

# **Perkins New 1000 Series**

Models AJ to AS and YG to YK

## **WORKSHOP MANUAL**

**4 and 6 cylinder diesel engines for industrial and agricultural applications**

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**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 New 1000 Series engines. For overhaul procedures the assumption is made that the engine is removed from the application. The engine conforms with USA (EPA/CARB) stage 1 and EEC stage 1 emissions legislation for agricultural 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. Generally, the type of pump fitted is as shown below.

- Lucas/Delphi - DP200 Series
- Bosch - EPVE
- Stanadyne - DB4.

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, for a list of these, see Chapter 16, Special tools. Reference to the relevant special tools is also made at the beginning of each operation, where relevant.

POWERPART recommended consumable products are listed on page 8. Reference to the relevant consumable products is also made at the beginning of each operation, where relevant.

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.

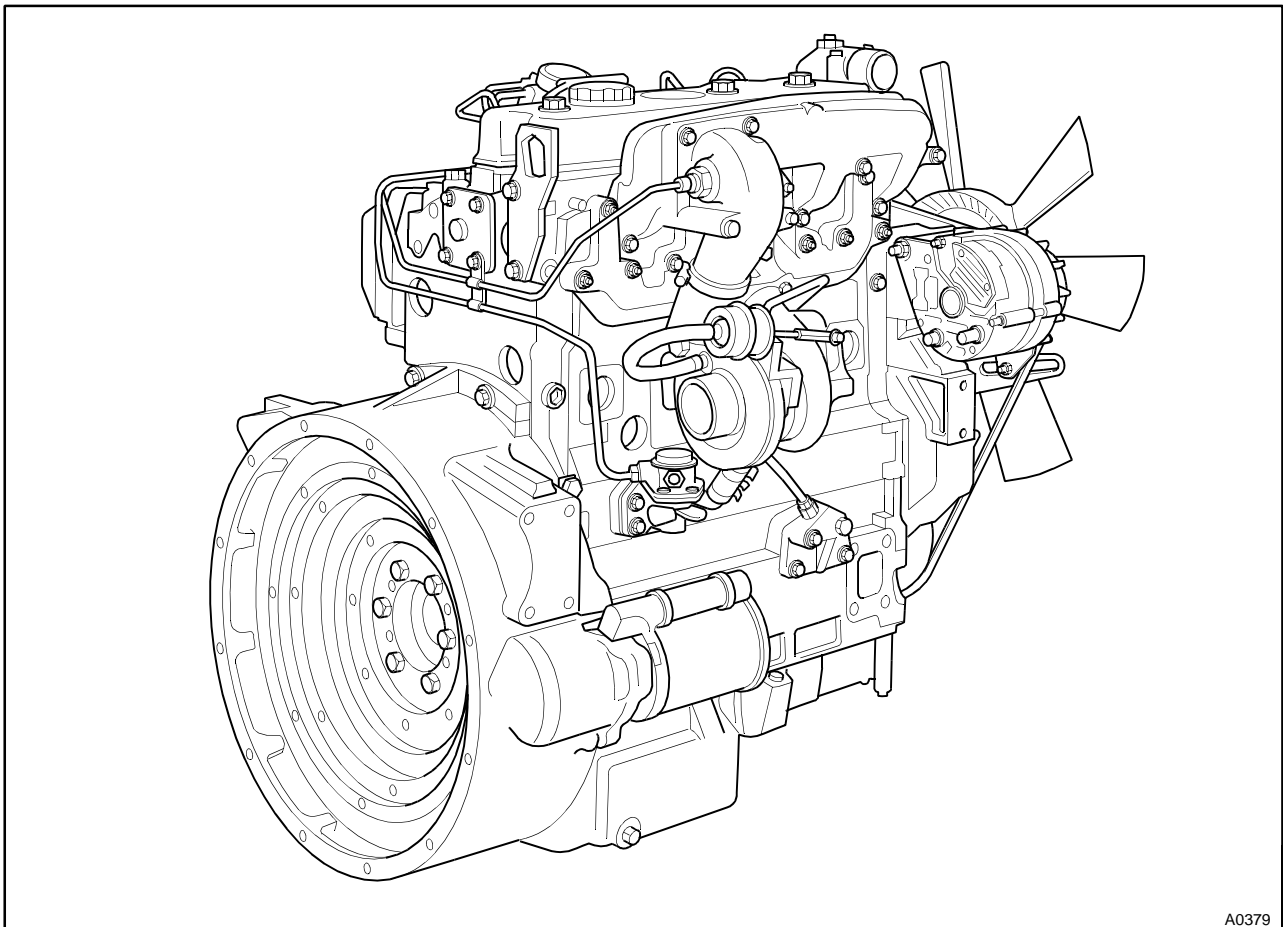
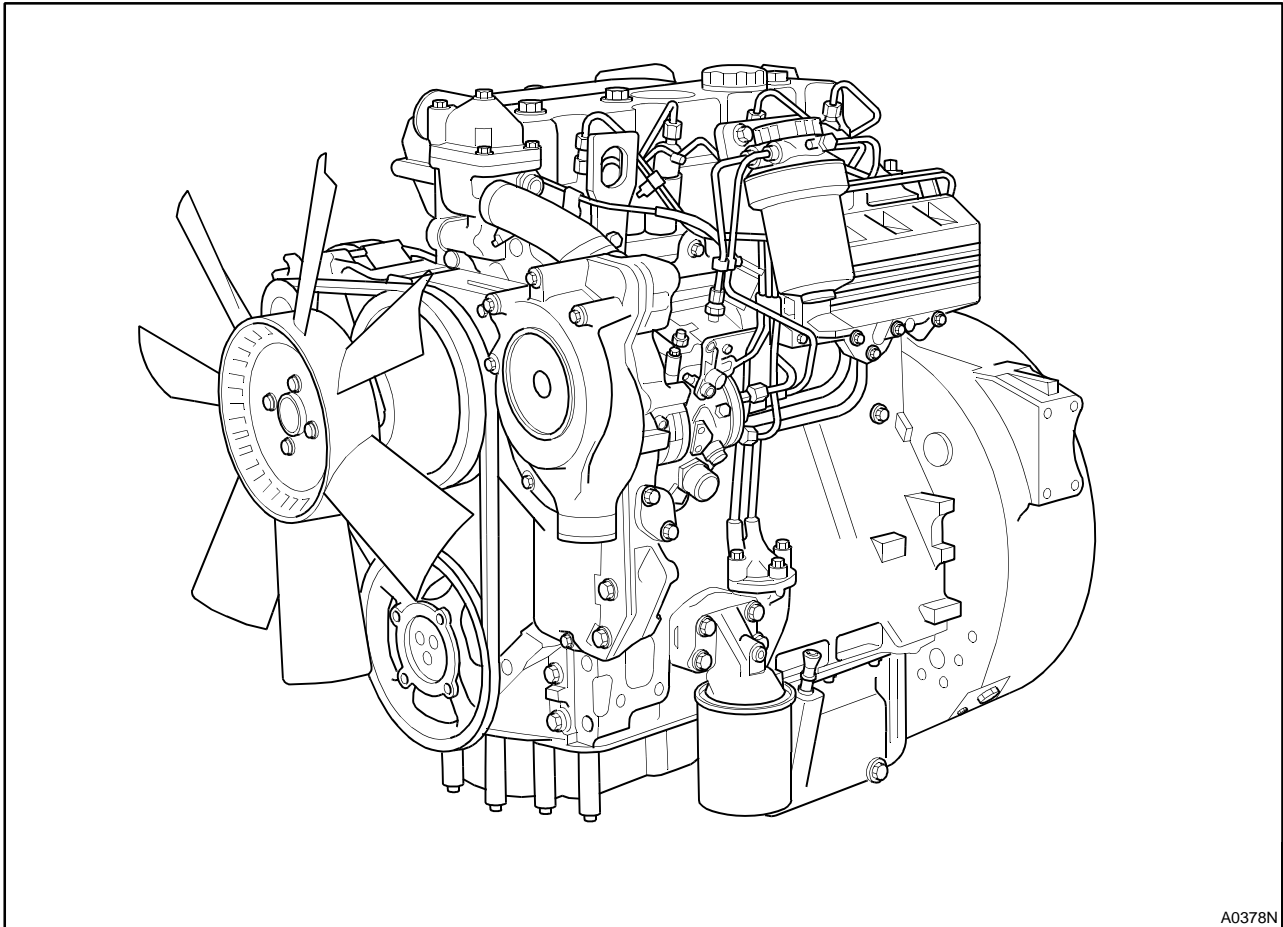
Danger is indicated in the text by two methods:

**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 New 1000 Series engines have been designed for industrial and agricultural applications. There are both four and six cylinder engines, each of which will have three basic engine types, naturally aspirated, turbocharged and turbocharged with an intercooler.

