

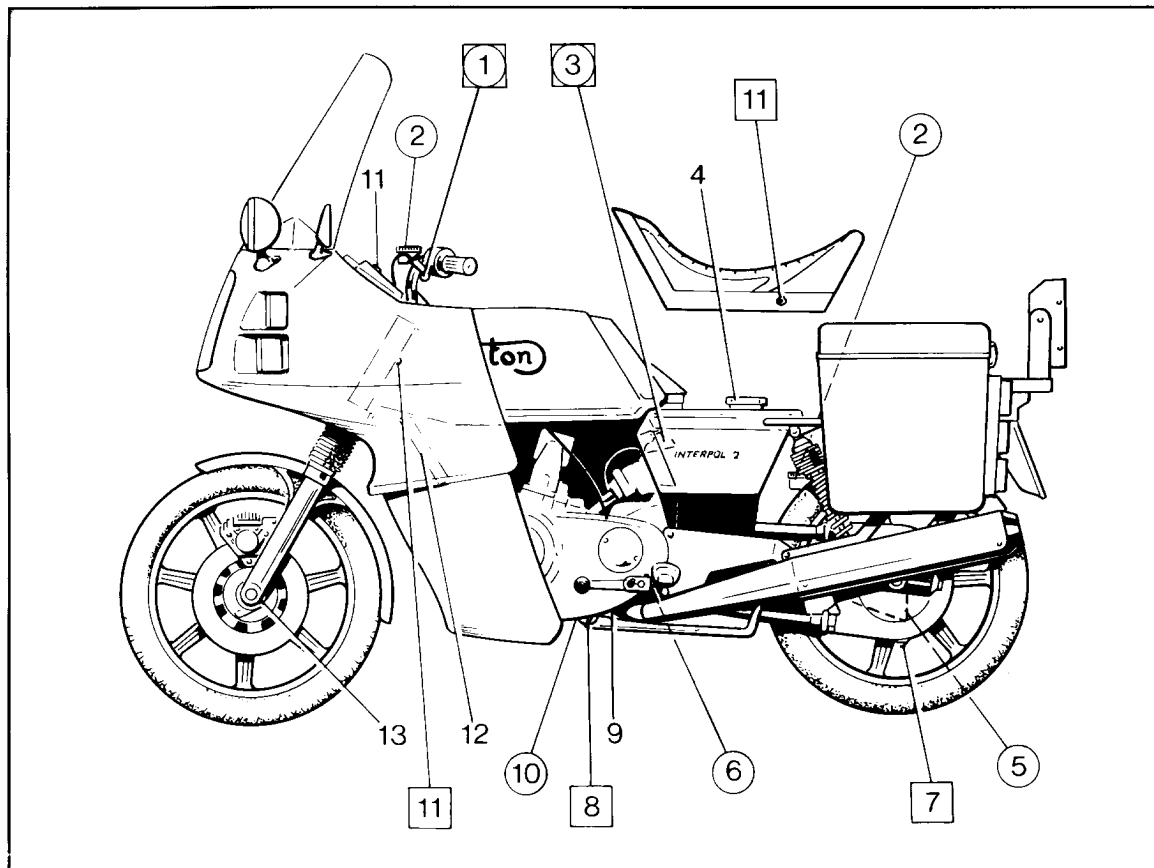
# SECTION A

## LUBRICATION SYSTEM

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## SECTION A1

### LUBRICATION CHART



**Fig. A1. Motorcycle Lubrication Chart**  
**Figures within squares refer to left side of machine.**  
**Figures within circles to the right side of the machine.**

KEY	ITEM	LUBRICANT	SECTION
1	BRAKE & CLUTCH LEVERS	OIL	A14
2	BRAKE & FLUID RESERVOIRS	BRAKE FLUID	F1
3	CARBURETTOR DAMPER PISTONS	OIL	B7
4	ENGINE OIL TANK	OIL	E6
5	REAR BRAKE CALIPER MOUNTING PLATE	GREASE	A13
6	BRAKE PEDAL PIVOT	GREASE	A15
7	FINAL DRIVE CHAIN	OIL	A9
8	SIDE STAND PIVOT	OIL	E17
9	GEARBOX	OIL	A7
10	PRIMARY DRIVE CHAINCASE	OIL	A8
11	LOCK MECHANISMS	OIL	—
12	AIR FILTER ELEMENTS	ACTION FLUID	E4
13	TELESCOPIC FORKS	FORK OIL	A12
REFER TO LUBRICATION SPECIFICATION CHART FOR CORRECT LUBRICANTS			A2

