



OWNER'S HANDBOOK

FOR

1971 MODELS
40 CU.IN. [**650** C.C.] TWINS

BONNEVILLE T120 R
TIGER 650 TR 6R
TROPHY 650 TR 6C

See Bookmarks

U.S.A. EDITION

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OWNER'S HANDBOOK

FOR

UNIT CONSTRUCTION

40 cu. in. (650 c.c.) TWIN

**1971
MODELS**

TRIUMPH ENGINEERING CO. LTD.

MERIDEN WORKS · ALLESLEY · COVENTRY · ENGLAND

TELEPHONE: MERIDEN 331
COVENTRY 20221

TELEGRAMS: "TRUSTY, COVENTRY"
TELEX: "TRUSTY" 31305

Publication Part No. 99-0930
First Amendment January 1971

U.S.A. EDITION

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INTRODUCTION

The Owner's Handbook includes all the information that the majority of owners will require. If you require more information for major repairs there is available a Workshop Manual but this is intended for those having basic mechanical knowledge and workshop facilities. To obtain the Workshop Manual order from your local Triumph dealer or distributor as we do not supply parts or service literature direct from the factory to individual customers.

Where specialised advice is required beyond the ability of the dealer, then you should write to your distributor who will act on our behalf. Unless the full engine number is quoted it is often difficult to identify the type of motorcycle and give a helpful reply. Any information which may have a bearing on the subject should be included, particularly details of any additions or alterations to the standard equipment.

Where a guarantee claim is involved, consult your dealer or distributor who may be able to provide a replacement to enable your motorcycle to be used whilst the defective part is returned to his distributor. Guarantee claims in respect of proprietary components should be forwarded by your dealer to his distributor.

The terms of the U.S. Triumph guarantee can be obtained from your dealer.

Eastern Distributors

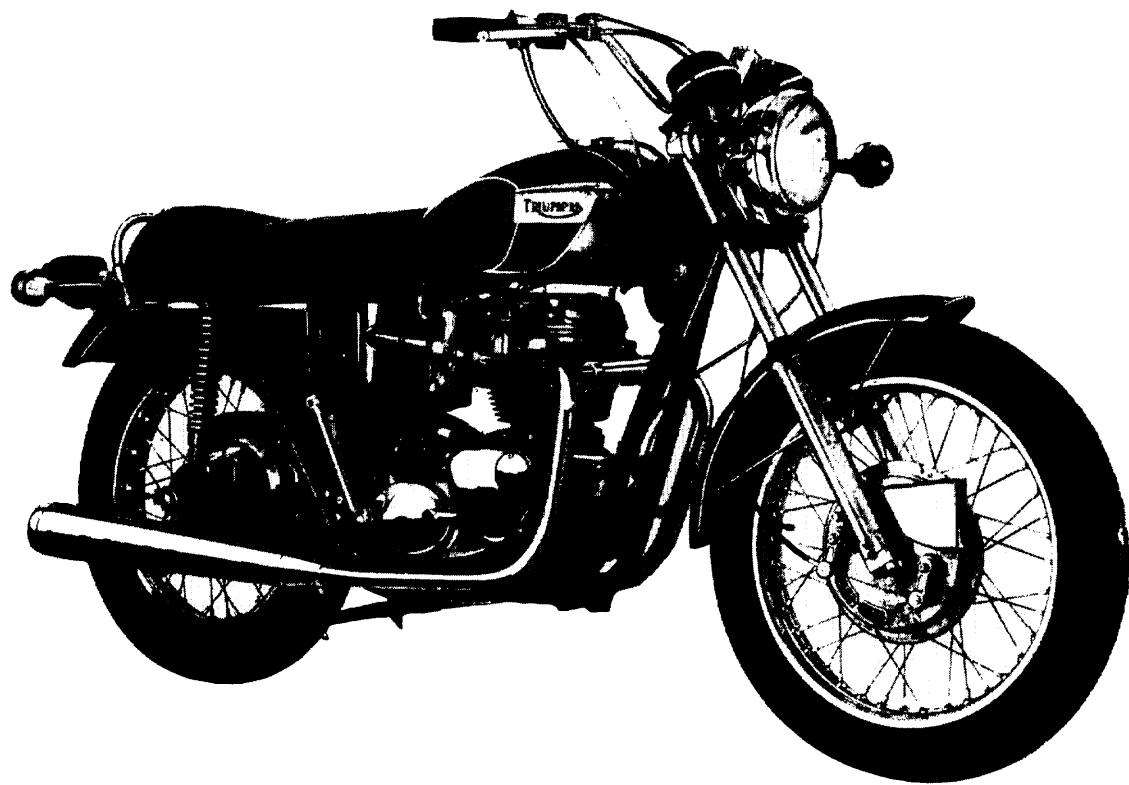
Triumph Motorcycle Corp.,
Towson,
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Telex: Tricor, Baltimore 87728
Telephone 3010-252-1700

Western Distributors

Triumph Motorcycle Corp.,
P.O. Box 275,
Duarte,
California, 91010

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Telephone 213-359-3221
213-681-0255



650 c.c. TRIUMPH BONNEVILLE T120R

USEFUL DATA

MOTOR	TR6R	TR6C	T120R
Bore and Stroke—mm.	71 x 82	71 x 82	71 x 82
Bore and Stroke—in.	2.795 x 3.23	2.795 x 3.23	2.795 x 3.23
Capacity—c.c. ...	649	649	649
Capacity—cub. in. ...	40	40	40
Compression Ratio ...	9.0 : 1	9.0 : 1	9.0 : 1
Tappet Clearance, Inlet and Exhaust—in. (Cold)...	0.002, 0.004	0.002, 0.004	0.002, 0.004
Valve Timing { I.O.	34°	34°	34°
Checked @ { I.C.	55°	55°	55°
0.020". Lift at { E.O.	55°	55°	55°
the tappet { E.C.	34°	34°	34°

IGNITION—Timing (Before top center)

Crankshaft position ...	38°	38°	38°
Contact Breaker Gap—in.	0.014"—0.016"		

SPARK PLUGS

Type ...	Champion N3, KLG FE100 or FE220 (See Page 26)		
Point Gap ...	0.025 in.		

CAPACITIES

Fuel Tank ...	3½ U.S. gals.	3½ U.S. gals.	3½ U.S. gals.
Oil Tank ...	4.8 U.S. pints	4.8 U.S. pints	4.8 U.S. pints
Gearbox ...	500 c.c.	500 c.c.	500 c.c.
Primary Chaincase (Initial fill) ...	150 c.c.	150 c.c.	150 c.c.
Front Forks (each leg) ...	190 c.c.	190 c.c.	190 c.c.

CARBURETOR

Amal Type ...	R930/65	R930/65	L930/67, R930/66
Main Jet ...	210	210	180
Needle Jet ...	.106	.106	.106
Needle Type ...	STD	STD	STD
Needle Position ...	2	2	1
Throttle Valve ...	930/3½	930/3½	930/3

SPROCKETS

Gearbox, Solo ...	19	18	19
Rear Wheel ...	47	47	47

CHAINS

Primary— $\frac{3}{8}$ in. pitch			
Duplex, links ...	84	84	84
Secondary— $\frac{3}{8}$ in. pitch x $\frac{3}{8}$ in. wide, links ...	106	106	106

	TR6R	TR6C	T120R
GEAR RATIOS			
4th Top	4.95	5.22	4.95
3rd Third	6.14	6.48	6.14
2nd Second	8.36	8.83	8.36
1st Bottom	12.08	12.73	120.8
Engine R.P.M. @ 10 m.p.h.	659	696	659
TIRE SIZE			
Front	3.25 x 19	3.25 x 19	3.25 x 19
Rear	4.00 x 18	4.00 x 18	4.00 x 18
TIRE PRESSURE			
Front lb./sq. in.	24	24	24
Rear lb./sq. in.	25	25	25
BULBS			
Headlight—12 v. 45/35W			
Pre-focus... ..	Lucas 370	Lucas 370	Lucas 370
Parking Light—12 v. 6W			
M.C.C.	Lucas 989	Lucas 989	Lucas 989
Stop and Tail Light—12 v.			
5/21W Offset pin ...	Lucas 380	Lucas 380	Lucas 380
High beam, ignition and			
direction indicator warn-			
ing Lights 2W (WL15)	Lucas 281	Lucas 281	Lucas 281
Speedometer—12 v. 3W			
M.E.S.	Lucas 987	Lucas 987	Lucas 987
Direction indicators 12 v.			
21W	Lucas 382	Lucas 382	Lucas 382
OVERALL DIMENSIONS			
Length—in.	87½	87½	87½
Width—in....	33	33	33
Seat Height—in.	32	32	32
Weight—lbs.	381	381	382
COLOR			
	Pacific Blue	Pacific Blue	Tiger Gold

GENERAL DESCRIPTION

This handbook refers to the Triumph motorcycles having a combined motor/gearbox unit of 40 cu. in. (650 c.c.) capacity. The vertical, parallel twin-cylinder, air cooled motor has overhead valves operated by push rods and has a bore of 2.795 in. (71 m.m.) and a stroke of 82 m.m. The motor is lubricated by pressure through a plunger pump from the oil reservoir in the main frame. The oil drains to the bottom of the crankcase where it is scavenged by the second part of the plunger pump and returned to the reservoir.

