

# 4008-30TAG3

# 4000

1105 kWm Standby @ 1500 rpm

## Diesel engine - ElectropaK

Series

### Basic technical data

Number of cylinders	8
Cylinder arrangement	Inline
Cycle	4 stroke
Induction system	Turbocharged
Combustion system	Direct injection
Compression ratio	13:1 nominal
Bore	160 mm
Stroke	190 mm
Cubic capacity	30.561 litres
Direction of rotation	Anticlockwise viewed on flywheel
Firing order	1, 4, 7, 6, 8, 5, 2, 3
Cylinders	1 furthest from flywheel

### Total weight of ElectropaK

Dry	4217 kg
Wet	4473 kg

### Overall dimensions

Height	1920 mm
Length	3468 mm
Width	2194 mm

### Moments of inertia

Flywheel	9.60 kgm <sup>2</sup>
Engine	6.02 kgm <sup>2</sup>

### Cyclic irregularity, engine/flywheel maximum

4008-30TAG3 at 1500 rev/min	1.67
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### Ratings

Steady state speed stability at constant load  $\pm 0.25\%$   
Electrical ratings are based on average alternator efficiency and are for guidance only (0.8 power factor being used).

### Operating point

Engine speed	1500 rev/min
Static injection timing	14° btdc
Cooling water exit temperature	< 98°C

### Fuel data

To conform to BS2869 class A2;BS EN590

### Performance

All data based on operation to ISO 3046/1, BS5514 and DIN 6271 standard reference conditions

### Noise

Estimated sound pressure level at 1 metre 111 dB(A)

**Note:** Noise level represents highest recorded at 1500 rev/min.

### Test conditions

Air temperature	25°C
Barometric pressure	100 kPa
Relative humidity	30%
Air inlet restriction at maximum power (nominal)	2.5 kPa
Fuel temperature (inlet pump)	58°C (maximum)
Exhaust back pressure (at maximum power)	3.0 kPa

**Note:** For test conditions relevant to data on load acceptance, refer to page 4 of this document

## General installation

### 4008-30TAG3

Designation	Units	Type of operation and application		
		50 Hz @ 1500 rev/min		
		Baseload	Prime power	Standby power
Gross engine power	kWm	850	997	1105
Fan and battery charging alternator power typical (tropical)	kWm	50		
Nett engine power	kWm	800	947	1055
Brake mean effective pressure - gross	kPa	2191	2570	2848
Combustion air flow at ISO conditions	m <sup>3</sup> /min	73	84	96
Exhaust gas temperature (after turbo) - maximum	°C	460	473	482
Exhaust gas flow - maximum at atmosphere pressure	m <sup>3</sup> /min	180	203	240
Boost pressure ratio	:1	3.20	3.86	4.20
Mechanical efficiency	%	90.0	93.0	93.0
Overall thermal efficiency (nett)	%	39	39	39
Friction and pumping power losses	kWm	70		
Mean piston speed	m/s	9.5		
Engine coolant flow	l/min	630		
Typical GenSet electrical output (0.8pf)	kVA	950	1125	1250
	kWe	760	900	1000
Assumed alternator efficiency	%	95		

**Note:** All quoted gross engine powers include an allowance of 1.5% for installation variances. Not to be used for CHP design purposes (indicative figures only). Consult Perkins Engines Stafford Limited. Assumes complete combustion.

### Rating definitions

#### Baseload power

Unlimited hours usage with an average load factor of 100% of the published baseload power rating. 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 hour 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 4008-30TAG3 ratings are optimised for the best fuel consumption and do not comply to Harmonised International Regulation Emission Limits. More information may be obtained by contacting the Applications Department at Perkins Engine Company Limited

## Energy balance

### 4008-30TAG3

Designation	Units	Baseload	Prime power	Standby power
Energy in fuel	kWt	2030	2418	2736
Energy in power output (gross)	kWb	850	997	1105
Energy to cooling fan (typical)	kWm	50		
Energy in power output (nett)	kWm	800	947	1055
Energy to exhaust	kWt	660	785	896
Energy to coolant and oil	kWt	270	300	331
Energy to radiation	kWt	50	58	74
Energy to charge cooler	kWt	200	278	330

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

## Cooling system

Recommended coolant: 50% inhibited ethylene glycol or 50% inhibited propylene glycol and 50% clean fresh water. For CHP systems and where there is no likelihood of ambient temperature below 10°C, then clean soft water may be used, treated with 1% by volume of Perkins inhibitor in the cooling system. The inhibitor is available in 1 litre bottles from Perkins, part number 21825 735.

