

Technical Data

4000 Series

Diesel Engine - Electrounit

4008TAG
4008TAG1
4008TAG2

Basic technical data

Number of cylinders 8
 Cylinder arrangement In line
 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 Anti-clockwise viewed on flywheel
 Firing order 1,4,7,6,8,5,2,3
 Cylinders 1 furthest from flywheel
 Total weight Electrounit (engine only) 4008TAG (dry) 3120 kg
 4008TAG1/2 (dry) 3250 kg
 4008TAG (wet) 3310 kg
 4008TAG1/2 (wet) 3428 kg
 Overall dimensions Height 1760 mm
 Length 2879 mm
 Width 1571 mm
 Moment of inertia Engine 9.60 kgm²
 Flywheel 6.02 kgm²
 Cyclic irregularity for engine/flywheel (Prime power):
 1500 rev/min...1.204 1800 rev/min....1.314 4008TAG
 1500 rev/min...1.195 1800 rev/min....1.300 4008TAG1
 1500 rev/min...1.180 1800 rev/min....1.278 4008TAG2

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 1500/1800 rev/min
 Static injection timing.. See engine number plate
 Cooling water exit temp.. <93 °C

Fuel data

To conform to BS2869 class A1, A2.

Performance

Sound pressure level 1500 rev/min 103/110 dBA
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
 For load acceptance figures please refer to Applications Dept

General installation 4008TAG

Designation	Units	50Hz 1500 rev/min			60Hz 1800 rev/min		
		Continuous Baseload	Prime Power	Standby Maximum	Continuous Baseload	Prime Power	Standby Maximum
Gross engine power	kWb	595	744	816	594	742	814
Fan power	kWm	29			30		
Net engine power	kWm	566	715	787	564	712	784
BMEP gross	bar	15.4	19.2	21.1	12.7	16.0	17.5
Combustion air flow	m ³ /min	49	56	64	53	62	68
Exhaust gas temperature max (after turbo)	°C	497			498		
Exhaust gas flow max (after turbo)	m ³ /min	166			182.7		
Boost pressure ratio	-	2.20	2.74	3.00	2.20	2.65	2.80
Mechanical efficiency	%	88	90	91	89	89	89
Overall thermal efficiency	%	43	42	41	41	40	40
Friction power and pumping losses	kWm	80			96		
Mean piston speed	m/s	9.5			11.4		
Engine coolant flow (min)	l/s	10			10.6		
Typical Genset Electrical Output 0.8pf 25 °C (100kPa)	kVA	672	849	935	670	846	931
	kWe	538	679	748	536	676	745
Assumed alternator efficiency	%	95			95		

General installation 4008TAG1

Designation	Units	50Hz 1500 rev/min			60Hz 1800 rev/min		
		Continuous Baseload	Prime Power	Standby Maximum	Continuous Baseload	Prime Power	Standby Maximum
Gross engine power	kWb	640	800	877	640	800	877
Fan power	kWm	38			56		
Net engine power	kWm	602	762	839	584	744	821
BMEP gross	bar	16.5	20.6	22.6	13.7	17.2	18.9
Combustion air flow	m ³ /min	51	64	69	55	66	70
Exhaust gas temperature max (after turbo)	°C	466			460		
Exhaust gas flow max (after turbo)	m ³ /min	171.8			172.9		
Boost pressure ratio	-	2.85	3.30	3.50	2.50	2.90	3.10
Mechanical efficiency	%	88	91	92	87	89	90
Overall thermal efficiency	%	42	41	40	41	40	40
Friction power and pumping losses	kWm	80			96		
Mean piston speed	m/s	9.5			11.4		
Engine coolant flow (min)	l/s	10			12		
Typical Genset Electrical Output 0.8pf 25 °C (100kPa)	kVA	715	905	996	694	884	975
	kWe	572	724	797	555	707	780
Assumed alternator efficiency	%	95			95		

