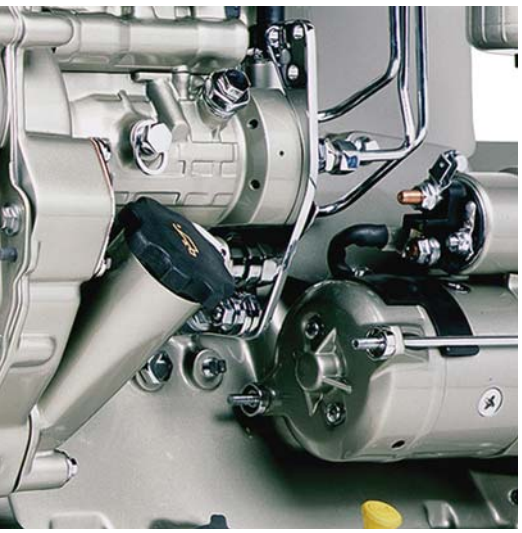
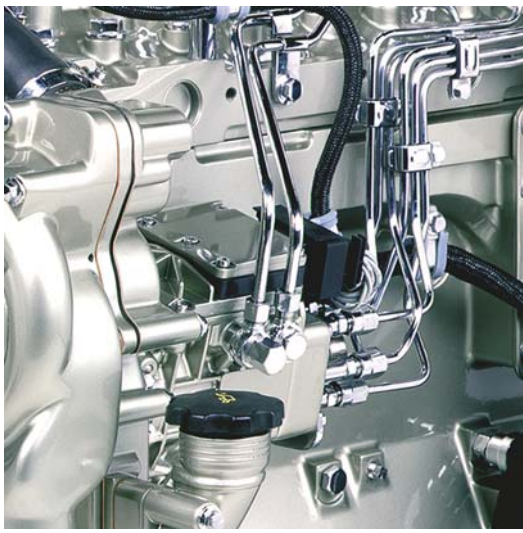
Perkins®

1100 Series





Designed to perform...
delivered with choice

The range of choice

The Perkins 1100 Series, comprising the 1100A, 1100B and 1100C ranges now offers three levels of emission compliant engines. This enables Perkins to continue offering tailored power solutions to more than 1000 equipment manufacturers worldwide.

Utilising new technologies and focusing on our customer needs, Perkins introduces the 1100 Series, setting new standards in productivity, refinement, and cost of ownership.

1103C-33T

Enhanced torque at work

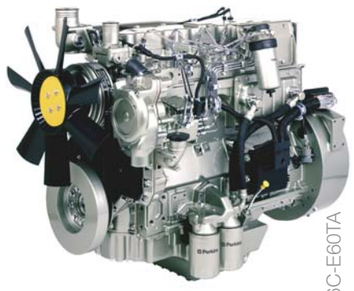
Productive power at work

The 1103A, B and C Range
3.3 litre 3 cylinder engines, with the choice of naturally aspirated and turbocharged models featuring mechanical governing.

The 1104A, B and C Range
4.4 litre 4 cylinder engines, at the heart of the range with the choice of naturally aspirated, turbocharged and turbo, air to air charge cooled variants. This completely redesigned engine offers the further choice of mechanical or full-authority electronically controlled variants for all aspirations. Here the customer will find a comprehensive range of choice to meet all needs, from the simplicity of mechanical governing through to the opportunity of high levels of machine integration available through the use of full authority electronics.

The 1106C
A 6 litre 6 cylinder engine completes the range with standard turbo air to air charge cooling and full authority electronic engine management. This provides enhanced engine performance with the opportunity for sophisticated control and machine integration.

1104C-44



1106C-E60TA

Designed for Quality

The introduction of 1100 Series has allowed new levels of quality to be achieved. Starting with predictive design techniques and finite element analysis, progressing through extensive development and field trials in customer applications, the 1100 Series has been created and tested with Quality in mind.
Leading edge product design and worldclass production standards have been further enhanced by the manufacturing investment in the 1100 Series.

