Fault Finding Guide for Diesel Engines
## CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTRODUCTION</td>
<td>4</td>
</tr>
<tr>
<td>STARTING PROBLEMS</td>
<td>5</td>
</tr>
<tr>
<td>Low cranking speed</td>
<td>6</td>
</tr>
<tr>
<td>Cold engine will not start</td>
<td>8</td>
</tr>
<tr>
<td>Engine is difficult to start</td>
<td>10</td>
</tr>
<tr>
<td>Engine starts and stops</td>
<td>12</td>
</tr>
<tr>
<td>Engine will not start cold or hot</td>
<td>14</td>
</tr>
<tr>
<td>ENGINE MISFIRES</td>
<td>16</td>
</tr>
<tr>
<td>LACK OF POWER</td>
<td>18</td>
</tr>
<tr>
<td>EXCESSIVE FUEL CONSUMPTION</td>
<td>20</td>
</tr>
<tr>
<td>BLACK EXHAUST</td>
<td>22</td>
</tr>
<tr>
<td>ENGINE KNOCKING</td>
<td>24</td>
</tr>
<tr>
<td>BLUE/WHITE EXHAUST</td>
<td>26</td>
</tr>
<tr>
<td>EXCESSIVE LUBRICATING OIL CONSUMPTION</td>
<td>29</td>
</tr>
<tr>
<td>POOR COMPRESSION</td>
<td>30</td>
</tr>
<tr>
<td>OVERHEATING</td>
<td>32</td>
</tr>
<tr>
<td>EXCESSIVE CRANKCASE PRESSURE</td>
<td>34</td>
</tr>
<tr>
<td>ERRATIC RUNNING</td>
<td>36</td>
</tr>
<tr>
<td>VIBRATION</td>
<td>38</td>
</tr>
<tr>
<td>LOW OIL PRESSURE</td>
<td>40</td>
</tr>
<tr>
<td>HIGH OIL PRESSURE</td>
<td>42</td>
</tr>
<tr>
<td>EXAMPLES OF SERVICE ASSISTANCE</td>
<td>44</td>
</tr>
</tbody>
</table>

## PERKINS COMPANIES

### AUSTRALIA

### FRANCE

### GERMANY
Perkins Motoren G.m.b.H., 8712 Kleinostheim, Postfach 1190, Germany. Telephone: 08027 6010, Telex: 4189998.

### GREAT BRITAIN

### ITALY

### JAPAN
Perkins Engines K.K., 8th Floor, Reinaranzaki Building, 14-2 Akasaka, I-chome, Minato-ku, Tokyo 107, Japan. Telephone: (03) 586 7377, Telex: J2242823 Perkoll J.

### U.S.A.

In addition to the above, there are Perkins distributors in most countries. Perkins Engines Ltd., Peterborough or one of the above companies can given details.
INTRODUCTION
This Fault Finding Guide should assist in the identifying of the probable cause of the problems which can occur. Having identified the problem, a remedy can be applied.
The relevant Workshop Manual should be consulted for any required detail.
The fuel injection equipment fitted to diesel engines is manufactured to extremely tight tolerances and cannot tolerate the ingress of any dirt particles. Therefore, if the fuel injection equipment, such as the lift pump, the fuel injection pump or the atomisers are suspect, then the equipment should be removed from the engine to the specialised fuel injection equipment workshop for testing and repair, or new replacement components fitted.

WARNING
Removal of the seals, or the breaking of the seals, on fuel injection pumps, will render any warranty claim on an engine, null and void.

Before commencing any work on a Perkins engine, ensure that you understand what the complaint is. For example, if the user complains that the engine is knocking, can you hear the knock which is being complained about.
If it becomes necessary to use new parts, ensure that the parts you use are genuine Perkins Parts. Your authorised Perkins parts counter will supply the proper part against the Perkins engine serial number.
LOW CRANKING SPEED

INCORRECT GRADE OF LUBRICATING OIL

Check with the user or his supplier that the oil brand and viscosity is in accordance with the approved list. See the relevant Service Literature.

