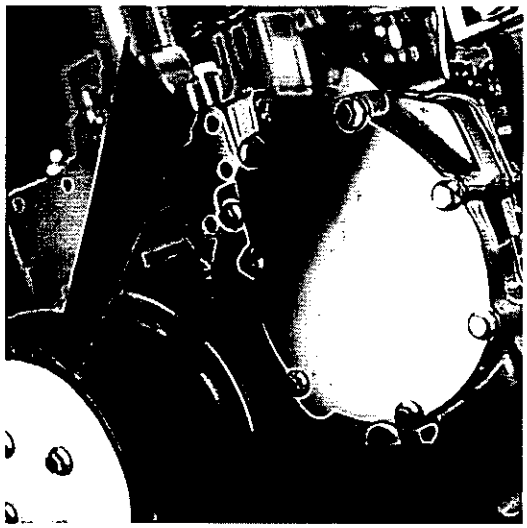
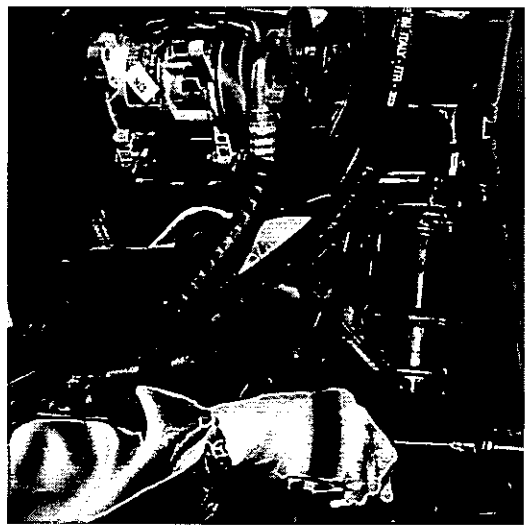
Perkins®

User Handbook

G4.203





GB

TPD1054

(GASOLINE)

SAFETY PRECAUTIONS

THESE SAFETY PRECAUTIONS ARE IMPORTANT. Refer also to the local government regulations applicable in your jurisdiction.

Do not use this engine in marine applications.

Do not modify the engine.

Do not smoke when refuelling.

Always remove spilt fuel and soaked clothing to a safe place.

Do not refuel whilst the engine is running (unless absolutely necessary).

Never clean, lubricate or adjust the engine whilst it is running (unless qualified to do so, in which case, extreme care should be taken to avoid injury).

Do not attempt any adjustments you do not understand.

Ensure the engine is positioned so as to prevent a build-up of toxic emissions.

Warn persons in the area to keep well clear of the engine and equipment during operation.

Do not wear loose clothing or allow long hair near moving machinery.

Keep well clear of rotating parts or machinery in operation. Note that fans are not clearly visible whilst the engine is running.

Do not run the engine with any safety guards removed.

Do not remove the radiator cap whilst the engine is hot and the coolant is under pressure as scalding can result.

On no account should sea water or any other electrolytic or corrosive medium be used in the cooling system.

Keep sparks or flames away from batteries as the gases from the electrolyte (especially whilst the battery is under charge) are highly inflammable. This acid is also dangerous to the skin and especially the eyes.

Always disconnect battery terminals before repairing or interfering with the electrical system.

Only one person should be in control of the engine.

Always operate the engine from the control panel or operator's seat.

Fuel can cause skin infection to some people. Use protective gloves or hand cream.

Do not move mobile equipment without first ensuring that the brakes are in good working order.

Ensure that the transmission drive control is in "Out of Drive" position before starting the engine.

Fit only genuine Perkins Parts.

SAFETY IS SENSE — USE IT

contents

Publication 201 TPD 0483 1054

April 1983
PERKINS ENGINES Ltd., PETERBOROUGH

This publication has been written for gasoline (petrol) engines only and any information required on L.P.G. (liquid petroleum gas) engines which is not to be found in this publication, such as, starting procedures, gas pressure reducing equipment, pre-heating and carburation should be obtained from the manufacturer of the machine or his supplier.

Perkins Engines Limited is not responsible for any damage caused to this engine or to its component parts by fitting of any L.P.G. conversion equipment not approved by the Company or which is incorrectly fitted or adjusted.

data

Type	Four cylinder. Four stroke.
Bore	3.6 in (91,44 mm) — nominal
Stroke	5 in (127 mm)
Compression Ratio	7.0 : 1
Cubic Capacity	203 in^3 (3,33 litre)
Firing Order	1, 3, 4, 2.
Tappet Clearance (cold)	
Before Engine No. U564083G	Inlet 0.012 in (0,30 mm) Exhaust 0.015 in (0,38 mm)
From Engine No. U564083G	Inlet 0.008 in (0,20 mm) Exhaust 0.012 in (0,30 mm)
Oil Pressure	30/60 lbf/in^2 (2,1/4,2 kgf/cm^2) at maximum engine speed and normal operating temperature
Ignition Timing	7° B.T.D.C. (Static)* 17½° B.T.D.C. @ 1400 rev/min (Dynamic) 24° B.T.D.C. @ 2000 rev/min (Dynamic)
Lubricating Oil Sump Capacity	13 U.K. pints 15.6 U.S. pints 7,38 litre
Sparking Plug	Champion N11Y 14 mm
Sparking Plug Gap	0.026 in (0,66 mm)
Contact Breaker Points Gap	0.019/0.021 (0,48/0,53 mm)
Fuel Specification	91 octane

*For each octane number below 90, retard the ignition by 1° (maximum retard not to exceed 10°).