The primary drive is by Duplex chain and six-plate clutch contained in an oil bath chaincase. The four-speed foot-controlled gearbox is contained in the same housing as the motor but the lubrication systems are entirely separate. The gearbox is lubricated by oil contained in the housing. The final drive is by single chain.

The telescopic front forks are mounted in the frame by taper roller bearings. The load is carried by two coil springs in compression and the movement is controlled by integral hydraulic damping.

The rear suspension is a forked member pivoting on bronze bushes which are lubricated by periodical high-pressure greasing. The load is carried by Girling combined coil spring and hydraulic damper units. The spring is adjustable for load but the hydraulic system is completely sealed and needs no attention.

The front wheel size is 19 in. rim diameter with a 3.25 in. section front tire and an 8 in. diameter front brake. The rear wheel has a 4.00 x 18 section tire with a 7 inch diameter brake.

The electrical system is supplied from an alternating current generator contained in the primary chaincase and driven from the crankshaft. The output is fed through a silicon diode bridge connected rectifier to a 12 volt lead-acid battery. The voltage is controlled by a Zener diode mounted on a heat sink.

IMPORTANT NOTE

The positive side of the battery is grounded to the frame.

LAYOUT OF CONTROLS

Clutch lever. On left handlebar. The clutch couples the motor drive to the gearbox and rear wheel. Pull the lever towards the handlebar to disengage the clutch.

Horn push. On left handlebar. Press to sound the horn.

Dipper switch. On left handlebar. Use the lever to change the headlamp beam between "high" and "low".

Headlamp flasher. On left handlebar. Press to flash headlamp "high" beam.

Air control. Lever on right handlebar. For starting a cold motor move the lever forward to the slack wire position. Open progressively as the motor warms up.

Front brake lever. On right handlebar. Pull the lever towards the handlebar to apply the front brake.

Throttle control. Twist the right handlebar grip towards you to increase the engine speed. Twist it away from you to reduce speed.

Speedometer. Indicates the speed and registers total and trip mileage. To set the trip indicator to zero twist the knob clockwise. Do not PULL the knob, as this is a snap fit in the speedometer.

Tachometer. Indicates engine speeds in revolutions per minute.

Direction indicator switch. On right handlebar. Use the switch to operate flashing indicators, move down for right indication and up for left indication.

Lighting switch. A two position rotary switch on the headlamp. Switch to "on" position for headlamp. The headlamp is not operative unless the ignition is switched to position 4 (see Fig. 12).

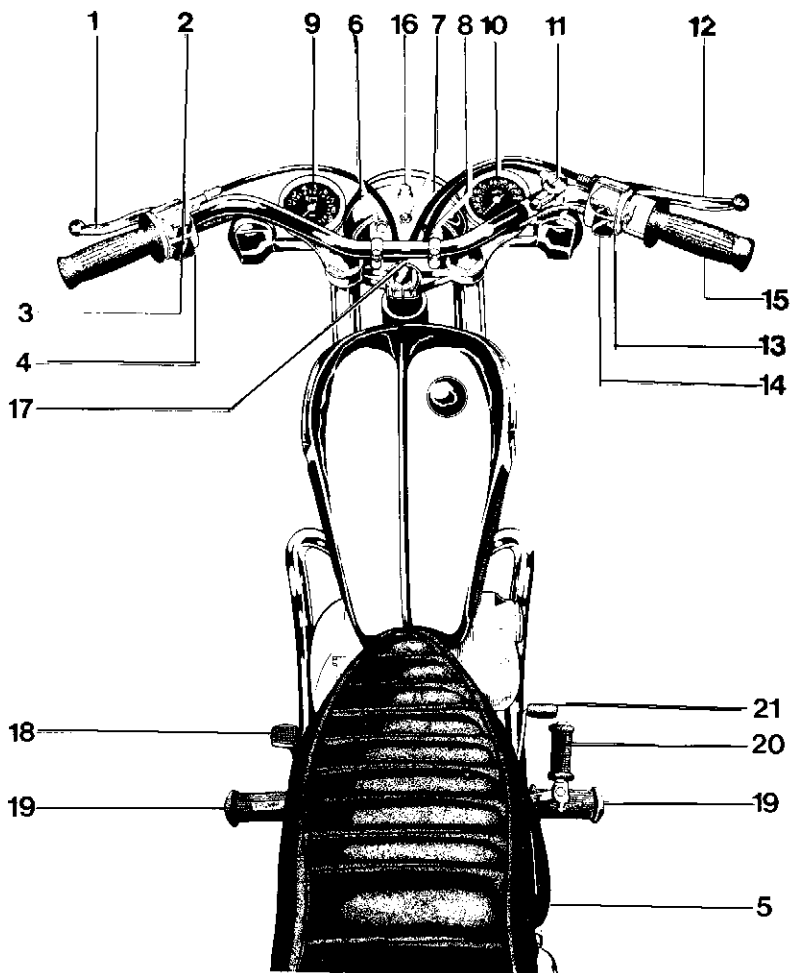
Oil pressure warning light. (Red). Fitted into headlamp shell—illuminates as ignition is switched on and should extinguish with the engine running as oil pressure builds up. If it fails to extinguish with the motor running beyond tickover, kill the motor instantly and investigate the cause.

High beam warning light. (Green). Shows as headlamp high beam is selected.

Direction indicator warning light. (Amber). Illuminates when the direction indicators are operating.

Kill button. On right handlebar. Press to stop motor. Always switch off ignition and remove key when parking.

Steering damper. (Where fitted). The large knob on the steering head. Turn clockwise to increase the friction on the steering for rough roads.



- | | |
|--|--------------------------------|
| 1. CLUTCH LEVER | 10. SPEEDOMETER |
| 2. HEADLAMP FLASHER | 11. AIR CONTROL LEVER |
| 3. DIP SWITCH | 12. FRONT BRAKE LEVER |
| 4. HORN PUSH | 13. KILL BUTTON |
| 5. MASTER ELECTRICAL SWITCH | 14. DIRECTION INDICATOR SWITCH |
| 6. OIL PRESSURE WARNING LIGHT (RED) | 15. THROTTLE CONTROL |
| 7. DIRECTION INDICATOR WARNING LIGHT (AMBER) | 16. LIGHTING SWITCH |
| 8. HIGH BEAM WARNING LIGHT (GREEN) | 17. PARKING LOCK |
| 9. TACHOMETER | 18. REAR BRAKE LEVER |
| | 19. FOOTREST |
| | 20. KICKSTARTER PEDAL |
| | 21. GEARSHIFT PEDAL |

Fig. 1. Control Layout.

ON THE MACHINE

Master electrical switch. This is situated in the right side panel. It is a four position switch operating with the following sequence:—

1. **OFF.** Key can be removed.
2. **PILOT.** The pilot and tail lights are illuminated. The key can be removed.
3. **IGNITION.** The motor can be started. The key is now retained.
4. **IGNITION AND LIGHTS.** All electrical equipment is now available for use and the key is retained.

Refer to Fig. 12 for positions.

Gas taps. At the rear underneath the tank. Turn down the lever on the right tap for normal running. When the reserve is required turn down the lever on the left tap. Always turn off both taps when parking to prevent gas flooding the motor.

FOOT CONTROLS

Brake pedal. In front of left footrest. Press down to apply the rear wheel brake.

Gearshift lever. In front of right footrest. Press down to shift to a lower gear or pull up to shift to a higher gear. The lever is spring loaded and always returns to the central position.

Starter pedal. The folding pedal behind the right footrest.

TAKING THE MOTORCYCLE ON THE ROAD FOR THE FIRST TIME

In most cases the dealer will have checked the oil levels in the gearbox, primary chaincase and oil reservoir, checked the tire pressures and properly serviced the battery; if in doubt check them again. Fill the gas tank with a suitable grade of fuel and the motorcycle is ready for starting.

TO START THE ENGINE

1. Select the neutral position between first and second gear.
2. Pull in the clutch lever and operate the starter pedal several times to free the clutch.
3. Turn on the gas tap and hold down for approx. 5 seconds the spring loaded tickler button(s) which floods the carburetor(s) and enrichens the mixture. In cold weather close the air lever to the stop.

4. Place the key in the ignition switch and turn to position 3. (See 'Master electrical switch' page 11 and Fig. 12).
5. Press down the starter pedal gently until you feel some resistance; then press harder with the throttle slightly open when the engine should start.
6. Open the air control as soon as the engine will allow it without stalling.