Power and Torque

Perkins strives for continuous improvement in engine performance to provide our customers with more productive machines. To improve productivity, Perkins has designed the 1100 Series with improved power, torque and torque back-up throughout the range to give excellent engine response, low speed performance and improved machine driveability.
The availability of full authority electronic control on 4 and 6 cylinder models provides accurate engine control throughout the operating range, coupled with further integration with customers' machines. The addition of electronics also increases the level of machine engine settings tailored to customer machines - giving further advances in machine refinement and flexibility.

Rugged Reliability

Perkins engines have always been designed to operate in the harshest of off-highway conditions. From the outset the 1100 Series was designed with durability and dependability in mind. The strengthened cast iron crankcase and stiffer cylinder blocks provide rigidity, whilst the new balancer design on 4 cylinder engines and new crankshaft on 3 cylinder reduce vibration - all important factors in engine durability. Redesigned cylinder heads use new multi-layer steel head gaskets and feature integral inlet manifolds to give total gas sealing around individual ports. An increased diameter rocker shaft further aids the robustness at the top end of the engines. Where required, integral oil coolers keep the engine lubricating oil at the optimum temperature for extended life.

Perkins have focused on reducing noise from the engine, giving the machine manufacturer less noise

More refined

Low Noise

With the 1100 Series, Perkins have focused on reducing noise from the engine, giving the machine manufacturer less noise to reduce in machine development. Perkins have identified three sources of noise during development:

Force
Noise created by combustion and the mechanical movement of engine parts.

Transmission
Noise carried through the engine structure.

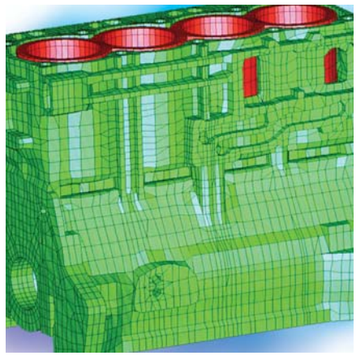
Radiation
Noise which 'escapes' rather than being contained by the engine.

To overcome 'Force' noise sources we have modified our combustion design to give a lower noise source. A new, quieter, front gear train has also been applied across the range to reduce mechanical noise.

To reduce the 'Transmission' of noise we have stiffened block structures across the range whilst introducing an open top deck block on 3 and 4 cylinder models which places a layer of water between the cylinder and block exterior - effectively double glazing the noise of combustion.

To minimise the escape of the resulting noise we have developed sound insulating front covers and isolated top covers. The 3 and 4 cylinder also benefit from an integral inlet manifold. These features lead to lower 'Radiation' of noise and an improvement in noise quality.

Reductions on the 4 cylinder add up to an impressive 3 dB (A) reduction - effectively halving engine noise



Cleaner

Noise is not the only environmental issue we have addressed. Exhaust emissions have also been significantly reduced and the 1100 Series range meets all future Stage II and Tier 2 requirements.

In addition, the new 1100 Series' induction system builds on Perkins traditional high efficiency combustion chamber. Improved airflow management in the 3 and 4 cylinder integral inlet manifolds and throughout the crossflow cylinder head give more efficient breathing and cleaner power. As a result, throughout the range, whether on mechanical or electronic models expertise has been applied to ensure that under normal operating conditions smoke levels are not visible to the naked eye.

In addition to emissions improvements, fuel filtration have received special attention and the new ‘ECOplus’ system has been introduced on 3 and 4 cylinder models. This system features a re-usable canister with a disposable filter element to give easier, cleaner and cheaper disposal for the operator, whilst reducing the impact on the environment.

The 1100 Series range meets all future Stage II and Tier 2 requirements

Tier 0	Tier 1	Tier 2
1103A 1104A		
1103B		
1103C 1104C 1106C		

Design features

Cross Flow Cylinder Head
This design integrates the inlet manifold into the cylinder head as one component and allows precise airflow management for enhanced combustion, improved performance and economy.