Rating Details

Rated Output (Gross)	64 bhp @ 2500 rev/min
Maximum Torque	174 lbf ft @ 1200 rev/min

running in

It is not necessary to gradually run-in a new or factory replacement engine and any prolonged light load running during the early life of the engine can in fact prove harmful to the bedding in of piston rings and liners.

Full load can be applied on a new or factory replacement engine as soon as the engine is used **provided that the engine coolant is first allowed to reach a temperature of 140°F (60°C).**

post delivery checkover

After a customer has taken delivery of his engine, a general checkover must be carried out by an experienced fitter after the first 25/50 hours in service and comprises the following :—

1. Drain the lubricating oil sump and refill to the correct level with clean new oil (do not overfill). Renew lubricating oil filter element.

2. Check fan belt tension.

3. Check tightness of all external nuts, setscrews, hose-clips, mountings, etc.

4. Start engine and check for fuel, coolant or lubricating oil leaks.

5. Adjust idling speed, if necessary, by turning setscrew situated on butterfly actuating lever clockwise to increase engine speed and anti-clockwise to decrease it.

operating instructions

STARTING THE ENGINE

If the engine or weather is warm, switch on ignition and open the throttle quarter way. With clutch disengaged operate starter and engine should start.

If engine does not start after four crankings, engage choke a quarter to richen mixture and try again. If the engines does not start now it may be over choked and should be allowed to rest for a few minutes before attempting a new start.

NOTE Maximum cranking time is limited to thirty seconds with a thirty second interval between them.

COLD STARTING

Engage full choke and open throttle quarter way. Disengage clutch, switch on ignition and operate starter. When engine starts, gradually reduce the choke opening as the engine warms and control engine speed on the throttle until the engine has reached a sufficiently high temperature to disengage the choke altogether. If the engine does not start after four crankings of thirty seconds duration and a pause of thirty seconds between them, allow the engine to rest for fifteen minutes before attempting another start.

TO STOP ENGINE

Gradually close throttle and switch off ignition.

frost precautions

Precaution against damage by frost should be taken if the engine is to be left exposed to inclement weather either by adequately draining the water system or where this is not convenient, an anti-freeze of reputable make and incorporating a suitable corrosion inhibitor may be used.

Should it be the policy to protect engines from frost damage by adding anti-freeze to the cooling system, it is advisable that the manufacturers of the relevant mixture be contacted to ascertain whether their products are suitable for use in Perkins engines also that their products will have no harmful effects on the cooling system generally. It is our experience that the best results are obtained from anti-freeze which conforms to British Standard 3151 or 3152.

A coolant solution containing 25%anti-freeze manufactured to BS3151 or BS3152 in water in a properly maintained engine should maintain its anti-freeze and anti-corrosive properties throughout the winter season in the U.K. and, in general, a safe life of 12 months may be reasonably expected.

When draining the cooling system (make sure machine is standing on level ground), it is not enough merely to open the radiator drain tap. The one on the cylinder block must also be opened. This tap is on the carburetter side of the cylinder block near the flywheel housing. When a pressurised radiator filler cap is used, this should be removed before draining the cooling system.

Sometimes it is possible for a small quantity of water to remain lodged in the bottom of the water pump after draining. If this freezes it could prevent the impeller from turning when the engine is next used with consequent over-heating. If the water pump pulley cannot be turned by hand, the cooling system should be filled with warm water before starting.

If the foregoing action is taken, no harmful effects should be experienced but Perkins Engines Limited cannot be held responsible for any frost damage or corrosion which may be incurred.

lubricating oils

Lubricating oils should meet the requirements of the US Ordnance Specification MIL-L-46152.

Some of these oils are listed below but any other oils that meet these specifications and have a minimum viscosity index of 80 are also suitable.

Where oils to the MIL-L-46152 specification are not available, then oils to the previous specification MIL-L-2104B may be used providing they give satisfactory service.

