

4008-30TAG1

4000

842 kW @ 1500 rpm

Diesel engine - ElectropaK 1/2 TA-Luft

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
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	1919 mm
Length	3468 mm
Width	2194 mm

Moments of inertia (mk²)

Flywheel	9.60 kgm ²
Engine	6.02 kgm ²

Cyclic irregularity, engine/flywheel maximum

4008-30TAG1 at 1500 rpm	1.67
-------------------------	------

Ratings

Steady state speed stability at constant speed... ± 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	10° 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 ... 109 dB(A)

Note: Noise level represents highest recorded at 1500 rpm

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 (nominal)	3.0 kPa

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

General installation

4008-30TAG1

Designation	Units	Type of operation and application		
		50 Hz @ 1500 rpm		
		Baseload power	Prime power	Standby power
Gross engine power	kWm	682	808	892
Fan and battery charging alternator power typical (tropical)	kWm	50		
Nett engine power	kWm	632	758	842
Brake mean effective pressure - gross	kPa	1758	2083	2300
Combustion air flow at ISO conditions	m ³ /min	59	69.5	77
Exhaust gas temperature (after turbo) - maximum	°C	450	465	470
Exhaust gas flow - maximum at atmosphere pressure	m ³ /min	130	160	185
Boost pressure ratio	:1	2.6	3	3.4
Mechanical efficiency	%	92.0	92.0	92.0
Overall thermal efficiency (nett)	%	34	38	38
Friction and pumping power losses	kWm	70		
Mean piston speed	m/s	9.5		
Engine coolant flow	l/min	630		
Typical Generator set electrical output (0.8pf)	kVA	750	900	1000
	kWe	600	720	800
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 4008-30TAG1 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 Engines Company Limited.

Energy balance

4008-30TAG1

Designation	Units	Baseload power	Prime power	Standby power
Energy in fuel	kWt	1837	2119	2382
Energy in power output (gross)	kWb	682	808	892
Energy to cooling fan (typical)	kWm	50		
Energy in power output (nett)	kWm	632	758	842
Energy to exhaust	kWt	660	720	850
Energy to coolant and oil	kWt	260	285	310
Energy to radiation	kWt	50	55	60
Energy to charge cooler	kWt	185	251	270

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 power) 98°C
 Maximum static pressure on pump 70 kPa

Total coolant capacity

Electrounit (engine only) 48 litres
 ElectropaK - Temperate (engine/radiator) typical 140 litres
 ElectropaK - Tropical (engine/radiator) typical 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 rpm 8-12°C (depending on rating)
 Coolant Immersion heater capacity 4 kW

Radiator - side by side vertical type

Radiator face area 2.6 m²
 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 litres/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 rpm
 Method of drive Engine driven

Fan 4008-30TAG1

Power 50 kW
 Fan Trufflo
 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 ³ /sec
50°C	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 rpm engine driven gear
 Shutdown switch - pressure setting (where fitted) 193 (falling) kPa

Oil consumption prime power

4008-30TAG1

Oil consumption prime power	Units	1500 rpm
After running in ⁽¹⁾	g/kWhr	0.4
Oil flow rate from pump	litres/sec	3.7

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 to be less than 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

4008-30TAG1 @ 1500 rpm		
Designation	g/kWh	litres/hour
Standby power	226	233
Prime power	225	212
Baseload power	225	154
At 75% of prime power	225	144
At 50% of prime power	230	109

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	5.5 kPa
Air filter type	Paper element

Exhaust system

Exhaust outlet size (internal)	1 x 270 mm
Exhaust outlet flange size	BS10 table D
Back pressure for total system 1500 rpm at standby power	7.7 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 rpm
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

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 rpm

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	%	65
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	%	35
Nett load	kWm	758
	kWe	720
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 ²	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

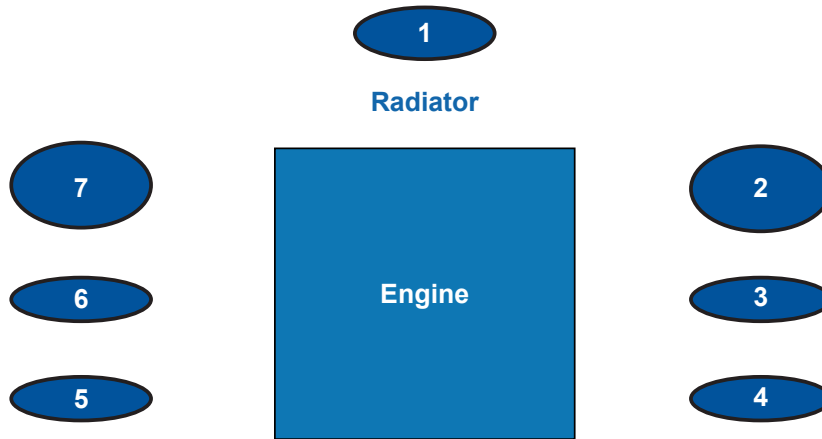
Notes:

- all tests were conducted using an engine installed and serviced to Perkins Engines 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 67 dBa



1500 rpm	
Noise measured at points 1 - 7 at standby power	SPL
Position	dBA
1	110
2	110
3	110
4	110
5	109
6	110
7	109

Frequency analysis at point 6 standby power	
Frequency (Hz)	dB
31.5	92.4
63	91.3
125	99.5
250	99.0
500	101.0
1000	103.0
2000	99.0
4000	97.0
8000	100.0
16000	89.0