

Section AO — ENGINE LUBRICATION

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Oil pump, Petrol models

To remove Operation AO/2

1. Drain the oil and remove sump.
2. Slacken the locknut securing oil pressure adjusting screw, then remove screw, washer, spring, plunger and ball (which may remain in the pump and can be removed when the pump complete is withdrawn).
3. Remove the pump locating screw.
4. Withdraw the pump, leaving the drive shaft in position.
5. If necessary, withdraw the oil pump drive shaft.

Note: On engines numbered 860001 to 16102271 and 16131648 a cylindrical oil pump filter was fitted into the side of the sump.

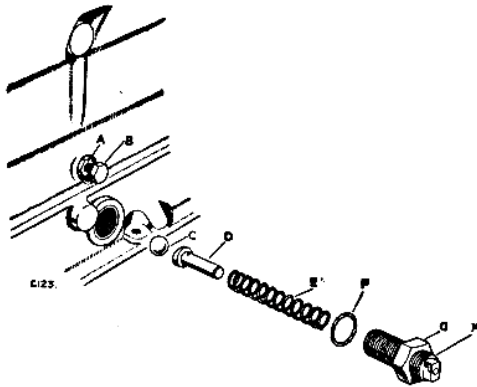


Fig. AO-1—Oil pressure relief valve.

A—Locknut
B—Locating screw—oil pump
C—Ball
D—Plunger

E—Spring
F—washer
G—Locknut
H—Adjusting screw—oil pressure

To overhaul and refit Operation AO/4

1. Remove the oil strainer from the pump.
2. Remove the oil pump cover and lift out the gears.
3. Remove the idler gear spindle. If necessary, press out the idler gear bush and drive out the bush in the pump body.
4. Clean parts, examine for wear and renew as necessary.
5. If removed, press a new bush into the body and ream in position to .5625 in. +.001 (14,28 mm + 0,025), ensuring correct alignment with the bore at the bottom end of the pump body. The bush should be a *light drive fit* in the pump body.

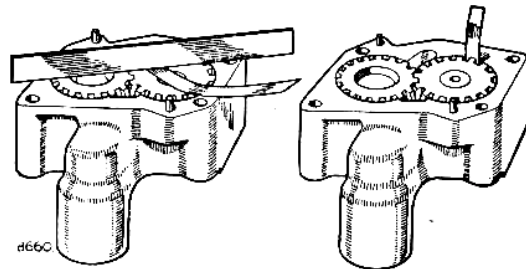


Fig. AO-2—Checking clearance of oil pump gears, Petrol models.

6. Check the radial clearance (.001 to .004 in., 0,02 to 0,10 mm), backlash (.008 to .012 in., 0,20 to 0,30 mm) and end-float (.003 to .005 in., 0,075 to 0,13 mm steel gear, and .004 to .006 in., 0,10 to 0,15 mm aluminium gear) of the gears; renew parts as necessary. If incorrect, oil flow would be insufficient.
7. Complete the assembly.
8. Refit by reversing removal procedure.
9. Adjust the oil pressure. Operation AO/6.

