

## Total Energy Solutions

### P230H-P275HE

#### OUTPUT RATINGS (0.8pf)

Model	50Hz	60Hz
P230H	230 kVA / 184 kW	245 kVA / 196 kW
P250HE	250 kVA / 200 kW	269 kVA / 215.2 kW
P250H	250 kVA / 200 kW	261 kVA / 208.8 kW
P275HE	275 kVA / 220 kW	288 kVA / 230.4 kW



#### Ratings Definitions

##### Continuous Power - Models P230H & P250H

These ratings are applicable for supplying continuous electrical power (at variable load) in lieu of commercially purchased power. There is no limitation to the annual hours of operation and this model can supply 10% overload power for 1 hour in 12 hours.

##### Standby Power - Models P250HE & P275HE

These ratings are applicable for supplying continuous electrical power (at variable load) in the event of a utility power failure. No overload is permitted on these ratings. The alternator on this model is peak continuous rated (as defined in ISO8528-3).

#### TECHNICAL DATA

Generator Set Model:	P230H-P250HE		P250H-P275HE	
Engine Model:	Perkins I306-E87TA300		Perkins I306-E87TA330	
Alternator Model:	LL5014H		LL5014J	
Number of Cylinders:	6 in line		6 in line	
Cubic Capacity: Litres (cu. in)	8.7 (530)			
Bore/Stroke:	116.6 (4.59) / 135.9 (5.35)			
Compression Ratio:	16.9:1			
Aspiration:	Turbocharged, AA Charge Cooled			
Frequency:	50 Hz	60 Hz	50 Hz	60 Hz
Engine Speed:	1500 RPM	1800 RPM	1500 RPM	1800 RPM
Maximum Continuous Power at Flywheel: kW (hp)	224 (300)	242 (325)	246 (330)	tba
BMEP: kPA (psi)	2055 (298)	1855 (269)	2261 (328)	tba
Piston Speed: m/sec (ft/sec)	6.8 (22.3)	8.2 (26.9)	6.8 (22.3)	tba
Fuel Tank Capacity: Litres (US Gal)	350 (92.5)	350 (92.5)	350 (92.5)	tba
Fuel Consumption, P230H: l/hr (Usg/hr)	48.8 (12.9)	56.1 (14.8)		
Fuel Consumption, P250HE: l/hr (Usg/hr)	53.2 (14.1)	61.5 (16.2)		
Fuel Consumption, P250H: l/hr (Usg/hr)			54.0 (14.3)	tba
Fuel Consumption, P275HE: l/hr (Usg/hr)			59.5 (15.7)	tba
Heat Rejection to Exhaust System: kW (Btu/min)	124 (7086)	145 (8252)	190 (10814)	tba
Heat Rejection to Cooling System: kW (Btu/min)	96 (5464)	110 (6261)	107 (6118)	tba
Total Radiated Heat: kW (Btu/min)	56.5 (3216)	63.5 (3614)	52.3 (2977)	tba
Exhaust Temperature: °C (°F)	526 (979)	477 (890)	528 (982)	tba
Cooling Air Flow: m <sup>3</sup> /min (cfm)	409 (14420)	517 (18226)	410 (14491)	tba
Combustion Air Flow: m <sup>3</sup> /min (cfm)	14.9 (525)	20.2 (712)	16.4 (578)	tba
Exhaust Gas Flow: m <sup>3</sup> /min (cfm)	40.3 (1424)	51.3 (1811)	44.5 (1572)	tba

Note: Standard reference conditions 27° (80°F) Air Inlet Temp, 152.4m (500ft) A.S.L. All engine performance data based on the above mentioned maximum continuous ratings. Fuel consumption data at full load with diesel fuel with a specific gravity of 0.85 and conforming to BS2869: 1988, Class A2.

