

Perkins 1100 Series

Models RE, RF, RG, RH, RJ and RK

WORKSHOP MANUAL

4 cylinder diesel engines for industrial, agriculture and construction applications

Publication TPD 1487E, Issue 1.

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The information is correct at the time of print.

Published in October 2002 by Technical Publications.

Perkins Engines Company Limited, Peterborough PE1 5NA, England

This publication is written in
Perkins Approved Clear English

PACE

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1

General information

Introduction

This Workshop Manual has been written to provide assistance in the service and overhaul of Perkins 1100 Series 4 cylinder engines. It should be used in conjunction with normal workshop practise and information contained in current service bulletins. Mention of certain accepted practices therefore, has been purposely omitted in order to avoid repetition. For overhaul procedures the assumption is made that the engine is removed from the application.

The engine conforms with USA (EPA/CARB) stage 2 and EEC stage 2 emissions legislation for agriculture, construction and industrial applications.

Most of the general information which is included in the relevant User's Handbook has not been repeated in this workshop manual and the two publications should be used together.

Where the information applies only to certain engine types, this is indicated in the text.

The details of some operations will be different according to the type of fuel injection pump which is fitted. The specific pump type used can be found by reference to the manufacturer's identification plate on the pump body but, generally, the type of pump fitted is as shown below:

- Delphi - DP210 Series
- Bosch - VP 30
- Bosch - EPVE.

When reference is made to the "left" or "right" side of the engine, this is as seen from the flywheel end of the engine.

Special tools have been made available and a list of these is given in Chapter 16, Special tools. Reference to the relevant special tools is also made at the beginning of each operation.

POWERPART recommended consumable products are listed under "POWERPART recommended consumable products" on page 9. Reference to the relevant consumable products is also made at the beginning of each operation.

Data and dimensions are included in Chapter 2, Specifications.

Read and remember the "Safety precautions" on page 5. They are given for your protection and must be used at all times.