General installation 4008TAG2

Designation	Units	50Hz 1500 rev/min			60Hz 1800 rev/min		
		Continuous Baseload	Prime Power	Standby Maximum	Continuous Baseload	Prime Power	Standby Maximum
Gross engine power	kWb	719	899	985	715	894	980
Fan power	kWm	38			56		
Net engine power	kWm	681	861	947	659	838	924
BMEP gross	bar	18.5	23.2	25.4	15.3	19.2	21.1
Combustion air flow	m ³ /min	57	69	75	59	72	75
Exhaust gas temperature max (after turbo)	°C	500			505		
Exhaust gas flow max (after turbo)	m ³ /min	201			202		
Boost pressure ratio	-	3.00	3.60	3.75	2.80	3.15	3.40
Mechanical efficiency	%	90	92	92	88	90	91
Overall thermal efficiency	%	41	41	40	41	40	39
Friction power and pumping losses	kWm	80			96		
Mean piston speed	m/s	9.5			11.4		
Engine coolant flow (min)	l/s	10			12		
Typical Genset Electrical Output 0.8pf 25 °C (100kPa)	kVA	809	1022	1125	783	995	1097
	kWe	647	818	900	626	796	878
Assumed alternator efficiency	%	95			95		

Note: Not to be used for CHP design purposes. (Indicative figures only). Consult Perkins Engines Co. Ltd. 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 prime 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

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

4008TAG

	Units	1500 rev/min			1800 rev/min		
		Continuous Baseload	Prime Power	Standby Maximum	Continuous Baseload	Prime Power	Standby Maximum
Energy in fuel	kWt	1399	1776	1997	1439	1858	2053
Energy in power output (Gross)	kWb	595	744	816	594	742	814
Energy to cooling fan	kWm	29	29	29	30	30	30
Energy in power output (Net)	kWm	566	715	787	564	712	784
Energy to exhaust	kWt	421	563	633	455	619	678
Energy to coolant and oil	kWt	218	247	300	235	277	307
Energy to radiation	kWt	50	61	68	40	60	76
Energy to charge coolers	kWt	115	161	180	115	160	178

4008TAG1

	Units	1500 rev/min			1800 rev/min		
		Continuous Baseload	Prime Power	Standby Maximum	Continuous Baseload	Prime Power	Standby Maximum
Energy in fuel	kWt	1535	1947	2182	1557	1994	2202
Energy in power output (Gross)	kWb	640	800	877	640	800	877
Energy to cooling fan	kWm	38	38	38	56	56	56
Energy in power output (Net)	kWm	602	762	839	584	744	821
Energy to exhaust	kWt	455	605	711	474	620	702
Energy to coolant and oil	kWt	240	297	312	247	308	317
Energy to radiation	kWt	60	70	90	58	81	101
Energy to charge coolers	kWt	140	175	192	138	185	205

4008TAG2

	Units	1500 rev/min			1800 rev/min		
		Continuous Baseload	Prime Power	Standby Maximum	Continuous Baseload	Prime Power	Standby Maximum
Energy in fuel	kWt	1733	2209	2498	1738	2250	2516
Energy in power output (Gross)	kWb	719	899	985	715	894	980
Energy to cooling fan	kWm	38	38	38	56	56	56
Energy in power output (Net)	kWt	681	861	947	659	838	924
Energy to exhaust	kWt	547	698	807	550	725	811
Energy to coolant and oil	kWt	244	332	349	255	336	366
Energy to radiation	kWt	70	80	100	59	85	100
Energy to charge coolers	kWt	153	200	257	160	210	259

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 bottles under Perkins Part No. OE 45350 (1 litre).

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:

Electrounit (engine only) 48 litres

Electropak (engine/radiator) 162 litres

Pressure cap setting 0.69 bar

Fan Incorporated in radiator

Diameter 4008TAG 1016 mm (Pusher)

Diameter 4008TAG1/2 1219 mm (Pusher)

Ambient Cooling Clearance (Open Electropak Prime power) based on air temp at fan 3 °C above ambient.

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Maximum additional restriction (duct allowance) to cooling airflow (Prime power) and resultant minimum airflow					
Ambient Clearance 50% glycol		Duct Allowance mm H ₂ O		Min airflow m ³ /min	
rev/min		rev/min		rev/min	
1500	1800	1500	1800	1500	1800
52 °C	52 °C	18	15	981	989

4008TAG1

Maximum additional restriction (duct allowance) to cooling airflow (Prime power) and resultant minimum airflow					
Ambient Clearance 50% glycol		Duct Allowance mm H ₂ O		Min airflow m ³ /min	
rev/min		rev/min		rev/min	
1500	1800	1500	1800	1500	1800
52 °C	52 °C	25	30	1121	1188

