

Triumph

MODEL COVERAGE

250	650	750 Twins
TR25W	TR6R, "Trophy"	TR7V, "Tiger 750"
	TR6C, "Trophy"	T140V, "Bonneville 750"
500	T120R, "Bonneville"	750 Triples
T100C, "Trophy Trail"		T150, "Trident"
T100R, "Daytona"		T150V, "Trident"

INDEX

GENERAL SPECIFICATIONS	1036	Engine Removal and Installation	1056
MAINTENANCE	1036	Top End	1056
Lubrication	1036	Clutch	1059
Engine	1036	Primary Drive and Clutch Hub	1059
Primary Chaincase	1037	Shifter, Kickstarter	1060
Front Forks	1038	Gearbox	1061
Final Drive Chain	1038	Bottom End	1064
Grease Nipples	1038	T150	1066
Service Checks and Adjustments	1038	Engine Removal and Installation	1066
Clutch	1038	Top End	1066
Primary Chain	1039	Clutch	1069
Final Drive Chain	1039	Gearbox	1071
Brakes	1039	Bottom End	1073
Periodic Maintenance Intervals	1039	Engine and Transmission Specifications	1067
Recommended Lubricants	1039	LUBRICATION SYSTEMS	1077
Maintenance Data	1040	TR25W	1077
TUNE-UP	1040	500, 650, 750 Twins	1078
Valve Adjustment	1040	T150, T150V	1081
Contact Breaker Points	1040	Oil Pump Specifications	1083
Ignition Timing	1041	FUEL SYSTEMS	1084
Carburetor Adjustments	1044	Monobloc	1084
Tune-Up Specifications	1044	Concentric	1084
ENGINE AND TRANSMISSION	1045	Trident	1085
TR25W	1045	Carburetor Specifications	1085
Engine Removal and Installation	1045	ELECTRICAL SYSTEMS	1086
Top End	1045	Ignition System	1086
Clutch and Primary Drive	1046	Charging System	1087
Transmission and Shifter	1047	Electrical Specifications	1089
Bottom End	1048	Wiring Diagrams	1091
T100C and T100R	1049	CHASSIS	1094
Engine Removal and Installation	1049	Wheels, Hubs, Brakes	1094
Top End	1050	Front Forks	1098
Clutch	1051	Rear Shock Absorbers	1102
Primary Drive and Clutch Hub	1051	Swing Arm	1103
Shifter	1052	Disc Brake Service	1105
Gearbox	1053	Chassis Specifications	1106
Bottom End	1053	Chassis Torque Specifications	1110
650 and 750 Twins	1056		

MAINTENANCE

NOTE: Common maintenance procedures are explained in detail in "General Information."

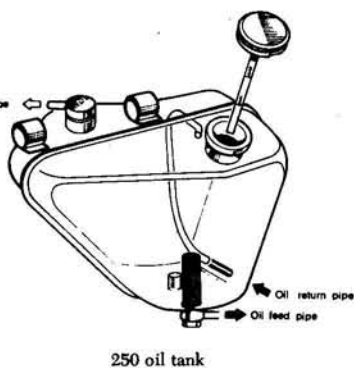
LUBRICATION

Engine

NOTE: Always change oil when the engine is at operating temperature.

TR25W

1. Remove the right side-panel.
2. Using a suitable container and funnel to catch the oil, remove the oil tank filter located in the lower right corner of the tank. Clean the filter in solvent.
3. Allow the tank to drain for about five minutes, then lean the machine toward the right side to make sure that all the oil has been removed.
4. Remove the four attaching nuts and the oil sump filter located at the bottom of the crankcase. Also, disconnect the supply and scavenge lines at the crankcase union nut.
5. Wash the sump filter in solvent, then allow it to air dry or blow it dry with compressed air.
6. Reinstall the sump filter and gasket, connect the supply and scavenge lines, and reinstall the oil tank filter.
7. Add the recommended oil to the tank until it reaches the correct level mark on the dipstick. Do not overfill it, as excessive venting will result.
8. Let the engine run for several minutes, then recheck the oil level and top up if necessary.



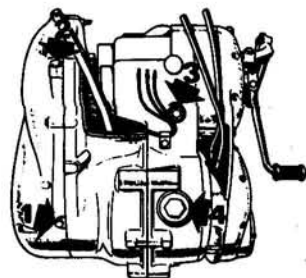
500 AND 650

1. Remove the sump drain plug and filter.
2. Thoroughly clean the filter in solvent.
3. Allow the oil to drain for approximately five minutes, then reinstall the filter (with gasket) and the sump drain plug.
4. Remove the oil tank filler cap.
5. Position a container under the oil tank, then remove the tank drain plug or disconnect the oil feed line.
6. Remove the oil tank filter and clean it thoroughly in solvent.
7. If possible, clean the oil tank with

General Specifications

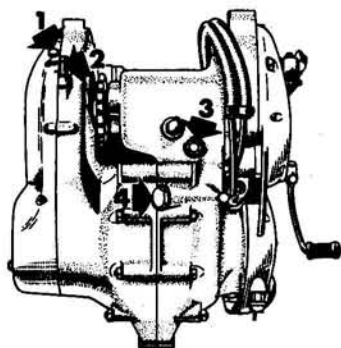
	TR25W	T100C	T100R	TR6R *	TR6C *
DIMENSIONS					
Net weight (lbs)	320.0	337.0	341.0	365.0	365.0
Overall Height (in.)	43.25	38.0	38.0	38.0	38.0
Overall Width (in.)	28.0	26.5	26.5	27.5	27.5
Overall Length (in.)	83.0	83.25	83.25	84.0	84.0
Wheelbase (in.)	53.0	53.5	53.5	55.0	55.0
Seat Height (in.)	32.0				
Ground Clearance (in.)	8.5	7.5	7.5	6.0	6.0
ENGINE					
Displacement (cc)	250	490	490	649	649
Bore x Stroke (mm)	67 x 70	69 x 65.5 (2)	69 x 65.5 (2)	71 x 82 (2)	71 x 82 (2)
Compression Ratio	10 : 1	9.0 : 1	9.1 : 1	9.0 : 1	9.0 : 1
Carburetor Type and Model	Amal 928/1	②	③	Amal R930/23	Amal R930/23
TRANSMISSION					
Clutch Type	wet, multi-plate	wet, multi-plate	wet, multi-plate	wet, multi-plate	wet, multi-plate
Internal Gear Ratios					
1st	2.65	2.47	2.47	2.44	2.44
2nd	1.65	1.61	1.61	1.69	1.69
3rd	1.24	1.22	1.22	1.24	1.24
4th	1.00	1.00	1.00	1.00	1.00
5th					
Sprockets (no. of teeth)					
Engine	23	26	26	29	29
Clutch	52	58	58	58	58
Gearbox	15	18	18	18	18
Rear Wheel	①	46	46	46	46
CHASSIS					
Front Suspension	rod damper or shuttle valve-type telescopic			shuttle valve-type telescopic	
Rear Suspension	swing arm with hydraulically dampened shocks			dampened shocks	
Tire Size: front	3.25 x 18	3.25 x 19	3.25 x 19	3.25 x 19	3.25 x 19
Tire Size: rear	4.00 x 18	4.00 x 18	4.00 x 18	4.00 x 18	4.00 x 18
ELECTRICAL					
System Voltage	12	12	12	12	12
Generator Type		alternator			
	T120R *	T150	TR7V	T140V	T150V
DIMENSIONS					
Net Weight (lbs)	365.0	470.0	402	408	460
Overall Height (in.)	38.0	43.5	38.0	38.0	43.5
Overall Width (in.)	27.5	32.5	33.0	33.0	32.5
Overall Length (in.)	84.0	86.0	87.5	87.5	88.0
Wheelbase (in.)	55.0	56.25	55.0	55.0	56.3
Seat Height (in.)		32.0	31.5	31.5	32.0
Ground Clearance (in.)	5.0	6.5	6.0	6.0	6.5
ENGINE					
Displacement (cc)	649	741	747	747	741
Bore x Stroke (mm)	71 x 82 (2)	67 x 70 (3)	76 x 82 (2)	76 x 82 (2)	67 x 70 (3)
Compression Ratio	9.0 : 1	9.0 : 1	8.6 : 1	8.6 : 1	9.5 : 1
Carburetor Type and Model	Amal R930/9 & L930/10	Amal 626	Amal R930/89	Amal L930/92 & R930/89	Amal 626
TRANSMISSION					
Clutch Type	wet, multi-plate	wet, single-plate	wet, multi-plate	wet, multi-plate	wet, single-plate
Internal Gear Ratios					
1st	2.44	2.44	2.59	2.59	2.59
2nd	1.69	1.69	1.84	1.84	1.84
3rd	1.24	1.19	1.40	1.40	1.40
4th	1.00	1.00	1.19	1.19	1.19
5th			1.00	1.00	1.00
Sprockets (no. of teeth)					
Engine	29	28	29	29	28
Clutch	58	50	58	58	50
Gearbox	18	18	20	20	18
Rear Wheel	46	52	47	47	53
CHASSIS					
Front Suspension	telescopic, hydraulically dampened				
Rear Suspension	swing arm with hydraulically dampened shocks				
Tire Size: front	3.25 x 19	3.50 x 19	3.25 x 19	3.25 x 19	4.10 x 19
Tire Size: rear	4.00 x 18	4.10 x 18	4.00 x 18	4.00 x 18	4.10 x 19
ELECTRICAL					
System Voltage	12	12	12	12	12
Generator Type			alternator		

* Optional 5-speed gearbox available. Ratios: 1st—2.585; 2nd—1.837; 3rd—1.400; 4th—1.192; 5th—1.000.
 ① 52 tooth standard; 49 tooth optional.
 ② Amal 376/273 prior to serial no. H.57083; Amal 626/8 after serial no. H.57083.
 ③ Amal 376/324 and 325 before serial no. H.5708; Amal 626/9 and 10 after serial no. H.5708.



500 models

1. Primary chaincase level plug
2. Primary chaincase drain plug and chain tensioner adjustment
3. Gearbox drain and level plug
4. Sump drain and filter plug



650, 750 Twins

1. Primary chaincase level plug
2. Primary chaincase drain plug and chain tensioner adjustment
3. Gearbox drain and level plug
4. Sump drain and filter plug

flushing oil. If it is not available, use kerosene, but make sure all traces are removed before filling the tank with oil.

8. Fill the tank with the recommended lubricant. The correct level is 1½ in. below the filler cap. Do not exceed this level, as excessive venting will result.

9. Allow the engine to run for several minutes, and recheck the oil level, topping it up if necessary.

TR7V, T140V

Note that the oil for these models is carried in the frame backbone. A filter is also fitted at the bottom of the frame oil reservoir.

1. When the engine is warm, remove the hex-head sump drain plug from beneath the engine. This plug houses the sump filter as well.

2. Allow the oil to drain from the sump for at least ten minutes. Clean the sump plug filter in a suitable solvent, check the condition of the gasket, then replace the filter and the drain plug.

3. Remove the oil reservoir filler cap. Remove the drain plug from the center of the base plate at the very bottom of the frame oil reservoir. Allow to drain for at least ten minutes.

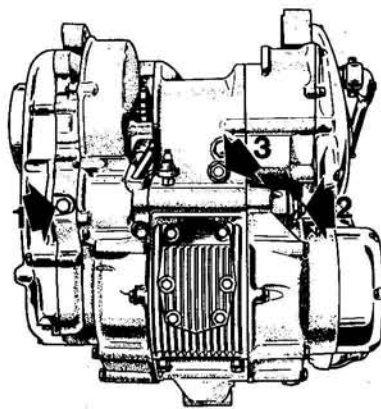
4. Remove the four nuts which secure the cover plate at the bottom of the reservoir, and remove the plate from the studs. Noting the location of the two gaskets (one above the filter base flange, and the other below), clean the filter in a suitable solvent.

5. Flushing the reservoir with kerosene is recommended.

6. The filter gaskets should be replaced. Refit the filter, cover plate, cover plate nuts, and drain plug. Fill the reservoir with the correct amount and recommended grade of oil. Check the oil level after the engine has been run for several miles.

T150, T150V

1. When the engine is warm, remove the six nuts and lockwashers which secure the crankcase sump filter plate to the bottom of the crankcase. Carefully remove the plate. Allow the oil to drain for about ten minutes.



Trident

1. Primary chaincase drain plug
2. Oil filter housing cap
3. Gearbox drain and level plug

2. Clean the sump filter in a solvent. The gaskets on either side of the filter should be replaced upon reassembly. Replace the filter, noting that the pocketed end is towards the rear of the engine. Tighten the nuts gradually and evenly.

3. Remove the oil tank filler cap, and the right side-panel. Drain the oil from the oil tank, then remove the tank oil filter, and wash it in a solvent.

4. Flushing out the oil tank with kerosene is recommended.

5. Remove the cartridge-type main feed oil filter. This is located beneath the large cap nut just below the forward end of the gearbox outer cover. Note that the filter is pulled out with a pair of needle-nosed pliers. There is a spring immediately beneath the cap nut, and an O-ring on the end of the filter. The filter should be replaced every time the oil is changed.

6. When replacing the filter, be sure that the O-ring and the fiber washer are in good condition.

CAUTION: When the filter is refitted, be sure that the hole in the filter faces inward.

Refill the oil tank with the correct quantity and recommended grade of oil. Check the level with the dipstick after the engine has run for several miles.

Gearbox

All gearbox components, including the shifter and kick-start mechanisms, are lubricated by oil splash. The oil should be changed at 500 miles in new or reconditioned engines, and at every recommended service interval thereafter.

NOTE: Drain oil when it is warm.

TR25W

1. Remove the nylon filler plug and the dipstick from the top of the gearbox.

2. Remove the plug on the bottom of the gearbox and drain the oil.

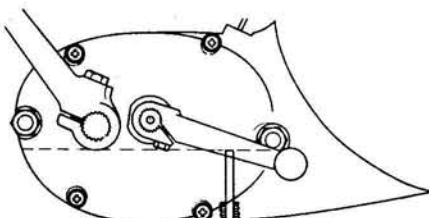
3. After draining, reinstall the plug, making sure that the sealing O-ring is in good condition.

4. Fill the gearbox with the recommended lubricant to the line marked on the dipstick.

OTHER MODELS

1. Remove the transmission drain plug located at the bottom of the gearbox.

2. After letting the oil drain for about ten minutes, reinstall the drain plug, but without the level plug that normally screws into it.



DRAIN PLUG — LEVEL PLUG

Gearbox drain and level plug

3. Remove the gearbox oil filler plug on the case cover and add fresh oil until it flows out the level plug hole.

4. Reinstall the level plug.

Primary Chaincase

Like the gearbox, the primary chaincase is lubricated by oil bath. On all models, the primary oil supply is contained within the case, where a collection chamber and a feed pipe provide direct lubrication to the primary chain and sprockets.

TR25W

1. On early machines, two of the chaincase securing screws serve as drain and level plugs. On later bikes, a vertical drain plug is provided at the bottom of the case and the forwardmost of the lower chaincase securing screws serves as a level plug.

2. Remove the chain inspection cap on top of the chaincase.

3. Remove the drain plug or screw and level screw.

4. Let the oil drain for about ten minutes, then reinstall the drain plug or screw.

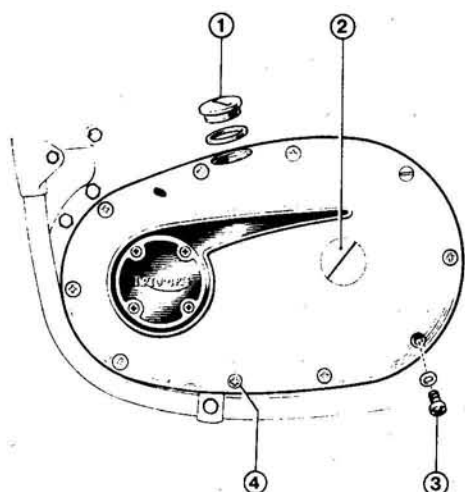
5. Pour the specified amount of the recommended lubricant into the chaincase through the chain inspection cap until it flows out the level screw hole.

6. Reinstall the level screw and chain inspection cap.

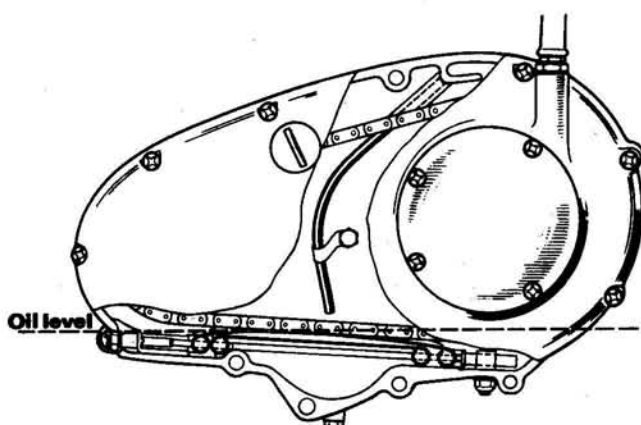
NOTE: Oil containing molybdenum disulphide or graphite, or oil additives, must not be used in the primary chaincase.

TWINS

On models after about 1971, the primary chaincase oil is automatically supplied by oil forced through the drive side crankshaft bearing. The level is main-



Early 250 chaincase filler (1), clutch adjustment cap (2), level (3) and drain (4) screws



Chaincase oil level (Trident)

tained by drillings which allow excess oil to re-enter the crankcase.

1. Remove the primary chaincase drain plug. This is also the chain adjuster cover plug. On some 500 models it may be necessary to remove the footpeg, striking it after the bolt is loosened to remove it from its taper.

2. Allow the oil to drain for about 10 minutes. Reinstall the drain plug. On older models, remove the level plug.

3. Remove the filler plug at the top of the case. On the older models, add the correct grade oil until it begins to seep from the level plug hole. Refit the level plug and filler plug.

On the more recent machines, add only about ¼ pint of motor oil. The level will come up to the proper amount as the machine is ridden. Check with the level plug.

T150, T150V

1. The primary chaincase is lubricated by oil forced through the crankshaft bearing as outlined for late-model Twins.

2. After removing the drain plug and allowing several minutes for the oil to drain off, refit the drain plug. Add no more than ½ pint of motor oil. The level will rise as the machine is ridden, and will be maintained at the proper level by drillings in the crankcase.

Front Forks

1. Drain each fork leg separately.
2. Remove the drain bolt at the bottom of the fork slider. Hold the front brake and pump the forks several times to expel all the oil.

3. Refit the drain plug. Remove the filler cap at the top of the fork leg.

NOTE: On machines with resiliently-mounted handlebars, the handlebars may have to be removed to gain access to the filler caps.

4. Add the correct amount and type of oil, refit the cap; repeat the procedure with the remaining fork leg.

Final Drive Chain

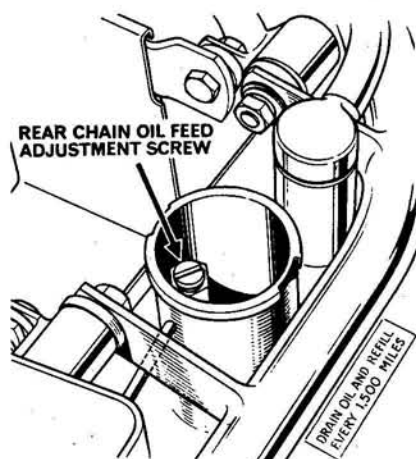
TR25W

Lubrication of the final drive chain is

totally dependent on the oil level in the primary chaincase. As the primary chain spins, it throws off the oil fed by the primary case collection chamber. This oil is collected by a small well at the back of the primary case and is then drip-fed to the chain.

500, 650, 750-3

The drive chain on these models is lubricated by means of an overflow tube from the neck of the oil tank. The flow is adjusted by means of a screw with a tapered tip threaded into the oil junction block in the neck of the tank. The screw is accessible after removing the tank filler cap. To increase oil flow to the chain, turn the screw counterclockwise. To decrease flow, turn the screw clockwise.



Chain oiler adjustment screw location (500, 650, and Trident)

750 TWINS

The chain should be lubricated by hand at intervals, depending on conditions. No automatic oiler is fitted.

Grease Nipples

Both the front and rear drum brake cams, and the swinging arm pivot are fitted with grease nipples. The brake cams should be given only one stroke of a hand

grease gun; the swinging arm pivot should be greased until the lubricant spurts out the pivot O-rings.

Brake Pedal Spindle

The brake pedal spindle is located on the left, rear, engine mounting plate. Since the operating shaft is exposed to the air, it should be coated with grease to prevent dirt penetration and corrosion.

1. Back off the rear brake rod adjustment until there is plenty of play.

2. Remove the pedal retaining nut and pedal.

3. Clean up the operating shaft and bore of the pedal with fine emery cloth.

4. Apply the recommended grease to the shaft and reinstall the pedal. Make sure you don't forget the spring and washer that accompany the retaining nut.

Wheel and Steering Head Bearings

1. These bearings should be packed with a good grade of bearing grease every 12,000 miles.

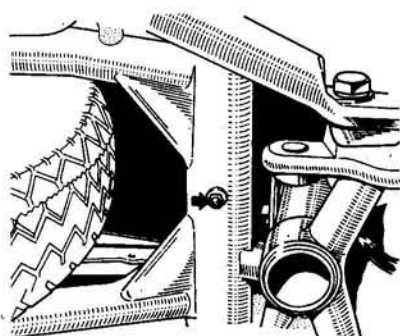
2. Refer to "Chassis" for removal and installation procedures.

SERVICE CHECKS AND ADJUSTMENTS

Clutch

TR25W, TWINS

1. Run down the clutch cable adjuster(s) until there is plenty of freeplay in the clutch hand lever.



Swing arm grease nipple (650)

2. Remove the clutch adjustment cap on the primary chaincase.

3. Loosen the adjustment nut. Turn the adjusting screw out a few turns, then turn it in until resistance is felt.

4. At this point, back the adjusting screw off the following number of turns:

TR25W: 1

500: ½

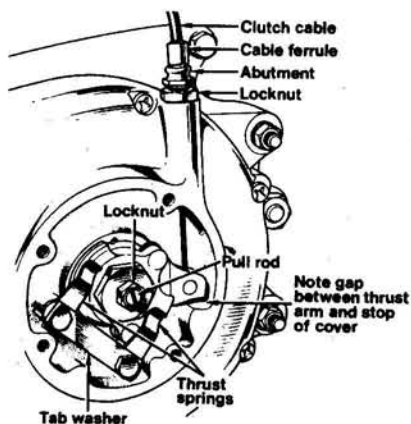
650, 750: 1

5. Tighten the adjusting screw locknut while holding the screw in position. Use the cable adjusters to allow ½ in. (3 mm) of freeplay between the clutch hand lever and the lever holder before the clutch begins to disengage.

T150, T150V

1. Remove the four screws which secure the clutch inspection plate to the primary chaincase.

2. Run down the clutch cable adjusters both at the handlebar and the chaincase cover so that there is plenty of slack in the clutch cable.



Trident clutch adjustment

3. Loosen the small locknut on the end of the clutch pull-rod. Then turn the large nut until the proper setting is obtained. This will be not less than 0.005 in. measured between the rear face of the large adjuster nut and the ball bearing in the actuating plate. Be sure that the clutch pull-rod does not turn, and retighten the small locknut. Recheck the setting.

4. Adjust the cable so that there is just a very small amount of freeplay at the handlebar lever.

Primary Chain Adjustment

ALL MODELS

An occasional adjustment is necessary to compensate for chain wear. Excess chain slack is taken up by tightening the tensioner bolt.

1. Remove the primary chaincase filler or inspection cap. Place a pan beneath the chaincase and remove the tensioner plug. On most models, the chaincase oil will drain off.

2. Chain slack should be as follows:

TR25W: ¼ in. (6 mm)

Trident: ½ in. (12 mm)

Others models: ¾ in. (9.5 mm)

This is total up-and-down movement. If adjustment is necessary, use a screw-

driver to turn the tensioner bolt until tension is correct.

3. After refitting the tensioner plug, refer to "Primary Chaincase" lubrication to fill and check oil level.

Final Drive Chain

1. Chain slack should be ¾ in. (19 mm) total up-and-down movement measured in the middle of the chain run with the machine on its wheels. With the bike on the center stand, the slack should be 1¾ in. (43 mm).

Measure at the chain's tightest point.

2. If adjustment is necessary, loosen the axle nut and the brake anchor. Move the wheel by turning the adjustment bolts by equal amounts.

3. Apply the rear brake and tighten the axle nuts.

Brakes

DISC BRAKES

1. The brakes are self-adjusting. Maintain the fluid level at ¼ in. below the top of the master cylinder.

2. Brake pads should be replaced when either of them reaches a lining thickness of ⅛ in. (1.6 mm).

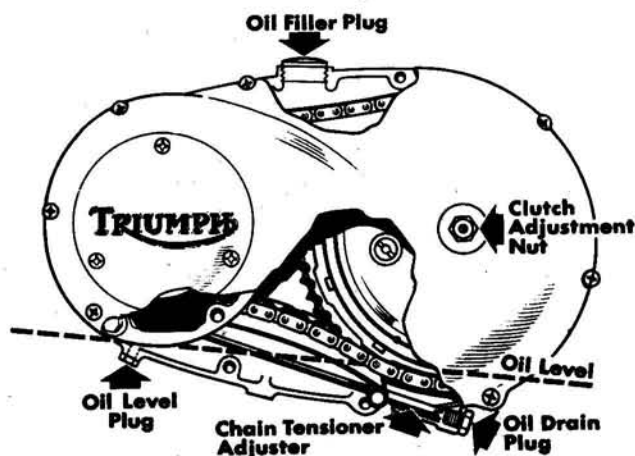
FRONT DRUM

1. On single-leading shoe brakes, use the adjuster at the wheel so that the hand lever can be moved about 1 in. (measured at the tip of the lever) before the shoes contact the drum.

2. On twin-leading shoe brakes, hand lever travel should be the same (1 in., measured at the tip of the lever) and is effected by using the adjuster at the hand lever.

REAR DRUM

1. If a change in pedal position is desired, do this before adjusting the brake.
2. Use the adjuster at the end of the brake rod so there is ½ in. (12 mm) of pedal movement before the shoes contact the drum. The measurement should be made with the weight of a rider on the motorcycle.



500 and 650 chaincase

Periodic Maintenance Intervals

Every 250 Miles

Check oil tank level

Check chain oil adjustment (where applicable)

Every 1000 Miles

Lubricate cables

Grease swing arm pivot and brake fittings

Remove and clean final drive chain

Check primary chaincase oil (1970 and later)

Change primary chaincase oil (1969 and earlier)

Every 1500 Miles

Change engine oil (650, 750 Twins)

Every 2000 Miles

Lubricate contact breaker

Every 3000 Miles

Check gearbox oil level

Grease brake pedal spindle

Every 4000 Miles

Change engine and primary chaincase oil (500 T150)

Change disposable oil filter element (where applicable)

Every 6000 Miles

Change gearbox oil

Change front fork oil

Repack wheel bearings

Every 12000 Miles

Grease steering head bearings

Recommended Lubricants

Engine and Primary Chaincase

SAE 20W/50, "SE"

SAE 10W/40, "SE"

Gearbox

SAE 90 EP

Front Forks

1972 and later: ATF

1971 and earlier: SAE 10/40

SAE 20W

SAE 30W

Drive Chain

Lubricant designed specially for motorcycle drive chains

Grease Fittings

A high grade chassis grease

Wheel and Steering Head Bearings

A high grade bearing grease

Controls and Cables

Tach and speedometer: chassis grease

Others: light motor oil

graphite or molybdenum disulphide lubricant

TUNE-UP

NOTE: Common tune-up procedures are explained in detail in "General Information."

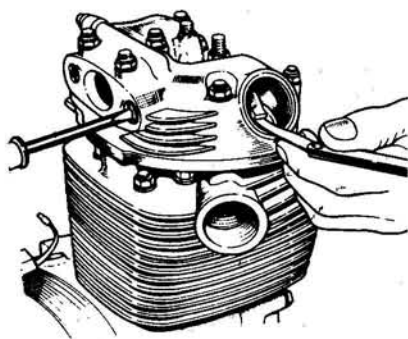
VALVE ADJUSTMENT

NOTE: Valves are adjusted when the engine is cold.

TR25W

1. Remove the spark plug, rocker inspection caps, and rocker spindle plate. Also, put the transmission in gear so that the engine can be easily rotated by turning the rear wheel.

2. Rotate the engine in the normal running direction until the intake valve has just completely closed.



Valve adjustment (250)

NOTE: This point can be accurately located by feeling the pushrod. When the valve is completely closed, the pushrod will be free to rotate.

3. The engine is now correctly positioned for checking the exhaust valve clearance. Slide the appropriate feeler gauge between the valve stem and the tappet, and check for a snug slip-fit.

4. If an adjustment is necessary, loosen the rocker spindle locknuts opposite the spindle cover plate. Turn the slotted exhaust valve spindle in a clockwise direction until the rocker arm just touches the valve stem, then turn it back again until the correct clearance is obtained. Tighten up the locknut and recheck the adjustment.

5. Rotate the engine forward again until the exhaust valve is just about to open. This is the correct position for checking the intake valve tappet clearance.

6. Check the clearance with the proper feeler gauge and, if necessary, readjust it to meet specifications. The procedure for adjusting the intake valve clearance is the same as that outlined for the exhaust valve except that the rocker spindle should first be turned counterclockwise, rather than clockwise.

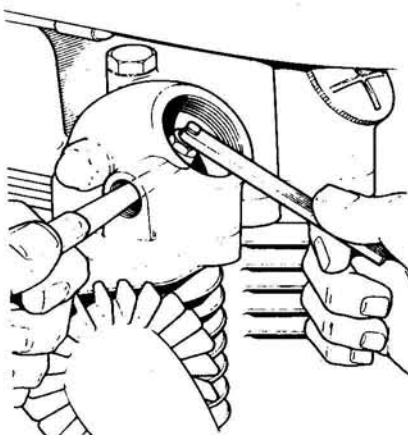
Twins

1. Remove the spark plugs and rocker box inspection caps.

1040

Maintenance Data

	TR25W	T100C	T100R	TR6R	TR6C	T120R	T150	TR7V	T140V	T150V
FUEL TANK (gallon) (liter)	3.9 14.8	3.6 13.5	3.6 13.5	4.1 15.5	2.9 10.9	2.9 10.9	5.1 19.3	2.5 9.5	2.5 9.5	4.2 15.9
OIL TANK (pint) (liter)	4.8 2.273	7.2 3.5	7.2 3.5	7.5 3.0	7.5 3.0	7.5 3.0	6.0 3.41	4.8 2.27	4.8 2.27	7.2 3.8
GEARBOX (pint) (cc)	0.6 264	0.67 375	0.67 375	0.875 500	0.875 500	0.875 500	1.25 710	0.875 500	0.875 500	1.5 750
PRIMARY CHAINCASE (pint) (cc)	0.3 142	0.5 300	0.5 300	0.625 350	0.625 350	0.625 350	0.75 426	0.625 350	0.625 350	0.75 426
FRONT FORKS (@ leg) (pint) (cc)	0.33 190	0.33 190	0.33 190	0.33 190	0.33 190	0.33 190	0.33 190	0.33 190	0.33 190	— 230
TIRE PRESSURE front (psi) rear (psi)	16 16	24 24	24 24	24 24	24 24	24 24	24 28	24 24	24 24	26 28



Valve adjustment (500)

2. On 500cc models, remove the large plugs on the side of each rocker box. The feeler gauge is inserted through these holes.

3. Slowly turn the engine over until the left exhaust valve is fully open. Now check the clearance of the right exhaust valve.

4. Insert the proper thickness feeler gauge between the valve stem and rocker arm. The feeler gauge should be a snug slip-fit if the clearance is correct.

5. If adjustment is necessary, loosen the adjuster locknut and turn the adjuster to effect the proper clearance. Hold the adjuster in place and tighten the nut. Recheck the clearance.

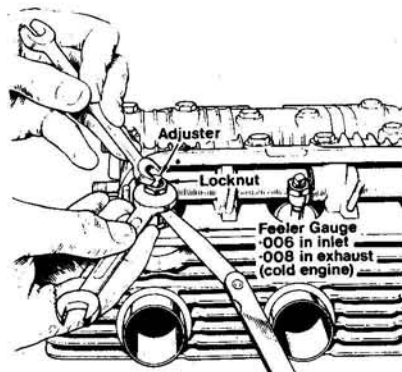
6. Turn the engine over so that the right exhaust valve is fully open, then check the adjustment of the left exhaust valve. Repeat this procedure with the intake valves.

NOTE: If, in an emergency situation, feeler gauges of the proper thickness are not available, clearances can be set approximately by turning the adjuster in until it is finger-tight, then backing it out ¼ turn per 0.010 in. until the given clearance is obtained. Check this setting with a feeler gauge as soon as possible.

T150, T150V

1. Remove the spark plugs and rocker box inspection caps.

2. Beginning with the intake cam, rotate the engine until two valves are opened by the same amount (approximately 1/16 in.). At this point, with one of the valves just opening and the other just closing, the third valve is correctly positioned for adjustment.



Valve adjustment (Trident)

3. Insert the appropriate feeler gauge and, if necessary, loosen the adjuster locknut and turn the adjuster until a snug slip-fit is obtained. Tighten the locknut and recheck the clearance.

4. Continue rotating the engine until the conditions outlined in step 2 are met for another intake valve. Repeat the procedure on the remaining intake and exhaust valves.

5. Install the spark plugs and rocker box inspection caps.

CONTACT BREAKER POINTS

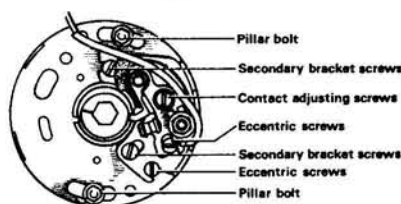
NOTE: When installing new points, the contact surfaces should be wiped with a solvent to remove any preservative coating.

TR25W

The contact breaker point assembly is located behind the circular cover on the right side of the engine.

REMOVAL

1. Remove the breaker point cover.
2. Remove the securing nut, nylon



Breaker points (250)

sleeve, and contact breaker lead.

3. Remove the contact adjusting screw, then lift the unit out.

INSTALLATION

Installation is a reversal of the removal procedure. Do not forget to install the fiber washer that fits between the moving point spring and the fixed point backing plate.

GAP ADJUSTMENT

1. Put the transmission in gear and rotate the engine by turning the rear wheel until the nylon heel of the contact breaker is aligned with the scribed mark on the breaker cam.

2. Loosen the contact adjusting screw and turn the eccentric screw until a snug slip-fit is obtained with the appropriate feeler gauge.

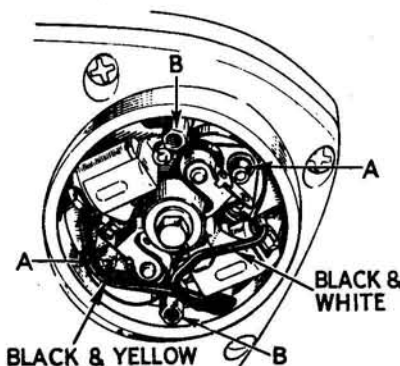
3. Tighten the adjusting screw and recheck the gap.

500 (Before H57083)

The point assembly is located behind a circular cover plate on the right side of the engine, and is driven off the right exhaust camshaft.

REMOVAL

1. Remove the points cover and gasket.



Breaker points (500 before H57083): sleeve nuts (A) and pillar bolts (B)

2. Remove the two sleeve nuts ("A" in the illustration), withdraw the points and condenser, and carefully disconnect the primary wire.

INSTALLATION

Installation is the reverse of removal. Add a drop of motor oil to the point pivots before refitting.

GAP ADJUSTMENT

1. Remove the spark plugs.
2. Rotate the engine until the nylon heel of one set of points aligns with the

mark scribed on the breaker cam.

3. Insert the appropriate feeler gauge and, if necessary, loosen sleeve nuts "A" (see illustration) and shift the breaker point plate until a snug slip-fit is achieved.

4. Repeat the above for the other set of points.

5. Check to make sure the breaker plate is correctly positioned. The set of points with the black/yellow lead should be situated toward the rear. Also make certain that the pillar bolts are in the center of their adjustment slots.

500 (H57083 and Later), 650, 750 Twin

The points are beneath a cover plate on the right, front side of the engine.

REMOVAL

1. Remove the cover plate.
2. Remove the primary wire terminal nut, and disconnect the wire, noting any insulators and their positions.
3. Remove the contact locking screw and remove the points.

INSTALLATION

Installation is the reverse of removal. Lubricate the pivot with a drop of oil. Note wire connections.

GAP ADJUSTMENT

1. Turn the engine over until the scribed mark on the breaker cam aligns with the nylon heel of one of the points.

2. Check the gap with the proper feeler gauge. It should be a snug slip-fit if correct. If adjustment is necessary, loosen the contact locking screw, and turn the contact eccentric adjusting screw until the gap is correct. Tighten the locking screw and recheck gap.

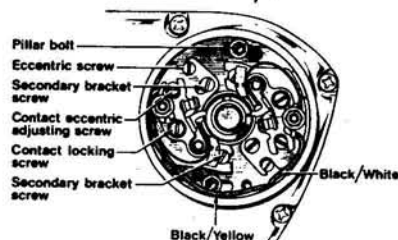
3. Repeat the procedure with the other set of points.

T150, T150V

The procedure for removal, installation, and gapping is the same as outlined for 650 and 750 Twins, above, except that three sets of points must be gapped. Note wire color codes by referring to the accompanying illustration.

IGNITION TIMING

NOTE: Points should be cleaned and gapped before setting ignition timing.



Breaker points (500 after H57082 and other twins)

TR25W

INITIAL PROCEDURE

Before actually setting static timing, the piston must be located at the specified number of degrees before top dead center and the automatic spark advance mechanism must be locked in the fully advanced position.

1. Remove the small inspection cover at the front of the primary chaincase.

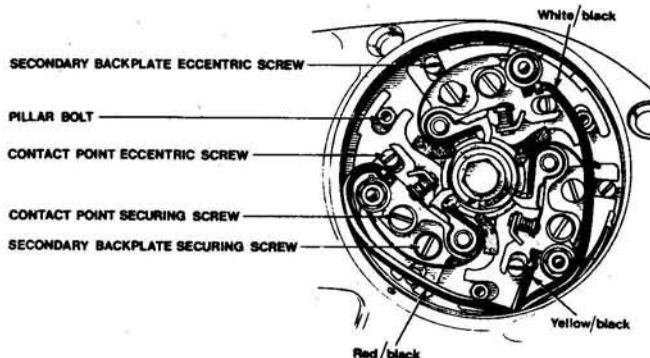
2. As can be seen through the aperture, a timing mark is scribed on the face of the alternator rotor and a pointer is mounted at the bottom of inspection hole.

3. Rotate the engine until it is on its compression stroke (i.e., both valves closed), then align the rotor mark and pointer. The piston is now located 37° before top dead center.

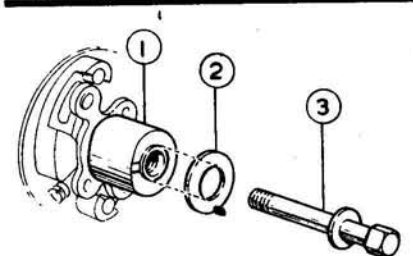
4. An alternate method of locating the piston, only possible on later machines, is by using Triumph special plunger and body (no. 61-2915 and 61-D572). Locate the piston on its compression stroke, then rotate the engine gently backward while applying slight pressure to the plunger. The plunger will drop into position, locking the piston at 37° before top dead center.

5. Now that the piston is correctly located, the automatic advance unit must be locked in the fully advanced position. This is necessary because, due to manufacturing tolerances, slight variation in spark timing will occur at one end of the advance curve or the other. In general, it is preferred that this variation does not affect high speed performance; therefore the mechanism should be set at the fully advanced position so that any fluctuations will occur only at idle speeds.

6. Carefully remove the cam central bolt and fit an extra washer on the bolt.



Breaker points (Trident)



Locking the breaker cam (1) with an oversized washer (2) and central bolt (3)

This washer should have a hole just large enough to clear the cam inner bearing (see illustration).

7. Reinstall the bolt, but before tightening it, rotate the cam counterclockwise until the advance weights are fully extended. Hold the weights in this position and tighten the central bolt.

8. After setting the final ignition timing, don't forget to remove the extra washer on the central bolt.

STATIC TIMING

1. With the piston correctly located and the advance mechanism locked in the full advance position, the ignition timing can now be set.

2. Hook up the test or continuity light: one lead to ground, the other to the primary wire terminal or points spring.

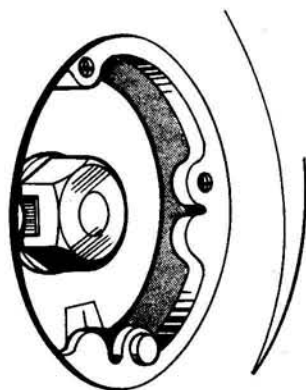
3. Loosen the two secondary bracket screws, and turn the eccentric screw in either direction until the points just open. Tighten the bracket screws.

4. If the points will not open using this method, set the eccentric screw in the middle of its adjustment range. Loosen the two pillar bolts which secure the large points plate, and rotate the entire plate until the points open. Make any necessary fine adjustments with the eccentric screw.

DYNAMIC TIMING

1. Remove the inspection cover at the front of the primary chaincase.

2. Hook up the strobe light. At engine speeds above 3,000 rpm, the mark on the alternator rotor should align with the fitted pointer.



Rotor and stator marks (250)

3. Make any ignition timing adjustments as described in Steps 3-4 under "Static Timing."

500 (Before H57083)

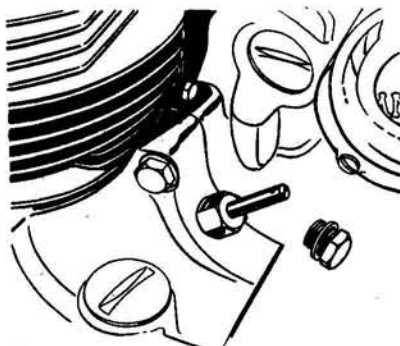
INITIAL PROCEDURE

Before setting ignition timing, the piston must first be positioned at top dead center.

1. Remove the spark plugs and rocker box inspection caps.

2. Put the transmission in gear so that the engine can be rotated by turning the rear wheel.

3. Locate the piston at top dead center, using a dial indicator, Triumph timing plunger and body no. D571/2, or, if necessary, a stick positioned in the spark plug hole. The right cylinder must be on the compression stroke.



Timing plunger is position (500)

STATIC TIMING

1. Remove the automatic advance unit and check the degree range stamped on the back. Make a note for future reference and reinstall the unit. A special extractor must be used to remove the unit.

2. Double the auto-advance range and subtract it from the fully advanced degree figure (38°). This is the correct static setting for the engine. Example:

$$\begin{aligned} \text{AUTO-ADVANCE} \\ \text{DEGREE RANGE} &= 12^\circ \\ \text{FULLY ADVANCED} \\ 2 \times 12^\circ &= 24^\circ \\ 38^\circ - 24^\circ &= \text{STATIC} \\ &\text{TIMING} \end{aligned}$$

3. If a stick is used to locate top dead center, convert the degree figure into inches or millimeters by using the chart, then scribe a corresponding mark on the stick.

500 Twin Crankshaft Degree Conversion Chart

Crankshaft position (BTDC) Degrees	Piston position (BTDC)	
	in.	mm
7	0.010	0.25
8	0.015	0.38
9	0.020	0.51
10	0.025	0.64
11	0.030	0.76
12	0.035	0.89
13	0.040	1.02
14	0.048	1.22
15	0.055	1.40
16	0.060	1.52
17	0.070	1.78
18	0.080	2.03
19	0.090	2.29
20	0.100	2.54
21	0.110	2.79

4. Fit a degree wheel to the auto advance unit and fasten a pointer to a convenient case cover screw.

5. If a dial indicator or timing plunger was used to locate top dead center, position the degree wheel and/or pointer to read TDC. Then remove the timing plunger (the dial indicator can remain) and carefully rotate the engine until it is at 38° before top dead center (right cylinder on the compression stroke), as indicated by the degree wheel and pointer.

6. Connect a timing light to the right cylinder points (black/yellow primary wire). Rotate the engine backward to a point below the static timing position, slowly approach the prescribed setting and, if necessary, adjust the breaker plate so that the points are just opening when the setting is reached.