MIL-L-46152 OILS

Company	Brand	SAE Designation		
		0°F (−18°C) to 30°F (−1°C)	30°F (−1°C) to 80°F (27°C)	Over 80°F (27°C)
B.P. Ltd.	Vanellus M	10W	20W	30
	Vanellus M		20W/50	20W/50
Castrol Ltd.	Castrol/Deusol CRX	10W	20	30
	Castrol/Deusol CRX	10W/30	10W/30	10W/30
	Castrol/Deusol CRX		20W/50	20W/50
	Deusol RX Super		20W/40	20W/40
A. Duckham & Co. Ltd.	Fleetol HDX	10	20	30
	Fleetol Multi V		20W/50	20W/50
	Fleetol Multilite	10W/30	10W/30	10W/30
	Q Motor Oil		20W/50	20W/50
	Farmadcol HDX		20	30
Esso Petroleum Co. Ltd.	Essolube XD-3	10W	20W	30
	Essolube XD-3		15W/40	15W/40
Mobil Oil Co. Ltd.	Delvac 1200 Series	1210	1220	1230
	Delvac Special	10W/30	10W/30	10W/30
Shell	Rimula X	10W	20W/20	30
	Rimula X	10W/30	10W/30	10W/30
	Rimula X		15W/40	15W/40
	Rimula X		20W/40	20W/40
	Rotella TX	10W	20W/20	30
	Rotella TX		20W/40	20W/40
Total Oil Co. Ltd.	Total Super HD		20W/20	30
	Total HD2-M	10W/30	20W/40	20W/50
	Total HD3-C (Rubia S)	10W	20W/20	30
	Total HD3-C (Rubia TM)		15W/40	15W/40
	Total Universal Tractor Oil (Multagri)		20W/30	20W/30
	Total Super Universal Tractor Oil (Multagri TM)		20W/30	20W/30

The above specifications are subject to alteration without notice.

maintenance

PERIODICAL ATTENTIONS

DAILY or EVERY 8 HOURS (whichever occurs first)

Check oil pressure.
Check fuel level.
Check water in radiator.
Check oil level in sump (make sure machine is standing level).
Under adverse conditions, service air cleaner (see air cleaner manufacturer's recommendations).

EVERY 250 HOURS or 4 MONTHS (whichever occurs first)

Clean air cleaner element (dry paper type).
Check fan belt adjustment.
Drain oil from sump and renew.
Lubricate distributor cam.

EVERY 500 HOURS or 12 MONTHS (whichever occurs first)

Renew element in lubricating oil filter.
Clean fuel water trap and pre-filters (where fitted).
Clean and service sparking plugs.
Re-face and set contact breaker points.

EVERY 1,000 HOURS

Renew sparking plugs.
Renew and set contact breaker points.
Check tappet clearances.
Strip and clean carburetter. Do not use wire brushes.
Re-check dynamic ignition timing to confirm effective operation of the automatic advance mechanism.

Note: If equipment for the above operation is not available, check static ignition timing.
Renew air cleaner element (or once a year, whichever occurs first).

EVERY 2,500 HOURS

Arrange for examination and service of proprietary equipment, i.e., compressor, exhauster, starter motor, dynamo, alternator etc.

alternator driving belt adjustment (See Fig. 1)

When a belt is to be checked for tension, thumb pressure on the longest unsupported length of the belt should allow $\frac{3}{8}$ in (10 mm) deflection.

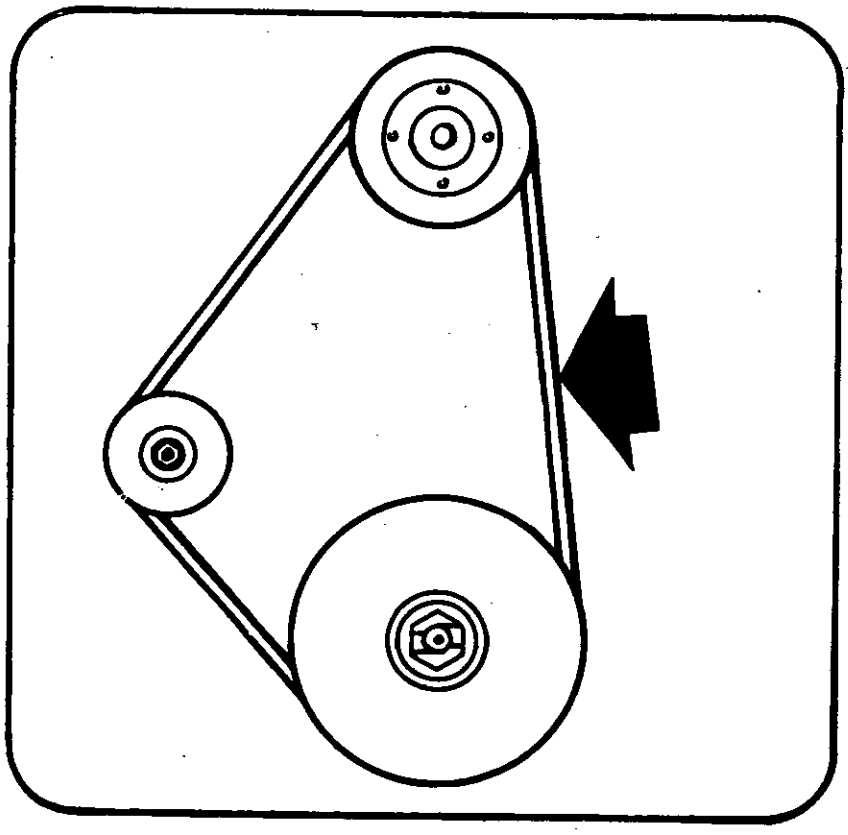


Fig. 1

METHOD OF ADJUSTMENT

Unscrew alternator adjusting lever setscrew and alternator support bracket bolts. The alternator can then be moved to slacken or tighten the belt. When the correct tension is reached tighten alternator adjusting lever setscrew and support bracket bolts. Fan belt adjustment should be checked in accordance with Periodical Attentions. It is advisable to re-check new belts for tension after a short period of running. This is to allow for initial stretch which is common to new belts.