4008TAG2

Maximum additional restriction (duct allowance) to cooling airflow (Prime power) and resultant minimum airflow					
Ambient Clearance 50% glycol		Duct Allowance mm H ₂ O		Min airflow m ³ /min	
rev/min		rev/min		rev/min	
1500	1800	1500	1800	1500	1800
52 °C	52 °C	13	13	1200	1290

Coolant pump speed and method of drive 1.4 x e rev/min Gear

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 96 °C rising

Coolant immersion heater capacity 4 kW x 1

Jacket cooling water data	Units	1500 rev/min	1800 rev/min
Coolant flow 4008TAG	l/s	10	10.6
Coolant flow 4008TAG1/2	l/s	10	12.0
Coolant exit temperature (max)	°C	93	93
Coolant entry temperature (min)	°C	70	70
Coolant entry temperature (max)	°C	86	86

Lubrication system

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

Lubricating oil capacity:

Sump maximum ... 153 litres

Sump minimum ... 127 litres

Lubricating oil temperature maximum to bearings ... 105 °C

Lubricating oil pressure:

at 80°C temperature to bearing gallery (minimum) ... 0.34 MPa

4008TAG

Oil consumption Prime Power	Units	1500 rev/min	1800 rev/min
After RUNNING - IN*	g/kWhr	0.50	0.53
Oil flow rate from pump	l/s	3.70	4.40

4008TAG1

Oil consumption Prime power	Units	1500 rev/min	1800 rev/min
After RUNNING - IN*	g/kWhr	0.50	0.53
Oil flow rate from pump	l/s	3.70	4.40

4008TAG2

Oil consumption Prime Power	Units	1500 rev/min	1800 rev/min
After RUNNING - IN*	g/kWhr	0.52	0.53
Oil flow rate from pump	l/s	3.70	4.40

*Typical after 250 hours

Sump drain plug tapping size ... G1

Oil pump speed and method of drive ... 1.4 x e rev/min, gear

Oil pump flow 1500 rev/min... 3.70 litres/sec

Oil pump flow 1800 rev/min... 4.40 litres/sec

Shutdown switch setting ... 1.93 bar falling

Normal operating angles

Fore and aft... 5°

Side tilt ... 10°

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 rev/min ... 660 litres
 Delivery/hour at 1800 rev/min ... 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 ... 3.0 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%

4008TAG

Fuel consumption gross				
Designation	g/kWh		Litres/hr	
	1500	1800	1500	1800
rev/min				
At Standby Max power rating	207	213	199	204
At Prime Power rating	202	212	177	185
At Continuous Baseload rating	199	205	139	143
At 75% of Prime Power rating	196	203	129	133
At 50% of Prime Power rating	202	210	88	92
At 25% of Prime power rating	218	220	48	48

4008TAG1

Fuel consumption gross				
Designation	g/kWh		Litres/hr	
	1500	1800	1500	1800
rev/min				
At Standby Max power rating	210	212	217	219
At Prime Power rating	206	211	194	199
At Continuous Baseload rating	203	206	153	155
At 75% of Prime Power rating	201	208	142	147
At 50% of Prime Power rating	207	210	97	99
At 25% of Prime power rating	217	207	51	49

4008TAG2

Fuel consumption gross				
Designation	g/kWh		Litres/hr	
	1500	1800	1500	1800
rev/min				
At Standby Max power rating	214	216	248	249
At Prime Power rating	208	213	220	224
At Continuous Baseload rating	204	206	173	173
At 75% of Prime Power rating	202	206	160	162
At 50% of Prime Power rating	205	205	108	108
At 25% of Prime power rating	216	210	57	55

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 ... 5001-00-00MF&T

Exhaust system

Maximum back pressure for total system

Designation	Units	1500 rev/min	1800 rev/min
4008TAG/1	mmH ₂ O	949	1091
4008TAG2	mmH ₂ O	683	683

Exhaust outlet flange size ... 2 x 152 mm (Table 'D')
 Recommended pipe sizes Refer to Installation Manual.

