

workshop manual for 4.108 4.107 and 4.99 diesel engines

©

Perkins Group Limited

Peterborough England

1983

All Rights Reserved

Publication No. 601 SER 0383 1072

This publication supersedes the previous edition numbered 601 SER 12771072 and incorporates amendment page sets 1 and 2 issued during 1986 and 1991.

This publication is written for world wide use. In territories where legal requirements govern smoke emission, noise, safety factors etc., then all instructions, data and dimensions given must be applied in such a way that, after servicing (preventive maintenance) or repairing an engine, it does not contravene the local regulations in use.

PERKINS COMPANIES

AUSTRALIA	Perkins Engines Australia Pty. Ltd. Suite 2, 364 Main Street, Mornington 3931, Victoria, Australia. Telephone: 597 51877. Telex: Perkoil AA30816. Fax: 597 58793.
FRANCE	Moteurs Perkins S.A. 9-11 Avenue Michelet, 93583 Saint Ouen, Cedex, France. Telephone: (1) 40 10 42 00. Telex: 642924F. Fax: (1) 40 10 42 45.
GERMANY	Perkins Motoren G.m.b.H. 8752 Kleinostheim, Postfach 1180, Germany. Telephone: Kleinostheim 6027 5010. Telex: 4188869A PER D. Fax: 6027 501124.
ITALY	Motori Perkins S.p.A. Via Socrate 8, 22070 Casnate con Bernate (Como), Italy. Telephone: (031) 452332. Telex: 380658 Perkit I. Fax: (031) 452335.
JAPAN	Varity (Japan) K.K. Reinzaka Building, 5th Floor, 14-2 Akasaka, 1-chome, Minato-ku, Tokyo 107, Japan. Telephone: (03) 586 7377. Telex: Perkoil J2424823. Fax: (03) 582-1596.
SINGAPORE	Perkins Engines Asia Pacific, 4 Kian Teck Drive, Singapore 2262. Telephone: 2656333/2653223. Telex Perkoil RS37729. Fax: 2641188.
UNITED KINGDOM	Perkins Power Sales and Service, Eastfield, Peterborough, PE1 5NA, England. Telephone: (0733) 67474. Telex 32501 Perken G. Fax: (0733) 582240. Perkins Engines (Shrewsbury) Limited, Sentinel Works, Shrewsbury SY1 4DP, England. Telephone: (0743) 52262. Telex: 35171/2 PESL G. Fax: (0743) 69911.
U.S.A.	Perkins Engines Inc., 1700 Bellemeade Court, Lawrenceville, Georgia 30245, U.S.A. Telephone: 404 822 3000. Telex: 544141 Perken Law. Fax: 404 822 3006. Perkins Engines Latin America Inc., Suite 620, 999 Ponce de Leon Boulevard, Coral Gables, Florida 33134, U.S.A. Telephone: 305 442 7413. Telex: 32501 Perken G. Fax: 305 442 7419.

In addition to the above, there are Perkins distributors in most countries. Perkins Power Sales and Service Ltd., Peterborough or one of the above companies can give details.

FOREWORD

This workshop manual has been compiled for use in conjunction with normal workshop practice. Mention of certain accepted practices therefore, has been purposely omitted in order to avoid repetition.

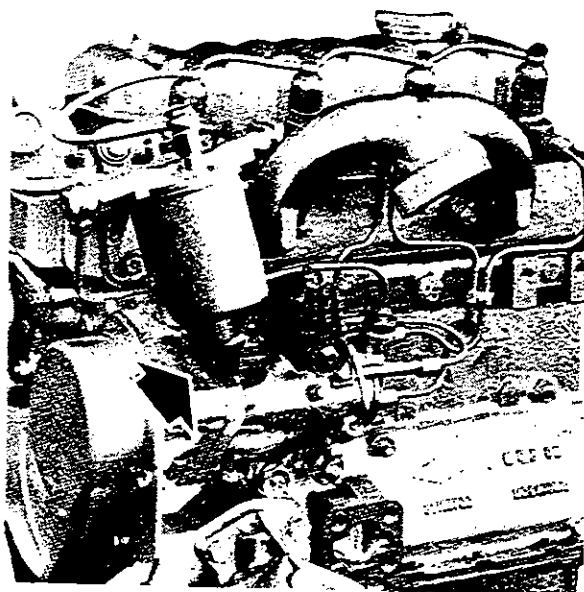
Reference to renewing joints and cleaning off joint faces has to a great extent been omitted from the text, it being understood that this will be carried out where applicable.