Maximum pressure in crankcase water jacket . . . . . 170 kPa  
 Maximum top tank temperature (standby) . . . . . 98°C  
 Maximum static pressure on pump . . . . . 70 kPa

### Total coolant capacity

Electrounit (engine only) . . . . . 48 litres  
 ElectropaK - Tropical (engine/radiator) . . . . . 140 litres  
 Maximum permissible restriction to coolant pump flow . . . . . 20 kPa  
 Thermostat operating range . . . . . 84-93°C  
 Ambient cooling clearance (standby power) based on air temperature at fan of 5°C above the ambient . . . . . 50°C  
 Temperature rise across the engine (standby power) with inhibited coolant @ 1500 rev/min . . . . . 8-12°C (depending on rating)

### Radiator - side by side vertical type

Radiator face area . . . . . 2.6 m<sup>2</sup>  
 Material . . . . . aluminium  
 Width of matrix (total both cores) . . . . . 1936 mm  
 Height of matrix . . . . . 1347 mm  
 Weight of radiator . . . . . 940 kg  
 Pressure cap setting (minimum) . . . . . 70 kPa  
 Overall dimensions (approximate)  
     Height . . . . . 1810 mm  
     Width . . . . . 2194 mm

### Water jacket cooling data 1500 rpm

Coolant flow . . . . . 630 l/min  
 Coolant exit temperature (maximum) . . . . . 98°C  
 Coolant inlet temperature (minimum) . . . . . 70°C  
 Coolant inlet temperature (maximum) . . . . . 86°C

### Coolant pump -1 off

Speed . . . . . 1.4 x rev/min  
 Method of drive . . . . . Engine driven

### Fan 4008-30TAG3

Power . . . . . 50 kWm  
 Fan . . . . . Truflo  
 Type . . . . . Axial flow  
 Diameter . . . . . 1250 mm  
 Number of blades . . . . . 9  
 Material . . . . . Hybrid  
 Drive ratio . . . . . 0.94\*engine

### Duct allowance

Maximum additional restriction to cooling airflow and resultant minimum airflow (standby power application)		
Ambient clearance 50% Glycol	Duct allowance (Pa)	Minimum airflow m <sup>2</sup> /sec m <sup>2</sup> /sec
50°	25	18.4
	12.5	19
	0	19.6

## Lubrication system

### Recommended SAE viscosity:

Multigrade oil conforming to the following must be used API CG 15W/40

**Note:** For additional notes on lubricating oil specifications, refer to the OMM manual

### Total system capacity:

Maximum sump capacity . . . . . 153 litres  
 Minimum sump capacity . . . . . 127 litres  
 Oil temperature at normal operating conditions . . . . . 95°C  
 Oil temperature (in rail) - Maximum continuous operation . . . . . 105°C

### Lubrication oil pressure

At rated speed . . . . . 340 kPa  
 Minimum . . . . . 240 kPa  
 Oil filter screen spacing . . . . . 40 microns  
 Sump drain plug tapping size . . . . . G1  
 Oil pump speed and drive method . . . . . 1.4 x rev/min engine driven gear  
 Shutdown switch - pressure setting (where fitted) . . . . . 193 (falling) kPa

## Oil consumption prime power

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Oil consumption prime power	Units	1500 rev/min
After running in <sup>(1)</sup>	g/kWhr	0.4
Oil flow rate from pump	litres/sec	3.7

1. Typically after 250 hours

## Fuel system

**Note:** Recommended fuel to conform to BS2869 1998 class A1, A2 or BS EN590

Injection system . . . . . Direct injection

### Fuel injection pump

Injector type . . . . . Unit injector  
 Injector pressure . . . . . 23.4 MPa  
 Lift pump type . . . . . Gerotor  
 Fuel delivery . . . . . 660 litres/hour  
 Heat retained in fuel to tank . . . . . 4.5 kWt  
 Fuel inlet temperature . . . . . < 58°C  
 Delivery pressure . . . . . 300 kPa  
 Maximum suction head at pump inlet . . . . . 2.5 metres  
 Maximum static pressure head . . . . . See manual  
 Fuel filter spacing . . . . . 10 microns  
 Governor type . . . . . Electronic  
 Governing . . . . . To ISO 8528-5 2005  
 Torque at the governor output shaft . . . . . 1 kgm  
 Tolerance on fuel consumption . . . . . To ISO 8528-1 1993

## Fuel consumption

4008-30TAG3 @ 1500 rpm		
Designation	g/kWh	litres/hr
Standby	210	269
Prime power	206	244
Baseload power	202	200
At 75% of prime power	202	188
At 50% of prime power	204	120

**Note:** All based on assumed density of 0.862

## Induction system

Maximum air intake restriction of engine	1500 rpm
Clean filter	1.3 kPa
Dirty filter	5.0 kPa
Air filter type	Paper element