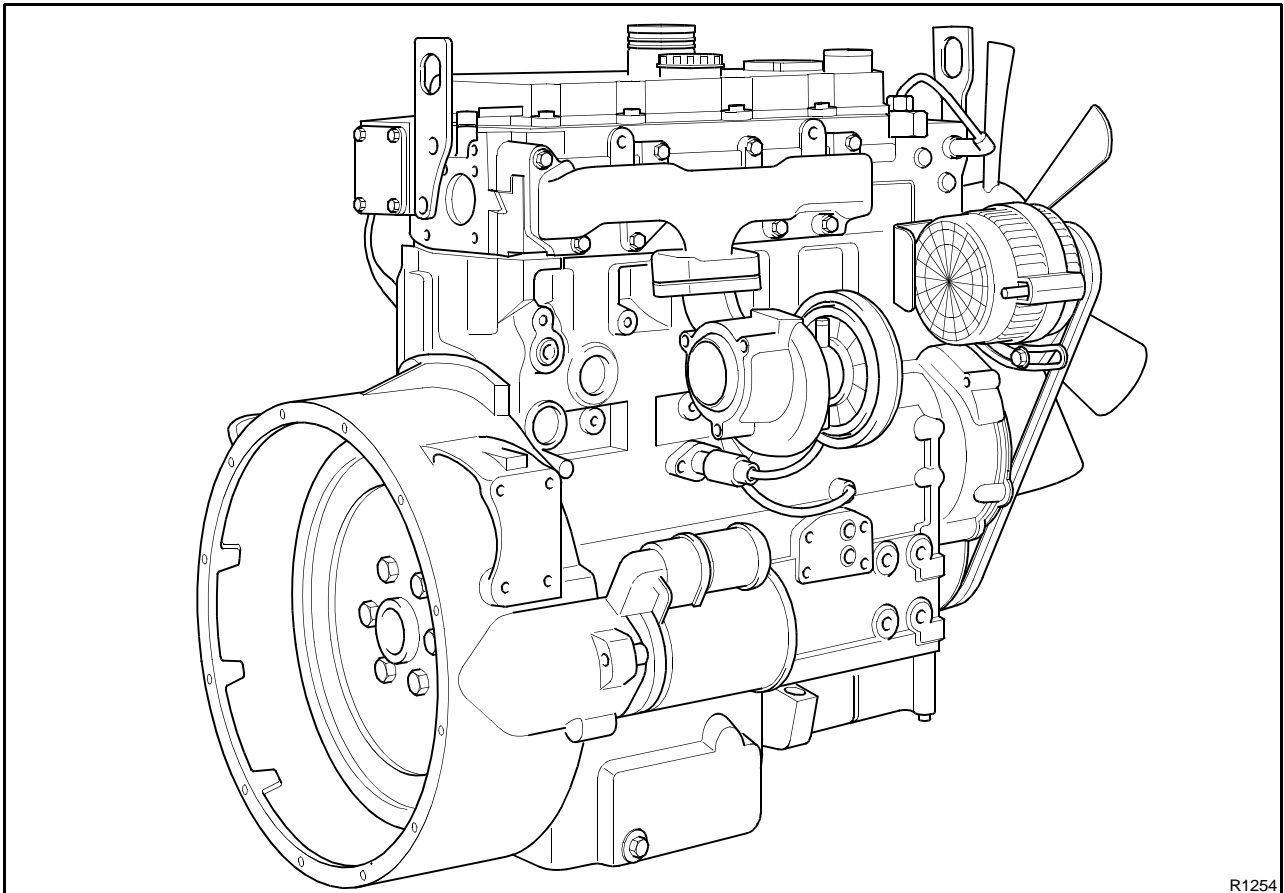
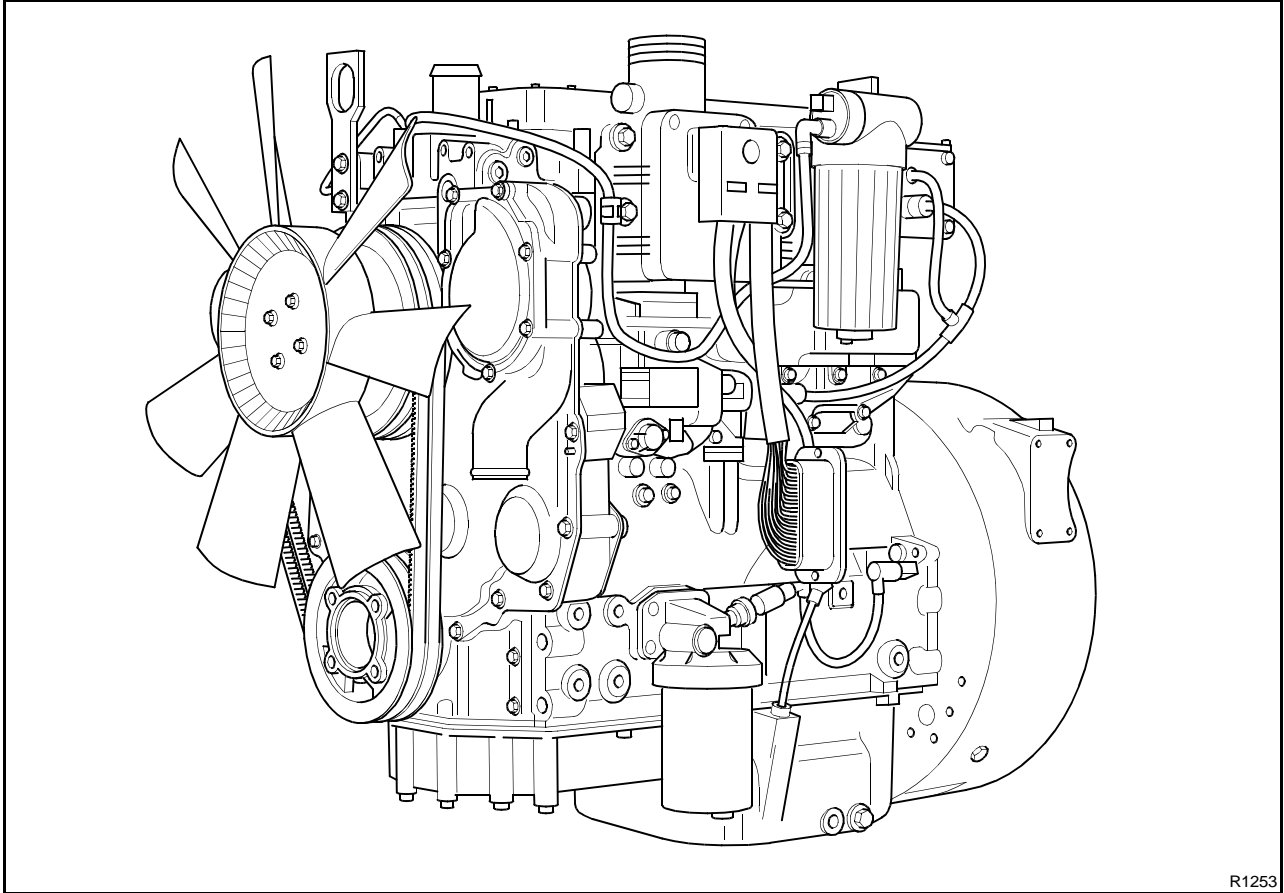
Danger is indicated in the text by two methods:

