4012-46TAG0A

906 - 1222 kWm (Gross) @ 1500rpm

4000 Series

ElectropaK

Basic technical data

Number of cylinders 12
Cylinder arrangement . . . . . 60° Vee
Cycle . . . . . 4 stroke, compression ignition
Induction system . . . . . Turbocharged
Compression ratio 13.6:1
Bore . . . . . 160 mm
Stroke . . . . . 190 mm
Cubic capacity . . . . . 45.842 litres
Direction of rotation . . . . . Anticlockwise viewed on flywheel
Firing order . . . . . $1^A, 6^B, 5^A, 2^B, 3^A, 4^B, 6^A, 1^B, 2^A, 5^B, 4^A, 3^B$
Cylinder 1 . . . . . Furthest from flywheel

Note: Cylinders designated 'A' are on the right hand side of the engine when viewed from the flywheel end.

Weight of ElectropaK

Tropical

Dry . . . . . 4400 kg
Wet + fuel cooler . . . . . 6086 kg
Wet - fuel cooler . . . . . 6070 kg

Overall dimensions of ElectropaK

Tropical

Length . . . . . 3915 mm
Width . . . . . 2198 mm
Height . . . . . 2259 mm

Moments of inertia

Engine . . . . . 9.46 kgm²
Flywheel . . . . . 9.55 kgm²
Total engine inertia . . . . . 19.01 kgm²

Cyclic irregularity for engine standby power

4012-46TAG0A 1.616

Ratings

Steady state speed stability at constant load . . . . . ± 0.25%

Electrical rating are based on average alternator efficiency and are for guidance only (0.8 power factor being used).

Operating point

Engine speed . . . . . 1500 rpm
Static injection timing . . . . . See engine number plate
Cooling water exit temperature . . . . . < 98°C

Fuel data

To conform to BS2869 class A2 or BS EN590.

Performance

Sound pressure level 1500 rpm . . . . . 108 / 109 dB(A)

Note: All data based on operation to ISO 3046/1, BS 5514 and DIN 6271 standard reference conditions.

Note: For engines operating in ambient conditions other than the standard reference conditions stated below a suitable derate must be applied.

Note: Derate tables for increased ambient temperature and/or altitude are available, please contact Perkins Applications Department.

Test conditions

Air temperature . . . . . 25°C
Barometric pressure . . . . . 100 kPa
Relative humidity 30%
Air inlet restriction at maximum power (nominal) . . . . . 2.5 kPa
Exhaust back pressure (nominal) . . . . . 3 kPa
Fuel temperature (inlet pump) . . . . . 58°C maximum

Note: For test conditions relevant to data on load acceptance, refer to Perkins Applications Department.

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General installation

4012-46TAG0A - Tropical

Designation	Units	Baseload power	Prime power	Standby power
Gross engine power	kWb	906	1117	1222
Fan power	kWm		64	
ElectropaK nett engine power	kWm	842	1053	1158
Gross BMEP	bar	1581	1949	2132
Combustion air flow	m³/min	86	106	114
Exhaust gas temperature after turbo (maximum)	°C		425	
Exhaust gas flow (maximum) at atmospheric pressure	m³/min		280	
Boost pressure ratio	-	2.5	2.8	3.0
Mechanical efficiency	%	89	91	92
Overall thermal efficiency (nett)	%	41.2	40.2	40.1
Friction power and pumping losses	kWm		120	
Mean piston speed	m/s		9.5	
Engine coolant flow (minimum)	litres/s		17	
Typical Genset electrical output 0.8pf 25ºC (100 kPa)	kWe	800	1000	1100
	kVA	1000	1250	1375
Assumed alternator efficiency	%		95	

Note: Not to be used for CHP design purposes (indicative figures only). Consult Perkins Engines Company Limited. Assumes complete combustion.

Rating definitions

Baseload power

Unlimited hours usage with an average load factor of 100% of the published baseload power. No overload is permitted on baseload power.