oil filter

TO RENEW ELEMENT (Standard Type)

1. Unscrew setscrew securing filter bowl at bowl base. (See Fig. 2).

2. Lower filter bowl clear. (See Fig. 3).

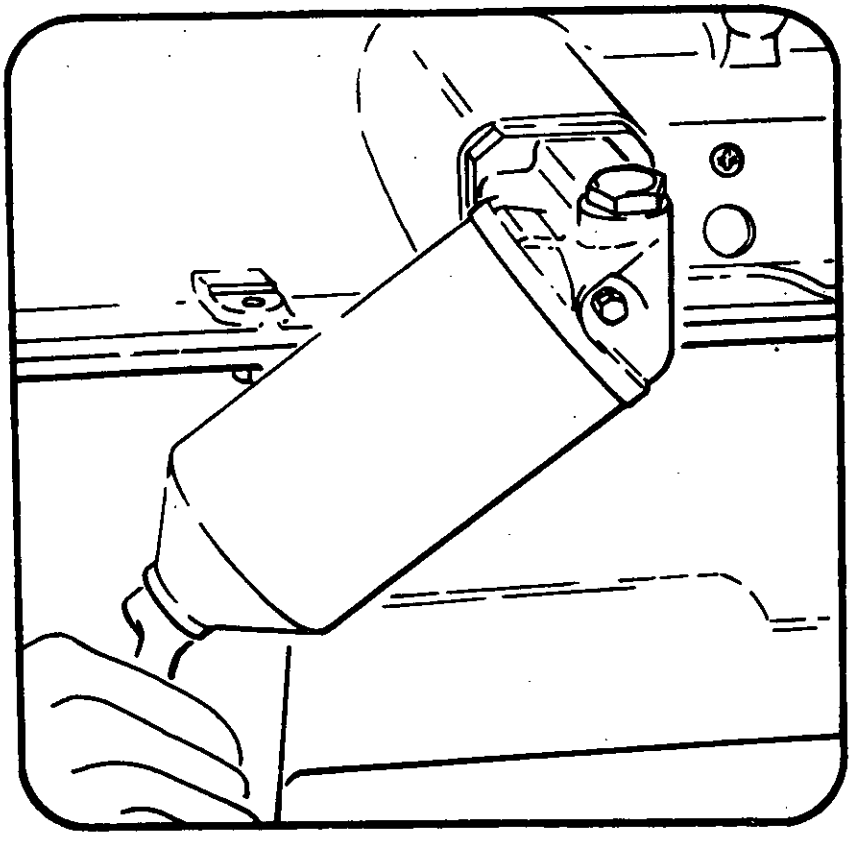


Fig. 2

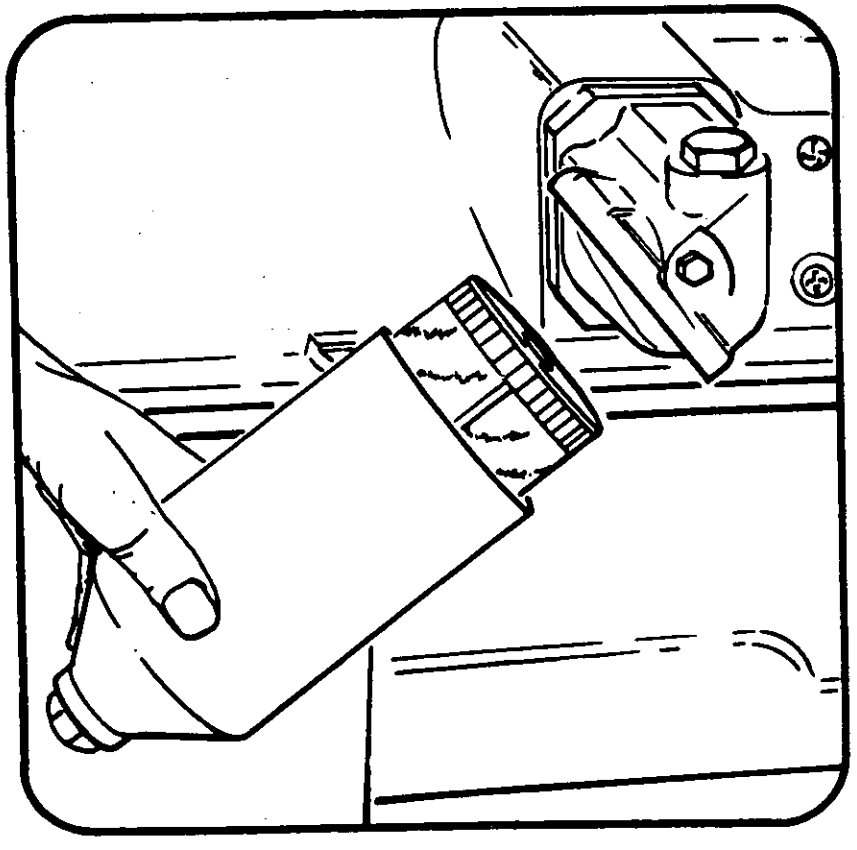


Fig. 3

3. Remove element and discard.
4. Wash bowl in cleaning fluid.
5. Fit new rubber joint in filter head casting.
6. Renew, if necessary, joints in the bowl.
7. Fit new element. tighten bowl securing setscrew and run engine to check for leaks.

TO RENEW ELEMENT (Canister Type)

1. Unscrew canister from filter headcasting.
2. Check that threaded adaptor is secure in headcasting.
3. Discard used canister.
4. Using clean engine oil, lightly oil top seal of replacement canister.
5. Screw replacement canister on to filter headcasting until canister seal just touches headcasting and then tighten by hand a further half turn. If the canister is overtightened, then difficulty may be experienced in its removal and a hexagon head is formed on the bottom of some canisters for this purpose.
6. Run engine and check for leaks.

to check tappet clearances (See Figs. 4 and 5)

The tappet clearances are checked/set between the tappet adjustment screw and the rocker lever with the engine cold. The correct clearances are given on Page 3.