BATTERY CAPACITY LOW (VOLTAGE)

Ensure that the battery is to the manufacturer's specification. Check the battery capacity and replace if necessary.

BAD ELECTRICAL CONNECTIONS BETWEEN BATTERY, STARTER MOTOR AND EARTH

Check for corroded or loose connections. Clean, tighten or remake connections as necessary using the correct cable specification.

FAULTY STARTER MOTOR

Check the voltage drop at the starter motor with the starter switched on. Check with the manufacturer's specification.

- Voltage drop normal
  - Replace or repair starter motor

- Voltage drop excessive
  - Have auto-electrician investigate further
COLD ENGINE WILL NOT START

INCORRECT USE OF COLD STARTING EQUIPMENT

Refer to the Perkins handbook, check that the book being used is relevant to the engine type with the problem.

FAULTY COLD STARTING EQUIPMENT

Check the continuity of the electrical circuit in the cold starting equipment by an indicated voltage at the heater terminals when switched on.

The CAV "Thermostart" is fitted to many types of Perkins engines and with the air cleaner or hose removed from the induction manifold, the functioning of the unit can usually be seen.

When the unit is switched to the "heat" or "H" position, the "Thermostart" should glow and as the fuel valve in the unit opens, a flame should appear. If not, then there is either no fuel available, or the "Thermostart" is faulty.

Glow plugs can also be found fitted in Perkins engines. When 12 volt glow plugs are first switched on, there is an initial current of about 40 amperes settling to about 10 amperes after about 10 seconds, with a terminal voltage of 11-12 volts.

Some in-line fuel injection pumps are fitted with an excess fuel device. Check that the remote controls are operating satisfactorily.

If "Start Pilot" aids are used, ensure the equipment is used strictly according to the manufacturer's instructions. Never attempt to use heaters in conjunction with ether type starting aids.

INCORRECT GRADE OF FUEL

Where necessary, check the specification of the fuel with the supplier, against the relevant Service Literature.

See sections
"LOW CRANKING SPEEDS" on page 6
"ENGINE IS DIFFICULT TO START" on page 10
"ENGINE WILL NOT START" on page 14
ENGINE IS DIFFICULT TO START

Assuming that the problems
LOW CRANKING SPEED
and
COLD ENGINE WILL NOT START
have been resolved, proceed as follows:

AIR IN THE FUEL SYSTEM

BLEED THE SYSTEM OF AIR AS IN THE RELEVANT SERVICE LITERATURE.

RESTRICTED FUEL FEED PIPE
OR
BLOCKED VENT IN THE FUEL TANK

TRACE AND RECTIFY RESTRICTION OR BLOCKAGE.

CHOKED FUEL FILTERS

RENEW FUEL FILTER ELEMENT(S).

DEFECTIVE FUEL LIFT PUMP

CHECK LIFT PUMP OPERATION, IF INSUFFICIENT FUEL IS FLOWING, REPAIR OR REPLACE FUEL LIFT PUMP.

POOR COMPRESSIONS

CHECK, AS IN THE "POOR COMPRESSION" SECTION.

STICKING VALVES
OR
INCORRECT VALVE TIP CLEARANCE

ADJUST VALVE TIP CLEARANCE ACCORDING TO THE RELEVANT MANUAL. INSPECT VALVES, GUIDES, SPRINGS AND ROCKER ASSEMBLY FOR WEAR.

INCORRECT FUEL PUMP TIMING
OR
INCORRECT VALVE TIMING

CHECK ALL ASPECTS OF VALVE AND FUEL PUMP TIMING ACCORDING TO THE RELEVANT MANUAL.

EXHAUST PIPE RESTRICTION

EXAMINE THE COMPLETE EXHAUST SYSTEM, CHECKING FOR DENTS OR KINKS IN THE PIPES, CHECK FOR BROKEN MUFFLERS.

DEFECTIVE OR INCORRECT ATOMISERS

CHECK THAT THE CORRECT PART NUMBER IS FITTED. REPLACE OR SERVICE ALL THE ATOMISERS.