BREAKING IN YOUR NEW MOTORCYCLE

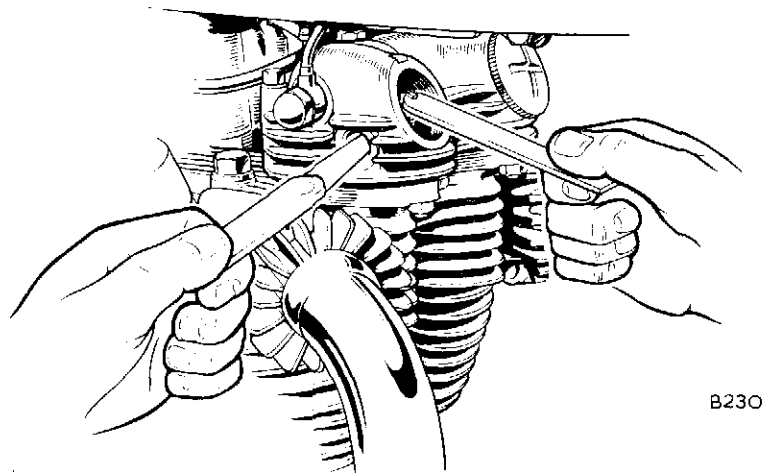
Although the new parts are machined as accurately as possible the moving parts need to mate with each other or become what is known as "broken-in". At a low constant speed this would take a considerable mileage, therefore the ideal method of breaking-in is to increase progressively the load and length of time the load is maintained. These machines will travel at 50 m.p.h. with only a small throttle opening on a level road without harm when new but any use of a large throttle opening, even in a lower gear, other than for a very short time may cause damage.

Shift gear frequently so that the engine is always working easily; neither pulling hard in a high gear nor revolving fast in a low gear. The extra use of the gearbox helps to break-in all the transmission parts. It is difficult to quote a set mileage but provided that the breaking-in is done intelligently it should be possible to use maximum performance after 1,500 miles. Whenever the maximum performance is used it is a good plan to snap shut the throttle for a moment occasionally as this sucks a certain amount of oil up the cylinders.

TO ADJUST THE VALVE OPERATING MECHANISM

There are four adjusters on the rockers which are accessible after removing the four inspection caps from the rocker boxes. A feeler gauge of the correct thickness can be inserted after removing four blanking plugs, one from each end of each rocker box (see Fig. 2). The clearance must always be checked when the engine is cold. It will be easiest to find the correct point of the stroke to adjust the valve

clearance if you put the machine on the centre stand, engage top gear, and then remove the sparking plugs. By turning the rear wheel you can then turn the crankshaft and position the valves.



B230

Fig. 2. To adjust the valve operating mechanism.

Inlet valves (towards the rear of the engine)

Turn the rear wheel until one of the inlet rockers moves downwards, thus opening the valve. When this valve is fully open the operating mechanism of the other inlet valve will be seated on the base of the cam and clearance can now be checked and adjusted if necessary. The clearance is 0.002 in. (0.05 mm.) and is correct when a feeler gauge of this thickness is a tight sliding fit between the valve tip and the adjuster. Tighten the locknut and recheck the clearance. Having adjusted one inlet valve, turn the rear wheel until the valve which you have adjusted is now fully open and repeat the procedure for the other inlet valve.

Exhaust valves

Having adjusted the inlet valves proceed to the exhaust valves which are situated at the front of the engine. Proceed in the same way as for the inlet valves and position one valve fully open whilst you check the clearance on the other. In this case the clearance is 0.004 in. (0.10 mm.).

Check that the inspection cap fibre washers are in good condition and replace the caps making sure that they are tight. The access plugs at the end of the rocker boxes are fitted with copper washers. It is advisable to check the condition of these washers and if necessary replace them before refitting the plugs.

TO ADJUST THE BRAKES

Front brake

The brake is of the two leading shoe type, the expansion of the shoes being equalised by the caliper action of the cam levers. The cable adjuster is combined with the control lever on the handlebar and should be set to eliminate slackness without applying the brake.

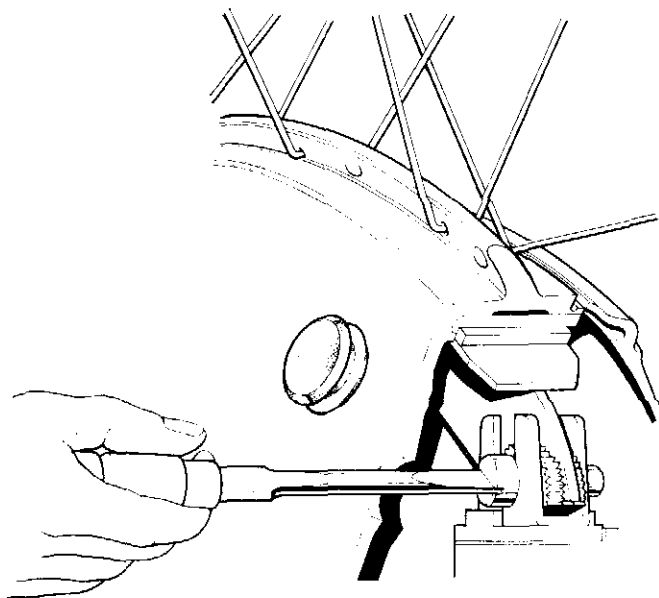


Fig. 3. To adjust front brake shoes.

After considerable mileage it may be necessary to re-position the shoes within the brake drum. Individual adjustment of the shoes is provided by a 'Micram' adjuster at the actuating tappet of each shoe.

Remove the brake cable to eliminate the possibility of any drag and remove the grommet from the hub shell (see Fig. 3). Rotate the wheel until the aperture is opposite one adjuster screw, and turn the 'Micram' adjuster in a clockwise direction until the brake shoe is hard against the drum. Turn back the adjuster one or two notches until the wheel revolves freely. Turn the wheel through half a revolution and repeat the adjustment on the second shoe. Ensure that the wheel revolves freely, replace the grommet and refit and adjust the cable length at the handlebar (see Fig. 4).

Rear brake

The rear brake pedal is adjustable for position and any adjustment for the pedal position should be made before adjusting the free movement. From the static position before the brake is applied there should be about $\frac{1}{2}$ in. free movement before the brake starts to operate. The actual adjustment is by means of a wing nut on the rear end of the brake operating rod (see Fig. 4). Turn the nut clockwise to reduce the clearance.

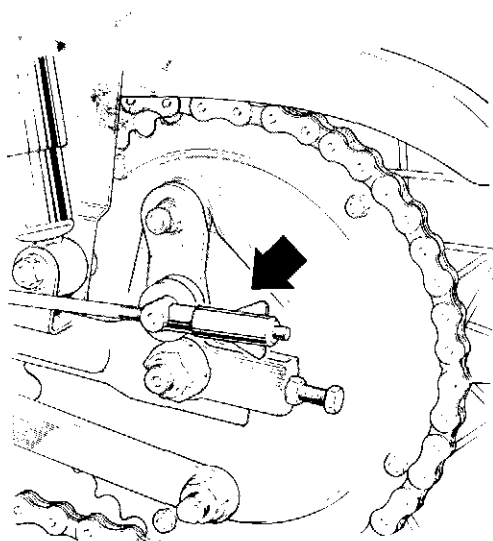
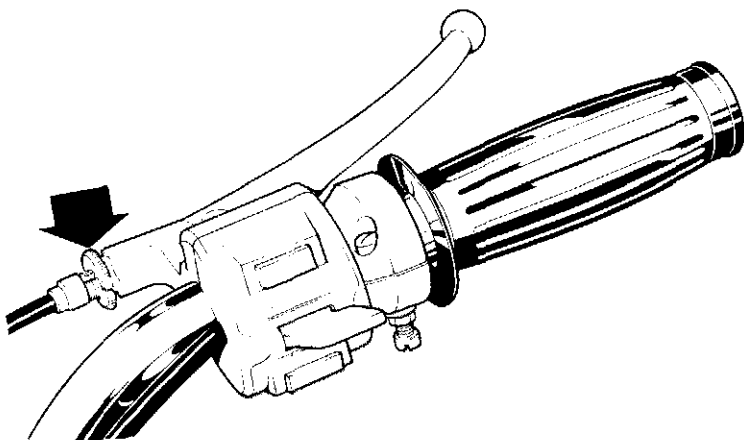


Fig. 4. Showing brake adjusters.

TO ADJUST THE CHAINS

Primary chain

The primary chain is of the Duplex type and is not adjustable as the centres of the engine shaft and gearbox are fixed. Provision for the take-up of wear in the primary chain is made by means of a rubber-faced slipper blade below the bottom run of the chain. The free movement in the chain can be felt with a finger after removing the top inspection plug (see Fig. 5). Do not move the chain by using the starter pedal while your finger is inside the case. The correct chain adjustment is $\frac{1}{2}$ in. free movement. To reduce the amount of slack remove the plug with the extended head from the bottom of the case and tighten the slotted adjuster nut at the rear end of the tensioner by using a short screwdriver Part No. D496. After replacing the plug, replenish the chaincase with $\frac{1}{4}$ pint (150 c.c.) of oil as used in the main oil reservoir.

Rear chain

The adjustment of the rear chain is controlled by draw bolts fitted to each end of the rear wheel spindle. The correct adjustment for the rear chain is $\frac{3}{4}$ in. free movement with the machine on its wheels and the chain at its tightest point or $1\frac{1}{4}$ in. with the machine on the stand and the chain at its slackest point. If the adjustment of the chain is outside these limits it should be corrected by loosening the wheel spindle and the brake torque stay nut on the anchor plate and then adjusting the draw bolts an equal number of turns. Always apply the brake pedal to centralise the brake plate and keep it applied while you tighten the spindle nut. Recheck the chain adjustment. If the wheel alignment was correct originally the adjustment of the nuts by an equal number of turns should preserve that alignment but if you are doubtful whether the rear wheel is in line then you should use a straight edge or piece of string alongside the rear wheel; making allowance for the difference in section between the rear tire and the front tire and then tighten or loosen the draw bolt adjuster on the right side so that the rear wheel lines up with the front wheel. If the rear wheel is not in line the road holding of the machine will be adversely affected and will cause rapid wear on the chain and rear wheel sprocket. When the adjustment is satisfactory, check the tightness of the wheel spindle nut, adjuster draw bolts and brake torque stay nuts. Finally check the adjustment of the brake operating rod. There is no automatic oil feed to the rear chain which should be lubricated manually with an oil gun weekly.

