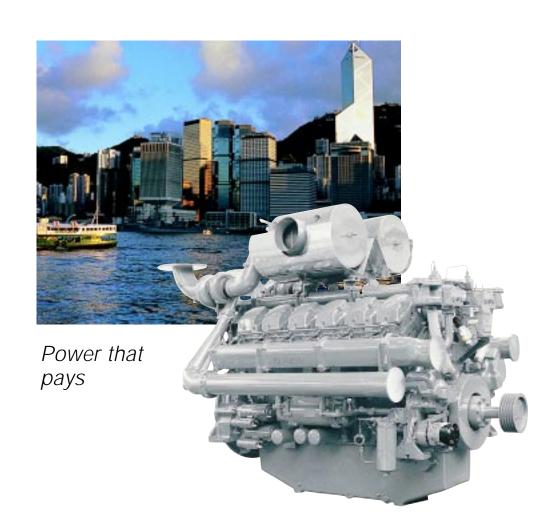


## 4000 Series



# 4000 Series A new generation of engines

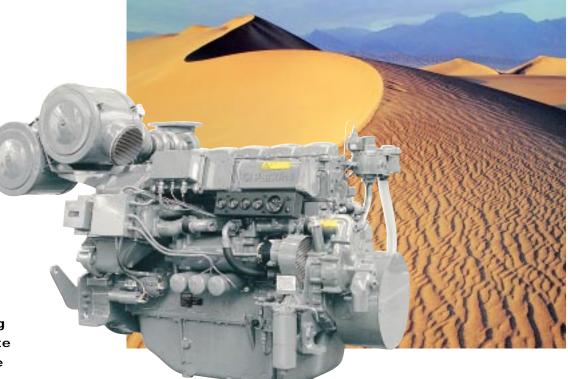
The Perkins' 4000 Series range of diesel engines was designed in advance of today's uncompromising market place demands and to create a new generation of engines for the 21st century.

Spanning the power band 446 bhp–2529 bhp (333kW–1886kW) the 4000 Series is a true family of 6 and 8 cylinder in-line and 12 and 16 cylinder Vee engines with a common design concept.

The 4000 series features include exceptional power to weight ratios, commonality of components, low fuel and oil consumptions, low levels of gaseous emissions, overall performance and reliability which set new standards for diesel engines.

The Perkins' 4000 Series has proved itself in the most arduous conditions worldwide, from Greenland to the Arabian Deserts.





The 4000 Series is the result of a 10 year research programme to develop a new design giving maximum reliability, durability and reduced running costs.

The latest computer aided design technology was used to help create the new range. Our engineers concentrated on the combustion process to achieve the best fuel efficiency and produce high power in a compact engine.

Central to the 4000 Series is a unique piston and cylinder design which incorporates a unit fuel injector. All 4000 Series engines benefit from this proven design. Individual cam/rocker operated unit injectors achieve high pressures to ensure ultra-fine atomisation and controlled rapid combustion resulting in low smoke and gaseous emissions, while producing high powers per cylinder. The application of unit injection eliminates the need for external high pressure fuel pipes.

The pistons are aluminium alloy and incorporate gallery cooling thus ensuring a thermally stable piston throughout the load and speed range. This feature gives longer life of piston-rings and cylinder liners, while decreasing the risk of potentially harmful carbon deposits.

The upper ring is wedge shaped running in a Ni-resist iron carrier, thus eliminating top ring groove wear and ring sticking after extended periods of running at high powers.

The 4000 Series cylinder and injection system are common throughout the range allowing these engines to achieve the highest power outputs per litre of cylinder capacity.

The range has externally mounted large capacity oil pumps to supply cool pressurised oil to all working surfaces of the engine in addition to the piston cooling jets. Wedge shaped gudgeon pin bosses create large bearing areas, thus enabling high power to be transmitted to robust induction hardened crankshafts.

Each cylinder has an individual four valve head to give optimised air flows to these high specific power engines.



## High power to weight ratio

The 4000 Series engines are noted for achieving high power outputs per cylinder and offering high power to weight ratios. The range provides power outputs normally only associated with much larger engines; their compact size and low weight reduces shipping costs and allows for easier installation. As the number of cylinders for the output is lower than with other engine designs, the 4000 Series offers considerably reduced maintenance downtime and lower parts costs.