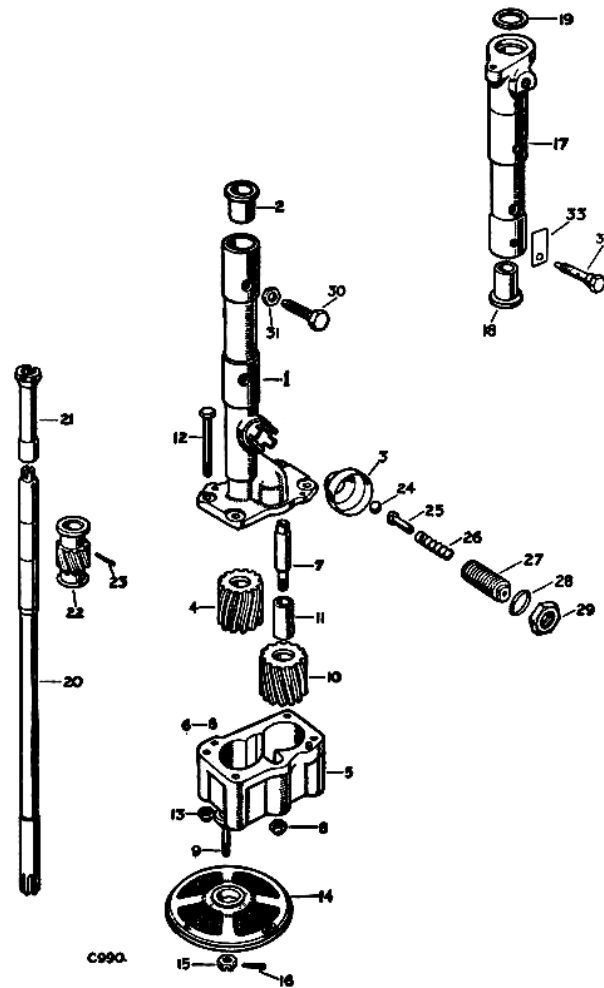


Fig. AO-3—Exploded view of oil pump and driving gear, Petrol models.

- | | | | |
|-------|---|-------|---|
| 1 | Oil pump body assembly | 18 | Bush for drive shaft |
| 2 | Bush for drive shaft | 19 | Cork washer for housing |
| 3 | Oil pump shield | 20 | Oil pump drive shaft |
| 4 | Oil pump gear, driver | 21 | Drive shaft for distributor |
| 5 | Oil pump cover assembly | 22 | Oil pump driving gear |
| 6 | Dowel locating body | 23 | Taper pin, fixing gear to shaft |
| 7 | Spindle for idler wheel | 24 | Steel ball |
| 8 | Self-locking nut ($\frac{3}{8}$ ") fixing spindle | 25 | Plunger |
| 9 | Stud for oil strainer | 26 | Spring |
| 10 | Oil pump gear idler assembly | 27 | Adjusting screw |
| 11 | Bush for idler gear | 28 | Washer |
| 12-13 | Fixings—cover to body | 29 | Locknut |
| 14 | Oil strainer for pump | 30-31 | Fixings—oil pump to cylinder block |
| 15-16 | Fixings—oil strainer to pump | 32 | Oil feed bolt, locating distributor housing |
| 17 | Distributor housing assembly | 33 | Locker for bolt |

The chart below covers all currently recommended lubricants for use in engines and all other units.

These recommendations apply to temperate climates, where operational conditions vary between approximately 10°F and 90°F.

PETROL ENGINE								
COMPONENTS	S.A.E.	B.P.	DUCKHAM'S	ESSO	MOBIL	SHELL	WAKEFIELD	REGENT
ENGINE, AIR CLEANER AND GOVERNOR	20W	Energol SAE 20W	Duckham's NOL Twenty	Esso Estra 20W/30	Mobiloil Arctic	Shell X100 SAE 20/20W	Castrolite	Havoline 20/20W
DIESEL ENGINE								
ENGINE AND AIR CLEANER	20W	Energol Diesel D20W	NOL Diesel Engine Oil 20	Essolube HD20	Mobiloil Arctic	Rotella 20/20W	Castrol CR20	RPM Delco Special 20
ALL MODELS								
GEARBOX AND TRANSFER BOX DIFFERENTIALS AND SWIVEL PIN HOUSINGS STEERING BOX AND STEERING RELAY UNIT (SEALED) REAR POWER TAKE-OFF, PULLEY UNIT AND CAPSTAN WINCH	90EP	Energol EP SAE 90	Duckham's NOL EP 90	Esso Expee Compound 90	Mobilube GX 90	Spirax 90EP	Castrol Hypoy	Universal Thuban 90
LUBRICATION NIPPLES	—	Energrease L-2	Duckham's LB 10 Grease	Esso Multi-purpose Grease H	Mobilgrease MP	Retinax A	Castrolase LM	Marfak Multi-Purpose 2

NOTE 1: -20°F = -28°C; 0°F = -17°C; 10°F = -12°C; 32°F = 0°C; 90°F = 32°C.