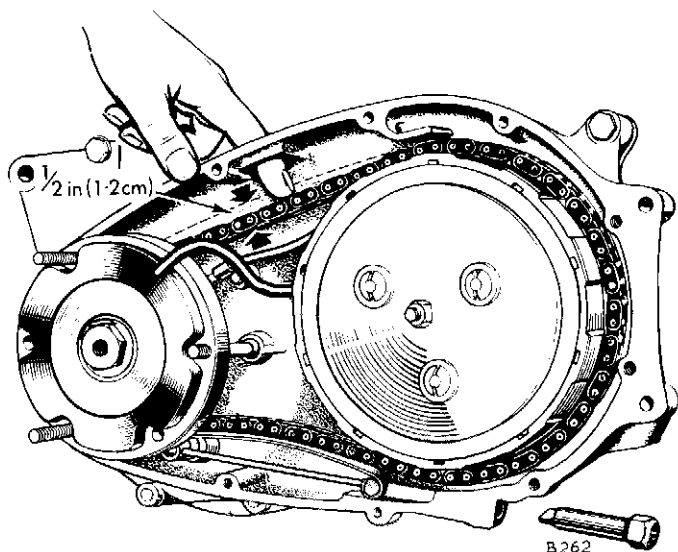


Fig. 5. To adjust the primary chain.

TO ADJUST THE CLUTCH AND THE CLUTCH OPERATING MECHANISM

The clutch is situated on the left side of the machine inside the primary chaincase. If the clutch is dragging and normal adjustment of the operating mechanism produces no improvement it will be necessary to remove the primary chaincase to adjust the three springs which provide the loading on the pressure plate. To remove the primary chaincase first take off the left exhaust pipe and swing the footrest and brake pedal out of the way. Place a tray underneath, and release the cover by unscrewing two domed nuts and eight screws. The three slotted nuts on the clutch should be tightened initially until the heads are flush with the end of the pins. The handle-bar clutch lever should be pulled and the starter pedal operated whilst you watch the outermost plate of the clutch. This should lift evenly and turn without wobbling. If one side of the plate is high the slotted nut nearest to it should be tightened as necessary until the pressure plate lifts and turns evenly. After replacing the cover replenish the chaincase with approximately $\frac{1}{4}$ pint (150 c.c.) of oil as used in the main oil reservoir. The correct level is maintained by the engine breathing system.

To adjust the clutch operating mechanism

When the clutch pressure plate lifts evenly it is then possible to adjust the clutch operating mechanism. Slacken off the adjustment at the handlebar end of the clutch cable and then screw in the adjuster situated in the centre of the pressure plate until the pressure plate just starts to lift. Screw back the adjuster one half turn and secure it with the locking nut. This adjustment can be carried out through the inspection hole in the primary chaincase if the chaincase has not been removed. Finally adjust the knurled nut at the handlebar abutment until there is approximately $\frac{1}{8}$ in. free movement in the cable. If it is required to take up excessive cable slack there is an adjuster fitted externally at the gearbox end of the cable.

To change the clutch cable

To remove the clutch cable slacken the adjustment at the handlebar abutment and then at the gearbox end of the cable. Pull the cable clear of the handlebar slotted adjuster and lever adjustment, disengaging the nipple from the lever. Slide the rubber cover upwards clear of the adjuster and remove the large filler plug from the gearbox outer cover. With a finger through this orifice the clutch cable nipple can be pushed clear of the internal clutch lever.

To replace the clutch cable, first pass the lower end through the rubber cover, bottom adjuster and abutment. Engage the cable nipple with the internal clutch lever. Pass the upper end of the cable through the slotted adjuster and abutment of the handlebar lever and fit the cable nipple to the lever. Slide the rubber cover into position at the gearbox end.

TELESCOPIC FRONT FORKS

The only routine attention needed to the front forks is checking the adjustment of the steering head races and changing the oil. Use the grade of oil as recommended on page 38, and change the oil at the mileage interval given on page 37.

To change the oil in the telescopic forks

Remove the small sloping screw immediately above the wheel spindle on the outside of each fork leg. Allow the oil to drain into a suitable container and then remove the last drops by pressing on the handlebars and pumping the forks up and down. Replace the drain bolts, making sure that the small fiber washers are in good condition.

To replenish the fork legs it will be necessary to remove the handle-bar and the large chromium plated nuts at the top of the fork, and this should be done on each side separately with the machine on the centre stand. The correct quantity for each leg is shown on page 36. Use the grade of oil shown on page 38.

To adjust the steering head races

The steering head races may require adjustment once or twice in the early stages of a machine's life but will rarely require attention after that. To check the adjustment, stand on the right side of the machine with the fingers of the left hand resting on the frame and the dust cover of the top bearing. With the right hand apply the front brake and rock the machine forward. Any play will be felt by the fingers of the left hand. To make the adjustment place the machine on the stand and unscrew the steering damper knob (where fitted). Slacken the pinch bolt at the back of the fork top lug and tighten down the large adjusting nut on the fork stem until the play is just taken-up. The forks and wheel should turn freely from lock to lock without any dragging or hesitation. If the adjustment seems correct but the movement is rough or jerky then the steering head races are probably damaged and it will be necessary to replace them. When the adjustment is correct tighten the pinch bolt (and steering damper where fitted).

REAR SUSPENSION

The swinging fork pivots on bronze bushes which should be lubricated with a high pressure grease gun at least every 1,000 miles until grease is seen to exude from the ends of the pivots. There are two nipples, one beneath each bearing housing. If the mileage intervals are not convenient, it is better to grease more frequently rather than to extend the interval.

The movement is controlled by Girling combined coil spring and hydraulic damper units. The hydraulic damping mechanism is completely sealed but the static loading of the spring is adjustable. There is a three position castellated cam ring covered by a shroud below the chromium plated dust cover and a "C" spanner is provided in the toolkit. To increase the static loading of the spring place the machine on the stand so that there is least load on the spring and use the "C" spanner to turn the cam; both units must be on the same notch whichever may be chosen.

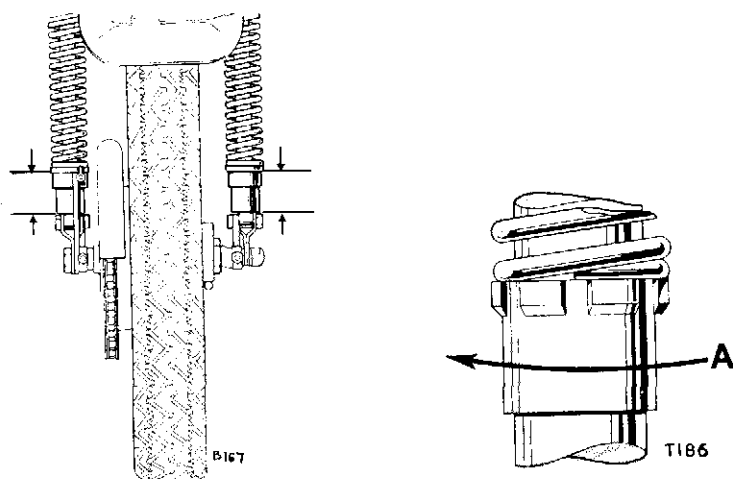


Fig. 6. Rear suspension spring adjustment.

A quick visual check can be made on this point from the rear of the machine as in Fig. 6. Comparing the exposed lengths of the units will establish that the loading is equal. To increase the static loading, turn the castellated cam ring in the direction shown. Alternative heavier springs are available to suit certain requirements and can be obtained from your dealer.

WHEELS

The wheel bearings are filled with grease on assembly and this should be sufficient to last for approximately 12,000 miles. In particularly dirty conditions it may be necessary to remove the bearings for cleaning and inspection at a lower mileage but this will usually be under cross-country conditions where the rider will be competent to take the decision to carry out this work. Always use the recommended grades of high melting point grease as hub temperatures rise during heavy braking and may cause a softer grease to melt and run into the brakes.

To remove the front wheel

Slacken the cable adjustment at the handlebar lever. Push the inner cable through the nipple bush in the front brake lever (at wheel) until the cable nipple is clear of the counterbore in the bush. Withdraw the bush from the lever and collect two washers. Slide the rubber gaiter off the cable and withdraw the cable from the rear

brake lever (at wheel). Collect the bush from the lever. Remove the eight spindle cap nuts and washers, and slacken the torque lug nut on the fork leg. Press down on the rear of the machine and remove the front wheel.

To replace the front wheel engage the torque stud on the brake plate with the lug on the fork leg and position the wheel spindle under the fork ends. Replace the wheel spindle caps, nuts and washers but do not tighten the nuts. Ensure that the torque lug is correctly located, tighten the nut to position the wheel and then tighten the spindle cap nuts.