Gear Train
A high contact ratio, helical gear train offers significant noise reduction in all operating conditions.

Balancer Design
A new balancer design has been applied to further improve noise and vibration.

Spin-On Oil Filter

Integrated Closed Circuit Breather
Closed circuit breathers are available on all models within the 1100 Series range and are standard on all naturally aspirated models - minimising the environmental impact of the engine.

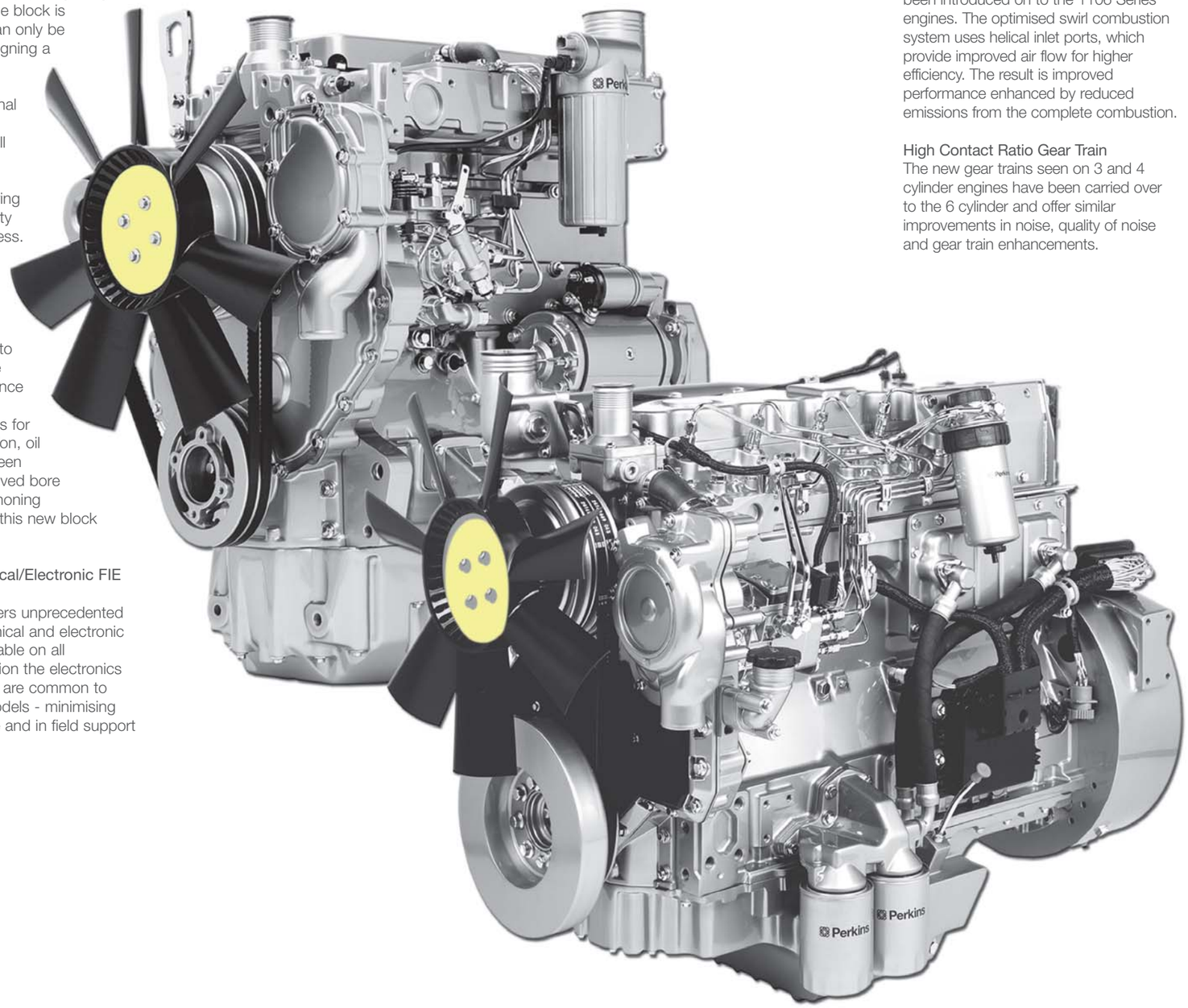
Electric Lift Pump (Fuel)
An electric lift pump design has been incorporated into 3 and 4 cylinder models (1100 B/C only). This eliminates the many fuel connections typically used and integrates them into one simple unit with enhanced durability and reliability.

