4008-30TAG2

947 kW @ 1500 rpm

Diesel engine - ElectropaK 1/2 TA-Luft

4000 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 kgm²
Engine ... 6.02 kgm²

Cyclic irregularity, engine/flywheel maximum

4008-30TAG2 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 ... 110 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

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General installation

4008-30TAG2

Designation	Units	Type of operation and application		
		50 Hz @ 1500 rpm		
		Baseload power	Prime power	Standby power
Gross engine power	kWm	724	892	997
Fan and battery charging alternator power typical (tropical)	kWm	50		
Nett engine power	kWm	674	842	947
Brake mean effective pressure - gross	kPa	1867	2300	2570
Combustion air flow at ISO conditions	m^3/min	62.5	77	84
Exhaust gas temperature (after turbo) - maximum	°C	460	470	480
Exhaust gas flow - maximum at atmosphere pressure	m^3/min	145	185	203
Boost pressure ratio	:1	2.7	3.4	3.86
Mechanical efficiency	%	92		
Overall thermal efficiency (nett)	%	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	800	1000	1125
	kWe	640	800	900
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 4008-30TAG2 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

4008-30TAG2

Designation	Units	Baseload power	Prime power	Standby power
Energy in fuel	kWt	1950	2382	2660
Energy in power output (gross)	kWb	724	892	997
Energy to cooling fan (typical)	kWm	50		
Energy in power output (nett)	kWm	674	842	947
Energy to exhaust	kWt	670	850	980
Energy to coolant and oil	kWt	280	310	330
Energy to radiation	kWt	55	60	60
Energy to charge cooler	kWt	221	270	293

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

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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 4kWe

Radiator - side by side vertical type

Radiator face area .. .. .2.6 m^2
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 4008-30TAG2

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^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.. ... . 95ºC
Oil temperature (in rail) - Maximum continuous operation 105ºC

Lubricating 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

4008-30TAG2

Oil consumption prime power	Units	1500 rpm
After running in [1]	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 to be less than 58ºC
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

4008-30TAG2 @ 1500 rpm		
Designation	**g/kWh**	**litres/hour**
Standby power	206	239
Prime power	206	214
Baseload power	202	170
At 75% of prime power	202	157
At 50% of prime power	210	110

Note: All based on assumed density of 0.862

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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) .. 1 x 270 mm
Exhaust outlet flange size .. BS10 table D
Back pressure for total system 1500 rpm at standby power .. 7.5 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 (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 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	%	58
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	%	42
Nett load	kWm	842
	kWe	800
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

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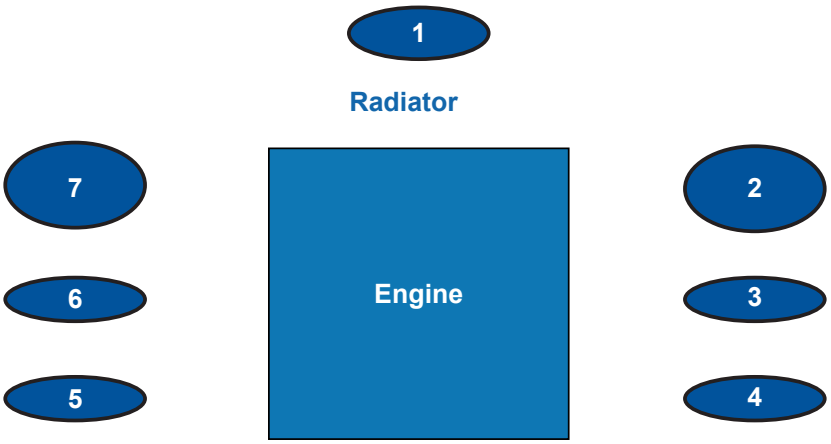
Noise data

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	110.0
2	110.0
3	110.0
4	111.0
5	110.0
6	112.5
7	111.5

Frequency analysis at point 6 standby power	
Frequency (Hz)	dB
31.5	92.9
63	92.0
125	99.6
250	107.0
500	101.0
1000	103.0
2000	101.0
4000	105.0
8000	104.0
16000	92.3

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