Position the cable abutment bush in the rear brake lever and pass the cable through it. **Ensure that the cable abutment locates correctly in the counterbore.** Replace the rubber gaiter. Position the end of the cable inner between the fork of the front brake lever and position a steel washer to the outside of the cable. Hold the washer in this position by pressing the cable against the fork. Pass the cable nipple bush through the lever, washer and over the cable and position the steel washer on the inside of the inner cable. Push the bush through the second washer and locate the cable nipple in the counterbore. Adjust the cable length at the handlebar.

Rear wheel

The rear wheel brake drum is integral with the rear hub and the hub bearings are of the non-adjustable ball journal type. A detachable steel sprocket is bolted to the brake drum by five bolts.

With hub bearings in good condition, there should not be any detectable side movement at the wheel rim.

To remove the rear wheel

Raise the machine by placing a 3" thick wooden block underneath the center stand. Ensure that the machine is in gear and remove the rear chain connecting link. Disconnect the brake operating rod and speedometer cable. Remove the nut and spring washer from the brake torque arm and detach the torque arm from the brake plate. Remove the wheel spindle nut, and withdraw the spindle from the left side. Collect an adjuster and end cap from each side of the swinging fork, and a plain steel washer and spacer from the right side of the swinging fork. The wheel can now be removed.

Replacement is the reversal of the removal procedure but always check the chain adjustment, brake adjustment and wheel alignment, see page 16.

TIRES

The tire size is 3.25 × 19 in. front and 4.00 × 18 in. rear. The pressure should be checked regularly, preferably every two weeks. After checking the pressure the valve cap should always be replaced as it forms a seal against dirt and also prevents accidental deflation of the tire at high speeds.

The tire pressures recommended below are suitable for an average rider but if a pillion passenger is carried the pressure in the rear tire should be increased by 6 lbs./sq. in. and in the front tire by 4 lbs./sq. in.

Tire size		Inflation pressure lb./sq. in.
Front	3.25	24
Rear	4.00	25

For further details consult the Dunlop booklet.

Front wheels are balanced complete with tire and tube before leaving the factory and if the tire is removed it should be replaced in the same position with the balancing spot level with the valve. If a new tire is fitted the weights should be removed and the wheel re-balanced, adding weights as necessary until it will remain at rest in any position. Make sure that the brake is not binding while the balancing operation is being carried out. When balancing the rear wheel, the chain should of course be disconnected and removed from the rear wheel sprocket.

BRAKES

Rear

The rear brake shoes are fully floating to allow them to centralise themselves in the brake drum. The linings are positioned towards the trailing edges of the shoes and the shoes must be fitted with the thrust pads against the fixed fulcrum pin. The leading and trailing shoes are not interchangeable and can be recognised by the markings "L" and "T".

Front

The front brake has two leading shoes which are self centralising. Both shoes are identical, but must be fitted with the "Micram" adjusters against the actuating tappets.

The following information is in accordance with the requirements of the U.S. Federal Highway Administration, Department of Transportation.

BRAKE BURNISHING PROCEDURE

Brakes should be bedded in progressively during the first 300 miles. This is done by gradually increasing brake lever pressure during the period, and braking from progressively increasing speeds. For guidance refer to the table below. The deceleration in ft./sec.² is converted to the equivalent braking time/distance.

Stage	1	2	3
Speed of commencement of stage (m.p.h.)	30	50	70
Speed at end of stage (m.p.h.) ...	0	30	30
Deceleration (ft. /s. ²)	12.5	12.5	12.5
Distance travelled (ft.)	77	135	344
Time taken (sec.)	3.5	2.3	4.7

Stage 1

A minimum of 20 stops using the front and rear brakes together. Decelerate from 30 m.p.h. to rest using the distance travelled or time taken to obtain the required deceleration.

Stage 2

A minimum of 50 decelerations from 50 to 30 m.p.h. using front and rear brakes together.

Stage 3

A minimum of 30 decelerations from 70 to 30 m.p.h. using front and rear brakes together.

The distance between brake applications should not be less than $\frac{1}{4}$ mile in each case. Disengage the clutch when carrying out the procedure to ensure that the brakes receive the full braking load.

The use of the above procedure, subject to traffic conditions will ensure that any high spots on the brake linings are not hardened, resulting in reduced brake efficiency. Correct burnishing will give an approximate minimum lining contact area of 50% which qualifies the published brake performance figures.

IGNITION TIMING

The ignition contact breaker is in the timing cover on the right of the motor, and is driven by the exhaust camshaft. There is a round chromium-plated cover over it held by two screws. To remove the timing cover, for instance to examine the oil pump, the contact breaker (cam and auto-advance assembly) must be released from the camshaft. To release the contact breaker remove the central bolt and use extractor tool D782 by screwing it into the end of the hollow spindle.

When replacing the contact breaker it must be positioned correctly relative to the exhaust camshaft. A pin is provided in the exhaust camshaft and a slot in the taper end of the auto advance spindle serves as a location.

For timing purposes two alternative methods have been used for setting the engine in the 38° fully advanced position. The first utilises service tool D2195 and D572. By turning the engine over gently with the service tool fitted in place of the blanking plug on the top rear of the crankcase, slight hand pressure on the plunger will enable this to locate with a slot cut into the flywheel for this purpose.

There are two slots in the flywheel, one at 38° and one at top dead centre (T.D.C.). When timing as above check with a sparking plug removed that the pistons are not at T.D.C. which would indicate the wrong slot being located. The T.D.C. plug is for degree plate use only.

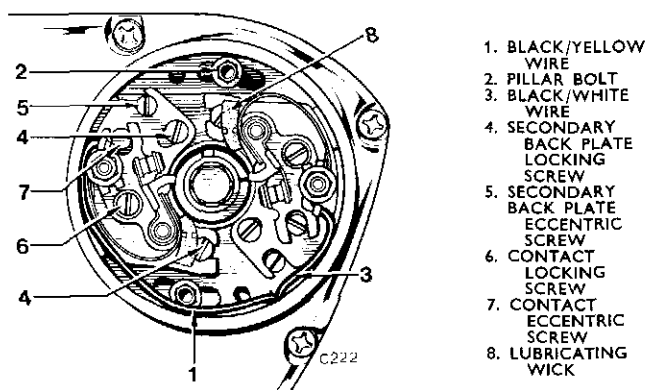


Fig. 7. Contact breaker, type 6CA.

The second method necessitates removal of the circular plate at the forward end of the primary chaincase. Through the aperture will be seen the timing marking on the rotor casting and this aligns with a pointer on the primary chaincase at the edge of the aperture. Placing the rotor marking in line with the pointer again gives the 38° timing position.

Remove both sparking plugs to facilitate turning over the engine. Set both sets of contact breaker gaps. (See page 32). Set the engine at 38° B.T.D.C. with the contact breaker cam turned clockwise to the fully advanced position. Check the left hand points (Black and Yellow lead) which should just be starting to open. If they are not, slacken both the pillar bolts and turn the contact breaker main backplate. Turn clockwise if the points open too early and vice versa. When correct, lock up the backplate, remove the flywheel locating plunger if used and turn the engine over slowly through 360° i.e. one revolution. Set the engine again at 38° B.T.D.C., check the cam is still at the fully advanced position and check that the second set of contacts (Black and White lead) are just starting to open. If there is any discrepancy, slacken the secondary backplate locking screws (Fig. 6) and using the eccentric adjuster screw move the backplate to achieve the correct opening point.

The timing is now correct. The lubricating felt wicks adjacent with the contact breaker nylon heels are treated initially with Shell Retinax A grease and thereafter 3 drops of engine oil should be added to the ends of the wicks at each 1,500 mile interval.

SPARK PLUGS

The spark plugs are 14 m.m. thread $\times \frac{3}{4}$ in. reach. The preferred grade is Champion N3.

Suitable alternative spark plugs of K.L.G. FE100 or FE220 (Ti2OR) grades may be used, but warmer plugs should be used for short distance use around town. It may be advisable to consult your dealer before varying the grade of plugs, as he will know local conditions and your type of use.

To remove a spark plug use the box spanner and tommy bar provided in the toolkit. If the plug is difficult to unscrew, pour some penetrating oil round the threads and allow it to soak before continuing.

Every 3,000 miles remove the spark plugs and have them cleaned and tested on a plug cleaning machine. If there is no plug cleaning machine available use a penknife or wire brush to remove carbon deposits. Measure the gap with feeler gauges; the correct setting is 0.025 in. To adjust the gap bend the side electrode but never the centre electrode. Every 10,000 miles fit new spark plugs.

When replacing the plug smear a little graphite grease round the threads and make sure the joint washer is in good condition. Tighten with the box spanner and tommy bar provided in the toolkit.

TO CLEAN YOUR MOTORCYCLE

Do not attempt to remove dried road dirt from your motorcycle, but use a copious supply of water from a hose or bucket containing some proprietary cleaner. Do not direct the water into the electrical system, air cleaner or brakes. Do not use abrasive cleaners on chromium plating but treat it in the same way as the painted surfaces. When the motorcycle is clean and dry, apply a wax polish.