ECOplus Fuel Filter
ECOplus fuel filters feature a re-usable canister with disposable filter element to give easier, cleaner and cheaper disposal whilst reducing the impact on the environment. In addition, this system does not require a pre-filter or water separator for fuel - all these are integrated into the design.

Integral Oil Cooler
Whilst a simple concept, integrating the oil cooler into the block is something which can only be achieved when designing a fundamentally new engine. Here the oil cooler has no external supplies of oil or coolant, removing all external leak paths through intelligent design - and delivering a reliable, high quality solution in the process.

Open Top Deck Block
A completely new block design has been used in order to reduce noise, revise cooling flow and hence minimise NVH and cooling requirements for the engine. In addition, oil consumption has been halved by the improved bore shape and revised honing technology used in this new block design.

Choice of Mechanical/Electronic FIE (1104)
The 1104 range offers unprecedented choice with mechanical and electronic engine control available on all aspirations. In addition the electronics and fuel pump type are common to 4 and 6 cylinder models - minimising engineering, service and in field support requirements.



Oil consumption has been halved by the improved bore shape and revised honing technology used in this new block design

Multi-Piece Exhaust Manifold
A new multi-piece exhaust manifold has been developed for 1106 to allow improved durability and gas sealing around the exhaust ports.

Cylinder Head
An improved design of cylinder head has been introduced on to the 1106 Series engines. The optimised swirl combustion system uses helical inlet ports, which provide improved air flow for higher efficiency. The result is improved performance enhanced by reduced emissions from the complete combustion.

High Contact Ratio Gear Train
The new gear trains seen on 3 and 4 cylinder engines have been carried over to the 6 cylinder and offer similar improvements in noise, quality of noise and gear train enhancements.

12/24V Electronic Rotary Fuel Pump
The fuel pump on 4 and 6 cylinder electronic models gives enhanced control and precise fuelling throughout the operating range of the engine - enhancing performance and fuel economy.

Peripheral Fixed Top Cover
A peripheral fixed top cover has been developed with revised sealing to minimise the potential for leaks from this area.

No Leak Off Rail Injectors
Further attention to minimise the potential for leaks can be seen through the elimination of leak off rails for the injectors - again eliminating the potential for leaks.

Carrier Joint Oil Cover Seal
Various joints around the engine have been re-designed to minimise the potential for leaks and improve durability - the oil cover is yet another example of this approach.

Revised Rear End Oil Seal
The rear end oil seal has been integrated to reduce the potential for leaks.

Tappet Chamber Barriers
Tappet chamber barriers have been employed to reduce breather gas flow and oil carryover - reducing oil mist and breather gases by obstructing their flow.

Engine Control Module
Standard and enhanced feature levels are available in the electronics package (offered on 4 and 6 cylinder) allowing our customer to tailor the machine/engine integration to their needs. In addition, power setting to ±3% is standard with all electronic engines.

Electronics

Recognising the need to offer choice, Perkins has included three core product options:

1) Mechanically Governed Engines
2) Standard Full Authority Electronic Engine Control
3) Enhanced Full Authority Electronic Engine Control

These engine choices allow the customer to move from proven mechanical engines through to the opportunities offered by our enhanced electronic package. This will allow machine integration features to be employed between engine and machine.

