

Total Energy Solutions

PI250-PI650E

OUTPUT RATINGS (0.8pf)

Model	50Hz	60Hz
PI250	1250 kVA / 1000 kW	1250 kVA / 1000 kW
PI375E	1375 kVA / 1100 kW	1375 kVA / 1100 kW
PI500	1500 kVA / 1200 kW	1500 kVA / 1200 kW
PI650E	1650 kVA / 1320 kW	1650 kVA / 1320 kW



Ratings Definitions

Continuous Power - Models PI250 & PI500

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 PI375E & PI650E

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:	PI250-PI375E		PI500-PI650E	
Engine Model:	Perkins 4012TWG2		Perkins 4012TAG2	
Alternator Model:	LL8124L		LL8124P	
Number of Cylinders:	12 VEE		12 VEE	
Cubic Capacity: Litres (cu. in)	45.84 (2797)		45.84 (2797)	
Bore/Stroke:	160.0 (6.30) / 190.0 (7.48)		160.0 (6.30) / 190.0 (7.48)	
Compression Ratio:	13.6:1		13.6:1	
Aspiration:	Turbocharged, Water Cooled		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)	1207 (1619)	1207 (1619)	1422 (1907)	1423 (1908)
BMEP: kPa (psi)	2110 (306)	1760 (255)	2480 (360)	2070 (300)
Piston Speed: m/sec (ft/sec)	9.50 (1870)	11.40 (2244)	9.50 (1870)	11.40 (2244)
Fuel Consumption, PI250: l/hr (Usg/hr)	277 (73.2)	285 (75.3)		
Fuel Consumption, PI375E: l/hr (Usg/hr)	307 (81.1)	318 (84.0)		
Fuel Consumption, PI500: l/hr (Usg/hr)			322 (85.10)	334 (88.2)
Fuel Consumption, PI650E: l/hr (Usg/hr)			363 (95.90)	370 (97.8)
Heat Rejection to Cooling System: kW (Btu/min)	590 (33559)	648 (36858)	452 (25710)	469 (26677)
Total Radiated Heat: kW (Btu/min)	202 (11490)	240 (13674)	197 (11200)	196 (11148)
Exhaust Temperature: °C (°F)	460 (860)	452 (846)	466 (871)	480 (896)
Cooling Air Flow: m ³ /min (cfm)	1760 (62287)	1695 (59850)	1740 (61439)	1740 (61439)
Combustion Air Flow: m ³ /min (cfm)	98.1 (3463)	102.8 (3631)	109.0 (3831)	114.0 (4014)
Exhaust Gas Flow: m ³ /min (cfm)	245 (8651)	254 (8969)	274 (9675)	283 (9993)

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

PI250 - PI375E					PI500 - PI650E				
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)
5374 (211.6)	2039 (80.3)	2462 (96.9)	10650 (23483)	10930 (24100)	5250 (206.7)	2220 (87.4)	2895 (114.0)	10550 (23263)	10830 (23880)

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

PI250, PI375E, PI500, PI650E

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 electronic 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.

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 2000 series Auto start panel with the following instrumentation and controls:

Instrumentation:

- Voltmeter
- Ammeter
- Combined Frequency & Tachometer
- Hours Run Counter
- Coolant temperature and Oil Pressure gauges
- Battery condition voltmeter

Controls:

- Run/Off/Auto Switch
- Lock Down Stop Button
- Engine Preheat Push Button
- Lamp Test / Reset Push-button
- 7 position voltmeter selector switch
- 4 position ammeter selector switch
- 3 attempt start timer