With valves rocking on No. 4 cylinder (i.e. the period between the opening of the inlet valve and the closing of the exhaust valve), set the clearances on No. 1 cylinder.

With valves rocking on No. 2 cylinder set the clearances on No. 3 cylinder.

With valves rocking on No. 1 cylinder set the clearances on No. 4 cylinder.

With valves rocking on No. 3 cylinder set the clearances on No. 2 cylinder.

distributor (See Fig. 6).

Pitted contacts should not necessarily be replaced unless the pitting or transferance exceeds 0.020 in (0,51 mm). Points can be cleaned with a sharp contact file or by using a fine stone. Care must be taken to ensure that the contact faces remain parallel.

When setting the contact breaker point gap, turn the crankshaft in the normal direction of rotation until the heel of the breaker lever is on the peak of one of the cam lobes. Unscrew contact breaker plate securing screw partially and using a screwdriver blade in the slots provided, set the point gap to 0.019/0.021 in (0,48/0,53 mm). (See Fig. 7).

A very light smear of cam lubricant should be put on the cam every 200 hours and one or two drops of light engine oil on the breaker lever pivot. Care should be taken when lubricating as any oil trace on the contact breaker points will cause rapid burning of the points.

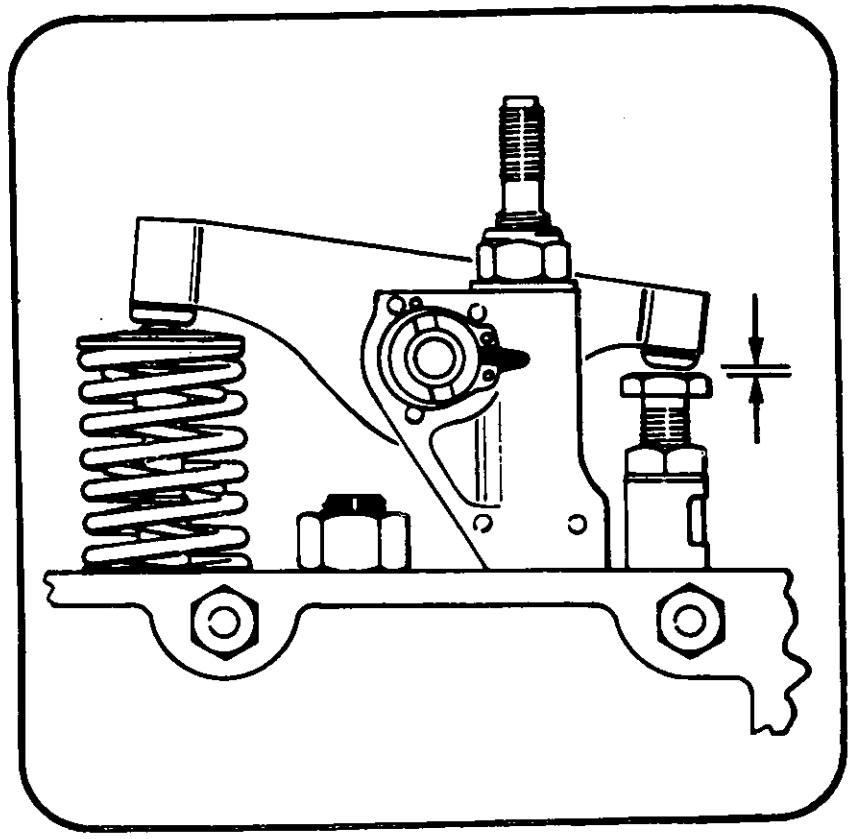


Fig. 4.