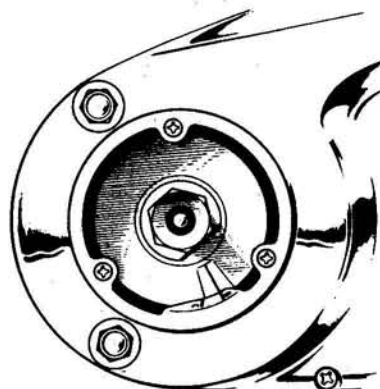
Adjust the timing by rotating the breaker plate after loosening the pillar bolts "B."

7. Rotate the engine forward 360° and repeat the procedure on the second set of points, noting that the main breaker plate must not be disturbed.

NOTE: To fine-tune the ignition timing, it is permissible to vary the breaker point gap slightly so that both cylinders are timed exactly the same. To advance the spark, open the points approximately 0.001 in. per crankshaft rotation degree.

DYNAMIC TIMING

After locating top dead center and installing a timing disc as previously described, connect the strobe light on the right cylinder points. If a 6 or 12-volt external power supply is needed, do not use the motorcycle battery. AC current pulses in the bike's low tension wiring can trigger the strobe light and lead to incorrect readings.



Rotor and stator timing marks with Adaptor D2014 (500)

Aim the strobe light at the timing disc and rev the engine until the auto advance mechanism is actuated (2,000 rpm). The pointer and 38° BTDC on the disc should be exactly in line. If they are not, loosen the contact breaker-plate pillar bolts and make the necessary adjustment. Repeat the procedure for the other cylinder. Remember that the main breaker plate must not be disturbed after setting the right cylinder.

500 (H57083 and Later)

INITIAL PROCEDURE

These models are fitted with alternator rotor marks and timing plunger stops at TDC and 38° BTDC for each cylinder.

First make sure the auto advance unit is correctly positioned on the camshaft locating peg. Lock the auto advance in the full advance position using a suitably sized washer which will bear on the breaker cam when the bolt is tightened (see illustration). Remove the plugs and rocker box covers.

STATIC TIMING

1. Remove the plug behind and between the cylinders. Turn the engine over slowly in the normal direction of rotation until the right cylinder is on the compression stroke, and close to TDC.

2. Install timing plunger and body Nos. D653/D654 and rotate the engine slowly applying slight pressure to the plunger until it drops into the crankshaft hole. The engine should now be at TDC and the right cylinder should be on the compression stroke. Check that there is clearance at both valves. If not, turn the crankshaft 360° to locate the right cylinder on its compression stroke.

3. Lift out the plunger, and rotate the engine backwards. When the plunger drops for the second time, the piston is at the firing point of 38° BTDC.

4. If no timing plunger is available, the piston can be positioned at the firing point by removing the inspection cap from the front of the primary chaincase. After establishing the right piston at TDC on its compression stroke, turn the engine backwards until the rotor and stator marks align. This will be the full advance firing point.

NOTE: Later machines have the stator pointer built in, but some earlier models require the use of adaptor No. D2014 which has two marks, "B" and "C." Use the line marked "C."

5. When the piston is positioned as outlined, a timing or test light should indicate that the right cylinder's points have just opened. The points for the right cylinder have the black/yellow primary wire.

6. If adjustment is necessary, loosen the two pillar bolts, and rotate the entire

point plate until the points just open. Tighten the bolts.

7. Turn the engine 360°, engage the plunger or line up the rotor and stator marks to position the piston at 38° BTDC, and check that the left cylinder (black/white primary wire) just open. If they do not, loosen the two secondary bracket screws, and turn the eccentric screw until timing is corrected. Tighten the bracket screws.

NOTE: If timing has been lost completely, as after rebuilding the engine, it is advisable to set the points late and the eccentric screws at about the middle of their adjustment range before resetting the timing.

DYNAMIC TIMING

1. A strobe light can be used by means of the rotor and stator timing marks beneath the plate at the forward end of the primary chaincase.

NOTE: If the strobe light requires a battery power source, do not use the motorcycle battery.

2. The marks should align above 2,000 rpm. Check the right cylinder (black/yellow primary wire) first, and adjust the timing, if necessary, by moving the point plate as explained in Step 6, above. Repeat the test with the left cylinder, changing the timing by moving the left cylinder points only as explained in Step 7, above.

650, 750 Twin

1. The procedures are the same as for 500 (H57803 and later) since the points are the same type. Note the following:

2. The plunger and body to be used are D2195/D572.

3. If the machine does not have a stator pointer, use D2014. If dynamic timing is being carried out with this pointer, use line "B."

T150, T150V

The Trident is equipped with one set of points for each cylinder. The firing order is one-three-two. The right (no. one) cylinder point lead is white/black; the center (no. two) red/black, and the left (no. three) yellow/black.

STATIC TIMING

NOTE: Early model Tridents have

three timing marks scribed onto the rotor, 120° apart, each one for a different cylinder. Late models have two sets of timing marks which are distinguished by "A" or "B."

When timing late engines before Serial No. PG 01603, use the "A" timing marks. For engines after PG 01603, line up the "B" timing marks.

1. Remove the spark plugs and rocker box inspection caps. Put the transmission in gear so that the engine can be rotated by turning the rear wheel.

2. Locate approximate top dead center by rotating the engine until no. 1 piston is at the top of its compression stroke (i.e., both valves closed with clearance at the tappets).

3. Install Triumph timing plunger and body no. D1858, then slowly rotate the engine backward until the plunger locks the crankshaft at 38° BTDC.

4. If the automatic advance unit is not installed, assemble it loosely with an extra washer on the central bolt to lock the cam in the fully advanced position. If it is installed, remove the central bolt and add the extra washer. The washer should have a hole just a little larger than the cam bearing.

5. When the auto-advance unit is fully advanced, the no. 1 cylinder points should just be opening. If this is not the case, loosen the secondary breaker plate screws and shift the plate until the points begin to open.

6. Remove the timing plunger and locate the no. 3 cylinder at TDC on the compression stroke. Rotate the engine backwards until the plunger indicates that the piston is at 38° BTDC. Repeat the procedure outlined above on the no. 3 cylinder points, then again on no. 2 cylinder points.

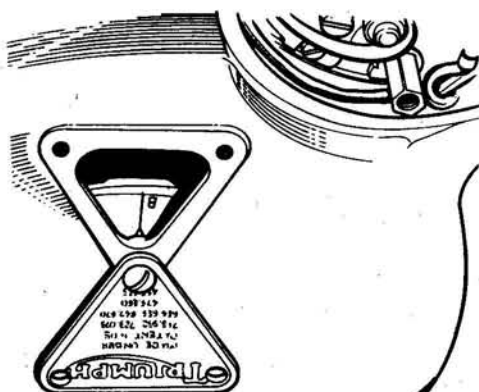
7. Remove the extra washer on the central bolt.

DYNAMIC TIMING

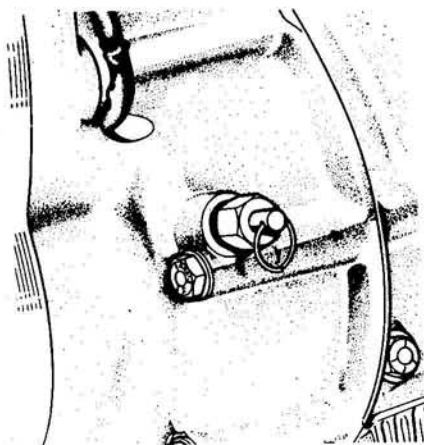
1. Remove the two top screws of the Triumph patent plate on the primary chaincase. Just loosen the bottom screw, as it will serve as a pointer.

2. Remove the ignition inspection plate located at the front of the primary chaincase.

3. Connect the strobe light to the right cylinder as instructed by the strobe man-



Trident timing marks (from Engine No. PG01603)



Timing plunger installed (Trident)

ufacturer. If the unit requires an external power source, *do not* use the motorcycle battery. AC pulses in the machine's low tension wiring can trigger the strobe light and lead to incorrect readings.

4. At engine speeds above 2,000 rpm, one of the three marks on the alternator rotor (exposed by the Triumph patent plate) should line up directly with the bottom plate screw. If adjustment is necessary, loosen the no. 1 point set secondary bracket and shift the plate until the marks are aligned. Tighten the plate securing screws.

5. Repeat the above procedure on no. 2 cylinder (center), then no. 3 cylinder (left).

6. Reinstall the patent and inspection plates.

CARBURETOR ADJUSTMENTS

Idle Speed and Mixture

NOTE: Make these adjustments when the engine is at operating temperature.

SINGLE-CARBURETOR

1. Make sure there is some freeplay in the throttle cable so the slide will close fully.

2. Turn the pilot air screw in until it is lightly seated, then back it out 2½ turns. Start the engine. Adjust the idle speed (throttle stop) screw so that the engine idles at about 750 rpm.

3. Make any fine adjustments by turning the pilot air screw in either direction so that an even idle is obtained. It should not be necessary to vary this screw more than ½ turn from the standard setting. If it is, there may be something wrong with the carburetor or engine. Check for fuel blockages, air leaks, etc.

4. Use the throttle cable adjuster to take up most of the slack in the cable. The twist grip should have 10–15° of rotation before the slide begins to rise.

TWIN-CARBURETOR

1. Make sure there is some slack in the main throttle cable so that the slides will close fully.

2. Screw each pilot air screw in gently until it is seated, then back them out 2½ turns.

3. Start the engine. Disconnect one of the spark plug leads and turn the throttle stop screw for the running cylinder in until the engine runs slowly but smoothly on one cylinder.

4. With both plug leads connected, rev the engine a few times to clean it out. Then disconnect the *other* plug lead, and turn the throttle stop screw for the running cylinder in until the engine runs slowly but smoothly on the one cylinder.

5. Connect the spark plug lead so that both cylinders will now be running. Idle speed will be very high. Back out each throttle stop screws by equal amounts until an idle speed of 500–750 rpm is obtained.

6. To smooth out the idle, if necessary, turn each pilot air screw in or out by equal amounts. It should not be necessary to turn either of them more than ½

turn. If it is, there is probably a defect in the system: air leaks, fuel flow problem, impure gasoline, etc.

7. Synchronize the throttle slides.

8. Use the adjuster on the main throttle cable so that the slide begin to rise after about 10–15° of twist-grip rotation.

Carburetor Synchronization, Twins

On twin-carburetor models, the throttle slides must be synchronized or one cylinder will lead the other while running. This operation should be carried out after setting the idle speed and mixture.

1. Remove the air cleaner(s).

2. Position a mirror behind the carburetors or reach into the bores with the thumb and index finger of one hand.

3. Twist open the throttle slides, and feel, or watch, as the slides enter the bores. They should begin to enter their respective bores simultaneously.

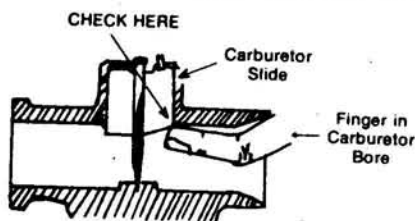
4. An alternate method is to place a finger on each carburetor slide when closed, and then turn the twist-grip slightly. Both slides should begin to lift at the same time.

5. If adjustment is necessary, use the cable adjusters on the top of each carburetor raising or lowering them so the

Tune-Up Specifications

	TR25W	T100C	T100R	TR6R	TR6C
(See text procedures)					
CARBURETION					
VALVES					
Valve Tappet Clearance (cold):					
Intake (in.)	0.008	0.002	0.002	0.002	0.002
Intake (mm)	0.203	0.050	0.050	0.050	0.050
Exhaust (in.)	0.010	0.004	0.004	0.004	0.004
Exhaust (mm)	0.254	0.100	0.100	0.100	0.100
Valve Timing:					
Intake Opens (BTDC)	51°	34°	40°	34°	34°
Intake Closes (ABDC)	68°	55°	52°	55°	55°
Exhaust Opens (BBDC)	78°	48°	61°	55°	55°
Exhaust Closes (ATDC)	37°	27°	31°	34°	34°
IGNITION					
Spark Plug (standard) (Champion)	N3	N4	N4	N3	N3
Spark Plug Gap:					
(in.)	0.020–0.025	0.020	0.020	0.025	0.025
(mm)	0.508–0.635	0.508	0.508	0.635	0.635
Contact Breaker Gap:					
(in.)	0.015	0.015	0.015	0.014–0.016	0.014–0.016
(mm)	0.381	0.381	0.381	0.350–0.400	0.350–0.400
Ignition Timing:					
Crankshaft Position (advanced)	37°	38°	38°	38°	38°
Piston Position (BTDC):					
(in.)	0.342	0.330	0.330	0.415	0.415
(mm)	8.687	8.380	8.380	10.4	10.4

	T120R	T150	TR7V	T140V	T150V
(See text procedures)					
CARBURETION					
VALVES					
Valve Tappet Clearance (cold):					
Intake (in.)	0.002	0.006	0.008	0.008	0.006
Intake (mm)	0.050	0.152	0.20	0.20	0.15
Exhaust (in.)	0.004	0.008	0.006	0.006	0.008
Exhaust (mm)	0.100	0.203	0.15	0.15	0.20
Valve Timing:					
Intake Opens (BTDC)	34°	50°	NA	NA	50°
Intake Closes (ABDC)	34°	64°	NA	NA	64°
Exhaust Opens (BBDC)	55°	67°	NA	NA	67°
Exhaust Closes (ATDC)	34°	47°	NA	NA	47°
IGNITION					
Spark Plug (standard) (Champion)	N3	N3	N3	N3	N3
Spark Plug Gap:					
(in.)	0.025	0.020	0.025	0.025	0.020
(mm)	0.635	0.500	0.635	0.635	0.50
Contact Breaker Gap:					
(in.)	0.014–0.016	0.014–0.016	0.014–0.016	0.014–0.016	0.014–0.016
(mm)	0.350–0.400	0.350–0.400	0.350–0.400	0.350–0.400	0.350–0.400
Ignition Timing:					
Crankshaft Position (advanced)	38°	38°	38°	38°	38°
Piston Position (BTDC):					
(in.)	0.415	0.357	0.415	0.415	0.357
(mm)	10.4	9.07	10.4	10.4	9.07



Checking carburetor synchronization

slide movements match. Allow each adjuster some part in making the adjustment. Do not screw either of them out too much, or that slide may not close fully.

6. Check the adjustment of the throttle

cable(s), using the adjuster(s) near the twist-grip so that the slides begin to rise after about 10-15° of grip rotation.

Triples

Due to type of linkage used, throttle slides should be synchronized first. There are two possible methods:

1. Remove the carburetor assembly from the motorcycle. Looking through the engine side of the carburetors, turn the idle speed screw so that one of the slides (any one) is being held open about 0.010 in. Loosen the locknut and turn the adjuster at the top of each carburetor so that the other two slides are open the same amount. Check by opening the

throttles and ensuring that all three slides clear the bore at the same time. Be sure the locknuts are tightened.

2. Alternately, check synchronization with the carbs in place on the machine using sight or feel according to the procedure outlined under "Carburetor Synchronization, Twins," above.

3. With the engine at operating temperature, turn each pilot air screw in until lightly seated, then back each out 2½ turns. Start the engine, and use the idle speed screw to set idle at 500 rpm.

4. Use the cable adjuster at the carburetor end to give about 10-15° of twist-grip rotation before the slides begin to rise.

ENGINE AND TRANSMISSION

NOTE: For engine component inspection and service procedures, refer to "Engine Rebuilding" under the "General Information" section. Triumph engine specifications are given at the end of this "Engine and Transmission" section.

TR25W

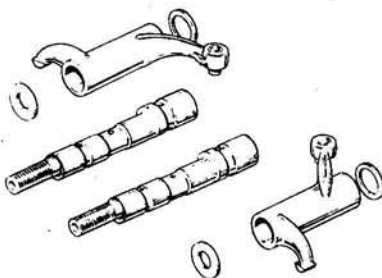
Engine Removal and Installation

1. Remove the fuel tank.
 2. Remove the exhaust system by disconnecting the exhaust pipe clamp at the head, and removing the two muffler mounting bolts.
 3. Remove the right side-cover and unbolt the skid plate from frame tubes. Drain the oil.
 4. Disconnect the valve rocker oil line from the metal T-connection and disconnect the flexible scavenge line from the crankcase line at the rear.
 5. Disconnect the alternator, oil pressure switch (if applicable), and contact breaker point leads from their snap connectors at the electrical box. Disconnect the spark plug wire.
 6. Remove the carburetor flange nuts and tie the carburetor out of the way. Leave the rubber connecting hose attached to the air filter housing.
 7. Disconnect the top engine mount (at the rocker cover).
 8. Remove the chainguard front extension and remove the master link from the chain.
 9. Disconnect the clutch cable using a suitable box wrench as a lever on the operating arm.
 10. Loosen the footpeg mounting bolt and swing the footpeg down.
 11. Remove the remaining engine mount bolts. Note that spacers are installed between the engine and frame at the right side of the front and bottom bolts.
 12. Remove the rear, engine mounting plate and lift the engine unit out of the frame from the right side.
- Installation is in reverse order of removal. Be sure to replace the two spacers correctly. Double-check all hardware and electrical connections when completed.

Top End REMOVAL

On the TR25W, the cylinder head and barrel may be removed with the engine in the frame. The procedure is as follows:

1. Remove the fuel tank.
2. Unbolt the engine mount at the cylinder head and push the bracket up out of the way.
3. Remove the carburetor from the head, leaving it suspended by the throttle cable.
4. Remove the exhaust system by disconnecting the exhaust pipe clamp at the head and removing the two, muffler mounting bolts.
5. Remove the spark plug and disconnect the rocker oil feed line.
6. Rotate the engine until the piston is at top dead center of the compression stroke (both valves closed, clearance at the rocker arms).
7. Remove the six cylinder head nuts; if the head will not move, free it with a rubber mallet.
8. Lift the head, rotate it around the pushrods to clear the frame, and remove it from the engine.



Valve train

9. To remove the barrel, first rotate the engine until the piston is at the bottom of the stroke and then gently lift the barrel off. Steady the piston as the barrel is withdrawn so that it will not be damaged.

10. To remove the piston, it will be necessary to heat it slightly to facilitate removal of the wrist pin. First remove the wrist pin circlips. After the piston is warm, the wrist pin should slide out

fairly easily. Mark the front of the piston inside the skirt to facilitate reassembly.

INSPECTION

Refer to "Engine Rebuilding" for service procedures.

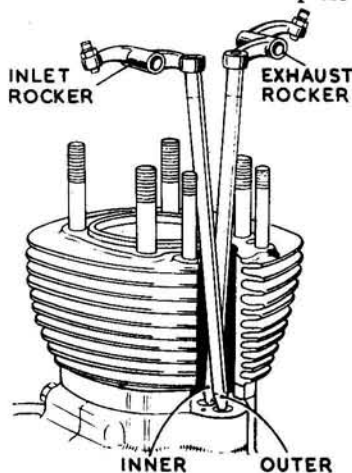
Oversized pistons are available in +0.020 and +0.040 sizes.

If the con rod bush must be replaced, refer to the T100C, T100R engine section for removal and installation procedures. Valve guides are removed and installed in the usual manner. The exhaust valve guide is counterbored at the lower end.

INSTALLATION

1. When installing the piston rings, note that the lower compression ring is marked "TOP" and must be installed in the second groove with this mark facing upwards. The top compression ring is probably chromed.

2. Warm the piston and install it, in correct position, on the connecting rod. Insert the piston pin before the piston has a chance to cool. Install new circlips and make sure that they are seated properly. Install a new cylinder base gasket and support the piston with two pieces of wood approximately ½ in. square by 6 in. long. Stagger the ring gaps 120 degrees apart, liberally oil the rings, and install a ring compressor. If a ring compressor is unavailable, it is possible to compress the



Pushrod installation

rings by hand, one at a time, as the barrel is slipped over the piston. Be careful. Slide the barrel over the piston and remove the compressor and wood blocks.

3. Install the two pushrods, noting that the outer one operates the intake valve. The top of the exhaust valve pushrod is painted red for identification, as it is slightly shorter than the intake pushrod. *The pushrods must be positioned correctly.*

4. Install the rocker box on the cylinder head using a new gasket, then torque the nuts to 7 ft lbs. Install a new head gasket and fit the head onto the barrel. Place the pushrod ends into the rocker arm ends, making absolutely sure that they are positioned correctly, as illustrated. Keep a light, downward pressure on the head and rotate the engine until the piston is at top dead center of the compression stroke. In this position both valves will be fully closed (clearance at both rocker arms). Tighten the cylinder head nuts, gradually to the figures given in specifications at the end of this section.

5. Check and adjust valve clearances, etc.

Clutch and Primary Drive

DISASSEMBLY

1. If the engine is mounted in the frame, remove the left-side footpeg and brake pedal.

2. Drain the oil from the primary chaincase remove the screws, and take off the primary drive cover. It may be necessary to tap the cover with a rubber mallet to break it free.

3. Remove the four, clutch-spring retaining nuts and withdraw the pressure plate, springs, and cups.

4. Withdraw the clutch plates.

5. Keep the clutch from turning by applying the rear brake, and remove the clutch center nut (after the locktab has been bent back).

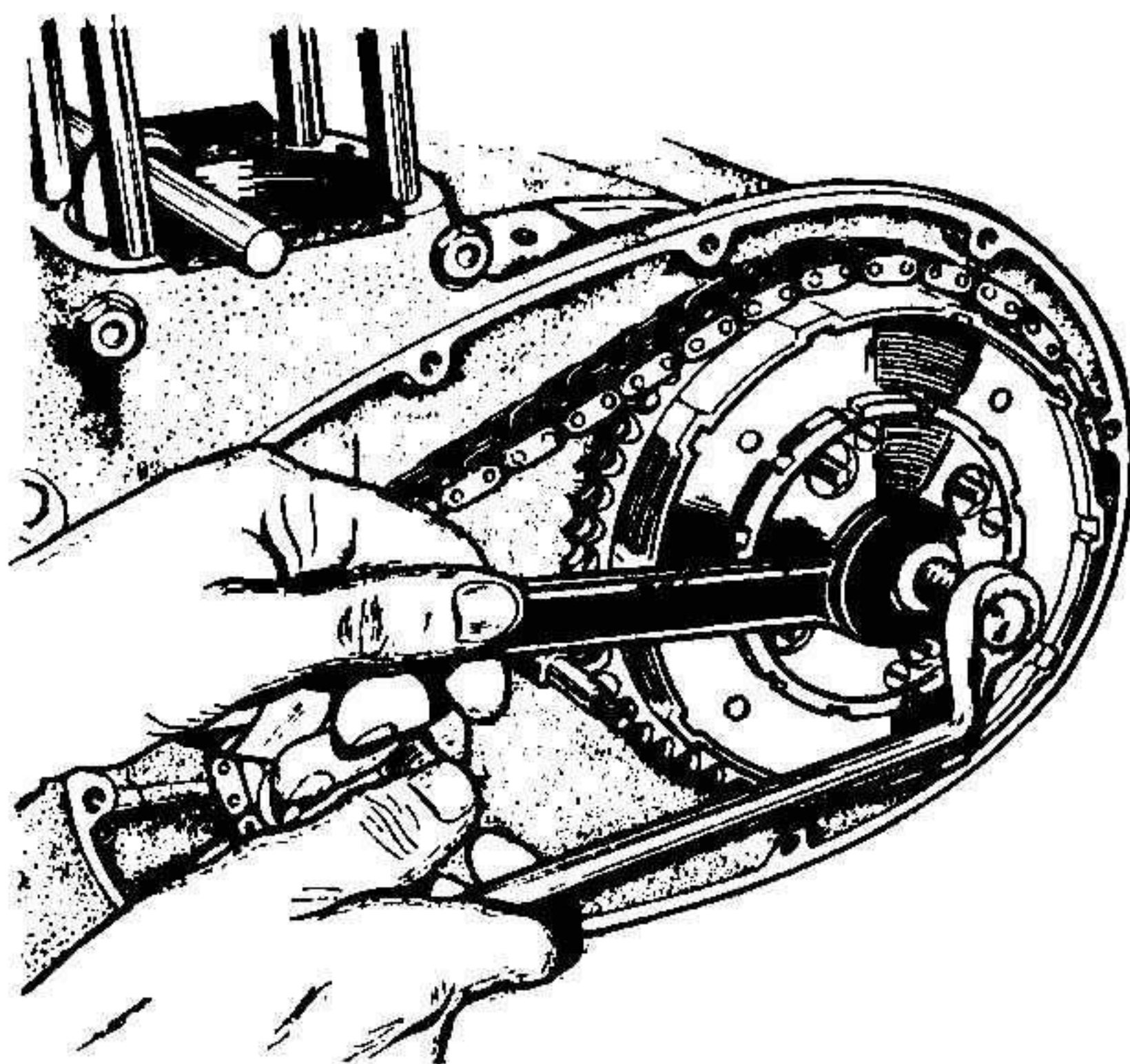
6. Remove the locktab and spacer, and withdraw the clutch pushrod.

7. To remove the clutch completely, it is necessary to remove the alternator. To remove the stator (enclosing the rotor), take off the three mounting nuts, pull the alternator lead through the grommet, and pull the stator off the studs.

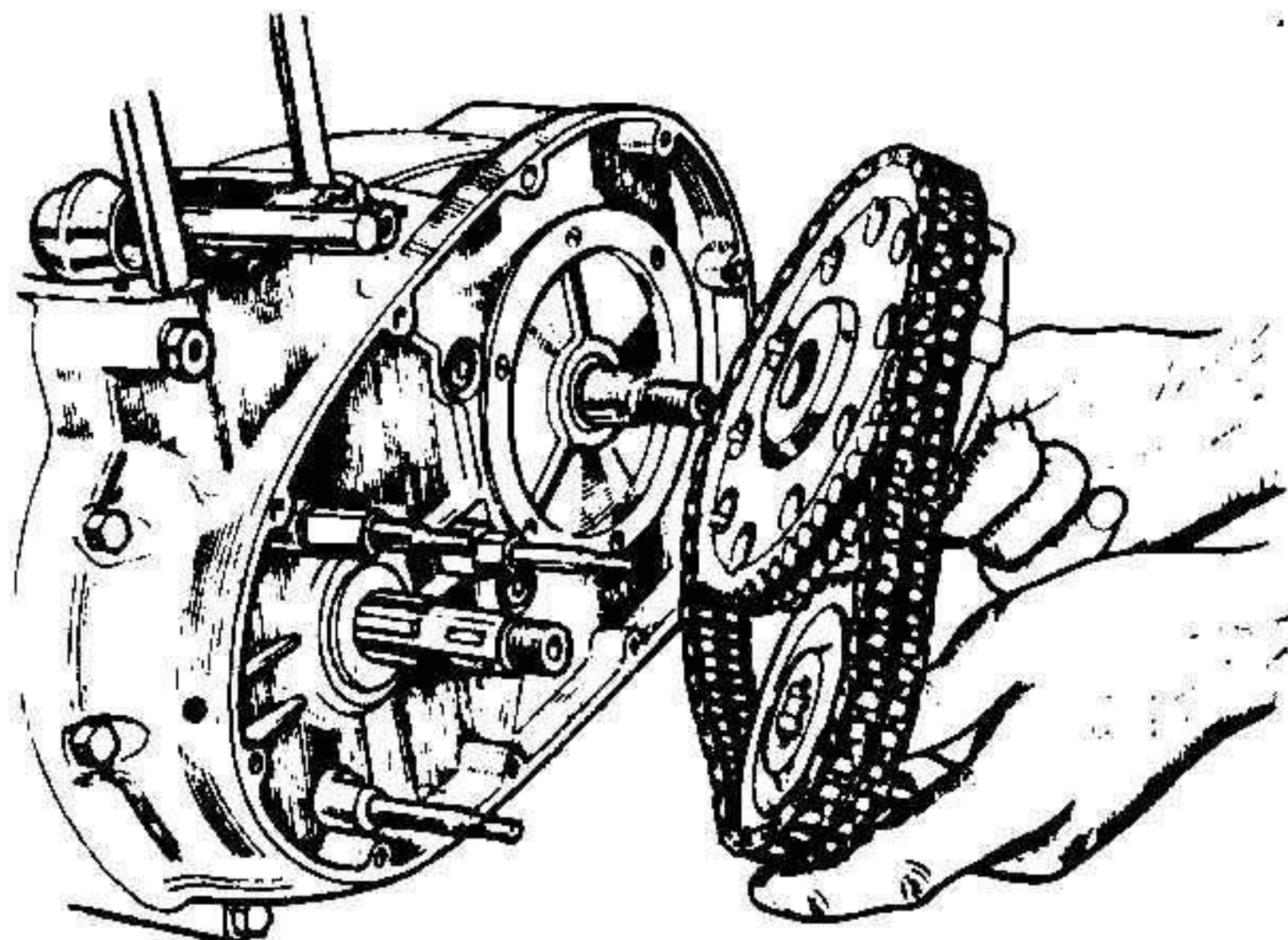
8. Remove the primary chain tensioner, noting that a spacer is installed on the rear stud.

9. Bend back the locktab and unscrew the rotor nut. Remove the rotor, wipe it clean, and store it in a clean place.

10. Use a gear puller to pull the clutch housing off the transmission mainshaft, while at the same time pulling the front sprocket off the engine crankshaft. Note any shims behind the sprocket.



Removing the clutch housing



Installing the primary drive

INSPECTION

1. If the thickness of the friction discs measures less than 0.137 in., they should be replaced.

2. To examine the dampers located in the clutch center, remove the four screws adjacent to the clutch spring housings and pry off the retaining plate. The dampers need not be replaced unless they are visibly damaged or worn. It may be necessary to lubricate them when installing; it is recommended that a liquid detergent be used. *Do not use petroleum-based oil or grease.*

3. The clutch center slots should be smooth and undamaged or jerky clutch engagement will result. Check clutch spring free length, and if less than 1.60 in., replace the springs as a set.

4. The rear sprocket roller bearing is allowed a slight amount of free-play, but, if excessive, the roller should be replaced.

ASSEMBLY

If the sprockets or clutch hub have been replaced it will be necessary to realign the sprockets to avoid excessive primary chain wear. Refer to "Primary Drive Sprocket Alignment." To reinstall the clutch:

1. If the clutch sleeve has been removed, smear it with grease and place

the twenty-five bearing rollers in position. Slide the sprocket over the rollers and install the clutch center over the splines of the sleeve.

2. Place the primary chain over the sprockets and position the sprockets on the shafts. Make sure that the transmission mainshaft key is correctly located.

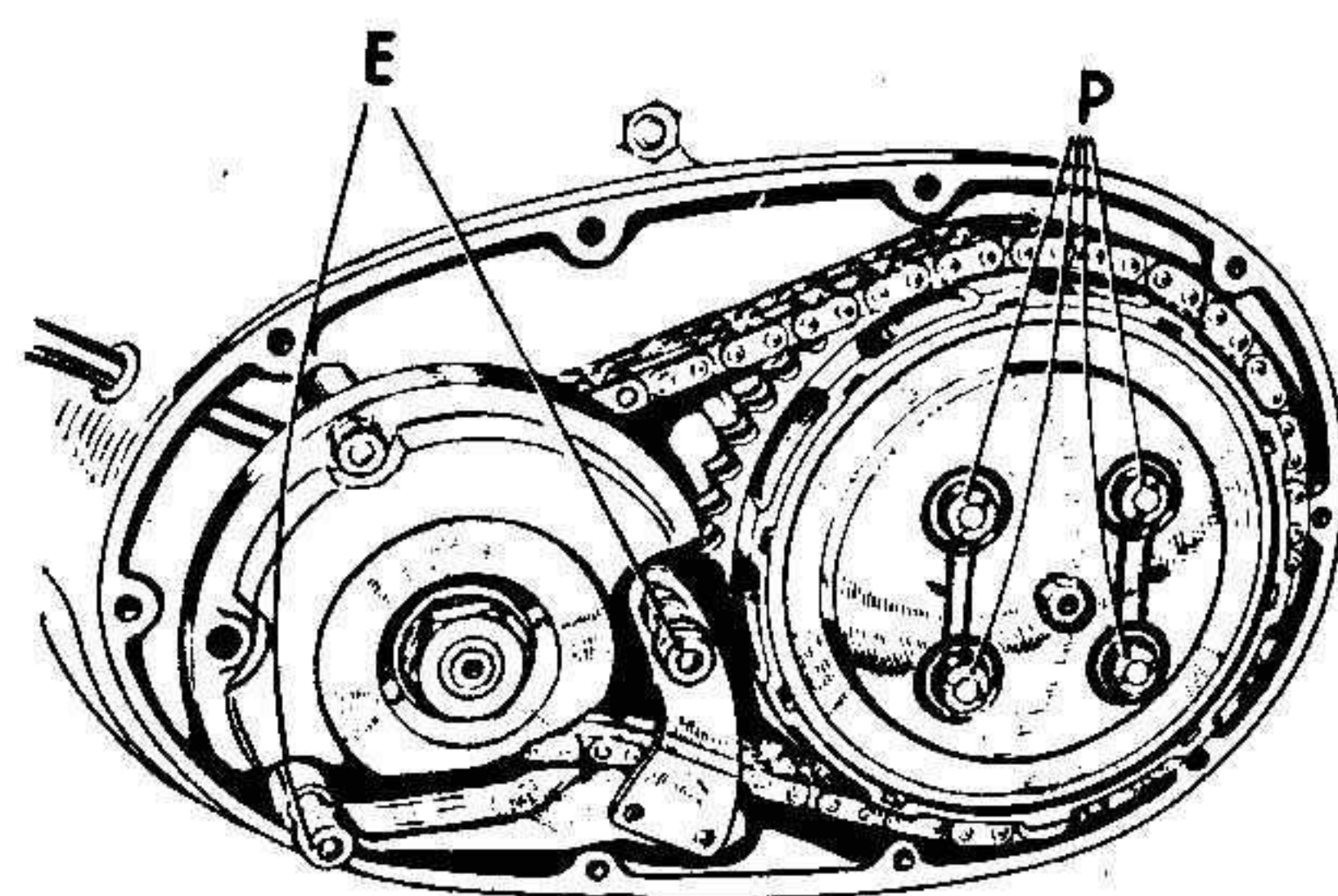
3. Install the clutch center spacer. Make sure that the mainshaft and clutch retaining nut threads are clean and dry. Install a new locktab and apply a small amount of thread-locking compound to the mainshaft threads before installing the retaining nut. Torque the nut to 60-65 ft lb.

4. Install the alternator rotor on the crankshaft with the marks facing out, making sure that the key is located correctly. Install a new locktab, apply a drop of thread-locking compound to the threads, then tighten the retaining nut to 60 ft lbs.

5. Pass the stator lead through the grommet at the front of the crankcase. Fit the stator over the studs and partially tighten the nuts. Check that there is an equal air gap between the rotor and stator at all points using an 0.008 in. feeler gauge. Variations can be corrected by repositioning the stator.

6. To adjust primary chain tension, loosen the rear stator retaining nut and adjust the tensioner to provide 1/4 in. free-play on the top run of the chain midway between the sprockets. Retighten the stator nut.

7. Install the clutch discs and plates, alternately, into the clutch housing, beginning with a disc. Insert the clutch pushrod into the mainshaft.



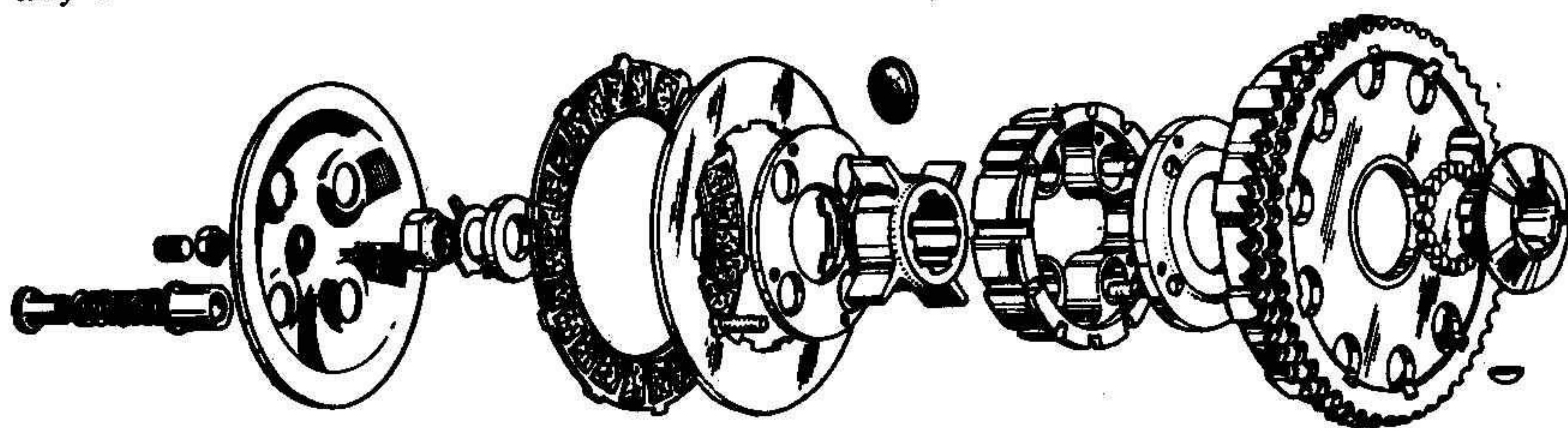
Primary chain (E) and pressure plate (P) adjustment points

8. Install the pressure plate complete with springs and cups. Make sure the spring cup location pips are seated in the slots in the pressure plate.

9. Install and tighten the four spring nuts until the first coil of each spring is just outside of its cup. Improper spring tension will cause excessive pressure at the handlebar lever or clutch slip. Check to see if the springs are tightened evenly by pulling the clutch lever in and kicking the engine over. If any wobble is noticeable at the pressure plate as it turns, tighten or loosen the springs as necessary until it runs true.

10. Adjust the clutch by means of the screw and locknut at the center of the pressure plate so that the clutch operating lever is angled approximately 30° away from the crankcase/side-cover joint.

11. Clean the crankcase and primary cover mating surfaces, apply a thin coat of



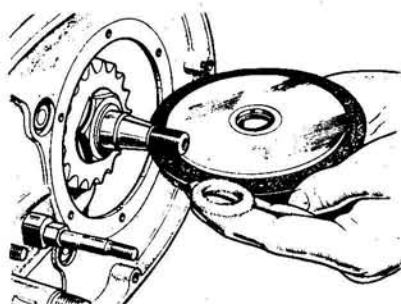
Clutch assembly

gasket cement, and mount the cover using a new gasket. If it is possible to use a torque wrench, tighten the screws to 3.5-4.5 ft lbs.

12. Fill the primary chaincase with oil and adjust the clutch lever free-play if necessary.

Transmission Countershaft Sprocket and Oil Seal

To examine or remove the countershaft final drive sprocket, first remove the six screws that retain the plate surrounding the shaft. Pry the plate loose and remove it with its oil seal, taking note of the felt washer that protects the seal from dirt and grit. Check for oil leakage at the back of the plate and replace the plate oil seal if necessary. Install the seal with the lip facing the countershaft sprocket.



Gearbox sprocket cover and seal

If the sprocket teeth are hooked or if the sprocket is damaged, it should be replaced (along with the drive chain and rear wheel sprocket if it too is worn). To remove the sprocket bend back the locktab, apply the rear brake, then unscrew the retaining nut. Disconnect the drive chain and pull the sprocket off the shaft. Examine the countershaft oil seal at this time. If it shows signs of leakage, remove the circlip, pry out the seal, and replace it with a new one. Coat the new seal with oil to facilitate installation. Examine the sprocket boss for wear, which may have been causing the seal to leak. Lightly oil the boss when installing the sprocket to avoid damaging the seal. Torque the sprocket retaining nut to 100 ft lbs. When installing the round plate, make sure the gasket is in good condition or use a new one. A new felt washer should be used behind the oil seal. Make sure that the small boss cast into the rear of the plate is installed in the four o'clock position, or else it will contact the drive chain.

Primary Drive Sprocket Alignment

Assemble and install the clutch unit—without the primary chain—on the transmission shaft. Install the crankshaft sprocket. (The sprocket spacer must be installed with the chamfered end against the sprocket.) Place a straightedge against the sprockets. If the sprockets are aligned properly, the straightedge will make contact both evenly. Shims of different thicknesses are available for installation behind the crankshaft sprocket to correct misalignment.

Transmission and Shifter Mechanism

DISASSEMBLY

1. If the top end has not been disassembled, position the piston at top dead center of the compression stroke to avoid distorting the inner camshaft bushing (due to valve spring pressure) as the inner crankcase cover is removed. Drain the transmission oil at this time.

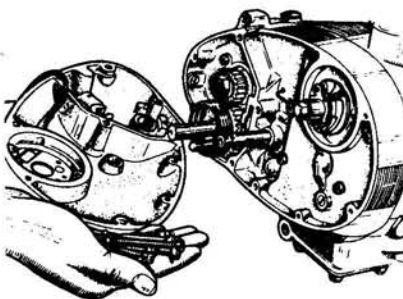
2. Disassemble the primary drive and clutch assembly including the countershaft sprocket, described previously. This is necessary to permit the transmission mainshaft to be withdrawn along with the inner crankcase cover at the right (timing) side of the engine.

3. To remove the right-side outer cover, first take off the kick-start and shift levers. Remove the cover retaining screws, noting that the screws are of different lengths and must be replaced in their original positions.

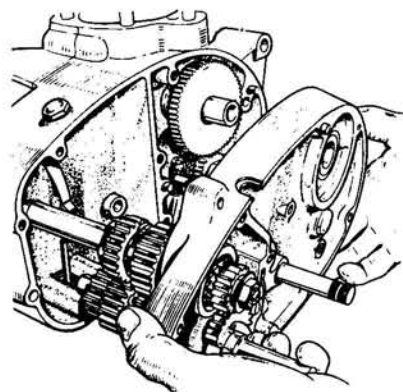
4. Unscrew the kick-start return spring anchor and remove the spring.

5. Remove the ignition advance unit from the inner cover.

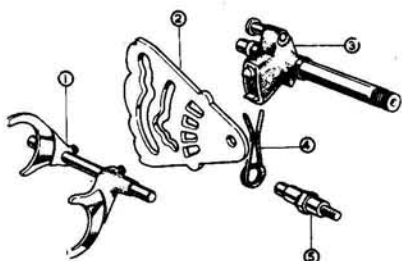
6. Take out the remaining inner



Removing the outer timing cover



Removing the inner timing cover



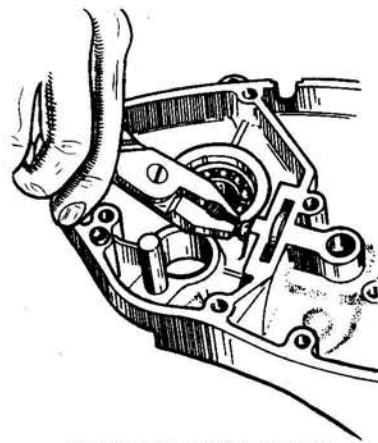
Shifter mechanism

cover mounting screws and tap the cover with a rubber mallet to break the joint seal. Withdraw the cover complete with transmission gear cluster. As the cover is removed, exert a slight inward pressure on the end of the camshaft to avoid disturbing the valve timing.

7. Depress the two plungers in the shift linkage quadrant and withdraw the quadrant and spring.

8. Remove the camplate pivot cotter pin from the outside of the cover. Screw one of the small inner cover screws into the pivot and pull the pivot out with a pair of pliers.

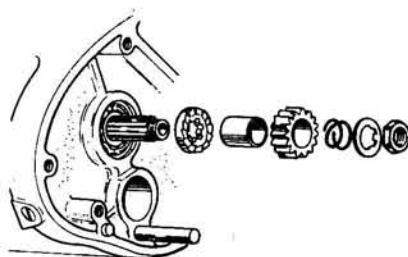
9. Remove the camplate, shift forks, and fork shaft.



Removing the camplate pivot pin

10. Withdraw the countershaft, complete with gear assembly and mainshaft sliding gear. To remove the mainshaft assembly from the cover, unscrew the kick-start ratchet retaining nut and remove the ratchet components from the shaft.

NOTE: When removing the countershaft gears, note that second gear is retained by a circlip.



Kickstarter ratchet assembly

11. The two gears remaining on the mainshaft are an interference fit. Remove by clamping the gears in a vise (protected from the jaws with pieces of wood or cloth) and driving the shaft out using a soft metal drift.

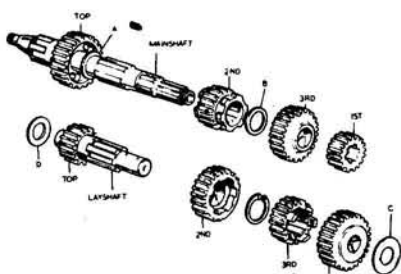
12. If it is desired to remove the left-side transmission bearing from the case, drive the pinion out of the bearing and remove the oil seal. The crankcase should be heated with a propane torch before the bearing is driven out to avoid damage to both the bearing and case.

