4006D-23TAG2A

4000 Series

667 kWm (Gross) @ 1500 rpm

An exhaust module will be supplied with this engine to ensure it complies with Emission Regulations. See Module Fitting Instructions for installation requirements.

ElectropaK

Basic technical data

Number of cylinders ... 6
Cylinder arrangement .. Vertical, Inline
Cycle ... 4 stroke, compression ignition
Induction system.. Turbocharged
Compression ratio.. 13.6:1
Bore . 160 mm
Stroke . 190 mm
Cubic capacity . 22.921 litres
Direction of rotation.. Anticlockwise viewed on flywheel
Firing order .. 1, 5, 3, 6, 2, 4
Cylinder 1. Furthest from flywheel

Weight of ElectropaK (engine only)

Dry ... 2524 kg
Wet .. 2663 kg

Overall dimensions of ElectropaK

Height .. 1964 mm
Length.. 3027 mm
Width... 1706 mm

Moments of inertia

Engine.. 4.51 kgm²
Flywheel.. 6.48 kgm²
Total engine inertia (engine and flywheel)... 10.99 kgm²

Cyclic irregularity for engine standby power

1500 rpm. .. 1.73

Ratings

Steady state speed stability at constant load ... ± 0.25%
Electrical ratings 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 maximum

Fuel data

To conform to BS2869 class A2.

Performance

Estimated sound pressure level (Tropical):
1500 rpm. .. 105 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) . Pre DOC 16.7 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

4006D-23TAG2A - Tropical

Designation	Units	50 Hz 1500 rpm	
		Baseload power	Prime power
Gross engine power	kWm	534	667
Fan power	kWm	30	
Nett engine power	kWm	504	637
BMEP Gross	kPa	1890	2330
Combustion air flow	m³/min	53	59
Exhaust gas temperature maximum after turbo	°C	510	
Exhaust gas flow (maximum)	m³/min	175	
Boost pressure ratio	-	3.4	3.9
Mechanical efficiency	%	90	
Overall thermal efficiency	%	33.4	33.3
Friction power and pumping losses	kWm	70	
Mean piston speed	m/s	9.5	
Engine coolant flow	litres/s	10	
Cooling fan airflow	m³/min	980	
Typical Genset electrical output 0.8 pf 25ºC (100 kPa)	kVA	601	750
	kWe	481	601
Assumed alternator efficiency	%	0.96	

Note: The above data is based on 42.940 MJ/kg calorific value for diesel conforming to specification BS2869 Class A2.

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.

Energy balance

Designation	Units	Baseload power	Prime power
Energy in fuel	kW	1507	1914
Energy in power output (gross)	kW	534	667
Energy to cooling fan	kW	30	
Energy in power output (nett)	kW	504	637
Energy to exhaust	kW	557	740
Energy to coolant and oil	kW	173	238
Energy to radiation	kW	76	51
Energy to charge cooler	kW	167	218

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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 temperature (standby) .. .. 98°C
Maximum static pressure head on pump.. .. .. 70 kPa
Draw down capacity. ... . 22 litres
Maximum permissible restriction to coolant pump flow . .. . 20 kPa
Thermostat operating range .. .. 71 - 85°C

Ambient cooling clearance (open ElectropaK prime power) based on air temp at fan 3°C above ambient.

Tropical

Maximum additional restriction (duct allowance) to cooling airflow and resultant minimum airflow at 1500rpm		
Ambient clearance: 50% Glycol	Duct allowance mm H_2O	Min airflow m³/sec
50°C	13	16.41

Radiator

Face area .. ..1.496 m²
Rows and materials . ... .1 row, aluminium

Material and Gills per inch

Jacket water ... ... 12 gills/in, aluminium
Charge air section. .. ..12 gills/in, aluminium

Width and height of matrix

Height .. .. 1651 mm
Width ... ... 906 mm
Weight (dry) radiator ... ... 215 kg total
Total coolant capacity.. ... ... 85 litres
Pressure cap setting ... ... 70 kPa