Prime power

Unlimited hours usage with an average load factor of 80% of the published prime power over each 24 hours period. A 10% overload is available for 1 hour in every 12 hours operation.

Standby power

Limited to 500 hours annual usage with an average load factor of 80% of the published standby power rating over each 24 hour period. Up to 300 hours of annual usage may be run continuously. No overload is permitted on standby power.

Emissions capability

All 4012-46TAG0A/2A ratings are optimised to the 'best fuel consumption' and do not comply to Harmonised International Regulation Emission Limits. More information on these statements can be obtained by contacting the Applications Department at Perkins Engines Company Limited.

4012-46TAG0A - Tropical

Designation	Units	Baseload power	Prime power	Standby power
Energy in fuel	kWt	2043	2616	2883
Energy in power output (gross)	kWb	906	1117	1222
Energy to cooling fan	kWm		64	
Energy in power output (nett)	kWm	842	1053	1158
Energy to exhaust	kWt	705	848	918
Energy to coolant and oil	kWt	229	326	379
Energy to radiation	kWt	62	77	85
Energy to charge coolers	kWt	141	248	280

Note: Not to be used for combined heat and power (CHP) purposes (indicative figures only). If necessary, please consult the Applications Department, Perkins Engines Company Limited, Stafford.

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Cooling system

For details of recommended coolant specifications, please refer to the Operation and Maintenance Manual (OMM) for this engine model.

Nominal jacket water pressure in crankcase ... 170 kPa
Maximum top tank temperature (standby) ... 98°C
Maximum static pressure head on pump ... 7 m

Total coolant capacity

Engine only ... 73 litres
ElectropaK - Temperate (engine and radiator) ... 210 litres
ElectropaK - Tropical (engine and radiator) ... 210 litres
Maximum permissible restriction to coolant pump flow ... 20 kPa
Thermostat operating range ... 71 - 85°C
Temperature rise across the engines (standby power) with inhibited coolant ... 8°C
Coolant temperature shutdown switch setting ... 101°C rising
Coolant immersion heater capacity (2 of) ... 4 kWe each

Note: Ambient cooling clearance (standby power) based on air temperature at fan 6 °C above ambient.

Radiator (Tropical)

Radiator face area ... 3.46 m²
Material and number of rows .. Copper, 4 rows (charge air / water jacket)
Material and fins per inch ... Brass, 12 rows (charge air / water jacket)
Width of matrix ... 2.10 m
Height of matrix ... 1.65 m
Weight of radiator ... 1620 kg
Pressure cap setting (minimum) ... 70 kPa

Water jacket cooling data

Temperate and Tropical

Coolant exit temperature (maximum) ... 98°C
Coolant inlet temperature (minimum) ... Thermostatic control
Coolant inlet temperature (maximum) ... 90°C

Coolant pump

Speed ... 1.4 x e rpm
Method of drive ... Gear driven

Fan

Type ... Axial flow
Diameter (Tropical) ... 1600 mm
Number of blades ... 12
Material ... Aluminium
Drive ratio ... 0.93:1

Duct Allowance - Maximum additional restriction to cooling airflow and resultant minimum airflow (Standby power applications)			
	Ambient clearance 50% glycol	Duct allowance (Pa)	Min airflow m³/sec
4012-46TAG0A - Tropical	52 °C	200	32.4

Lubrication system

Lubricating oil capacity

Total system capacity ... 177 litres
Sump maximum ... 157.5 litres
Sump minimum ... 115 litres
Oil temperature at normal operating conditions to bearings ... 105°C

Lubricating oil pressure

At rated speed ... 400 kPa
Minimum at 80 °C ... 340 kPa
Oil relief values open ... 400 kPa
Oil filter spacing ... 40 microns
Sump drain plug tapping size ... G1
Oil pump speed ... 2100 rpm
Method of drive ... Gear driven
Shutdown switch pressure setting (where fitted) ... 193 kPa falling
Oil pump flow ... 6 litres/sec

