

4008 TAG

60 Hz 1800 rev/min

4008 TAG1

60 Hz 1800 rev/min

4008 TAG2

60 Hz 1800 rev/min

4000

Series

Diesel Engine - Electropak

Basic technical data

Number of cylinders	8
Cylinder arrangement	Inline
Cycle	4 stroke, compression ignition
Induction system	Turbocharged
Compression ratio	13.6:1 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

Weight of Electrounit

Engines only

4008TAG (dry)	3120 kg
4008TAG1/TAG2 (dry)	3250 kg
4008TAG (wet)	3310 kg
4008TAG1/TAG2 (wet)	3428 kg

Overall dimensions

Height	1760 mm
Length	2879 mm
Width	1571 mm

Moments of inertia

Engine	9.60 kgm ²
Flywheel	6.02 kgm ²

Cyclic irregularity, engine/flywheel prime power

4008TAG	1.314
4008TAG1	1.300
4008TAG2	1.278

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	1800 rev/min
Static injection timing	See engine number plate
Cooling water exit temperature	< 98°C

Fuel data

To conform to BS2869 class A1, A2.

Performance

Estimated sound pressure level 110 dB(A)

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

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)	3.0 kPa

Note: For load acceptance figures, please contact the Applications Department.

General installation

4008TAG

Designation	Units	60 Hz 1800 rev/min		
		Continuous baseload	Prime power	Standby power
Gross engine power	kWb	594	742	814
Fan power	kWm	30		
Nett engine power	kWm	564	712	784
Gross BMEP	kPa	1270	1600	1750
Combustion air flow	m ³ /min	53	62	68
Exhaust gas temperature after turbo	°C	498.0		
Exhaust gas flow maximum (after turbo)	m ³ /min	182.7		
Boost pressure ratio	-	2.20	2.65	2.80
Mechanical efficiency	%	89		
Overall thermal efficiency	%	41	40	40
Friction power and pumping losses	kWm	96.0		
Mean piston speed	m/s	11.4		
Engine coolant flow (minimum)	litres/s	10.6		

4008TAG1

Designation	Units	60 Hz 1800 rev/min		
		Continuous baseload	Prime power	Standby power
Gross engine power	kWb	666	819	899
Fan power	kWm	56		
Nett engine power	kWm	610	763	843
Gross BMEP	kPa	1452	1786	1928
Combustion air flow	m ³ /min	59	72	74
Exhaust gas temperature (after turbo)	°C	420	460	490
Exhaust gas flow maximum (after turbo)	m ³ /min	207		
Boost pressure ratio	-	2.80	3.00	3.15
Mechanical efficiency	%	88	90	90
Overall thermal efficiency (nett)	%	38	37	37
Friction power and pumping losses	kWm	96.0		
Mean piston speed	m/s	11.4		
Engine coolant flow (minimum)	litres/s	10.6		

4008TAG2

Designation	Units	60 Hz 1800 rev/min		
		Continuous baseload	Prime power	Standby power
Gross engine power	kWb	743	898	1004
Fan power	kWm	56		
Nett engine power	kWm	687	842	948
Gross BMEP	kPa	1530	1928	2162
Combustion air flow	m ³ /min	59	72	77
Exhaust gas temperature (after turbo)	°C	440	490	520
Exhaust gas flow maximum (after turbo)	m ³ /min	207		
Boost pressure ratio	-	2.80	3.15	3.40
Mechanical efficiency	%	88.0	90.0	91.0
Overall thermal efficiency (nett)	%	38.0	37.0	37.0
Friction power and pumping losses	kWm	96.0		
Mean piston speed	m/s	11.4		
Engine coolant flow (minimum)	litres/s	10.6		

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

Continuous baseload rating: Power available for continuous full load operation.

Prime power rating: is available for unlimited hours per year with a variable load of which the average engine load factor is 80% of the published power rating, incorporation of a 10% overload for 1 hour in every 12 hours of operation which is permitted.