ASSEMBLY

1. To reinstall the left-side bearing (if removed), heat the crankcase very gently

around the area of the bearing housing, moving the torch slowly and evenly to prevent distortion. Install the bearing and fit a new oil seal.

2. If necessary, install a new inner cover bearing, having first heated the cover in an oven. Use new oil seals in the cover.



Transmission gears

3. Install the camplate with the small mark positioned as shown in the accompanying illustration. Install the camplate pivot and lock in place with a cotter pin.

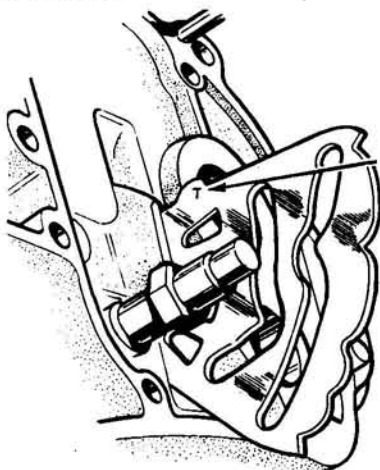
4. Replace the mainshaft gears on the shaft, fit the shaft into the inner cover bearing, install the kick-start ratchet components, and tighten the retaining nut to 50-55 ft lbs. Lock the nut in place with the locktab.

5. Install the kick-start half-gear into the inner cover. Place the cover, with the outside surface down, close to the edge on your workbench so that the half-gear shaft is over the edge but the gear is retained in the cover. Place the countershaft first gear shim over the bearing in the half-gear shaft. Use a small amount of grease to hold it in position.

6. Engage the mainshaft and countershaft first gears and fit the shift fork into the countershaft third gear with the machined (flat) side of the fork up. Engage the roller (button) of the fork in the lower camplate track.

7. Fit the mainshaft second gear with its shift fork (machined side of the fork down) and engage the fork roller in the upper track of the camplate.

8. Insert the shift fork shaft through the forks and into the inner cover. Position the countershaft second gear on the shaft and install the countershaft in the inner cover.

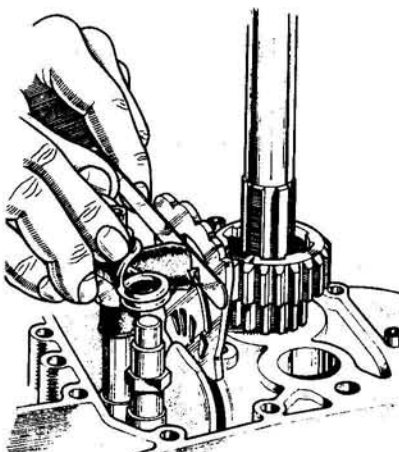


Installing the camplate

9. Place the mainshaft fourth gear thrust washer over the shaft, retaining it with a dab of grease. Install the countershaft thrust washer, making sure that the side with the radius faces the gear.

10. Lubricate all components with motor oil and rotate the shafts to confirm that they are free of binding.

11. If the shift return spring has been removed, it must be reinstalled so that the marked (painted) side of the coil faces the shift quadrant body. If the spring is unmarked, install it in the position in which it appears in the accompanying illustration (in line with the two pins) by trial and error.



Installing the shifter mechanism and return spring

12. Install the shift quadrant assembly into the inner cover, using a flat blade to keep the plungers depressed so they can slide over the camplate.

13. If the inner case, mainshaft, countershaft, or any gears have been replaced, it will be necessary to check end-float of the shafts and adjust if necessary. To accomplish this, mount the inner cover on the crankcase and tighten the screws. Remove the kick-start ratchet assembly and half-gear and the ends of the mainshaft and countershaft will be accessible. Thrust washers of different thicknesses are available to adjust end-float to specification.

14. When all components have been assembled on the inner cover and it is ready to be installed, clean the crankcase and inner cover mating surfaces thoroughly, and apply a thin coat of gasket cement to one of the surfaces. Lubricate the crankshaft oil seal and camshaft end, and mount the cover on the crankcase. Tighten the screws to 3.5-4.5 ft lbs. Check operation of the gears.

15. Install the outer cover, cleaning the mating surfaces and applying gasket cement as above. Install the kick-start and shift levers.

NOTE: Before the cover is installed, the position of the shift linkage quadrant can be adjusted for smoother gear selection (late models only). Loosen the adjuster locknut and select each gear in turn. If the gears do not engage positively, turn the adjuster screw a little at a time until gear selection is satisfactory. Do not turn the screw

more than 1/4 turn from vertical in either direction. Tighten the locknut when adjustment is complete.

16. Install the primary drive and clutch assembly and refill the transmission and primary case with oil.

Bottom End

DISASSEMBLY

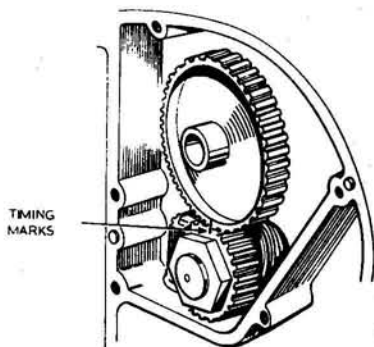
1. Drain the oil from the engine, transmission, and primary case. Remove the engine.

2. Remove the cylinder head, piston, and barrel.

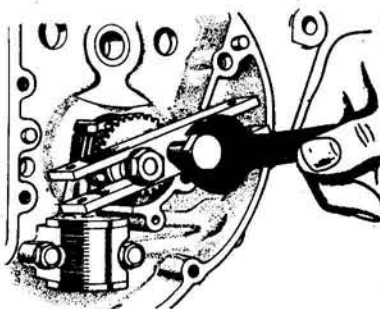
3. Remove the primary drive and clutch assembly.

4. Remove the right-side outer cover and then take off the inner cover, complete with transmission gearset, as described in the preceding section.

5. Note the alignment of the marks on the timing gears and withdraw the upper gear and camshaft, allowing the tappets to fall clear.



Timing gear marks



Removing the crankshaft pinion

6. Insert a bar through the connecting rod small-end, place blocks of wood under the bar to protect the crankcase, and unscrew the nut at the end of the crankshaft. The bar will keep the engine from turning over as the nut is broken free.

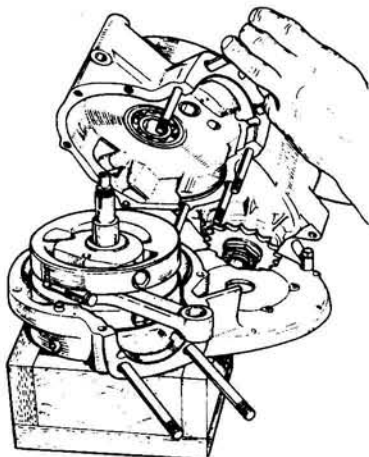
7. Remove the small timing gear with a suitable gear puller.

8. Take off the nut and remove the oil pump drive-gear.

9. From the left side of the crankcase, remove the three bolts at the lower front of the case, the two stud nuts at the center of the case, and the remaining two stud nuts at the cylinder base.

10. Remove the woodruff keys from the crankshaft ends and separate the crankcase halves by tapping with a rubber mallet.

11. Lift away the right crankcase, and remove the crankshaft assembly. Note the number of shims used, if any, between the right-side flywheel and main bearing.



Separating the crankcase halves

MAIN BEARINGS

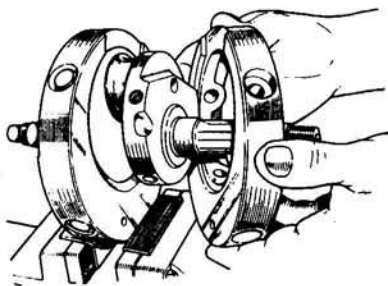
The inner and outer races of the left-side roller bearing are separated as the crankcase halves are split. The outer race can be driven out after the case has been heated in an oven. The inner race, remaining on the crankshaft, can be pulled off using a suitable gear puller. The right-side (timing side) ball bearing assembly can be driven out after heating the case.

New bearings can be installed in the cases in the same manner, after the cases have been heated.

CONNECTING ROD BEARINGS AND CRANKSHAFT ASSEMBLY

The connecting rod can be removed by simply unbolting the bearing cap. Loosen the nuts alternately, a turn at a time, to prevent distortion. To facilitate reassembly, the connecting rod and cap have been marked with a center punch. Note the direction in which the marks face.

Examine the bearing shells and crankpin carefully for signs of wear, scoring, and other damage. If it is necessary to regrind the crankshaft, bearings are available in 0.010, 0.020, and 0.030 in. undersizes. It is very important that the radius at either end of the crankpin is machined to 0.070-0.080 in. when regrinding. Do not attempt to refinish the bearing shells or file the bearing cap mating surfaces to reduce bearing clearances.



Removing a flywheel

If the crankshaft is to be reground, the flywheels must be removed. Loosen the four, short, flywheel retaining bolts (closest to the crankpin) first to avoid distortion. Remove the remaining four bolts and separate the flywheels. Clean the oil sludge trap, located in the right flywheel. Unscrew the plug and clean the passage with solvent and compressed air.

When reinstalling the flywheels, make sure that the flywheel incorporating the sludge trap is fitted on the right side. Apply a drop of thread-locking compound to the threads of each flywheel retaining bolt and tighten evenly to 50 ft lbs.

When installing the connecting rod on the crankshaft, make sure that the rod bearing shells are properly located in the connecting rod and cap. The oil hole should face the drive (left) side flywheel. Lubricate the bearing surfaces with fresh engine oil and install the bearing cap, taking note of the position of the punch marks to ensure that the cap is installed in its original position. It is recommended that new connecting rod bolts and nuts be used as a precaution against breakage. Clean the threads, apply a drop of thread-locking compound, and tighten the nuts to 22 ft lbs. Using a pressure oil can, force oil into the passage at the right end of the crankshaft until it is coming out around the connecting rod bearing. This indicates that the oil passages are not restricted and are full of oil.

ASSEMBLY

1. On the TR25W, the crankshaft end-float must be checked. Proceed with step 2, below, omitting the gasket cement. Check crankshaft end-float, disassemble the cases again and add or remove thrust washers as necessary between the flywheel and right-side main bearing to adjust end-float to within 0.002-0.005 in. Then start with step 2 again and follow the remainder of the assembly procedure.

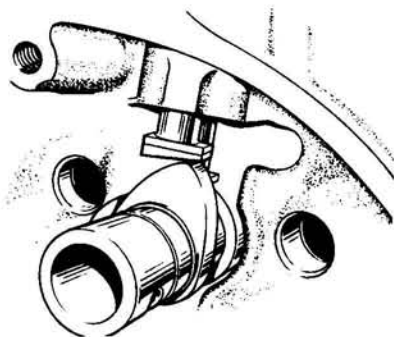
2. Place the crankshaft assembly into the drive-side crankcase. Clean the crankcase mating surfaces and apply a thin coat of gasket cement to the mating surface of one of the cases. Fit the crankcase halves together and install the three bolts and four nuts. Tighten evenly to 16-18 ft lbs.

3. Rotate the crankshaft to make sure that it turns freely. If it does not, the cause of the trouble must be determined and rectified. Look for incorrect main bearing alignment or insufficient crankshaft endplay.

4. Install the small timing gear on the end of the crankshaft, taking care to locate the woodruff key properly. Tighten the retaining nut to 50-55 ft lbs.

5. Install the oil pump drive-gear on the pump shaft using the special locknut (or a suitable replacement) as originally installed.

6. Place the two tappets into their bores with the thinner end of the tappet foot facing forward. Install the camshaft and timing gear unit, with the timing marks aligned, and fit the thrust washer on the end of the camshaft (late models only).



Note position of tappet contact pad

NOTE: On early engines there are two marks on the camshaft timing gear—a dash and a V. On these engines the dash must be ignored and the marks aligned as illustrated. On later engines that do not have the V mark, simply align the dash marks.

7. Install the right-side inner cover complete with transmission gearset and install the outer cover.

8. Install the primary drive and clutch assembly.

T100C AND T100R

Engine Removal and Installation

1. Remove the gas tank and disconnect the spark plug leads.

2. Disconnect the battery terminals and the connectors at the two ignition coils.

3. Remove the ignition coils, taking care not to damage the outer casings.

4. Disconnect the snap connectors between the contact breaker assembly and the condensers.

5. Remove the two cylinder-head torque stays.

6. Disconnect the tachometer drive cable.

7. Remove the carburetor(s) complete with air cleaners.

8. Disconnect the rocker oil feed line, taking care not to bend it.

9. Drain the oil tank and disconnect the delivery lines to the engine.

10. Drain the engine sump, primary chaincase, and transmission.

11. Loosen the clutch adjustment at the handlebar, then disconnect and remove the clutch cable.

12. Remove the exhaust header pipes and mufflers.

13. Remove the final, drive-chain master link and withdraw the chain.

14. Disconnect the alternator leads at their snap connectors underneath the engine.

15. Remove the bolts securing the front engine plates and withdraw the plates.

16. Remove the stud securing the bottom of the engine to the frame and the bolt securing the rear engine plates to the transmission case.

17. Have a helper support the engine, then remove the two nuts securing the right rear engine plate to the frame. Re-

move the plate.

18. Remove the left front stud securing the engine torque stay.

19. Remove the right footrest.

20. With the helper, lift the engine out the right side of the machine.

21. Installation is basically a reversal of the removal procedure. Note the following:

a. When the engine is in position in the frame, install the bottom frame bolt first, then install the right rear engine plate and tighten the bolts fingertight only.

b. Install the front, engine mounting plate, then tighten all mounting bolts snugly.

Top End

REMOVAL

The cylinder head and barrel can be removed without taking out the engine.

1. Disconnect the leads from the battery terminals and remove the fuel tank.

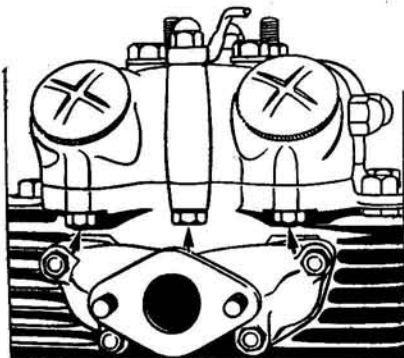
2. Disconnect the high tension cables and wiring harness from the ignition coils, then remove the coils. Take care not to damage the coil outer casings.

3. Remove the cylinder head torque stays.

4. Remove the rocker oil feed line.

5. Remove the two nuts from the studs at the bottom of the exhaust rocker box.

6. Remove the two phillips screws from the top of each rocker box, loosen all eight cylinder head bolts and remove the central head bolts.



Rocker box stud nuts and bolt (500)

7. Remove the exhaust rocker box, then remove the intake rocker box in the same manner. Take care not to lose the six plain washers (one under each bottom securing nut).

8. Remove the pushrods and mark them for reassembly position.

9. Remove the exhaust header pipes.

10. Disconnect the fuel lines and plug the ends. Disconnect the throttle linkage at the carburetor(s).

11. Remove the remaining four cylinder head nuts by turning each one a little at a time in an X pattern.

12. Remove the cylinder head complete with intake manifold(s) and carburetor(s). If the cylinder head is being serviced, rather than being removed to gain access to another part of the engine, remove the intake manifolds and carburetor(s).

13. Remove the pushrod tubes, remembering to replace the rubber seals during assembly.

14. Remove the cylinder head gasket.

15. Wedge a piece of rubber between the intake and exhaust tappets to prevent them from falling into the case when the barrel is removed.

16. Rotate the engine until the pistons are both at TDC, then remove the eight cylinder base nuts and washers.

17. Raise the barrel high enough to stuff some clean, no-lint rags into the case openings. It is also a good idea to fit some kind of rubber protectors over the cylinder studs to prevent damage to the connecting rods when the barrel is removed.

18. Lift off the barrel carefully, supporting the pistons when they are free.

19. Remove and mark the tappets for reassembly.

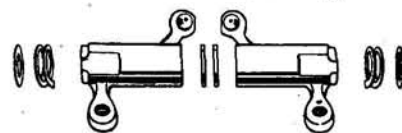
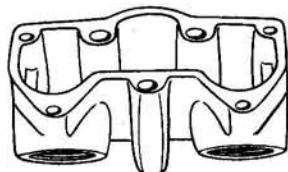
ROCKER BOXES

The rocker spindles can be removed by driving them out with a suitable drift. Once out, the spindles will release the rocker arms and washers. Clean the parts in kerosene or a cleaning solvent, then blow them dry with compressed air. Also blow out the spindle oil drillings with compressed air. Upon reassembly, the spindle oil seals should be replaced.

If the rocker ball pins require replacement, drive them out with a suitable drift and press the new ones in with the drilled flat toward the rocker spindles.

The rocker boxes can be reassembled using a 7/16 in. x 6 in. bar, ground to a taper at one end. This bar serves as an alignment tool for the spindles. Before beginning assembly, note that two of the washers removed from the spindles have a smaller diameter than the other washers. These are thrust washers and they must be assembled last—against the right inner face of the rocker box.

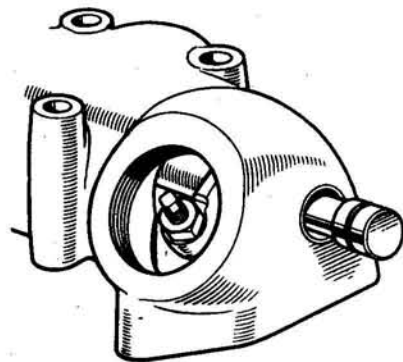
Grease two plain washers and position them on either side of the center bearing boss. Position the left rocker arm, bringing it into line with the alignment bar, and locate the plain washer, spring washer, and thrust washer as shown in the accompanying illustration. Repeat this for the right rocker arm, then oil the spindle and slide it as far into the rocker box as possible. Tap it in the remaining distance with a soft-faced hammer.



Rocker arms and spindle (500)

TAPPETS AND GUIDE BLOCKS

The only wear likely to be apparent on the tappets is at their tips which are plated with Stellite. Over a long period of time, an indentation will be worn in the center of the tip. If the width of this indentation exceeds 3/32 in., replace the tappet.



Installing the rocker box spindle



Tappet guide block assembly

It is not necessary to remove the press-fit tappet guide blocks to check their condition. Simply insert the tappet and rock it back and forth in the block. There should be little or no lateral play. See specifications for allowable clearances.

CYLINDERS

The difference between the largest and smallest of the six bore measurements must not exceed 0.13 mm (0.005 in.), or reboring is necessary.

PISTONS

1. Remove the inner and outer piston pin retaining circlips, then attach a piston pin removal tool and press out the pin.

2. Lay out and mark the pistons, piston pins, and retaining circlips for reassembly.

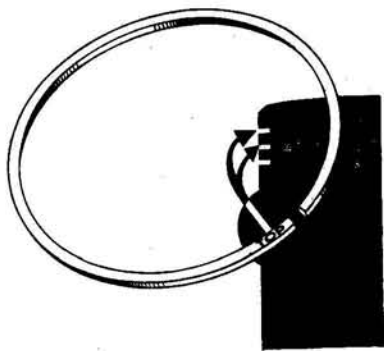
3. Remove the piston rings one at a time by lifting an end of the ring out of its groove and holding a thin piece of metal between it and the piston. Slide the piece of metal around the circumference of the piston while at the same time gently lifting the raised part of the ring upwards.

4. Replacement pistons are available in three oversizes. These sizes and the corresponding recommended cylinder bore sizes are given in a chart at the end of this section.

5. Install the piston rings one at a time over the top of the piston. Note that the two compression rings are marked TOP, which must face upwards when the rings are fitted.

6. Position the piston on the connecting rod.

7. Install one new retaining circlip as a stop, then press the piston pin into position and install another new circlip on the other side.



Install compression rings with the "Top" mark facing upwards

NOTE: It is advisable to heat the piston to 100° C prior to assembly.

ASSEMBLY

1. Position new guide block O-ring seals at the base of the cylinder block.
2. If it was removed, lightly grease the outside surface of the exhaust guide block, then carefully align the guide block and cylinder locating holes and drive the block into position with Triumph special tool no. Z23 or a suitable drift.

3. Repeat the above step for the intake guide block, then install the locking bolts.

4. After installing the guide blocks, make sure that the exhaust guide block oil drillways are free from obstruction.

5. Install the tappets in the guide blocks after thoroughly lubricating them with oil. Wedge them in position.

6. Install the cylinder base gasket, making certain that the gasket does not obscure the oil feed drillway in the crankcase.

7. Fit ring compressors over the piston rings, then carefully slide the cylinder down over the pistons. Remove the ring compressors as soon as the rings are positioned within the cylinder. Continue lowering the cylinder block and then remove the rags in the crankcase openings as late as possible.

8. Install the cylinder base attaching nuts.

9. Replace or anneal the cylinder head gasket.

10. Clean the mating cylinder head and cylinder surfaces, then grease the gasket and position it on the cylinder.

11. Coat the tappet guide blocks with grease and position the pushrod cover tubes with new O-rings seals.

12. Position the cylinder head and install the four outer and one central head bolt finger-tight.

13. Place a small amount of grease in the bottom cup of each pushrod, then locate the intake pushrods in their respective bores. This will have to be done by "feel."

14. When the pushrods are properly positioned, remove the spark plugs and turn the engine over until both intake pushrods are level and at the bottom of their travel.

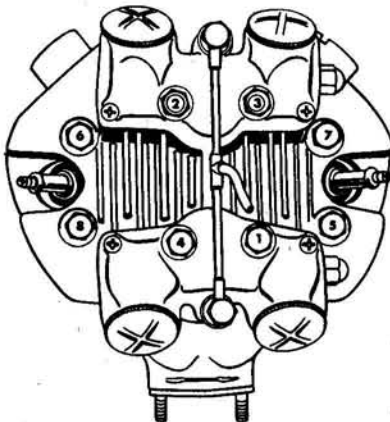
15. Install the intake rocker box.

16. Repeat the above procedure for the exhaust rocker box, noting that the central cylinder head bolts should be tightened to torque specifications before tightening the underside securing nuts.

17. Turn the engine over several times to make sure the valves are operating properly, then reinstall the torque stays and secondary ignition coils.

18. Connect the rocker oil feed line, using either new copper washers or annealed, used ones.

19. The remainder of the assembly procedure is a reversal of the disassembly instructions. Adjust valve tappet clearances.



Cylinder head bolt tightening sequence

Clutch

DISASSEMBLY

1. Remove the left exhaust header pipe.

2. Loosen the rear brake adjustment until the pedal drops clear of the primary cover.

3. Remove the left footrest.

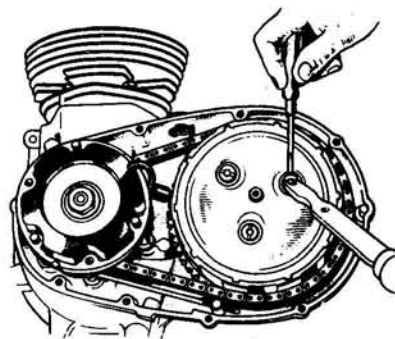
4. Drain the oil from the chaincase, then remove the chain tension adjuster.

5. Remove the ten, recessed cover-securing screws and withdraw the cover and paper gasket.

6. Remove the chain tensioner assembly.

7. The clutch pressure plate is held in place by three, slotted adjuster nuts. To remove these nuts, slide a knife or screwdriver blade under the nut and loosen it with Triumph tool no. D364 (supplied with tool kit) or a suitable substitute.

NOTE: The clutch nuts are fitted with locking tabs which may be sheared off by removal. If so, replace them.



Removing the clutch nuts

8. Remove the clutch springs, cups, and pressure plate assembly.

9. The clutch plates can be removed with the use of two, narrow, hooked tools made of 1/32 in. wire.

INSPECTION

1. If the thickness of the discs is 0.030 in. (0.75 mm), or more, less than specified, they should be replaced.

2. Check the fit of the plate on the shock absorber unit. There should be little radial clearance.

3. Measure the clutch spring length and compare with specifications. If a spring has shortened by 0.10 in. (2.5 mm) or more, replace the set.

ASSEMBLY

1. Install the clutch plates and discs; the innermost position must be occupied by a bonded plate.

2. Install the cups, pressure plate, springs, and slotted adjuster nuts.

3. True the clutch pressure plate by first tightening the pressure-plate, slotted adjuster nuts until they are even with the clutch pins, and then by kicking the engine over and observing the rotation of the plate, and then making any necessary adjustment until the plate turns evenly. If the plate wobbles even slightly, it must be corrected.

Primary Drive and Clutch Hub

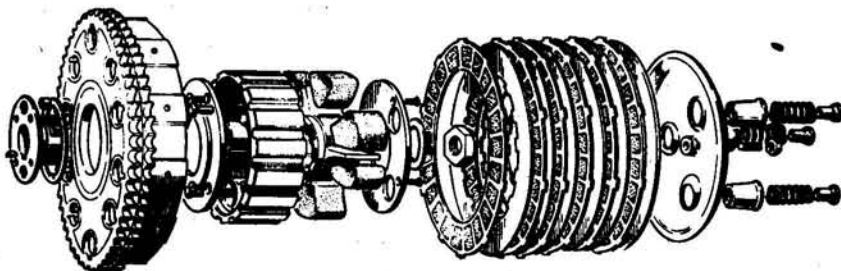
DISASSEMBLY

1. Remove the primary cover as previously described.

2. Remove the clutch assembly as previously described.

3. Disconnect the alternator stator leads at their snap connectors under the engine.

4. Remove the three stator securing nuts and withdraw the stator from over its mounting studs. Unscrew the sleeve nut



Clutch assembly

and then the lead can easily be removed.

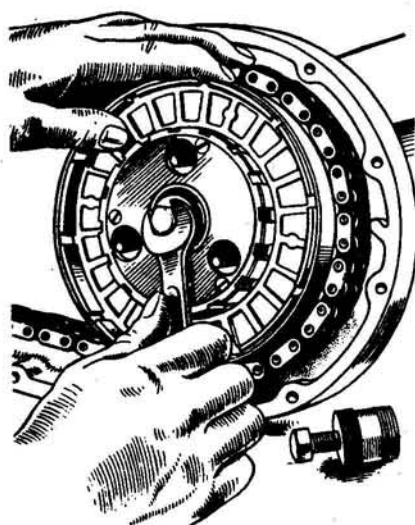
5. Remove the rotor.

6. Remove the rotor key and distance piece.

7. Remove the clutch hub securing nut and cup.

NOTE: Machines prior to serial no. H49833 have a tab washer and a different cup washer, rather than the self-locking securing nut.

8. Screw the body of extractor no. Z13 into the clutch hub until it bottoms, then tighten the center bolt until the hub is released.



Removing the clutch housing

9. Assemble extractor no. Z151 and D662/3 on the engine sprocket and tighten its center bolt until the engine sprocket is released.

10. Withdraw the engine sprocket, clutch hub, and primary chain together.

11. Remove the transmission mainshaft key and check the oil seal for leakage.

INSPECTION

1. Inspect the clutch shock absorber for worn rubbers or punctures. They can be removed by prying them out, small rubbers first. Replace as necessary. When reassembling, apply thread-locking compound to the cover plate securing screws.

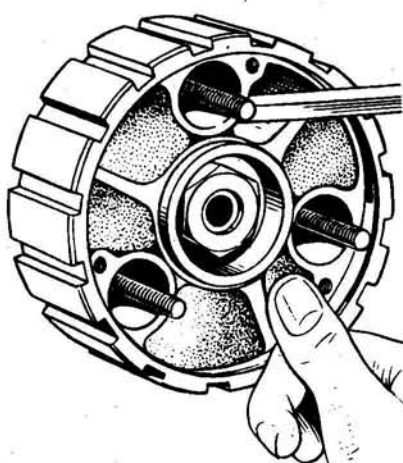
2. First thoroughly clean the primary chain then check it for wear by scribing two marks on a flat surface 12 in. apart, and centering two pivot pins at the scribe marks. Fully compressed, the chain link pivot should line up with the marks; fully stretched, it should not extend more than 1/4 in. beyond the marks.

3. Check the fit between the shock absorber spider and the clutch hub splines. The spider should be a push fit on the clutch hub, with no radial movement.

4. Check the fit of the engine sprocket on the crankshaft in the same manner. There should be no radial movement.

5. Check the clutch hub bearing diameter, rollers, and clutch sprocket bearing. Replace any bearing rollers that are pitted or worn. See specifications.

6. Make sure the shock absorber spider is a good fit in the inner and outer



Installing clutch hub rubbers

retaining plates, and that the arms have not excessively scored the inner surface of the retaining plates.

ASSEMBLY

1. Grease the clutch hub and install the thrust washer and twenty of the correct rollers. Do not use 1/4 in. x 1/4 in. rollers!

2. Position the hub and press the shock absorber, complete with the three threaded pins, on the hub.

3. Install a new tapered distance collar behind the engine sprocket, with the taper toward the crankshaft main bearing and oil seal.

4. Install the transmission mainshaft key and tap the clutch hub onto its taper.

5. Lubricate the primary chain and lay it over the clutch sprocket.

6. Wrap the chain around the engine sprocket, then position the sprocket on the crankshaft.

7. Place clutch locking tool Z13 in the clutch plate housing, then install the cup washer and self-locking nut. Torque the nut to specifications.

NOTE: On machines before serial no. H49833, install the tab washer with the long tab in the hole in the shock absorber spider, install the securing nut and bend a tab to lock the nut.

8. Install the alternator rotor, making sure that the key or locating peg is correctly positioned.

9. Install the alternator stator. Put a 0.008 in. (0.2 mm) feeler gauge between each stator pole and the rotor. Turn over the engine to make sure that the rotor and stator do not touch.

Transmission Countershaft Sprocket

REMOVAL AND INSTALLATION

1. Disassemble the clutch and primary drive as previously described. Remove the sprocket cover.

2. Bend back the tab washer and, while holding the rear brake, remove the sprocket securing nut.

3. Slide off the final drive chain and remove the countershaft sprocket.

4. Make sure the oil seal is in good condition, then lubricate the ground boss

of the new sprocket and position it on the transmission mainshaft.

5. Replace the tab washer, screw on the securing nut finger-tight, then, with the chain in place, tighten the nut to torque specifications.

6. Oil the bushing that protrudes from the mainshaft high gear and install the sprocket cover with a new paper gasket.

7. The remainder of installation is a reversal of the removal procedure.

Clutch and Shifter Operating Mechanisms

DISASSEMBLY

1. Remove the right exhaust header pipe and footrest.

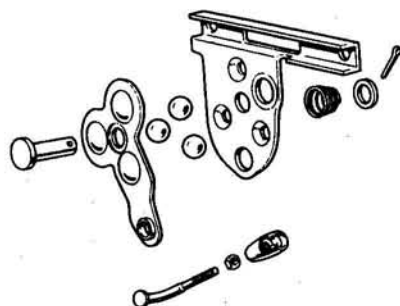
2. Drain the gearbox oil.

3. Disconnect the clutch cable from the actuating lever.

4. Remove the two nuts and four recessed screws that secure the gearbox outer cover. Remove the kick-starter.

5. Hold the gearshift lever in one hand, then tap the cover with a soft-faced mallet until it is free to be removed.

6. Unscrew the two nuts inside the gearbox outer cover and remove the shifter return springs complete with the thrust buttons and distance pieces.



Clutch operating mechanism

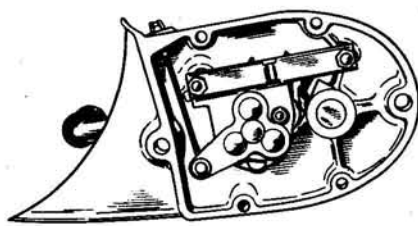
7. Unscrew the countersunk screw that secures the clutch operating mechanism and withdraw the assembly.

8. Remove the shifter lever pinch bolt, remove the lever, and then withdraw the shaft from the cover.

9. Remove the cotter pin from the clutch operating shaft. This will release the clutch operating balls.

10. Remove the two cotter pins and disconnect the plungers and springs from the shifter quadrant.

11. If the shifter spindle bushing requires replacement, heat the outer cover to 100° C and drive it out with a suitable, shouldered drift. Drive in the new bushing before the cover has a chance to cool.



Clutch mechanism installed

NOTE: A drift for removing and installing the shifter spindle bushing can be made from a piece of $\frac{3}{4}$ in. diameter bar. Machine the bar to a diameter of $\frac{5}{8}$ in. and cut a length of $\frac{3}{4}$ in.

ASSEMBLY

1. Install the shifter quadrant springs, plungers, and securing cotter pins, then install a new O-ring on the spindle.
2. Lubricate the spindle and O-ring with oil, then insert the spindle in the cover.
3. Assemble the clutch-operating mechanism balls in their recesses and install the shaft and clutch lever in the order shown in the accompanying illustration. Don't forget to install the spring and washer before replacing the cotter pin.



Shifter mechanism

4. Install the distance collar on the end of the shifter quadrant shaft, then install the clutch operating mechanism in the cover and secure it in place with the countersunk screw.
5. Install the distance pieces over the studs, then connect the shifter return springs and thrust buttons. Install the return spring cover plate and tighten the securing nuts.
6. Install the gearbox outer cover with sealant, tighten the securing screws, and install the kick-start lever.
7. Refill the transmission with oil.

Gearbox and Kick-Start Mechanism

DISASSEMBLY

1. Disassemble the primary drive and clutch as previously described. Remove the transmission mainshaft nut and key.
2. Remove the gearbox outer cover, noting that the gearbox should first be positioned in fourth gear.
3. Remove the two inner gearbox cover retaining screws, then remove the

entire gearbox assembly by tapping the clutch end of the mainshaft with a mallet.

4. Remove the camplate cotter pin, then withdraw the camplate spindle.

5. Pry off the kick-starter return spring and remove the distance piece. Withdraw the kick-starter spindle.

6. Remove the camplate index plunger and place it aside.

7. Remove the selector fork spindle and disengage the selector forks from the camplate.

8. Remove the layshaft and kick-starter pawl, plunger, and spring.

9. Drive the mainshaft assembly out of the bearing with a soft-faced mallet.

10. Remove the countershaft sprocket as previously described, then drive the mainshaft high gear into the gearbox with a soft metal drift and hammer.

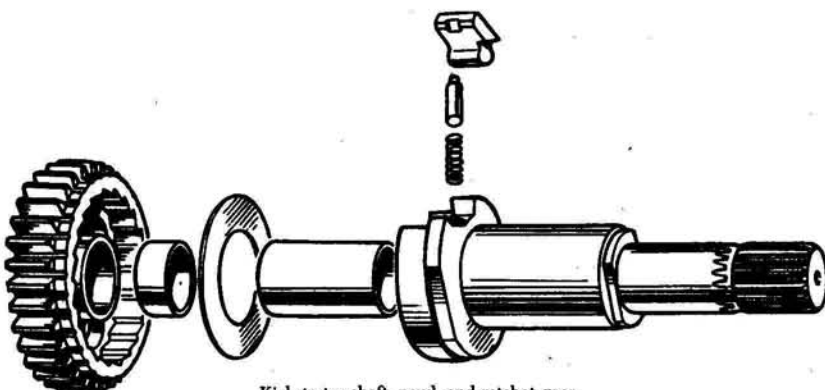
11. To remove the mainshaft right bearing, heat the cover to 100°C and drive it out with a suitable, shouldered drift. Install the new bearing while the cover is still hot. Replace the securing circlip.

12. To remove the high gear bearing on the left side of the machine, pry out the oil seal and remove the retaining circlip. Heat the case around the bearing to 100°C , then drive it out with a suitable, shouldered drift. Install the new bearing while the case is still hot. Replace the oil seal with the lip and spring toward the bearing, then replace the retaining circlip.

13. If it is necessary to replace the mainshaft high gear bushing, press it out with a drift measuring $5.0 \times \frac{3}{8}$ in., having $\frac{3}{4}$ in. of one end machined to $\frac{13}{16}$ in. diameter. Install the new bushing with the same drift, making certain the bushing oil groove is at the gear teeth end. The bushing should then be reamed to the size given in specifications.

14. The layshaft right needle roller bearing can be removed by heating the kick-starter spindle to 100°C and tapping it off with a block of wood.

15. The layshaft left needle roller bearing is of the closed-end type and can be removed through the countershaft sprocket cover plate aperture. Heat the case to 100°C and drive the bearing into the gearbox with a suitable drift. Install the new bearing while the case is still hot. A special drift, for which dimensions are given in the accompanying illustration, must be used to install the new bearing.



Kickstarter shaft, pawl, and ratchet gear

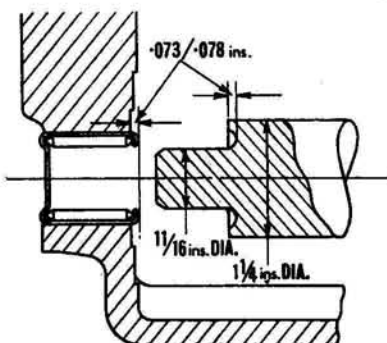
ASSEMBLY

1. If all replacement bearings have been installed with new seals and circlips, install the layshaft thrust washer over the needle roller cage, and hold it in position with a dab of grease.

2. Lubricate the mainshaft and layshaft captive gears, then assemble the mainshaft in the inner gearbox cover.

3. Install the plunger, spring, and pawl on the kick-starter spindle, then insert the assembly in the inner gearbox cover and slide the layshaft assembly into the kick-starter bearing. Remember to install the mainshaft distance piece between the mainshaft assembly and the main bearing in the inner cover.

4. Position the selector forks on the shafts as shown in the accompanying illustration and insert the selector fork spindle to hold them in position.



5. Assemble the camplate in the outer cover and locate the selector fork rollers in their camplate tracks.

6. Install the camplate spindle and secure it with a new cotter pin. Install the camplate index plunger and spring.

7. Operate the selector forks manually to make sure that each selector fork is on its appropriate shaft. When the camplate is moved to its full extent, both selector rollers should move to the full extent of the camplate grooves in both directions. If not, the selector forks will have to be disengaged and reversed.

8. Install the distance piece over the kick-starter shaft, then secure the end of the return spring with its retaining screw.

NOTE: Use a screwdriver to tension the return spring before connecting it and installing the return spring plate.

9. The remainder of the assembly procedure is a reversal of the disassembly instructions.

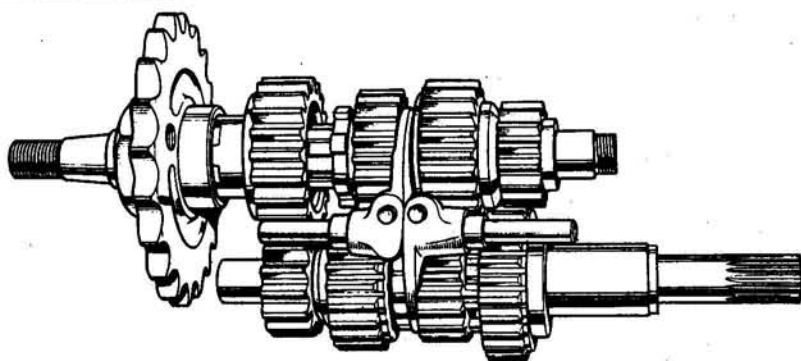
Bottom End

CAMSHAFT SERVICE (ENGINE INSTALLED)

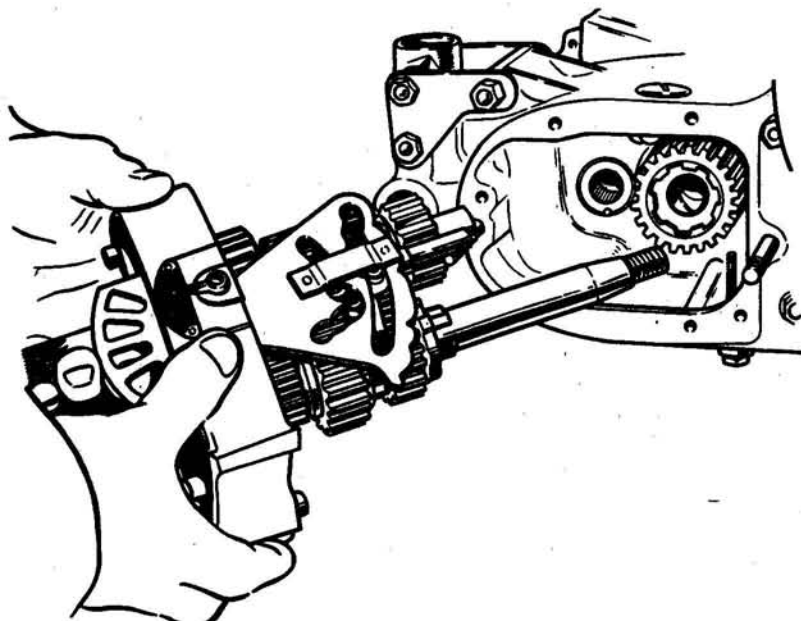
It is not necessary to separate the crankcase halves in order to replace the camshafts.

Removal and Installation

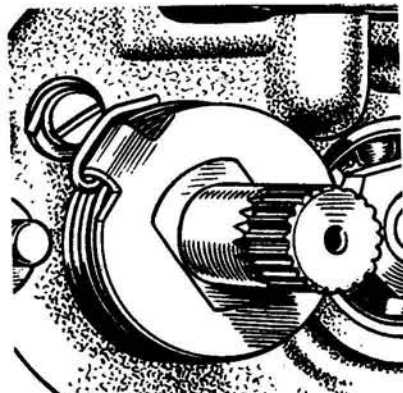
1. Remove the rocker boxes.
2. Remove the timing cover.
3. Remove the oil pump (see "Lubrication Systems"), and temporarily block the crankcase holes to prevent oil spillage. Make sure you remember to open these holes before reinstalling the oil pump.



Gear cluster and shift forks



Installing the gearbox components



Kickstarter return spring installed

4. Extract the intake and exhaust camwheels. The camshaft retaining plates can now be seen.

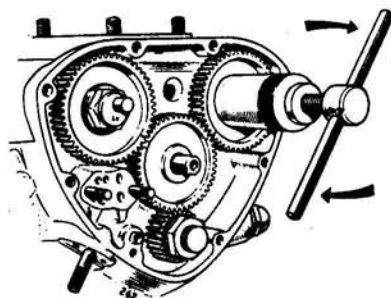
5. Carefully pull the camshafts out the right side of the machine. Make sure the breather disc and spring, located behind the intake cam, do not fall into the crankcase. Also, lean the machine to the left when removing the cams so that the cam followers do not fall into the crankcase.

6. Assemble the rotary breather valve and spring to the new intake camshaft, then install both cams, making certain

that the slot in the end of the intake cam fully engages the dog on the breather valve.

7. Reinstall the camshaft retainer plates and secure them in place with new screws.

8. The remainder of the assembly procedure is a reversal of the removal instructions.



Removing a camshaft gear

CRANKCASE

Disassembly

1. Remove the primary chaincase cover and disconnect the alternator leads under the engine.

2. Remove the three screws that secure the alternator stator, and pull the stator off its mounting studs. Do not disconnect the leads at this time.

3. Disassemble the clutch and primary drive as previously described. Remove the stator sleeve and withdraw the stator leads.

4. Remove the gearbox outer cover and dismantle the gearbox.

5. Remove the rocker boxes, cylinder head, cylinder barrel, and pistons.

6. Disconnect the clutch cable and remove the carburetor(s).

7. Remove the contact breaker cover and the oil pump, then remove the crankshaft pinion. The camshaft pinions can also be removed at this time.

NOTE: The crankshaft pinion nut has a right-hand thread, but the camshaft nuts are left-hand threads.

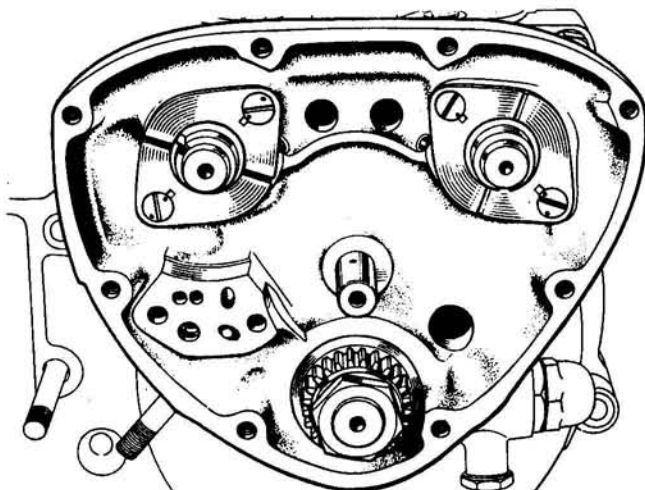
8. Remove what's left of the engine from the frame.