DEFECTIVE FUEL INJECTION PUMP

REMOVE PUMP FOR ATTENTION BY SPECIALISED WORKSHOP OR FIT REPLACEMENT PUMP.
# Engine Starts and Stops

<table>
<thead>
<tr>
<th>Condition</th>
<th>Possible Cause</th>
<th>Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insufficient Fuel in Tank</td>
<td></td>
<td>Ensure that the fuel level in the tank is sufficient, if too low it may allow air to be drawn into the system at intervals, consequently stopping the engine.</td>
</tr>
<tr>
<td>Air in Fuel System</td>
<td></td>
<td>Bleed the fuel system as instructed in the relevant Service literature.</td>
</tr>
<tr>
<td>Check Low Pressure Fuel Pipes on Suction Side, For Hairline Cracks or Loose Connections Allowing Air into the System</td>
<td></td>
<td>Rectify as necessary.</td>
</tr>
<tr>
<td>Blocked Fuel Tank Vent</td>
<td></td>
<td>Check and rectify as necessary.</td>
</tr>
<tr>
<td>Choked Fuel Filter/s</td>
<td></td>
<td>Check and renew as necessary.</td>
</tr>
<tr>
<td>Restriction in Fuel Return Pipe</td>
<td></td>
<td>Ensure that the fuel return pipe from the injection pump is not restricting fuel return in any way. i.e. Blocked, kinked, etc., as this will cause the engine to stop as the rev/min is raised.</td>
</tr>
<tr>
<td>Restriction in the Induction System</td>
<td></td>
<td>Check air cleaner/element, renew if dirty. Ensure that no restriction is present in induction piping.</td>
</tr>
<tr>
<td>Sticking Atomiser/s</td>
<td></td>
<td>Remove for attention of specialised workshop.</td>
</tr>
<tr>
<td>Exhaust Pipe Restriction</td>
<td></td>
<td>Check and clear restriction.</td>
</tr>
</tbody>
</table>
ENGINE WILL NOT START

INSUFFICIENT FUEL IN TANK → Ensure that there is sufficient fuel in the tank.

FAULTY STOP CONTROL OPERATION → Ensure that the engine stop control operation is functioning, and is in the run position.

See Sections:
LOW CRANKING SPEED page 6
COLD ENGINE DOES NOT START page 8
ENGINE IS DIFFICULT TO START page 10 → Ensure items in these sections are in order.

BROKEN FUEL INJECTION PUMP DRIVE → Check by removing the fuel injection pump inspection plate (see relevant Service Literature), turn the engine and check that the inside of the pump is rotating. If not, remove it and check the quill (drive) shaft of the pump, the drive (timing) gears and/or the auxiliary fuel injection pump drive arrangement.
ENGINE MISFIRES

RESTRICTION IN THE INDUCTION MANIFOLD

Check air cleaner/element condition. Check for dents or kinks in the hoses and pipes and examine the induction manifold for any obstruction.

INCORRECT TYPE, OR CROSSED HIGH PRESSURE PIPES

No. 1 outlet on fuel injection pumps is given in relevant Service Literature. Check rotation of pump and engine firing order for correct pipe fitting.

AIR IN THE FUEL SYSTEM, RESTRICTED FUEL FEED PIPE, OR INCORRECT VALVE TIP CLEARANCES

Refer to Section "Engine is difficult to start" on page 10.

DEFECTIVE FUEL LIFT PUMP

Remove outlet pipe and check there is sufficient fuel available from the lift pump, if in doubt replace unit.

BROKEN OR WEAK VALVE SPRINGS, STICKING VALVES, OR INCORRECT VALVE TIP CLEARANCES

Refer to relevant Service literature to check valve spring length at a known load. Adjust valve tip clearances.

INCORRECT FUEL PUMP TIMING OR INCORRECT VALVE TIMING

Check engine timing by referring to the relevant Service literature.

DEFECTIVE OR INCORRECT TYPE FUEL INJECTION PUMP, DEFECTIVE OR INCORRECT TYPE ATOMISERS

Check that the correct part number is fitted. Remove equipment to the specialised fuel injection workshop for checking and servicing.