## SECTION A2

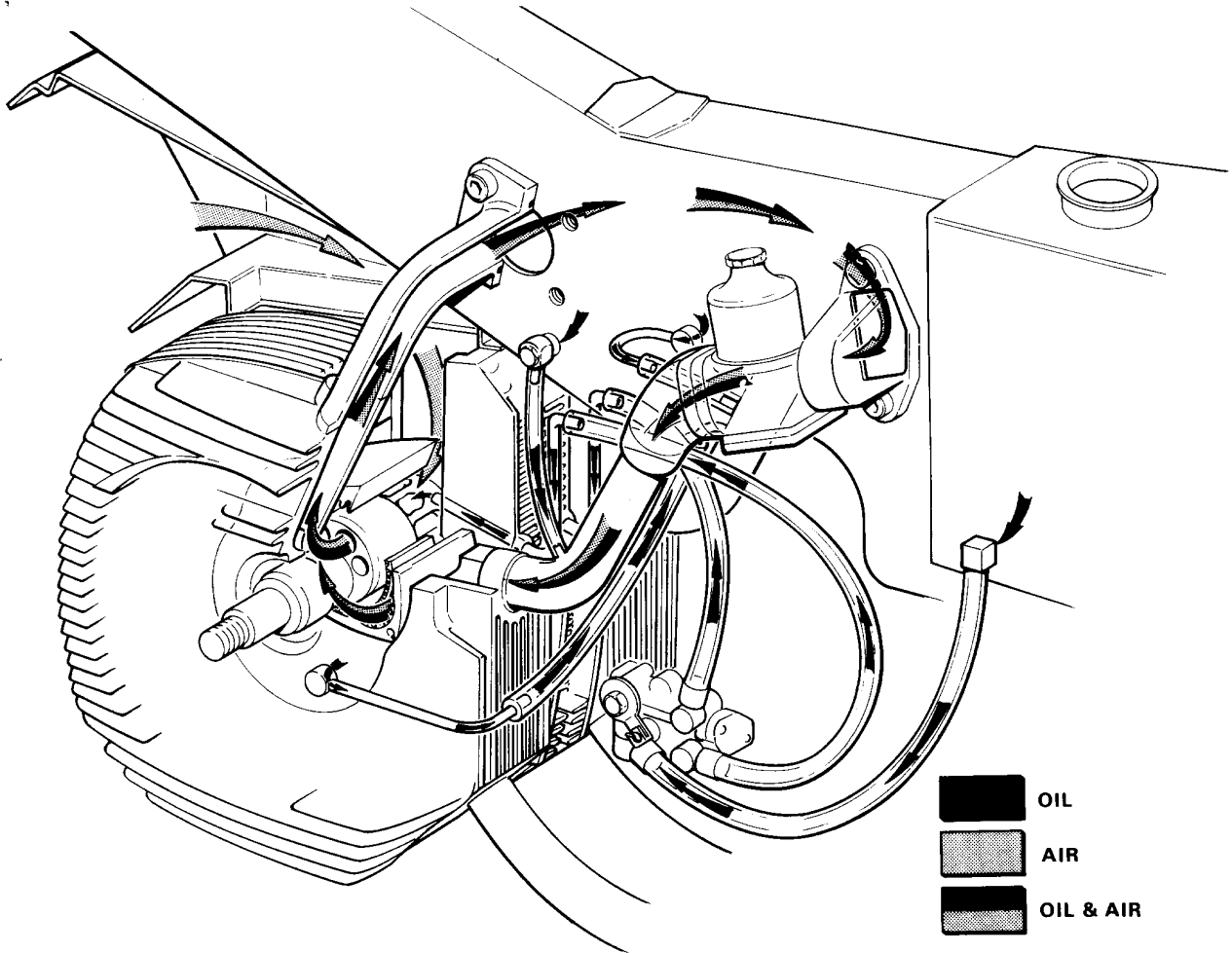
### APPROVED LUBRICANTS

#### DO NOT USE MULTIGRADE OILS AS ENGINE LUBRICANTS

Monograde oils meeting the minimum Service Classification CC or CD (Milspec MIL-L-2104B) are the only oils recommended for use in this engine – Preferred SAE rating – 40