#### DIMENSIONS AND WEIGHTS

P230H - P250HE					P250H - P275HE				
Length:	Width:	Height:	Net:	Gross:	Length:	Width:	Height:	Net:	Gross:
Mm (in)	Mm (in)	Mm (in)	Kg (lb)	Kg (lb)	Mm (in)	Mm (in)	Mm (in)	Kg (lb)	Kg (lb)
2953 (116)	1003 (39.5)	1717 (67.6)	2073 (4571)	2418 (5332)	2953 (116)	1003 (39.5)	1717 (67.6)	2138 (4714)	2483 (5475)

Net = With Lube Oil    Gross = Net + Packing Case

Generating set pictured may include optional accessories

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



## Technical Specifications

### Total Energy Solutions

## P230H, P250HE, P250H, P275HE

### ENGINE

PERKINS Multi Cylinder, 4 Stroke, direct injection, compression ignition, continuously rated, water cooled industrial diesel engine. Arranged for electric start and stop. Built to comply with BS5514 and capable of sustaining a 10% overload for one hour in a 12 hour running period. Complete with cooling fan drive, lubricating oil filters, air cleaners, starter motor, battery charging alternator or dynamo and regulator, multi cylinder, fuel injection pump, fuel control solenoid, fuel lift pump, engine speed adjustment. The engine will be fitted with a heavy dynamically balanced flywheel suitable for constant speed generator duty.

### ENGINE GOVERNOR

The engine is fitted with an efficient approved engine speed mechanical type governor.

### COOLING SYSTEM

The engine will be complete with tropical capacity radiator for cooling the machine in tropical ambient temperatures, together with pusher type cooling fan and guards are fitted to the set.

### FILTRATION SYSTEM

The engine will be fitted with dry type heavy duty air filters with replaceable elements. The engine will be complete with fuel and lubricating oil filters with replacement elements.

### STARTING SYSTEM

The engine will be electric start complete with starter motor, heavy duty lead acid batteries, battery racks and interconnecting cables.

### BATTERY CHARGING SYSTEM

The engine will be complete with battery charging alternator unit complete with voltage regulator.

### EXHAUST SILENCER SYSTEM

The engine will be fitted with industrial capacity exhaust silencer.

### ALTERNATOR

The alternator will be of brushless, self exciting, self regulating design. It will be directly coupled to the engine and will include excitation system, automatic voltage regulator, voltage adjusting potentiometer and underspeed protection.

The excitation system will provide an exceptionally rapid response to load changes and all alternators are designed for high motor starting capability and will be tropically insulated and windings will be impregnated with thermosetting insulated varnish for use in tropical climates. The rotor system is dynamically balanced to minimise vibration. Ample ventilation is provided by a shaft mounting centrifugal fan. A screen protected enclosure is standard and the automatic voltage regulator is readily accessible at the non drive end.

### COUPLING ARRANGEMENT

The engine and alternator will be directly coupled by means of an SAE flange so that there is no possibility of misalignment being found after prolonged use. A flexible coupling is used in all cases and the coupling is completely guarded for safety purposes.

### BASE FUEL TANK

Incorporated in the base frame is a fuel tank with a capacity sufficient for 8 hours operation.

### MOUNTING ARRANGEMENT

The engine and alternator will be mounted as a whole on a heavy duty fabricated steel base frame constructed from folded channel sections. Crane lifting arrangement is included.

### ANTI VIBRATION MOUNTING PADS

The above mentioned base frame will be complete with Anti Vibration mounting pads for fixing between the base frame and the generator.

### CIRCUIT BREAKER

Floor standing vibration isolated sheet steel box containing suitable rated 3 pole circuit breaker with thermal and magnetic overloads.

### CONTROL PANEL

Mounted in a vibration isolated sheet steel enclosure a 1000 series key start panel with the following instrumentation and controls:

- Voltmeter
- Ammeter
- Combined Frequency & Tachometer
- Hours Run Counter
- Coolant temperature and Oil Pressure gauges
- Battery condition voltmeter
- Off/On/Start switch
- 7 position voltmeter selector switch
- 4 position ammeter selector switch

Shutdown protection for high coolant temperature and low oil pressure.