POOR COMPRESSIONS

Refer to the "POOR COMPRESSION" section.

OVERHEATING

Refer to the "OVERHEATING" section.
LACK OF POWER

Confirm the complaint by a road test, ensuring that the engine reaches normal operating temperature and that the test conditions are in order.

STOP CONTROL

STICKING ENGINE SPEED CONTROL OR ITS RESTRICTED MOVEMENT

RESTRICTION IN THE INDUCTION SYSTEM

AIR IN THE FUEL SYSTEM, RESTRICTED FUEL FEED PIPE, CHOKED FUEL FILTERS OR BLOCKED FUEL TANK VENT

DEFECTIVE FUEL LIFT PUMP

INCORRECT FUEL INJECTION PUMP TIMING OR INCORRECT VALVE TIMING

EXHAUST SYSTEM RESTRICTION

POOR BOOST PRESSURE (where turbocharger is fitted)

DEFECTIVE OR INCORRECT TYPEATOMISERS DEFECTIVE OR INCORRECT TYPE FUEL INJECTION PUMP

INCORRECT VALVE TIP CLEARANCES

POOR COMPRESSIONS

TEST CONDITIONS

- Ensure vehicle or machine load is not excessive.
- Tyre sizes and pressures are as recommended.
- The road wheels rotate freely and no brakes are binding.
- Ensure axle drive ratios are in correct specification.
- The clutch or free-wheeling system is functioning correctly.
- Consider accessories fitted (wind resistance with vehicles).

Ensure it is in the fully “run” position.

Check that all engine speed control linkages are free and that maximum movement is achieved.

Check air cleaner/element condition. Check for dents or kinks in the hoses and pipes and examine the induction manifold for any obstructions.

Refer to the section “Engine is difficult to start” on page 10.

Remove outlet pipe and check there is sufficient fuel available from the lift pump, if in doubt replace the unit.

Check all aspects of fuel pump and valve timing according to the relevant Service literature.

Examine the complete exhaust system, checking for dents or kinks in the pipes, check for broken mufflers.

Check turbocharger for:

- excessive air inlet depression
- all induction pipes and joints are in order
- restricted exhaust from turbine
- low or high air delivery pressure
- low oil pressure and/or poor oil drain
- fuel injection pump fueling.

On boost controlled engines, ensure there are no leaks on the pipe from induction manifold to fuel pump.

Check that the correct part number is fitted. Remove the equipment to the specialised fuel injection workshop for checking and servicing.

See relevant Service literature for correct valve tip clearances.

Refer to the “POOR COMPRESSION” section on page 30.
EXCESSIVE FUEL CONSUMPTION

FUEL LEAKS

Effect a fuel consumption test to confirm the complaint ensuring that the test conditions are in order as in section "Lack of power" on page 16.

DILUTION OF THE LUBRICATING OIL BY FUEL OIL

With the engine stopped, check the low pressure fuel pipes for leaks and rectify.

A cold running engine can cause solid fuel to wash down the cylinder bores.

A defective lift pump diaphragm can allow fuel to leak into the engine sump (pan).

Faulty seals on the drive shaft of the fuel injection pump may allow fuel oil to drain into the engine timing case or auxiliary drive and then into the lubricating oil.

RESTRICTION IN THE INDUCTION SYSTEM

Check air cleaner/element condition. Check for dents or kinks in the hoses or pipes and examine the induction manifold for any obstructions.

Refer to the relevant Service literature to check valve spring length at a known load. Adjust valve tip clearances.

STICKING VALVES OR INCORRECT VALVE TIP CLEARANCES

Check that the Thermostat is not leaking fuel into the induction manifold during normal operating conditions — see section "Cold engine will not start".

DEFECTIVE COLD STARTING AID (THERMOSTART)

Check all aspects of fuel pump and valve timing according to the relevant Service literature.