Perkins Electronic control system is designed specifically for the off-highway diesel engine market from a proven technology base. This allows the engine to include ECM's mounted on engine with high temperature capabilities, coupled with wiring harnesses and sensors designed for use in the harshest off-highway environments.

The 4 cylinder is offered with the choice of mechanical or electronic control.
At the smaller end the 3 cylinder is mechanical, whilst at the larger end the 6 cylinder is electronic – as requested by our customer base.

Perkins Electronic control system is designed specifically for the off-highway diesel engine market

Standard electronic engine management gives the operator the benefits of:

- improved fuel consumption through more precise control of injection timing
- machine protection under extreme operating conditions
- easy servicing and fault diagnostics

Enhanced features further improve the benefits of electronics giving:

- improved functionality, leading to better machine driveability and therefore productivity
- improved reliability though better engine monitoring and planned maintenance
- further cost savings from the increased fuel efficiency and integration into machine design

All electronic product has been designed for easy service with diagnostic capability supported by TIPSS.

Cheaper to run

Ease of Service

Service periods across the 1100 Series range have been doubled to 500 hours as standard. The use of the more easily disposable ECOplus fuel filters on 3 and 4 cylinder models further enhances cost saving. In addition, valve adjustment is only required every 1,000 hours. Whilst service intervals have been improved, the time taken to complete a service is minimised with Single Side Servicing across the range.

Taking advantage of the extensive re-design, many parts within the range are common to other models within the family, reducing the variety and complexity of parts required to service and overhaul this true family of engines.

Improved Economy

Cost of Ownership is key to the Perkins 1100 Series range. Building on Perkins traditional strengths in durability, reliability, overhaul and parts support, 1100 Series provides improved cost of ownership throughout its working life.

In addition, electronic 4 and 6 cylinder models allow a greater degree of control over timing and fuel use throughout the operating range of the engine. This leads to improved economy throughout the speed range and lower fuel cost for the operator.

Oil consumption has been improved across the range and halved on 3 and 4 cylinder models due to the new block structure and the enhanced surface finishes of the bores.

Ease of Installation

During the development of the 1100 Series an important factor has been to ensure our customers have minimum disruption to their machines in adopting the latest technology. The new 1100 Series engines have been designed to fit within the installation envelope of its benchmark predecessors, whilst all mounting points are arranged to ensure a seamless changeover for our customers. 'A', 'B' and 'C' models equally interchange within the same installation envelope.

To further ease the installation, Perkins have looked carefully at the design of the engines' cooling systems. An improved gear-driven water pump coupled with optimised flow patterns in the cylinder heads give best heat extraction whilst the top tank operating temperature has been increased to 110ºC. Together these moves result in minimised radiator requirement, and facilitate compact machine design.

As ever, Perkins long-established spectrum of options will be available to - allow the 1100 Series to be tailor-made both for existing and new applications. An extensive selection from cooling fans through to flywheels, flywheel housings, exhaust outlets, induction manifolds, turbocharger positions, starters, alternators and many, many more make the 1100 series family a truly flexible proposition.

Perkins long-established spectrum of options will be available to allow the 1100 Series to be tailor-made

Standard Equipment

The 1100 Series continues the Perkins strengths of offering a combination of ratings, configurations and dress options with the addition of electronics where desired.

As ever this allows Perkins to truly tailor the 1100 Series solution to industrial applications.