In this workshop manual, the different engine types are indicated by their code letters. These are the first two letters of the engine number as indicated below:

<b>AJ</b>	Four cylinder, naturally aspirated
<b>AK</b>	Four cylinder, turbocharged
<b>AM</b>	Four cylinder, turbocharged and intercooled
<b>AP</b>	Four cylinder, naturally aspirated, belt driven coolant pump
<b>AQ</b>	Four cylinder, turbocharged, belt driven coolant pump
<b>AR</b>	Four cylinder, naturally aspirated, 103 mm cylinder bore
<b>AS</b>	Four cylinder, naturally aspirated, belt driven coolant pump, 103 mm cylinder bore
<b>YG</b>	Six cylinder, naturally aspirated
<b>YH</b>	Six cylinder, turbocharged
<b>YJ</b>	Six cylinder, charge cooled, air to air
<b>YK</b>	Six cylinder, turbocharged and intercooled

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:

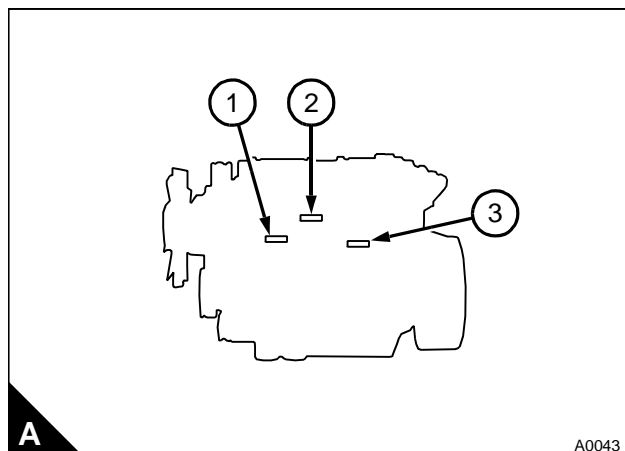
**AK80920\*U510256B\***

The components of the engine number are as follows:

AK80920\*U510256B\*

AK	Model code number
80920	Build list number
U	Built in the UK
510256	Engine serial number
B	Year of manufacture

*Continued*



Date letters for engines start from the 1st of January each year. To comply with the new emissions legislation that engines built before 1st April 1999 can be clearly identified from those built after this date, a new letter has been used from the 1st of April 1999. The date letters used are as follows:

From the 1st of January 1999 to the 31st of March 1999 the date letter is E.

From the 1st of April 1999 to the 31st of January 2000 the date letter is F.

If you need parts, service or information for your engine, you must give the complete engine number to your Perkins 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 distributor.

Other identification labels fitted to the engine include:

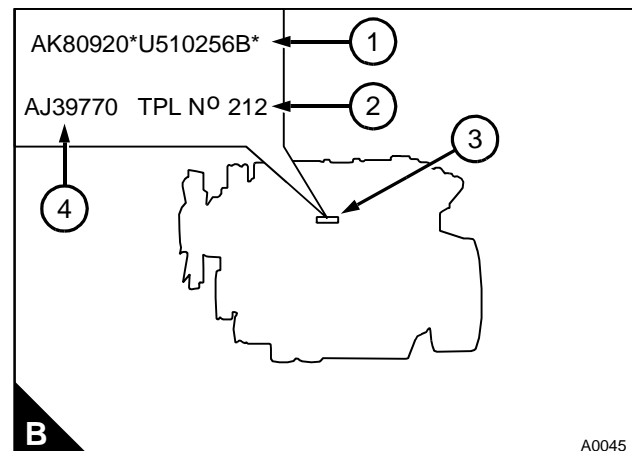
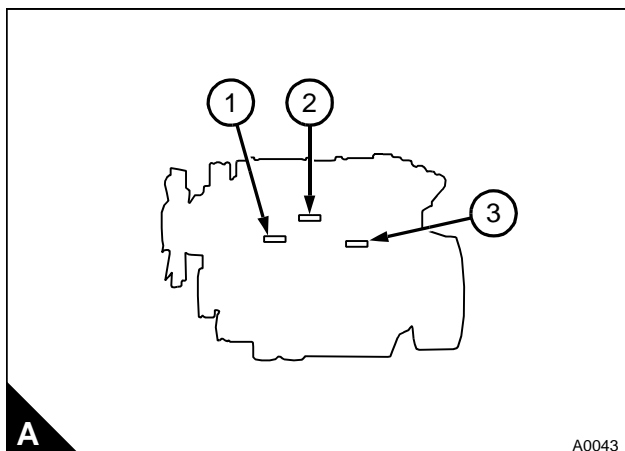
An emissions legislation label (A3) fitted to the side of the cylinder block.

A label (A1) with the fuel injection pump part numbers.

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

Examples of the serial numbers are shown in (B).

If parts for the short engine are needed in service, use the serial number (B4). If parts which were moved from the original engine to the short engine are needed, use the serial number (B1) and the TPL number (B2).



---

## 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 operators 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.
- 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.
- 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 6 for safety precautions.
- Read and use the instructions relevant to lift equipment, see "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.

## **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.