Warning! *This indicates that there is a possible danger to the person.*

Caution: *This indicates that there is a possible danger to the engine.*

Note: Is used where the information is important, but there is not a danger.

Engine views



Engine identification

The Perkins 1100 Series 4 cylinder engines have been designed for industrial, construction and agricultural applications. There are a range of four cylinder engines with or without electronics, available in naturally aspirated, turbocharged and air to air charge cooled models.

In this Workshop Manual, the different models are indicated by their code letters. The first two letters of the engine number are indicated below:

RE	Naturally aspirated
RF	Naturally aspirated, electronic
RG	Turbocharged
RH	Turbocharged, electronic
RJ	Turbocharged, charge cooled
RK	Turbocharged, charge cooled, electronic

Continued

The Perkins 1100 Series 4 cylinder engines have been designed for agricultural, industrial and construction applications.

The correct identification of the engine is by the full engine number.

The engine number is stamped on a label which is fastened to the left side (A2) of the cylinder block. An example of an engine number is:

RE.....*U.....*

If you need parts, service or information for your engine, you must give the complete engine number to your Perkins Dealer/Distributor. If there is a number in the area of the label marked TPL No, then this number must also be given to your Perkins Dealer/Distributor.

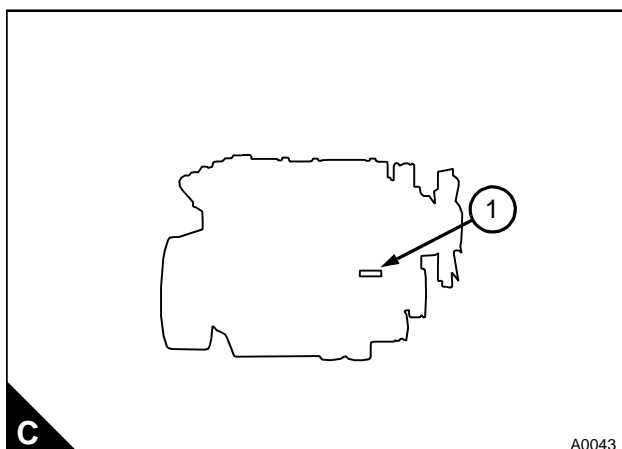
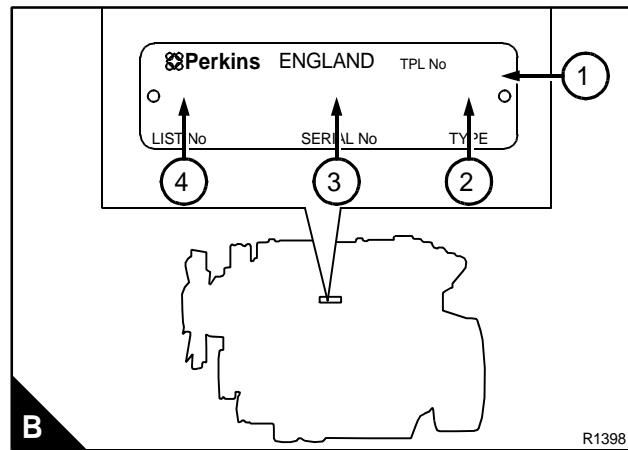
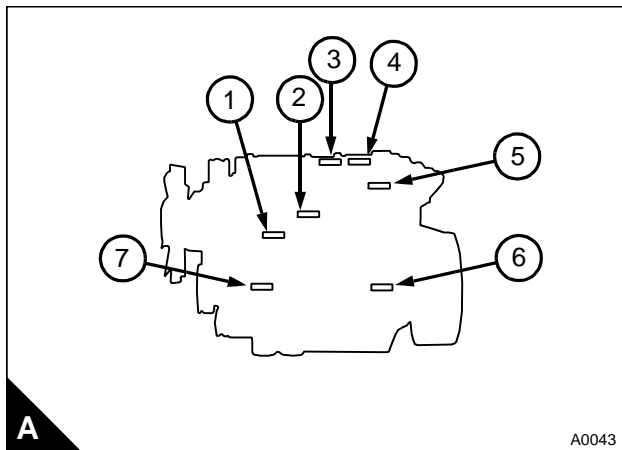
Other identification labels fitted to the engine include:

- A label (A1) with the fuel injection pump part numbers.
- An emissions legislation label (A3), (A6), (A7) and (C1) can be fitted in four different positions on the engine.
- A "Ether" warning label (A5) is fitted on the intake manifold.
- A "caution please read User's Handbook label" (A4) is screen printed into the atomiser cover.

If a short engine has been fitted in service, two engine serial numbers and a TPL number are stamped on the engine serial number label (B3).

The engine serial number plate (B) contains the following information:

- TPL number (1).
- Type (2).
- Serial number (3).
- List number (4).



Safety precautions

These safety precautions are important. You must refer also to the local regulations in the country of use. Some items only refer to specific applications.

- Only use these engines in the type of application for which they have been designed.
- Do not change the specification of the engine.
- Do not smoke when you put fuel in the tank.
- Clean away fuel which has been spilt. Material which has been contaminated by fuel must be moved to a safe place.
- Do not put fuel in the tank while the engine runs (unless it is absolutely necessary).
- Do not clean, add lubricating oil, or adjust the engine while it runs (unless you have had the correct training; even then extreme care must be used to prevent injury).
- Do not make adjustments that you do not understand.
- Ensure that the engine does not run in a location where it can cause a concentration of toxic emissions.
- Other persons must be kept at a safe distance while the engine or auxiliary equipment is in operation.
- Do not permit loose clothing or long hair near moving parts.
- Keep away from moving parts during engine operation.

Warning! *Some moving parts cannot be seen clearly while the engine runs.*

- Do not operate the engine if a safety guard has been removed.
- Do not remove the filler cap, or any component of the cooling system while the engine is hot and while the coolant is under pressure because dangerous hot coolant can be discharged.
- Do not allow sparks or fire near the batteries (especially when the batteries are on charge) because the gases from the electrolyte are highly flammable. The battery fluid is dangerous to the skin and especially to the eyes.
- Disconnect the battery terminals before a repair is made to the electrical system.
- Only one person must control the engine.
- Ensure that the engine is operated only from the control panel or from the operator's position.
- If your skin comes into contact with high-pressure fuel, obtain medical assistance immediately.
- Diesel fuel and lubricating oil (especially used lubricating oil) can damage the skin of certain persons. Protect your hands with gloves or a special solution to protect the skin.
- The combustible material of some components of the engine (for example certain seals) can become extremely dangerous if it is burned. Never allow this burnt material to come into contact with the skin or with the eyes, see "Viton seals" on page 8 for safety precautions.
- Do not wear clothing which is contaminated by lubricating oil. Do not put material which is contaminated with oil into the pockets of clothing.
- Discard used lubricating oil in a safe place to prevent contamination.
- Ensure that the control lever of the transmission drive is in the "out-of-drive" position before the engine is started.
- Use extreme care if emergency repairs must be made in adverse conditions.
- Read and use the instructions relevant to "Engine lift equipment" on page 7.

Continued

- Always use a safety cage to protect the operator when a component is to be pressure tested in a container of water. Fit safety wires to secure the plugs which seal the hose connections of a component which is to be pressure tested.
- Do not allow compressed air to contact your skin. If compressed air enters your skin, obtain medical help immediately.
- Turbochargers operate at high speed and at high temperatures. Keep fingers, tools and items away from the inlet and outlet ports of the turbocharger and prevent contact with hot surfaces.
- Do not clean an engine while it runs. If cold cleaning fluids are applied to a hot engine, certain components on the engine may be damaged.
- Fit only genuine Perkins parts.