	ENGINE	PRIMARY DRIVE & CARBURETTOR DASHPOTS	GEARBOX	FINAL DRIVE & GENERAL LUBRICATION POINTS	FRONT FORKS	GREASE &
SHELL	Rotella 40 or 30	All seasons Motor Oil	Spirax HD HD85W/140	All seasons Motor Oil	Donax TF or Dexron 2	HMP Grease
B.P.	Vanellus M40 or M30	Super Visco 2000 or Visco-Static	Motorcycle Oil 80/140	Super Visco 2000 or Visco-Static	Motorcycle Fork Oil	B.P. Eng. Grease L2
ESSO	HDX 30 or 40	Plus 20w/50	GP 85w/140 GX 85w/140	Plus 20w/50	Glide G Nuto H 32 Unavis J 32	Beacon 2 or 3
FILTRATE	HD 111 30 or 40	Super 20w/50	Hypoid EP 80w/140	Super 20w/50	Filtrate fork oil	Super lithium grease
CASTROL	Deusol 30 or 40	GTX 20w/50 or 15w/50	Castrol Gear Oil EP85/140	GTX 20w/50 15w/50	Castrol Fork oil	Castrol LM Grease
CHEVRON	Delo 100 SAE 30 or 40	Supreme 20w/50	Universal Gear Lubricant SAE 80w/140	Supreme 20w/50	EP Hydraulic oil 32	Duralith grease EP 2
TEXACO	Ursatex SAE 30 or 40	Eurotex HD motor oil 15w/50	Fleetgear oil SAE 80w/140	Eurotex HD Motor oil 15w/50	Rando HD 32	Marfak all purpose grease
DUCKHAMS	Fleetol HDX 30 or 40	Duckhams 15w/50 Hypergrade		Duckhams 15w/50 Hypergrade	Duckhams Fork oil	Duckhams LB10 Grease
CONOCO	HD30 or HD40	20w/50		20w/50	Hyd SP 32	HMP Grease
GULF	XHD 40	Multi G	Multipurpose Gear Lube 85W/140	Multi G	Hydrasil 32	Gulf Crown No. 2 E.P.

Products are not Listed in Order of Preference



**Fig. A2. Engine Lubrication System**

## SECTION A3

### ENGINE LUBRICATION SYSTEM

#### INTRODUCTION

This engine has been designed to utilise a 'total loss' lubrication system, completely eliminating the need for oil changing, full flow filters, oil return pumps etc., whilst at the same time providing a continually metered supply of clean oil to lubricate the moving parts of the engine.

Oil is taken from an oil tank formed within the frame of the motor cycle which is fed directly to a metering unit, located on the drive sprocket end of the gearbox mainshaft and driven by the mainshaft. Oil flow at any engine speed is controlled by the oil metering pump output regulating lever which is directly connected to the throttle control cable. Oil supply to the engine therefore is governed by a combination of engine speed and throttle opening.

Should the oil metering unit prove to be suspect at any time (see Section A5) complete replacement of the unit is recommended as no servicing is possible. On no account should any attempt be made to overhaul a metering unit as serious damage can be caused to the complete power unit if a defective component is re-fitted.

Oil is distributed from the metering unit via two feed pipes to each side of the aluminium intermediate plate where it meets incoming cooling air and forms an air/oil mist. The mist lubricates the rotor shaft, rotors, gears and bearings within the rotor housing and is subsequently burnt off during the process of combustion. Slight smoking from the exhaust is normal and to be anticipated after or during tickover but excessive smoking is abnormal and immediately indicates re-adjustment of the metering unit has become necessary. (Section A6).

## SECTION A4

### REMOVAL AND REPLACEMENT OF OIL METERING UNIT

#### REMOVING THE OIL METERING UNIT

Drain the gearbox oil and remove the left gearbox end cover. Disconnect both oil feed and supply pipes from the metering unit at the three banjo union bolts being careful to block the oil tank to metering unit pipe to prevent loss of oil. This can easily be achieved by clamping two sealing washers either side of the feed pipe banjo union using a bolt and nut. Release the two bolts securing the metering unit to the gearbox end cover.

Disconnect the operating cable and detach the oil metering unit.

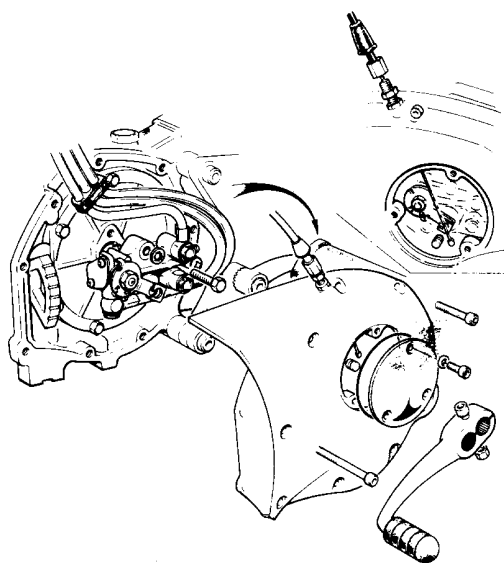


Fig. A3. Removal and replacement of the oil metering unit

## REFITTING THE OIL METERING UNIT

Clean the mating surfaces on the gearbox end plate and oil metering unit and coat lightly with the recommended sealing compound. (General Data). Inspect the 'O' ring and replace if necessary. Refit the metering unit ensuring the oil feed pipes to the engine are

primed and the oil feed pipe from the oil tank to the metering unit has flow. Refit the gearchange/cover assembly using the recommended sealer. Refill the gearbox with the recommended lubricant. (Section A2). Adjust the metering unit as described in Section A6 and replace the access cover.