NOTE 2: The multi-grade oils listed above are recommended for use under the S.A.E. number as shown in the chart; they are also approved for use under the higher range of S.A.E. grades that they cover.

NOTE 3: Information on oil recommendations for use under extreme winter or tropical conditions can be obtained from The Rover Co. Ltd., Technical Service Department.

Oil pressure relief valve, Petrol models**To adjust****Operation AO/6**

1. Fit a slave oil pressure gauge in place of the warning light switch, run the engine and ensure that there is at least 20 lb./sq.in. (1,4 kg/cm²) oil pressure.
2. Warm the engine to running temperature and adjust the pressure by means of the valve to 55-65 lb./sq.in. (3,8-4,5 Kg/cm²) at 30 m.p.h. (50 k.p.h.) in top gear. Tighten the screw to increase pressure and vice versa. If necessary, renew the release valve spring.
3. Refit the warning light switch and lead.

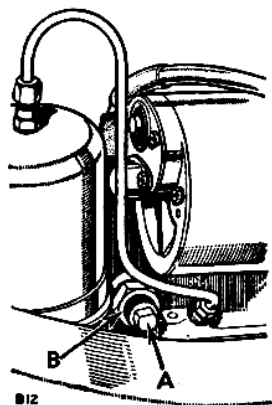


Fig. AO-4—Oil pressure adjustment
1948-54 models

A—Adjusting screw.

B—Locknut.

External oil filter, 1948-54 models, to renew

1. Disconnect the inlet and outlet pipes from the filter.
2. Slacken the four set bolts securing the filter mounting bracket and clip to the cylinder block; withdraw and discard the filter.
3. Fit the new filter by reversing this procedure, and refill the engine with one of the recommended lubricants.
4. Run the engine for five minutes and inspect and rectify any oil leaks.
5. Check the engine oil level and top up as necessary.

External oil filter, 1955-58 Petrol models**Element to renew****Operation AO/8**

1. Position a suitable drip-tray beneath the filter, then unscrew the bolt at the base of the filter container. Withdraw the container complete with element and large rubber sealing washer. Discard the element and wash the container thoroughly in petrol.

2. Place a new filter element in the container and reassemble the unit, using the new large rubber sealing washer supplied with element. Ensure that the sealing washers are in position and intact and that the container is correctly located.
3. Fill crankcase sump with clean oil—11 pints (6 litres)—to the "high" mark on dipstick, run the engine and check for oil leaks at the filter and then add more oil as necessary. Figure for capacity includes 1 pint (0,5 litre) for filter.

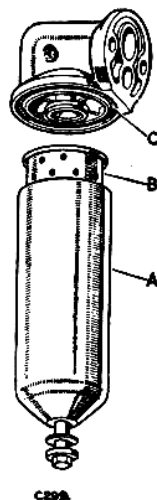
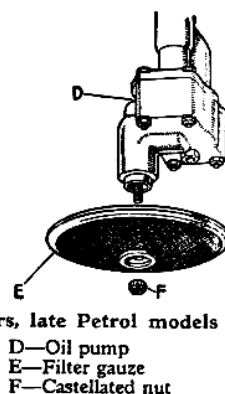


Fig. AO-5—Engine oil filters, late Petrol models

A—Container
B—Element
C—Gasket



D—Oil pump
E—Filter gauze
F—Castellated nut

Filter—to remove and clean Operation AO/10

1. Remove the bolts securing the filter head to the adaptor, then withdraw complete unit.
2. Unscrew the container bolt and renew element. Operation AO/8.
3. Remove the relief valve, spring and ball from the filter head, then wash these parts thoroughly in petrol.
4. Reverse dismantling procedure and refit the assembly to the cylinder block with a new joint washer interposed.