9. Clamp the crankcase firmly in a vise at the bottom mounting lug and remove the bolt and two screws at the cylinder base.

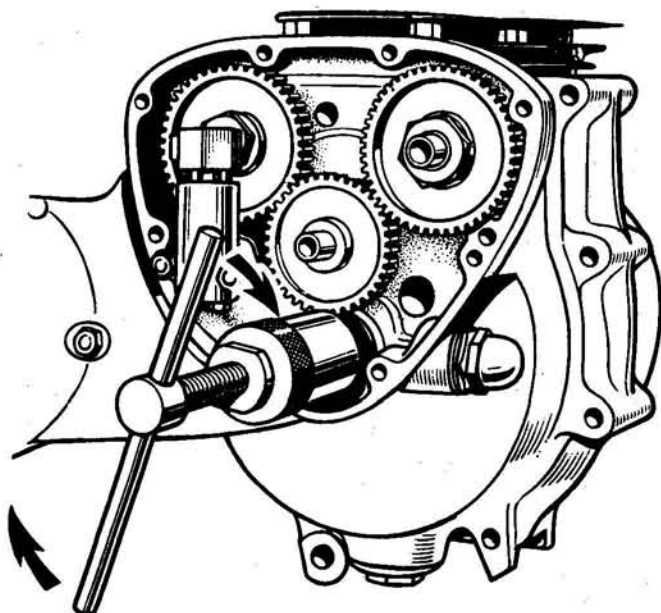
10. Remove the stud at the front of the engine and the two nuts next to the gearbox housing.

11. Attach Triumph extractor no. Z151 and separate the cases.

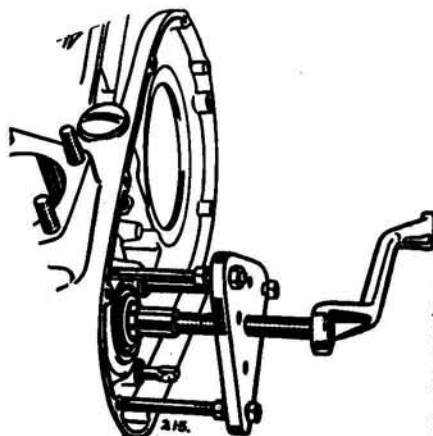
12. After the cases are apart, remove the crankshaft assembly. Remove the



Camwheels removed, revealing camshaft retaining plates



Removing the crankshaft pinion



Separating the case halves with tool no. Z151

breather valve from within the intake camshaft bushing in the left case.

Crankshaft and Connecting Rods

DISASSEMBLY

1. Clamp the crankshaft assembly in a soft-jawed vise and place a rag over any sharp edges to protect the connecting rods.

2. Unscrew the cap retainer nuts a little at a time to avoid distortion, then remove the caps and connecting rods.

NOTE: The connecting rods, caps and nut are center-punched to facilitate reassembly.

3. Using a large impact driver, unscrew the oil tube retainer plug from the right end of the big-end journal. If necessary, drill a hole $\frac{1}{8}$ in. deep and $\frac{1}{8}$ in. in diameter to eliminate the locking effect of the plug center punch.

4. Remove the flywheel bolt next to the big-end journal, then pull out the oil tube with a hooked piece of stiff wire through the flywheel bolt location hole.

5. Thoroughly clean all parts in solvent, then blow them dry with com-

pressed air. Make sure the oil drillways are blown clear.

6. To remove the flywheel, unscrew the two remaining bolts and press the crankshaft out of the right side plain bearing with a five ton press.

NOTE: Before removing the flywheel, make certain it is marked for reassembly.

INSPECTION

Inspect the big-end journals for any signs of scoring, etc., and measure the journal diameter. Compare with specifications. Light score marks can be removed with fine grade emery cloth, but make sure all metal filings are removed before reassembly. If the scoring is light, new connecting rod shell bearings should be installed; if the scoring is extensive, the journals should be reground to an appropriate undersize.

NOTE: The replaceable big-end bearing shells are pre-sized to give the correct dimensions. Under no circumstances should they be scraped, or the connecting rod and cap filed to alter the bearing dimensions.

ASSEMBLY

1. Position the oil tube in the crankshaft, aligning the flywheel bolt holes with those in the crankshaft. Temporarily install one of the flywheel bolts to secure it in position.

2. Apply thread-locking sealant to the oil tube plug and install it in the crankshaft. Center-punch the crankshaft opposite the slot to lock the plug in position.

3. Heat the flywheel to 100° C, then position it over the crankshaft with the center punch mark to the right. Turn the flywheel through 180° to get it over the crankshaft web, then turn it to the correct position relative to the crankshaft and align the bolt holes.

4. Coat the flywheel bolt threads with a thread-locking sealant, then install and torque them to specifications.

5. If a new or reground crankshaft, or a new flywheel was installed, the assembly should be rebalanced.

6. Check to make sure all the oil drillways are free from obstruction, then install the connecting rods and caps. Torque the retaining nuts to 27 ft lbs.

7. Last, force oil through the crankshaft, right main-bearing journal drillway until it is expelled at both big-end bearings. This will provide assurance that the drillway is free from obstruction.

Camshaft Bushings

The intake and exhaust camshafts run in bronze bushings in the left case and are butted directly into the right case. To remove the bushings in the left case, a tap will be necessary. The ideal size is $\frac{7}{8}$ in. diameter x 9 whitworth.

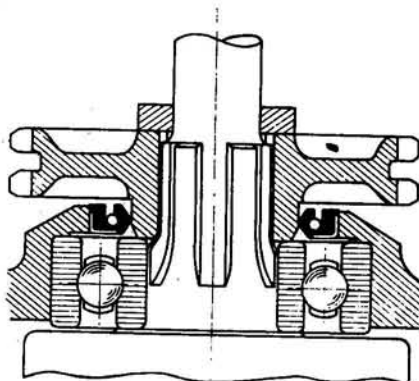
When a good thread has been cut in the bushing, heat the case to 100° C and screw in the appropriate bolt. Grip the bolt in a vise and tap the case with a soft-faced mallet until the bushing is free. The replacement bushings are pre-sized but will require a light reaming to meet specifications. After reaming the new bushings, make sure the crankcase is thoroughly cleaned to remove any metal filings.

Main Bearings

To remove the left main bearing heat the case to 100° C and drive it out with tool no. Z14. The right main bearing prior to H65573 is a bronze bushing, and is removed by first removing the lock plate, heating the case to 100° C, then driving it out with a suitable, shouldered drift. It is advisable to replace the left bearing oil seal while the engine is apart, even if it appears to be in good condition. This is installed with the open face outwards.

To install the left bearing, first make sure that its housing is clean, then heat the case to 100° C and drive the bearing into position with a tubular drift the same size as the bearing outer race. A suitable size would be $2\frac{3}{4}$ in. diameter x 6 in. long.

To install the right bronze bushing, heat the case to 100° C and then press the bushing into position. Let the case cool, then line-ream the bushing to specifications. Tool no. Z134 is available for this purpose. To use it, the case halves must be assembled and the reamer inserted through the right main bearing, with the



Left main bearing oil seal installation

pilot end located in the left main bearing. Reamer Z134 is also available in 0.010, 0.020, and 0.030 undersizes.

After H65573 the right bearing is the ball-type and is removed and installed in the same manner as the left bearing.

After both bearings have been installed, press the oil seal into the left case, open face outwards.

Assembly

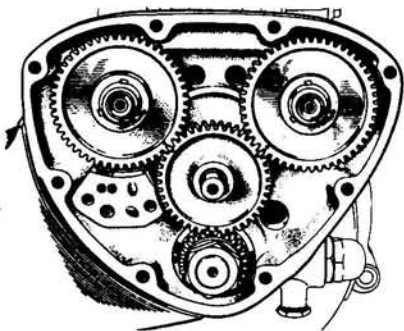
1. Thoroughly clean the mating crankcase halves, giving special attention to the locating dowels.

2. Position the left case on two wooden blocks, lubricate the main bearing and camshaft bushings and then install the breather valve and spring in the intake cam bushing. Assemble both camshafts, making sure the intake cam slot engages the breather valve dog.

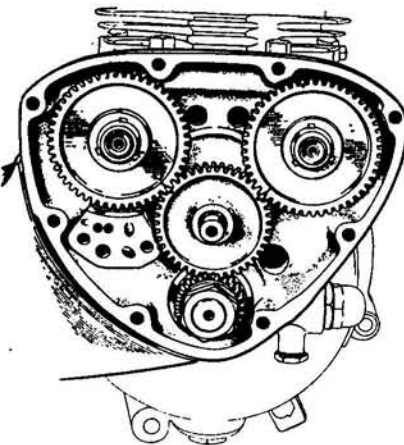
3. Carefully install the crankshaft assembly, making sure the fit in the bearing is good.

4. Apply fresh joining compound to the mating surfaces, then position the connecting rods in the center and lower the right case over the crankshaft. When the halves are mated, check to make sure the crankshaft and camshafts are not binding. The crankshaft should rotate freely, while the camshafts should offer only slight resistance.

5. The remainder of the assembly procedure is a reversal of the disassembly instructions. Make sure all timing pinions are correctly located.



Timing marks (T100C)



Timing marks (T100R)

650 AND 750 TWINS

Engine Removal and Installation

TR6R, TR6C, AND T120R

1. Turn off the fuel petcock, then disconnect and plug the fuel lines.

2. Remove the three securing bolts and the fuel tank.

3. Remove the main fuse from its holder, then disconnect the right and left ignition coil leads.

4. Remove the securing bolts and the two ignition coils. Disconnect the oil pressure switch on the timing cover.

5. Remove the attaching nuts and bolts, then remove the front and rear torque stays from the cylinder head.

6. Disconnect the tachometer drive cable from the right-angle gearbox at the front of the engine.

7. Disconnect the throttle cable at the carburetor(s).

8. On single carburetor engines, remove the air cleaner.

9. Remove the carburetor(s).

10. Disconnect the rocker oil feed line, taking care not to bend it excessively.

11. Drain the engine sump, oil tank, and transmission.

12. Disconnect all lines from the oil tank.

13. Back off the clutch adjustment at the handlebar until there is plenty of slack, then disconnect the cable at the operating arm on the right side of the engine.

14. Remove the exhaust headers and mufflers.

15. Disconnect the final drive-chain master link and remove the chain.

16. Disconnect the two generator leads at the bottom of the engine.

17. Remove the front chainguard securing bolt and loosen the rear mounting bolt. Pull the chainguard back several inches to get it out of the way.

18. Remove the four bolts and one nut securing the left and right rear engine-mounting plates. Remove the plates.

19. Remove the nuts and washers from one side of the front upper and lower mounting plates.

20. Remove both right-side rocker boxes.

21. Remove the left lower bolts securing the rear frame to the front frame.

22. Pull out the front upper and lower mounting studs, then lift the engine out the left side of the frame. A helper at this point will greatly reduce the possibility of dropping the engine.

Installation is basically a reversal of the removal procedure. To make sure the wiring harness is properly connected, refer to the appropriate wiring diagram.

TR7V, T140V

1. Shut off the fuel taps, and disconnect the fuel lines. Remove the rubber cap from the top, center, of the gas tank, and remove the sleeve nut below. Take the tank off the frame.

2. Detach the torque stay from the

engine by removing the two nuts securing the stay to the cylinder head and removing the bolt and nut from the frame.

3. Disconnect the tachometer cable at the engine.

4. Remove the header pipes and mufflers.

5. Disconnect the oil pressure switch at the timing cover, the clutch cable at the engine, the contact breaker, coil, and alternator leads.

6. Remove the carburetor(s) from the manifold(s) and pull away from the air cleaner.

7. Drain the oil from the frame backbone oil reservoir by means of the drain plug at the very bottom of the reservoir.

8. Disconnect the oil feed line from the bottom of the reservoir, and the oil return line at the top. Disconnect the rocker feed line at the top of the reservoir.

9. Drain the oil from the gearbox and the primary chaincase. Drain the crankcase sump.

10. Disconnect the crankcase breather hoses at the left, rear of the crankcase by loosening the hose clamp screws.

11. Remove the chainguard by removing the securing bolt and loosening the left side bottom shock absorber bolt. Pull the chainguard out of the back of the bike.

12. Remove the drive chain masterlink and disengage the chain from the gearbox sprocket.

13. Remove both footpegs.

14. Remove the two rear engine mounting plates each of which are secured by five nuts and bolts. Remove the bottom and front engine mounting studs. Note the location of the spacers. For both studs, the wide spacer is installed on the right side of the motorcycle.

15. Remove the engine from the left side of the frame.

Installation is essentially the reverse of the removal procedure. Refer to the wiring diagrams in the "Electrical Systems" section to insure that all connections are correct. Refer to "Tune-Up and Maintenance" for the proper grades and quantities of oil.

TOP END

Removal

650 TWINS

1. Remove the fuel tank.

2. Disconnect the battery terminal leads.

3. Disconnect and remove the secondary ignition coils, taking care not to damage the alloy cases.

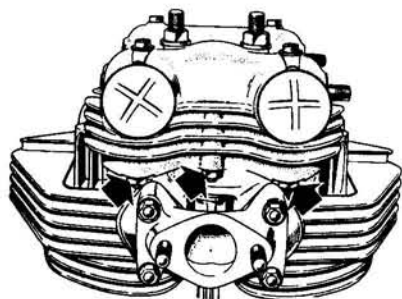
4. Remove the front and rear torque stays.

5. Disconnect the rocker oil feed line, taking care not to bend it excessively.

6. Remove the rocker inspection caps.

7. Remove the three nuts from the securing studs on the underside of the exhaust rocker box.

8. Remove the exhaust rocker box



Exhaust rocker box securing nuts (650, 750 Twin)

outer securing bolts and the central cylinder-head bolts.

9. Remove the intake rocker box in the same manner, noting that the outer securing bolts may have to be loosened only a little at a time because of clearance difficulties.

10. Make sure to collect the six plain washers that fit underneath the securing nuts. They often stick to the cylinder-head flanges.

11. Withdraw and lay out the pushrods so that they can be installed in their original position.

12. Remove the carburetor(s) and the intake manifold.

13. Remove the exhaust header pipes.

14. Loosen the cylinder head nuts, a little at a time, in a cross pattern. Lift off the cylinder head.

15. Remove the pushrod cover tubes and rubber O-ring seals.

16. Check the tappet guide blocks for sharp edges that could cut into the pushrod O-ring seals. Smooth out any of these sharp edges or rough areas with a fine grade emery cloth.

17. Remove the copper cylinder-head gasket.

18. Wedge a piece of rubber between the intake and exhaust tappets to prevent them from falling into the crankcase when the cylinder is removed.

19. Rotate the engine until both pistons are at top dead center, then remove the cylinder block attaching nuts at the base of the block.

20. Carefully lift up the cylinder block and, as soon as there is enough room, stuff some clean lint-free rags into the crankcase openings. At this time it is also advisable to fit rubber protectors (or a suitable substitute) over the cylinder base studs.

21. Remove the cylinder base gasket and make sure the two locating dowels are in position on the crankcase.

22. Remove the tappets from the cylinder block and mark them for reassembly.

23. Invert the cylinder head on a bench, remove the locking bolts, then drive out the tappet guide blocks with a suitable drift. Make sure the intake and exhaust guide blocks are marked for reassembly, as the exhaust block has drilled oilways and the intake block does not.

TR7V, T140V

1. Remove the fuel tank after shutting off the petcocks and disconnecting the fuel lines. Remove the carburetor(s) from the head.

2. Disconnect the wires from the battery terminals. Remove the exhaust pipes and mufflers.

3. Disconnect the rocker feed line by removing the domed nut on each rocker spindle.

4. Remove the torque stay by removing the nut at each rocker box. Remove the torque stay bolt and nut on the frame.

5. Remove the rocker box inspection covers. Also remove the three nuts from the studs beneath each rocker box. Account for the washer on each of the studs.

6. Remove the securing bolts on the opposite side of each rocker box, and finally the two larger securing nuts on top. Remove the rocker boxes from the head.

7. Remove the pushrods and place them in a safe place.

8. There are ten cylinder head nuts and bolts. Loosen each one a single turn at a time until they can be turned easily, then remove them. Lift off the cylinder head.

9. New O-rings must be used on the ends of the pushrod cover tubes. New rocker box gaskets should also be used. Be sure that the rocker box mating surfaces are in good condition before refitting.

Rocker Boxes

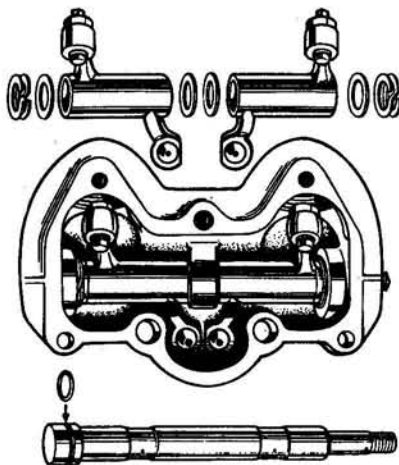
DISASSEMBLY

1. Carefully drive out the rocker spindle, using a soft metal drift.

2. Remove the rocker arms and washers.

3. Remove the rocker oil seals.

4. If the rocker ball pins require replacement, drive them out with a suitable drift, then press in the new ones with the drilled flat toward the rocker spindle.



Rocker box assembly (650, 750 Twin)

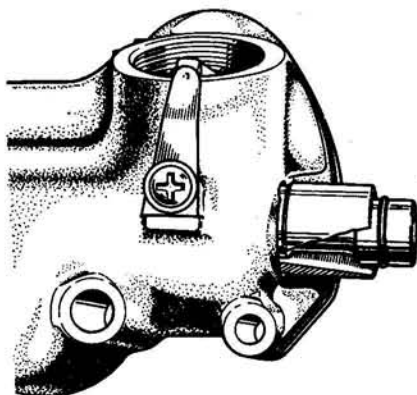
ASSEMBLY

1. Assemble the rocker boxes using Triumph seal compressor D2221 and a 7/16 x 6 in. bolt with one end ground to a taper.

2. Apply grease to two of the plain washers and position them on either side of the center spindle bearing boss.

3. Position the left rocker arm and insert the alignment bolt, then install the outer plain and spring washers.

4. Position the right rocker arm in the



Installing the rocker arm spindle

same manner.

5. Install a new oil seal on the spindle, then coat the whole spindle with oil.

6. Slide the spindle into seal compressor no. D2221 (or a suitable replacement) and through the rocker box, pushing the alignment bolt out the other end. The final positioning of the spindle may require a few taps with a hammer and soft metal drift.

Valves and Valve Springs

REMOVAL

1. Compress the valve springs with the spring compressor and remove the split retainers with a narrow, straight-slot screwdriver.

2. Remove each valve and spring, making certain they are marked and matched for reassembly.

NOTE: The intake and exhaust valves are marked "IN" and "EX," respectively.

INSTALLATION

1. Assemble the inner and outer springs with the top and bottom cups over the valve guide.

2. Lubricate the valve stem with a little graphite oil, then slide the valve into position.

3. Compress the spring and install the two retainer halves in the exposed groove of the valve stem.

Valve Guides

Triumph engines are equipped with replaceable bronze valve guides. To remove an old guide, use Triumph special tool 61-6013 or fabricate one to the dimensions given. This is a mild steel bar about 5 in. long and 0.5 in. diameter with a 1 in. section at one end machined to 5/16 in. When installing the new guide, first lightly grease the guide then press or drive it into place, using the special tool. When new valve guides have been installed, it will be necessary to recut the valve seats and grind in the valves.

NOTE: The intake and exhaust valve guides are almost identical in appearance, except in length. The shorter guides are for the intake valves and the longer guides are for the exhaust valves.

Tappets and Guide Blocks

The only noticeable tappet wear is in the center of the Stellite tip. An indentation greater than $\frac{3}{32}$ in. indicates that the tappet should be replaced.

It is not necessary to remove the guide blocks to check wear. Simply rock the tappets in their respective guide block bores and note the amount of lateral free-play; there should be little or no movement.

Cylinder Barrel

If there is a difference of 0.13 mm (0.005 in.) between any of the bore measurements, the cylinder should be re-bored.

Pistons

1. Make sure the crankcase opening edges are covered with lint-free rags to protect the aluminum alloy connecting rod from being damaged.

2. Remove the inner and outer piston pin retaining circlips, then attach a piston pin removal tool and press out the pin.

3. Lay out and mark the pistons, pins, and retaining circlips for reassembly.

4. Remove the piston rings one at a time by lifting an end of the ring out of its groove and holding a thin piece of metal between it and the piston. Slide the piece of metal around the circumference of the piston while at the same time gently lifting the raised part of the ring upwards.

5. Replacement pistons (650) are available in three or four oversizes. These sizes and the corresponding recommended cylinder bore sizes are given in a chart at the end of this section.

TR7V and T140V pistons are available in four oversizes in increments of 0.010 in. Also note that the cylinders and pistons for these models are paired up according to a three-step grading system when the engine is assembled at the factory. There are three sizes "L" (Low), "M" (Medium), and "H" (High).

Refer to the accompanying illustrations for cylinder bore and piston skirt measurement points. Then refer to the "Suitable Re-bore Sizes" chart at the end of this section.

6. Install the piston rings one at a time over the top of the piston. Note that the two compression rings are marked "TOP" to ensure correct assembly position. This mark must face upwards when the rings are fitted.

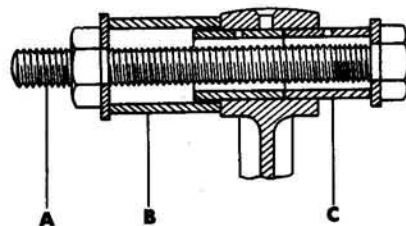
7. Position the piston on the connecting rod.

8. Install one new retaining circlip as a stop, then press the piston pin into position and install another new circlip on the other side.

NOTE: If there is no alternative and the piston pin must be driven into its bore, it is advisable to heat the piston to 100° C prior to assembly.

Piston Pin and Small End Bushing

Inspect the piston pin for center "step wear," scoring, or burring, then slide it into the small-end connecting rod bushing, and make certain that there is no lateral free-play. If there is, replace the bushing in the following manner:

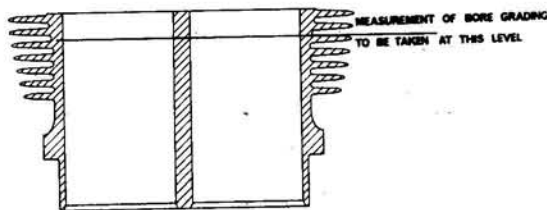


Piston pin bushing replacement: A, bolt; B, tubing collar; C, new bushing

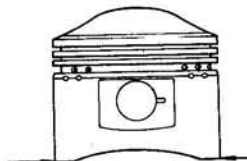
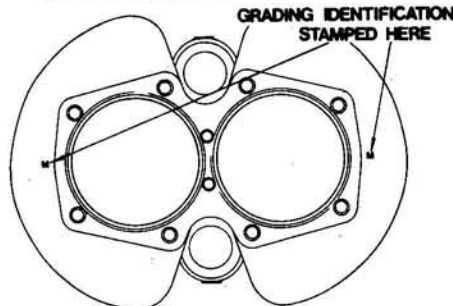
1. Find a threaded bolt approximately 4 in. in length and a piece of tubing $1\frac{1}{4}$ in. long with an inside diameter of $\frac{7}{8}$ in.
2. Place a suitable washer and the new bushing on the bolt, then insert the end of the bolt through the old bushing.
3. Place the piece of tubing over the end of the bolt and screw the nut on finger-tight.
4. Centralize the new bushing and align the oil drillway with that in the old bushing.
5. Now tighten the nut on the bolt and

ASSEMBLY

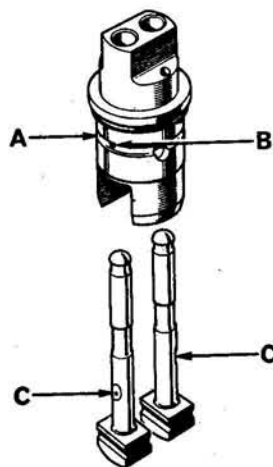
1. Position new guide block O-ring seals at the base of the cylinder block.
2. Lightly grease the outside surface of the exhaust guide block, then carefully align the guide block and cylinder locating holes and drive the block into position with Triumph special tool no. 61-6008 or a suitable drift.
3. Repeat the above step for the intake guide block, then install the locking bolts.
4. After installing the guide blocks, make sure that the exhaust guide block oil drillways are free from obstruction.
5. Install the tappets in the guide blocks as shown in the accompanying illustration, after thoroughly lubricating



MEASUREMENT OF BORE GRADING TO BE TAKEN AT THIS LEVEL



750 Twin piston and cylinder wear measurement points and cylinder grading marks



Tappet and guide block (A) oil passage (B, C) alignment

them with oil. Wedge them into position.

6. Install the cylinder base gasket, making certain that the gasket does not obscure the oil feed drillway in the crankcase.

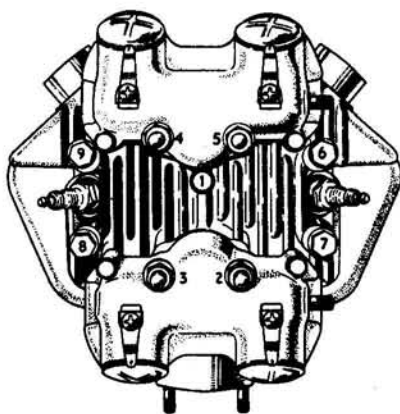
7. Fit ring compressors over the pistons, then carefully slide the cylinder down over the pistons. Remove the ring compressors as soon as the rings are positioned within the cylinder. Continue lowering the cylinder block and then remove the rags in the crankcase openings as late as possible.

8. Install the cylinder base attaching nuts.

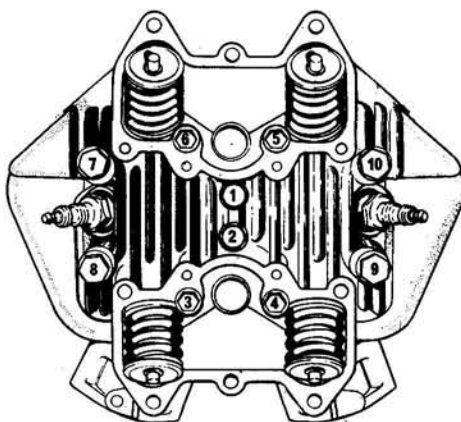
9. Replace or anneal the cylinder head gasket.

10. Clean the mating cylinder head and cylinder surfaces, then grease the gasket and position it on the cylinder.

11. Coat the tappet guide blocks with grease and position the pushrod cover



Cylinder head bolt tightening order (650)



Cylinder head bolt tightening order (750 Twin)

tubes with new O-ring seals.

12. Position the cylinder head and install the head nuts and bolts finger-tight.

13. Place a small amount of grease in the bottom cup of each pushrod, then locate the intake pushrods in their respective bores. This will have to be done by "feel."

14. When the pushrods are properly positioned, turn the engine over until both intake pushrods are level and at the bottom of their travel.

15. Install the intake rocker box.

16. Repeat the above procedure for the exhaust rocker box, noting that the central cylinder-head bolts should be tightened to torque specifications before tightening the underside securing nuts.

17. Turn the engine over several times to make sure the valves are operating properly, then reinstall the torque stays and secondary ignition coils.

18. Connect the rocker oil feed line, using either new copper washers or annealed, used ones.

19. The remainder of the assembly procedure is a reversal of the disassembly instructions. Adjust valve tappet clearances.

Clutch

Service procedures are basically the same for the 650 and 750cc twins, except that the larger models have a triplex primary drive chain in place of the duplex chain found on the 650.

DISASSEMBLY

1. Remove the left exhaust header pipe.

2. Loosen the rear brake adjustment until the pedal drops clear of the primary cover.

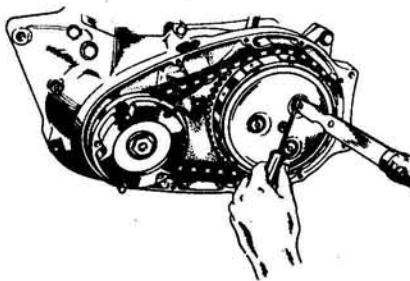
3. Remove the left footrest.

4. Drain the oil from the chaincase, then remove the chain tension adjuster.

5. Remove the ten, recessed, cover-securing screws and withdraw the cover and paper gasket.

6. Remove the chain tensioner assembly.

7. The clutch pressure plate is held in place by three, slotted adjuster nuts. To remove these nuts, slide a knife or screwdriver blade under the nut and loosen it with Triumph tool no. D364 (supplied with tool kit) or a suitable substitute.



Removing the clutch nuts

NOTE: The nuts are fitted with locking tabs which may be sheared off by removal. If so, replace them.

8. Remove the clutch springs, cups, and pressure plate assembly.

9. The clutch plates can be removed with the use of two, narrow, hooked tools made of $\frac{1}{32}$ in. wire.

INSPECTION

1. If the thickness of the discs is 0.030 in. (0.76 mm), or more, less than specified, they should be replaced.

2. Check the fit of the plate on the shock absorber unit. There should be little radial clearance.

3. Measure the clutch spring length and compare with specifications. If a spring has shortened by 0.10 in. (2.5 mm) or more, replace the whole set.

ASSEMBLY

1. Install the clutch plates and discs, keeping in mind that the innermost position must be occupied by a bonded plate.

2. Install the cups, pressure plate, springs, and slotted adjuster nuts.

3. True the clutch pressure plate by first tightening the pressure-plate, slotted

adjuster nuts until they are even with the clutch pins, and then by kicking with engine over and observing the rotation of the plate, and then making any necessary adjustment until the plate turns evenly. If the plate wobbles even slightly, it must be corrected.

Primary Drive and Clutch Hub

DISASSEMBLY

1. Remove the primary cover as previously described.

2. Remove the clutch assembly as previously described.

3. Disconnect the alternator stator leads at their snap connectors under the engine.

4. Remove the three, stator securing nuts and withdraw the stator from over its mounting studs. Unscrew the sleeve nut and then the lead can easily be removed.

5. To remove the rotor, bend back the tab washer, and remove the locknut.

6. Remove the rotor key and distance piece.

7. Remove the clutch hub securing nut and cup.

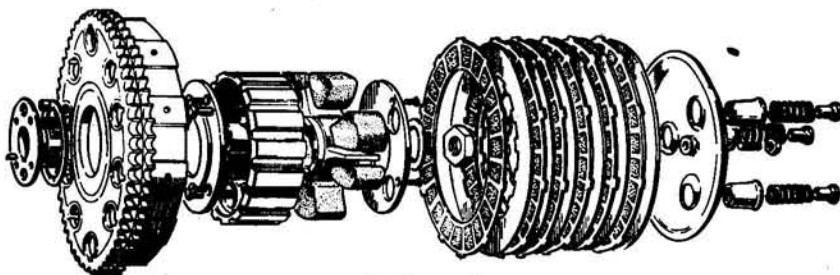
NOTE: Machines prior to serial no. H49833 have a tab washer and a different cup washer, rather than the self-locking securing nut.

8. Screw the body of extractor no. Z13 into the clutch hub until it bottoms, then tighten the center bolt until the hub is released.

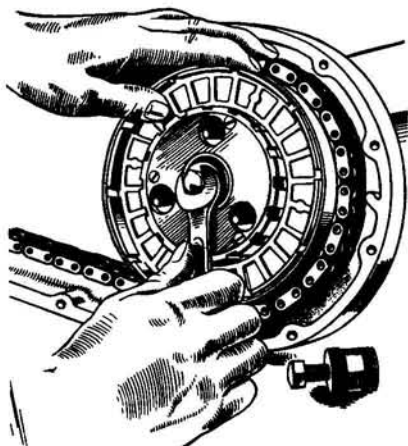
9. Assemble extractor no. Z151 and D662/3 on the engine sprocket and tighten its center bolt until the engine sprocket is released.

10. Withdraw the engine sprocket, clutch hub, and primary chain together.

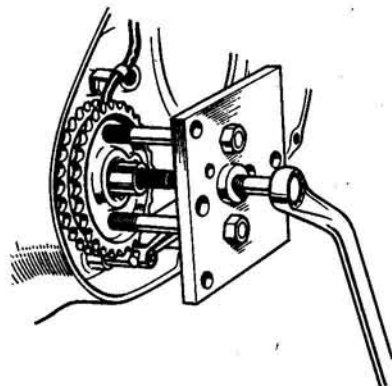
11. Remove the transmission main-



Clutch assembly



Removing the clutch housing



Removing the engine sprocket

shaft key and check the oil seal for leakage.

INSPECTION

1. Inspect the clutch shock absorber for worn rubbers or punctures. They can be removed by prying them out, small rubbers first. Replace as necessary. When reassembling, apply thread-locking compound to the cover-plate securing screws.

2. First thoroughly clean the primary chain then check it for wear by scribing two marks on a flat surface 12 in. apart, and centering two pivot pins at the scribe marks. Fully compressed, the chain link pivot should line up with the marks; fully stretched, it should not extend more than 1/4 in. beyond the marks.

3. Check the fit between the shock absorber spider and the clutch hub splines. The spider should be a push fit on the clutch hub, with no radial movement.

4. Check the fit of the engine sprocket on the crankshaft in the same manner. There should be no radial movement.

5. Check the clutch hub bearing diameter, rollers, and clutch sprocket bearing. Replace any bearing rollers that are pitted or worn. See specifications.

6. Make sure the shock absorber spider is a good fit in the inner and outer retaining plates, and that the arms have not excessively scored the inner surface of the retaining plates.

ASSEMBLY

1. Grease the clutch hub and install

the thrust washer and twenty of the correct rollers. Do not use 1/4 in. x 1/4 in. rollers!

2. Position the hub and press the shock absorber, complete with the three threaded pins, on the hub.

3. Install a new tapered distance collar behind the engine sprocket, with the taper toward the crankshaft main bearing and oil seal.

4. Install the transmission mainshaft key and tap the clutch hub onto its taper.

5. Lubricate the primary chain and lay it over the clutch sprocket.

6. Wrap the chain around the engine sprocket, then position the sprocket on the crankshaft.

7. Place clutch-locking tool Z13 in the clutch plate housing, then install the cup washer and self-locking nut. Torque the nut to specifications.

NOTE: On machines before serial no. H49833, install the tab washer with the long tab in the hole in the shock absorber spider, install the securing nut and bend a tab to lock the nut.

8. Install the alternator rotor, making sure that the key or locating peg is correctly positioned.

9. Install the alternator stator. Put a 0.008 in. (0.2 mm) feeler gauge between each stator pole and the rotor. Turn over the engine to make sure that the rotor and stator do not touch.

10. The remainder of the assembly procedure is a reversal of the disassembly instructions.

Transmission Countershaft Sprocket

REMOVAL AND INSTALLATION

1. Disassemble the clutch and primary drive as previously described. Remove the sprocket cover.

2. Bend back the tab washer and, while holding the rear brake, remove the sprocket securing nut.

3. Slide off the final drive chain and remove the countershaft sprocket.

4. Make sure the oil seal is in good condition, then lubricate the ground boss of the new sprocket and position it on the transmission mainshaft.

5. Replace the tab washer, screw on the securing nut finger-tight, then, with the chain in place, tighten the nut to torque specifications.

6. Oil the bushing that protrudes from the mainshaft high gear and install the sprocket cover with a new paper gasket.

7. The remainder of installation is a reversal of the removal procedure.

Shifter, Kick-Start, and Clutch Operating Mechanisms

DISASSEMBLY

1. Remove the right exhaust header pipe.

2. Remove the right footrest.

3. Loosen the clutch cable adjustment at the handlebar lever, then disconnect the cable end from the operating lever in the gearbox outer cover.

4. Drain the gearbox oil into a suitable container.

5. Put the transmission in high gear.

6. Remove the top and bottom nuts and recessed screws that secure the gearbox outer cover. Depress the kick-start lever slightly and tap the cover lightly until it is free.

7. Loosen the kick-starter cotter pin nut a few turns, then drive out the cotter pin.

8. Slide the lever off the shaft and remove the kick-starter quadrant and spring assembly.

9. Apply the rear brake, bend back the tab washer, and remove the kick-starter ratchet pinion securing nut.

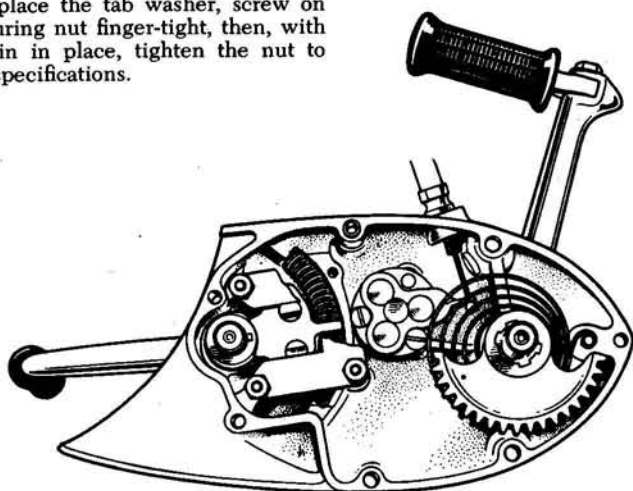
10. Remove the pinion, ratchet, spring, and sleeve.

11. If the kick-starter quadrant is to be replaced, drive out the spindle with a suitable drift and hammer. Install the new spindle so that the kick-starter lever location flat is correctly positioned with respect to the quadrant.

12. Remove the shifter foot pedal from the shaft.

13. Remove the guide plate, plunger quadrant, and curved return springs.

14. Remove the two screws that secure the clutch operating mechanism. Remove the securing cotter pin and disassemble the mechanism.



Gearbox outer cover assembled

INSPECTION

Kick-Starter

Inspect the ratchet teeth for burrs, chips, or rounded edges. Make sure the ratchet spring is in good condition and that the thin-walled steel bushing is a clearance fit in the kick-start pinion. Examine the kick-starter stop peg to make certain it is firmly pressed into the inner cover and is not distorted in any way.

If it is necessary to replace the kick-start spindle bushing, heat the cover to 100° C, then drive out the bushing with a suitable, shouldered drift. Drive in the new bushing while the cover is still hot.

Shifter

If the shifter spindle bushing requires replacement (outer cover), heat the cover surrounding the bushing to 100° C and drive the bushing out with a suitable, shouldered drift. Drive in the new bushing before the cover has a chance to cool.

The inner cover spindle bushing will probably never need replacement, since it suffers an insignificant amount of wear. If it does require replacement, however, it will be necessary to tap the bushing, heat the cover, install an appropriate bolt and then drive it out.

Clutch Operating Mechanism

The clutch operating mechanism is constantly immersed in oil, so wear should be negligible. Inspect the balls for pitting, etc., and make sure they operate smoothly in the plates.



Clutch operating mechanism

ASSEMBLY

1. Assemble and install the clutch operating mechanism, using the accompanying illustration for reference.

2. Install a new rubber O-ring on the shifter spindle and install the spindle in the outer cover bushing, using a few drops of oil to aid installation.

3. Install the two quadrant-return springs, making certain they are correctly located over the step in the cover.

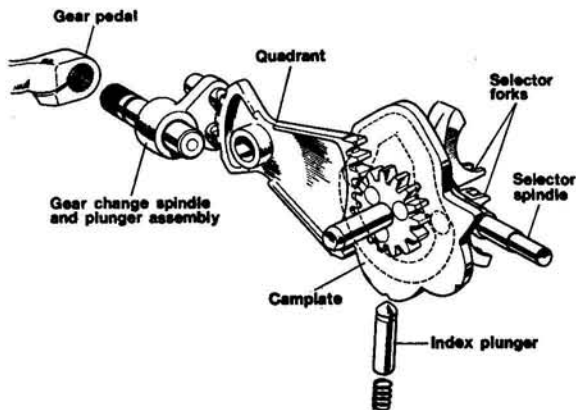
NOTE: To facilitate connecting of the springs, first install the shifter pedal and clamp it in place, thereby allowing the quadrant to turn and the springs to be compressed.

4. Install the retainer plate with its four securing nuts and lock washers.

5. Install the plungers and springs, taking care that they don't go springing off somewhere during assembly.

6. Install the kick-starter thin-walled steel sleeve, spring pinion, and ratchet.

7. Install the tab washer and the retaining nut, then torque the nut to specifications and lock it by bending up the washer tab. Do not overtorque the nut as it may cause the thin sleeve to collapse.



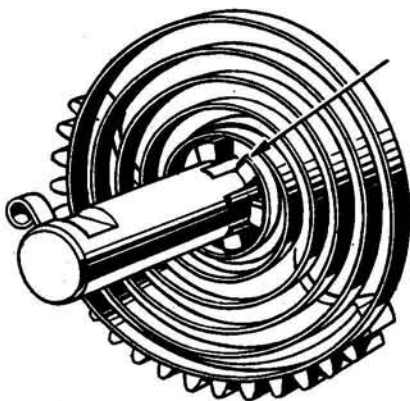
Shifter mechanism (4-speed)

8. Connect the return spring to the kick-starter quadrant as shown in the accompanying illustration.

9. Install the spindle in the kick-starter bushing and connect the return spring to the anchor peg at the rear of the cover.

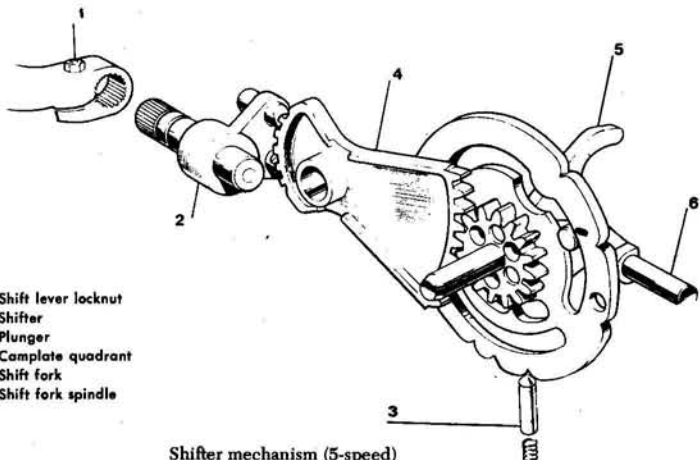
10. Install the oil seal over the spindle and assemble the kick-starter lever and securing cotter pin.

11. Clean the outer cover joining surface and apply fresh sealing compound. Make sure the two locating dowels are in position.



Kickstarter return spring installed

12. Move the kick-starter lever half-way through its stroke, then fit the outer cover on the gearbox.



Shifter mechanism (5-speed)

13. Before installing the remaining parts, make sure the kick-start lever is fully operational and returns to its upright position.

14. The rest of the assembly is a reverse of the disassembly procedure.

Gearbox Service

DISASSEMBLY

1. Remove the gearbox outer cover as previously described, leaving the gearbox engaged in high gear.

2. Remove the right rear engine plate.

3. Bend back the tabs on the lock-washer, apply the rear brake, and unscrew the kick-starter pinion ratchet retaining nut from the gearbox mainshaft.

4. Remove the clutch and primary drive as previously described. Don't forget to remove the mainshaft key.

Refer to the appropriate procedures, below, for 4-speed or 5-speed service.

4-Speed:

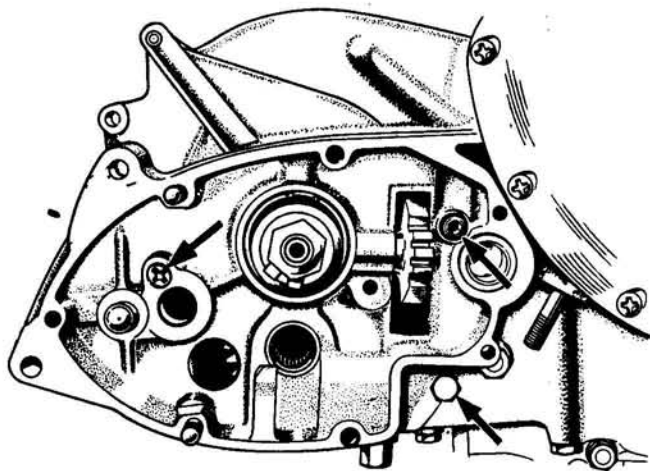
5. Remove the large dome nut from under the gearbox and withdraw the camplate indexing plunger and spring.

6. Remove the allen screw, phillips screw, and bolt that secure the inner gearbox cover. Tap the cover with a mallet until it is free.

7. Remove the selector fork spindle and then withdraw the mainshaft assembly.

8. Remove the layshaft and remaining gears.

9. Remove the camplate and spindle



Gearbox inner cover removal

assembly and then remove the two bronze thrust washers located over the needle roller bearings.