Coolant jacket data	Units	1500 rpm
Coolant flow	litres/s	10
Coolant exit temperature (maximum)	°C	98
Coolant entry temperature (minimum)	°C	70

Charge cooler, integral with radiator

Face area .. ..1.126 m²

Coolant pump

Speed and method of drive . ... 1.4 x e rpm, Gear

Fan

Type. .. ..Engine mounted
Speed (1500). .. .. 1170 rpm
Diameter. .. ..1.2 m
Number of blades:
Tropical... 9
Material . ... Composite
Drive ratio.. ... ... 0.78:1

Lubrication system

Recommended lubricating oil to conform with the specification of API CG4 15W/40.

Lubricating oil capacity

Sump maximum ... ... 113.4 litres
Sump minimum. ... ...90.7 litres

Lubrication oil pressure at rated speed

Minimum. .. ..240 kPa
Oil relief values open ... .300 kPa
Oil filter spacing ... . 40 microns
Sump drain plug tapping size. G1
Oil pump speed and method of drive. .. ..1.4 x e rpm, gear driven

Oil pump flow

1500 rpm... ... ... 3.7 litres/sec
Oil consumption as a percentage of full load fuel consumption less than 0.25%

Normal operating angles

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

Electrical system

Type.. . ... Insulated return
Alternator .. .. .55 amps at 28 volts, stabilised output at 20°C ambient
Starter motor . ... 7.5 kW
Number of teeth on flywheel 190
Number of teeth on starter motor.. 12
Minimum cranking speed.. ... ... 120 rpm
Pull in current of starter motor solenoid ... ... 30 amps at 24 volts
Hold in current of starter motor solenoid... .. .. 9 amps at 24 volts
Engine stop solenoid. ... ... 24 volts
Pull in current of stop solenoid.. ... ... 60 amps at 24 volts

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Fuel system

Recommended fuel to conform to . ... BS2869 1998 Class A1, A2
Type of injection system .. .. Direct injection
Fuel injector . ... Combined unit injector
Injector pressure.. ... ...
.. .. 220 ATS (NOP) 1400 bar maximum operating pressure

Delivery

1500 rpm. .. .. 630 litres/hour
Fuel delivery pump pressure.. ... .300 kPa
Fuel lift pump maximum suction head .. ..2.5 m
Fuel return maximum pressure head .. .. see manual
Fuel filter spacing.. .. .. 10 microns
Governor type .. ..Electronic

Fuel consumption gross Tropical

	g/kWh	litres/hr
Prime	228	179
Baseload	233.5	147
75% prime	221	132
50% prime	218	89

Note: Fuel consumption with radiator & fan, for fuel consumption based on electrical output of the generating set contact your OEM.

Note: Fuel consumption data is based on diesel having a specific gravity of 0.85. Fuel consumption tolerance is +5%

Induction system

Maximum air intake restriction of engine

Clean filter. ... ... 127 mm H_2O
Dirty filter... ... ... 380 mm H_2O
Air filter type .. .. Dry, paper

Exhaust system

Exhaust outlet size (internal). ... ... 2 x 152.4 mm

Exhaust back pressure for total system

Pre DOC .. .. 16.7 kPa

Note: Please see Module Fitting Instructions (provided with module) for further details.

Engine mounting

Maximum additional load applies to flywheel due to all rotating components .. ..650 kg

Position of engine centre of gravity (wet):
Forward of the rear face of the crankcase ... ... 625 mm
Above the crankshaft centre line.. ... ... 140 mm

Starting requirements

Temperature range down to 10°C (50 °F)

Oil CG4 15w/40
Starter. ... . 1 x 24 volts
Battery ... . 2 x 12 volts x 143 Ah
Maximum breakaway current. ... . 1000 amps
Maximum breakaway cranking current ... .600 amps
Aids.. .. ..Not necessary

Note: The 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 warned by the immersion heater.