Oil pump, Diesel models**To remove****Operation AO/12**

1. Drain the oil and remove sump.
2. Remove the securing bolts and withdraw pump assembly.
3. Withdraw the driving shaft from pump upper casing.
4. Unscrew the securing nut and remove filter gauze assembly.

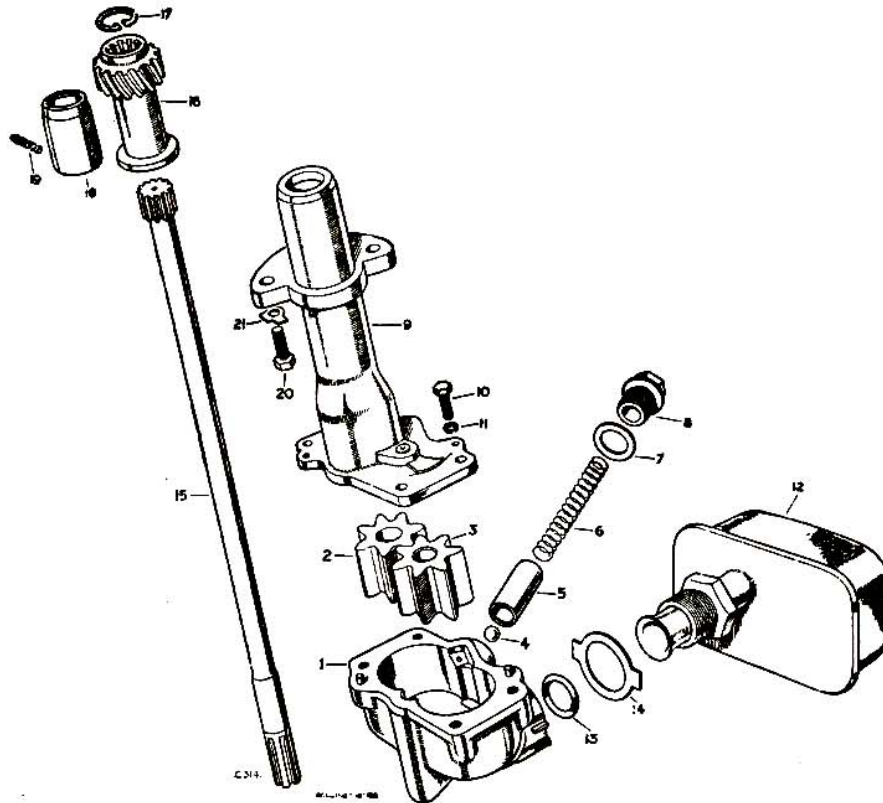


Fig. AO-6—Exploded view of oil pump and driving gear, Diesel models.

- | | |
|-------------------------|---------------------------|
| 1 Lower casing | 11 Spring washer for bolt |
| 2 Driving gear | 12 Filter gauze assembly |
| 3 Driven gear | 13 Oil seal |
| 4 Relief valve ball | 14 Tab washer |
| 5 Relief valve plunger | 15 Driving shaft |
| 6 Relief valve spring | 16 Driving shaft gear |
| 7 Washer | 17 Circlip |
| 8 Plug | 18 Bush—drive shaft gear |
| 9 Upper casing | 19 Locating screw |
| 10 Set bolt for casings | 20 Securing bolt |

5. Remove the bolts securing the upper casing to lower body, tap them gently apart and withdraw the gears. The idler gear spindle may be removed if necessary.
6. Unscrew the relief valve plug and remove the spring, plunger and ball.

To overhaul and refit **Operation AO/14**

1. Check the external diameter of the gears and the internal diameter of the gear housings, using a ring gauge and plug gauge, Part Nos. 276095 and 276094 respectively. With the gauges an exact fit in the bore of the housing, and on the outer diameter of the gears, a radial clearance of .0005 in. (0,01 mm) will exist between the gears and housing.