TO CHANGE THE OIL

Whilst the machine is new it is necessary to change the oil in the motor, primary chaincase, oil reservoir and gearbox. The reason for this is that the breaking-in process previously mentioned is a type of controlled wearing and minute particles of metal are produced in this process particularly during the very early stages.

Drain the motor and reservoir, and clean out the gauze strainers after the first 500 miles.

It is advisable to have this operation carried out again at 1,500 miles and at the same time have the gearbox and primary chaincase drained and flushed. Whenever the oil is changed it is advisable to do it when the oil is hot and when the majority of the foreign matter is in suspension. The regular motor oil change period is every 1,500 miles.

MOTOR AND OIL RESERVOIR

There is a gauze strainer in the crankcase which is removable for cleaning by unscrewing the hexagon-headed plug which slopes from left to right under the motor. Remove the reservoir drain plug from the base of the main frame and collect oil in a suitable container.

Detach the reservoir strainer by unscrewing the four nuts securing the retaining plate. Rinse the strainers in clean kerosine. Replace the strainers, with new fiber washers if necessary, and replenish the reservoir to the "full" position on the dipstick. Start the motor and immediately check the oil issuing from the oil return pipe. The reservoir dipstick is contained in the toolkit.

GEARBOX

The drain and level plugs are situated underneath the gearbox, see illustration. To drain the gearbox remove the assembly. When you are ready to replenish the gearbox replace only the drain plug (D) with the level tube and then add oil to the gearbox through the side filler hole (B) until oil just begins to flow down the level tube, then replace the level plug (C).

When checking the level remember that normally there will be some oil trapped in the level tube which should be allowed to drain before topping up commences.

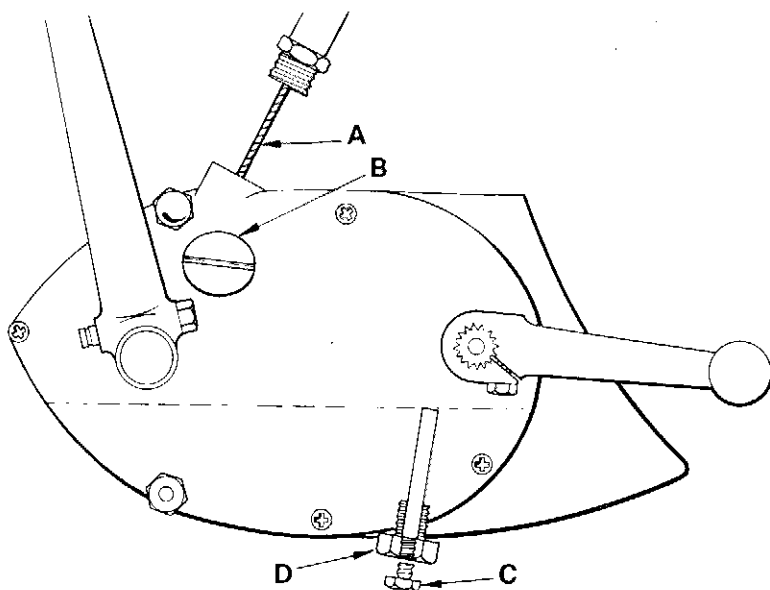


Fig. 8. Gearbox drain and level plugs.

PRIMARY CHAINCASE

The primary chaincase oil level is automatically maintained by the engine crankcase breathing system. Only after the lubricant has been drained off or lost during adjustment of the primary chain is it necessary to replenish with $\frac{1}{4}$ pint of engine oil. The drain plug is in the bottom of the outer portion of the chaincase.

THE AMAL CONCENTRIC CARBURETOR

How it operates

When the motor is idling, mixture is supplied from the pilot jet system, then as the throttle slide is raised, via the pilot by-pass. The mixture is then controlled by the tapered needle working in the needle jet and finally by the size of the main jet. The pilot system is supplied by a pilot jet, which is non-detachable and which is located in the mixing chamber body. The main jet does not spray directly into the mixing chamber but discharges through the needle jet into the primary air chamber and the fuel goes from there as a rich fuel-air mixture through the primary air choke into the main air choke.

This primary air choke has a compensating action in conjunction with bleed holes in the needle jet, which serve the double purpose of air-compensating the mixture from the needle jet and allowing the fuel to provide a well, outside and around the needle jet, which is available for snap acceleration.

Adjustment of carburetor parts

Throttle stop screw. This screw should be set to open the throttle sufficiently to keep the engine running at a slow tick-over, when the twistgrip is closed.

Pilot air screw

To set the idling mixture, this screw should be set in to enrich or out to weaken, normal number of turns out from full in is about $2\frac{1}{2}$. The screw controls the suction on the pilot jet by metering the amount of air which mixes with the gasoline.

Needle and needle jet

Machines are delivered from the factory with the needle in the correct position, which should not be altered.

Throttle valve cut-away

The amount of cut-away is recorded by a number marked on the throttle, viz. 928/2½ means throttle type 928 with No. 2½ cut-away; a larger cut-away such as 4 gives a weaker mixture or a smaller such as 2 gives a richer mixture.

For settings see Useful Data on Page 6.

Drain plug

The carburetor(s) has a drain plug situated in the base of the float bowl. This plug is hollow and collects any foreign matter present. It is advisable to drain the float bowl and clean the plug at each 3,000 mile interval.

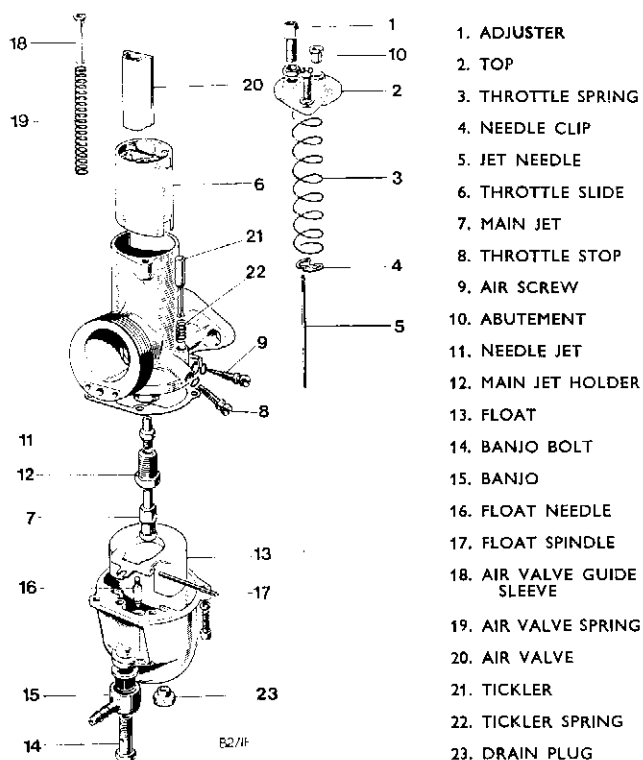


Fig. 9. Amal concentric carburetor.

Air filter

The air filter has two elements consisting of surgical gauze bound with metal gauze. To remove the elements, detach the outer covers by means of the center fixing bolts and withdraw the elements. They may be washed in gasoline and then finally cleaned with a jet of compressed air.

Twin Carburetors

The twin carburetors fitted to the T120R may require synchronisation and a simple method is as follows:—First adjust the cables so that they have the minimum of free play. Now start the motor and take off one plug lead and then adjust the pilot air screw and throttle stop screw in the OPPOSITE carburetor until the motor runs regularly. Replace the plug lead and repeat the process similarly for the other carburetor. With both plug leads replaced the tickover will be too fast and the stop screws should be lowered simultaneously until correct. It is most important the throttle slides lift simultaneously or the motor will run roughly, particularly when accelerating.

Effect of altitude on carburation

Increased altitude tends to produce a rich mixture. The greater the altitude, the smaller the main jet required. As supplied from the factory, carburetor settings are suitable for altitudes of up to 3,000 feet approximately. Machines used constantly at altitudes 3,000 to 6,000 feet should have the main jet size reduced by 5 per cent and thereafter for every 3,000 feet in excess of this, further reductions of 4 per cent should be made.

ELECTRICAL EQUIPMENT

The electrical system is supplied from an alternating current generator contained in the primary chaincase and driven from the crankshaft. The generator output is then converted into direct current by a silicon diode rectifier. Direct current is supplied to the battery provided on the machine with a Zener diode in circuit to regulate the current that the battery receives, this depending entirely on the state of charge of the battery. The current is then supplied to the ignition system which is controlled by a double contact breaker driven direct from the exhaust camshaft. The contact breaker feeds two ignition coils, one for each cylinder.

In the case of a flat battery the machine can still be started without difficulty by switching on the ignition as with the normal starting procedure.

The routine maintenance needed by the various components is set out in the following paragraphs. All electrical components and connections including the ground points to the frame of the machine must be CLEAN and TIGHT.

Contact breaker unit, Type 6CA

The contact breaker is contained behind the round chromium-plated cover held by two screws on the right side of the motor. See Fig. 7, Page 25. The nylon heels of the moving contacts may settle down initially and it is necessary to check both contact breaker gaps after 500 miles.