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

Typical load acceptance (cold)

4006D-23TAG2A @ 1500 rpm

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)			
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
42	264 / 251	≤ -10	5	58	365 / 347	≤ -10	5

The above complies with requirements of Classification 3 & 4 of ISO 8528-12 and G2 operating limits stated in ISO 8528-5.

The above figures were obtained under test conditions as follows:

Engine block temperature ... . 45°C
Alternator efficiency 95%
Minimum ambient temperature ... . 10°C
Governing mode ... . Isochronous
Typical alternator inertia ... .20 kgm²
Under frequency roll off (UFRO) set to .. .. 1 Hz below rated frequency

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

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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Noise Data

Noise levels

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

Octave analysis

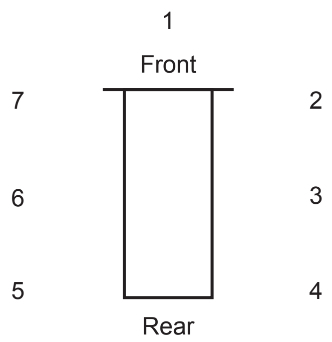
The following histograms show an octave band analysis at the position of the maximum noise level.

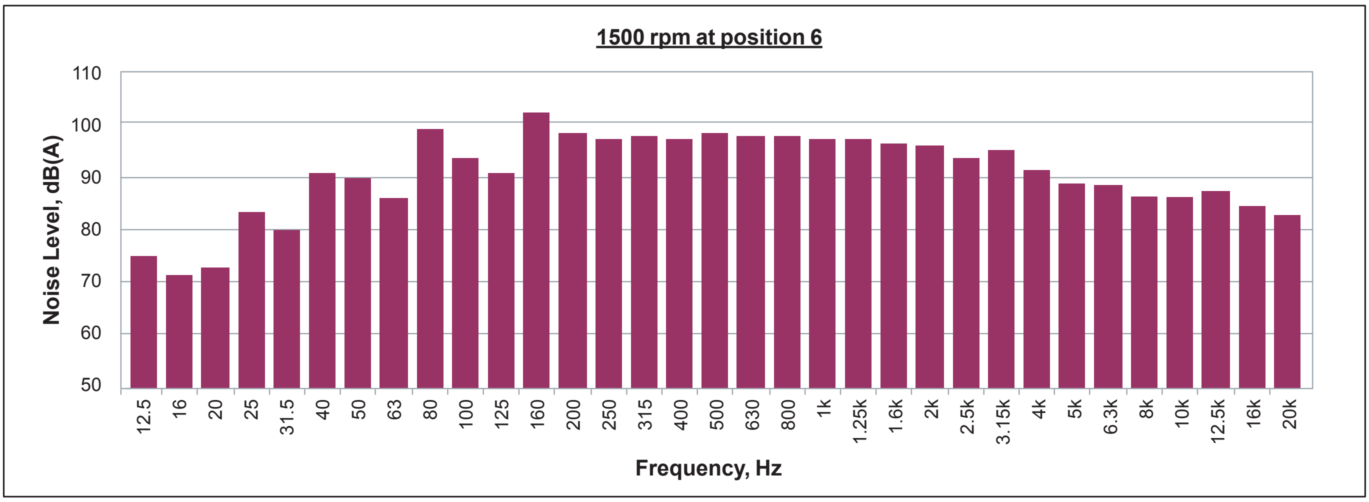
Total noise levels

Sound pressure level ... . re: -20 x 10^{-6} pa
Speed 1500 rpm ... ... Ambient noise level 63 dB(A)

1/3rd Octave analysis performed at the position of maximum noise.

Position	Noise, dB(A)
1	102.2
2	104.0
3	106.2
4	103.3
5	104.5
6	107.5
7	104.5





Note: Please contact Application team for drawing information

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