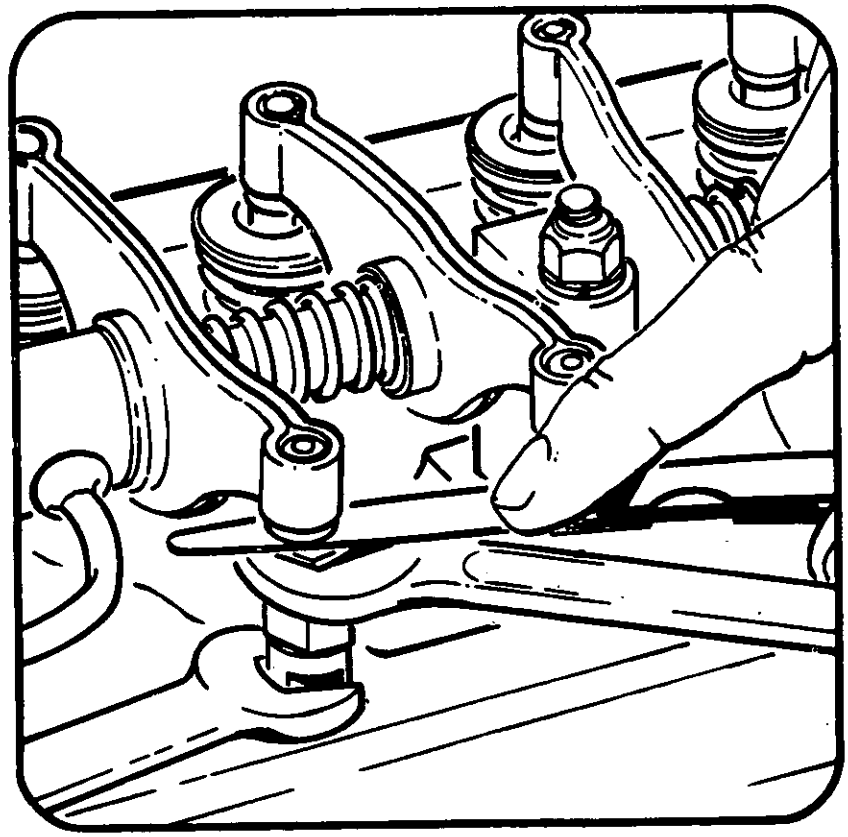


Fig. 5.

Key to Fig. 6.

1. Condenser.
2. Breaker cam.
3. Contact set.
4. Primary lead.
5. Contact set attaching screw.
6. Screwdriver slot.
7. Drive gear.
8. Clamp.
9. Contacts.

ignition timing (static)

1. Set No. 1 piston to 7° B.T.D.C. on its firing stroke.

2. Fit distributor with rotor arm, vacuum advance capsule and L.T. lead as in Fig. 8.

   Note : Some engines may not have the advance capsule fitted. in which case the L.T. lead should be taken as the reference point.

3. Connect a low voltage battery and bulb in series with the distributor L.T. and earth.

4. Turn the distributor clockwise until the timing light just goes out and tighten distributor clamp.

ignition timing (dynamic)

To check dynamic ignition timing, detach the high tension lead from No. 1 sparking plug and connect it to a neon timing lamp. Connect the other timing lamp lead to the sparking plug. With the engine running at normal temperature, direct the light onto the crankshaft pulley and timing plate (See Fig. 9).

The correct timing must be checked with the engine speed set at 1,400 rev/min when the notch in the pulley will appear to be aligned at 17½° on the timing plate. Advance or retard if necessary by loosening the distributor clamp and turning the distributor body with the direction of rotation of the rotor to retard, or against the direction of rotation to advance. Clamp distributor when correct setting is found.

NOTE : Vacuum advance pipe should be disconnected when checking dynamic advance.