Engine lift equipment

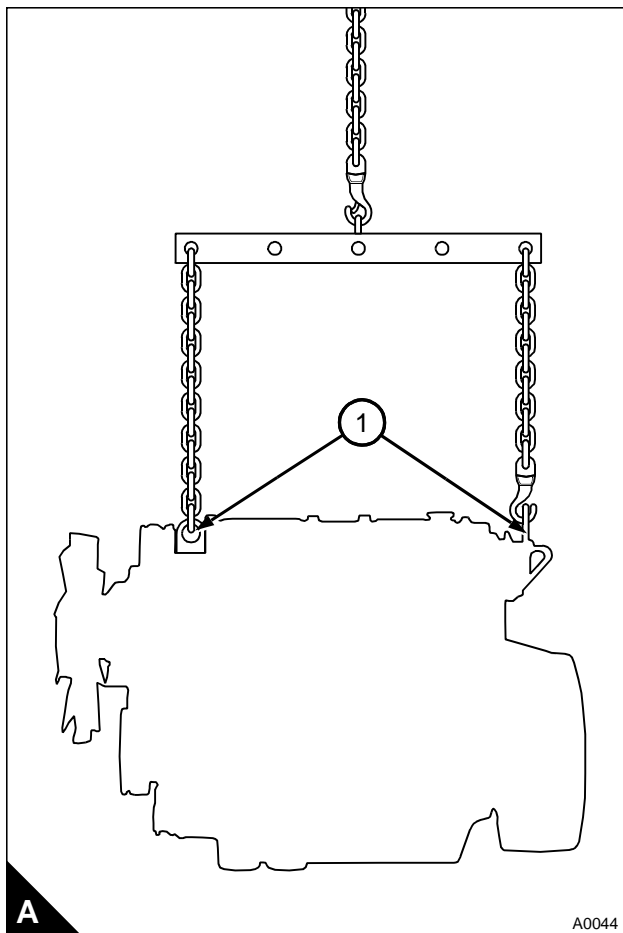
The maximum weight of the engine without coolant, lubricant, or a gearbox fitted will vary for different applications. It is recommended that lift equipment of the minimum capacity listed below is used:

Four cylinder engines	600 kg (1320 lbs)
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Note: Use lift equipment or obtain assistance to lift heavy engine components such as the cylinder block, cylinder head, balancer unit, flywheel housing, crankshaft and flywheel.

Before the engine is lifted:

- Always use lift equipment of the approved type and of the correct capacity to lift the engine. It is recommended that lift equipment of the type shown in (A) is used, to provide a vertical lift directly above the engine lift brackets (A1). Never use a single lift bracket to raise an engine.
- Check the engine lift brackets for damage and that they are secure before the engine is lifted. The torque for the setscrews for the engine lift brackets is 44 Nm (33 lbf ft) 4,5 kgf m.
- To prevent damage to the rocker cover, ensure that there is clearance between the hooks and the rocker cover.



Viton seals

Some seals used in engines, and in components fitted to engines, are made of Viton. Viton is used by many manufacturers and is a safe material under normal conditions of operation.

If Viton is burned, a product of this burnt material is an acid which is extremely dangerous. Never allow this burnt material to come into contact with the skin or with the eyes.

If it is necessary to come into contact with components which have been burnt, ensure that the precautions which follow are used:

- Ensure that the components have cooled.
- Use neoprene gloves and discard the gloves safely after use.
- Wash the area with calcium hydroxide solution and then with clean water.
- Disposal of components and gloves which are contaminated must be in accordance with local regulations.

If there is contamination of the skin or eyes, wash the affected area with a continuous supply of clean water or with calcium hydroxide solution for 15-60 minutes. Obtain immediate medical attention.

Safety cautions when an engine is cleaned

Care should be taken, when an engine is cleaned with a high pressure cleaning system.

Cautions:

- *Do not wash an engine while it runs or while it is hot. If cold cleaning fluids are applied to a hot engine, certain components on the engine could be damaged.*
- *Leave the engine to cool for at least one hour and disconnect the battery connections before cleaning.*
- *Do not wash any part of the fuel injection pump (FIP), cold start device, electrical shut off solenoid (ESOS) or electrical connectors.*
- *Ensure that the alternator, starter motor and any other electrical components are shielded and not directly cleaned by the high pressure cleaning system.*

If these cautions are ignored, the engine or certain components could be damaged, fail to operate and also make the manufacturer's warranty invalid.