10. Remove the circular countershaft sprocket cover from the primary inner cover. Remove the sprocket securing nut.

11. Drive the mainshaft high gear through into the gearbox with a suitable drift. Replace the oil seal.

5-Speed:

5. Remove the allen bolt, phillips screw and bolt and remove the gearbox inner cover, tapping it outward with a softfaced mallet if necessary.

6. Remove the engaging dog pinion from the countershaft. Remove the circlip from the countershaft.

7. Pull out the shift fork rod, then remove the countershaft first gear along with the shift fork.

8. Remove the countershaft second gear, then remove the mainshaft with its first, second, and third gears in position.

9. Take out the mainshaft fourth gear and the countershaft third gear together with the two shift forks.

10. Remove the countershaft fourth and fifth gears.

11. Remove the two thrust washers over the countershaft needle bearings: one on each countershaft bearing.

12. To remove the mainshaft high gear, remove the plate from the inside primary chaincase at the back of the clutch. Bend back the locking plate, and unscrew the sprocket nut. Drive the high gear into the box with a soft-faced mallet or drift.

13. Remove the camplate plunger nut at the bottom of the transmission case, and take out the spring and plunger. Remove the camplate from the gearbox.

14. Carefully inspect the condition of the mainshaft oil seal after removing the gearbox sprocket.

MAINSHAFT BEARINGS

The mainshaft bearings are press-fit into their housings and are retained by spring circlips to prevent sideways motion due to end thrust. To remove the right bearing, remove the circlip, heat the cover to 100° C, and drive the bearing out with a suitable, shouldered drift. Install the new bearing while the cover is still hot. Reinstall the circlip.

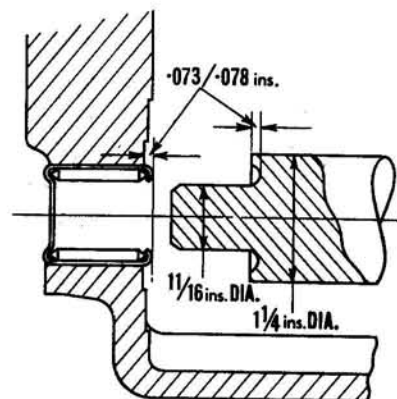
To remove the high gear bearing on the left side, pry out the large oil seal, then remove the retaining circlip. Heat the case around the bearing to 100° C, then drive the bearing out with tool no. Z15 or a suitable, shouldered drift. Install the new bearing while the base is still hot. Install the circlip and press in a new seal.

To replace the high gear bushing, (4-speed transmission) press it out with a suitable, shouldered drift. This drift can be fabricated by machining 3/4 in. on one end of a 1/2 in. x 5 in. bar to 13/16 in. diameter. The bushing must be pressed out from the tooth side of the gear. Install the new bushing in the same manner, making sure the oil groove in the bushing is on the tooth side of the gear. Ream the bushing to the size given in specifications and make sure any filings are removed from the case before reassembly.

LAYSHAFT BEARINGS

Remove the right bearing by heating the cover to 100° C and pressing or driving it out with a drift similar to the one shown in the accompanying illustration. Press in the new bearing, while the cover is still hot, from the inside of the cover until 0.073-0.078 in. of the bearing protrudes, as shown in the accompanying illustration.

Remove the left bearing by heating the cover housing to 100° C and driving it through into the gearbox with a suitable drift inserted through the countershaft

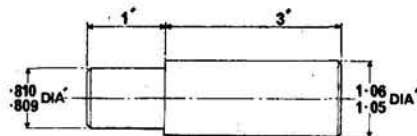


Layshaft bearing installation

sprocket aperture. Press the new bearing into place while the cover is hot. It must protrude 0.073-0.078 in. inside the gearbox.

MAINSHAFT HIGH GEAR BEARINGS (5 SPEED)

The mainshaft high gear is fitted with two caged needle bearings (one in each end). Press them out and in together with a drift of the dimensions shown in the illustration.



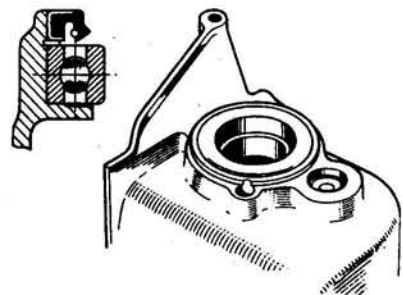
High gear needle bearing drift dimensions

ASSEMBLY

4-Speed

1. Drive a new oil seal up to the main bearing with the lip and spring toward the bearing.

2. Press the high gear into the bearing.



Mainshaft oil seal (4-speed)

3. Lubricate the ground taper of the countershaft sprocket with oil and slide it on to the high gear. Screw on the securing nut finger-tight.

4. Connect the final drive chain over the sprocket, then tighten the securing nut to specifications with tool no. Z63 or a suitable substitute.

5. Lubricate the extended nose of the high gear with oil, then reinstall the sprocket cover with a new paper gasket.

6. Lubricate the camplate spindle and install it in its housing within the gearbox.

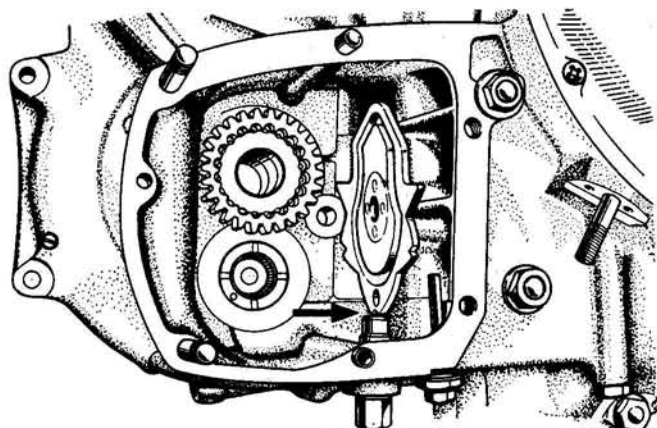
7. Assemble the camplate plunger and spring in the domed retaining nut and screw it into position under the gearbox. Don't forget the fiber washer.

8. Locate the camplate plunger in the notch between second and third gear.

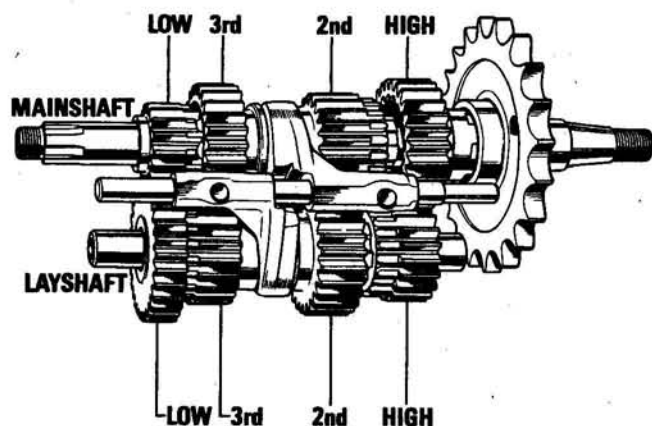
9. Position the thrust washer over the inner needle roller bearing. Coat the washer with grease to hold it in place and note that the grooved surface of the washer should be toward the layshaft.

10. Lubricate the captive mainshaft and layshaft gears, then assemble them in a cluster as shown in the accompanying illustration.

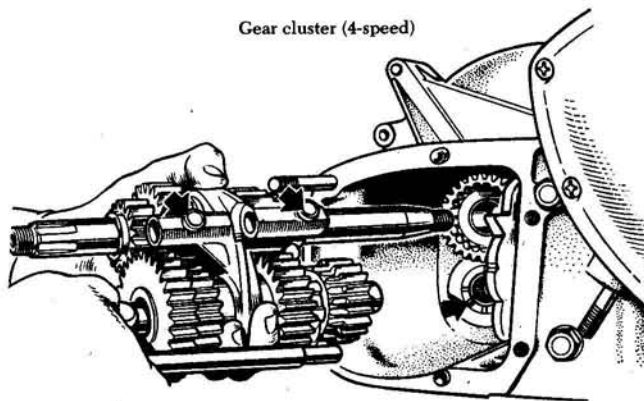
11. Grease the camplate rollers, then position them on the selector forks as shown in the accompanying illustration.



Gearbox assembly with camplate notch between 2d and 3rd gear engaged (4-speed)



Gear cluster (4-speed)



Installing the gearbox components (4-speed)

NOTE: The selector fork with the smaller radius is for the mainshaft cluster.

12. Install the mainshaft and layshaft cluster in the gearbox. As the shafts are being located in their respective bearings, the gears should be slid into position and aligned so that the selector fork rollers engage the camplate and the selector forks are approximately aligned.

13. Lubricate the selector fork spindle with oil, then slide it through the forks, shoulder end first, until it is fully situated in the gearbox housing.

14. Make sure the camplate quadrant is moving freely in the inner cover, then position the layshaft thrust washer over the bearing in the inner cover. Hold it in

place by smearing it with grease.

15. Thoroughly lubricate all parts in the gearbox with a pressure oil can, then apply fresh sealer to the joining surface of the gearbox. Make sure the two locating dowels are in position.

16. Begin to install the inner cover assembly, and when the joining surfaces are about $\frac{1}{4}$ in. apart, position the camplate quadrant in the middle point of its travel, and quickly complete the installation. This will align the camplate middle tooth with the mainshaft centerline.

17. Install the gearbox securing screws and nut, then temporarily install the gearbox outer cover assembly and check out the gearbox operation. If there is a problem, chances are the quadrant teeth are

not correctly engaged with the camplate pinion.

18. The remainder of the assembly procedure is a reversal of the disassembly instructions.

5-Speed

1. Replace the camplate after lubricating the camplate spindle with some gearbox oil.

2. Refit the mainshaft oil bearing noting that the lip faces the mainshaft bearing. A new oil seal must always be used.

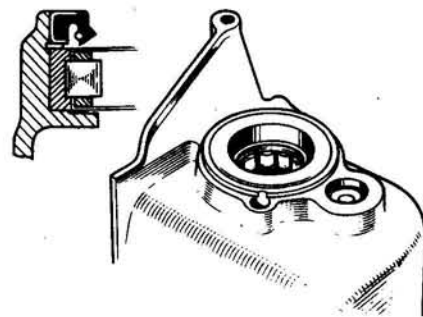
3. Push the mainshaft high gear into the bearing. Put some transmission oil on the tapered boss of the gearbox sprocket and place it on its shaft, in place, then replace the sprocket nut, tightening it by hand for the time being.

4. Run the drive chain over the gearbox sprocket. Apply the rear brake and tighten the sprocket nut as tight as possible.

5. Lubricate the end of the high gear which protrudes into the primary chaincase, and refit the cover plate. A new paper gasket should be used.

6. Replace the thrust washer over the inner needle bearing. The grooved surface of the thrust washer must face the countershaft. The washer may be held in place by smearing the rear surface with a bit of grease.

7. Refer to the accompanying illustration, and set the camplate in the "neutral" position, and refit the cam plunger, spring, and bolt on the bottom of the gearbox.

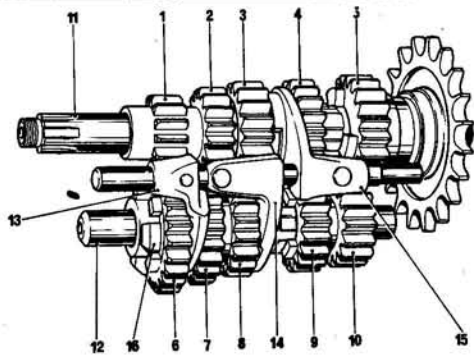


Gear cluster (5-speed)

8. With gearbox oil, lubricate the needle bearing in the high gear and the countershaft bearing. Place the mainshaft high gear onto the mainshaft. Also refit the shift fork to the mainshaft. Note that the three shift forks are all different, and this one has a large engaging pin and no cutaway on the housing.

9. Insert the mainshaft assembly into the high gear, engaging the pin on the shift fork with the camplate groove. Use onto the mainshaft. Also refit the shift fork to the mainshaft. Note that 10. Replace the countershaft with its two highest gears into the gearbox, engaging these gears with their mainshaft counterparts. Note that none of the sliding gear dogs will be engaged if the transmission is set at neutral.

11. Refit the countershaft third gear and its shift fork. This shift fork has a large engaging pin and a cutaway on the housing. Refit the mainshaft third gear



Gearbox mainshaft oil seal and roller bearing (5-speed)

- | | |
|----------------------------|--------------------------------------|
| 1. 1st gear (Mainshaft) | 10. 5th gear |
| 2. 2nd gear | 11. Mainshaft |
| 3. 3rd gear | 12. Countershaft |
| 4. 4th gear | 13. 1st gear countershaft shift fork |
| 5. 5th gear | 14. 3rd gear countershaft shift fork |
| 6. 1st gear (Countershaft) | 15. Mainshaft shift fork |
| 7. 2nd gear | 16. Countershaft dog pinion |
| 8. 3rd gear | |
| 9. 4th gear | |

and engage it with the corresponding countershaft gear.

12. Lubricate the countershaft second gear bushing and replace the gear on the countershaft.

13. Replace the first and second gears onto the mainshaft. Refit the countershaft first gear with its shift fork. Note that this shift fork has the smaller engaging pin.

14. Insert the shift fork rod. Replace the circlip on the end of the countershaft, and replace the engaging dog pinion against the circlip.

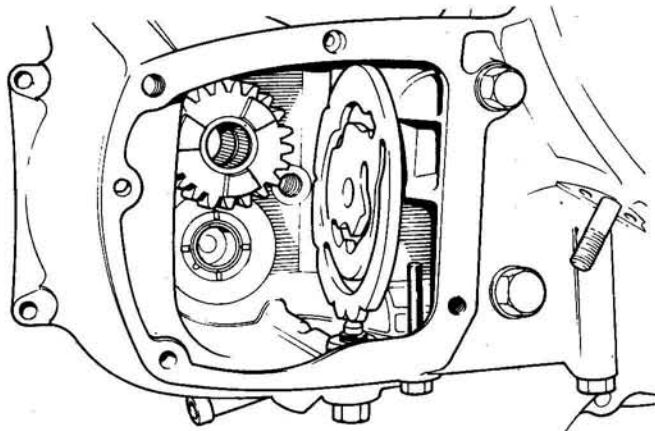
15. Turn the camplate counterclockwise (relative to a rider on the machine), which will place the transmission in first gear. Note that the engaging dog pinion on the countershaft will mesh with the dogs on the countershaft first gear, groove facing the countershaft.

16. Insure that the camplate quadrant operates freely. Replace the thrust washer over the needle bearing for the countershaft in the gearbox cover.

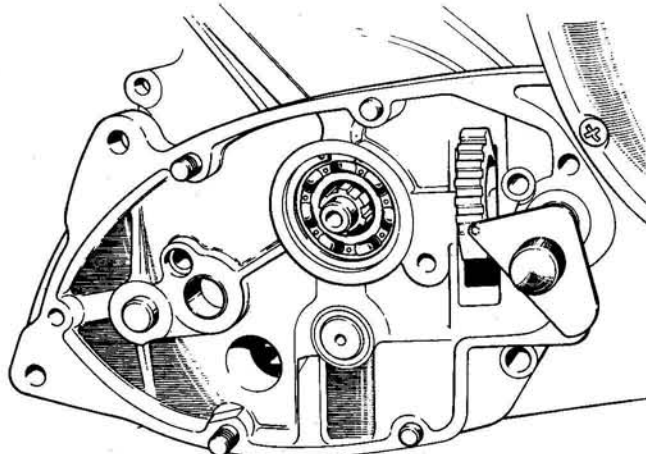
17. Lubricate all moving parts in the gearbox with transmission oil. Apply some gasket compound to the gearbox mating surfaces. Begin refitting the inner cover. When the inner cover is about 1/4 in. away from the mating surfaces, position the camplate quadrant as shown using the special tool (60-6128). If not available, line up the top edge of the second tooth on the quadrant with an imaginary horizontal line through the center of the gearshift spindle housing. This housing is at the extreme forward part of the inner cover, and is shown occupied by the special tool in the illustration of the inner cover.

18. Refit the inner cover securing bolt and screws tightening them lightly. Assemble the outer cover and gearshift lever and check that the shifter operates properly. If not, it is probable that the quadrant teeth are not properly engaged with the camplate gear.

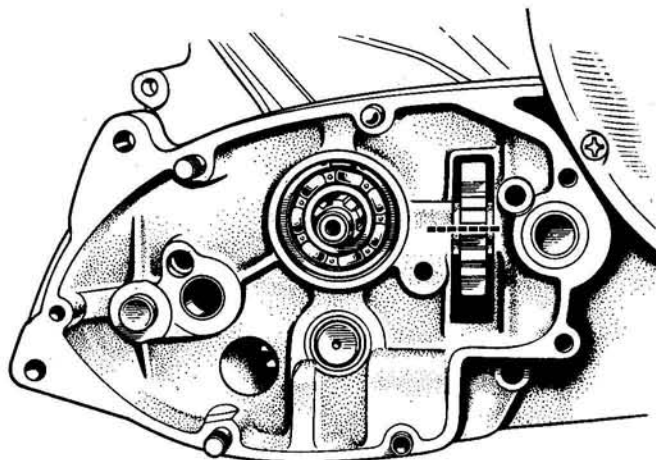
19. Assuming that the shifting is working properly, tighten the inner cover securing bolt and screws, and refit the kick-starter assembly, the outer cover, and refill the gearbox and primary chaincase with the correct amounts and grades of oil.



Camplate installed: gearbox in neutral (5-speed)



Refitting the inner gearbox cover (5-speed)



Installing the gearbox inner cover while aligning quadrant

Bottom End

DISASSEMBLY

1. Remove the primary chaincase cover and disconnect the alternator leads under the engine.

2. Remove the three screws that secure the alternator stator, and pull the stator off its mounting studs. Do not disconnect the leads at this time.

3. Disassemble the clutch and primary drive as previously described. Re-

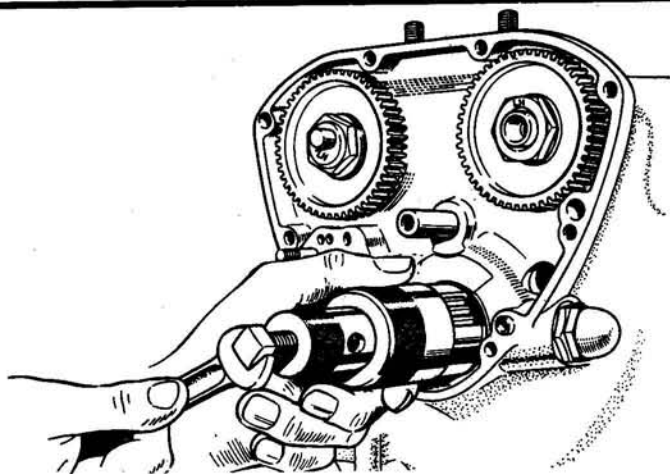
move the stator sleeve and withdraw the stator leads.

4. Remove the gearbox outer cover and dismantle the gearbox.

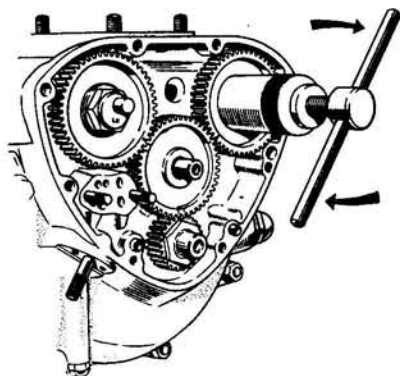
5. Remove the rocker boxes, cylinder head, cylinder barrel, and pistons.

6. Disconnect the clutch cable and remove the carburetor(s). Remove the timing cover. Note that the screws are of different lengths.

7. Remove the contact breaker cover and the oil pump, then remove the crank-



Removing the crankshaft pinion



Removing the camshaft pinions with tool no. D2213

shaft pinion. The camshaft pinions can also be removed at this time.

NOTE: The camshaft pinion nuts are left-hand threads. The crankshaft nut has a right-hand thread.

8. Remove what's left of the engine from the frame.

9. Remove the crankcase filter and oil-way plug.

10. Clamp the crankcase firmly in a vise at the bottom mounting lug and remove the three bolts and two screws near the cylinder base.

11. Remove the four remaining studs and the two nuts next to the gearbox housing.

12. Attach Triumph extractor no. 61-6064 and separate the cases.

13. Remove the breather valve from within the intake camshaft bushing in the left case.

CRANKSHAFT AND CONNECTING RODS DISASSEMBLY

1. Clamp the crankshaft assembly in a soft-jawed vise and place a rag over any sharp edges to protect the connecting rods.

2. Unscrew the cap retainer nuts a little at a time to avoid distortion, then remove the caps and connecting rods.

NOTE: The connecting rods, caps, and nut are center-punched to facilitate reassembly.

3. Using a large impact driver, unscrew the oil tube retainer plug from the right end of the big-end journal. If necessary, drill a hole $\frac{1}{8}$ in. deep and $\frac{1}{8}$ in. in diameter to eliminate the locking effect of the plug center punch.

4. Remove the flywheel bolt next to the big-end journal, then pull out the oil tube with a hooked piece of stiff wire through the flywheel bolt location hole.

5. Thoroughly clean all parts in kerosene or a cleaning solvent, then blow them dry with compressed air. Make sure the oil drillways are blown clear.

6. To remove the flywheel, unscrew the two remaining bolts and press the crankshaft out of the right-side bearing with a five ton press.

NOTE: Before removing the flywheel, make certain it is marked for reassembly.

INSPECTION

Inspect the big-end journals for any signs of scoring, etc., and measure the journal diameter. Compare with specifications. Light score marks can be removed with fine-grade emery cloth, but make sure all metal filings are removed before reassembly. If the scoring is light, new connecting rod shell bearings should be installed; if the scoring is extensive, the journals should be reground to an appropriate undersize.

NOTE: The replaceable big-end bearing shells are pre-sized to give the correct dimensions. Under no circumstances should they be scraped, or the

connecting rod and cap filed to alter the bearing dimensions.

ASSEMBLY

1. Position the oil tube in the crankshaft, aligning the flywheel bolt holes with those in the crankshaft. Temporarily install one of the flywheel bolts to secure it in position.

2. Apply thread-locking sealant to the oil tube plug and install it in the crankshaft. Center-punch the crankshaft opposite the slot to lock the plug in position.

3. Heat the flywheel to 100° C, then position it over the crankshaft with the center punch mark to the right. Turn the flywheel through 180° to get it over the crankshaft web, then turn it to the correct position relative to the crankshaft and align the bolt holes.

4. Coat the flywheel bolt threads with a thread-locking sealant, then install and torque them to specifications.

5. If a new or reground crankshaft, or a new flywheel was installed, the assembly should be rebalanced.

6. Check to make sure all the oil drillways are free from obstruction, then install the connecting rods and caps. Torque the retaining nuts to 28 ft lbs.

7. Last, force oil through the crankshaft, right main-bearing journal drillway until it is expelled at both big-end bearings. This will provide assurance that the drillway is free from obstruction.

CAMSHAFT BUSHINGS

The intake and exhaust camshafts run in bronze bushings.

To remove the bushings in the left case, a tap will be necessary. The ideal size is $\frac{7}{8}$ in. diameter x 9 whitworth.

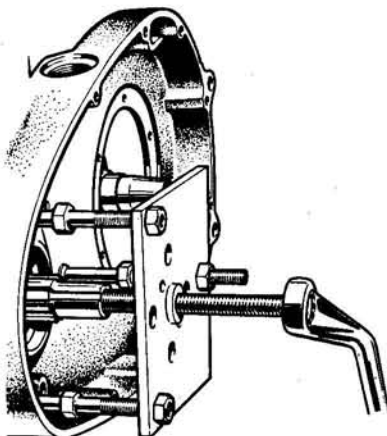
When a good thread has been cut in the bushing, heat the case to 100° C and screw in the appropriate bolt. Grip the bolt in a vise and tap the case with a soft-faced mallet until the bushing is free. The replacement bushings are pre-sized but will require a light reaming to meet specifications. After reaming the new bushings, make sure the crankcase is thoroughly cleaned to remove any metal filings.

To remove the bushings in the right case, heat the area around the bushing to 100° C, then drive it out with a suitable, shouldered drift. Install the new bushing while the case is still hot, making sure the oil drillway holes are aligned.

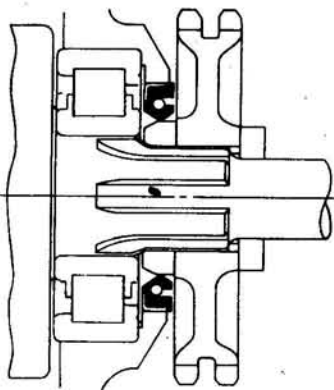
MAIN BEARINGS

To remove the left main bearing, heat the case to 100° C and drive it out with tool no. Z14. Only the right main bearing spool remains in the case, and is removed by first removing the lock plate, heating the case to 100° C, then driving it out with tool no. Z162 or a suitable, shouldered drift. It is advisable to replace the left bearing oil seal while the engine is apart, even if it appears to be in good condition.

To install the left and right bearings, first make sure that their housings are clean, then heat the cases to 100° C and drive the bearings into position with a



Separating the case halves



Left main bearing oil seal installation

tubular drift the same size as the bearing outer race. A suitable size would be $2\frac{3}{4}$ in. diameter x 6 in. long.

After both bearings have been installed, press the oil seal into the left case. This is installed with the spring side facing away from the bearing.

ASSEMBLY

1. Thoroughly clean the mating crankcase halves, giving special attention to the locating dowels. Install the oilway plug.

2. Position the left case on two wooden blocks, lubricate the main bearing and camshaft bushings and then install the breather valve and spring in the intake cam bushing. Assemble both camshafts, making sure the intake cam slot engages the breather valve dog, if fitted.

3. Carefully install the crankshaft assembly, making sure the fit in the bearing is good.

4. Apply fresh joining compound to the mating surfaces, then position the connecting rods in the center and lower the right case over the crankshaft. When the halves are mated, check to make sure the crankshaft and camshafts are not binding. The crankshaft should rotate freely, while the camshafts should offer only slight resistance.

5. The remainder of the assembly procedure is a reversal of the disassembly instructions. Torque all bolts and nuts to specifications.

T150

Engine Removal and Installation

1. Remove the fuel tank.
2. Drain the oil tank and crankcase. Remove the oil cooler.

3. Disconnect the rocker box oil lines, then disconnect the oil supply lines from underneath the rear of the crankcase.

4. Remove the carburetors and exhaust header pipes.

5. Unbolt and remove the right-side footpeg.

6. Unscrew the retaining bolt at the front of the chainguard, remove the lower left-side shock absorber mounting nut, and remove the chainguard.

7. Remove the masterlink and pull the drive chain off the countershaft sprocket.

8. Disconnect the alternator and contact breaker point leads at their connectors. Remove the spark plugs.

9. Turn the cable adjuster at the clutch lever all the way in until the cable is completely slack. Take out the four, clutch, inspection-cover retaining screws and disconnect the clutch cable from the release lever.

10. Disconnect the tachometer cable from the tachometer drive at the front of the crankcase.

11. Pull the engine breather tube off at the rear of the inner primary chaincase.

12. Unscrew the pinch-bolt and pull the brake pedal off its shaft.

13. Unscrew the nut from the kick-start lever shaft and drive out the locating pin by tapping on the end of the threads with a small hammer. Remove the kick-starter lever.

14. Unscrew the five bolts and nuts from the right-side rear engine mount plate. Unscrew the swing arm shaft nut and remove the plate. It is not necessary to remove the left mount plate.

15. Unscrew the nut from the long engine mount bolt underneath the crankcase and drive the bolt out. Note the position of the spacer between the crankcase and frame lug before removing the bolt.

16. Support the engine and remove

the engine mount bolt at the front frame down-tube. Raise the engine slightly and remove it from the left side of the frame.

Installation is in reverse order of removal. The following points should be noted:

1. Be sure to reinstall the engine mount spacers and washers in their original positions.

2. When connecting the oil lines underneath the crankcase, the smaller (delivery) oil line is attached to the small, straight, junction pipe, and the larger (scavenge) line is attached to the stepped-down junction pipe.

3. Adjust the clutch cable free-play at the handlebar lever after the cable has been reconnected.

4. Adjust the rear brake after the pedal has been installed.

NOTE: Before starting the engine, $\frac{1}{2}$ pt of oil should be poured into the crankcase. The oil can be added through the timing plug aperture in the right case.

Top End

REMOVAL

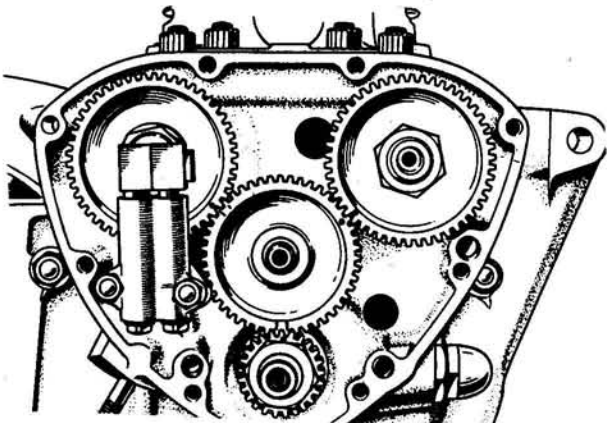
The cylinder head and barrel on the Trident can be removed with the engine in the frame. The procedure is as follows:

1. Turn off the fuel taps and disconnect the lines. Remove the metal strip running down the center of the fuel tank (early models) or the rubber plug at the top of the tank (later models). Unscrew the retaining nut and remove the tank.

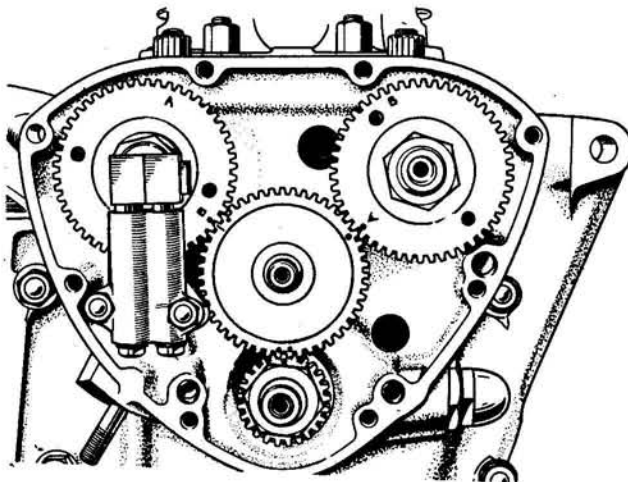
2. Loosen the oil line clamps at the oil cooler and pull the lines off their connector pipes. Mark the lines and pipes to facilitate correct reassembly. Do not unscrew the large hexagonal connectors from the cooler. Unbolt the oil cooler bracket from the frame and remove the cooler. Note that the bracket is insulated from the frame with rubber bushings to protect the cooler from vibration.

3. Disconnect the throttle cable from the linkage at the carburetors and disconnect the choke cable at the handlebar lever. Loosen the carburetor-to-intake manifold clamps and remove the carburetors as a unit.

4. Unscrew the exhaust header pipe



Timing gear mark alignment (650)



Timing gear mark alignment (750 Twin)

Engine and Transmission Specifications—TR25W

nuts at the cylinder head. Disconnect the mufflers from the pipes and remove the header pipe assembly.

5. Unbolt and remove the top engine mount (cylinder head stay).

6. Unscrew the two acorn nuts that secure the rocker oil feed lines to the rocker shafts and tie the pipes out of the way. Remove the access covers and completely loosen the valve adjusters to relieve the head studs of valve spring pressure.

7. Remove the two, small end bolts and three nuts (at the underside of the cylinder head) that secure the rocker boxes to the head. Loosen the head bolts and nuts gradually, in the sequence shown, and then lift off the rocker boxes.

8. Remove the spark plugs, unscrew the remaining cylinder head bolts, and lift the head carefully off the studs. Remove the pushrod tubes and pushrods.

9. To prevent the tappets from falling into the crankcase when removing the barrel, wrap electrical tape around the top of each tappet.

10. Loosen the cylinder-barrel retaining nuts gradually, in the sequence shown, to prevent distortion. Lift the barrel carefully off the crankcase, taking care to support the pistons as they are exposed by the cylinders so that they won't be damaged on the crankcase flange. Mark the tappets so they can be replaced in their original positions. *This is very important.*

11. Remove the piston wrist pin circlips, heat the piston crown, and remove each piston, marking it for location (L,R,C) and mark the front or back for position.

12. To disassemble the rocker mechanism, tap the rocker shafts out from the threaded end. Be sure to install the thrust washers and springs in their correct positions when assembling.

Cylinders

Maximum allowable wear is 0.005 in.

Pistons

These are available in four oversizes, in increments of 0.010 in.

Tappets

The tappet guide blocks, pressed into the base flange of the cylinder, should not normally need replacement. If it does become necessary to replace them, the dowels must be drilled out and the cylinder must be heated before the guides can be pressed out. New dowels will have to be used along with the new guides.

INSTALLATION

1. Carefully install the rings on the pistons. Note that the compression rings are tapered, and the work "top" must be installed facing up.

2. Be sure to coat each moving part with fresh engine oil or assembly lube during installation.

3. Warm the pistons and install them, in their original positions on the connecting rods. Insert the wrist pins before the pistons have a chance to cool. Install new circlips and make sure that they are properly seated.

PISTON

Material	"Lo-Ex" aluminum
Compression ratio	10:1
Clearance (bottom of skirt)	0.0023-0.0028 in. (0.05842-0.07112 mm)
Clearance (top of skirt)	0.0042-0.0053 in. (0.10668-0.13462 mm)
(Both measured on major axis)	

PISTON RINGS

Material—compression (top)	Brico BSS 0.5004 cast iron
Material—compression (center)	Brico 8 cast iron
Material—scraper	Brico BSS 0.5004 cast iron
Width—compression (top and center)	0.0625 in. (1.5875 mm) 0.0615-0.0625 in.)
Width—scraper	0.125 in. (3.175 mm) (0.124-0.125 in.)
Depth—compression (top and center)	0.108-0.114 in. (2.7432-2.8956 mm)
Depth—scraper	0.094-0.100 in. (2.3876-2.540 mm)
Clearance in groove	0.001-0.003 in. (0.0254-0.0762 mm)
Fitted gap—(maximum)	0.013 in. (0.3302 mm)
Fitted gap—(minimum)	0.009 in. (0.2283 mm)
Connecting rod (length between centers)	5.312 in. (134.92 mm)
Internal die of small end	0.6892 in. (17.51 mm)

CYLINDER BARREL

Material	Aluminum alloy with austenitic iron liner
Bore size (standard)	67 mm
Stroke	70 mm
Oversizes	1/2 mm and 1 mm

CYLINDER HEAD

Material	Aluminum alloy
Inlet port size	1.125 in. (28.575 mm)
Exhaust port size	1.25 in. (31.75 mm)

CAMSHAFT

Journal diameter (right- and left-hand)	0.7480-0.7485 in. (18.9992-19.0119 mm)
Cam lift (inlet)	0.345 in. (8.763 mm)
Cam lift (exhaust)	0.336 in. (8.534 mm)
Base circle radius	0.906 in. (23.0124 mm)

CAMSHAFT BUSHINGS

Bore diameter (fitted)	0.7492-0.7497 in. (19.0297-19.04238 mm)
Outside diameter	0.908-0.909 in. (23.0632-23.0886 mm)
Camshaft clearance	0.0007-0.0017 in. (0.01778-0.04318 mm)

CRANKSHAFT

End float	0.002-0.005 in. (0.0508-0.127 mm)
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VALVES

Seat angle (inclusive)	90°
Head diameter (inlet)	1.450-1.455 in. (36.830-36.957 mm)
Head diameter (exhaust)	1.312-1.317 in. (33.3248-33.4518 mm)
Stem diameter (inlet)	0.3095-0.3100 in. (7.861-7.874 mm)
Stem diameter (exhaust)	0.3090-0.3095 in. (7.848-7.861 mm)

VALVE GUIDES

Material	Hidural 5
Bore diameter	0.3120-0.3130 in. (7.9248-7.950 mm)
Outside diameter	0.5005-0.5010 in. (12.7127-12.7254 mm)
Length	1.844 in. (46.8376 mm)
Cylinder head interference fit	0.0015-0.0025 in. (0.0381-0.0635 mm)

VALVE SPRINGS

Free length (inner)	1.400 in. (35.56 mm)
Free length (outer)	1.750 in. (44.45 mm)
Fitted length (inner)	1.262 in. (32.0548 mm)
Fitted length (outer)	370 in. (34-798 mm)

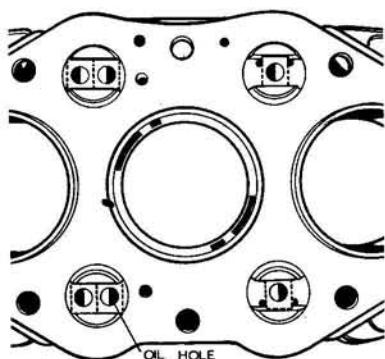
VALVE TIMING

Tappets set to 0.015 in. (0.381 mm) for checking purposes only:

Inlet opens BTDC	51°
Inlet closed ABDC	68°
Exhaust opens BBDC	78°
Exhaust closes ATDC	37°

BEARING DIMENSIONS

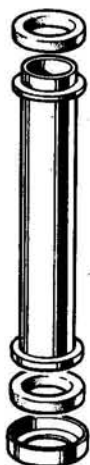
Clutch roller (25)	0.1875 x 0.1875 in. (4.7025 x 4.7025 mm)
Con-rod big-end bearing—running clearance	0.0005-0.0015 in. (0.0127-0.0381 mm)
Con-rod big-end—crank diameter	1.4375-1.4380 in. (36.5125-36.5252 mm)
Crank undersizes	0.010, 0.020, and 0.030 in. (0.254, 0.508, and 0.762 mm)
Con-rod small-end bush (bore)	0.6890-0.6894 in. (17.5006-17.6108 mm)
Crankcase bearing (drive-side)	25 x 62 17 mm
Crankcase bearing (timing-side)	25 x 62 17 mm
Crankcase diameter (drive-side and timing side)	0.9841-0.9844 in. (24.9961-25.0038 mm)
Gearbox layshaft bearings (drive-side and timing side)	0.5 x 0.625 x 0.8125 in. (12.7 x 15.875 x 20.6375 mm)
Gearbox layshaft diameter (drive-side and timing side)	0.6245-0.625 in. (15.8623-15.8750 mm)
Gearbox mainshaft bearing (drive-side)	30 x 62 x 16 mm
Gearbox mainshaft bearing (timing-side)	0.625 x 1.5625 x 0.4375 in. (15.875 x 39.2875 x 11.1125 mm)
Gearbox mainshaft diameter (drive-side)	0.7485-0.749 in. (19.0119-19.0246 mm)
Gearbox mainshaft diameter (timing-side)	0.6245-0.625 in. (15.8623-15.8750 mm)
Gearbox sleeve pinion (internal diameter)	0.752-0.753 in. (19.1008-19.1262 mm)
Gearbox sleeve pinion (external diameter)	1.179-1.180 in. (29.9466-29.9720 mm)
Piston pin diameter	0.6882-0.6885 in. (17.4803-17.4879 mm)



Correct cam follower positions (Trident)

4. Install the tappets in their original positions. Wrap a piece of tape around the top of each tappet stem to prevent it from falling into the crankcase as the cylinder is installed. Make sure that the oil holes in the tappet stems line up with the oil holes in the guide blocks, as shown.

5. Install a new cylinder base gasket on the crankcase flange. Stagger the end gaps of the piston rings 120° apart and oil the rings liberally. Bring the center piston up to top dead center and install a ring compressor. Slide the cylinder down over the piston. Raise the outside pistons as far as possible without accidentally pulling the center piston out of its bore. Install the outer pistons and seat the cylinder against the crankcase. Tighten the cylinder retaining nuts gradually, in the proper sequence, to 20-22 ft lbs.



Pushrod tube assembly (Trident)

6. Remove the tape from the tappets and fit the pushrod tubes over the tappet guides. Make sure that the rubber seals at either end of the tubes are in good condition.

7. Install a new head gasket on the cylinder with the ribs facing down (toward the cylinder). Install the cylinder head carefully over the studs and onto the cylinder. Fit the four outer head bolts loosely. Insert the pushrods onto their tubes. Make sure that the pushrods line up evenly. *This is very important.*

8. Install the rocker boxes on the head using new gaskets. Coat only one side of the gaskets with cement. Make sure that the pushrods are properly seated in the rocker arms.

Engine and Transmission Specifications—TR25W (cont.)

CLUTCH

Type	Multi-plate with integral cush drive
Number of plates:	
Driving (bonded segments)	4
Driven (plain)	5
Overall thickness of driving plate and segments	0.167 in. (4.242 mm)
Clutch springs	4
Free length of springs	1.65685 in. (42.0687 mm)
Clutch pushrod (length)	9.0 in. (228.6 mm)
Clutch pushrod (diameter)	0.1875 in. (4.7025 mm)

Engine Specifications—T100C and T100R

PISTONS

Material	Aluminum alloy die casting
Clearance:	From H.49833 Before H.49833
Top of skirt	0.0050-0.0072 in. 0.0075-0.0085 in.
Bottom of skirt	0.0030-0.0045 in. 0.002-0.003 in.
Piston pin hole diameter	0.6882-0.6886 in. 0.6882-0.6886 in.

PISTON RINGS

Material	Cast iron
Compression rings (taper faced):	
Width	0.0615-0.0625 in.
Thickness	0.092-0.100 in.
Fitted gap	0.010-0.014 in.
Clearance in groove	0.001-0.003 in.
Oil control ring:	
Width	0.124-0.125 in.
Thickness	0.092-0.100 in.
Fitted gap	0.010-0.014 in.
Clearance in groove	0.0005-0.0025 in.

VALVES

Seat angle (included)	90°
Head diameter:	
Inlet	1 $\frac{1}{32}$ in.
Inlet (Before H.49833)	1 $\frac{1}{16}$ in.
Exhaust	1 $\frac{1}{16}$ in.
Stem diameter:	
Inlet	0.3095-0.3100 in.
Exhaust	0.3090-0.3095 in.

VALVE GUIDES

Material	Hidural
Bore diameter (Inlet and exhaust)	0.312-0.313 in.
Outside diameter (Inlet and exhaust)	0.5005-0.5010 in.
Length:	
Inlet	1 $\frac{3}{4}$ in.
Exhaust	1 $\frac{3}{4}$ in.

VALVE SPRINGS

(Inner—Yellow, Outer—L/Blue Spot)	Outer	Inner
Free length	1 $\frac{1}{2}$ in.	1 $\frac{19}{32}$ in.
Total number of coils	6	8 $\frac{1}{4}$
Total fitted load:		
Valve open	136 lbs	
Valve closed	63 lbs	

VALVE TIMING

Set all tappet clearances at 0.020 in (0.5 mm) for checking:	
Inlet opens	34° before top center
Inlet closes	55° after bottom center
Exhaust opens	48° before bottom center
Exhaust closes	27° after top center

ROCKERS

Material	High tensile steel forging
Bore diameter	0.4375-0.4380 in.
Rocker spindle diameter	0.4355-0.4360 in.
Tappet clearance (cold):	
Inlet	0.002 in. (0.05 mm)
Exhaust	0.004 in. (0.10 mm)

TAPPETS

Material	High tensile steel forging—Stellite Tip
Tip radius	$\frac{3}{4}$ in. (T100C), 1 $\frac{1}{8}$ in. (T100R)
Tappet diameter	0.3110-0.3115 in.
Clearance in guide block	0.0005-0.0015 in.

TAPPET GUIDE BLOCK

Diameter of bores	0.3120-0.3125 in.
Outside diameter	1.000-0.9995 in.
Interference fit in cylinder block	0.0005-0.0015 in.

Engine Specifications—T100C and T100R (cont.)

CAMSHAFTS

Journal diameter:	
Left	0.8100-0.8105 in.
Diometrical clearance:	
Left	0.0010-0.0025 in.
End float	0.005-0.008 in.
Cam lift:	
Inlet	0.314 in.
Exhaust	0.296 in. (T100C), 0.314 in. (T100R)
Base circle diameter:	
Inlet and exhaust	0.812 in.

CAMSHAFT BEARING BUSHES

Material	Steel-backed bronze
Bore diameter (fitted):	
Left	0.8125-0.8135 in.
Outside diameter:	
Left	0.906-0.907 in.
Length:	
Left inlet	1.114-1.094 in.
Left exhaust	0.922-0.942 in.
Interference fit in crankcase:	
Left	0.002-0.003 in.

