Marapco GENERATORS

Perkins Powered Generating Sets

YOUR PARTNER IN POWER

P350P3 - P700E5

OUTPUT RATINGS

Generator Set Model	P350P3 P400E3		P400P3 P450E3		P450P3 P500E3		P500P3 P550E3		P550P5 P605E5		P600P5 P660E5		P635P5 P700E5	
Ratings at 0.8PF	kVA	kW	kVA	kW	kVA	kW	kVA	kW	kVA	kW	kVA	kW	kVA	kW
380-415V, 50Hz / 1500 r.p.m	350.0 400.0	280.0 320.0	400.0 450.0	320.0 360.0	450.0 500.0	360.0 400.0	500.0 550.0	400.0 440.0	550.0 605.0	440.0 484.0	600.0 660.0	480.0 528.0	635.0 700.0	508.0 560.0
480V, 60Hz / 1800 r.p.m	400.0 438.0	320.0 350.4	438.0 500.0	350.4 400.0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

Ratings Definitions

Prime Power(Continuous) – Model P with suffix (P3)or(P5)

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 – Model P with suffix (E3)or(E5)

These ratings are applicable for supplying continuous electrical power (at variable load) in 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) at 27°C.

TECHNICAL DATA

Perkins Engine Model:		Perkins 2306A-E14TAG2		Perkins 2306A-E14TAG3		Perkins 2506A-E15TAG1		Perkins 2506A-E15TAG2		Perkins 2806A-E18TAG1		Perkins 2806A-E18TAG1A		Perkins 2806A-E18TAG2	
Leroy-Somer Alternator Model:		LL6114B		LL6114D		LL6114D		LL6114F		LL6114G		LL6114K		LL7024H	
Number of Cylinders:		6 / In Line		6 / In Line		6 / In Line		6 / In Line		6 / In Line		6 / In Line		6 / In Line	
Cubic Capacity:	Litres (cu.in)	14.6 (890.9)		14.6 (890.9)		15.2 (927.6)		15.2 (927.6)		18.1 (1104.5)		18.1 (1104.5)		18.1 (1104.5)	
Bore/Stroke:	mm	137.0/165.0		137.0//165.0		135.0/167.0		135.0/167.0		145.0/183.0		145.0/183.0		145.0/183.0	
	in	5.4/6.5		5.4/6.5		5.3/6.6		5.3/6.6		5.7/7.2		5.7/7.2		5.7/7.2	
Compression ratio:		15.9:1		15.9:1		16.0:1		16.0:1		14.5:1		14.5:1		14.5:1	
Aspiration:		Turbocharged Air To Air Charge Cooled													
Frequency:		**50 Hz**	**60 Hz**	**50 Hz**	**60 Hz**	**50 Hz**	**60 Hz**	**50 Hz**	**60 Hz**	**50 Hz**	**60 Hz**	**50 Hz**	**60 Hz**	**50 Hz**	**60 Hz**
Engine Speed:	RPM	1500	1800	1500	1800	1500	-	1500	-	1500	-	1500	-	1500	-
Gross Engine Power:	kW	353.0	393.0	396.0	447.0	443.0	-	487.0	-	544.0	-	592.7	-	628.0	-
	hp	473.0	527.0	531.0	599.0	594.0	-	653.0	-	730.0	-	795.0	-	842.0	-
BMEP:	kPA	1935.0	1795.0	2170.0	2042.0	2471.0	-	2717.0	-	2400.0	-	2615.0	-	2771.0	-
	psi	280.7	260.4	314.8	296.2	358.4	-	394.0	-	348.1	-	379.3	-	401.9	-
Piston Speed:	m/sec	8.3	9.9	8.3	9.9	8.0	-	8.0	-	9.0	-	9.0	-	9.0	-
	ft/sec	27.2	32.5	27.2	32.5	26.2	-	26.2	-	29.5	-	29.5	-	29.5	-
Total Oil Capacity:	Litres	68.0	68.0	68.0	68.0	62.0	-	62.0	-	55.5	-	55.5	-	55.5	-