**WARNING:** Great care must be taken when priming the oil feed pipes not to overload the one way valves with excess pressure.

## SECTION A5 TESTING THE OIL METERING UNIT

If the machine has shown a tendency to 'smoke' heavily from the exhaust, the oil metering unit may be

- a) not adjusted correctly or
- b) not delivering oil at the specified rate (see General data section ).

Adjust the metering unit as described in Section A6 and, if smoking persists, remove the metering unit and test in the following manner:-

Drive the pump at 1500 rpm with a supply of clean engine oil to the bottom union. (See Fig. A3). Take the two outlet pipes to measuring

flasks and run the metering unit in the 'F' position until all of the air bubbles have been displaced from the pipes by oil. Once a flow of oil has been established, reduce the flow rate by moving the operating lever to the 'C' position (wire in this position). Allow the pump to run for exactly 15 minutes and measure the amount of oil in the measuring flasks and multiply this figure by 4. This will give the amount of oil per outlet/hour in cc. Repeat the test with the operating lever in the 'F' position, and check the delivery figures with those given in General Data. If the oil metering unit is delivering oil outside the specified limits, it must be replaced, as attempting to overhaul the unit could ultimately result in serious damage to the engine.

## SECTION A6 ADJUSTING THE OIL METERING UNIT

Run the engine until normal running temperature is reached. Remove the oil metering unit inspection cover on the left gearbox cover. To set the adjustment of the metering unit, run the engine at 2000 rpm.

Adjust the oil metering unit operating cable until 'C' mark on the operating lever lines up with the line on the metering unit casting, with engine speed at a steady 2000 rpm.

Lock the operating cable in this position. Run the engine at constant 2000 rpm and re-check setting marks and if necessary re-set. Replace the cover. If smoke is still apparent from the exhaust, investigate further.

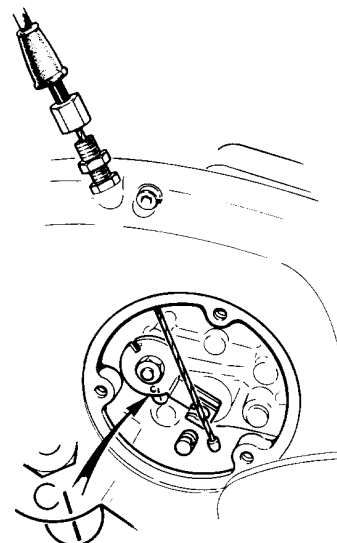


Fig. A4. Adjusting the oil metering unit

## SECTION A7

### GEARBOX LUBRICATION

The gearbox is lubricated by means of its own internal oil bath, splash oil being fed to all the

gearbox components including the enclosed gearchange mechanism.