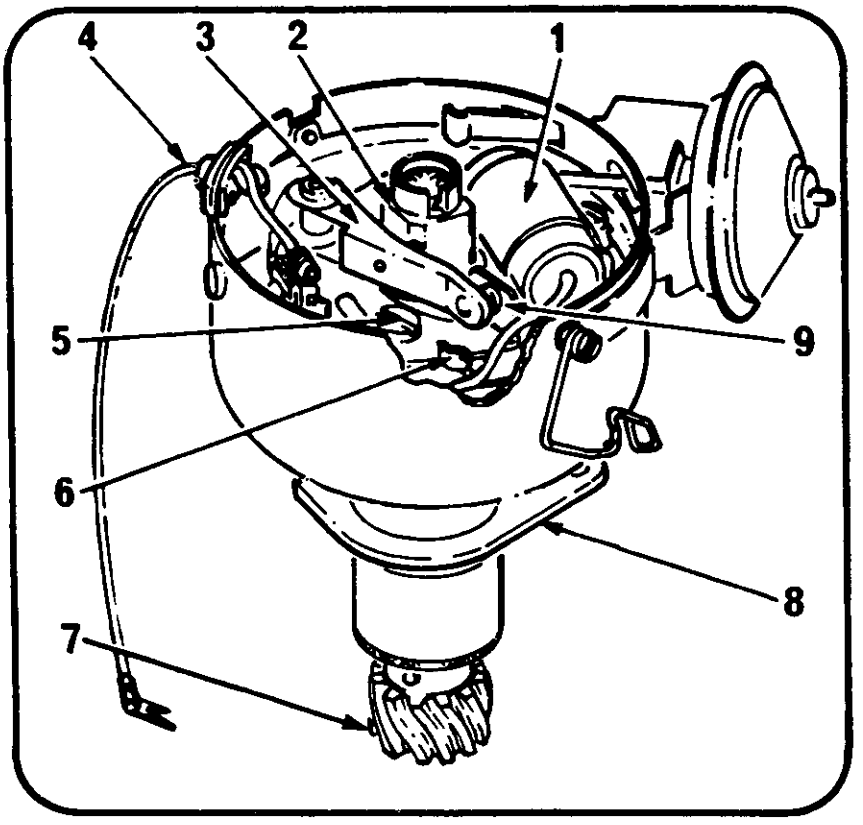


Fig. 6.

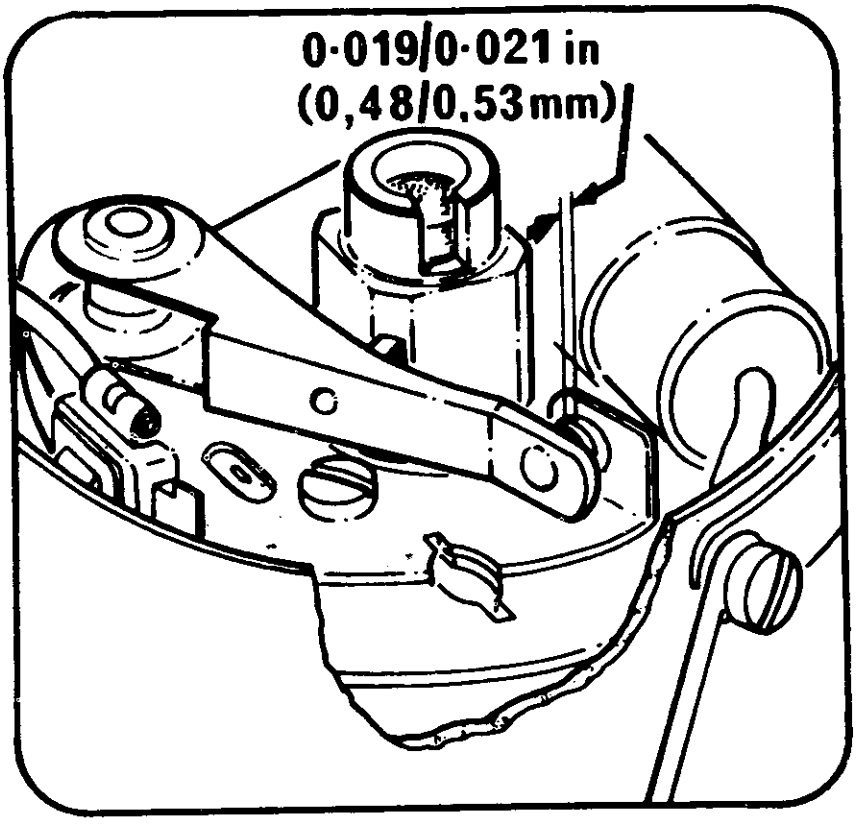


Fig. 7.