Electrical system

Type ... Insulated return
 Alternator ... 24 volts with integral regulator
 Alternator output... 40 amps at a stabilised 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 ... 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

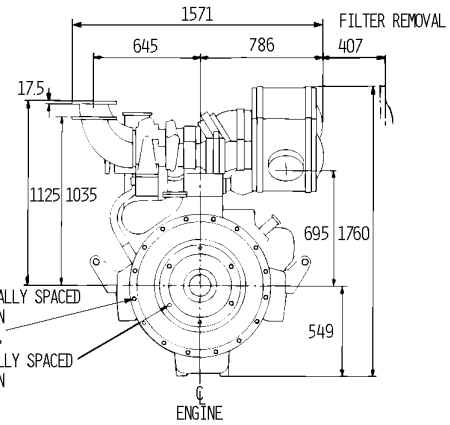
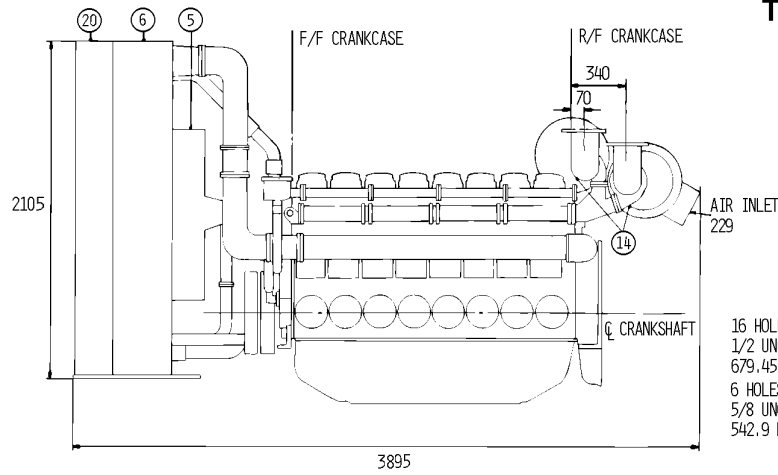
Starting Requirements

Temperature Range	
Range Down to 0 °C (32°F)	Oil: SAE 30 Starter: 1 x 24V Battery: 2 x 12 volts x Ah 178 Max breakaway current: 1400 amps Cranking current: 750 amps Aids: Not necessary Starter cable size: 70 mm Maximum length: 6 m

Notes:

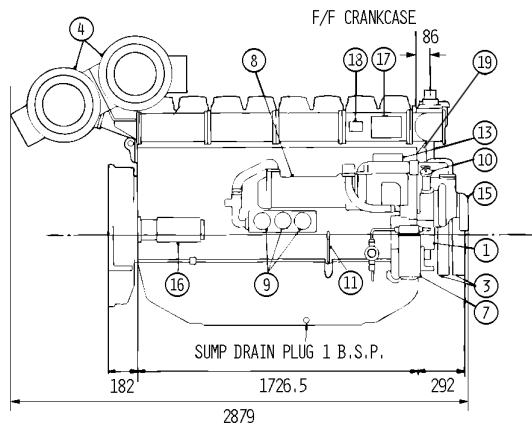
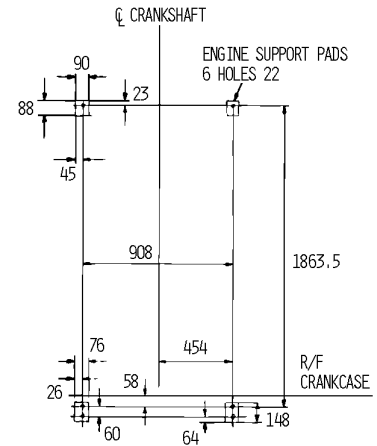
- Battery capacity is defined by the 20 hour rate at 0 °C.
- The oil specification should be for the minimum ambient temperature as the oil will not be warmed by the immersion heater.
- Breakaway current is dependent on battery capacity available. Cables should be capable of handling the transient current which may be up to double the steady cranking current.