To adjust the contact breaker gap, turn the motor with the starter pedal until the scribe mark on the cam aligns with the nylon heel of one set of points. Measure the gap (0.015 in.) with feeler gauges. If they are outside the limits, slacken the slotted screw which secures the stationary contact and move the contact until the gap is correct, then tighten the slotted screw. Turn the motor forward until the second pair of contacts just open and adjust them in the same way.

Every 3,000 miles subsequently, inspect the contact breaker points and if they are burnt or pitted remove them from the base plates and clean them with fine emery cloth. Wipe with a clean cloth moistened with gasoline. Replace the contacts on the base plate making sure that any insulating washers are in their correct positions. Adjust the gap and then clean the second pair of contacts. Place a few drops of clean engine oil on the centrifugal automatic advance mechanism and three drops on the felt pads which lubricate the cam.

Two drops of oil should also be applied to the spindle which supports the cam to prevent corrosion and possible seizure. Do not allow any oil on the contacts. Initially the lubricating felts are treated with Shell Retinax A grease and thereafter 3 drops of engine oil should be added to the wicks at 1,500 mile intervals.

Ignition coils, Type 17M12

The twin ignition coils are mounted on a plate beneath the twin seat. Keep the tops of the coils clean particularly around the electrical terminals. Inspect the cables for frayed wires or damaged insulation. Any damaged section of cable must be replaced. The high tension leads should be fitted so that they slope forwards.

Battery, Type PUZ5A

A Lead/acid battery is carried beneath the hinged twin seat. Keep the top and the terminals clean. During charging the battery produces gas and this may carry some acid. Wipe up any liquid as it will cause corrosion if it is allowed to remain on metal parts. Check the acid level every week. The level is indicated on the outside of the case. Add distilled water until the liquid reaches this point. If you suspect a faulty battery have it checked by any Triumph dealer. When replacing the battery on the machine always connect the red (+) positive terminal to the frame of the machine (ground).

Lighting switch, Type PS.6

The lighting switch is a two position turn switch mounted in the headlamp shell. It is of the sealed variety and if a fault is suspected, test by substituting another switch.

Ignition switch, Type 149SA

It is of the barrel type using non-identical keys. The owner should make a note of the key number to ensure correct replacement in case of loss. No emergency start position is incorporated in the switch, as the machine will start with the switch in the normal ignition position with a "flat" battery.

Alternator, Type RM21

The alternator is contained in the primary chaincase and has no wearing parts. Check that the snap connectors are clean and tight in the output cable to the rear of the engine unit.

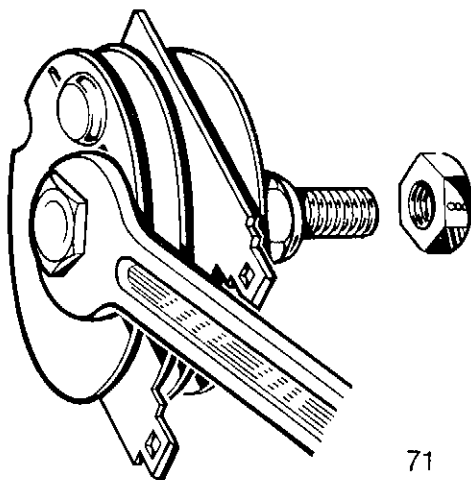


Fig. 10. To secure the rectifier.

Rectifier, Type 2DS506

The central fixing bolt of the rectifier must make electrical contact with the frame of the motorcycle, a separate ground lead connects to the top terminal of the rectifier. When tightening a rectifier hold the spanner as shown in the illustration above. Never disturb the self-locking nut which clamps the plates together. If the plates are twisted the internal electrical connections will be broken. Note that the fixing bolt and nut are $\frac{1}{4} \times 28$ U.N.F. thread and are both marked by circles to indicate this thread form.

ZENER DIODE

The Zener diode is a small electronic device that acts as a by-pass valve to divert surplus charging current away from the battery. It acts as a voltage regulator, and controls the current into the battery, and is mounted on the air filter housing to ensure efficient cooling. Care must be taken therefore not to impair the flow of air around the heat sink.

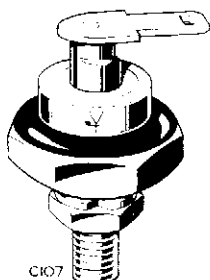
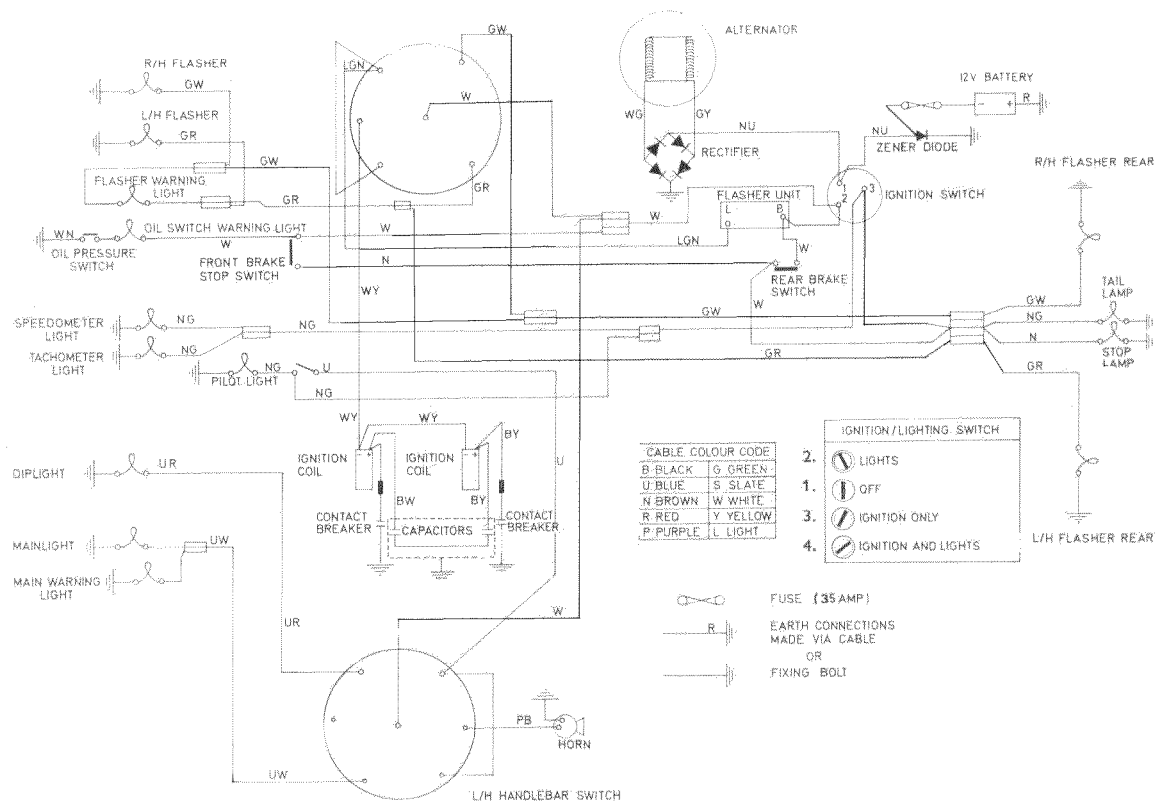


Fig. 11. Zener diode, Model ZD715.

Fig. 12. Wiring diagram, all models.



Providing the diode is kept clean, to ensure maximum efficiency, no maintenance will be necessary.

Caution. The body of the Zener diode is made of copper to ensure maximum heat conductivity. This means that the fixing stud has a relatively low tensile strength, and should not be subjected to a tightening torque greater than 2 lbs. ft.

Fuse

A line fuse is included in the electrical circuit, and is located in the battery live lead. It consists of a plastic tubular holder with a standard 35 ampere rating fuse spring loaded and held in position by a bayonet type fixing cap on the end of the holder. This connection should be checked to ensure that it is clean and tight. It may be necessary to increase the fuse rating if additional electrical equipment is subsequently fitted to the machine. The machine must not be run with a "blown" fuse, otherwise serious damage will result.

Stoplamp switches

Switches are fitted front and rear. The front switch is fitted into the brake cable and the rear to the rear chainguard operated by the rear brake rod. The switches are sealed units but the rear one can be adjusted for position.

CONDENSER PACK 2 CP

The two condensers are mounted on a common plate with a rubber shroud. The condenser pack is located beneath the twinseat.