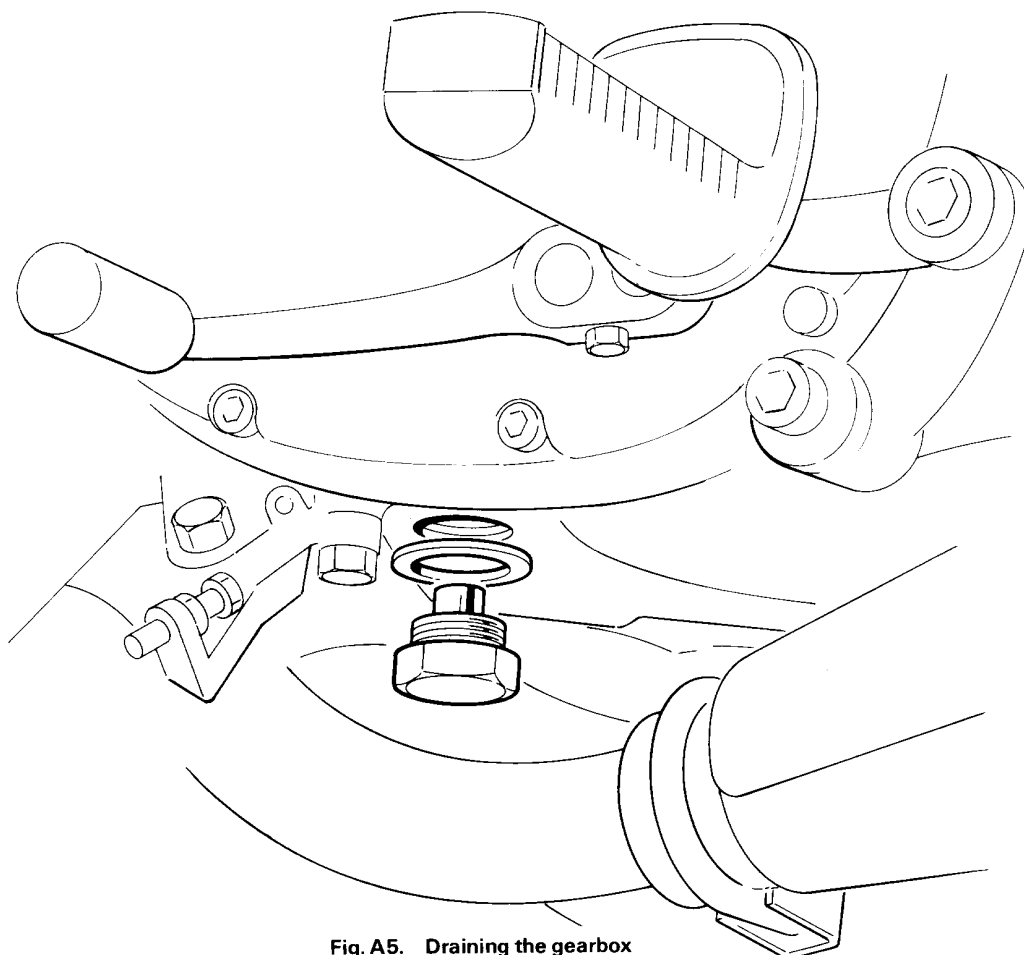


Fig. A5. Draining the gearbox

#### Drain and Refill.

1. Stand the machine on firm level ground.
2. The oil can now be drained by removing a magnetic drain plug in the base of the gearbox. This plug should be inspected for any signs of debris or metallic particles adhering to it. (see Fig.A5).
3. When the oil has drained thoroughly, clean the drain plug, drain plug aperture and refit drain plug using 'Loctite 648' to secure.
4. Remove the gearbox inspection cover plate (three screws) and refill with one litre of the recommended lubricant (Section A2) up to approximately 3mm ( $\frac{1}{8}$ ) below edge of cover aperture.

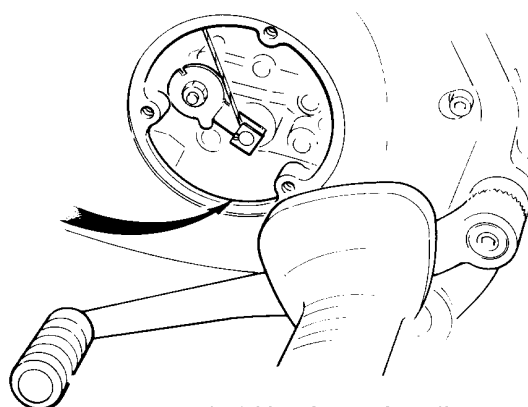


Fig. A6. Replenishing the gearbox oil

5. Recheck level after allowing oil to settle.
6. Refit gearbox inspection cover plate (See Fig.A ).

Note: Ensure only recommended lubricants are used.

## SECTION A8

### PRIMARY CHAINCASE LUBRICATION

The primary chain and clutch are lubricated by the oil contained within the chaincase which also functions as the damping medium for the primary chain tensioner mechanism. It is therefore essential that the chaincase oil level is maintained correctly at all times.

Excessive noise or rattling from this area may indicate that either the primary drive chain is prematurely worn or the tensioner is unable to function correctly, due to low oil level, broken spring etc. The cause must be identified and rectified immediately.