INCORRECT FUEL INJECTION PUMP TIMING OR INCORRECT VALVE TIMING

Check that the correct part number is fitted. Remove the equipment to the specialised fuel injection workshop for checking and servicing.

DEFECTIVE OR INCORRECT TYPE ATOMISERS DEFECTIVE OR INCORRECT TYPE FUEL INJECTION PUMP

POOR COMPRESSIONS

Refer to the section "POOR COMPRESSION" on page 30.
BLACK EXHAUST

Confirm the complaint by a road test, ensuring that the engine reaches normal operating temperature and that the test conditions are in order as in the section "Lack of power" on page 18.

- **RESTRICTION IN THE INDUCTION MANIFOLD**
  - Check air cleaner/element condition. Check for dents or kinks in the hoses or pipes and examine the induction manifold for any obstructions.

- **POOR BOOST PRESSURE (Where turbocharger is fitted)**
  - Check turbocharger for:
    - excessive air inlet depression
    - all induction pipes and joints are in order.
    - low air delivery pressure.
    - restricted exhaust from turbine.
    - fuel injection pump fuelling.
    - low oil pressure and/or poor oil drain.
    - See relevant Service literature.

- **EXHAUST SYSTEM RESTRICTION**
  - Examine the complete exhaust system checking for dents or kinks in the pipes, check for broken mufflers.

- **DEFECTIVE "THERMOSTART" (COLD STARTING AID)**
  - Check that the "Thermostart" is not leaking fuel into the induction manifold during normal operating conditions.

- **DEFECTIVE OR INCORRECT ATOMISERS**, **DEFECTIVE OR INCORRECT FUEL INJECTION PUMP**
  - Check that the correct part number is fitted. Remove the equipment to the specialised fuel injection workshop for checking and servicing.

- **INCORRECT FUEL INJECTION PUMP TIMING OR INCORRECT VALVE TIMING**
  - Check all aspects of fuel pump and valve timing according to the relevant Service literature.

- **INCORRECT VALVE TIP CLEARANCES**
  - Adjust valve tip clearances according to the relevant Service literature.

- **POOR COMPRESSIONS**
  - Refer to the section "POOR COMPRESSION" on page 30.
ENGINE KNOCKING

INCORRECT TYPE OR GRADE OF FUEL

Check that the fuel being used is to the correct specification. See relevant Service literature.

DEFECTIVE OR INCORRECT TYPE OF ATOMISERS

Determine the knock is a faulty atomiser or not. Slacken off the high pressure pipe of each atomiser in turn to eliminate "knocking" whilst running engine at high idle. If the knock ceases on the slackening off of a particular atomiser fuel pipe then that atomiser is probably faulty.

BROKEN VALVE SPRING/S
STICKING VALVES
INCORRECT VALVE TIP CLEARANCES

Refer to the relevant Service literature to check valve spring length at a given load. Adjust valve tip clearances.

INCORRECT FUEL PUMP TIMING OR INCORRECT VALVE TIMING

Check all aspects of fuel pump and valve timing according to the relevant Service literature.

INCORRECT PISTON HEIGHT

Remove cylinder head, check for any damage and check the height of the pistons when at T.D.C. relative to the top of the cylinder block. See the relevant Service literature.

BROKEN, WORN OR STICKING PISTON RINGS
PISTON "PICK UP", BEGINNING TO SEIZE
WORN CYLINDER BORES

Repair the engine.

WORN OR DAMAGED BEARINGS
GUDGEON (WRIST) PIN BEARING WORN

Repair engine.

CAMSHAFT END FLOAT EXCESSIVE

Repair engine.

KNOCK OR RATTLE, POSSIBLY EXCESSIVE BACKLASH ON TIMING GEARS

Repair engine.
BLUE/WHITE EXHAUST

NOTE
CONFIRM COMPLAINT BY ROAD TEST, ENSURING ENGINE
REACHES NORMAL OPERATING TEMPERATURE

INCORRECT GRADE OF LUBRICATING OIL

Ensure that the oil being used is of the correct specification, i.e. (spec: MIL-L-2104C or MIL-L-46152).