The panel will be complete with all necessary internal wiring, control circuit relays, termination's and outgoing terminals, circuit components, control switches and push buttons are clearly identified by number or named plates.

### ACCESSORIES

- l set operation and maintenance manuals
- l circuit wiring diagram

### FINISH

The generator is thoroughly cleaned and primed with 2 coats of industrial primer and finished in two coats of industrial high gloss paint.

### WORKS TEST

The Generator will be load tested in the test bay before despatch. All systems will be thoroughly checked for correct operation. All fluid seals will be proved. Where possible faults, control functions and site load conditions will be simulated and the generator and its systems will be checked, proved and then passed for despatch.

## Technical Data Sheet

### Total Energy Solutions

Models	50Hz		60Hz	
	P230H-P250HE	P250H-P275HE	P230H-P250HE	P250H-P275HE
<b>Engine Specifications</b>				
Manufacturer:	Perkins Engine Group			
Model	I306-E87TA300	To Be Checked	I306-E87TA300	To Be Checked
Type / Aspiration:	4 - Cycle / Turbocharged / Air to Air Aftercooled			
Cylinder Configuration:	6 In Line			
Displacement: L (cu. in.)	8.71 (531)			
Bore / Stroke: mm (in)	116.6 (4.59) / 135.9 (5.35)			
Compression Ratio:	16.9 : 1			
Governor: Type / Class	Mechanical Class A1, 4% Droop			
Air Cleaner Type:	Dry Replaceable Element with Restriction Indicator.			
Engine Speed	1500	1500	1800	1800
Maximum Power at Rated RPM: kW (hp)				
Standby:	224 (300)	246 (330)	243 (325)	tba
Continuous:	201 (270)	224 (300)	219 (293)	tba
BMEP: kPa (psi)				
Standby:	2055 (298)	2261 (328)	1855 (269)	tba
Continuous:	1855 (269)	2059 (299)	1675 (243)	tba
Piston Speed: m/sec (ft/min)	6.80 (1339)	6.80 (1339)	8.20 (1614)	tba
Regenerative Power: kW	20.8	tba	28.6	tba
<b>Lubricating System</b>				
Type:	Full Pressure			
Total Oil Capacity: L (qts)	24.6 (26.0)	To be Checked	24.6 (26.0)	To be Checked
Oil pan: L (qts)	20.8 (22.0)	To be Checked	20.8 (22.0)	To be Checked
Oil Filter:	Spin On, Full Flow			
Oil Cooler:	Water Cooled			
Oil Type Required:	API CD 15W-40			
<b>Fuel System</b>				
Fuel Filter Type:	Replaceable Element			
Recommended Fuel:	#2 Diesel			
<b>Cooling System</b>				
Radiator Sys Cap Incl. Eng: L (US Gal)	33.9 (9.0)			
Water Pump Type:	Centrifugal			
Max Coolant Static Head: mH <sub>2</sub> O (ftH <sub>2</sub> O)	tba			
Min Temp to Engine: Deg C (F)	tba			
Temp Rise Across Engine: Deg C (F)	tba			
Heat Rejected to Coolant at Rated Power: kW (Btu/min)				
Standby:	96 (5464)	107 (6118)	110 (6261)	tba
Continuous:	91.0 (5176)	95.5 (5431)	115 (6541)	tba
Total Heat Radiated to Room at Rated Power: kW (Btu/min)				
Standby:	56.5 (3216)	52.3 (2977)	63.5 (3614)	tba
Continuous:	55.9 (3180)	tba	58.6 (3333)	tba
Radiator fan Load: kW (hp)	6.4 (8.6)	9.0 (12)	11.2 (15.0)	15 (20)