## Exhaust system

Exhaust outlet size (internal)	2 x 152.4 mm
Exhaust outlet flange size	BS10 table D
Back pressure for total system 1500 rpm at standby power	7.0 kPa

## Electrical system

Alternator type	Insulated return
Alternator voltage	24 volts
Alternator output	55 amps
Starter type	Electric
Starter motor voltage	24 volts
Starter motor power	8.2 kW
Number of teeth on flywheel	190
Number of teeth on starter pinion	12
Minimum cranking speed (0°C)	120 rev/min
Starter solenoid pull-in current @ -25°C maximum	30 amps
Starter solenoid hold-in current @ -25°C maximum	9 amps
Stop solenoid hold-in current	1.1 amps
Engine stop solenoid voltage	24 volts

## Cold start recommendations

### Temperature range down to 0°C (32 °F)

Oil	API CG 15W/40 SAE grade
Starter	1 x 24 volts
Battery	2 x 12 volts x 178 Ah
Maximum breakaway current	1400 amps
Cranking current	750 amps
Minimum mean cranking speed	120 rev/min

#### Notes:

- battery capacity is defined by the 20 hour rate
- the oil specification should be for the minimum ambient temperature as the oil will not be warmed by the immersion heater
- breakaway current is dependent on the battery capacity available. Cable should be capable of handling transient currents which may be up to double the steady state cranking current

## Engine mounting

Maximum static bending moment at rear face of block	1356 Nm
Maximum additional load applied to flywheel due to all rotating components	650 kg

## Centre of gravity (bare engine - wet)

Forward of rear face of cylinder block	900 mm
Above crankshaft centre line	140 mm

## Load acceptance cold

Initial load acceptance when engine reaches rated speed

15 seconds maximum after engine starts to crank	Units	
Prime power	%	52
Nett load	kWm	495
	kWe	470
Transient frequency deviation	%	≤ 10
Frequency recovery time	sec	5

Second load application immediately after engine has recovered to rated speed

5 seconds after initial load application	Units	
Prime power	%	48
Nett load	kWm	947
	kWe	900
Transient frequency deviation	%	≤ 10
Frequency recovery time	sec	5

## Test conditions

The figure shown in the tables above were obtained under the following test conditions		
	Units	
Engine block temperature (cold)	°C	45
Ambient temperature	°C	25
Governing mode	Isochronous	
Alternator inertia (typical)	kgm <sup>2</sup>	50
Under frequency roll off (UFRO) point set to 1500 rpm	Hz	49
UFRO rate set to (approximately)	V/Hz	16
LAM on/off		On

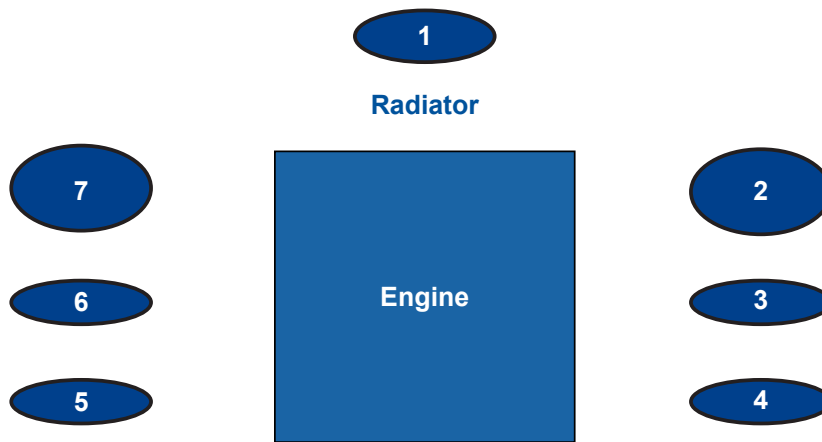
#### Notes:

- 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 efficiencies as published in the general installation section of this data sheet
- the information given on this technical data sheet is for standard ratings only
- for ratings other than those shown, contact Perkins Engines Limited Stafford
- the information given in this document is for guidance only

## Noise data

Noise measured in semi reverberant environment and measured at a distance of one metre from the periphery of the engine

Ambient Noise ... 77 dBa



1500 rpm	
Noise measured at points 1 - 7 at standby power	SPL
Position	dBA
1	110.0
2	111.0
3	110.0
4	112.8
5	113.0
6	113.5
7	113.0

Frequency analysis at point 6 standby power	
Frequency (Hz)	dB
31.5	92.7
63	92.3
125	102.7
250	110.6
500	101.7
1K	104.0
2K	99.5
4K	110.0
8K	105.8
16k	92.3