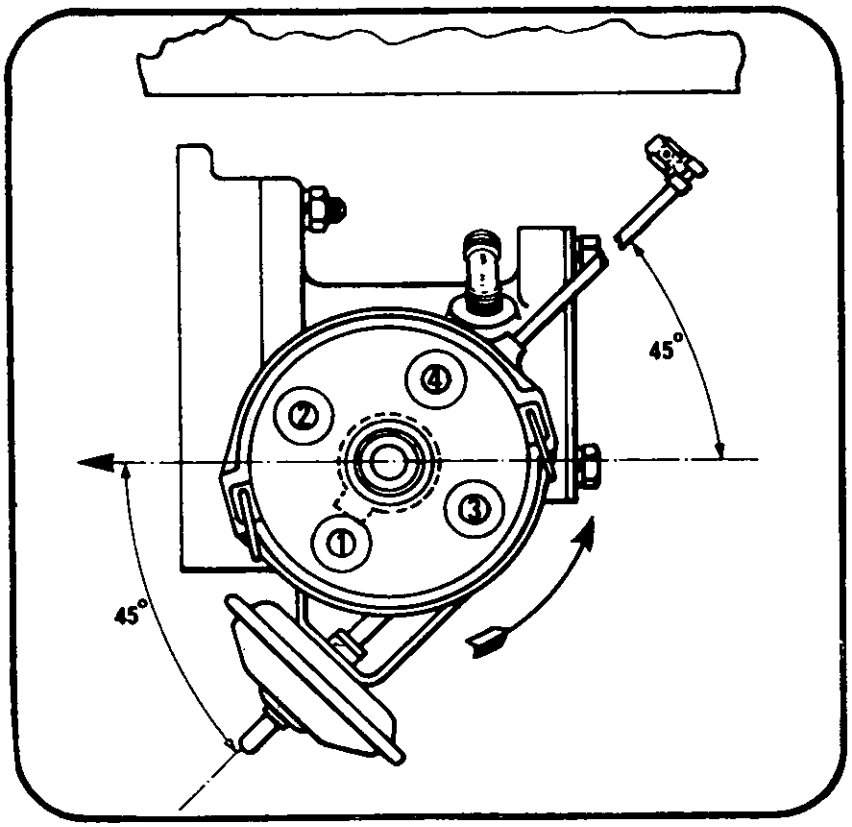


Fig. 8.

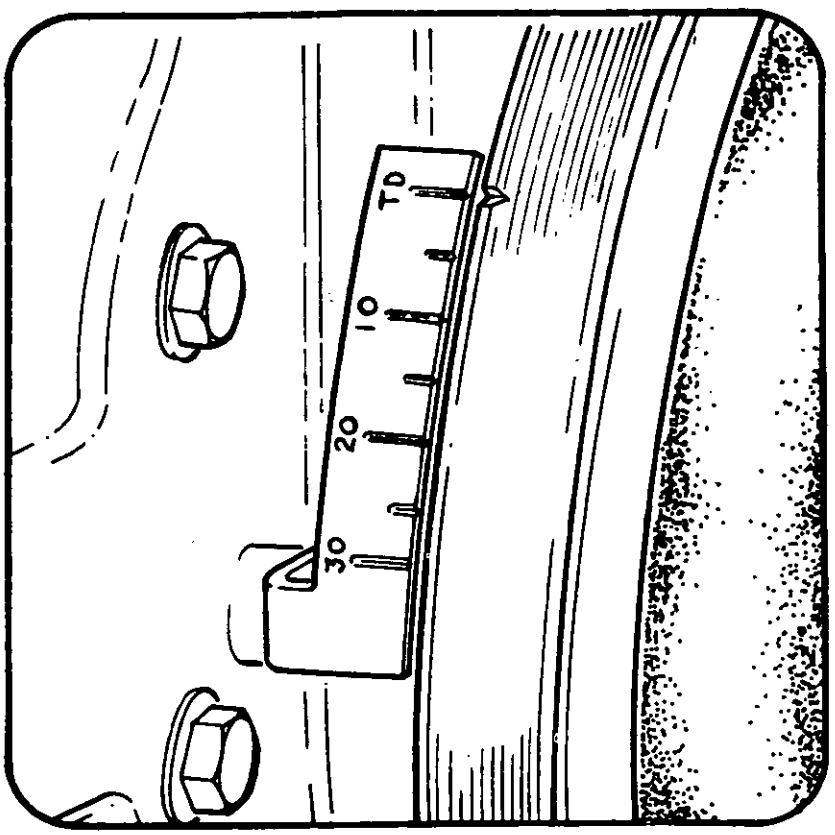


Fig. 9.

preservation of laid up engine

It is recommended that the following procedure be adopted and applied immediately the unit is withdrawn from service.

1. Clean all external parts of engine.

2. Run engine until well warmed through. Stop engine and drain lubricating oil sump.

3. Renew element in full flow lubricating oil filter.

4. Fill sump to correct level with clean new lubricating oil or with a suitable preservation fluid.

5. Run engine for a short period to circulate lubricant or fluid.

6. Drain fuel system.

7. Drain water from radiator and cylinder block.

8. Clean out engine breather pipe.

9. Remove sparking plugs and spray into the cylinder bores, $\frac{1}{4}$ pint (0,14 litre) of lubricating oil divided between the cylinders.

10. Slowly turn the engine over compressions and replace sparking plugs.

11. Remove air cleaner and any intake pipe which may be fitted between the air cleaner and the carburetter. Carefully seal air intake orifice with water proofed adhesive tape or some other suitable medium.

12. Remove exhaust pipe and seal opening as in '11'.

13. Disconnect battery and store in a fully charged condition. Before storing, the battery terminals should be treated to prevent corrosion.

14. Where a preservative is used in the lubricating oil sump, this should be drained off and replaced by normal lubricant prior to re-starting the engine at the end of the storage period.

PERKINS COMPANIES

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P.O. Box 697, Wayne, Michigan 48184, U.S.A.
Telephone: 313 595 9600. Telex: 23-4002.
Cables: Perkeng Wane.

In addition to the above, there are Perkins Distributors in most countries. Perkins Engines Ltd., Peterborough or one of the above companies can give details.

CALIFORNIA
Proposition 65 Warning

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

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