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## Technical Data Sheet

### Total Energy Solutions

Models	50Hz		60Hz	
	P230H-P250HE	P250H-P275HE	P230H-P250HE	P250H-P275HE
<b>Air Requirements</b>				
<i>Combustion Air Flow: m<sup>3</sup>/min (cfm)</i>				
Standby:	14.9 (525)	16.4 (578)	20.2 (712)	tba
Continuous:	13.9 (492)	14.9 (525)	17.8 (627)	tba
<i>Max. Air Cleaner Restriction: kPa (inH<sub>2</sub>O)</i>		7.5 (30.1)		
<i>Radiator Cooling Air: m<sup>3</sup>/min (cfm)</i>	409 (14420)	410 (14491)	517 (18226)	tba
<i>Max Restriction at Radiator Discharge (Static) kPa (inH<sub>2</sub>O)</i>				
		tba		
<i>Alternator Cooling Air: m<sup>3</sup>/min (cfm)</i>	33.4 (1180)	33.4 (1180)	40.2 (1420)	40.2 (1420)
<b>Exhaust System</b>				
<i>Max Allowable Back Pressure: kPa (inHg)</i>		8.5 (2.5)		
<i>Exhaust Flow at Rated kW: m<sup>3</sup>/min (cfm)</i>				
Standby:	40.3 (1424)	44.5 (1572)	51.3 (1811)	tba
Continuous:	37.8 (1333)	41.5 (1464)	45.1 (1593)	tba
<i>Exhaust Temp at Rated kW Dry Exhaust: Deg C (F)</i>				
Standby:	526 (979)	528 (982)	477 (890)	tba
Continuous:	494 (921)	510 (950)	448 (838)	tba
<i>Silencer Model (Qty):</i>		SD100 (1)		
<b>Engine Electrical System</b>				
<i>Voltage / Ground</i>		24 / Negative		
<i>Battery Charge Alternator Ampere Rating:</i>		55		

#### Alternator Specifications

<b>Type:</b>	Revolving field, 4 pole, self - exciting, self regulating, brushless.	<b>Excitation System:</b> The main stator provides power via the automatic voltage regulator (AVR) to the exciter field. Residual magnetism provides an additional small output voltage and a circuit within the AVR ensures full voltage build-up from this. The exciter output is fed to the main rotor windings through a 3 phase, full wave bridge rectifier. This diode bridge is protected against surges and voltage transients caused for example, by short circuit. The excitation system will not sustain a short circuit. Close voltage regulation is maintained down to about 95% of rated speed. Below this the AVR reduces output voltage linearly with speed. This assists the prime mover to recover speed following heavy load applications and protects the rotor against over excitation due to low speeds.
<b>Output reconnectable:</b>	Broad Range.	
<b>Stator Windings:</b>	12 leads, reconnectable, 2 Layer, 2/3 pitch	
<b>Voltage Regulator:</b>	Solid State	
<b>Insulation: NEMA MG1-I.66:</b>	Class H	
<b>Bearings:</b>	One	
<b>Coupling:</b>	Flexible Disk, SAE flange	

#### Control Panel Specification

<b>Type:</b>	1000 Series Key Start
<b>Mounting:</b>	Vibration Isolated in sheet steel enclosure.
<b>Instruments Included:</b>	Voltmeter, Ammeter, Combined Frequency & Tachometer Hours run counter, Coolant temperature and Oil pressure Gauges.
<b>Controls Include:</b>	Battery Condition Voltmeter, Off/On/Start Switch, 7 pos Voltmtr selector switch, 4 pos Ammtr selector switch
<b>Shutdown Protection On:</b>	High Coolant Temperature, Low Oil Pressure

#### Circuit Breaker

<b>Type:</b>	3 Pole
<b>Mounting:</b>	Vibration Isolated in sheet steel enclosure.
<b>U.L. Listed:</b>	Available

#### Quality Standards

<b>Meets standards of:</b>	BS4999, BS5000, BS5514 IEC34, VDE0530, NEMA MG -122
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