Similarly, it is understood that in reassembly and inspection, all parts are to be thoroughly cleaned and where present, burrs and scale are to be removed.

It follows that any open ports of high precision components, e.g., fuel injection equipment, exposed by dismantling, will be blanked off until reassembled, to prevent the ingress of foreign matter.

When setscrews or studs are fitted into holes which are tapped through into the inside of the engine, a suitable sealant must be used on the threads.

Throughout this manual, whenever the "left" or "right" hand side of the engine is referred to, it is that side of the engine as viewed from the flywheel end.



The engine number is stamped on the fuel pump mounting flange as shown in the above illustration.

Three systems of engine numbering have been used.

On very early engines the serial number consisted of seven digits as follows:—

Engine Type	Typical Engine Number
4.108	7300269
4.107	7100399
4.99	7000251

Identification on these engines can be identified by observing the first two figures of the engine number which remain constant depending on engine type.

With later engines, the number consisted of figures and letters:—

Engine Type	Typical Engine Number
4.108	108U251
4.107	107U251
4.99	99U251

The first figures represent the capacity of the engine in cubic inches, the letter "U" signifies that the engine was built in the United Kingdom and the last group of figures comprises the engine serial number.

On current engines, the number can consist of up to fifteen letters and figures, a typical number being ED21512U510256D

SAFETY PRECAUTIONS



THESE SAFETY PRECAUTIONS ARE IMPORTANT. You must refer also to the local regulations in the country of use. Some items only apply 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 caution 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 equipment, is in operation.
- Do not permit loose clothing or long hair near moving parts.
- Keep away from moving parts during engine operation. Attention: 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 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 use salt water or any other coolant which can cause corrosion in the closed coolant circuit.
- 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 operation 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.
- Do not wear clothing which is contaminated by lubricating oil. Do not put material which is contaminated with oil into the pockets.
- Discard used lubricating oil in a safe place to prevent contamination.
- Do not move mobile equipment if the brakes are not in good condition.
- Ensure that the control level 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 at sea or 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.
- Fit only genuine Perkins parts.

ASBESTOS JOINTS



Some joints and gaskets contain compressed asbestos fibres in a rubber compound or in a metal outer cover. The "white" asbestos (Chrysotile) which is used is a safer type of asbestos and the risk of damage to health is extremely small.

The risk of asbestos from joints occurs at their edges or if a joint is damaged when a component is removed or if a joint is removed by abrasion.

To ensure that the risk is kept to a minimum, the procedures given below must be applied when an engine which has asbestos joints is dismantled or assembled.

- Work in an area with good ventilation.
- Do not smoke.
- Use a hand scraper to remove the joints — do not use a rotary wire brush.
- Ensure that the joint to be removed is wet with oil or water to contain loose particles.
- Spray all loose asbestos debris with water and put it in a closed container which can be sealed for safe disposal.

CONTENTS

ENGINE VIEWS	A
TECHNICAL DATA	B
OPERATING AND MAINTENANCE	C
FAULT FINDING	D
CYLINDER HEAD	E
PISTONS AND CONNECTING RODS	F
CYLINDER BLOCK AND LINERS	G
CRANKSHAFT AND MAIN BEARINGS	H
TIMING CASE AND DRIVE	J
TIMING	K
LUBRICATING SYSTEM	L
COOLING SYSTEM	M
AIR CLEANERS AND FUEL SYSTEM	N
FLYWHEEL AND HOUSING	P
ELECTRICAL EQUIPMENT	Q
ENGINES FOR REFRIGERATION UNITS	R
APPROVED LUBRICATING OILS	Appendix
APPROVED SERVICE TOOLS	"
INDEX	"

EXAMPLES OF SERVICE FACILITIES

Service

If any problems occur with your engine or the components fitted to it, your Perkins distributor can make the necessary repairs and will ensure that only the correct parts are fitted and that the work is done correctly.

Certain components can be supplied by your Perkins distributor through the Perkins Power exchange system. These will enable you to reduce the cost of some repairs.

Extended Warranty

The engine warranty period can be extended to two years. For details, get in contact with your nearest Perkins distributor.

Service Literature

Users handbooks and other service publications are available from your Perkins distributor at a nominal cost.

