fire and life-safety loads.
- Manual changeover 20 A–3,200 A in steel or GRP where auto-changeover is not required.
- Generator intake / Powerlock panels for hire and temporary incomers.
- Bespoke Form 4 plant boards: busbars rated for combined fault level, protection graded, BMS / DNO RTU interface.

WHAT WE NEED TO QUOTE THE PLANT, NOT JUST THE ENGINE

Incoming single-line (voltage, rating, fault level, 3- or 4-pole), duty (AMF, closed-transition, multi-set, peak lop or a mix), site maximum demand and half-hour data if peak-lopping, whether export is allowed, acoustic limit, and fuel-storage hours. GES then designs the set, the board, the interconnect, G99 paperwork, commissioning and aftercare as one package.

Synchronising · Peak lopping · Multi-set plant

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Individual ZS / ZC sheets · Range guide issued separately