Normal operating angles

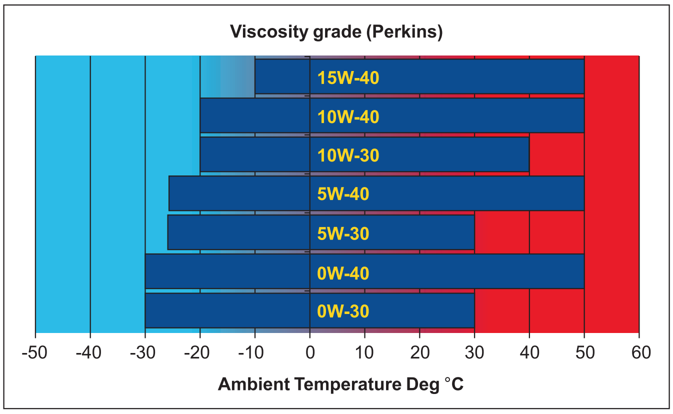
Front and rear ... 5°
Side tilt ... 10°

Oil consumption

Prime power	Units	
After running in (typically after 250 hours)	g/kWhr	0.52
Oil flow rate from pump	litres/sec	6

Recommended SAE viscosity

Multigrade oil conforming to the following must be used: API CH4 15W/40.



Note: For additional notes on lubricating oil specifications, please refer to the Operation and Maintenance Manual (OMM).

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Induction system

Maximum air intake restriction of engine

Clean filter.. ... .2 kPa
Dirty filter. .. ..4 kPa
Air filter type ... .Paper element

Fuel system

Recommended fuel to conform to: ... .. .BS2869 Class A2 or BS EN590
Injection system ... . Direct
Fuel injection pump and injector type .. .. Combined unit injector
Injector pressure ... . .140 MPa
Lift pump type .. .. Tuthill TCH 1-089
Fuel delivery (4012-46TAG0A) .. .. 1020 litres/hour
Heat retained in fuel to tank. .. .. 8 kW
Fuel inlet temperature to be less than .. .. 58°C
Delivery pressure.. .. ..300 kPa
Maximum suction head at pump inlet .. ..2.5 m
Maximum static pressure head .. ..See manual
Fuel filter spacing.. .. .. 10 microns
Governor type .. ..Electronic
Governing to .. .. ISO 8528-12 Class 3 and 4; ISO 8528-5 Class G2
Tolerance on fuel consumption ... ... ± 5%

Fuel consumption

4012-46TAG0A (Tropical)		
Rating	**g/kWh**	**litres/hr**
Standby power	198	281
Prime power	199	258
Baseload power	203	213
75% prime power	204	202
50% prime power	215	127

Note: All figures in the table above are based on gross mechanical output with assumed fuel density of 0.862. For fuel consumption based on electrical output of the generating set contact your OEM.

Exhaust system

Maximum back pressure for total system

Exhaust outlet size (internal).. ... . 2 x 254 mm Table D flanges
Exhaust outlet flange size ... . 2 x 254 mm Table D flanges
Back pressure for total system at standby power ... .5 kPa

Note: For recommended pipe sizes, please refer to the Installation Manual.

Electrical system

Type. .. .. Insulated return
Alternator .. ..24 volts with integral regulator
Alternator output ... . 55 amps, 28 volts at 20 °C ambient
Starter motor.. .. ..24 volts
Starter motor type . .. . Axial
Starter motor power .. .. 16.4 kW
Number of teeth on flywheel 156
Number of teeth on starter motor 12
Minimum cranking speed (0°C).. .. ..120 rpm
Pull in current of starter motor solenoid at -25°C maximum [1]. 30 amps
Hold in current of starter motor solenoid at -25°C maximum [1] ... 9 amps
Engine stop solenoid ... .24 volts
Hold-in current of stop solenoid.. .. .. 1.1 amps

[1] All leads rated to 10 amps minimum.