TIMING GEARS

Inlet and exhaust camshaft pinions:	
Number of teeth	50
Interference fit on camshaft	0.000-0.001
Intermediate timing gear:	
Number of teeth	42
Bore diameter	0.5618-0.5625
Intermediate timing gear bush:	
Material	Phosphor bronze
Outside diameter	0.5635-0.5640 in.
Bore diameter	0.4990-0.4995 in.
Length	0.6775-0.6825 in.
Working clearance on spindle	0.0005-0.0015 in.
Intermediate wheel spindle:	
Diameter	0.4980-0.4985 in.
Interference fit in crankcase	0.0005-0.0015 in.
Crankcase pinion:	
Number of teeth	25
Fit on crankcase	+0.0003 in. -0.0005 in.

CYLINDERS

Material	Cast iron
Bore size	2.7160-2.7165 in.
Maximum oversize	2.7360-2.7365 in.
Tappet guide block housing diameter	0.9985-0.9990 in.

CYLINDER HEAD

Material	DTD 424 Aluminum Alloy
Inlet port size	1 in. dia. (T100C), 1 1/8 in. dia. (T100R)
Exhaust port size	1 1/4 in. dia.
Valve seatings:	
Type	Cast-in
Material	Cast iron

CRANKSHAFT

Type	Forged two-throw crank with bolt-on flywheel
Left main bearing size and type	72 x 30 x 19 mm. Ball Journal
Right crankshaft main-bearing journal diameter	1.4375-1.4380 in.
Right main-bearing more, size, and type	1.4390-1.4385 in. Steel-backed copper lead-lined bush
	Under sizes available: -0.010 in. -0.020 in., -0.030 in.
Left main bearing housing diameter	2.8321-2.8336 in.
Right main bearing housing diameter	1.8135-1.8140 in.
Big-end journal diameter	1.4375-1.4380 in.
Min. regrind diameter	1.4075-1.4080 in.
Crankshaft end float	0.008-0.017 in.

CONNECTING RODS

Material	Alloy 'H' Section RR .56
Length (Centers)	5.311-5.313 in.
Big-end bearings type	Steel-backed white metal
Bearing side clearance	0.013-0.017 in.
Bearing diometrical clearance	0.005-0.0020 in. minimum

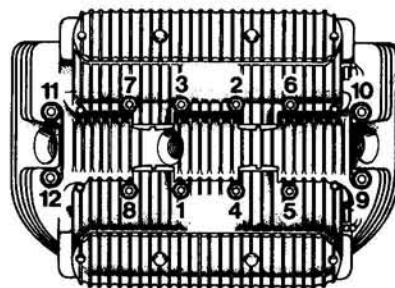
PISTON PIN

Material	High tensile steel
Fit in small end bush	0.0005-0.0012 in.
Diameter	0.6882-0.6885 in.
Length	2.151-2.156 in.

SMALL-END BUSHING

Material	Phosphor Bronze
Outer diameter	0.782-0.783 in.
Length	0.890-0.910 in.
Finished bore diameter	0.6905-0.6910 in.

9. Install the remaining eight, cylinder head bolts and tighten all twelve nuts and bolts evenly, in the sequence shown, to 18 ft lbs. Refit the remaining rocker box mounting bolts and nuts.



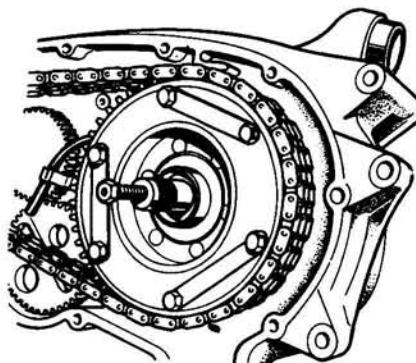
Cylinder head bolt tightening sequence

10. Reconnect the rocker oil lines using new copper washers. Install the top engine mount and exhaust headerpipes. Install the carburetors on the head and connect the throttle and choke cables. Bolt the oil cooler onto the frame, taking care to install the rubber bushings correctly, and connect the oil lines. Install the fuel tank.

Clutch

DISASSEMBLY

1. Drain the oil from the primary chaincase.
2. Take out the four screws and remove the clutch inspection cover. Unscrew the large locknut and the adjuster nut from the end of the clutch release rod.
3. Back off the primary chain adjuster, remove the fourteen screws, and pull off the primary cover. Note that the screws are of different lengths; they must be replaced in their original positions.
4. Bend back the locktab, install oil seal protector 61-6051, and unscrew the engine sprocket retaining nut. Remove the transmission sprocket (clutch hub), retaining nut and pull both sprockets off together using Triumph tools D1860 and 61-6046—or suitable gear pullers.



Removing the clutch hub

5. To remove the inner crankcase (clutch) cover, first take out the screws and bolts that secure the cover, noting their positions to facilitate reassembly. Pull off the inner cover, taking care not to damage or lose the oil pump O-rings.
6. Take off the spacer and pull the

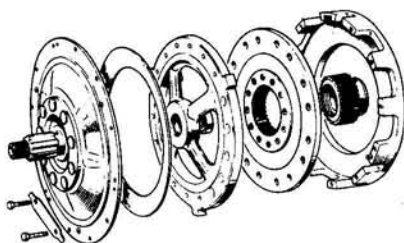
clutch unit off the shaft.

7. Mark the relative positions of the clutch cover, drive plate, and pressure plate. Bend back the locktabs on the twelve cover bolts and loosen the bolts gradually, a turn at a time, to prevent distortion of the cover.

8. Separate the clutch components, taking care not to lose the three dowel pins in the cover.

INSPECTION

Examine the drive plate and pressure plate for cracks, scoring, and overheating (extreme blue discoloration). Check to see that the drive plate slots and pressure plate tabs are not broken or excessively worn. The diaphragm spring may be reused unless it shows signs of being overheated, in which case it may have been weakened. If the bearing is worn and/or the oil seal damaged, replace both components.



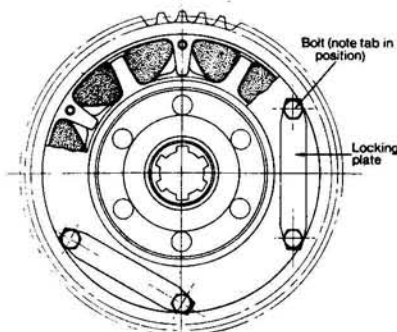
Clutch assembly

ASSEMBLY

1. Apply a small amount of high temperature grease to the sides of the three pressure plate tabs and assemble the pressure plate, disc, and drive plate (aligning the positioning marks).

2. Apply a small amount of grease to the machined ridge on the pressure plate and install the diaphragm on the ridge with the outer edge of the spring upward.

3. Lightly grease the ridge inside the cover and install the cover (in alignment with the drive plate and pressure plate positioning marks) and install the twelve bolts using new locktabs. Tighten finger-tight only.



Late type shock absorber rubbers

4. Install a centering tool from the rear of the clutch and tighten the twelve bolts one-half turn at a time, working around the cover, until the cover meets the drive plate. Fully tighten the bolts and lock them with the locktabs.

Clutch and Transmission Specifications— T100C and T100R

CLUTCH

Type	Multiplate with integral shock absorber
Number of plates:	
Driving (bonded)	6
Driven (plain)	6
Pressure Springs:	
Number	3
Free-length	13 ¹ / ₂ in.
Number of working coils	9 ¹ / ₂
Spring rate	58 ¹ / ₂ lbs/in.
Approximate fitted load	42 lbs
Bearing rollers:	
Number	20
Diameter	0.2495–0.2500 in.
Length	0.231–0.236 in.
Clutch hub bearing diameter	1.37–1.3743 in.
Clutch sprocket bore diameter	1.0745–1.0755 in.
Thrust washer thickness	0.052–0.054 in.
Engine sprocket teeth	26
Clutch sprocket teeth	58
Chain details	Duplex endless— ³ / ₄ in. pitch x 78 links

CLUTCH OPERATING MECHANISM

Conical spring:	
Number of working coils	2
Free length	1 ¹ / ₂ in.
Diameter of balls	³ / ₈ in.
Clutch operating rod:	
Diameter of rod	⁷ / ₁₆ in.
Length of rod	9.562–9.567 in.

RATIOS

Internal ratios (Std)	
4th (Top)	1.00 : 1
3rd	1.22 : 1
2nd	1.61 : 1
1st (Bottom)	2.47 : 1
Overall ratios:	
4th (Top)	5.70
3rd	6.95
2nd	9.18
1st (Bottom)	14.09
Engine rpm @ 10 mph in 4th (Top) gear	763
Gearbox sprocket teeth	18

GEARS

Mainshaft high gear:	
Bore diameter (Bush fitted)	0.7520–0.7530 in.
Working clearance on shaft	0.0020–0.0035 in.
Bush length	2 ¹ / ₂ in.
Bush protrusion length	³ / ₄ in. (nil after H.57083)

GEARS

Layshaft low gear:	
Bore diameter (bush fitted)	0.689–0.690 in.
Working clearance on shaft	0.0015–0.003 in.

GEARBOX SHAFTS

Mainshaft:	
Left end diameter	0.7495–0.7500 in.
Right end diameter	0.6685–0.6689 in.
Length	9 ¹ / ₄ in.
Length (before H.49833)	8 ³ / ₄ in.
Layshaft:	
Left-end diameter	0.6845–0.6850 in.
Right-end diameter	0.6870–0.6875 in.
Length	5 ³ / ₈ in.
Camplate plunger spring:	
Free-length	2 ¹ / ₂
Number of working coils	22
Spring rate	5–6 lbs/in.

BEARINGS

High gear bearing	30 x 62 x 16 mm Ball journal
Mainshaft bearing	17 x 47 x 14 mm Ball journal
Layshaft bearing (left)	1 ¹ / ₄ x ⁷ / ₈ x ³ / ₄ in. Needle roller
Layshaft bearing (right)	³ / ₈ x ¹ / ₄ x ³ / ₄ in. Needle roller

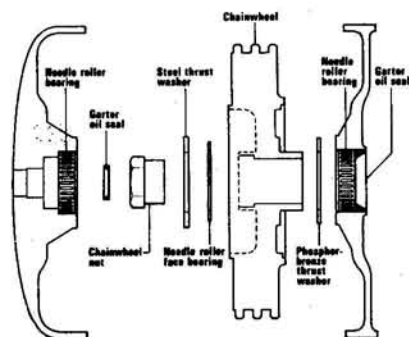
KICK-START OPERATING MECHANISM

Ratchet spring free-length	¹ / ₂ in.
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GEARCHANGE MECHANISM

Plungers:	
Outer diameter	0.3402–0.3412 in.
Working clearance in bore	0.0015–0.0035 in.
Plunger springs:	
Number of working coils	16
Free-length	1 ¹ / ₄ in.
Outer bush bore diameter	0.623–0.624 in.
Clearance on shaft	0.001–0.003 in.
Quadrant return springs:	
Number of working coils	18
Free-length	1 ¹ / ₈ in.

Engine Specifications—TR6R, TR6C, and T120R



Clutch assembly order

5. Remove the centering tool, install the release rod, lightly grease the disc splines, and install the clutch on the engine.

6. Install the oil pump O-rings and check the clutch hub needle bearing for excessive play. Check the oil seal and replace if worn or deformed.

7. Apply gasket-sealing compound to the crankcase and inner cover mating surfaces. Install the cover on the crankcase using a new gasket, and tighten the screws evenly.

8. Install the twelve damper rubbers and then the outer plate. Apply thread-lock compound to the six plate-retaining screws.

NOTE: Later models use six bolts with locktabs and a modified plate. If the screws on earlier models were found to be in need of replacement, replace the screws and plate with the later components.

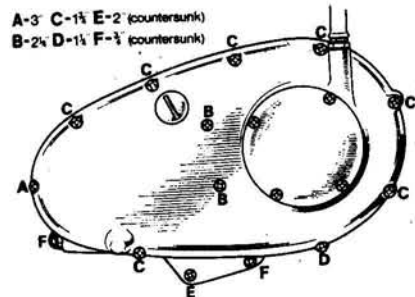
9. Install the thrust washer on the back of the damper hub, fit the primary chain over the sprockets, and install the sprockets, on the shafts. Tighten the crankshaft sprocket nut to 60 ft lbs and lock in position with the locktab. Install the spacer and tighten the mainshaft sprocket nut to 60 ft lbs.

10. Install the thrust bearing and replace the primary cover using gasket cement and a new gasket.

11. Adjust primary chain tension.

12. Install the large clutch adjusting nut, taking care not to damage the oil seal on the release rod threads. Insert an 0.005 in. feeler gauge between the bearing and large nut, and tighten the small locknut while holding the release rod from turning. Refill the primary chaincase with oil and check the clutch for correct operation.

A-3" C-1½" E-2" (countersunk)
B-2½" D-1½" F-½" (countersunk)



Primary chaincase screws

PISTONS

Clearance:	
Top of skirt	0.0106-0.0085 in.
Bottom of skirt	0.0061-0.0046 in.
Piston pin hole diameter	0.6882-0.6886 in.

PISTON RINGS

Material	Cast iron
Compression rings (tapered):	
Width	0.0615-0.0625 in.
Thickness	0.092-0.100 in.
Fitted gap	0.010-0.014 in.
Clearance in groove	0.001-0.003 in.
Oil control ring:	
Width	0.092-0.100 in.
Thickness	0.124-0.125 in.
Fitted gap	0.010-0.014 in.
Clearance in groove	0.0005-0.0025 in.

VALVES

Stem diameter:	
Intake	0.3095-0.3100 in.
Exhaust	0.3090-0.3095 in.
Head diameter:	
Intake	1.592-1.596 in.
Exhaust	1.434-1.440 in.
Exhaust valve material	21-4NS

VALVE GUIDES

Material	Aluminum-bronze
Bore diameter (Inlet and exhaust)	0.3127-0.3137 in.
Outside diameter (Inlet and exhaust)	0.5005-0.5010 in.
Length:	
Inlet	1⅜ in.
Exhaust	1⅝ in.

VALVE SPRINGS (RED SPOT INNER, GREEN SPOT OUTER)

Free-length	1½ in.	1⅞ in.
Number of coils	5½	7¼
Total fitted load:		
Valve open	143 lbs	155 lbs
Valve closed	75 lbs	87 lbs
Fitted length (valve closed):		
Inner	1⅞ in.	1⅞ in.
Outer	1⅞ in.	1⅞ in.

ROCKERS

Material	High tensile steel forging
Bore diameter	0.5002-0.5012 in.
Rocker spindle diameter	0.4990-0.4995 in.
Tappet clearance(cold):	
Inlet	0.002 in. (0.05 mm)
Exhaust	0.004 in. (0.10 mm)

CAMSHAFTS

Journal diameter:	
Left	0.8100-0.8105 in.
Right	0.8730-0.8735 in.
Diametrical clearance:	
Left	0.0010-0.0025 in.
Right	0.0005-0.0020 in.
End float	0.013-0.020 in.
Cam lift: Inlet and exhaust	0.314 in.
Base circle diameter	0.812 in.

Primary Drive Service

Follow steps 1-4, above, for clutch disassembly. Inspect the sprockets for worn and broken teeth. If the sprockets are to be replaced, the chain should be replaced also or else the new sprockets will be ruined in a short time.

Transmission Countershaft Sprocket

1. Remove the small clutch hub and clutch housing.
2. Remove the clutch hub retaining nut and pull the hub using a suitable gear puller.
3. Remove the clutch housing from the crankcase. Check the oil seal for wear and distortion, and replace if necessary. Unscrew the sprocket nut and then remove the final, drive-chain master link. Pull the sprocket off the shaft.
4. To replace the sprocket, install it on the shaft using hardening gasket cement

on the sleeve gear splines to prevent oil from leaking between the sprocket and sleeve gear.

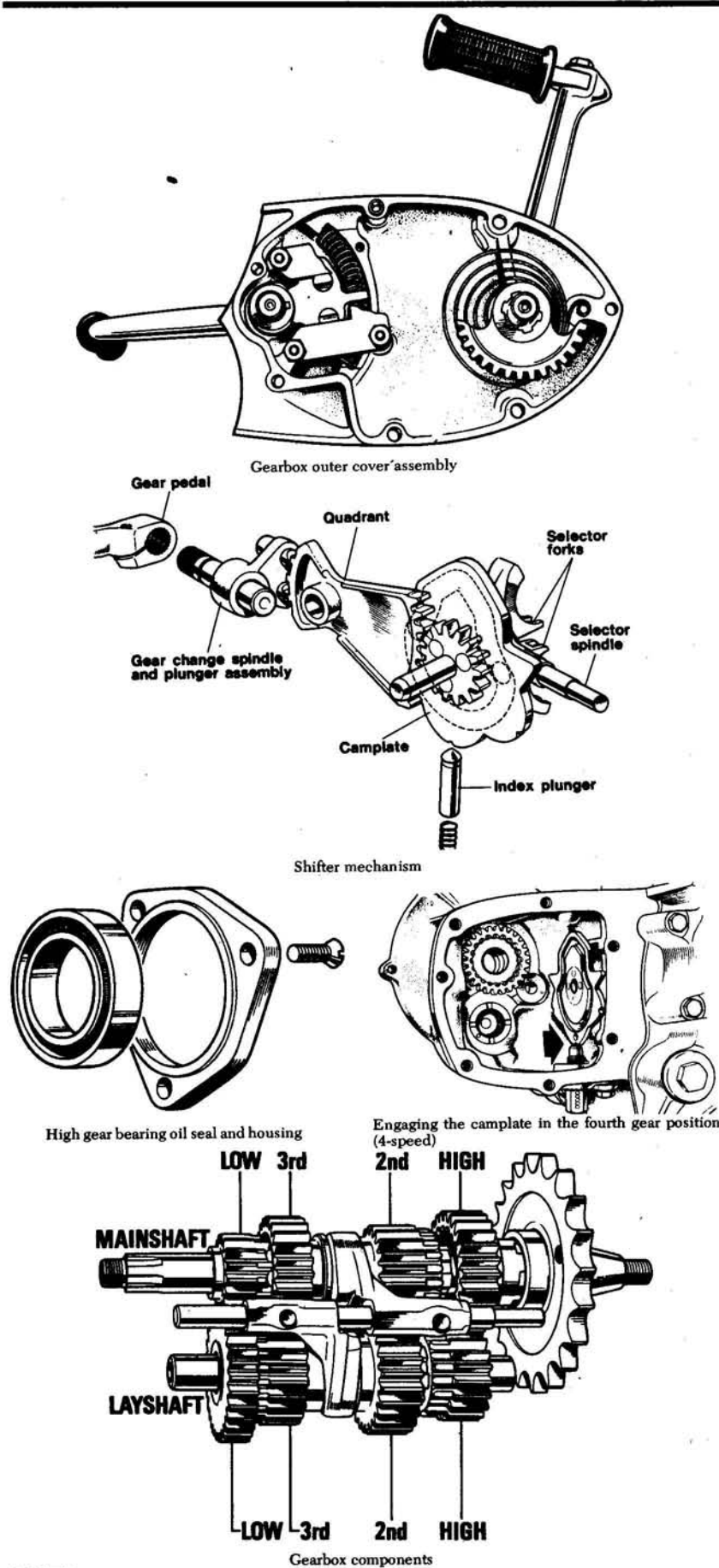
5. The remainder of installation is in reverse order of removal.

Gearbox, Shifter, and Kick-Start, Mechanisms

4-SPEED

Disassembly

1. Drain the primary chaincase and transmission.
2. Remove the clutch.
3. Take out the five screws and the acorn nut, and remove the transmission outer cover complete with kick-start assembly and shifter mechanism. The kick-start half-gear is a press fit onto the shaft. If the return spring is to be replaced, load it 1¼ turns before slipping the hook over the dowel pin. The kick-start seal is accessible after the kick-start lever is removed.



4. To remove the kick-start ratchet and gear, bend back the locktab and unscrew the transmission mainshaft nut. If a new gear is to be installed, use a new spring also. The ratchet need not be removed for removal of the transmission gears.
5. Take out the two screws and bolts and remove the transmission inner cover, complete with selector quadrant and mainshaft assembly. Note the countershaft thrust washer located on the inner face of the cover by a small peg.
6. Unscrew the plug from the base of the transmission case that retains camplate plunger and spring.
7. Pull out the shift fork shaft and remove the countershaft first gear. Remove the sliding gears and selector forks from the case.
8. Pull the countershaft assembly out of the case and then remove the shift camplate. The countershaft top gear or sleeve pinion is attached to the final drive sprocket by a large nut.

Assembly

1. Install the high gear into the bearing and then the final drive sprocket into the case.
2. Lubricate and install the camplate shaft into the case.
3. Install the camplate plunger and spring, with retaining plug, under the transmission case, and the fiber washer.
4. Set the camplate with the plunger located in the high gear notch. Install the thrust washer over the inner needle bearing. The grooved surface of the washer should face the countershaft. The washer can be held in place with grease.
5. Lubricate the components and assemble the countershaft and mainshaft gear clusters.
6. Place the camplate rollers on the shift forks, holding them in position with grease. Install the shift forks in their respective gears. The fork with the smaller radius is for the mainshaft cluster.
7. Install the mainshaft and countershaft gears, align the gears so that the shift fork rollers are located in the camplate tracks, and align the shift fork bores as closely as possible.
8. Lubricate the fork shaft and install it through the forks, shouldered end first, until it is fully engaged in the case. (The mainshaft shift fork should be at the innermost position).
9. Make sure the camplate quadrant is able to move freely in the inner cover. Position the countershaft thrust washer over the needle bearing in the inner cover, holding it with grease.
10. Lubricate all the transmission components. Apply gasket cement to the inner cover and transmission mating surfaces, make sure that the two dowel pins are in position, and install the inner cover.
11. Temporarily install the outer cover and check to see that the shift sequence is correct by operating the shift lever while turning the final drive sprocket. If the shift sequence is not correct, remove the inner cover and make sure the quadrant teeth are accurately engaged with the camplate gear. When reinstalling the inner cover, sure the top of the first tooth

Engine Specifications—TR6R, TR6C, and T120R (cont.)

is on the centerline of the mainshaft.

12. Reassemble the kick-shaft ratchet and gear, tightening the nut 40–45 ft lbs. To facilitate this, install the final drive chain, put the transmission in gear, and apply the rear brake.

13. Install the outer cover using gasket cement on both mating surfaces.

14. Install the clutch.

5-SPEED

The Trident T150V (5-speed) utilizes a transmission which is quite similar to the 5-speed found in the TR7V and T140V. For service procedures, refer to the earlier section dealing with the transmission for the 750 Twins.

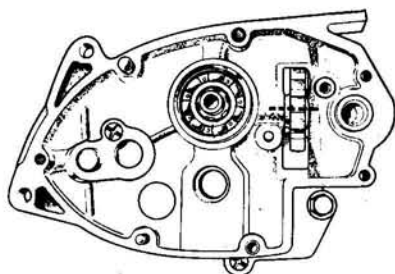
One difference between the 750 Twin transmission and that for the T150V is that the latter has a high gear bearing oil seal which is found in a housing secured by three screws.

Bottom End

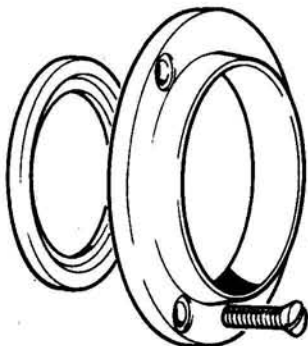
DISASSEMBLY

1. Drain the oil from the crankcase, transmission, and primary drive. Remove the engine.

2. Remove the cylinder head, barrel, and pistons.



Inner cover installed with quadrant aligned



Mainshaft high gear oil seal and housing (5-speed)

3. Remove the primary drive and clutch assembly.

4. Remove the transmission gear cluster.

5. Remove the ignition points cover. Scribe a line on the breaker plate housing to facilitate reassembly, take out the three bolts, and remove the breaker plate assembly. Unscrew the bolt in the center of the breaker cam and remove the ignition advance unit with tool no. D782, or by screwing in a bolt that fits the threads in the cam until the advance unit is broken loose.

6. Take out the screws and remove

TAPPETS
Material
Tip radius
Tappet diameter
Clearance in guide block

High tensile steel body—Stellite tip
1.125 in.
0.3110–0.3115 in.
0.0005–0.0015 in.

TAPPET GUIDE BLOCK
Diameter of bores
Outside diameter
Interference fit in cylinder block

0.3120–0.3125 in.
1.000–0.9995 in.
0.0005–0.0015 in.

CAMSHAFT BEARING BUSHES
Material
Bore diameter (fitted):
Left
Right
Outside diameter:
Left
Right
Length:
Left inlet

High density sintered bronze

0.8125–0.8135 in.
0.874–0.875 in.

1.0010–1.0015 in.
1.126–1.127 in.

1.104–1.114 in.

CAMSHAFT BEARING BUSHES
Left exhaust
Right inlet and exhaust
Interference fit in crankcase:
Left
Right

0.932–0.942 in.
1.010–1.020 in.

0.001–0.002 in.
0.0010–0.0025 in.

TIMING GEARS
Inlet and exhaust camshaft pinions:
Number of teeth
Interference fit on camshaft
Intermediate timing gear:
Number of teeth
Bore diameter
Intermediate timing gear bush:
Material
Outside diameter
Bore diameter
Length
Working clearance on spindle
Intermediate wheel spindle:
Diameter
Interference fit in crankcase
Crankshaft pinion:
Number of teeth
Fit on crankshaft

50
0.000–0.001 in.

47
0.5618–0.5625 in.

Phosphor bronze
0.5635–0.5640 in.
0.4990–0.4995 in.
0.6775–0.6825 in.
0.0005–0.0015 in.

0.4980–0.4985 in.
0.0005–0.0015 in.

25
+0.0003/–0.0005 in.

CYLINDER BLOCK
Material
Bore size
Maximum oversize
Tappet guide block housing diameter

Cast iron
2.7984–2.7953 in.
2.8348–2.8353 in.
0.9990–0.9985 in.

CYLINDER HEAD
Material
Inlet port size
Exhaust port size
Valve seating:
Type
Material

D.T.D. 424 Aluminum
1 $\frac{3}{16}$ in. dia tapering to 1 $\frac{1}{8}$ in.
1 $\frac{3}{8}$ in. dia

Cast-in
Cast iron

CRANKSHAFT
Crankshaft type

Main bearing (drive-side) size and type
Main bearing (timing side) size and type
Main bearing journal diameter
Main bearing housing diameter
Big-end journal diameter
Minimum regrind diameter
Crankshaft end float
Balance factor

Forged two-throw crank with bolt-on flywheel
Located by the timing side main bearing
2 $\frac{1}{16}$ x 1 $\frac{3}{8}$ x 1 $\frac{3}{16}$ in. Ball Journal
2 $\frac{1}{16}$ x 1 $\frac{3}{8}$ x 1 $\frac{3}{16}$ in. Ball Journal
1.1247–1.1250 in.
2.8095–2.8110 in.
1.6235–1.6240 in.
1.6035–1.6040 in.
0.003–0.017 in.
85 per cent (using 689 gramme weights)

CONNECTING RODS
Length (centers)
Big-end bearings—type
Bearing side clearance
Bearing diametrical clearance

6.499–6.501 in.
Steel-backed white metal
0.012–0.016 in.
0.0005–0.0020 in.

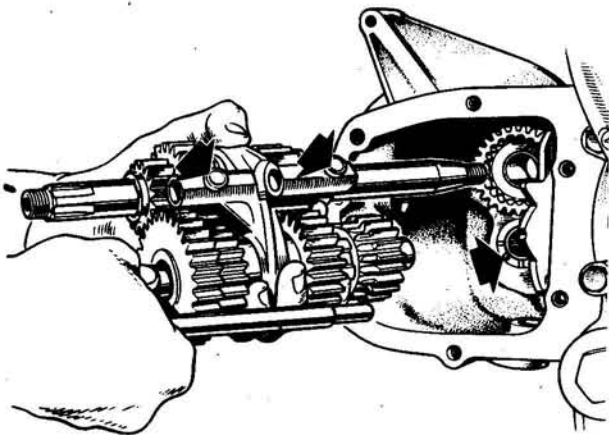
the timing gear cover (right crankcase cover).

7. Unscrew the three nuts and pull the alternator stator off the studs. Unscrew the cable sleeve nut (covered by a rubber grommet) and pull the cable through.

8. Bend back the locktab and unscrew the alternator rotor retaining nut.

Pull the rotor off the shaft, leaving the key in place to prevent the crankshaft timing gear from turning.

9. Before removing the timing gears, take note of the marks on the gear teeth that will line up if the gears are installed correctly. Pull the crankshaft pinion off using tool no. 61-6019 or a suitable gear puller.



Installing the gearbox components

10. Remove the circlip and pull off the idler (center) timing gear and its thrust washer.

11. To unscrew the two camshaft, timing-gear retaining nuts, it will be necessary to lock the crankshaft in position by inserting a bar through two of the connecting rods. Take care not to damage the crankcase. Unscrew the nuts, which have left-hand threads, and pull off the camshaft timing gears using tool no. D2213 or a suitable gear puller. Remove the woodruff keys.

12. Take out the three bolts and remove the tachometer drive which is located just above the front engine mount.

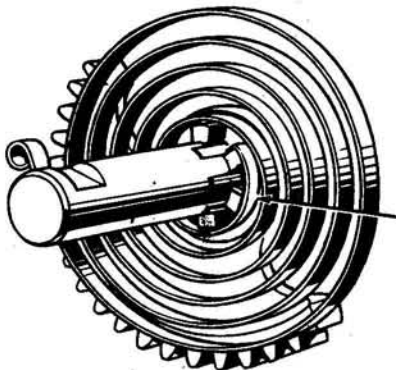
13. Remove the oil filter from the bottom of the crankcase, held in place by a large brass plug.

14. To separate the crankcases, first take out the hex bolts, allen bolt, and the six nuts from the timing side crankcase as shown in the illustration.

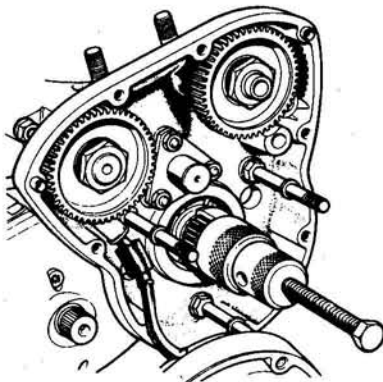
15. Next, remove the hex-head bolts from the drive-side crankcase. Tap off the drive-side crankcase using a soft metal drift. Place the drift against the lug at the rear of the case.

CAM SHAFTS

Withdraw the camshafts from the timing side crankcase and examine the lobes for wear and damage. Examine the tachometer drive gear on the exhaust cam-



Kickstarter return spring installation



Removing the crankshaft pinion

shaft for broken or worn teeth. Replace the camshafts if they do not appear to be in perfect condition.

CRANKSHAFT REMOVAL

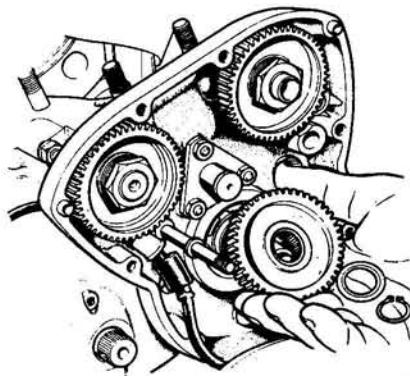
1. Remove the retaining screws from the two small oil lines on top of the main bearing journal caps, pull the lines up, turn them away from the caps, and push them down and out of the crankcase.

2. Remove the locknuts from the main bearing caps. To remove the caps, screw the oil line screws, with washers, back into them and pry the caps off the studs with levers.

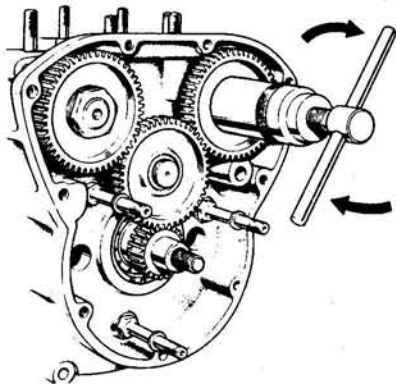
3. The crankshaft assembly can now be removed.

CENTER MAIN BEARINGS AND CONNECTING ROD BEARINGS

The crankpins and the two center



Removing the idler timing gear



Removing the camshaft pinions

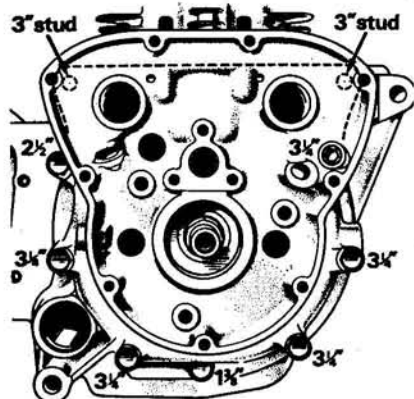
crankshaft journals run on replaceable, plain bearing inserts. Be sure to mark the rods and caps before removal so that they may be replaced in their original positions. It will be necessary to reground the crankshaft if journal or crankpin wear exceeds 0.002 in. or if their surfaces are damaged. Bearings are available in 0.010, 0.020, 0.030, and 0.040 in. undersizes. The crankshaft assembly will not require rebalancing if components are replaced or if the crankshaft is reground.

OUTER MAIN BEARINGS

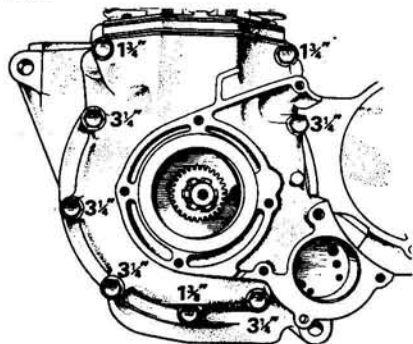
If they are to be removed, it will be necessary to remove the circlips on either side of the bearing.

NOTE: The center of the timing side roller bearing will remain with the crankshaft as the crankshaft is removed.

Oil seals should be replaced at this time to avoid future trouble. Take care not to damage seals during installation. The flat side of the seal always faces outside.



Right case securing bolts



Left case securing bolts

ASSEMBLY

1. Fit the rod and main bearing inserts into their seats and lubricate them with fresh engine oil. Install the connecting rods and caps in their original positions and tighten the nuts to 18 ft lbs. Use new nuts if possible. Make sure that all components are completely clean and well lubricated during assembly.

2. Place the crankshaft in position in the crankcase, with the splined end on the drive side. Install the main bearing caps, making sure that the marks on the caps and lower bearing seats correspond. Install the washers and nuts (new nuts should be used) and tighten to 18 ft lbs. Check to see that the crankshaft is free to rotate easily. If it will not, switch the main bearing inserts around, make sure they are seated properly and re-oil them. Too tight a fit will require turning down the crankshaft journals slightly.

3. Install new rubber seals for the tappet oil lines (connecting at the main bearing caps) and install the lines as removed, taking care not to damage the seals.

4. Replace the oil filter O-rings in the center crankcase.

5. Apply a thin coat of gasket cement to the crankcase mating surfaces and install the crankcases (with the camshafts installed in the turning side case) in reverse order of removal. Take care to avoid damaging tappet oil lines with the exhaust camshaft as the turning side case is installed. Tighten the nuts and bolts evenly to 15 ft lbs.

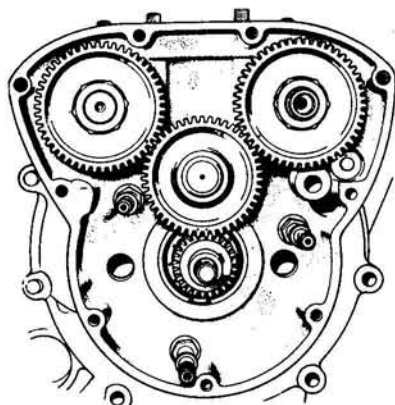
6. Check that the crankshaft and camshafts are free to rotate freely. If not, alignment is incorrect somewhere and must be corrected.

7. Install the crankshaft spacer on the timing side and then install the special key and crankshaft timing gear (with the mark facing out).

8. Install the camshaft timing gears with the no. 1 keyway (in line with the timing mark) located on the key in the shaft, and with the timing marks facing out. Install and tighten the left-handed-threaded retaining nuts.

9. Install the idler timing gear, aligning the timing marks as shown.

10. Install the alternator rotor, tightening the nut to 50 ft lbs. Install the stator and tighten the nuts to 8 ft lbs.



Timing gear marks properly aligned

Engine Specifications—TR6R, TR6C, and T120R (cont.)

PISTON PIN	
Material	High tensile steel
Fit in small-end bush	0.0005–0.0012 in. clearance
Diameter	0.6882–0.6885 in.
Length	2.151–2.156 in.
SMALL END BUSHING	
Material	Phosphor bronze
Outer diameter	0.8140–0.8145 in.
Length	1.030–1.031 in.
Finished bore diameter	0.6890–0.6894 in.

Clutch and Transmission Specifications—TR6R, TR6C, and T120R

CLUTCH	
Type	Multiplate with integral shock absorber
Number of plates:	
Driving (bonded)	6
Driven (plain)	6
Pressure springs:	
Number	3
Free-length	1 ¹³ / ₁₆ in.
Number of working coils	9 ¹ / ₂
Spring rate	113 lbs/in.
Approximate fitted load	62 lbs
Bearing rollers:	
Number	20
Diameter	0.2495–0.2500 in.
Length	0.231–0.236 in.
Clutch hub bearing diameter	1.3733–1.3743 in.
Clutch sprocket bore diameter	1.8745–1.8755 in.
Thrust washer thickness	0.052–0.054 in.
Engine sprocket teeth	29
Clutch sprocket teeth	58
Chain details	Duplex endless— ³ / ₈ in. pitch x 84 links
CLUTCH OPERATING MECHANISM	
Conical spring:	
Number of working coils	2
Free-length	1 ³ / ₃₂ in.
Diameter of balls	³ / ₈ in.
Clutch operating rod:	
Diameter of rod	⁷ / ₃₂ in.
Length of rod	11.822–11.812 in.
GEARS	
Mainshaft high gear:	
Bore diameter (bush fitted)	0.8135–0.8145 in.
Working clearance on shaft	0.0032–0.0047 in.
Bush length	2 ¹ / ₂ in.
Layshaft low gear:	
Bore diameter (bush fitted)	0.8135–0.8145 in.
Working clearance on shaft	0.0025–0.0045 in.
GEARBOX SHAFTS	
Mainshaft:	
Left end diameter	0.8098–0.8103 in.
Right end diameter	0.7494–0.7498 in.
Length	11 ¹ / ₁₆ in.
Layshaft:	
Left end diameter	0.6845–0.6850 in.
Right end diameter	0.6845–0.6850 in.
Length	6 ³ / ₁₆ in.
Camplate plunger spring:	
Free-length	2 ¹ / ₂ in.
Number of working coils	22
Spring rate	5–6 lb/in.
BEARINGS	
High gear bearing	1 ¹ / ₄ x 2 ¹ / ₂ x ⁵ / ₈ in. Ball Journal
Mainshaft bearing	³ / ₄ x 1 ¹ / ₈ x ⁹ / ₁₆ in. Ball Journal
Layshaft bearing (right and left)	1 ¹ / ₁₆ x ³ / ₈ x ³ / ₄ in. Needle Roller
KICK START OPERATING MECHANISM	
Bush bore diameter	0.751–0.752 in.
Spindle working clearance in bush	0.003–0.005 in.
Ratchet spring free-length	¹ / ₂ in.
GEARCHANGE MECHANISM	
Plungers:	
Outer diameter	0.4315–0.4320 in.
Working clearance in bore	0.0005–0.0015 in.
GEARCHANGE MECHANISM	
Plunger springs:	
Number of working coils	12
Free-length	1 ¹ / ₄ in.
Inner bush bore diameter	0.6245–0.6255 in.
Clearance on shaft	0.0007–0.0032 in.
Outer bush bore diameter:	0.7495–0.7505 in.
Clearance on shaft	0.0005–0.0025 in.
Quadrant return springs:	
Number of working coils	9 ¹ / ₂
Free-length	1 ³ / ₄ in.

Replacement Piston and Suitable Bore Sizes

500

Piston Marking in. (mm)	Bore	
	(in.)	(mm)
Standard	2.716	60.000
+0.010 (0.254)	2.726	69.254
+0.020 (0.508)	2.736	69.508
+0.040 (1.016)	2.756	70.000

650

Piston Marking in. (mm)	Suitable Bore Sizes	
	(in.)	(mm)
Standard	2.7948 2.7953	70.993 71.006
Oversizes		
+0.010 (0.254)	2.8048 2.8053	71.247 71.260
+0.020 (0.508)	2.8148 2.8153	71.501 71.514
+0.040 (1.016)	2.8348 2.8353	72.009 72.022

750—2

Piston Marking in. (mm)	Suitable Bore Sizes	
	(in.)	(mm)
Standard (L, M, H)	see "Cylinder and Piston Grading"	
+0.010 (0.254)	3.0010— 3.0021	76.2254— 76.2533
+0.020 (0.508)	3.0110— 3.0121	76.4794— 76.5073
+0.030 (0.726)	3.0210— 3.0221	76.7334— 76.7613
+0.040 (1.016)	3.0310— 3.0321	76.9514— 76.9793

750—3

Piston Size in. (mm)	Bore (in.)	Size (mm)
Standard	2.6368 2.6363	66.975 66.962
+0.010 (0.254)	2.6468 2.6463	67.229 67.215
+0.020 (0.508)	2.6568 2.6563	67.483 67.470
+0.040 (1.016)	2.6768 2.6763	67.990 67.980

Cylinder and Piston Grading

750—2

	"L"	"M"	"H"
Piston Diameter			
in.	2.9871— 2.9874	2.9875— 2.9878	2.9879— 2.9882
mm	75.872— 75.880	75.883— 75.890	75.893— 75.900
Cylinder Bore			
in.	2.9911— 2.9913	2.9914— 2.9917	2.9918— 2.9921
mm	75.973— 75.980	75.983— 75.990	75.993— 76.000

Engine Specifications—TR7V, T140V

PISTONS

Material	Aluminum alloy die cast
Clearance	see piston grading chart
Top of Skirt	—
Bottom of Skirt	—
Piston pin hole diameter	0.7502–0.7504 in.

PISTON RINGS

Material	cast iron
Compression rings (tapered)	
Width	0.113–0.121 in.
Thickness	0.0615–0.0625 in.
Fitted gap	0.008–0.013 in.
Clearance in groove	0.0015–0.0025 in.
Oil control ring	
Width	0.121 in.
Thickness	0.125 in.
Fitted gap	0.010–0.040 in.
Clearance in groove	0.0015–0.0025 in.

VALVES

Stem diameter: Intake	0.3095–0.3100 in.
Exhaust	0.3090–0.3095 in.
Head diameter: Intake	1.592–1.596 in.
Exhaust	1.434–1.440 in.
Exhaust valve material	21/4NS

VALVE GUIDES

Material	Aluminum-bronze
Bore diam. (Inlet & exhaust)	0.3127–0.3137 in.
Outside diameter (Inlet and exhaust)	0.5005–0.5010 in.
Length: Inlet	1 ³ / ₃₂
Exhaust	2 ¹ / ₆₄

VALVE SPRINGS (Red spot inner,

Green spot outer)	
Free-length	Out. 1 ¹ / ₂ in. In. 1 ¹ / ₃₂ in.
Number of coils	Out. 5 ¹ / ₂ In. 7 ¹ / ₄
Total fitted load	
Valve open	Int. 143 lbs. Ex. 155 lbs.
Valve closed	Int. 75 lbs. Ex. 87 lbs.
Fitted length (valve closed)	
Inner	1 ³ / ₁₆ in. 1 ¹ / ₂ in.
Outer	1 ¹ / ₃₂ in. 1 ⁵ / ₃₂ in.

ROCKERS

Material	High tensile steel forging
Bore diameter	0.5002–0.5012 in.
Rocker spindle diameter	0.4990–0.4995 in.
Tappet clear. (cold): Inlet	0.008 in. (0.203 mm)
Exhaust	0.006 in. (0.15 mm)

CAMSHAFTS

Journal diam.: Left	0.8100–0.8105 in.
Right	0.8730–0.8735 in.
Diametrical clear.: Left	0.0010–0.0025 in.
Right	0.0005–0.0020 in.
End float	0.013–0.020 in.
Cam lift: Inlet and exhaust	0.347 and 0.305 in.
Base circle diameter	0.812 in.

