PACCAR FR & GR engines

FR103 - FR118 - FR136 - FR152 - GR165 - GR184 - GR210 - GR220

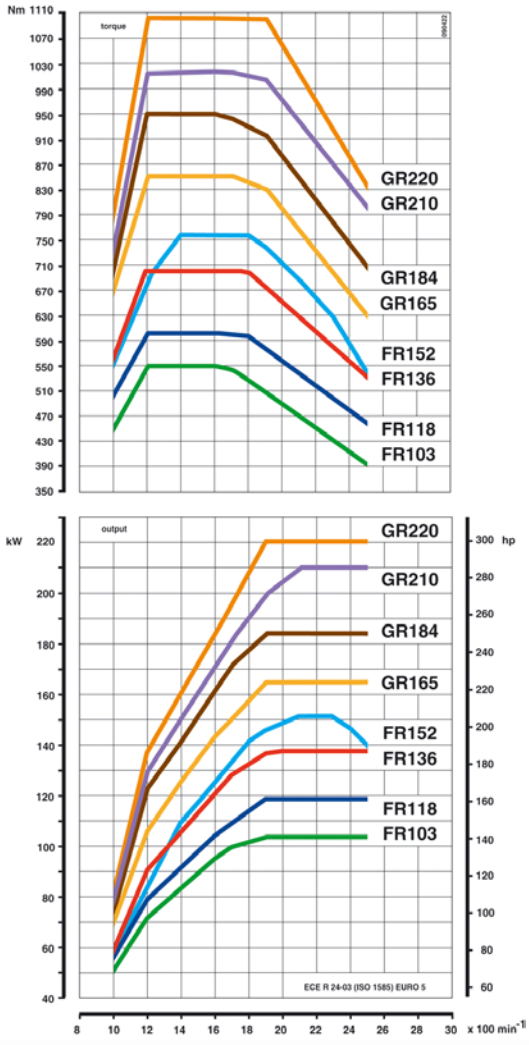
The power-to-weight ratio of the new four and six-cylinder PACCAR engines is amongst the best in this performance class. These engines feature a high flexibility, resulting in excellent driveability and less gear-shifting

Engine	Output kW (hp)	Engine rpm	Torque Nm
FR103	103 (140)	1900	550 at 1200 - 1700 rpm
FR118	118 (160)	1900	600 at 1200 - 1800 rpm
FR136	136 (185)	2000	700 at 1200 - 1800 rpm
FR152	152 (207)	2100-2300	760 at 1400 - 1800 rpm
GR165	165 (224)	1900	850 at 1200 - 1700 rpm
GR184	184 (250)	1900	950 at 1200 - 1700 rpm
GR210	210 (286)	2100	1020 at 1200 - 1800 rpm
GR220	220 (300)	1900	1100 at 1200 - 1900 rpm

General information

Four-cylinder (FR) or six-cylinder (GR), vertical in-line turbocharged diesel engine with intercooling.
Clean combustion with Selective Catalytic Reduction (SCR) aftertreatment for Euro 5 emission level.

Bore x stroke .....107 x 124 mm
Piston displacement FR (4 cyl) .....4.5 litres
GR (6 cyl).....6.7 litres



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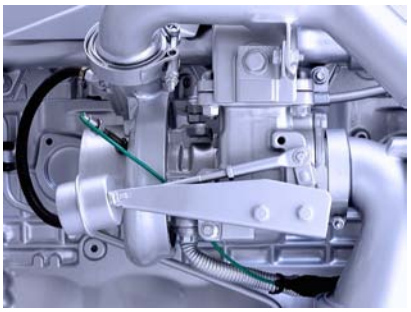
Details

Main construction

Cylinder block	cast iron stiffened ladder frame, contoured and deep skirted with cylinder bores direct in the block
Cylinder head	one-piece cross-flow type head, covering all 4 or 6 cylinders; cast iron
Valves	four valves per cylinder
Cylinder liners	dry, replaceable, plateau honed
Pistons	aluminium alloy pistons, Ni-resist with symmetrical re-entrant combustion chamber; gallery cooled
Piston rings	2 compression rings; 1 scraper ring
Crankshaft	forged alloy steel with balance weights; viscous damper at front end; supported in 5 (FR) or 7 (GR) bearings
Cam shaft	steel forged and induction hardened; supported in 4 bearings; driven from the timing gears (single plain gear train at the rear of the engine)

Fuel injection and induction

Fuel injection	high-pressure common rail
Injectors	electronically controlled
Injection timing	variable start and duration, electronically controlled
Injection pressure	max. 1800 bar
Fuel injection	start and duration, as well as the injection pressure, are controlled by the engine mounted electronic control module
Induction	turbocharged with charge cooling (intercooling)
Turbocharger	turbocharger with waste gate



Lubrication

Oil filter	full flow filter with replaceable element
Oil cooler	coolant-to-oil plate type heat exchanger
Oil pump	gear-type, driven by crankshaft

Cooling system

Pump	belt driven centrifugal pump
Thermostat	single wax type in coolant return line
Oil filter	full flow filter with replaceable element
Fan drive	crankshaft driven with temperature controlled viscous coupling
Expantion tank	translucent tank (for visual level check) behind the front grille panel

Auxiliaries and exhaust brake

Compressor	driven from rear timing gears
Alternator	poly V-belt driven at engine front
Steering pump	driven from timing gears (via compressor)
Exhaust brake	pneumatically operated butterfly valve in the exhaust duct
Cold start system	automatically controlled electric grid heater in the air inlet manifold (optional)
Exhaust brake	modulating butterfly valve

PACCAR FR & GR engines

General

Reliability and durability

Building on an excellent reputation for reliability and durability of its Euro 3 predecessor, the PACCAR FR and GR range of engines marks a major evolutionary step to even higher standards.