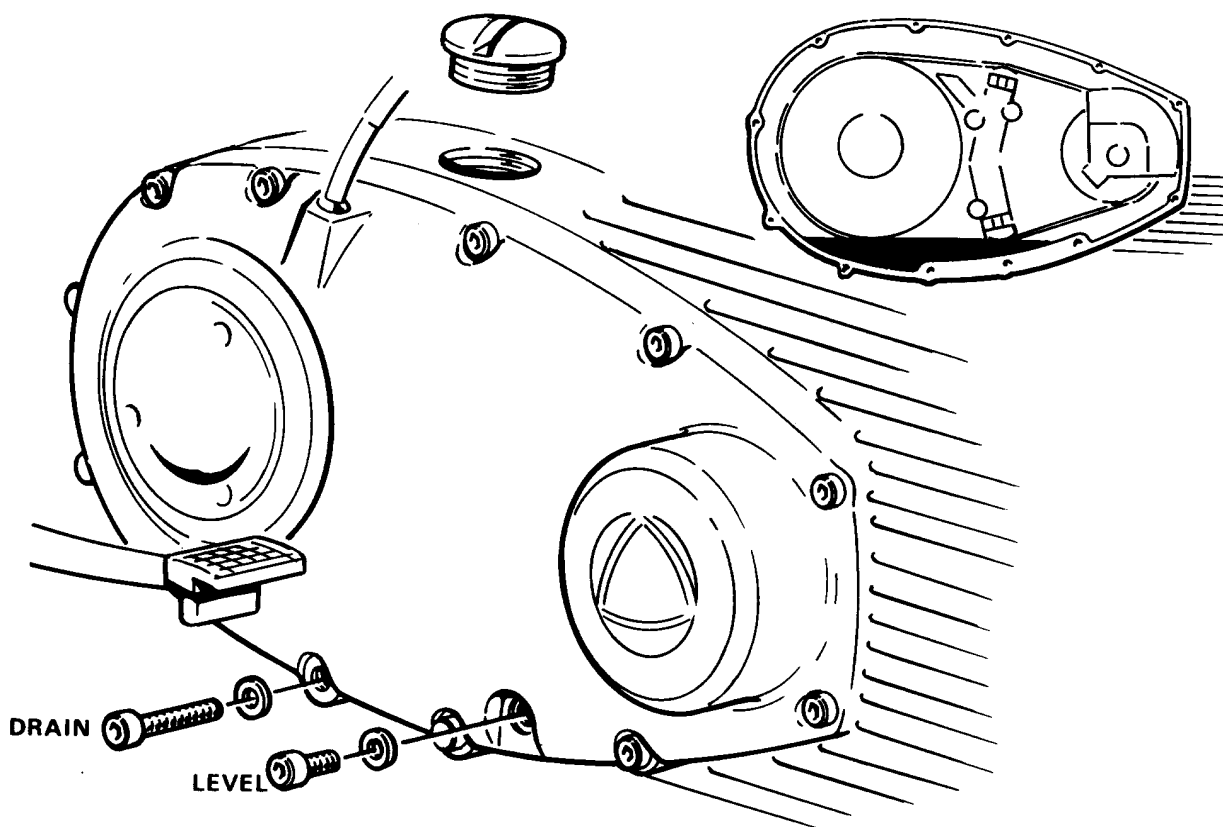


Fig. A7. Replenish oil in the primary chaincase

#### DRAIN AND REFILL

The oil can be drained from the primary chaincase by removing the lowest hexagon headed socket screw at the bottom of the outer primary drive cover which also acts as the primary chaincase oil drain plug. When the oil has drained, clean and replace the drain plug. Next remove the primary chaincase polished

alloy filler plug on the top of the chaincase, and unscrew and remove the level plug taking care not to lose the sealing washer. Using a plastic container and tube, squeeze in 250cc of the recommended lubricating oil (Section A2) and allow to settle. Re-check oil level and replace filler plug. Run the engine to normal operating temperature, stop engine, remove level plug and allow excess oil to drain off. Replace drain plug, using Loctite 648'.



## SECTION A9

### REAR CHAIN LUBRICATION

The rear chain is lubricated by continued immersion within its own sealed oil bath, the chain being protected from damage by road dirt ingress by fully sealed rubber gaiters. The rear wheel drive sprocket is also fully enclosed within a cast aluminium housing incorporating the rear chaincase drain plug.

To drain and refill the rear chaincase proceed as follows:-

1. Remove drain plug at the lowest point of the rear sprocket housing and allow the oil to drain. Clean the drain plug and aperture, replace the drain plug securing with 'Loctite 648'.
2. Remove the black plastic filler plug and washer situated on top of the gearbox sprocket housing and replenish with 175 cc

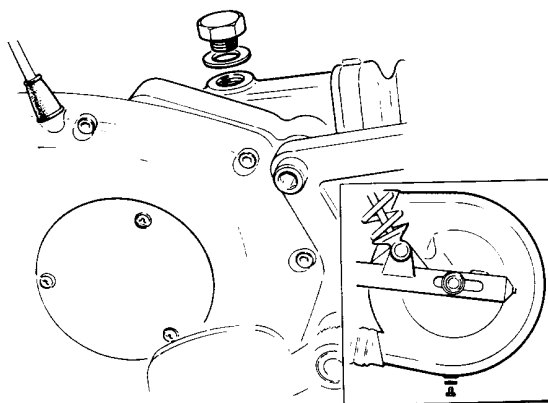


Fig. A8. Drain and refill the rear chaincase

clean fresh oil to the recommended specification (see Section A2).

Refit filler plug.

## SECTION A10

### STEERING HEAD BEARINGS

The steering head bearings are of the taper roller type and are greased on original assembly. As the steering head bearings are sealed units no further lubrication is necessary except during:-

- a. Removal for replacement.
- b. Removal for any other reason, ie. fork replacement, re-painting the frame etc. (eg. total strip down operation)

Although the steering head bearings do not normally require lubrication, they should be checked for adjustment at every 6000 and 12,000 mile service. (See section G 13).

## SECTION A11

### WHEEL BEARING LUBRICATION

The wheel ball bearing races are sealed for life. No adjustment or lubrication is necessary. If any play or rough running becomes evident,

the bearings will need replacing. Removal and replacement of front and rear wheel bearings is fully dealt with in sections F2 and F4.