TYPICAL ENGINE

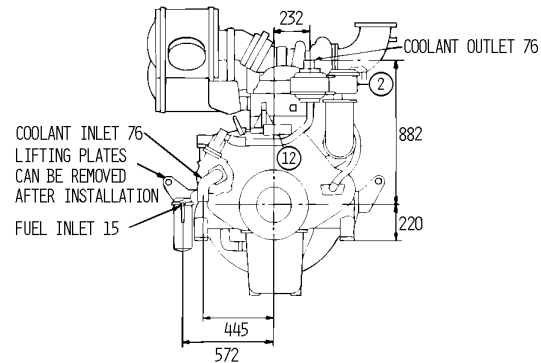
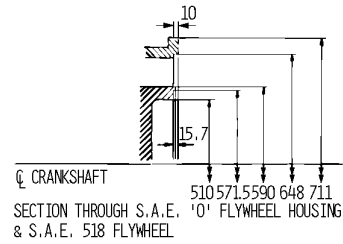
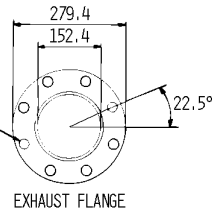


16 HOLES EQUALLY SPACED
1/2 UNC-2B ON
679.45 P.C.D.
6 HOLES EQUALLY SPACED
5/8 UNC-2B ON
542.9 P.C.D.

Electronit Support and Pad Dimensions



8 HOLES EQUALLY SPACED 17.5 ON 235 P.C.D.



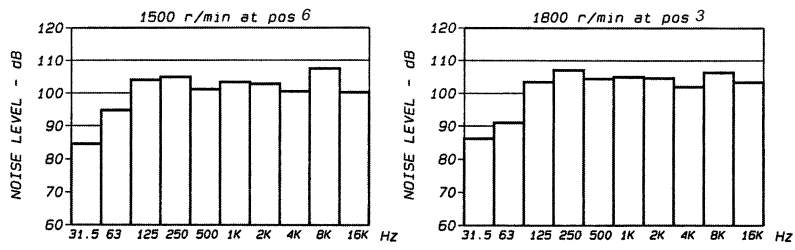
ITEM	
①	ALTERNATOR
②	BREATHER
③	DAMPERS
④	AIR CLEANERS
⑤	FAN
⑥	RADIATOR (COVRAD)
⑦	FUEL FILTER & SEPARATOR
⑧	OIL COOLER
⑨	LUBRICATING OIL FILTERS
⑩	OIL FILLER
⑪	DIPSTICK
⑫	STOP SOLENOID
⑬	GOVERNOR ACTUATOR
⑭	TURBOCHARGERS
⑮	COOLANT PUMP
⑯	24V STARTER
⑰	GOVERNOR CONTROL BOX
⑱	TERMINAL BOX
⑲	FUEL LEAK OFF
⑳	CHARGE COOLER

DIM 005

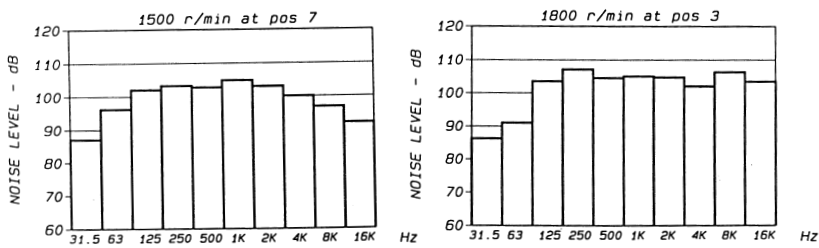
THIS DRAWING SHOWS APPROX DIMENSIONS ONLY. FOR INSTALLATION DETAILS, G.A. DRAWINGS MUST BE OBTAINED FROM PERKINS ENGINES COMPANY STAFFORD LTD A 52°C AIR AMBIENT RADIATOR CAN BE SUPPLIED AS AN OPTION.

4008TAG/4008TAG1/4008TAG2 DIESEL ENGINES

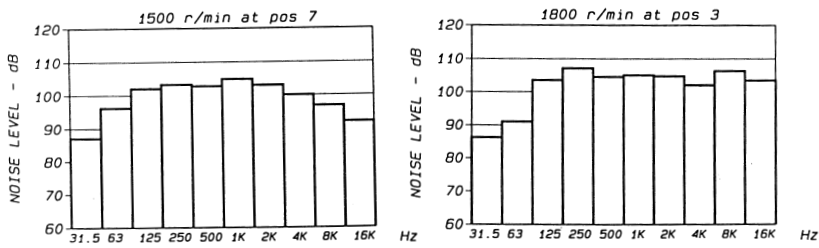
4008TAG



4008TAG1



4008TAG2



The information given on technical data sheets are for standard ratings only. For ratings other than shown contact Perkins Engines Co Ltd Stafford.

Notes

4000 Series

4008TAG 4008TAG1 4008TAG2



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