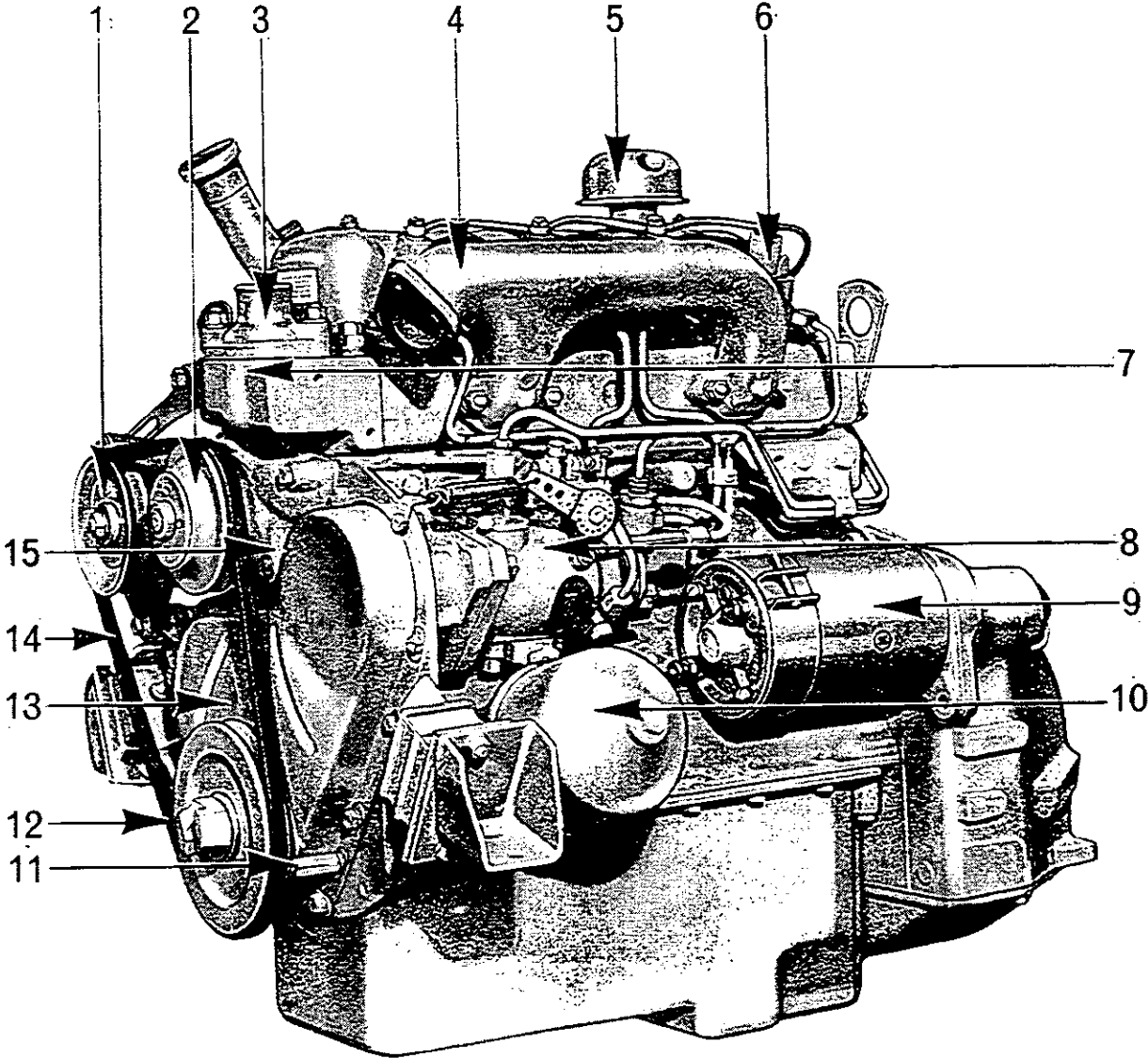
Training

Local training on correct engine operation, overhaul and service is available at some Perkins distributors. If special training is needed, your Perkins distributor can give details on how to get this at the Product Education Department, Peterborough, or other main centres.