## SECTION A12

### TELESCOPIC FORK LUBRICATION

The oil contained in the front fork legs not only lubricates bearing surfaces, but also acts as the damping medium. Because of the latter function it is essential that the amount of oil in each leg is of exactly equal quantities and viscosity. Check at the recommended maintenance periods as any variation due to loss or unequal filling will adversely affect the handling qualities of the machine.

Oil leakage from the fork leg gaiter indicates oil seal failure and replacement is dealt with in Section G7. The correct period for changing the fork oil is every 12,000 miles or every twelve months, whichever is the sooner.

To change the oil remove the drain screws at the rear of each fork slider leg and drain. When oil flow stops, sit astride the machine and with the machine off the centre stand apply the front brake lever and push the fork up and down three or four times to release any trapped oil. Replace both drain plugs and sealing washers.

With the machine replaced on the centre stand, support the weight of the machine under the engine (or alternatively operate on one fork leg at a time). Remove the fork stem top nuts and refill with the recommended quantity of the specified lubricant. (Section A2). Replace stem cap nuts being careful whilst applying pressure to pre-tension the coiled fork springs, not to cross thread the cap nuts into the fork tubes. Tighten the cap nuts. Finally standing astride machine, engage the front brake and pump the forks up and down to prime the damper units.

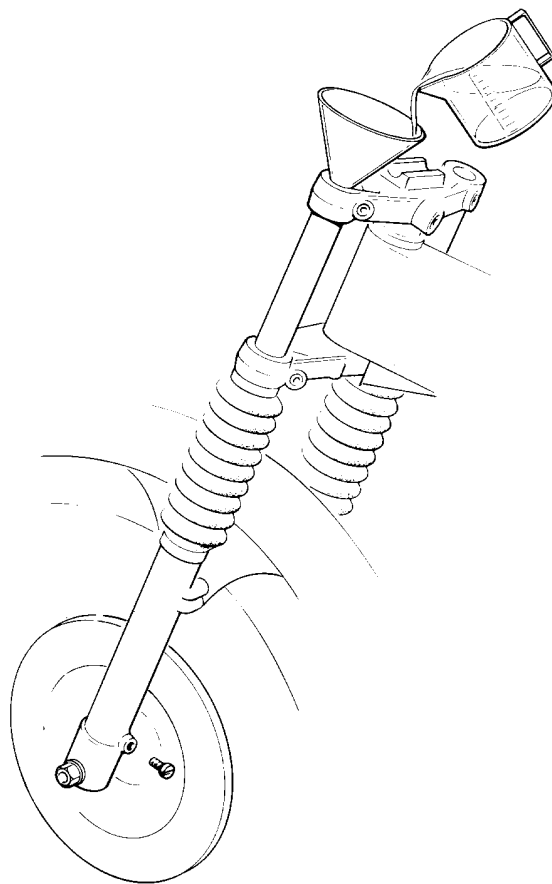
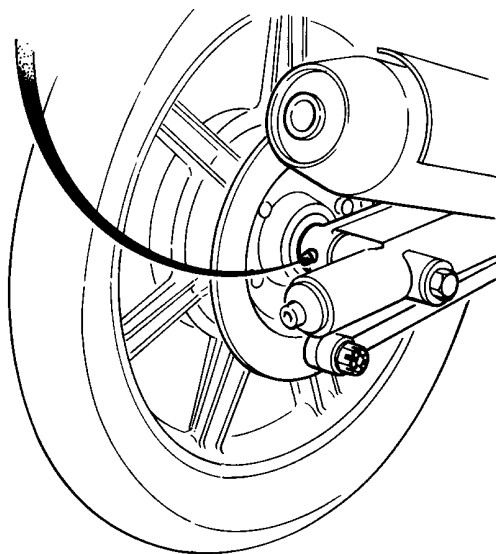


Fig. A9. Draining and replenishing the front forks

## **SECTION A13**

### **LUBRICATION NIPPLES**



The machine has only one grease nipple. This is located at the rear disc brake caliper mounting plate, and should be given two or three pumps of the recommended grease (Section A2) at the 6000 mile and 12000 mile services (or at 3 month intervals - whichever is most appropriate, and the excess grease wiped clean.

**Fig. A10. Rear brake caliper grease nipple**

## **SECTION A14**

### **CONTROL CABLES**

All control cables are nylon lined and do not require lubrication. However, the front brake lever and clutch lever pivots require lubricating

every month or at the 6000 and 12000 mile service whichever is the soonest, with the recommended lubricant. (Section A2).