CRANKSHAFT

Crankshaft type	Forged two-throw crank with bolt-on flywheel
	located by the timing side main bearing
Main bearing (drive side) size and type	2 ¹ / ₁₆ x 1 ¹ / ₄ x 1 ¹ / ₈ in. roller bearing
Main bearing (timing side) size and type	72 x 30 x 19 mm ball race
Main bearing journal diameter (timing side)	1.1808–1.1812 in.
Main bearing journal diameter (drive side)	1.1247–1.250 in.
Main bearing housing diameter	2.8095–2.8110 in.
Big end journal diameter	1.6235–1.6240 in.
Minimum regrind diameter	1.6035–1.6040 in.
Crankshaft end float	0.003–0.017 in.

TAPPETS

Material	High tensile steel body—Stellite tip
Tip radius	0.75 in. (In.); 1.125 in. (Ex.)
Tappet diameter	0.3110–0.3115 in.
Clearance in guide block	0.0005–0.0015 in.

TAPPET GUIDE BLOCK

Diameter of bores	0.3120–0.3125 in.
Outside diameter	1.000–0.9995 in.
Interference fit in cyl. block	0.0005–0.0015 in.

CAMSHAFT BEARING BUSHES

Material	High density sintered bronze
Bore diam. (fitted): Left	0.8125–0.8135 in.
Right	0.874–0.875 in.
Outside diameter: Left	1.0010–1.0015 in.
Right	1.126–1.127 in.
Length: Left inlet	1.104–1.114 in.

CAMSHAFT BEARING BUSHES

Left exhaust	0.932–0.942 in.
Right inlet and exhaust	1.010–1.020 in.
Interference fit in crankcase	
Left	0.001–0.002 in.
Right	0.0010–0.0025 in.

750—3 Center Bearing Sizes

Shell Bearing Marking	Suitable Crankshaft Size	
	(in.)	(mm)
Standard	1.9170	48.692
	1.9175	48.705
Undersize	1.9070	48.438
—0.010	1.9075	48.451
—0.020	1.8970	48.184
	1.8975	48.197
—0.030	1.8870	47.930
	1.8875	47.943
—0.040	1.8770	47.676
	1.8775	47.689

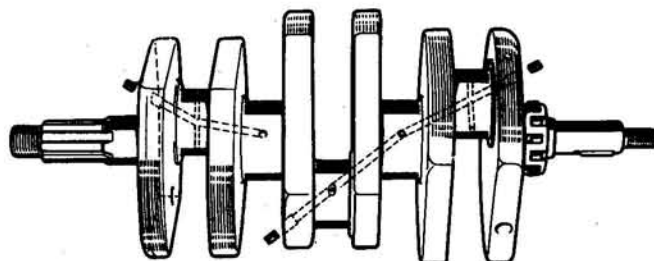
11. Loosely install the ignition advance unit and then install the breaker plate assembly, aligning the marks. Coat the crankcase and cover mating surfaces with gasket cement and install the timing side crankcase cover, using a new gasket.

12. Install the oil filter in the bottom of the engine.

13. Install the tachometer drive unit, coating the gasket with gasket cement on both sides. Tachometer drive components generally do not require replacement unless an obvious fault is visible.

14. Install the transmission gear cluster as detailed earlier.

15. Install the primary drive and clutch.



Crankshaft oil passages

Big-End Journal Sizes

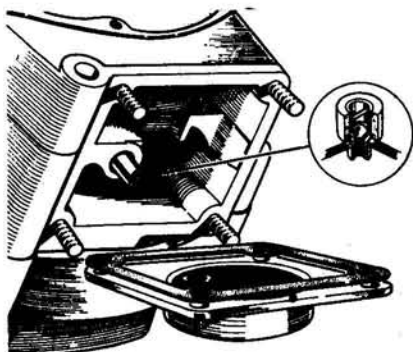
Shell Bearing Marking	Journal Size							
	250		500		650, 750—2		750—3	
	(in.)	(mm)	(in.)	(mm)	(in.)	(mm)	(in.)	(mm)
Standard	1.4375	36.5125	1.4375	36.512	1.6235	41.237	1.6235	41.237
	1.4380	36.5252	1.4380	36.525	1.6240	41.250	1.6240	41.250
Undersize								
—0.010	1.4275	36.2585	1.4365	36.258	1.6135	40.983	1.6135	40.983
	1.4280	36.2712	1.4370	36.271	1.6140	40.996	1.6140	40.996
—0.020	1.4175	36.0045	1.4355	36.004	1.6035	40.729	1.6035	40.729
	1.4180	36.0172	1.4360	36.017	1.6040	40.742	1.6040	40.742
—0.030	1.4075	35.7505	1.4345	35.750	—	—	1.5935	40.475
	1.4080	35.7632	1.4350	35.763	—	—	1.5940	40.488
—0.040	—	—	—	—	—	—	1.5833	40.221
	—	—	—	—	—	—	1.5840	40.234

LUBRICATION SYSTEMS

TR25W

Scavenge Non-return Valve

The scavenge non-return valve is located within the oil return pipe in the engine sump. It's a good idea to check its operation whenever the sump strainer screen is removed.



Scavenge non-return valve (250)

Poke a piece of wire into the pipe and force the check ball out of its seat. Allow it to drop back down of its own weight. If the ball does not seat itself properly, this indicates a sludge buildup in and around the valve. If necessary, immerse the return pipe in gasoline and let it sit until the check ball operates freely.

Feed Non-return Valve

The oil feed non-return valve is located

in the inner timing cover of the engine. Check its operation as described above and, if necessary, clean it with gasoline.

If you have a problem with the engine sump filling with oil whenever the bike is left to sit, chances are that a malfunction of this valve is the cause.

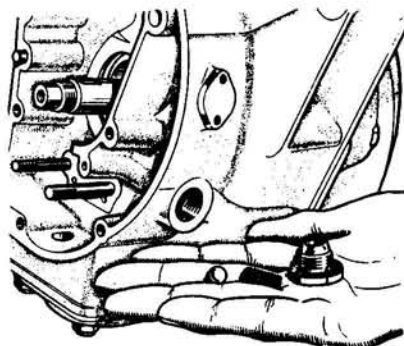
Crankcase Oil Line Union

The oil line union is secured to the crankcase with one nut. If a leak has developed at this junction, disconnect the oil lines and inspect the union sealing O-rings. Replace if necessary.

When reinstalling the union, note that the oil lines are correctly connected when they are crossed (i.e., outer line from the oil tank to the inner connection of the union).

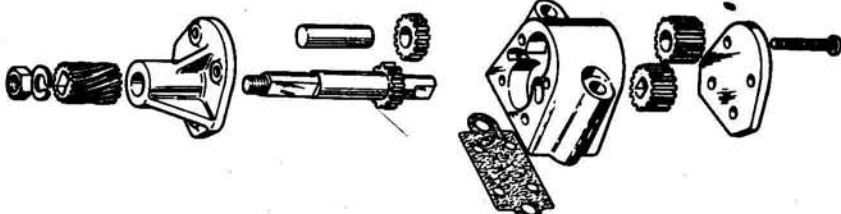
Oil Pressure Relief Valve

The oil pressure relief valve is located at the front right side of the crankcase. Should oil pressure exceed a pre-set limit, the valve routes the excess oil directly back into the sump.



Oil pressure relief valve (250)

To remove the valve, unscrew the hexagonal plug and withdraw the ball and spring. Inspect them for corrosion etc., and replace them if necessary. The spring will, in time, lose its strength, so it is advisable to replace it if the machine has accumulated high mileage. Also replace the fiber washer if it is in less than perfect condition.



Oil pump (250)

Oil Pump

The oil pump is located at the front right side of the engine inside the case cover.

DISASSEMBLY

1. Remove the four screws at the base of the pump and remove the baseplate and top cover.
2. Mark the worm gear for reassembly, then remove the nut and washer that secure the gear and driving spindle to the top cover.
3. Clean all parts thoroughly in kerosine or a cleaning solvent and blow them dry with compressed air.

INSPECTION

Examine the oil pump parts for excessive scoring and foreign object damage. If oil changes have been neglected, it will be evident by the damage done to the pump gear teeth and pump body. Small scratches can be ignored, but any more substantial wear calls for parts replacement.

Inspect the pump gears for worn or broken teeth. If formerly sharp edges have become rounded off, the gear should be replaced.

ASSEMBLY

1. Make sure all parts are absolutely clean and bathed in engine oil or assembly lube.
2. Insert the driving spindle into the pump top cover.
3. Install the worm drive gear and secure it with the nut and spring washer.
4. Install the driven spindle and gear in the top cover.
5. Install the lower pump gears and baseplate.
6. Rotate the spindle and gears to make certain there is no binding, then tighten the four securing screws.
7. Check the joining surfaces of the oil pump to make sure they are all parallel. If not, the pump may not be free to operate when installed in the engine.
8. Also check the crankcase breather located near the clutch cable abutment in the timing case. This breather *must* be free from obstruction.

500, 650, 750 TWINS

Checking Oil Pressure

Normal oil pressure at idle is about 20 to 25 psi, but may rise as high as 80 psi when the engine is cold. Normal running pressure is 65 to 80 psi.

Oil pressure can be checked by connecting a gauge and adaptor in place of the relief valve.

Oil Line Junction Block

REMOVAL AND INSTALLATION

1. Drain the transmission oil.
2. Remove the gearbox outer cover as described in "Engine and Transmission."
3. Drain the oil tank.
4. Disconnect the rubber lines from

Engine Specifications—TR7V, T140V (cont.)

TIMING GEARS

Inlet and exh. camshaft pinions	50
Number of teeth	0.000-0.001 in.
Interference fit on camshaft	
Intermediate timing gear	47
Number of teeth	0.5618-0.5625 in.
Bore diameter	
Intermediate timing gear bush	
Material	Phosphor bronze
Outside diameter	0.5635-0.5640 in.
Bore diameter	0.4990-0.4995 in.
Length	0.6775-0.6825 in.
Working clear. on spindle	0.0005-0.0015 in.
Intermediate wheel spindle	
Diameter	0.4980-0.4985 in.
Interference fit in crank.	0.0005-0.0015 in.
Crankshaft pinion	
Number of teeth	25
Fit on crankshaft	+0.0003/-0.0005 in.

CYLINDER BLOCK

Material	Cast iron
Bore size	2.9911-2.9921 in.
Maximum oversize	+0.040 in.
Tappet guide block housing diameter	0.9990-0.9985 in.

CYLINDER HEAD

Material	D.T.D. 424 Aluminium
Inlet port size	1.12 in.
Exhaust port size	1 1/4 in. diam.
Valve seatings	
Type	Cast-in
Material	Cast iron

CONNECTING RODS

Length (centers)	5.999-6.001 in.
Big-end bearings—type	Steel backed with white metal
Bearing side clearance	0.012-0.016 in.
Bearing diametrical clearance	0.005-0.0020 in.

PISTON PIN

Material	High tensile steel
Fit in small-end bush	0.0005-0.0012 in. clear.
Diameter	0.6882-0.6885 in.
Length	2.151-2.156 in.

SMALL END BUSHING

Material	Phosphor bronze
Outer diameter	0.8140-0.8145 in.
Length	1.030-1.031 in.
Finished bore diameter	0.6890-0.6894 in.

Clutch and Transmission Specifications— TR7V, T140V

CLUTCH

Type	Multiplate with integral shock absorber
Number of plates	
Driving (bonded)	6
Driven (plain)	6
Pressure springs	
Number	3
Free length	1.75 in.
No. working coils	7 1/2
Spring rate	169 lbs.
Approximate fitted load	83 lbs.
Bearing rollers	
Number	20
Diameter	0.2495-0.2500 in.
Length	0.231-0.236 in.
Clutch hub bearing diameter	1.3733-1.3743 in.
Clutch sprocket bore diameter	1.8745-1.8755 in.
Thrust washer thickness	0.052-0.054 in.
Engine sprocket teeth	29
Clutch sprocket teeth	58
Chain	Triplex endless—3/8 in. pitch x 84 links

CLUTCH OPERATING MECHANISM

Conical spring	
Number of working coils	2
Free length	1 3/32 in.
Diameter of balls	3/8 in.
Clutch operating rod	
Diameter	7/32 in.
Length	11.812-11.822 in.

GEARS

Mainshaft, high gear	
Bearing type	Needle roller (Torrington B1314)
Bearing length	0.865-0.875 in.
Spigot diameter (high gear)	1.5072-1.5077 in.

Clutch and Transmission Specifications— TR7V, T140V (cont.)

GEARBOX SHAFTS

Mainshaft	
Left end diameter	0.8089–0.8103 in.
Right end diameter	0.7494–0.7498 in.
Length	11.23 in.
Layshaft	
Left end diameter	0.6870–0.6875 in.
Right end diameter	0.6870–0.6875 in.
Length	6.47 in.

GEARBOX BEARINGS

Mainshaft bearing (left)	1½ x 2½ x ¾ in. Roller bearing
Mainshaft bearing (right)	¾ x 1¾ x ¾ in. Ball Journal
Layshaft bearing (left)	1½ x ¾ x ¾ in. Needle roller
Layshaft bearing (right)	1½ x ¾ x ¾ in. Needle roller
Layshaft 1st gear bush	
Bore diameter	0.795–0.800 in.
Shaft diameter	0.8070–0.8075 in.
Layshaft 2nd gear bush	
Bore diameter	0.795–0.800 in.
Shaft diameter	0.8070–0.8075 in.

KICK START OPERATING MECHANISM

Bush bore diameter	0.751–0.752 in.
Spindle working clearance in bush	0.003–0.005 in.
Ratchet spring free-length	½ in.

GEARCHANGE MECHANISM

Plungers	
Outer diameter	0.4315–0.4320 in.
Working clearance in bore	0.0005–0.0015 in.
Plunger springs	
Number of working coils	12
Free-length	1¼ in.
Inner bush bore diameter	0.6245–0.6255 in.
Clearance on shaft	0.0007–0.0032 in.
Outer bush bore diameter	0.7495–0.7505 in.
Clearance on shaft	0.0005–0.0025 in.
Quadrant return springs	
Number of working coils	9½
Free-length	1¾ in.

Engine Specifications—T150

PISTONS

Material	Aluminum Alloy—die casting
Clearance:	
Top of skirt	0.0056–0.0035 in. (0.42–0.089 mm)
Bottom of skirt	0.0033–0.0018 in. (0.084–0.0457 mm)
Piston pin hole diameter	0.6885–0.6883 in. (17.9879–17.4828 mm)

PISTON RINGS

Material	Cast iron HG10
Compression rings (tapered):	
Width	2.729–2.577 in.
Thickness	0.0625–0.0615 in. (1.5875–1.5621 mm)
Fitted gap	0.009–0.013 in. (0.2286–0.3302 mm)
Clearance in groove	0.0035–0.0015 in. (0.89–0.038 mm)
Oil control ring:	
Width	2.729–2.577 mm
Thickness	0.125–0.124 in. (3.175–3.1496 mm)
Fitted gap	0.010–0.040 in. (0.254–1.016 mm)
Clearance in groove	0.0105–0.0065 in. (0.266–0.165 mm)

CYLINDER

Material	Austenitic steel liner Aluminum Alloy
Bore size	2.6368–2.6363 in. (66.9747–66.062 mm)
Maximum oversize	0.040 in. (1.016 mm)
Tappet guide block housing diameter	1.1562–1.1557 in. (29.3675–29.3548 mm)

CYLINDER HEAD

Material	Alum. alloy die casting
Inlet port size	1 in. dia (25.4 mm)
Exhaust:	
Valve seatings	1¼ in. dia (31.75 mm)
Type	Cast-in
Material	Cast iron

VALVES

Stem diameter:	
Intake	0.3100–0.3095 in. (7.8740–7.8613 mm)
Exhaust	0.3095–0.3090 in. (7.8613–7.8495 mm)
Head diameter:	
Intake	1.534–1.528 in. (38.9636–38.812 mm)
Exhaust	1.315–1.309 in. (33.401–33.2486 mm)
Exhaust valve material	21–4 'N' heat treated

VALVE GUIDES

Material	Hidural 5
Bore diameter (Inlet and exhaust)	0.3115–0.3110 in. (7.9121–7.8994 mm)
Outside diameter (Inlet and exhaust)	0.5005–0.5010 in. (12.7127–12.7254 mm)
Length:	
Intake	1.875 in. (47.625 mm)
Exhaust	1.875 in. (47.625 mm)

the oil tank.

5. Remove the junction block and clean it thoroughly in kerosene.

6. Check all lines for chafing and signs of decomposition. Replace as necessary.

7. Installation is basically a reversal of the removal procedure. Use a new gasket between the junction block and crankcase, and reconnect the oil lines carefully.

Rocker Oil Feed Line

REMOVAL AND INSTALLATION

1. Remove the two domed nuts securing the feed line to the rocker spindle.

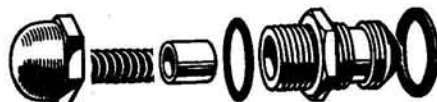
2. Disconnect the feed line at the oil tank.

3. Remove the clips securing the feed line to the frame.

NOTE: Take care not to bend the feed line when removing it from the frame because it may cause a future rupture.

4. Thoroughly clean the oil feed line with kerosene, then blow it out with compressed air.

5. Check the line for proper sealing by holding your thumb over the banjo fitting



Pressure relief valve (Twins)

at one end of the line and blowing through the other.

6. To install the rocker oil feed-line, reverse the removal procedure and replace the banjo fitting washers.

Oil Pressure Relief Valve

The valve is located at the front of the engine on the right side, adjacent to the timing cover.

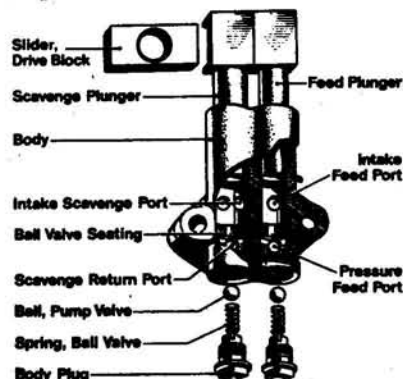
REMOVAL AND DISASSEMBLY

1. Remove the valve body by unscrewing the hexagonal cap.

2. Separate the cap from the valve body and withdraw the piston and spring.

3. Thoroughly clean all parts in kerosene, then inspect the piston and spring for signs of wear. Also check to make sure the valve filter is free from obstruction.

4. If the bike has accumulated high mileage it is advisable to check spring pressure with the standard figure given in specifications.



Oil pump (Twins)

ASSEMBLY AND INSTALLATION

1. Replace both fiber washers with new ones.
2. Assemble the valve body, piston, and spring.

NOTE: The open end of the piston should face toward the spring and cap.

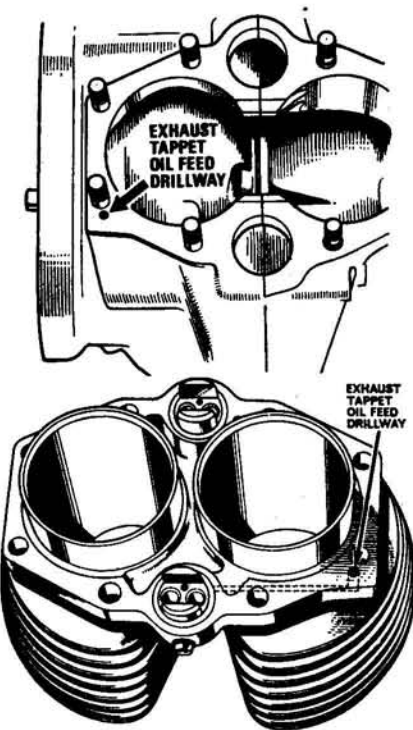
3. Install the valve body and screw on the hexagonal cap.

Oil Pump

The oil pump is located inside the timing cover and is driven off the end of the intake camshaft. Since the pump itself is totally immersed in oil, wear on internal parts should be negligible. The oil pump drive block slider is not as well lubricated, however, and therefore should be replaced when the machine has accumulated high mileage.

REMOVAL AND DISASSEMBLY

1. Remove the timing cover.
2. Remove the two oil pump securing nuts.
3. Lift the oil pump off the mounting studs.



Tappet oil feed drillways

4. Remove the scavenge and feed plungers.
5. Unscrew the two square end caps and remove the two springs and balls.
6. Clean all parts in kerosine, then inspect them for scoring, pitting, and excessive wear. Measure plunger diameters and spring compressed strength. Standard values are given in the specifications.

ASSEMBLY AND INSTALLATION

1. Lubricate all parts generously with engine oil.
2. Assemble the plungers, balls, springs, and end caps.

Engine Specifications—T150 (cont.)

VALVE SPRINGS (RED AND WHITE)

Free-length:	
Inner	1.468 in. (37.2872 mm)
Outer	1.600 in. (40.64 mm)
Total number of coils:	
Inner	6
Outer	5½
Total fitted load	
Valve open:	
Inner	82 lbs (37.228 kgm)
Outer	115 lbs (51.31 kgm)
Valve closed:	
Inner	37-40 lbs (16.798-18.144 kgm)
Outer	43-53 lbs (21.792-24.062 kgm)

VALVE LIFT

Set all tappet clearances @ nil for checking
Measure valve lift at TBC with cold engine

Valve lift:
Inlet 0.152 in. (3.86 mm)
Exhaust 0.146 in. (3.71 mm)

ROCKERS

Material	NI. CH. Steel stamping (EN33)
Bore diameter	0.5002-0.5012 in. (12.7051-12.7305 mm)
Rocker spindle diameter	0.4990-0.4995 in. (12.6746-12.6873 mm)
Tappet clearance (cold):	
Inlet	0.006 in. (0.1524 mm)
Exhaust	0.008 in. (0.2032 mm)

CAMSHAFTS

Journal diameter	1.0615-1.0605 in. (26.9621-26.9367 mm)
Diametrical clearance	0.0005-0.0020 in. (0.0127-0.0508 mm)
End float	0.007-0.014 in. (0.178-0.356 mm)
Cam lift: Inlet and exhaust	0.3045 in. (7.7343 mm)
Base circle diameter	0.812 in. dia (20.6248 mm)

TAPPETS

Material	EN32B (Stellite tip)
Tip radius	1.125 in. (28.575 mm)
Tappet diameter	0.3115-0.3110 in. (7.9121-7.8994 mm)
Clearance in guide block	0.0005-0.0015 in. (0.0127-0.0381 mm)

TAPPET GUIDE BLOCK

Diameter of bores	0.3125-0.3120 in. (7.9375-7.9248 mm)
Outside diameter	1.153-1.148 in. (29.2862-29.1592 mm)
Interference fit in cylinder block	0.0027-0.0082 in. (0.06858-0.20828 mm)

ROCKER SPINDLE BUSHINGS

Bush D/S:	
Bore diameter	0.497-0.498 in. (12.624-12.649 mm)
Outside diameter	0.6260-0.6265 in. (15.9004-15.913 mm)
Bush T/S:	
Bore diameter	0.375-0.374 in. (9.525-9.4996 mm)
Outside diameter	0.501-0.502 in. (12.725-12.751 mm)

TIMING GEARS

Inlet and exhaust camshaft pinions:	
Number of teeth	50
Interference fit on camshaft	0.000-0.001 in. (0.000-0.0254 mm)
Intermediate timing gear	
Number of teeth	42
Bore diameter	0.5618-0.5625 in. (14.2697-14.2875 mm)
Intermediate timing gear needle roller	1½ x 2½ x ¾ in. (17.46 x 22.225 x 15.87 mm)
Intermediate wheel spindle	
Diameter	0.6888-0.6885 in. (17.4955-17.4879 mm)
Crankcase pinion:	
Number of teeth	25
Fit on crankcase	-0.00003 in. (-0.00762 mm) -0.0005 in. (-0.0127 mm)

CRANKSHAFT

Crankshaft type

Main bearing (drive side) size and type

Main bearing (center) running clearance
Main bearing (timing side) size and type

Right main bearing housing diameter	2.8110-2.8095 in. (71.3994-71.3613 mm)
Right main bearing journal diameter	1.1248-1.1245 in. (28.5699-28.5623 mm)
Center main bearing housing diameter	2.0630-2.0625 in. (52.4002-52.3875 mm)
Center main bearing journal diameter	1.9170-1.9175 in. (48.6918-48.7045 mm)
Left main bearing housing diameter	2.0447-2.0457 in. (51.9344-51.9608 mm)
Left main bearing journal diameter	0.9843-0.9840 in. (25.0012-24.9936 mm)
Big-end journal diameter	1.6240-1.6235 in. (41.2496-41.2369 mm)
Minimum regrind diameter	1.6200-1.6185 in. (41.148-41.1099 mm)
Crankshaft end float	0.0015-0.0145 in. ((0.038-0.368 mm)

CONNECTING RODS

Material	Alloy 'H' Section RR.56
Length (centers)	5.751-5.749 in. (14.6075-14.6024 mm)
Big-end bearings type	Steel-backed white metal
Con rod side clearance	0.013-0.019 in. (0.3302-0.4826 mm)
Bearing diametrical clearance	0.0005-0.0020 in. minimum (0.0127-0.0508 mm)

PISTON PIN

Material	High tensile steel
Fit in small-end	0.0005-0.0011 in. (0.0127-0.0279 mm)

Clutch and Transmission Specifications—T150

3. Add approximately 1 cc of oil in each plunger bore, then press the plungers until the oil is forced through both outlet ports.

NOTE: The outlet ports are the two holes nearest the square end caps.

4. Hold your thumb over the intake ports (nearest the plunger tops) and pull the plungers out slightly. If the oil level drops in either outlet port, the ball and spring in that port are not seated properly, and the end cap should be removed and the cleaning process repeated.

NOTE: On machines equipped with a brass body oil pump, the balls can be lightly, but sharply, tapped to ensure a good seal. On machines equipped with the cast iron pump body, however, this should not be attempted since a bad seal indicates a warped body that should be replaced.

5. Check the oil pump drive block slider for excessive wear, then install the pump with a new gasket. Make sure that the conical securing nuts are positioned so that they fit into the countersunk holes in the pump body.

6. Clean the timing cover and crankcase mating surfaces, then apply fresh sealing compound and install the cover.

T150, T150V

Checking Oil Pressure

Normal running oil pressure at 3,000 rpm is 75–90 psi, but may rise above that when the engine is cold. Pressure can be checked by installing an oil pressure gauge in one of the blanking plugs at the front of the center crankcase.

If the oil pressure is unsatisfactory, check the following:

1. Faulty or dirty oil pressure relief valve.
2. Insufficient amount of lubricant in the oil tank.
3. Dirty or incorrectly installed oil filters.
4. Faulty oil pump.
5. Obstructed crankcase drillings.
6. Excessively worn main or connecting rod bearings.
7. Leaking crankcase union O-rings.

Oil Pressure Relief Valve

The oil pressure relief valve is located in the primary chaincase. Triumph special tool no. D2135 can be used to remove the valve with only the primary cover removed, but if this tool is not available,

CLUTCH DETAILS

Single diaphragm spring-clutch spring rate
Minimum travel to disengage
Minimum wear of friction plate
Bearing-Outer thrust plate—Size and type
Needle race—Size and type
Thrust race—Size and type

1,000 lb (approx) (453.8 kgm)
0.035 in. (0.889 mm)
0.06 in. (1.524 mm)
 $\frac{1}{2} \times 1\frac{1}{4} \times \frac{1}{4}$ in. (12.7 x 28.575 x 6.35 mm)
(2 off) $1\frac{3}{8} \times 1\frac{1}{4} \times \frac{1}{2}$ in. (34.93 x 41.28 x 12.7 mm)
 $1\frac{3}{8} \times 2\frac{1}{4} \times \frac{3}{4}$ in. (34.93 x 52.39 x 1.984 mm)

GEAR

Mainshaft high gear:
Bore diameter (bush fitted)
Working clearance on shaft
Bush length
Layshaft low gear:
Bore diameter
Working clearance

0.8135–0.8145 in. (20.6629–20.6883 mm)
0.0032–0.0047 in. (0.08128–0.1194 mm)
 $2\frac{1}{4}$ in. (57.15 mm)
0.8135–0.8145 in. (20.6629–20.6883 mm)
0.0025–0.0045 in. (0.0635–0.127 mm)

GEARBOX SHAFTS

Mainshaft:
Left end diameter
Right end diameter
Length
Layshaft:
Left end diameter

0.8098–0.8103 in. (20.5689–20.5816 mm)
0.7494–0.7498 in. (19.0348–19.044 mm)
 $10\frac{1}{4}$ in. (262.337 mm)
0.6845–0.6850 in. (17.4063–17.419 mm)
0.6845–0.6850 in. (17.4063–17.419 mm)
 $6\frac{1}{4}$ in. (168.694 mm)

Length
Camplate plunger spring:
Free-length
Number of working coils
Spring rate
Working range

$22\frac{1}{2}$ in. (67.4675 mm)
27
9 lbs/in. (0.633 kg/sq cm)
7.5 to 11.5 lbs (3.405 kgm–5.220 kgm)

BEARINGS

High gear bearing
Mainshaft bearing
Layshaft bearing (left)
Layshaft bearing (right)

$1\frac{1}{4} \times 2\frac{1}{2} \times \frac{5}{8}$ in. Ball Journal
31.75 x 63.5 x 15.875 mm)
 $\frac{3}{4} \times 1\frac{1}{4} \times \frac{5}{8}$ in. Ball Journal
(19.05 x 47.625 x 14.282 mm)
 $1\frac{1}{8} \times \frac{3}{4} \times \frac{3}{4}$ in. Needle Roller
(17.463 x 22.227 x 19.05 mm)
 $1\frac{1}{8} \times \frac{3}{4} \times \frac{3}{4}$ in. Needle Roller
(17.463 x 22.227 x 19.05 mm)

KICK-START OPERATING MECHANISM

Bush bore diameter
Spindle working clearance in bush
Ratchet spring free-length

0.751–0.752 in. (19.0754–19.1008 mm)
0.003–0.005 in. (0.0762–0.127 mm)
 $\frac{1}{2}$ in. (12.7 mm)

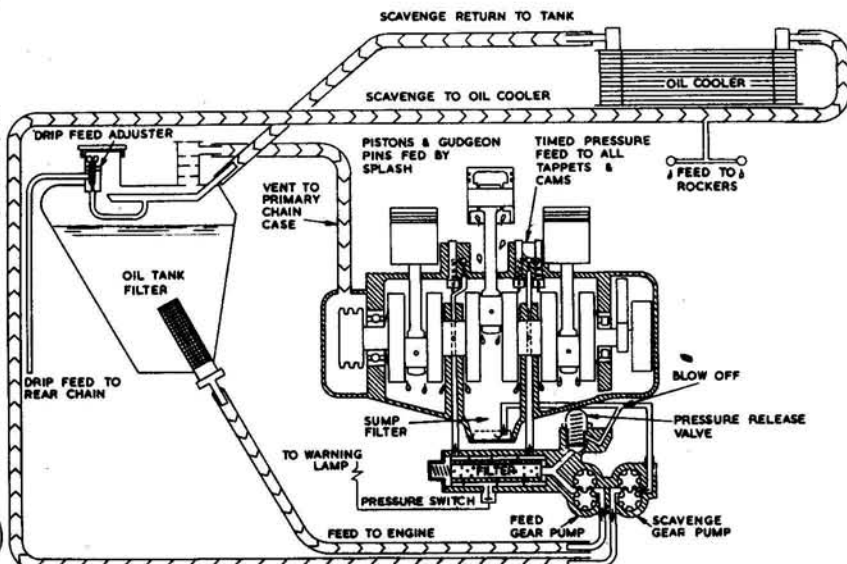
GEARCHANGE MECHANISM

Plungers:
Outer diameters
Working clearance in bore
Plunger springs:
Number of working coils
Free-length
Inner bush bore diameter
Clearance on shaft
Outer bush bore diameter
Clearance on shaft
Quadrant return springs:
Number of working coils
Free-length

0.4315–0.4320 in. (10.9601–10.9728 mm)
0.0005–0.005 in. (0.0127–0.127 mm)
12
 $1\frac{1}{4}$ in. (31.75 mm)
0.6245–0.6255 in. (15.7423–15.8877 mm)
0.0007–0.0032 in. (0.01778–0.08128 mm)
0.7495–0.7505 in. (19.0373–19.0627 mm)
0.0005–0.0025 in. (0.0127–0.0635 mm)
 $\frac{9}{16}$
 $1\frac{1}{4}$ in. (44.45 mm)



Pressure relief valve (Trident)



Trident lubrication system

Triumph

the chaincase must be disassembled to gain access.

Disassemble and inspect the valve as described for the 500, 650 and 750 cc Twins.

Rocker Oil Feed Line

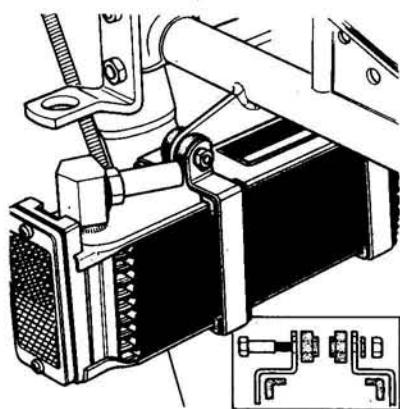
Service the rocker oil feed line as described for the twins.

Oil Cooler

The Trident is equipped with an oil cooler mounted below the gas tank on two support brackets. Great care should be taken when handling this component.

REMOVAL

1. Remove the gas tank.
2. Mark both oil lines for reassembly, then disconnect the clips. Take care not to tilt the cooler as it still contains approximately one-half pint of oil.
3. Loosen the top support bracket bolts and remove the bracket corner packings.



Oil cooler installation

4. Hold the cooler upright and remove the bracket bolts, nuts, and washers.
5. Lift out the cooler, then drain the remaining oil by inverting the cooler over a suitable container.
6. Clean the outside of the cooler with kerosene and a soft-bristled brush. It is not necessary to flush the cooler.

INSTALLATION

Installation is a reversal of the removal procedure. Note the following:

1. The large oil line fittings at the top of the cooler should face rearward when the cooler is installed.
2. When the cooler is properly installed, the left oil line fitting should be connected to the scavenge line and the right fitting to the oil tank return line.

Oil Pump

The oil pump is the double-gear type and is mounted in the primary side crankcase. Drive is provided by the crankshaft via reduction gears. Since the pump is immersed in oil, wear should be negligible on all but the feed and scavenge drive gears.

REMOVAL

1. Remove the outer and inner primary chaincases (See "Engine and Transmission").

Engine Specifications—T150V^①

MAIN BEARINGS

Right main bearing size	25 x 52 x 15 mm
Right main bearing journal diameter	2.0447–2.0457 in. (51.934–51.961 mm)
Left main bearing journal diameter	2.8095–2.8110 in. (71.3613–71.3994 mm)
Left main bearing journal diameter	1.1245–1.1248 in. (28.563–28.5699 mm)
Minimum regrind diameter	1.5833–1.5840 in. (40.221–40.234 mm)

CONNECTING RODS

Big end bearing material	Lead-bronze
--------------------------	-------------

CYLINDER HEAD

Intake port size	1½ in. (27 mm)
------------------	----------------

CAMSHAFTS

Cam lift (In. and Ex.)	0.329 in. (8.356 mm)
------------------------	----------------------

① With the exception of the specifications on this chart T150V information may be obtained from the T150 Engine Specifications chart.

Clutch and Transmission Specifications—T150V

CLUTCH DETAILS

Single diaphragm spring-clutch spring rate	1,000 lb (approx) (453.6 kmg)
Minimum travel to disengage	0.035 in. (0.889 mm)
Minimum wear to friction plate	0.06 in. (1.524 mm)
Bearing-Outer thrust plate—Size and type	½ x 1½ x ¼ in. (12.7 x 28.575 x 6.35 mm)
Needle race—Size and type	(2 off) 1½ x 1½ x ½ in. (34.93 x 41.28 x 12.7 mm)
Thrust race—Size and type	1½ x 2½ x ¾ in. (34.93 x 52.39 x 1.984 mm)

GEARS

Mainshaft, high gear	
Bearing type	Needle roller (Torrington B1314)
Bearing length	0.865–0.875 in.
Spigot diameter (high gear)	1.5072–1.5077 in.

GEARBOX SHAFTS

Mainshaft	
Left end diameter	0.8089–0.8103 in.
Right end diameter	0.7494–0.7498 in.
Length	10.33 in.
Layshaft	
Left end diameter	0.6870–0.6875 in.
Right end diameter	0.6870–0.6875 in.
Length	6.47 in.

GEARBOX BEARINGS

Mainshaft bearing (left)	1½ x 2½ x ¾ in. Roller bearing
Mainshaft bearing (right)	¾ x 1½ x ¾ in. Ball journal
Layshaft bearing (left)	1½ x ¾ x ¾ in. Needle roller
Layshaft bearing (right)	1½ x ¾ x ¾ in. Needle roller
Layshaft 1st gear bush	
Bore diameter	0.795–0.800 in.
Shaft diameter	0.8070–0.8075 in.
Layshaft 2nd gear bush	
Bore diameter	0.795–0.800 in.
Shaft diameter	0.8070–0.8075 in.

KICK START OPERATING MECHANISM

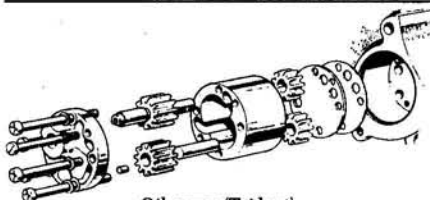
Bush bore diameter	0.751–0.752 in.
Spindle working clearance in bush	0.003–0.005 in.
Ratchet spring free-length	½ in.

GEARCHANGE MECHANISM

Plungers	
Outer diameter	0.4315–0.4320 in.
Working clearance in bore	0.0005–0.0015 in.

GEARCHANGE MECHANISM

Plunger springs	
Number of working coils	12
Free-length	1¼ in.
Inner bush bore diameter	0.6245–0.6255 in.
Clearance on shaft	0.0007–0.0032 in.
Outer bush bore diameter	0.7495–0.7505 in.
Clearance on shaft	0.0005–0.0025 in.
Quadrant return springs	
Number of working coils	9½
Free-length	1¼ in.
Camplate plunger spring:	
Free length	2.28 in.
Number of working coils	21
Spring rate	8.80 lbs./in.



Oil pump (Trident)

2. Remove the four attaching screws and lift out the oil pump assembly.
3. Remove the two remaining screws and separate the pump parts.
4. Drive out the gear spindles with a thin, soft alloy drift.
5. Wash all parts thoroughly in cleaning solvent or kerosene, then blow them dry with compressed air.

INSPECTION

Examine the gear teeth for scoring or rounded out edges. Check the spindles and spindle bores in the gears and pump body. Replace any parts that are excessively worn.

Engine Torque Specifications

TR25W

Carburetor flange nuts	10 ft lbs (1.383 kg/m)
Clutch center nut	60-65 ft lbs (8.295-8.998 kg/m)
Con. rod end cap nuts	25-27 ft lbs (3.456-3.733 kg/m)
Crankshaft pinion nut	35-40 ft lbs (4.839-5.530 kg/m)
Cylinder barrel nuts	26-28 ft lbs (3.595-3.871 kg/m)
Cylinder head stud nuts	18-20 ft lbs (2.489-2.765 kg/m)
Kick-start ratchet nut	50-55 ft lbs (6.913-7.604 kg/m)
Oil pump stud nuts	5-7 ft lbs (691-968 kg/m)
Rotor fixing nut	60 ft lbs (8.295 kg/m)
Valve cover nuts (large)	10 ft lbs (1.383 kg/m)
Valve cover nuts (small)	5-7 ft lbs (691-869 kg/m)

T100C, T100R

Flywheel bolts	33 ft lbs
Con. rod bolts	27 ft lbs
Crankcase junction bolts	15 ft lbs
Crankcase junction studs	20 ft lbs
Cylinder block nuts	35 ft lbs
Cylinder head bolts (1/2 in. dia.)	18 ft lbs
Rocker box nuts	5 ft lbs
Rocker box bolts	5 ft lbs
Rocker spindle-domed nuts	25 ft lbs
Oil pump nuts	6 ft lbs
Kickstart ratchet pinion nut	40 ft lbs
Clutch center nut	50 ft lbs
Rotor fixing nut	30 ft lbs
Stator fixing nuts	20 ft lbs
Twin carburetor manifold socket screws	10 ft lbs

TR6R, TR6C, T120R

Flywheel bolts	33 ft lbs (4.6 kg/m)
Con. rod bolts	28 ft lbs (3.9 kg/m)
Crankcase junction bolts	13 ft lbs (1.8 kg/m)
Crankcase junction studs	20 ft lbs (2.8 kg/m)
Cylinder block nuts	35 ft lbs (4.8 kg/m)
Cylinder head bolts (1/2 in. dia.)	18 ft lbs (2.49 kg/m)
Cylinder head bolt (3/8 in. dia.)	15 ft lbs (2.1 kg/m)
Rocker box nuts	5 ft lbs (0.7 kg/m)
Rocker box bolts	5 ft lbs (0.7 kg/m)
Rocker spindle-domed nuts	22 ft lbs (3.0 kg/m)
Oil pump nuts	5 ft lbs (0.7 kg/m)
Kick-start ratchet pinion nut	45 ft lbs (6.3 kg/m)
Clutch center nut	50 ft lbs (7 kg/m)
Rotor fixing nut	30 ft lbs (4.1 kg/m)
Stator fixing nuts	20 ft lbs (2.8 kg/m)
Primary cover domed nuts	10 ft lbs (1.4 kg/m)

TR7V, T140V

Flywheel bolts	33 ft lbs (4.6 kg/m)
Con. rod bolts	22 ft lbs (3.9 kg/m)
Crankcase junction bolts	13 ft lbs (1.8 kg/m)
Crankcase junction studs	20 ft lbs (2.8 kg/m)
Rocker box bolts —inner (1/2 in. dia.)	10 ft lbs (1.38 kg/m)
Cylinder head bolts—outer (3/8 in. dia.)	18 ft lbs (2.49 kg/m)
Cylinder head bolt—center (3/8 in. dia.)	16 ft lbs (2.07 kg/m)
Cylinder head bolt—inner (3/8 in. dia.)	18 ft lbs (2.49 kg/m)
Rocker box nuts	5 ft lbs (7 kg/m)
Rocker box bolts (1/4 in. dia.)	5 ft lbs (7 kg/m)
Rocker spindle-domed nuts	22 ft lbs (3.0 kg/m)
Oil pump nuts	5 ft lbs (7 kg/m)
Kick-start ratchet pinion nut	45 ft lbs (6.3 kg/m)
Clutch center nut	70 ft lbs (7 kg/m)
Rotor fixing nut	40 ft lbs (4.1 kg/m)
Stator fixing nuts	20 ft lbs (2.8 kg/m)
Primary cover domed nuts	10 ft lbs (1.4 kg/m)

T150, T150V

Con. rod bolts	18 ft lbs (2.489 kg/m)
Crankcase junction bolts	12 ft lbs (1.659 kg/m)
Crankcase junction studs	15 ft lbs (2.074 kg/m)
Cylinder block nuts	20-22 ft lbs (2.765-3.042 kg/m)
Cylinder head bolts	18 ft lbs (2.489 kg/m)
Rocker box nuts	6 ft lbs (0.691 kg/m)
Rocker box bolts	6 ft lbs (0.691 kg/m)
Rocker spindle-domed nuts	22 ft lbs (3.042 kg/m)
Kick-start ratchet pinion nut	40-45 ft lbs (5.530-6.221 kg/m)
Rotor fixing nut	50 ft lbs (6.913 kg/m)
Stator fixing nuts	8 ft lbs (1.106 kg/m)
Clutch center nut	60 ft lbs (8.295 kg/m)
Gearbox sprocket —Lock nut	58 ft lbs (8.019 kg/m)
Center bearing nuts	18 ft lbs (2.489 kg/m)

INSTALLATION

Installation is a reversal of the removal procedure. Note the following:

1. Replace the gasket that fits between the pump and crankcase.
2. Make certain that the two screws holding the pump body together are sufficiently tightened.

3. Make sure the pump is correctly located over the dowel in the crankcase recess.

4. Replace the O-ring that fits around the pump body in the inner primary chaincase.

5. When installing the oil pump drive gear, apply a thread-locking compound to the securing screw.

Oil Pump and Pressure Relief Valve Specifications

TR25W

OIL PUMP	
Pump body material	Zinc base alloy
Type	Double gear
Drive ratio	1 : 4
Non-return valve spring (free-length)	0.625 in. (15-875 mm)
Non-return valve spring ball (diameter)	0.25 in. (6.35 mm)
Oil pressure relief valve spring (free-length)	0.6094 in. (15.4781 mm)
Oil pressure relief valve ball (diameter)	0.3125 in. (7.9375 mm)

T100C and T100R

OIL PUMP	
Body material	Brass
Bore diameter:	
Feed	0.3748-0.3753 in.
Scavenge	0.4372-0.4377 in.
Scavenge (Bef. H.49833)	0.4877-0.4872 in.
Plunger diameter:	
Feed	0.3744-0.3747 in.
Scavenge	0.4369-0.4372 in.
Scavenge (Bef. H.49833)	0.4872-0.4869 in.
Valve spring length	1/2 in.
Ball diameter	7/32 in.
Aluminum cross-head width	0.497-0.498 in.
Working clearance in plunger heads	0.0015-0.0045 in.