	US Gal	18.0	18.0	18.0	18.0	16.4	-	16.4	-	14.7	-	14.7	-	14.7	-
Fuel Tank Capacity:	Litres	791.0	791.0	791.0	791.0	928.0	-	928.0	-	1000.0	-	1000.0	-	1000.0	-
	US Gal	209.0	209.0	209.0	209.0	245.2	-	245.2	-	264.2	-	264.2	-	264.2	-
Fuel Consump, **Prime**:	1/hr	69.4	84.9	79.2	93.2	88.8	-	97.2	-	110.8	-	118.4	-	125.6	-
	USg/hr	18.3	22.4	20.9	24.6	23.5	-	25.7	-	29.3	-	31.3	-	33.2	-
Fuel Consump, **Standby**:	1/hr	81.2	91.3	87.9	103.8	98.6	-	106.8	-	122.5	-	131.1	-	140.0	-
	USg/hr	21.5	24.1	23.2	27.4	26.0	-	28.2	-	32.4	-	34.6	-	37.0	-
Heat Rejection to Exhaust System:	kW	297.0	304.0	297.0	340.0	355.0	-	398.0	-	393.8	-	414.0	-	442.8	-
	Btu/min	16890	17288	16890	19335	20188	-	22634	-	22395	-	23544	-	25182	-
Heat Rejection to Cooling System:	kW	131.0	146.0	150.0	163.0	157.0	-	166.0	-	138.7	-	210.0	-	200.0	-
	Btu/min	7450	8303	8530	9270	8928	-	9440	-	7888	-	11942	-	11374	-
Total Radiated Heat:	kW	15.0	19.0	16.0	21.0	47.0	-	49.0	-	34.5	-	38.0	-	40.5	-
	Btu/min	853	1081	910	1194	2673	-	2787	-	1962	-	2161	-	2303	-
Exhaust Temperature:	°C	494	389	514	434	514	-	528	-	550	-	563	-	563	-
	°F	921	731	957	814	957	-	982	-	1022	-	1045	-	1045	-
Radiator Cooling Air Flow:	m³/min	444.0	600.0	444.0	600.0	660.0	-	660.0	-	660.0	-	660.0	-	660.0	-
	cfm	15680	21189	15680	21189	23308	-	23308	-	23308	-	23308	-	23308	-
Combustion Air Flow:	m³/min	24.0	36.0	26.0	38.0	30.5	-	32.0	-	24.9	-	34.3	-	36.7	-
	cfm	848	1271	918	1342	1077	-	1130	-	879	-	1211	-	1296	-
Exhaust Gas Flow:	m³/min	66.6	95.7	69.3	98.4	81.0	-	87.0	-	109.0	-	123.0	-	123.0	-
	cfm	2352	3380	2447	3475	2860	-	3072	-	3849	-	4344	-	4344	-

Note: Standard reference conditions 27°C (80°F) Air Inlet Temp, 152.4m (500ft) A.S.L. 60% relative humidity. All engine performance data based on the above mentioned maximum continuous ratings. Fuel consumption data at full load with diesel fuel with specific gravity of 0.85 and conforming to BS2869: 1998, Class A2.

DIMENSIONS AND WEIGHTS

Generator Set Model		P350P3 / P400E3	P400P3 / P450E3	P450P3 / P500E3	P500P3 / P550E3	P550P5 / P605E5	P600P5 / P660E5	P635P5 / P700E5
Length:	mm(in)	3601 (141.8)	3601 (141.8)	3700 (145.7)	3700 (145.7)	4111 (161.9)	4111 (161.9)	4111 (161.9)
Width:	mm(in)	1110 (43.7)	1110 (43.7)	1100 (43.3)	1100 (43.3)	1536 (60.5)	1536 (60.5)	1536 (60.5)
Height:	mm(in)	2070 (81.5)	2070 (81.5)	2143 (84.4)	2143 (84.4)	2246 (88.4)	2246 (88.4)	2246 (88.4)
Net Weight*:	kg(lb)	3316 (7311)	3453 (7613)	3793 (8362)	3920 (8642)	4655 (10263)	4717 (10399)	4800 (10582)

* Weight Including Lube Oil Only Without Coolant.