It should not be possible to interpose a feeler strip of more than .002 in. (0,05 mm) thickness between the gear perimeter and ring gauge, or a feeler strip of more than .003 in. (0,08 mm) thickness between the gear perimeter and gear housing, thus allowing a maximum radial clearance of .003 in. (0,08 mm) between the gear and housing.

2. Press the short, stepped end of idler spindle into the pump body and fit the cast iron idler wheel. Mesh the steel gear with the idler gear, inserting the splined end first.
3. Lay a straight edge across the joint face of pump body and check the end-float with a feeler gauge. This should be between .002 and .005 in. (0,0508 to 0,127 mm).

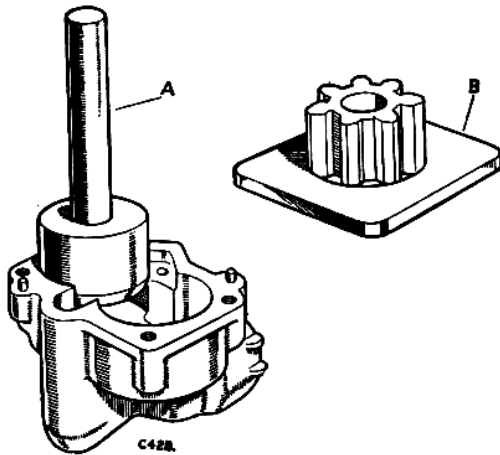


Fig. AO-7—Checking for radial clearance,
Diesel models
A—Plug gauge B—Ring gauge

4. Smear the joint faces of pump body and cover lightly with suitable jointing compound, then bolt together.
 5. Insert the relief valve ball, plunger and spring. Secure with plug and washer.
- Note:* No provision is made for oil pressure adjustment.
6. Insert the longer splined end of driving shaft into the pump and locate in the driving gear.
 7. With the inlet port rearward, and the splined upper end of driving shaft aligned to the drive gear, offer the pump to engine and secure in position.

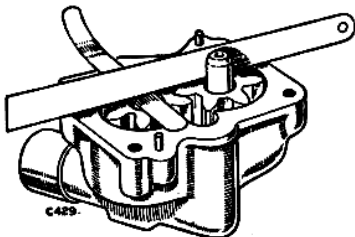


Fig. AO-8—Checking end-float of the gears,
Diesel models

8. Fit a tab locking washer and seal to the filter gauze and nut assembly. Screw the unit into the pump inlet ports and position the filter square with sump bottom; lock in position.
9. Refit the crankcase sump and refill with oil—13 pints (7 litres)—to the “high” mark on dipstick, run the engine and check for oil leaks at the sump joint face, then add more oil as necessary. Figure for capacity includes 2 pints (1 litre) for filter.

External oil filter, Diesel models

Element—to renew Operation AO/16

1. Position a suitable drip-tray beneath the filter, then unscrew the bolt at base of the filter container. Withdraw the container complete with the element, which must be discarded.
2. Wash the container thoroughly in petrol, fit a new element, new inner and outer top sealing rings, then replace the container.
3. Fill crankcase sump with clean oil (13 pints (7 litres)) to the “high” mark on dipstick, run the engine and check for oil leaks and then add more oil as necessary. Figures for capacity includes 2 pints (1 litre) for filter.

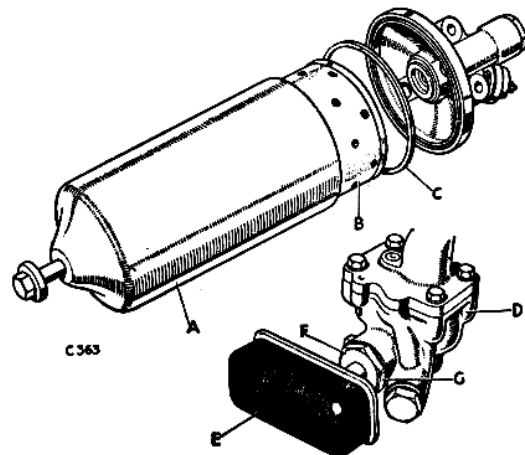


Fig. AO-9—Engine oil filters, Diesel models.