SECTION A
Engine Views

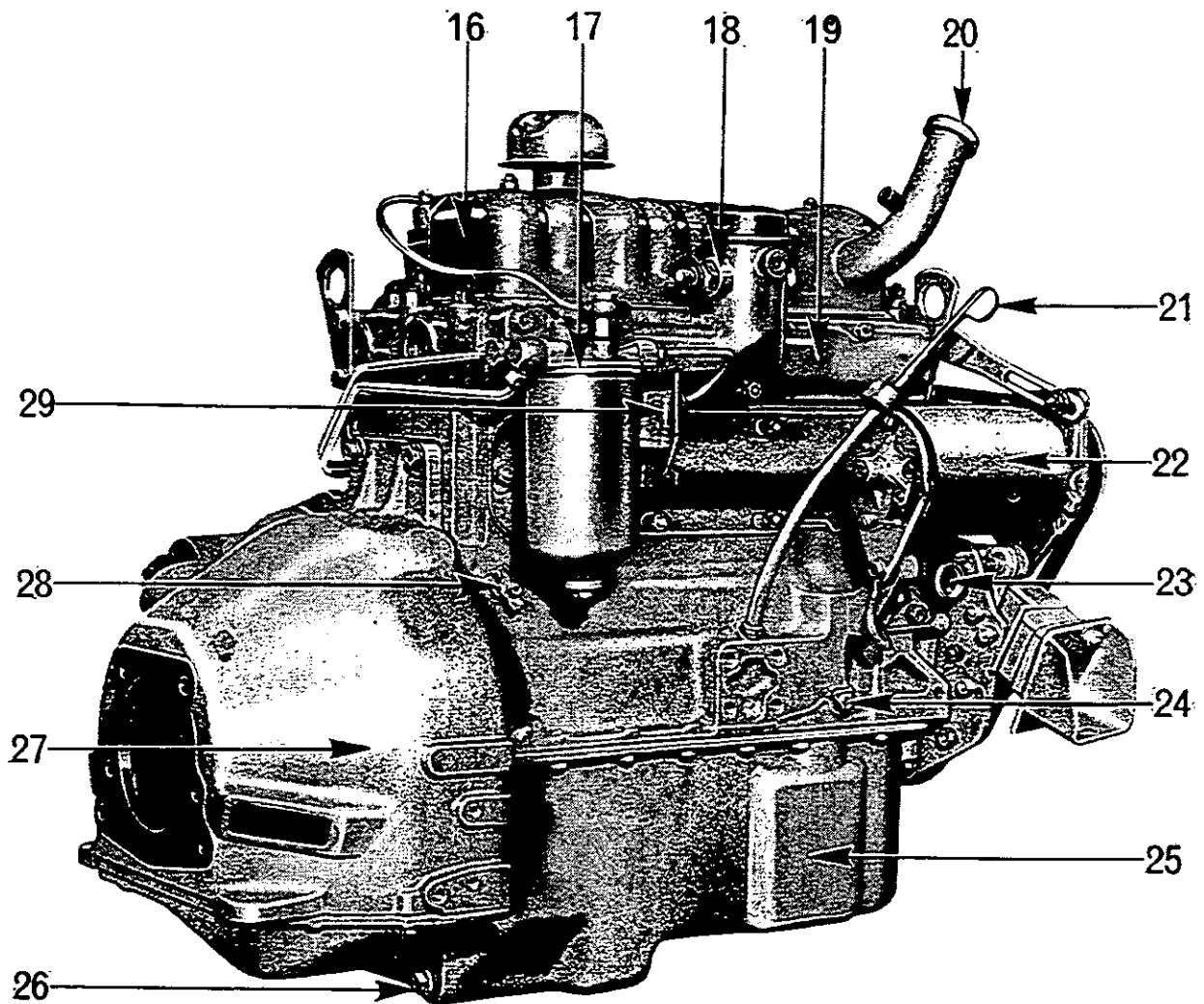
Index to Engine Views

- 1 Dynamo Pulley
- 2 Water Pump Pulley
- 3 Water Outlet
- 4 Exhaust Manifold
- 5 Breather
- 6 Atomiser
- 7 Thermostat Housing
- 8 Fuel Injection Pump
- 9 Starter Motor
- 10 Lubricating Oil Filter
- 11 Timing Pin
- 12 Crankshaft Pulley
- 13 Timing Case
- 14 Fan Belt
- 15 Water Pump
- 16 Cylinder Head Cover
- 17 Fuel Oil Filter
- 18 Starting Aid
- 19 Induction Manifold
- 20 Lubricating Oil Filter
- 21 Dipstick
- 22 Dynamo
- 23 Water Inlet
- 24 Lubricating Oil Pump Locating Setscrew
- 25 Lubricating Oil Sump
- 26 Sump Drain Plug
- 27 Flywheel Housing
- 28 Cylinder Block Drain Tap
- 29 Fuel Lift Pump



VIEW OF FUEL PUMP SIDE OF ENGINE

ENGINE VIEWS—A.4



VIEW OF CAMSHAFT SIDE OF ENGINE