FAULTY COLD START EQUIPMENT

Check for leaking cold start unit.
Check that excess fuel device is not permanently engaged (in line pumps only).

RESTRICTION IN THE INDUCTION SYSTEM

Check air cleaner, re-new if dirty. Ensure that no restriction is possible in induction piping.

INCORRECT FUEL PUMP OR VALVE TIMING

Check timing according to relevant Service literature.

COLD RUNNING

Check coolant temperature/thermostat.

WORN OR DAMAGED VALVE STEM OIL DEFLECTORS VALVE GUIDES OR VALVE STEMS

Remove cylinder head and check, replace with new parts as necessary.

POOR COMPRESSION

Refer to the section “POOR COMPRESSION” on page 30.

"BLOWN" OR LEAKING CYLINDER HEAD GASKET PISTON "PICKING UP" BEGINNING TO SEIZE BROKEN, WORN OR STICKING PISTON RINGS WORN CYLINDER BORES

Repair engine.
EXCESSIVE LUBRICATING OIL CONSUMPTION

OIL LEAKS

Examine for leaks with the engine under normal operating conditions and rectify where necessary.

NEW OR REBUILT ENGINES NOT FULLY BEDDED IN

Allow time for new piston rings to become bedded in to the cylinder liners. The amount of time to allow will depend upon the way the engine is used and the conditions under which it is operating.

INCORRECT VISCOSITY OIL, DILUTED OR INFERIOR OIL

Drain the oil and refill with the engine manufacturers recommended grade and viscosity of oil to comply with the machines ambient and working conditions. Change the oil filter element.

OIL LEVEL TOO HIGH
(Can also cause overheating)

Check for improper practices of checking the oil level, i.e. engine cold, drain-down time and engine/machine standing level. If the complaint persists, check that the dipstick and tube are of the correct part number.

ENGINE NOT BREATHING

Check all breather pipes and any breather oil strainers and oil return pipes in the breather system.

COMMUNICATION BETWEEN OIL FEED PIPE AND FUEL OIL PIPE

Check very carefully the rubbing spot of any chafing pipes. Lubricating oil under pressure can flow from its own pipe into a fuel pipe with a lower pressure through the smallest of pin holes.

OIL CARRY-OVER BY ANCILLARY EQUIPMENT

Oil carry-over by an air compressor can usually be indicated by an unusual amount of oil draining from the air reservoir.

FAULTY OIL COOLERS

Any leak from the oil pressure side into the coolant can usually be detected by the presence of oil in the coolant.

CONSUMPTION BY THE FUEL INJECTION PUMP

This would normally be expected to show itself in some other form, such as engine performance or exhaust condition.

BLOCKED INDUCTION SYSTEM

Check air cleaner/element and induction pipework for restriction.

GLAZED BORES

May be the result of long idling periods — Deglaze bores and re-ring pistons.

WORN, BROKEN OR STUCK PISTON RINGS
WORN PISTONS AND CYLINDER BORES
WORN VALVE GUIDE BORES
WORN VALVE STEM SEALS

Dismantle and repair, inspecting for causes of the conditions found.
POOR COMPRESSION

- **Restriction in the Induction System**
  - Check air cleaner/element, renew if dirty. Ensure that no restriction is possible in induction piping and manifold.

- **Sticking Valve(s), Broken Valve Spring(s) or Incorrect Valve Tip Clearances**
  - Check re-set valve tip clearances as necessary.

- **Incorrect Valve Timing**
  - Check timing as instructed in relevant Service literature.

- **If Compression Figures Show a Particularly Low Figure on One Cylinder, Then the Most Likely Cause is a Cylinder Head Gasket Leaking or Poor Valve Seating**
  - Remove cylinder head and check gasket, valves, seats and guides. Fit new parts as necessary.

- **Pitted Valves and Seats, Worn Valve Stems and Guides**

- **Incorrect Piston Heights**
  - Check piston heights, ensure that tolerance is within specification.