#### Ease of servicing

Part of the initial design brief for the 4000 Series was to provide excellent service access and ease of maintenance. The individual cylinder heads can, for example, be easily removed. The unit fuel injection system considerably aids reliability and maintains overall engine efficiency while providing an easily serviced system.

The 4000 Series benefits from the worldwide support of the Perkins International dealer network, sophisticated parts support system and the finest trained engineers.

#### **Proven power**

The 4000 Series has been subject to continued research and development using the latest techniques of diesel engine design and engineering practice. The engines are manufactured to the highest quality standards.

At an early stage, advanced computer predictive techniques and finite element analysis were extensively used.
Application of such advanced engineering techniques allowed our engineers to optimise component design, to achieve maximum reliability and component life and thereby further contribute to operating efficiency.



## **Premium** specification

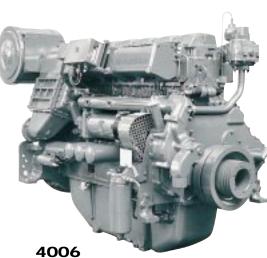


Proven power continued

> Later in the development programme, specially constructed test chambers allowed each stage of design and development to be fully tested in rigorous operating conditions, allowing years of simulated usage to be incorporated in basic design decisions. The application of techniques such as photo elastic strain analysis contributed significantly to the success of the development programme.

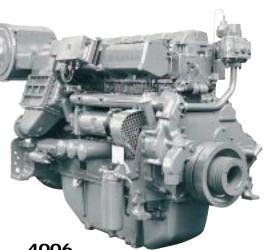
All engines are fully tested and approved before leaving the Perkins factory and each engine is individually certified as complying with Perkins' quality standards. Since all engines are run before despatch, they can be directly installed on-site and will give full power on installation, without a period of 'bedding-in'

**Application** 



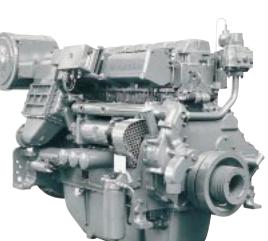
6 cylinder in-line water cooled diesel engine developing

333-710 kWm net



4008

8 cylinder in-line water cooled diesel engine developing 597-947 kWm net



**Technical data** 

achieved. Coupled with their overall compact size, high power output and low fuel consumption, this makes the 4000 series an exceptional engine

Applications typically include: Generating Sets, Pump Sets, Compressor Sets and Stone Crushers.

Emission levels are low, typical smoke

levels of below 1 Bosch unit being



Premium specification turbocharged, four stroke, water cooled diesel engines. Individual models may be specified with either radiator or heat exchanger cooling, the latter for use in conjunction with remote radiators or cooling towers.

Bore	160mm								
Stroke	190mm								
Compression ratio	13.6:1								
Rotation	Anti-clockwise (When viewed from the flywheel end)								
	4006	4008	4012	4016					
Total swept volume (Litres)	22.92	30.56	45.84	61.12					
Governing	To ISO 3046/4 A1/BS 5514/4 A1								
Fuel specification	BS 2869 1988 Class A1 + A2 or ASTM D975 No. 2D or equivalent								

**Note** In any proposals involving the use of fuel different from the above specification, an analysis of the proposed fuel should be forwarded to enable Perkins to make recommendations regarding amended maintenance periods for engine and fuel injection equipment.

Full technical data are available on request to cover all aspects of engine specification and performance, installation and application