STANDARD SPECIFICATIONS: P350P3 - P700E5

1. OUTPUT RATINGS

The generating set is normally supplied connected for 380 or 415 volt, 3 phase, 50 Hz, and alternative voltages / frequencies are available.

2. ENGINE

Perkins four stroke heavy duty industrial type electronic diesel engine.

2.1 Engine Management System:

Full electronic engine management system equipped with Electronic Control Module(ECM) controlling: speed governing, air/fuel ratio, start stop sequence, engine protection & diagnostics.

2.2 Governing Type

Electronic compliant with Class: ISO8528 G2-G4.

2.3 Electrical System

24 Volt DC,electronically controlled unit injectors, Energised to run stop solenoid.

2.4 Engine Sensors

The following sensors are equipped and controlled by ECM: Crank Speed/Timing, Cam Speed/Timing, Boost Pressure, Oil Pressure, Inlet Air Manifold Temperature, Fuel Temperature, Coolant Temperature, Atmospheric Pressure, Calibration Probe.

3. COOLING SYSTEM

Gear-driven circulating pump.Mounted belt-driven pusher fan.Radiator and cooling fan complete with guards, designed for ambients up to 50 °C.

4. ENGINE FILTERATION SYSTEM

Replaceable 'ecoplus' fuel filter element with primary filter/water separator.Spin-on, full flow replaceable 'ecoplus' oil filter, oil cooler integral with filter header. Cartridge type heavy duty dry air filter with replaceable element & restriction indicator.

5. EXHAUST SYSTEM

Heavy duty industrial capacity exhaust silencer (supplied loose).

6. ELECTRICAL SYSTEM

24 volt starter motor and 24 volt 70 Amp alternator with DC output. ECM mounted on engine with wiring looms and sensors. 3 level engine protection system.High capacity maintenance free lead acid starting battery (2x12Volt), battery rack mounted on the generating set baseframe and heavy duty inter-connecting cables with terminations.

7. ALTERNATOR

Screen protected and drip-proof IP23, self exciting, self regulating, single bearing brushless alternator with fully interconnected damper windings, IC0A1 cooling system and sealed-for life bearing.

7.1 Insulation System

The insulation system is class H. All windings are impregnated in either a triple dip thermosetting, polyester varnish or vacuum pressure impregnated polyester resin.Heavy coat of anti-tracking varnish for additional protection against moisture or condensation.

7.2 Automatic Voltage Regulator

The fully sealed automatic voltage regulator maintain the voltage(steady state) within the limits of +/-0.5% from no load to full load including cold to hot variations at any power factor between 0.8 lagging and unity and inclusive of a speed variation of 5%. Normal adjustment is by a trimmer incorporated in the AVR.The standard AVR is: **R448**

7.3 Waveform Distortion,THF & TIF Factors

The total distortion of the voltage waveform with open circuit between phases or phase and neutral is in the order of 2. On a 3 phase balanced harmonic-free load the total distortion is in the order of 3.5%. Machines are designed to have a THF(waveform IEC) less than 2% and a TIF(waveform NEMA) less than 50. A 2/3 pitch factor is standard on all stator windings. (Total Harmonic Content LL/LN is less than 4%)

7.4 Radio Interference

Suppression is in line with European standards:

EN61000-6

7.5 Electrical Characteristics

Electrical design & features in accordance with:BS 4999/5000, IEC34.1/34.2, VDE0530, UTE NFC 51.111, NEMA MG 1-22.

8. MOUNTING ARRANGEMENT

8.1 Baseframe: The complete generating set is mounted, as a whole, on a heavy duty fabricated, welded steel baseframe. The baseframe incorporates specially designed lifting points.