- **Broken, Worn or Sticking Piston Rings, Worn Cylinder Bores**
  - Repair engine.
OVERHEATING

Check that the machine or vehicle is not being overloaded.
Check that any temperature gauge fitted to the machine is not faulty,
by removing the radiator pressure cap, run the engine until coolant
warms up and using a thermometer in the radiator compare its reading
to that of the gauge fitted to the machine.

COOLANT LEVEL TOO LOW
LUBRICATING OIL LEVEL TOO HIGH

With engine cold check the level of the coolant. Check for leaks.
Check for improper practices of checking the oil level. Level engine/
machine and allow drain-down time.

LOOSE FAN BELT
DEFECTIVE WATER PUMP

Check there is about \( \frac{3}{4} \) in (10mm) depression on the longest run of the
belt(s) by normal hand pressure.
With radiator cap removed and the thermostat removed, check there is
a swirl of coolant in the header tank. With remote tanks, remove the
thermostat from a cold engine, momentarily start the engine when
cooler should be pushed out by the water pump, from the
thermostat housing.

CHOKED, DEFECTIVE OR INCORRECT RADIATOR, HOSES OR
PRESSURE CAP

Back-flush the cooling system with pressurised water. Remove all hoses
for inspection. Check the radiator and pressure cap part number and
its operation with the manufacturers spec. Ensure the air flow through
the radiator is not impeded.

FAULTY THERMOSTAT

Check that the thermostat opens at the correct temperature and it is
the correct part number.

RESTRICTION IN THE INDUCTION MANIFOLD

Check air cleaner/element condition. Check for dents or kinks in the
hoses or pipes and examine the induction manifold for any
obstruction.

DEFFECTIVE THERMOSTART

Check that the thermostat is not leaking fuel into the induction manifold
under normal operating conditions.

EXHAUST SYSTEM RESTRICTION

Examine the complete exhaust system for dents or kinks in the pipes
and check for any damage to the mufflers.

CYLINDER HEAD GASKET LEAKING OR CRACKED CYLINDER HEAD

This can sometimes be detected by bubbles in coolant and by comparing
cylinder pressures. Remove cylinder head for inspection or replacement.

INCORRECT FUEL INJECTION PUMP TIMING OR
INCORRECT VALVE TIMING

Check all aspects of fuel pump and valve timing according to the relevant
Service literature.

DEFFECTIVE OR INCORRECT TYPE ATOMISERS OR FUEL PUMP

Check for correct part number and arrange for testing in specialised
workshop.

PISTON PICK-UP BEGINNING TO SEIZE

Repair engine.
EXCESSIVE CRANKCASE PRESSURE

NOTE
IT IS ASSUMED THAT ON A COMPLAINT OF THIS NATURE, OIL IS
BEING BLOWN OUT EXTERNALLY, i.e. OUT OF DIPSTICK TUBE,
ETC.

CHOKED BREather OR PIPE

Remove the engine breather and pipe and check for restriction. Rectify
as necessary.

DEFECTIVE EXHAUSTER (if fitted)

Ensure that there are no leaks in the vacuum system or exhauster, as
this would permit air to enter the engine causing crankcase pressure.

PISTON PICK-UP BEGINNING TO SEIZE
WORN CYLINDER BORES
BROKEN, WORN OR STICKING PISTON RINGS
CYLINDER HEAD GASKET LEAKING

Repair engine.
ENSURE THAT THE ENGINE IS OPERATING AT THE CORRECT TEMPERATURE

See section “OVERHEATING” on page 32.

DEFECTIVE STOP CONTROL OPERATION, STICKING THROTTLE OR RESTRICTED MOVEMENT

Ensure that the operation of these is free, and are not fouling in any way.

RESTRICTION IN THE INDUCTION SYSTEM

Check air cleaner element, re-new if dirty. Ensure that no restriction is possible in induction piping and manifold.

AIR IN THE FUEL SYSTEM

Bleed fuel system as instructed in relevant Service Literature.

INCORRECT TYPE OR CROSSED HIGH PRESSURE PIPES

Ensure that these are of the correct type and are fitted in the correct firing order.