Standby power rating: is for the supply of emergency power at variable load for the duration of the non-availability of the mains power supply. **NO OVERLOAD** capacity is available at this rating. Engines must not be allowed to have facilities for parallel operation with the mains supply. This rating should be applied only when reliable mains power is available. Should this not be the case then refer to prime power rating. A standby rated engine should be sized for an average load factor of 80% based on published standby rating for 500 operating hours per year. Standby ratings should never be applied except in true emergency power failure conditions.

Energy balance

4008TAG

Designation	Unit	Continuous baseload	Prime power	Standby power
Energy in fuel	kWt	1439	1858	2053
Energy in power output (gross)	kWb	594	742	814
Energy to cooling fan	kWm	30		
Energy in power output (nett)	kWm	564	712	784
Energy to exhaust	kWt	455	619	678
Energy to coolant and oil	kWt	235	277	307
Energy to radiation	kWt	40	60	76
Energy to charge coolers	kWt	115	160	178

4008TAG1

Designation	Unit	Continuous baseload	Prime power	Standby power
Energy in fuel	kWt	1616	2067	2260
Energy in power output (gross)	kWb	665	819	899
Energy to cooling fan	kWm	56		
Energy in power output (nett)	kWm	609	763	843
Energy to exhaust	kWt	511	662	727
Energy to coolant and oil	kWt	237	307	337
Energy to radiation	kWt	54	86	87
Energy to charge coolers	kWt	149	193	210

4008TAG2

Designation	Unit	Continuous baseload	Prime power	Standby power
Energy in fuel	kWt	1738	2260	2584
Energy in power output (gross)	kWb	715	898	1004
Energy to cooling fan	kWm	56		
Energy in power output (nett)	kWm	659	842	948
Energy to exhaust	kWt	550	727	830
Energy to coolant and oil	kWt	255	337	375
Energy to radiation	kWt	59	86	110
Energy to charge coolers	kWt	160	212	265

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

Cooling system

Recommended coolant: 50% inhibited ethylene glycol or 50% inhibited propylene glycol and 50% clean fresh water. For combined heat and power 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.

Nominal jacket water pressure in crankcase 1.7 bar

The following is a guide based on ambient air conditions of 52°C on a Perkins supplied radiator.

Total coolant capacity

Electronit..... 48 litres
ElectropaK (engine/radiator)..... 162 litres
Pressure cap setting0.69 bar
Fan Incorporated in radiator

Diameter

4008TAG 1016 mm (pusher)
4008TAG1/2 1219 mm (pusher)

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

Maximum additional restriction (duct allowance) to cooling airflow (prime power applications) and resultant minimum airflow			
	Ambient clearance 50% glycol	Duct allowance mm H ₂ O	Minimum airflow m ³ /sec
4008TAG	52°C	15	989
4008TAG1	52°C	30	1188
4008TAG2	52°C	13	1290

Coolant pump speed 1.4 x e rpm
Method of drive Gear driven
Maximum static pressure head on pump above engine crank centre line 7 m
Maximum external permissible restriction to coolant pump flow 20 kPa
Thermostat operating range 71-85°C
Shutdown switch setting 101°C rising
Coolant immersion heater capacity 4 kW x 1

Jacket cooling water data	Units	
Coolant flow 4008TAG	litres/s	10.6
Coolant flow 4008TAG1/2	litres/s	12.0
Coolant exit temperature (maximum)	°C	93.0
Coolant entry temperature (minimum)	°C	70.0
Coolant entry temperature (maximum)	°C	86.0

Lubrication system

Recommended lubricating oil to conform with the specification of APICD or MIL - L - 2104C.