## SECTION A15

### REAR BRAKE PEDAL SPINDLE LUBRICATION

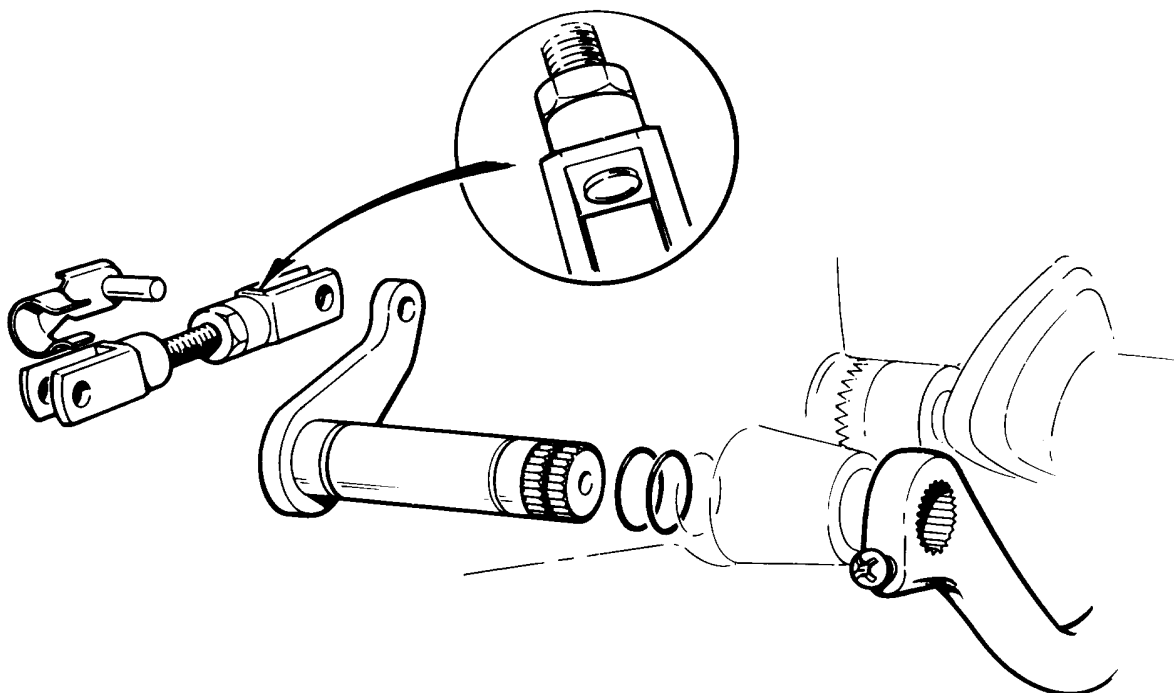


Fig. A11. Rear brake pedal spindle lubrication

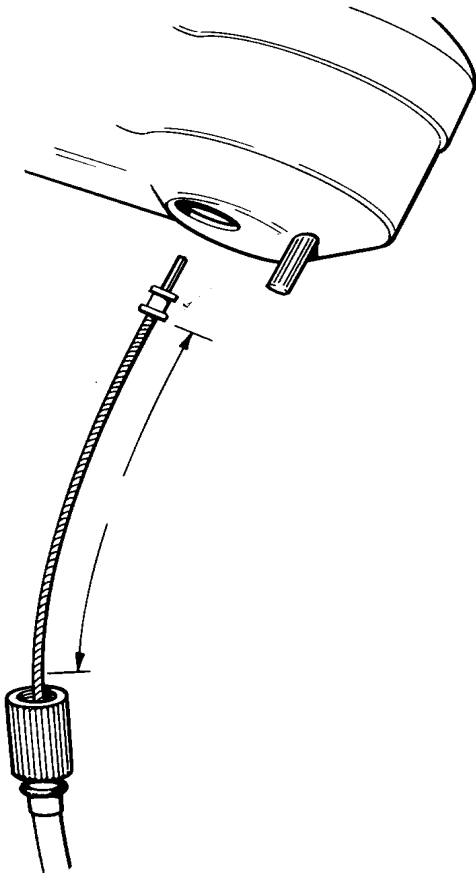
Should the brake pedal feel stiff in operation or be reluctant to return to the 'off' position, the spindle may need cleaning and re-greasing. To do this, remove the brake pedal and spindle as described in Section E20. Clean out the spindle bearing, examine and replace, if necessary the sealing 'O' rings, lubricate with

grease (Section A2) and re-assemble applying grease to the brake rod pivot clip pins. Check operation of brake pedal.

Freedom of operation can be maintained subsequently by simple regular application of the oil can to the pedal pivot spindle joint.

## SECTION A16

### SPEEDOMETER CABLE



Lubricate every 12,000 miles. Disconnect the outer cable at the drive housing and withdraw the inner cable. Clean and inspect. Lightly grease the inner cable with high melting point grease, (see Section A2 - Recommended Lubricants) leaving the top 6" free of grease. Re-insert the inner cable into the outer and re-connect to the drive housing.

Fig.A12. Speedometer cable lubrication