Shutdowns with Individual Warning Lamps

- Fail to Start
- High Coolant Temperature
- Low Lube oil Pressure
- Overspeed

Remote Signals / Contacts from Panel

- Terminal for Remote Emergency Stop
- Common Fault Alarm Signal

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

ACCESSORIES

- 1 set operation and maintenance manuals
- 1 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	
	PI250-PI375E	PI500-PI650E	PI250-PI375E	PI500-PI650E
Engine Specifications				
Manufacturer:	Perkins Engine Group			
Model	4012TWG2	4012TAG2	4012TWG2	4012TAG2
Type / Aspiration:	4 - Cycle / Turbocharged			
Cylinder Configuration:	12V to be checked			
Displacement: L (cu. in.)	30.56 (1865)	45.84 (2797)	30.56 (1865)	45.84 (2797)
Bore / Stroke: mm (in)	160.0 (6.30) / 190.0 (7.48)			
Compression Ratio:	13.6: 1			
Governor: Type / Class	Electronic Class AI, 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:	1207 (1619)	1422 (1907)	1207 (1619)	1423 (1908)
Continuous:	1097 (1471)	1296 (1738)	1097 (1471)	1297 (1739)
BMEP: kPa (psi)				
Standby:	2110 (306)	2480 (360)	1760 (255)	2070 (300)
Continuous:	1910 (277)	2260 (328)	1600 (232)	1890 (274)
Piston Speed: m/sec (ft/min)	9.50 (1870)	9.50 (1870)	11.40 (2244)	11.40 (2244)
Regenerative Power: kW	120	120	140	140
Lubricating System				
Type:	Full Pressure			
Total Oil Capacity: L (qts)	159 (42.0)			
Oil pan: L (qts)	136 (35.9)			
Oil Filter:	Spin On, Full Flow			
Oil Cooler:	Water Cooled			
Oil Type Required:	API CD 15W-40			
Fuel System				
Fuel Filter Type:	Replaceable Element			
Recommended Fuel:	#2 Diesel			
Cooling System				
Radiator Sys Cap Incl. Eng: L (US Gal)	290.0 (76.6)	250.0 (66.1)	290.0 (76.6)	250.0 (66.1)
Water Pump Type:	Centrifugal			
Max Coolant Static Head: mH ₂ O (ftH ₂ O)	7.0 (23.1)			
Min Temp to Engine: Deg C (F)	80 (176)	90 (194)	80 (176)	90 (194)
Temp Rise Across Engine: Deg C (F)	13.0 (23.4)	8.0 (14.4)	13.0 (23.4)	8.0 (14.4)
Heat Rejected to Coolant at Rated Power: kW (Btu/min)				
Standby:	590 (33559)	452 (25710)	648 (36858)	469 (26677)
Continuous:	536 (30488)	411 (23378)	589 (33502)	426 (24231)
Total Heat Radiated to Room at Rated Power: kW (Btu/min)				
Standby:	202 (11490)	196 (11200) to be checked	240.4 (13674)	196 (11148)
Continuous:	188 (10693)	183.9 (10460)	223.4 (12707)	183 (10409)
Radiator Fan Load kW (hp)	45 (60)	40 (54)	45 (60)	40 (54)

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Technical Data Sheet

Total Energy Solutions

Models	50Hz		60Hz	
	PI250-PI375E	PI500-PI650E	PI250-PI375E	PI500-PI650E
Air Requirements				
<i>Combustion Air Flow: m³/min (cfm)</i>				
Standby:	98.1 (3463)	108.5 (3831)	102.8 (3631)	113.7 (4014)
Continuous:	92.0 (3247)	102.3 (3612)	100.2 (3539)	104.4 (3685)
<i>Max. Air Cleaner Restriction: kPa (inH₂O)</i> 3.7 (14.9)				
<i>Radiator Cooling Air: m³/min (cfm)</i>	1764 (62287)	1740 (61439)	1695 (59850)	1740 (61439)
<i>Max Restriction at Radiator Discharge (Static) kPa (inH₂O)</i>				
	tba	tba	tba	tba
<i>Alternator Cooling Air: m³/min (cfm)</i>	188.3 (6650)	188 (6650)	223 (7860)	223 (7860)
Exhaust System				
<i>Max Allowable Back Pressure: kPa (inHg)</i>				
	9.3 (2.8)	6.0 (1.8)	10.7 (3.2)	7.3 (2.2)
<i>Exhaust Flow at Rated kW: m³/min (cfm)</i>				
Standby:	245 (8651)	274 (9675)	254 (8969)	283 (9993)
Continuous:	226 (7980)	247 (8722)	243 (8580)	257 (9075)
<i>Exhaust Temp at Rated kW Dry Exhaust: Deg C (F)</i>				
Standby:	460 (860)	466 (871)	452 (846)	480 (896)
Continuous:	450 (842)	435 (815)	440 (824)	450 (842)
<i>Silencer Model (Qty):</i> tba				
Engine Electrical System				
<i>Voltage / Ground</i> 24 / Negative				
<i>Battery Charge Alternator Ampere Rating:</i> 32				

Alternator Specifications

Type:	Revolving field, 4 pole, self - exciting, self regulating, brushless.	Excitation System: 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.
Output reconnectable:	Broad Range.	
Stator Windings:	6 leads, reconnectable, 2 Layer, 2/3 pitch	
Voltage Regulator:	Solid State	
Insulation: NEMA MG1-1.66:	Class H	
Bearings:	One	
Coupling:	Flexible Disk, SAE flange	

Control Panel Specification

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

Circuit Breaker

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

Quality Standards

Meets standards of:	BS4999, BS5000, BS5514, IEC34, VDE0530, NEMA MG -122
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