BLOCKED FUEL TANK VENT
RESTRICTED FUEL FEED PIPE
CHOKEED FUEL FILTER

Check and rectify as in section "ENGINE IS DIFFICULT TO START" page 10.

DEFECTIVE FUEL LIFT PUMP

Check lift pump operation, if insufficient fuel flow is evident, remove lift pump and rectify or fit replacement.

STICKING VALVE/S, BROKEN VALVE SPRING/S OR INCORRECT VALVE TIP CLEARANCE

Check, reset valve tip clearance as necessary.

INCORRECT FUEL PUMP OR VALVE TIMING

Check all aspects of fuel pump and valve timing according to the relevant Service literature.

DEFECTIVE ATOMISERS OR INCORRECT TYPE DEFECTIVE FUEL INJECTION PUMP

Check that the correct part number is fitted. Remove the equipment to the specialised fuel injection workshop for testing and servicing.

POOR COMPRESSION

Refer to the section “POOR COMPRESSION” on page 30.
VIBRATION

STICKING THROTTLE OR RESTRICTED MOVEMENT

Ensure that the operation of the throttle is free, and not fouling in any way.

FAULTY ENGINE MOUNTING/S OR (HOUSING)

Check that the engine mountings and feet are not loose or perished. Ensure that the flywheel housing is not faulty or cracked, etc.

DAMAGED FAN OR INSECURE C/SHAFT PULLEY

Check for damaged fan or fan blades, i.e. broken, bent or cracked. Ensure that C/Shaft pulley and fan are correctly torqued.

INCORRECT OR CROSSED HIGH PRESSURE PIPES

Ensure that these are of the correct type and are fitted in the correct firing order.

STICKING VALVES

Remove rocker cover, and check that the operation of the valves is free.

INCORRECTLY ALIGNED OR LOOSE FLYWHEEL OR HOUSING

Check tightness of flywheel housing, and with a clock gauge check that the alignment of the flywheel and housing are within limits. Refer to relevant Service literature.

POOR COMPRESSION

Refer to the section "POOR COMPRESSION" on page 30.
LOW OIL PRESSURE

INSUFFICIENT OIL IN SUMP

LUBRICATING OIL NEEDS CHANGING (DIRTY, SLUDGED OR DILUTED)

- Oil dirty
  - Change oil and filter.

- Oil sludged
  - Drain oil, and clean engine with flushing oil. Refill with recommended oil, and change filter.

- Oil diluted
  - Trace cause, if diluted by diesel fuel, rectify as in section "EXCESSIVE FUEL CONSUMPTION" page 20. If diluted by water, possible causes:
    - Defective oil cooler (if fitted)
    - Cylinder head gasket leaking
    - Porous cylinder block. Check and rectify as necessary and change oil and filter.

INACCURATE GAUGE OR WARNING LIGHT

- Oil pressure OK.

- Oil pressure too low.
  - Replace with new oil pressure gauge or warning light switch.
  - Remove sump and check that the sump strainer is clear.
  - Check suction pipe for cracks or bad joint to the oil pump.

RESTRICTED SUMP STRAINER
- DEFECTIVE SUCTION PIPE
- DEFECTIVE PRESSURE RELIEF VALVE
- WORN OIL PUMP

WORN OR DAMAGED BEARINGS

Ensure that there is sufficient oil in the sump, and that the correct type and grade is being used.
HIGH OIL PRESSURE

INCORRECT TYPE OR GRADE OF LUBRICATING OIL

Check with customer, ensure that the correct type and grade of lubricating oil is being used.

INACCURATE OIL PRESSURE GAUGE

Check accuracy of oil pressure gauge, by connecting a master gauge in place of the original.

OIL PRESSURE RELIEF VALVE STUCK (CLOSED)

Oil pressure too high

Replace with new oil pressure gauge.

Oil pressure normal

Remove and check pressure relief valve operation, repair as necessary or fit a new replacement.
EXAMPLES OF SERVICES ASSISTANCE

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
Workshop manuals 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 of how to get this at the Product Education Department, Peterborough, or other main centres.