4012

12 cylinder 60° Vee form water cooled diesel engine developing 576-1423 kWm net



4016

16 cylinder 60° Vee form water cooled diesel engine developing 824-1886 kWm net

**Standard** equipment

equipment	/	10/	<u></u>	0. /	h
	V.C	JOB AC	08 40	VI VC	26
Base Engine	*	*	*	*	
Fuel Injection System, hand stop control, fuel lift pump and priming pump	*	*	*	*	
Electronic Govenor	*	*	*	*	
Medium Duty Air Cleaners – paper elements	*	*	*	*	
24 Volt electrical equipment comprising starter motor, battery charging alternator with low voltage control unit	*	*	*	*	
SAE Flywheel and Housing (size dependent on model)	*	*	*	*	
Turbochargers	*	*	*	*	
Vertical Exhaust Outlets	+	+	+	+	
Fuel Oil Filter and Water Separator	*	*	*	*	
Lubricating Oil Filters	*	*	*	*	
Engine Jacket - Water Oil Cooler/Temperature Stabiliser	*	*	*	*	
Thermostats	*	*	*	*	
Water Pumps	*	*	*	*	
Free End Crankshaft Pulley	+	+	+	+	
Crank Case Doors	*	*	*	*	
Air to Water Charge Cooler using jacket water	+	+	+	+	
Torsional vibration damper to suit most applications	*	*	*	*	
Engine protection pack for customer to wire as necessary and comprising a) 24 volt stop solenoid energised to run b) Low oil pressure/high water temperature switch	*	*	*	*	
Overspeed Switch with Magnetic Pick-up	*	*	*	*	
Induction air shut-off valves			*	*	
Engine feet	*	*	*	*	
Perkins Engine User's Manuals	*	*	*	*	

**Optional** equipment

	equipment			7		/
,			30b AC	08/	22/40	376/
		V,	2/ W	, v,	) W	
	Tropical Radiator (52°C) with Charge Air Cooler Matrix including water and air pipes, hoses and clips, fan, guards and belts (TAG models)	•	•	•	•	
	Tropical Radiator (52°C) including water and air pipes, hoses and clips, fan, guards and belts (TWG models)	•	•	•	•	
	Water pipes, hoses and clips for radiator	•	•	•	•	
	Heavy-duty air cleaners – paper element with pre-cleaner	•	•	•	•	
	Changeover lubricating oil filters	•	•	•	•	
	Changeover fuel oil filters	•	•	•	•	
	Immersion heater(s) with thermostat	•	•	•	•	
	Induction air shut-off valves	•	•			



NB This list is not exhaustive. Further options may be available to meet particular applications. Please consult Perkins Sales Department. Notes ★ Standard equipment + Standard equipment according to build • Optional equipment

#### **Performance and** power ratings

Ratings	Ratings for Power Generation 1500 rev/min												
	Cont	inuous B	aseload P	ower		Prime	Power		Standby(Maximum) Power				
ENGINE		NET (exc	cept TEG)			NET (exc	ept TEG)		NET (except TEG)				
	kWm	bhp	kWe	kVa	kWm	bhp	kWe	kVA	kWm	bhp	kWe	kVA	
4006TG	340	456	323	404	376	504	357	447	416	558	395	494	
4006TWG	383	514	364	455	427	573	406	507	473	635	449	562	
4006TAG1	429	575	408	509	479	642	455	569	527	707	501	626	
4006TAG2	484	649	460	575	533	715	506	633	587	787	558	698	
4006TAG3	587	787	558	698	645	856	613	766	710	952	675	844	
4006TEG*	489	655	465	581	538	721	511	639	592	794	562	703	
4008TWG2	652	874	619	774	710	952	675	843	782	1048	743	929	
4008TAG	657	881	624	780	715	959	679	849	787	1055	748	935	
4008TAG1	694	930	659	824	762	1021	724	905	839	1125	797	996	
4008TAG2	784	1051	745	931	861	1154	818	1022	947	1269	900	1125	
4012TWG	795	1066	755	944	868	1164	825	1031	957	1283	909	1136	
4012TWG2	963	1291	924	1155	1059	1420	1017	1271	1169	1568	1122	1403	
4012TAG	963	1291	924	1155	1061	1422	1019	1274	1168	1566	1121	1401	
4012TAG1	1044	1400	1002	1253	1136	1523	1091	1364	1250	1676	1200	1500	
4012TAG2	1147	1538	1101	1376	1254	1681	1204	1505	1380	1851	1325	1656	
4012TEG*	977	1310	938	1174	1075	1441	1032	1290	1182	1584	1135	1419	
4012TEG2*	1184	1587	1137	1421	1294	1735	1242	1553	1423	1908	1366	1708	
4016TWG	1071	1436	1028	1285	1182	1585	1135	1418	1301	1745	1249	1561	
4016TWG2	1290	1730	1238	1548	1423	1908	1366	1708	1567	2101	1504	1880	
4016TAG	1332	1786	1279	1599	1460	1957	1402	1753	1607	2155	1543	1929	
4016TAG1	1396	1871	1340	1675	1537	2061	1476	1845	1690	2266	1622	2028	
4016TAG2	1557	2088	1495	1868	1715	2300	1646	2058	1886	2529	1811	2264	
4016TEG*	1292	1733	1240	1550	1432	1920	1375	1718	1575	2112	1512	1890	
4016TEG1*	1398	1875	1342	1678	1538	2062	1476	1845	1692	2269	1624	2030	
4016TEG2*	1550	2079	1488	1860	1708	2290	1640	2050	1879	2520	1804	2255	