Lubricating oil capacity:

Maximum sump capacity 213 litres
Minimum sump capacity 157 litres
Oil temperature at normal operating conditions..... 95 °C
Oil temperature (in rail) - Maximum continuous operations 105 °C

Lubrication oil pressure

At rated speed 400 kPa
Minimum @ 80 °C 340 kPa
Oil filter screen spacing 40 microns
Sump drain plug tapping size G1
Oil pump speed and drive method. 1.4 x e rpm engine driven
Shutdown switch - pressure setting..... 193 kPa (falling)

Oil consumption prime power

4008TAG, TAG1 and TAG2

Oil consumption prime power	Units	1800rev/min
After running-in ¹	g/kWhr	0.52
Oil flow rate from pump	litres/sec	6.7

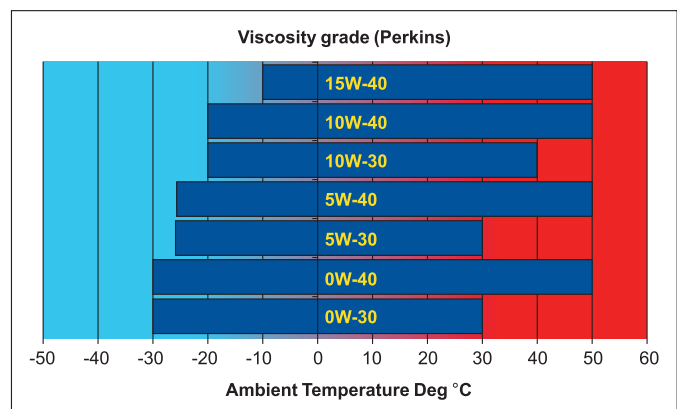
1. Typical after 250 hours

Normal operating angles

Front and rear 5°
Side tilt 10°

Recommended SAE viscosity

Multigrade oil conforming to API CG 15W/40 CH4 must be used.



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

Fuel system

Recommended fuel to conform to: BS2869 1998 Class A1, A2
Type of injection system..... Direct injection
Fuel injection pump..... Combined unit injector
Fuel injector Combined unit injector
Fuel injector opening pressure..... 234 bar
Fuel lift pump Tuthill TCH 1-054
Delivery/hour at 1500 rpm..... 810 litres
Heat retained in fuel to tank 4008TAG..... 4.0 kW
Heat retained in fuel to tank 4008TAG1/2. 4.5 kW
Temperature of fuel at lift pump to be less than 58°C
Fuel lift pump pressure. 3 bar
Fuel lift pump maximum suction head..... 2.5 m
Fuel lift pump maximum pressure head see Installation Manual
Fuel filter spacing..... 10 microns
Governor type Electronic
Torque at the governor output shaft..... 0.917 kgm
Static injection timing See engine number plate
Tolerance on fuel consumption +5%

Fuel consumption gross

4008TAG

Designation	g/kWh	litres/hr
At standby maximum power rating	213	204
At prime power rating	212	185
At continuous baseload rating	205	143
At 75% of prime power rating	203	133
At 50% of prime power rating	210	92
At 25% of prime power rating	220	48

4008TAG1

Designation	g/kWh	litres/hr
At standby maximum power rating	217	224
At prime power rating	213	201
At continuous baseload rating	206	156
At 75% of prime power rating	206	145
At 50% of prime power rating	205	97

4008TAG2

Designation	g/kWh	litres/hr
At standby maximum power rating	217	250
At prime power rating	213	224
At continuous baseload rating	206	173
At 75% of prime power rating	206	162
At 50% of prime power rating	205	108

Induction system

Emissions data with combustion air temperature of 25 °C at continuous base load.

Maximum air intake restriction of engine

Clean filter..... 127 mm H₂O
 Dirty filter..... 380 mm H₂O
 Air filter type..... 5001-00-00 MF&T

Exhaust system

Maximum back pressure for total system

Designation	Unit	1800 rev/min
4008TAG/TAG1	mmH ₂ O	1091
4008TAG2	mmH ₂ O	683

Exhaust outlet flange size 2 x 152 mm (table 'D')

For recommended pipe sizes see the Installation Manual.