A reduced number of different components, enhanced oil circulation around the engine with a new sump oil suction tube and redesigned breather and oil drain configuration all contribute to a hard to match sturdiness of the new PACCAR engines.
The direct benefit to the operators is a longer service interval, using E5 mineral oil.

Performance

Both maximum performance and maximum torque are available over a wide rev range.

That's why vehicles with a PACCAR FR or GR engine are easy to drive and even in dense traffic do not require frequent gear shifts.
These characteristics make the FR and GR engines pre-eminently suitable for tough innercity distribution jobs.

The standard exhaust brake delivers up to 95 kW braking power for FR engines and up to 165 kW for GR engines.

Fuel efficiency

The combination of high pressure common rail injection and SCR aftertreatment technology contributes to a very precise control of the combustion process.

The highly efficient combustion results in an excellent fuel economy as another leading edge of the PACCAR FR and GR engines.

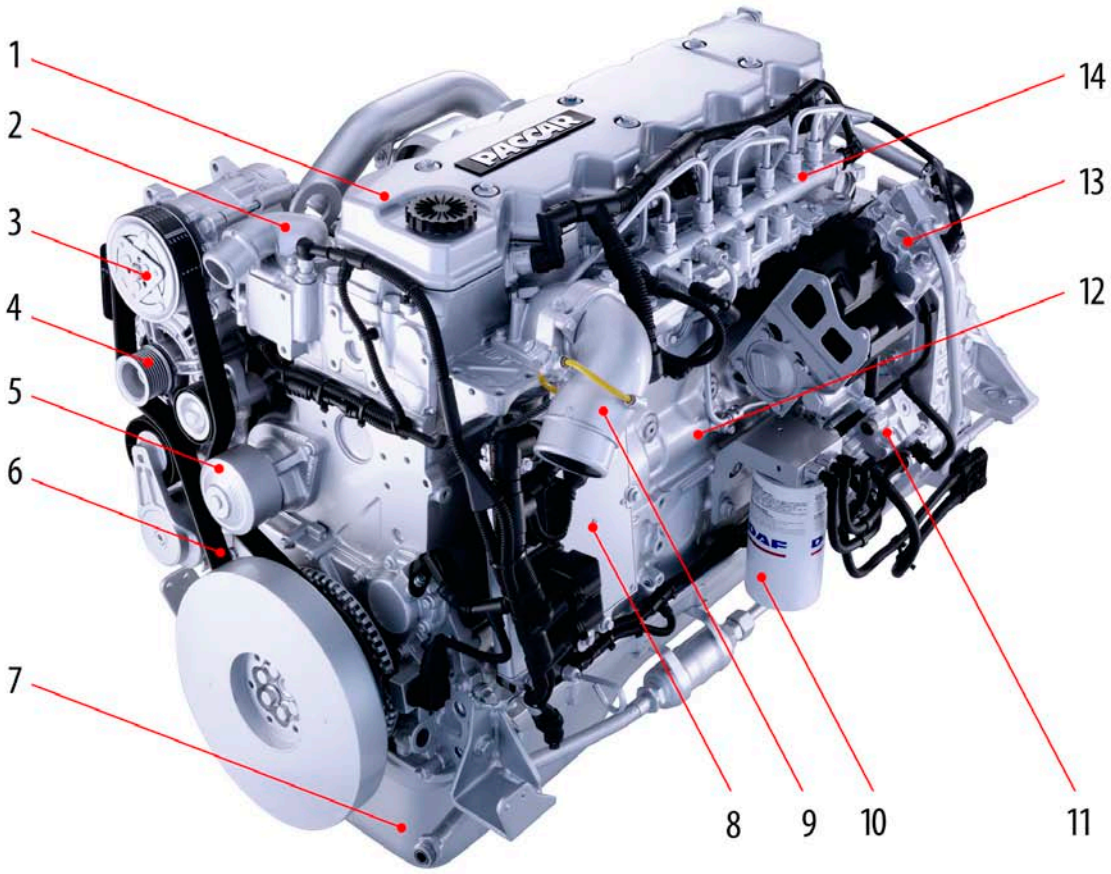
Environment

The PACCAR engines use SCR technology to comply with the most stringent requirements for exhaust gas emissions.

The four-cylinder FR engines comply with the Euro 5-EEV (Enhanced Environmentally friendly vehicle) standard.
The six-cylinder GR engines comply with the Euro 5 standard, with optional EEV compliance.

PACCAR FR & GR engines

lay-out



Legend:

1.	Valve cover	8.	ECU unit
2.	Thermostat housing	9.	Air intake pipe
3.	Airco compressor	10.	Fuel filter
4.	Alternator drive	11.	Fuel pump
5.	Water pump drive	12.	Engine block
6.	Poly-V belt auxiliary drive	13.	Air compressor
7.	Oil sump	14	High-pressure common rail