Option Range

- Engine ratings
- Timing case and gear driven auxiliaries
- Flywheel housing
- Flywheel and starter ring
- Balancer
- Lubricating oil filter
- ECOplus oil filtration
- Adapter plate
- Starter motor
- Fan drive
- Lubricating oil sump
- Lubricating oil filters and breathers
- Front end drives
- Coolant pump
- Fan and extensions
- Alternator
- Belt driven auxiliaries
- Induction manifolds
- Exhaust manifolds
- Fuel filter
- ECOplus fuel filtration
- Cold start aid
- Engine mountings
- Electronics standard and enhanced feature sets

Engine Powers

Engine	Power Range		Torque Range	TBU range
	kW	bhp	Nm	%
1103B-33	43	57.7	200-225	16-18
1103B-33T	49	65.7	260	19
1103C-33	43	57.7	222	19-30
1103C-33T	55	74	270-291	22-30
1104A-44	63.5	85	263-293	16-17
1104A-44T	80.5	108	367-404	16-24
1104C-44	64	86	273-308	12-24
1104C-E44	64	86	302	13-19
1104C-44T	74.5	99.5	345-413	15-34
1104C-E44T	85	114	383-412	14-33
1104C-44TA	97	130	410-500	9-31
1104C-E44TA	106	142	428-502	9-30
1106C-E60TA	129.5	174	420-695	13-51

* other ratings available
TBU = Torque Back-Up

Basic Engine Data

	1103	1104	1106
Configuration	In-line 3 cylinder	In-line 4 cylinder	In-line 6 cylinder
Bore/Stroke	105 mm x 127 mm		100 mm x 127 mm
Capacity	3.3 litres	4.4 litres	6 litres
Combustion System	Direct injection	Direct injection	Direct injection
Induction System	NA/Turbo	NA/Turbo/ Turbo Charge Cooled	Turbo Charge Cooled
Compression Ratio	19.25:1 (NA) 18.25:1 (T)	19.2:1 (NA) 18.2:1 (T and TA)	17.25:1
Cooling System	Water Cooled		
Length	546 mm	663 mm	933 mm
Width	571 mm (NA) 586 mm (T)	471 mm (NA) 597 mm (T and TA)	697 mm
Height	826 mm	775 mm (NA) 810 mm (T and TA)	796 mm
Dry Weight	276 kg (T)	291 kg (NA) 306 kg (T) 306 kg (TA)	505 kg

Worldwide after sales support

Perkins product support team aims to maximise engine user profitability and lower operating costs by increasing up time and maximising residual values for Perkins powered equipment wherever it is operating in the world.

Through an experienced network of distributors and dealers, fully trained engine experts deliver total service support around the clock, 365 days a year. 4000 Service points around the world have a comprehensive suite of web based tools covering technical information, parts identification and ordering systems, all dedicated to maximising the productivity of your engine.

Perkins actively pursues product support excellence by insisting our distribution network invest in their territory to provide you with a consistent quality of support across the globe.

Throughout the entire life of a Perkins engine, we provide access to genuine OE specification parts giving 100% reassurance that you receive the very best in terms of quality for the lowest possible cost.

Genuine product support enables Perkins' engines to operate with optimum power and fuel efficiency. By utilising the genuine services offered, engine life is ultimately maximised… so too is the residual value of the Perkins powered machine.

Genuine product support enables Perkins engines to operate with optimum power and fuel efficiency

Asia
Perkins Engines (Asia Pacific) Pte Ltd
7 Tractor Road
Singapore 627968
Telephone +65 6828 7469
Fax +65 6828 7414

Europe, Middle East and Africa
Perkins Engines Company Limited
Peterborough PE1 5NA
United Kingdom
Telephone +44 (0)1733 583000
Fax +44 (0)1733 582240

North America
Perkins Engines Inc
N4 AC 6160
PO Box 610
Mossville, IL 61552-0610, USA
1-888-PERK-ENG
Telephone +1 309 578 7364
Fax +1 309 578 7329

Latin America
Perkins Motores do Brasil Ltda
Rua Alexandre Dumas, 1711 Ed. Birman 11, 9° andar
Chácara Santo Antonio
São Paulo / SP - Brasil
Cep: 04717-004
Telephone +55 11 2109 2038
Fax +55 11 2109 2089



Perkins®

www.perkins.com