	Continuous Baseload Power								Prime Power									Stand	by(Max	imum)	Power			
		1200 r	ev/min			1800 re	ev/min			1200 r	ev/min			1800 r	ev/min			1200 r	ev/min			1800 r	ev/min	
ENGINE	N	NET (except TEG)		NET (except TEG)			N	NET (except TEG)			N	NET (except TEG)		NET (except TEG)			G)	NET (except TEG)			3)			
	kWm	bhp	kWe	kVA	kWm	bhp	kWe	kVA	kWm	bhp	kWe	kVA	kWm	bhp	kWe	kVA	kWm	bhp	kWe	kVA	kWm	bhp	kWe	kVA
1006TG	-	-	_	-	340	456	320	400	-	-	-	-	376	504	353	442	-	-	_	-	416	558	391	489
4006TWG	333	446	316	395	362	485	344	430	369	495	351	438	406	544	386	481	407	546	387	484	452	606	429	537
4006TAG1	-	-	-	-	424	569	403	504	-	-	-	-	474	636	450	563	-	-	_	-	522	700	496	620
4006TAG2	385	516	366	458	478	641	454	568	425	570	404	505	527	707	501	626	468	627	445	556	581	779	552	690
4006TAG3		_	-	_	583	782	554	693	-	_	-	-	641	860	609	761	-	-	-	_	706	947	671	838
4006TEG*		_	-	_	489	655	465	581	-	_	-	-	538	721	511	639	-	-	-	-	592	794	562	703
4008TWG2	-	-	-	_	626	839	595	743	-	-	-	-	684	917	650	812	-	-	-	-	756	1013	718	898
4008TAG	-	-	-	_	646	866	614	768	-	-	-	-	704	944	669	836	-	-	-	-	776	1041	737	921
4008TAG1	597	800	567	709	676	906	642	803	623	835	592	740	744	997	707	884	686	920	652	815	821	1101	780	975
4008TAG2	631	846	599	749	761	1021	723	904	693	929	658	823	838	1124	796	995	763	1023	725	906	924	1239	878	1098
4012TWG	576	772	547	684	-	-	-	-	640	858	608	760	-	-	_	-	711	953	675	844	-	-	-	-
4012TWG2		-	-	-	937	1256	900	1125	-	-	-	-	1033	1385	992	1240	-	-	-	-	1143	1533	1097	1371
4012TAG	778	1043	747	934	-	-	-	-	854	1145	820	1025	-	-	_	-	940	1261	902	1128				
4012TAG1	-	-	_	-	1043	1399	1001	1251	-	-	-	-	1135	1522	1090	1363	-	-	-	-	1249	1675	1199	1499
4012TAG2	-	-	_	-	1147	1538	1101	1376	-	-	-	-	1254	1681	1204	1505	-	-	-	-	1380	1850	1325	1656
4012TEG*	785	1052	754	944	-	-	-	-	860	1153	826	1034	-	-	_	-	946	1268	908	1135	-	-	-	-
4012TEG2*		_	_		_	-	_	-	-	-	-		-	_	-	-	-	_	-		ļ	-	_	-
4016TWG	824	1105	791	989	-	-	_	-	908	1218	872	1090	-	-	-	-	1002	1344	962	1202	-	_	_	-
4016TWG2	-	-	_	_	-	-	_	-	-	-	-	_	-	-	-	-	-	-	-	-	-	_	_	-
4016TAG	1052	1410	1010	1263	-	-	-		1146	1537	1100	1375	-	-	-	-	1263	1694	1212	1515		-	_	-
4016TAG1		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4016TAG2	1271	1703	1219	1524	-	-	-	-	1400	1877	1344	1680	-	-	-	-	1540	2065	1478	1848	-	-	-	-
4016TEG*	1042	1397	1000	1250	-	-	-		1146	1537	1100	1375	-	-	-	-	1261	1691	1211	1514		-	-	-
4016TEG1*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4016TEG2*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