Electrical system

Type..... Insulated return
 Alternator 24 volts with integral regulator
 Alternator output 40 amps,
 at a stable output 28 volts, at 20°C ambient
 Starter motor..... 24 volts
 Starter motor power 8.2 kW
 Number of teeth on flywheel 190
 Number of teeth on starter motor 12
 Minimum cranking speed (0°C)..... 120 rev/min
 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
 Hold-in current of stop solenoid..... 1.1 amps at 24 volts

Engine mounting

Position of centre of gravity (wet engine) forward from
 rear face of crankcase..... 900 mm
 Engine vertical centre line above crankshaft centre line 140 mm
 Maximum additional load applied to flywheel due to all
 rotating components 650 Kg

Starting requirements

Temperature range down to 0°C (32 °F)

Oil SAE 30
 Starter..... 1 x 24 volts
 Battery 2 x 12 volts x 178 Ah
 Maximum breakaway current..... 1400 amps
 Cranking current..... 750 amps
 Aids..... Not necessary
 Starter cable size 70 mm²
 Maximum length 6 m

Notes:

- battery capacity is defined by the 20 hour rate at 0 °C.
- the oil specification should be for the minimum ambient temperature as the oil will not be warmed by the immersion heater.
- 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

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: -20×10^{-6} pa
 Ambient noise level 4008TAG..... 79 dB(A)
 Ambient noise level 4008TAG1/TAG2..... 79 dB(A)
 Octave analysis carried out at the position of maximum noise.

4008TAG, 4008TAG1, 4008TAG2

Position 1		
1800 rev/min	108 dB(A)	4008TAG
	104 dB(A)	4008TAG1
	105 dB(A)	4008TAG2

Position 7		
1800 rev/min	109 dB(A)	4008TAG
	106 dB(A)	4008TAG1
	107 dB(A)	4008TAG2

Position 2		
1800 rev/min	109 dB(A)	4008TAG
	107 dB(A)	4008TAG1
	108 dB(A)	4008TAG2

Position 7		
1800 rev/min	111 dB(A)	4008TAG
	109 dB(A)	4008TAG1
	110 dB(A)	4008TAG2

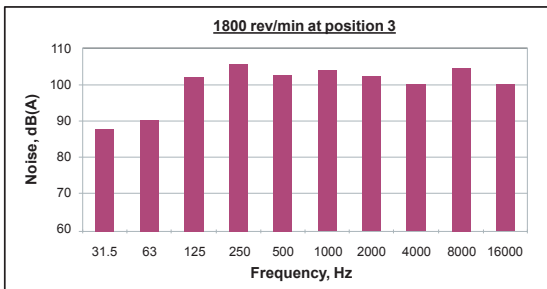
Position 3		
1800 rev/min	111 dB(A)	4008TAG
	111 dB(A)	4008TAG1
	111 dB(A)	4008TAG2

Position 5		
1800 rev/min	111 dB(A)	4008TAG
	108 dB(A)	4008TAG1
	109 dB(A)	4008TAG2

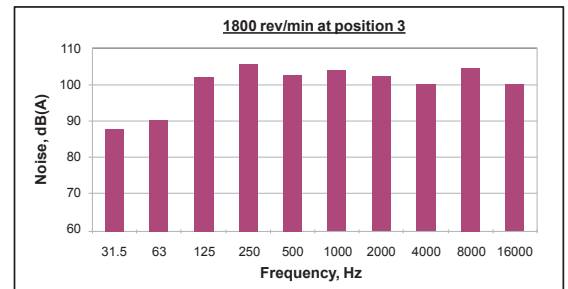
Position 4		
1800 rev/min	110 dB(A)	4008TAG
	108 dB(A)	4008TAG1
	109 dB(A)	4008TAG2



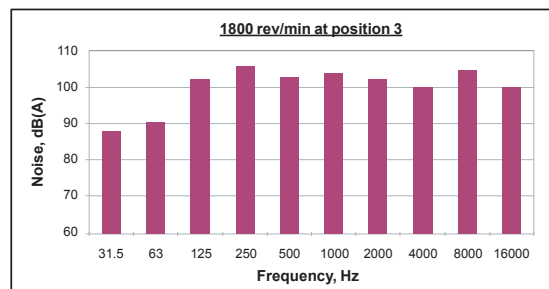
4008TAG



4008TAG1



4008TAG2



Note: The information given on Technical Data Sheets are for standard ratings only. For ratings other than shown, please contact Perkins Engines Company Limited.