Engine mounting

Maximum static bending moment at rear face of block.. .. .. 1356 Nm
Maximum additional load applied to flywheel due to all rotating components .. .. 850 kg

Centre of gravity

Bare engine, dry

Forward of the rear face of the cylinder block.. .. ..771 mm
Above the crankshaft centre line .. .. 32 mm

ElectropaK, dry

Forward of the rear face of the cylinder block.. .. .. 1176 mm
Above the crankshaft centre line .. .. 32 mm

Cold start recommendations

Temperature range down to -10°C (14°F)

Oil 15W/40 CH4
Starter. ... . 2 x 24 volts
Battery ... . 4 x 12 volts x 286 Ah
Max breakaway current .. .. 1600 amps
Cranking current ... . 810 amps
Aids.. .. .. Block heaters
Minimum mean cranking speed . .. .120 rpm

Note: Battery capacity is defined by the 20 hour rate at 0°C.

Note: The oil specification should be for the minimum ambient temperature as the oil will not be warmed by the immersion heater.

Note: Breakaway current is dependant on battery capacity available. Cables should be capable of handling transient current which may be up to double the steady cranking current.

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Noise Data

Noise levels

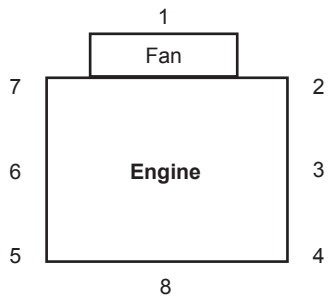
The figures for total noise levels are typical for an engine running at Standby power rating in a semi-reverberant environment and measured at a distance of one metre from the periphery of the engine.

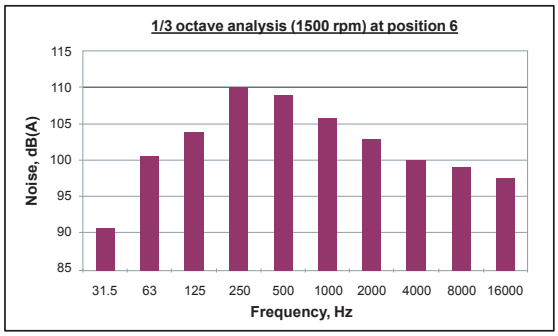
Total noise levels

Sound pressure level ... re: -20 x 10 Pa
Speed 1500 rpm ... Ambient noise level 79 dB(A)

Octave analysis

The following histogram shows an octave band analysis at the position of the maximum noise level.





Position	Noise dB(A)
1	114
2	113
3	111
4	110
5	110
6	111
7	110
8	108

Load acceptance (cold)

	Initial load acceptance when engine reaches rated speed (15 seconds maximum after engine starts to crank)				2nd load application immediately after engine has recovered to rated speed (5 seconds after initial load application)			
Engine Type	Prime power %	Load kWm nett / kWe	Transient frequency deviation %	Frequency recovery time seconds	Prime power %	Load kWm nett / kWe	Transient frequency deviation %	Frequency recovery time seconds
4012-46TAG0A	80	800	≤ 10	5	20	200	≤ 10	5

The figures shown in the table above were obtained under the following test conditions:
Engine block temperature ... 40 °C
Ambient temperature ... 25 °C
Governing mode ... Isochronous
Alternator inertia ... 50 kgm²
Under frequency roll off (UFRO) point set to ... 49.5 Hz
UFRO rate set to ... 16 V/Hz
LAM on / off ... .On

All tests were conducted using an engine installed and serviced to Perkins Engine Company Limited recommendations.

Applied load is a percentage of generator electrical output efficiency as published in the general installation section of this data sheet.

The information given on this Technical Data Sheet is for guidance only. For ratings other than those shown, please contact Perkins Engines Company Limited.

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