All ratings are net with tropical fan power deducted except for TEG ratings marked \* which are gross.

The above ratings represent the engine performance capabilities guaranteed within plus or minus 3% at the reference conditions equivalent to those specified in ISO 8528/1; ISO 3046/1; BS5514/1.

All electrical ratings are based on an average alternator efficiency and a power factor of 0.8.

Continuous Baseload – Power available for continuous full load operation. Overload of 10% permitted for 1 hour in every 12 hours operation.

Prime Power – Power available for variable load with an average load factor not exceeding 80% of the prime power rating in any 24 hour period. Overload of 10% permitted for 1 hour in every 12 hours operation.

Standby Maximum – Power available at variable load in the event of a main power network failure for a maximum of 500 hours per year. No overload is permitted.

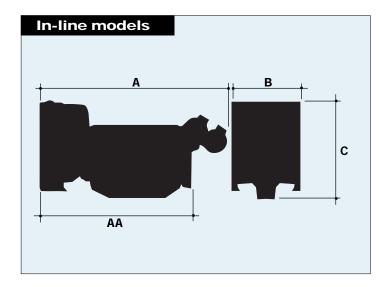
#### **Model Designations**

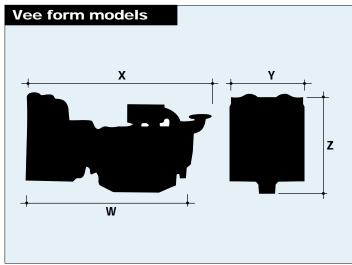
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TAG Turbocharged, water cooled diesel engine with Air to Air charge cooler (radiator cooled). TWG Turbocharged, water cooled diesel engine with Air to Water charge cooler using jacket water.

TEG Turbocharged, water cooled diesel engine with Air to Water charge cooler using water from an external source.

### **Approximate dimensions**





	4006		4008	
MM	With radiator	Without radiator	With radiator	Without radiator
Α	3365mm	2190mm	3935mm	2855mm
AA	2713mm	1538mm	3281mm	2201mm
В	1630mm	1105mm	1870mm	1585mm
С	2184mm	1525mm	2258mm	1775mm
Approx. weight Kgs.	3010	2400	4360	3250
Example used	4006T	AG3	4008T	AG2

	4012		4016			
MM	With radiator	Without radiator	With radiator	Without radiator		
Х	3900mm	2715mm	4460mm	3265mm		
W	3317mm	2132mm	3827mm	2632mm		
Υ	2245mm	1725mm	2775mm	1725mm		
Z	2749mm	2120mm	3239mm	2115mm		
Approx. weight Kgs.	5800	4400	8010	5570		
Example used	4012TA	\G2	4016TAG2			

Note The above weights and dimensions are for guidance only. Exact sizes and weights will vary according to engine specification and are available on request.

#### Ratings

All ratings are quoted at ISO 8528/1 reference conditions - 25°C ambient temperature, barometric pressure 100kPa, relative humidity 30%. For engines operating in conditions other than those specified, derating may be required; please consult Perkins Sales or Applications department.

All ratings given in this document are net unless specified. Gross ratings may be obtained from Perkins Technical Data Sheets as may other technical details. These sheets are available on request from Perkins or its Distributors.

For Generating Set applications a 10% overload for 1 hour in every 12 hours is available on continuous baseload and prime power ratings only. Please consult Perkins Sales or Applications Departments for overloads available or for continuous ratings for other applications.

#### Installation

For guidance on the installation of Perkins 4000 Series engines please refer to the Perkins Installation Manual TSL 4068.







#### **Perkins Engines Company Limited**

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