8.2 Coupling: The engine and alternator are directly coupled by means of an SAE flange so that there is no possibility of misalignment after prolonged use. The high inertia engine flywheel (SAE J620 size 14) is flexibly coupled to the alternator rotor and a full torsional analysis has been carried out to guarantee no harmful vibration will occur in the assembly.

8.3 Anti-Vibration Mounting Pads: Anti-vibration pads are affixed between engine/alternator feet and the baseframe thus ensuring complete vibration isolation of the rotating assemblies and enabling the machine to be placed on an uneven surface without any detrimental effects.

8.4 Safety Guards

The fan, fan drive and battery charging alternator drive are fully guarded for personnel protection. A stone guard protects the radiator core from accidental damage.

9. FUEL SYSTEM (MEUI)

Mechanically actuated **E**lectronically controlled **U** ni fuel **I**njectors with full authority electronic control. On all sets, the baseframe design incorporates an integral fuel tank with a capacity of approx 8 hours. The tank is supplied complete with contents indicator, fuel fill cap with breather, fuel feed and return lines to engine and drain plug.

10. CONTROL SYSTEM

10.1 PowerWizard 1.0 Control Panel: Set mounted auto start panel in a vibration isolated sheet steel enclosure with a hinged lockable door.The control panel is equipped as follows:(PW2.0 is optional)

a. INSTRUMENTATION: LCD Display with adjustable contrast and backlight with auto power off.
Volts 3-phase (L-L & L-N)
Amps (per phase & average)
Frequency
Battery Volts
Hours Run
Engine Jacket Water Temperature (in °C or °F)
Lube Oil Pressure (in psi, kPa or bar)
Engine Speed (rpm)

b. CONTROLS	
2 LED Status Indicators	Menu Navigation Keys
Lamp Test Key	Alarm Acknowledge Key
Run, Auto & Stop keys	2 Spare Fault Channels
Engine and AC Metering Shortcut Keys	
Control Module Keys have tactile feedback	
Lock Down Emergency Stop Push Button	
c. PROTECTIONS	
Fail to start	Loss of engine speed detection
High coolant temperature	High/Low Battery Voltage
Low lube oil pressure	Battery Charger Failure
Under/Over speed	(if fitted)
d. Other Features	
20 Event Fault Log	
CAN1 data link - J1939 for communication with ECM	
e. Languages: LED displays with many languages	

f. DC and AC Wiring Looms

DC and AC wiring looms utilizing industrial type multipin connectors, thus permitting fast fault finding and simple retrofitting of alternative or remote control systems.

10.2 Circuit Breaker

3 Pole moulded case circuit breaker with integral trip unit for thermal and magnetic overload protection mounted on the generator in a vibration isolated sheet steel box with adequate access for incoming and outgoing cables.

11. DOCUMENTATION

A full set of installation, operation and maintenance manuals, circuit wiring diagrams, and commissioning / fault finding instruction leaflets.

12. GENERAL ARRANGEMENT

The generating set is designed and constructed for installation in a weather protected building. Various types of weatherproof and sound attenuated enclosures are available upon request.

13. FACTORY TESTS

The generating set is load tested before despatch. All protective devices, control functions and site load conditions are simulated and the generator and it's systems checked, proved and then passed for despatch. A test certificate can be provided upon request.

14. EQUIPMENT FINISH

All sheet metal components are first treated with a phosphate chemical conversion coating which provides an excellent corrosion resistant surface. These metal components are then "painted" by applying a polyester powder which is subjected to very high temperatures causing the powder to melt and form a continuous high gloss and extremely durable coating.The engine and alternator are thoroughly cleaned and finished in temperature controlled ovens with industrial high gloss paint. All fasteners are electroplated.

Note:Generating set is supplied with unpainted turbo-charger.

15. QUALITY STANDARDS

The equipment meets the followings standards:BS5000, ISO8528, ISO3406, IEC60034, VDE0530, NEMA MG-1.22

16. WARRANTY

One year against manufacturing defects.

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Website: www.marapco.com

N. Ireland - U.K.

Marapco GENERATORS

Jan-08

Made in UK