ROUTINE MAINTENANCE

	<i>Page</i>
Every week. Check battery acid level	33
Every two weeks. Check tire pressure	23
Every 250 miles	
Check level in oil reservoir	27
Every 1,000 miles	
Lubricate and adjust control cables including brakes	General
Grease swinging fork pivot	20
Check front chain adjustment	17
Check rear chain adjustment	17
Check nuts, bolts and screws for tightness	General
Every 1,500 miles	
Lubricate contact breaker	32
Change engine oil	27
Every 3,000 miles	
Check gearbox oil level	28
Check adjustment of valve operating mechanism ...	12
Clean and adjust spark plugs	26
Clean and adjust contact breaker	32
Clean air filter	30
Check ignition timing	25
Clean carburetor	30
Every 6,000 miles	
Change oil in gearbox	28
Change oil in front forks	19
Check adjustment of steering head bearings ...	19
Every 10,000 miles	
Change spark plugs	26
Every 12,000 miles	
Clean and grease wheel bearings ...	Workshop Manual
Clean and grease steering head bearings ...	Workshop Manual

RECOMMENDED LUBRICANTS (All Markets)

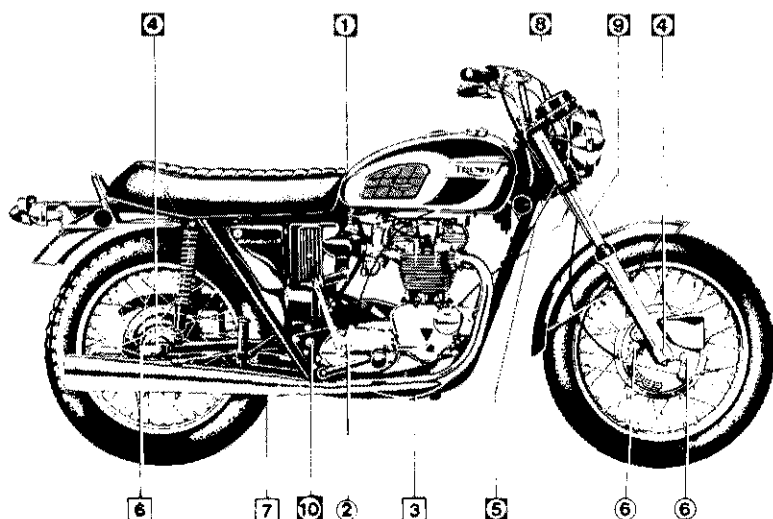
UNIT	MOBIL	CASTROL	B.P.	ESSO	SHELL	TEXACO
Engine and Primary Chaincase	Mobiloil Super	Castrol GTX or Castrol XL 20/50	B.P. Super Visco-Static	Uniflo	Shell Super Motor Oil	Havoline Motor Oil 20W/50
Gearbox	Mobilube GX 90	Castrol Hypoy	B.P. Gear Oil SAE 90 EP	Esso Gear Oil GX 90/140	Shell Spirax 90 EP	Multigear Lubricant EP 90
Telescopic Fork ...	Mobil ATF 210	Castrol T.Q.F.	B.P. Autron 'B'	Esso Glide	Shell Donax T.7	Texomatic 'F'
Wheel Bearings, Swinging Fork and Steering Races ...	Mobilgrease MP or Mobilgrease Super	Castrol LM Grease	B.P. Energrease L2	Esso Multipurpose Grease H	Shell Retinax A	Marfak All Purpose
Easing Rusted Parts ...	Mobil Handy Oil	Castrol Penetrating Oil		Esso Penetrating Oil	Shell Easing Oil	Graphited Penetrating Oil

APPROVED LUBRICANTS (All Markets)

	Engine and Primary Chaincase	Gearbox	Telescopic Fork	Wheel Bearings, Swinging Fork and Steering Races	Easing Rusted Parts
DUCKHAM'S	Duckham's Q20/50	Duckham's Hypoid 90	Duckham's Q-Matic	Duckham's LB10 Grease	Duckham's Adpenol Penetrating Oil
FILTRATE	Filtrate Super 20W/50	Filtrate EP.90	Filtrate A.T. Fluid 'F'	Filtrate Super Lithium Grease	

GUIDE TO LUBRICATION POINTS

<i>Illustration No.</i>	<i>Description</i>	<i>SAE Oil grade</i>
1	Engine oil reservoir	20W/50
2	Gearbox	EP90
3	Primary chaincase	20W/50
4	Wheel hubs	Grease
5	Steering head	Grease
6	Brake cam spindle	Grease
7	Brake pedal spindle	Grease
8	Exposed cables	10W/30
9	Telescopic fork	Auto. trans. fluid
10	Swinging fork pivot	Grease
—	All brake rod joints and pins ...	10W/30



Numbers in circles refer to right side of machine.

Numbers in squares refer to left side of machine.

Fig. 13. Lubrication points

The following information is in accordance with the requirements of the U.S. Federal Highway Administration, Department of Transportation.

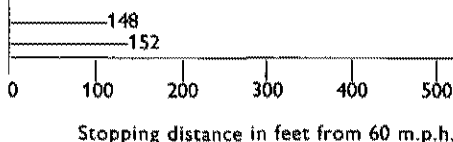
This figure indicates braking performance that can be met or exceeded by the vehicles to which it applies, without locking the wheels, under different conditions of loading.

The information presented represents results obtainable by skilled drivers under controlled road and vehicle conditions, and the information may not be correct under other conditions.

Description of vehicles to which this table applies:—
TRIUMPH T120R BONNEVILLE

A. Fully Operational Service Brake

LOAD
LIGHT
MAXIMUM



This figure indicates passing times and distances that can be met or exceeded by the vehicles to which it applies, in the situations diagrammed below.

The low-speed pass assumes an initial speed of 20 m.p.h. and a limiting speed of 35 m.p.h. The high-speed pass assumes an initial speed of 50 m.p.h. and a limiting speed of 80 m.p.h.

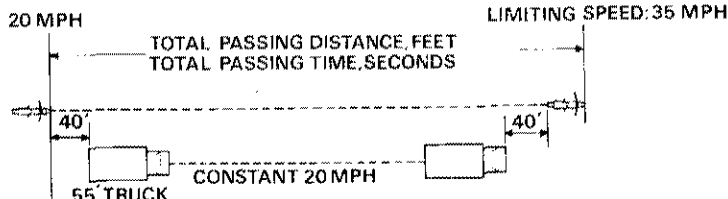
Notice:—The information presented represents results obtainable by skilled drivers under controlled road and vehicle conditions, and the information may not be correct under other conditions.

Description of vehicles to which this table applies:—
AS ABOVE

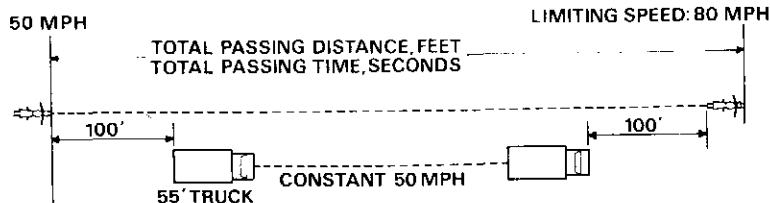
Summary Table

LOW-SPEED PASS 378 feet; 8.1 seconds
HIGH-SPEED PASS 963 feet; 9.6 seconds

LOW-SPEED
INITIAL SPEED:



HIGH-SPEED
INITIAL SPEED:



The following information is in accordance with the requirements of the U.S. Federal Highway Administration, Department of Transportation.

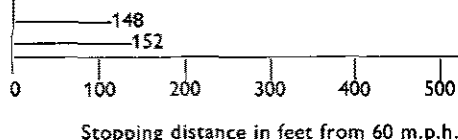
This figure indicates braking performance that can be met or exceeded by the vehicles to which it applies, without locking the wheels, under different conditions of loading.

The information presented represents results obtainable by skilled drivers under controlled road and vehicle conditions, and the information may not be correct under other conditions.

Description of vehicles to which this table applies:—
TRIUMPH TR6C TROPHY 650, TR6R TIGER 650

A. Fully Operational Service Brake

LOAD
LIGHT
MAXIMUM



This figure indicates passing times and distances that can be met or exceeded by the vehicles to which it applies, in the situations diagrammed below.

The low-speed pass assumes an initial speed of 20 m.p.h. and a limiting speed of 35 m.p.h. The high-speed pass assumes an initial speed of 50 m.p.h. and a limiting speed of 80 m.p.h.

Notice:—The information presented represents results obtainable by skilled drivers under controlled road and vehicle conditions, and the information may not be correct under other conditions.

Description of vehicles to which this table applies:—
AS ABOVE

Summary Table

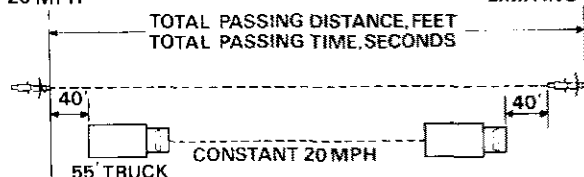
LOW-SPEED PASS 378 feet; 8.1 seconds

HIGH-SPEED PASS 963 feet; 9.6 seconds

LOW-SPEED
INITIAL SPEED:

20 MPH

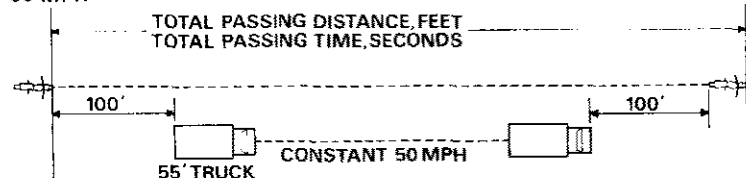
LIMITING SPEED: 35 MPH



HIGH-SPEED
INITIAL SPEED:

50 MPH

LIMITING SPEED: 80 MPH



IMPORTANT NOTE

The fitting of components which are not approved by the manufacturer invalidates the guarantee.

Printed in England by
WARWICK PRINTING COMPANY LIMITED
WARWICK