A—Container D—Oil pump F—Nut for filter gauze
B—Element E—Filter gauze G—Locker for nut
C—Gasket

Filter—to remove and clean

Operation AO/18

1. Disconnect the leads from the oil pressure switch.
2. Remove the bolts securing the filter head to cylinder block, then withdraw the complete filter assembly.
3. Unscrew the container bolt and renew element. Operation AO/16.
4. Remove the pressure switch, also the relief valve spring and ball from the filter head, then wash these parts thoroughly in petrol.
5. Reverse dismantling procedure and refit the assembly to the cylinder block with a new joint washer interposed.

DEFECT LOCATION

Symptom, Cause and Remedy

A—WARNING LIGHT REMAINS "ON"—ENGINE RUNNING

1. Low oil pressure—*See item B.*
2. Oil pressure switch unserviceable—*Renew.*
3. Electrical fault—*Check circuit.*

B—LOW OIL PRESSURE

Ascertained by gauge fitted in place of switch and with sump oil level correct.

1. Dirty gauze filter on pump—*Remove sump, remove filter gauze and clean in petrol with a stiff brush. Refill with clean oil.*
2. Pump body joints loose—*Tighten.*
3. Foreign matter on pump ball valve seat—*Remove and clean.*

4. Relief valve plunger sticking—*Remove and ascertain cause.*
5. Weak relief valve spring—*Renew.*
6. Incorrectly adjusted relief valve (2 litre Petrol only)—*Adjust to 55 to 65 lb/sq. in. (3,8 to 4,5 Kg/cm²)*
7. Gears excessively worn—*See Operations AO/4 and AO/14*
8. Excessively worn bearings—main, connecting rod big-end, camshaft, etc.—*Ascertain which bearings and rectify.*

C—WARNING LIGHT FAILS TO GLOW —

When engine is stopped and ignition (petrol engines) or auxiliary services (Diesel) switch is "on".

1. Bulb filament broken—*Renew bulb. Section Q.*
2. Oil pressure switch unserviceable—*Renew.*
3. Electrical fault—*Check circuit.*

DATA

Oil pump—Petrol models

Type	....	....	Gear
Drive	....	....	Skew gear from camshaft
End-float of gears:			
Steel gear	....	.003 to .005 in. (0,075 to 0,13 mm)	
Aluminium gear	....	.004 to .006 in. (0,10 to 0,15 mm)	
Radial clearance of gears	....	.001 to .004 in. (0,02 to 0,10 mm)	
Backlash of gears008 to .012 in. (0,20 to 0,30 mm)	

Oil pressure, engine warm

At 2,000 R.P.M.	55 to 65 lb./sq.in. (3,8 to 4,5 Kg/cm ²)
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Oil pressure relief valve

Type	Adjustable
Relief valve spring:		
Free length	3.050 in. (77,47 mm)
Compressed length at 13 lb. (5,89 Kg) load	....	1.990 in. (50,54 mm)

Oil pump—Diesel models

Type	....	....	Spur gear
Drive	....	....	Splined shaft from camshaft
End-float of gears	....	.002 to .005 in. (0,025 to 0,12 mm)	
Radial clearance of gears	....	.0005 to .002 in. (0,012 to 0,050 mm)	
Backlash of gears	0.004 to .008 in. (0,10 to 0,20 mm)	

Oil pressure, engine warm

At 2,000 R.P.M.	50 to 60 lb./sq.in. (3,515 to 4,220 Kg/cm ²)
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Oil pressure relief valve

Type	Non-adjustable
Relief valve spring:		
Free length	2.840 in. (52,93 mm)
Compressed length at 10 lb. load (4,53 Kg.)	....	2.45 in. (61,23 mm)