OIL PRESSURE RELIEF VALVE

Piston diameter	0.5605-0.5610 in.
Working clearance	0.001-0.002 in.
Pressure relief operates	60 lb/sq in. (4.22 kg/sq.cm)
Spring length (Free)	1 3/4 in.
Load at 1 1/2 in.	8 lbs
Rate	42.3 lbs

OIL PRESSURE

Normal running	60 lb/sq in.
Idling	20-25 lb/sq in.

Oil Pump and Pressure Relief
Valve Specifications (cont.)

TR6R, TR6C, T120R, TR7V, T140V

OIL PUMP	
Body material	Brass
Bore diameter:	
Feed	0.40675-0.40625 in.
Scavenge	0.4877-0.4872 in.
Plunger diameter:	
Feed	0.40615-0.40585 in.
Scavenge	0.4872-0.4869 in.
Valve spring length	1/2 in.
Ball diameter	3/32 in.
Aluminum cross-head width	0.497-0.498 in.
Working clearance in plunger heads	0.0015-0.0045 in.
OIL PRESSURE RELIEF VALVE	
Piston diameter	0.5605-0.5610 in.
Working clearance	0.001-0.002 in.
Pressure relief operates	60 lb/sq in. (4.22 kg/sq cm)
Spring length	1 11/32 in.
Load at 1 1/8 in.	12-12 1/2 lbs
Rate	37 lb/in.
OIL PRESSURE	
Normal running	68-80 lb/sq in.
Idling	20-25 lb/sq in.
OIL PRESSURE SWITCH	
Operating pressure	7-11 lb/sq in.

T150, T150V

OIL PUMP	
Body material	Cast iron
Bore diameter	0.3438-0.3433 in. (8.7325-8.7198 mm)
Scavenge gear-bore diameter	0.3438-0.3448 in. (8.7325-8.7579 mm)
Feed gear-bore diameter	0.3438-0.3448 in. (8.7325-8.7579 mm)
Spindle diameter	0.3433-0.3428 in. (8.7198-8.70712 mm)
Cover plate bore diameters:	
Spindle	0.3433-0.3438 in. (8.7198-8.7325 mm)
Drive scavenge gear	0.4375-0.4370 in. (11.1125-11.0998 mm)
Pump drive ratio	1.9 : 1 (engine to pump)
OIL PUMP DRIVE	
Intermediate gear-bore diameter	0.5625-0.5620 in. (14.287-14.2748 mm)
Bush-bore	0.4387-0.4382 in. (11.143-11.1302 mm)
-length	0.755-0.745 in. (19.177-18.923 mm)
Spindle-diameter	0.4360-0.4355 in. (11.0744-11.0617 mm)
OIL PRESSURE RELIEF VALVE	
Piston diameter	0.5605-0.5610 in. (14.2367-14.2494 mm)
Working clearance	1.001-0.002 in. (0.0254-0.0508 mm)
Pressure relief operates	90 lb/sq in. (6.328 kg/sq cm)
Spring length (Free)	1 1/4 in. (34-925 mm)
Lead at 1 1/8 in.	8 lbs (3.632 kgm)
Rate	42.3 lbs (19-2042 kgm)
OIL PRESSURE	
Normal running	75-85 lb/sq in. (5.273-5.624 kg/sq cm)
Idling	20-25 lb/sq in. (1.406-1.758 kg/sq cm)
Oil pressure switch: Working range	7-11 lbs (3.178-4.994 kgm)

(3 screws). Remove the float spindle, float, and spindle bush.

10. Remove the pilot air and throttle stop screws.

11. Remove the locating peg, and shake out the jet block.

Assembly and Installation

1. Assembly is the reverse of disassembly. Use new gaskets, O-rings, and fiber washers.

2. Install the throttle slide(s) in the carburetor(s) before tightening the flange nuts. Tighten these nuts slowly and evenly. Check for free slide movement as the nuts are tightened. If the slide sticks, the nuts are overtightened, warping the carburetor body.

3. After connecting the fuel line(s), check for leaks.

CONCENTRIC (EXCEPT TRIDENT)

Removal and Disassembly

1. Remove the air cleaner(s).

2. Disconnect the fuel feed lines at the carburetor(s).

3. Loosen the carburetor flange nuts evenly, then remove them and pull off the carburetor.

4. Remove the carburetor top and pull out the slide assembly. To disassemble, remove the needle and clip by compressing the return spring against the cap, compress the return spring and disengage the cable from the slide.

5. Remove the float bowl banjo bolt, with banjo and filter.

6. Remove the float bowl screws, tapping the bowl lightly to free it if stuck.

NOTE: Hold the carburetor in the upright position when removing the float bowl.

7. Remove the float assembly from the float bowl. The float spindle is pressed lightly into the bowl.

8. Unscrew and remove the main jet holder complete with main and needle jets.

9. Unscrew and remove the pilot jet (if fitted), pilot air screw, and throttle stop screw.

FUEL SYSTEMS

Triumph motorcycles were fitted with one or two Amal Monobloc carburetors prior to 1967, and from that date have been equipped with the Concentric version.

NOTE: For carburetor theory, inspection, and service, refer to "Carburetors" under the "General Information" section.

MONOBLOC

Removal and Disassembly

1. Remove the air cleaner(s).

2. Disconnect the fuel feed line at the carburetor banjo. Disconnect the feed line between the carburetors.

3. Gradually loosen the two carburetor flange nuts, and remove the carburetor.

4. Unscrew and remove the carburetor cap, and pull out the choke and throttle slide assembly. To disassemble, remove the needle clip, compress the spring, disengage the cable from the slide, and separate the components.

5. Remove the banjo bolt, and take off the banjo and filter screen.

6. Unscrew and remove the float needle seat. Take out the needle.

7. Remove the main jet cover nut. Unscrew and remove the main jet holder complete with main and needle jets.

8. Remove the pilot jet cover nut. Unscrew and remove the pilot jet.

9. Remove the float bowl cover

Assembly and Installation

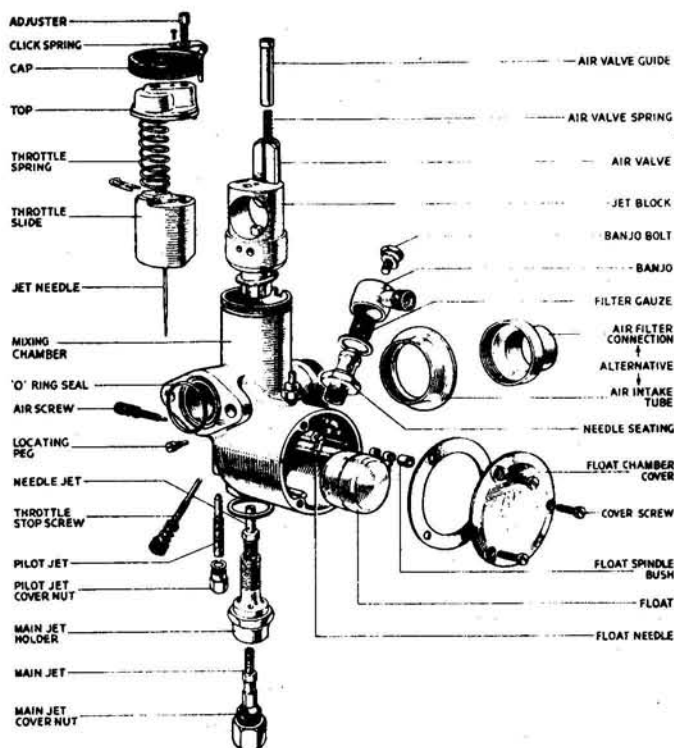
1. Assembly is the reverse of disassembly. Use new O-rings (the condition of the flange O-ring is critical), float bowl gasket, and washers.

2. If plastic banjos are fitted, do not overtighten them, or they may leak.

3. Put the throttle slide assembly in the carburetor body before bolting it down. Be sure the flange O-ring is seated in its groove and hold the carburetor against its manifold while screwing on the nuts.

4. Tighten the flange nuts gradually and evenly, checking for free slide movement as this is done. Overtightening or uneven tightening of the nuts may cause the slide to stick because it may warp the body.

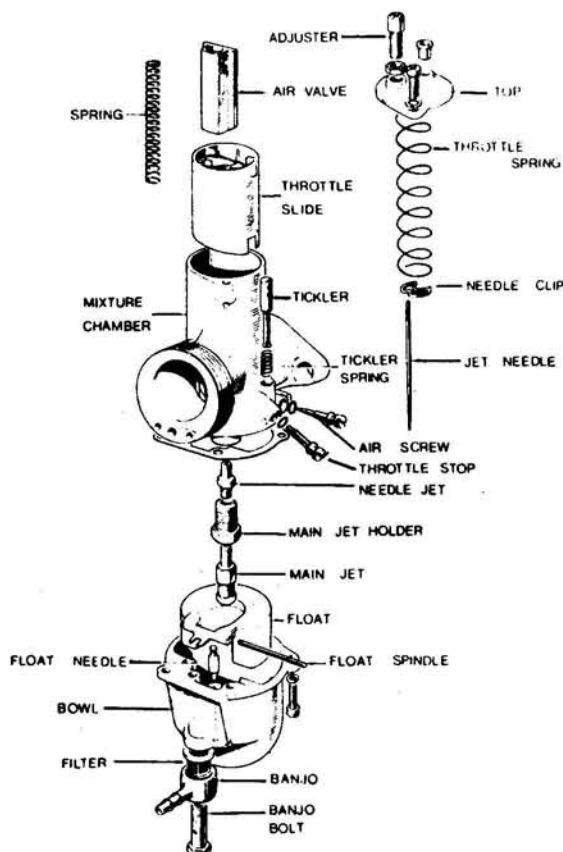
5. After connecting the fuel line(s), check for leaks.



Monobloc carburetor with float bowl



Removing the main jet, holder, and needle jet



Concentric carburetor

TRIDENT

The Trident is equipped with three, Model 600 Concentric carburetors. These units differ from the other Concentric carburetors in that the throttle slide has no conventional throttle spring, but is returned by a scissor spring located on the external throttle linkage.

Removal and Disassembly

1. Remove the side panels and the fuel

Carburetor Specifications

	TR25W	T100C (before H57083)	T100C (H57083 and later)	T100R (before H57083)	T100R (H57083 and later)
Type (Amal)	928/1 Concentric	376/273	628/8 Concentric	376/324 and 325	626/9 and 10 Concentric
Venturi Size	28 mm	1 in. (25.4 mm)	26 mm	1 1/8 in.	26 mm
Main jet	160	190	180	200	140
Needle jet	0.106 in.	0.106 in.	0.106 in.	0.106 in.	0.106 in.
Needle type	—	C	—	C	—
Needle clip position (groove from top)	1	3	2	3	2
Throttle slide cutaway	3	3.5	4	3.5	3
Pilot jet	—	25	—	25	—
Slide spring free length (in./mm)	2.5/63.5	—	2.5/63.5	—	2.5/63.5

Carburetor Specifications (cont.)

	TR6R and TR6C	T120R	T150, T150V	TR7V	T140V
Type (Amal)	R930/23 Concentric	R930/9 and 10 Concentric	626 Concentric	R930/89	L930/93
Venturi Size	30 mm	30 mm	27 mm	30 mm	30 mm
Main Jet	230	220	150	280	190
Needle jet	0.106 in.	0.106 in.	0.106 in.	0.106 in.	0.106 in.
Needle type	STD	STD	STD	STD	STD
Needle clip position (groove from top)	2	2	2	2	1
Throttle slide cutaway	3	2.5	①	3.5	3
Pilot jet	—	—	—	—	—
Slide spring free length (in./mm)	2.5/63.5	2.5-63.5	—	2.5/63.5	2.5/63.5

① T150: 2.5
T150V: 3.5

tank.

2. Disconnect the throttle cable from the throttle linkage and disconnect the choke cable from the handlebar lever.

3. Remove the air cleaner assembly out the left side of the machines.

4. Remove the two screws securing each carburetor top, then remove the manifold nuts and pull each carburetor back and down, leaving the slide assemblies fastened to the throttle linkage.

5. To remove the carburetor top and slide assemblies, disconnect the slide from the throttle rod and the air valve from its cable. Remove the jet needle retaining clip and compress the throttle rod return spring to free the top retaining plate. Push the bottom nipple of the throttle rod down to clear the throttle slide and compress the air valve spring to free it from the cable end nipple.

6. Unscrew the air valve cable abut-

ment to completely remove the carburetor top.

7. The remainder of the disassembly procedure is the same as for the standard Concentric. Refer to the "Concentric: Removal and Disassembly" section preceding, Steps 5-9.

Assembly and Installation

Refer to "Concentric: Assembly and Installation" section preceding.

ELECTRICAL SYSTEMS

IGNITION SYSTEM

Troubleshooting

TR25W

1. Make sure the contact breaker is clean and correctly gapped. Also make certain the battery terminals are tight and in good condition.

2. Check the main wiring harness fuse.

3. Turn the ignition switch on and slowly turn the engine over while watching the ammeter needle. As the contact breaker opens and closes, the needle should flick between zero and a slight discharge. If it does not, there is a fault somewhere in the low tension circuit.

4. Recheck the condition of the points to make sure you aren't getting a false indication due to dirt, oil, or an incorrect adjustment.

500 AND 650 TWINS

1. Check the condition and gap of the contact breaker points and the tightness of the battery terminals.

2. Remove the gas tank.

3. Disconnect the white lead that connects the "SW" terminals of both ignition coils.

4. Connect the white lead to the left coil "SW" terminal, then turn on the igni-

tion switch and slowly turn over the engine while observing the ammeter needle. As the contact breaker opens and closes, the needle should flick between zero and a slight discharge.

5. Disconnect the white lead from the left coil and connect the "SW" terminal of the right coil. Turn the ignition switch on and observe the ammeter needle as described above.

6. If the ammeter needle does not flick in the described manner for both the right and left ignition coils, a fault exists in the low tension circuit.

T150

1. Lift up the seat and disconnect the white lead that connects the "SW" terminal of all three ignition coils.

NOTE: Lucas coils are marked "SW" and "CB." SIBA coils are marked "1" instead of "SW" and "15" instead of "CB."

2. Connect the white lead to one coil at a time and check ammeter needle deflection as previously described for the other models.

750 TWINS, T150V

Procedures are essentially as described above, except that the coil wires are white/yellow.

Low Tension Circuit Tests

If the above tests showed that the fault exists somewhere in the low tension circuit, isolate the problem source in the following manner:

NOTE: On 12 volt machines, disconnect the zener diode center terminal.

1. Place a piece of non-conducting material between the contact breaker points. Turn the ignition switch on.

2. Using a 0-15 volt DC voltmeter (0-10 volts for 6 volt machines) and the appropriate wiring diagram for reference, make point-to-point checks as described below.

3. Check the battery by connecting the voltmeter between the negative terminal of the battery and ground (frame). No reading indicates a blown main, or a faulty red, battery lead; a low reading indicates a poor ground.

4. Connect the voltmeter between the ignition coil negative terminal (SW or 1) and ground (one at a time on twins and triples). No reading indicates a faulty lead between the battery and coil terminal, or a faulty switch or ammeter connection.

5. Connect the voltmeter between ground and one ammeter terminal at a time. No reading at the "load" terminal indicates either a faulty ammeter or a break in the blue/brown lead from the battery; no reading on the battery side in-

dicates a faulty ammeter.

6. Connect the voltmeter between the ignition switch "feed" terminal and ground. No reading indicates a break or faulty terminal along the brown/white lead. Check for voltage readings between ground and the brown/white lead terminals at the rectifier, ammeter and lighting switch (on singles and twins.)

7. Connect the voltmeter between the ignition switch "load" terminal and ground. No reading indicates a faulty switch. A positive reading at this point, but not in step 4, indicates a break or faulty connection along the white lead.

8. Disconnect the ignition coil lead from the positive (CB or 15) terminal and connect one voltmeter lead in its place (one coil at a time on twins and triples). Connect the other voltmeter lead to ground. No reading indicates a faulty primary coil winding.

9. Reconnect the ignition coil lead(s) and connect the voltmeter across the contact breaker points one set at a time. Leave the rubber insulator in place. No reading indicates a faulty connection, faulty insulation, or a faulty condenser.

10. On 12 volt machines, reconnect the zener diode center terminal and connect the voltmeter to this terminal and ground. The meter should read battery output voltage.

High Tension Circuit Tests

If the preliminary ignition system checks showed that the problem lay in the high tension circuit, check the following:

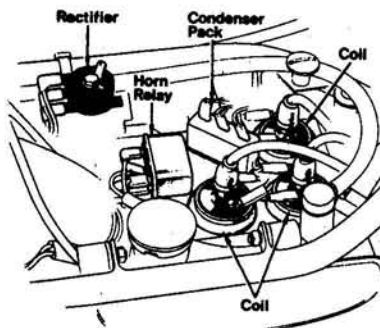
1. Test the ignition coil(s) as described in component tests. If the coils are in satisfactory condition, either the high tension cables or spark plug cap(s) are at fault.

2. Remove the spark plug cap(s) from the cable(s) and turn the ignition switch on. Hold the cable about 1/4 in. away from the cylinder cooling fins and kick the engine over. A bright blue spark should jump across the gap; if not, the cable is defective. If the spark does appear, the spark plug cap is faulty.

Component Tests

IGNITION Coil

1. Check the coil in the machine by removing the spark plug cap and holding the high tension cable end about 1/4 in. away from the cylinder cooling fins. Turn the ignition on and kick the engine over.



Component location (Trident)

2. Check primary winding resistance by removing the coil and connecting an ohmmeter to the low tension terminals. The readings obtained should be:

TR25W

3.0 ohms minimum
3.4 ohms maximum

T100C, T100R, TR6C, TRGR, and T120R MA6 type

1.8 ohms minimum
2.4 ohms maximum

MA12 type

3.0 ohms minimum
3.4 ohms maximum

T150, T150V

3.3 ohms minimum
3.8 ohms maximum

TR7V, T140V

3.0 ohms minimum
3.4 ohms maximum

3. Inspect the high tension cables for any signs of insulator deterioration.

CONDENSERS

A faulty condenser is usually indicated by burning or arcing of the points. On the TR25W, the condenser is located under the ignition plate in the primary chain-case; on twins and triples, they are located under the gas tank.

To check the condenser(s), first turn the ignition switch on, then take readings across the contact breaker(s) (open position) with a voltmeter. No reading indicates that the condenser insulation has broken down, and the unit should be replaced.

CHARGING SYSTEM

The charging system consists of an alternator and a full-wave bridge rectifier that converts the AC pulses in DC for recharging the battery and powering the lights. 12 volt machines are also equipped with a zener diode to absorb any excess charge.

Alternator Output Test

TR25W

1. Disconnect the two or three alternator output leads.

NOTE: Earlier machines have three leads; later machines have two.

2. Start and run the engine at 3,000 rpm.

3. Connect a 0-15 volt AC voltmeter with a 1 ohm load resistor in parallel with each of the alternator leads as described below.

4. Three-lead-type stator:

a. White/green and green/black leads—minimum voltmeter reading 4.0 volts.

b. White/green and green/yellow leads—minimum voltmeter reading 6.5 volts.

c. White/green and green/black with

green/yellow leads—minimum voltmeter reading 8.5 volts.

5. Two-lead-type stator:

a. White/green and green/yellow leads—minimum voltmeter reading 8.5 volts, for all except 47205 stator (9.0V).

6. If low or no readings are obtained, inspect the leads for damage and make sure they have tight connections. Check the alternator output again, and if the same results are obtained the difficulty lies in the alternator itself and it must be replaced.

7. To check for grounded coils within the stator, connect the voltmeter to each terminal and ground. If a reading is obtained, the coil connected to the lead being tested is grounded.

T100C, T100R, TR64, TR6C, AND T120R

Test the alternator output as described for the TR25W. Correct output readings are given in the following chart.

T150

Check alternator output for the Trident in the same manner as described for the three-lead TR25W stator. Correct output readings are given.

TR7V, T140V, T150V

These models use a 47205 stator. Procedures are same as for TR25W. Minimum voltmeter reading is 9.0 volts.

	Alternator Output Minimum AC Volts @ 3,000 rpm		
RM20 stator	green/white and	green/white and	green/white and green/black
47209 (12 volt)	green/black connected	green/yellow connected	green/black and green/yellow connected
	5.0	8.0	10.0

Rectifier Test

Two precautions should be taken whenever handling the rectifier for testing or for any other purpose.

1. When removing or installing the rectifier, prevent any possibility of twisting the rectifier plates, which could result in broken internal wiring.

2. Never disturb the nuts that hold the rectifier plates together.

To test the rectifier in the machine:

1. Disconnect the brown/white lead from the center terminal and wrap the end in tape to prevent a short-circuit to ground.

2. Connect a DC voltmeter in parallel with a 1 ohm load resistor between the center rectifier terminal and ground.

3. On twins, disconnect the alternator green/yellow lead and connect it to the rectifier green/black lead by using the appropriate jumper cable. Make sure this connection is insulated to prevent a short-circuit.

4. Start and run the machine at 3,000 rpm and observe the voltmeter reading. It must be 7.5 volts minimum.

5. If the reading is higher than specified, check the rectifier ground. If the ground is OK, replace the rectifier. If the reading was zero or less than specified, the problem lies in the rectifier or charging system wiring. First check the rectifier on a bench.

Stator Number	System Voltage	DC Input to Battery amp @ 3,000 rpm			Alternator Output Minimum AC Volts @ 3,000 rpm			Stator Coil Details		
		Off	Pilot	Head	A	B	C	No. of Coils	Turns per coil	S.W.G.
47162	6V	2.75	2.0	2.0						
	12V	2.0*	2.1*	1.5*	4.0	6.5	8.5	6	140	22
		4.8†	3.8†	1.8†						
47164	6V	2.7	0.9	1.6	4.5	7.0	9.5	6	122	21
47167	6V	6.6‡	6.6‡	13.6‡	7.7	11.6	13.2	6	74	19
47188	6V	Not applicable			5.0	1.5	3.5	2	250	25
								2	98	20
								1	98	20
								1	98	21
47204	12V						8.5	as 47162		

Coil Ignition Machines

A—Green/White and Green/Black

B—Green/White and Green/Yellow

C—Green/White and { Green/Black } connected

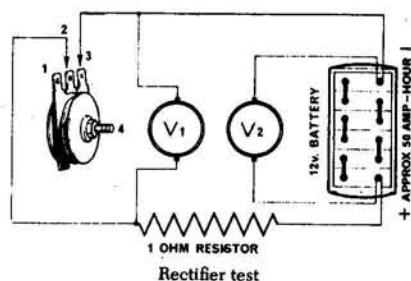
{ Green/Yellow }

NOTE: On machines fitted with two-lead-stator, only test C is applicable as leads are colored green/white and green/yellow.

* Zener in Circuit

† Zener disconnected

‡ With Boost Switch in Circuit



4. Disconnect the voltmeter and, using the accompanying illustrations for guidance, test each of the diodes with the voltmeter leads. Keep the testing time as short as possible so that the rectifier does not overheat. No reading should be greater than 2.5 volts in Test 1, and no reading should be more than 1.5 volts less than the battery voltage in Test 2 (i.e., 10.5 volts minimum).

5. If the rectifier does not meet specifications, it should be replaced.

Charging Circuit Continuity Test

If the rectifier tests did not pinpoint the problem, it must be located somewhere within the charging circuit wiring. For checking continuity, the battery must be in a good state of charge and the alternator leads must be disconnected at their snap connectors.

TR25W

1. Make sure there is power at the rectifier by connecting a DC voltmeter, with a 1 ohm load resistor in parallel, between the center rectifier terminal and ground. The meter should read battery voltage.

2. If there is no voltage at the rectifier, repeat steps 3, 5, and 6 under "Low Tension Circuit Tests" to isolate the problem in the wiring.

500 AND 650 TWINS

6 Volt Machines

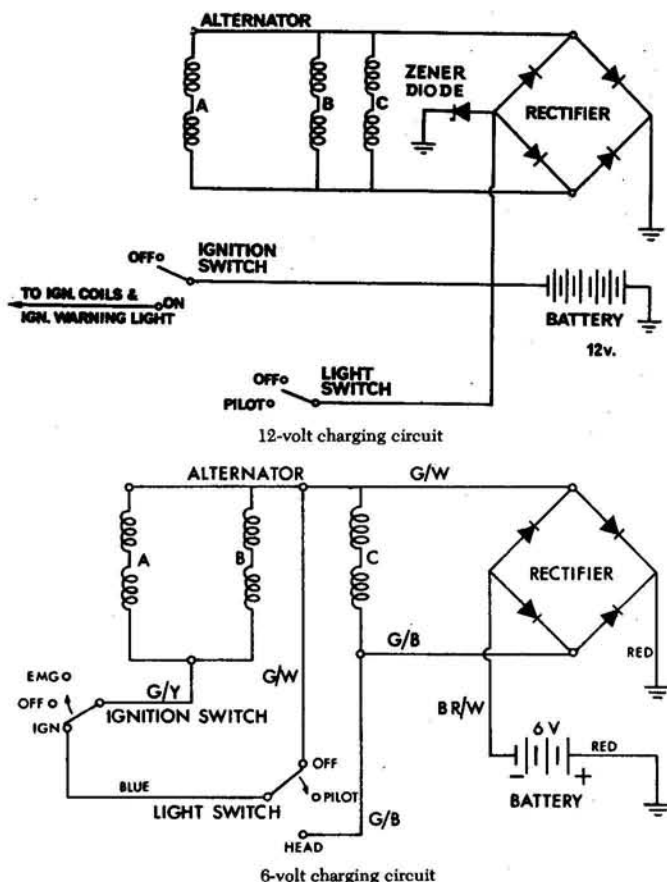
1. Repeat steps 1 and 2 given for the TR25W.

2. Connect the green/yellow lead from the main wiring harness (under the engine) to the rectifier center terminal with a jumper cable. Turn the ignition switch on.

3. Connect a DC voltmeter, with a 1 ohm resistor in parallel, between the green/white lead at the rectifier and ground. With the light switch in the "off" position, the meter should read battery voltage. If not, the leads to the ignition switch terminals 16 and 18, and the leads to light switch terminals 4 and 5, should be checked.

4. Connect the green/yellow lead from the main wiring harness to the rectifier center terminal with a jumper cable. Turn the ignition switch to the IGN position and the headlight switch to the HEAD position.

5. Connect a DC voltmeter, with a 1 ohm resistor in parallel, to the green/black lead at the rectifier and ground. The meter should read battery voltage. If not, the leads to ignition switch terminals 16 and 17, and the leads



Rectifier Bench Test

1. Disconnect and remove the rectifier. Observe the note on handling the unit.

2. Connect the rectifier to a 12 volt battery and a 1 ohm load resistor.

3. Connect a DC voltmeter in the V position as shown in the accompanying illustration. The meter should read 12 volts.

to light switch terminals 5 and 7, should be checked. With the light switch in the PILOT position, there should be no voltage reading between ground and the rectifier green/black or green/white leads.

12 Volt Machines

1. Check the battery to make sure the fuse is intact and that the battery is correctly connected to ground (positive).
2. Check to see that there is voltage at the rectifier center terminal as previously described. If there is not, disconnect the alternator leads at their snap connectors under the engine.
3. Wire a jumper lead between the center and green/yellow rectifier terminals and check the voltage between the snap connector and ground. If there is no reading, the alternator harness lead is faulty.
4. Repeat the above for the rectifier green/white lead.
5. If there is voltage at the center rectifier terminal, check the ammeter terminal. If it is satisfactory here, the brown/white lead to the rectifier center connector is faulty.
6. If there is no voltage at either the rectifier or the ammeter, the blue/brown wire from the battery is faulty.

T150

Perform the charging circuit continuity test for the Trident in the same manner as described for the 500 and 650 twins.

TR7V, T150V, T150V

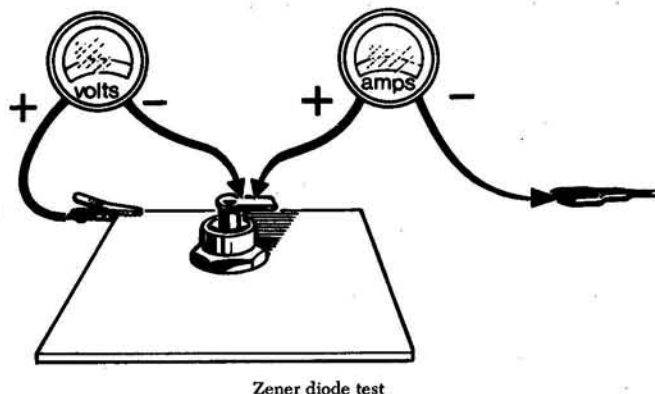
The test is similar to that for the 500 and 650 Twins as described above except that the wire color codes have changed. The rectifier center terminal for these models is fitted with a brown/blue wire instead of the brown/white wire for the earlier models.

Load Resistor

A 1 ohm load resistor has been referred to in several steps of the charging system test procedures. This resistor is easily obtainable from a local electrical supply outlet, or can be constructed as follows:

1. Materials:
4 yards of 18, S.W.G. (0.048 in.) Nichrome wire
1 foot of flexible, heavy gauge wire
1 alligator clip
1 piece of asbestos approximately 2 in. in diameter
2. Instructions:

Fold the thin wire double and connect the heavy wire to the folded end. Connect the other end of the heavy wire to the positive terminal of a 6 volt battery. Connect a 0-10 volt DC voltmeter between the battery terminals and an ammeter between the negative terminal of the battery and the free ends of the thin wire. Make this last connection with the alligator clip. Move the clip along the two thin wires until the ammeter reading is numerically equal to the voltmeter reading. Cut the thin wires at this point and wrap them around the piece of asbestos, making sure the wires do not touch each other.



Zener Diode

The zener diode serves the functions of a voltage regular, tapping off excess alternator current output and rerouting it to a heat sink. It is very important that the diode be kept clean and free from ob-

struction in the cooling airstream at all times. Other than this, if you make sure that the base of the diode and heat sink have firm metal-to-metal contact, the diode is a maintenance free item.

NOTE: Before making any of the fol-

Electrical Specifications

TR25W

Battery	Lucas PUZ5A
Coil	Lucas MA.12
Contact breaker unit	Lucas 6CA
Generator	Lucas RM.19
Generator output	115 watt
Horn	Lucas 6H
Rectifier	Lucas 2DS.506
Zener diode	Lucas ZD.715
Bulbs: headlamp (main)	40/27 watt
headlamp (pilot)	6 watt
main beam indicator	2 watt
stop and tail lamp	6/21 watt

T100C and T100R

Battery	1 Lucas 12 volt battery PUZ5A or earlier 2 Lucas batteries connected in series (MKZ9E)	
Rectifier	Lucas 2DS506	
Alternator type	Lucas RM19	
Horn	27899 12 volt	
Bulbs:	No.	Type
Headlight	Lucas 414	50/40 watts
Parking light	Lucas 989	6 watts MCC
Stop and tail light	Lucas 380	6/21 watts offset
Speedometer light	Lucas 987	2 watts MES
Ignition warning light	Lucas 281	2 watts (BA7S)
Main beam indicator light (where fitted)	Lucas 281	2 watts (BA7S)
Zener diode type	ZD 715	
Coil type	Lucas MA12 (12V) 2 off	
Contact breaker type	Lucas 4CA (12° range)	
	After H.57083 Lucas 6CA (12° range)	
Fuse rating	35 amp	

TR6C, TR6R, and T120R

Battery (12V)	PUZ5A	
Rectifier type	2DS 506	
Alternator type	RM.19	
Horn type (12V)	6H	
Cutout switch	151SA	
Bulbs:	No.	Type
Headlight (L/H dip)	464	40/27 watts vert-dip pre-focus
Parking light	989	6 watts—MCC
Stop and tail light	380	L679 21/6 watts—offset pin
Speedometer light	989	6 watts—MCC
Ignition warning light	281	2 watts (BA7S)
High beam indicator light	281	2 watts (BA7S)
Zener diode type	ZD 715	
Coil type (2 off)	Siba 3200/1 2 off or later, 17M12 (12V) 2 off	
Contact breaker type	6CA	
Fuse rating	35 amp	

lowing tests, make sure the battery is in a full state of charge.

1. Disconnect the zener diode cable and connect a 0-5 amp (minimum) ammeter in series between the diode connector and the disconnected cable. The ammeter positive lead must be connected to the diode terminal.

2. Connect a DC voltmeter between the zener diode and the heat sink. The red or positive lead of the voltmeter must be connected to the heat sink, which is grounded to the frame.

3. Make sure all lights are off, then start the engine and slowly increase its speed while observing both meters.

4. Until the voltmeter reaches 12.75 volts, the ammeter should read zero.

5. Continue increasing the engine speed until the ammeter reads 2.0 amps, at which time the voltmeter should be reading 13.5 to 15.3 volts.

6. If the ammeter registers before the voltmeter reaches 12.75 volts in step 4, or if the voltage is higher than stated in step 5 when the ammeter reads 2.0 amps, the zener diode should be replaced.

CAPACITOR IGNITION SYSTEM

A capacitor ignition system kit is available to make it possible to run the machine without a battery. The kit consists only of a mounting spring and the capacitor unit itself. The system uses the same equipment as the coil ignition/battery type, with the exception of the battery.

In operation, the capacitor stores the current from the alternator and releases it at the moment of contact breaker opening. This produces an adequate spark for starting, although not as healthy a spark as it produced by a battery. When running, the capacitor also helps to reduce DC voltage ripple. The lighting system will also operate normally, except that the parking light will not function when the engine is not running.

In addition to the obvious advantage of not requiring a battery, this system has several other points in its favor: cold weather does not affect the capacitor mounted so that it can be connected in an emergency starting situation.

INSTALLATION

1. The capacitor terminals can be identified as follows:

Single terminal—positive (ground) marked with a red dot on the mounting rivet. Double terminal—negative.

2. Install the capacitor in its spring with the terminals facing down. Push the unit into the spring until the last coils fit into the capacitor body groove.

3. Connect the capacitor negative terminal and zener diode to the center (brown/white lead) connector of the rectifier.

4. Connect the positive terminal of the capacitor to the rectifier center ground bolt terminal.

5. Mount the capacitor spring in any convenient spot near the battery carrier.

Before putting the machine into operation, a few precautions should be taken to avoid any damage to the capacitor or wiring system.

1. If the battery is to remain in the machine, it is essential that the negative lead be very carefully insulated to prevent it from shorting to the frame. This can be done by either wrapping the lead in electrical tape or, better yet, by replacing the battery fuse with a wooden dowel of similar dimensions.

2. If the capacitor is being used as a back-up system in case of battery failure, take the time to check it occasionally to

ensure that it's still operational.

3. Do not run the engine with the zener diode disconnected as the capacitor will be destroyed due to excessive voltage.

Capacitor Ignition Test

The capacitor has a limited storage life of approximately 18 months at 68° F, or 9 to 12 months at 86° F. Therefore, it would be wise to check its condition regularly if it is not in use.

1. Connect the capacitor to a 12 volt battery for approximately 5 seconds. Make sure the terminal polarity is correct or the capacitor will be ruined.

2. Let the capacitor stand for at least 5 minutes, then connect a DC voltmeter to the terminals. Note the steady reading of the meter. A good capacitor will register at least 9 volts.

Electrical Specifications (cont.)

T150

Battery type (12V)	PUZ5A
Rectifier type	54048008 (Lucas)
Alternator type	RM20
Horn type (12V): R-H	P201
L-H	P101
Bulbs:	No. Type
Headlight (L/H dip)	446 50/40 watts—pre-focus
Parking light	989 6 watts—MCC
Stop and tail light	380 6/21 watts—offset pin
Speedometer light	987 2.2 watts—MES
Ignition warning light	281 2 watts (BA7S)
High beam indicator light	283 2 watts (BA7S)
Zener diode type	ZD 71S
Coil type (3)	Siba 32000 3 off
Contact breaker type	Lucas 7CA (12°)
Oil warning light	281 2 watts (BA7S)
Fuse rating	35 amps

T150V

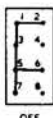
Battery type (12V)	PUZ5A
Rectifier type	Lucas 2DS.506
Alternator	RM 20/21
Horn	Clearhooter HF 80 High/low
Bulbs:	No. Type
Headlight	370 45/40 watts
Parking light	989 6 watts
Stop and tail light	380 21/6 watts
Instrument lights	643 2.2 watts
Zener diode	ZD.71S
Coils (3)	17M12
Contact breakers	7CA
Fuse rating	35 amps

TR7V, T140V

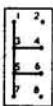
Battery type (12V)	PUZ5A
Rectifier	2DS 506
Alternator	RM21
Horn	Lucas 6H
Zener diode	2D715
Coils (2)	17M12
Bulbs:	No. Type
Headlight	370 45/35 watts
Parking light	989 6 watts
Stop and tail light	380 5/21 watts
Warning lights	281 2 watts
Instrument lights	987 3 watts

WIRING DIAGRAMS

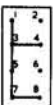
LIGHTING POSITIONS



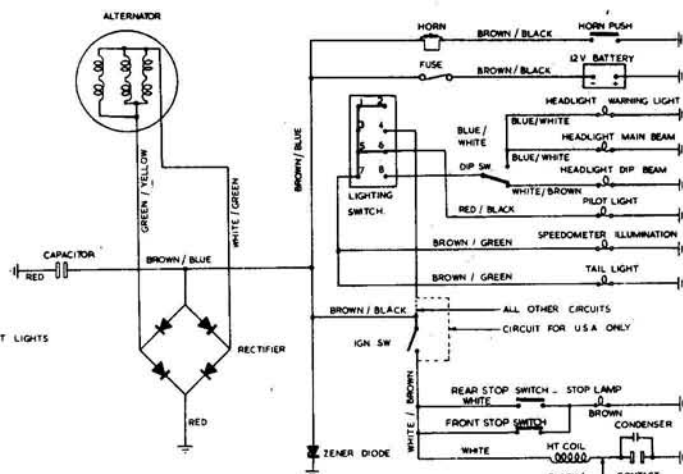
OFF



TAIL, PILOT, INSTRUMENT LIGHTS

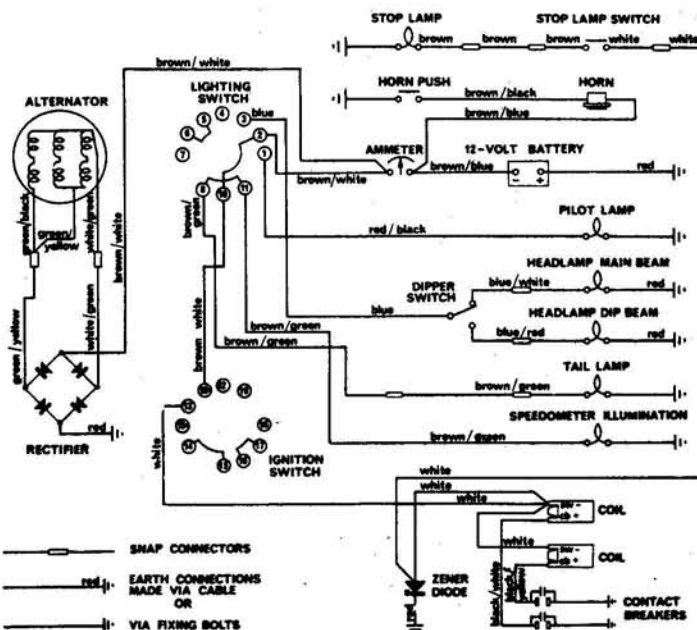
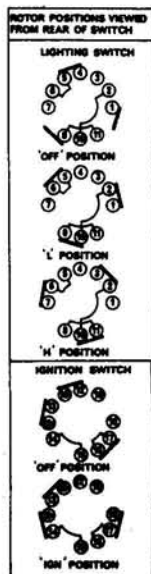
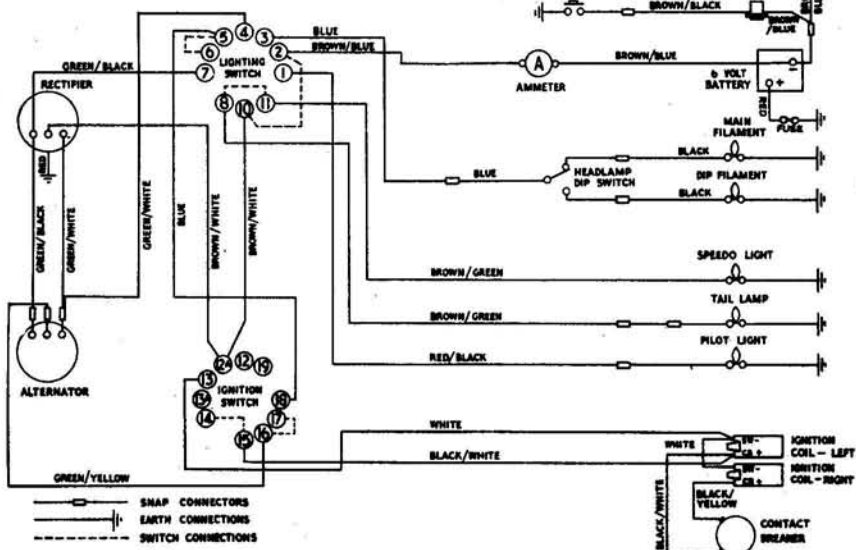


TAIL, INSTRUMENTS, HEAD LIGHTS



250

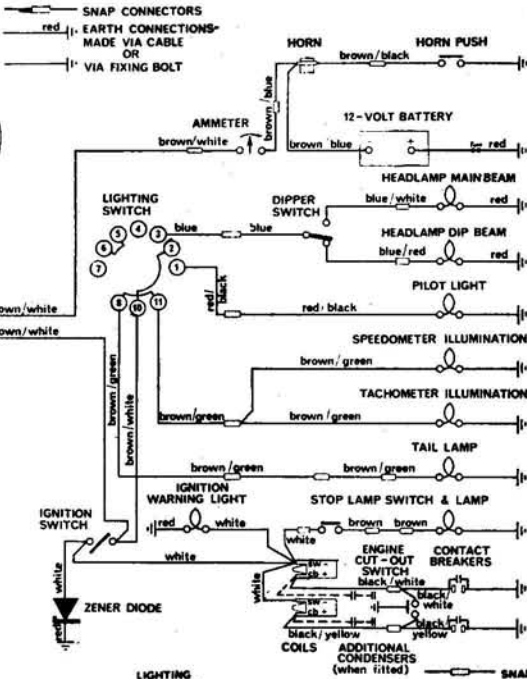
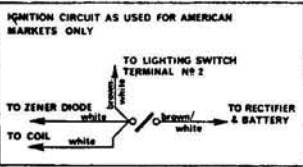
500 with 6-volt system



500 with 12-volt system and nacelle to No. H49832

WIRING DIAGRAMS

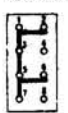
SWITCH ROTOR POSITIONS VIEWED FROM REAR OF SWITCH



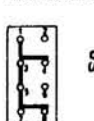
500 with 12-volt system without nacelle up to No. H49832

500 with 12-volt system and separate headlight after No. H57083

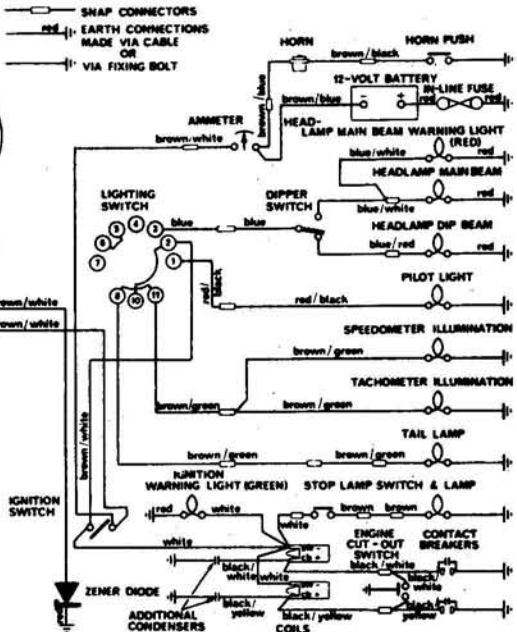
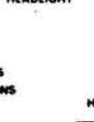
LIGHTING POSITIONS



TAIL/PILOT INSTRUMENTS

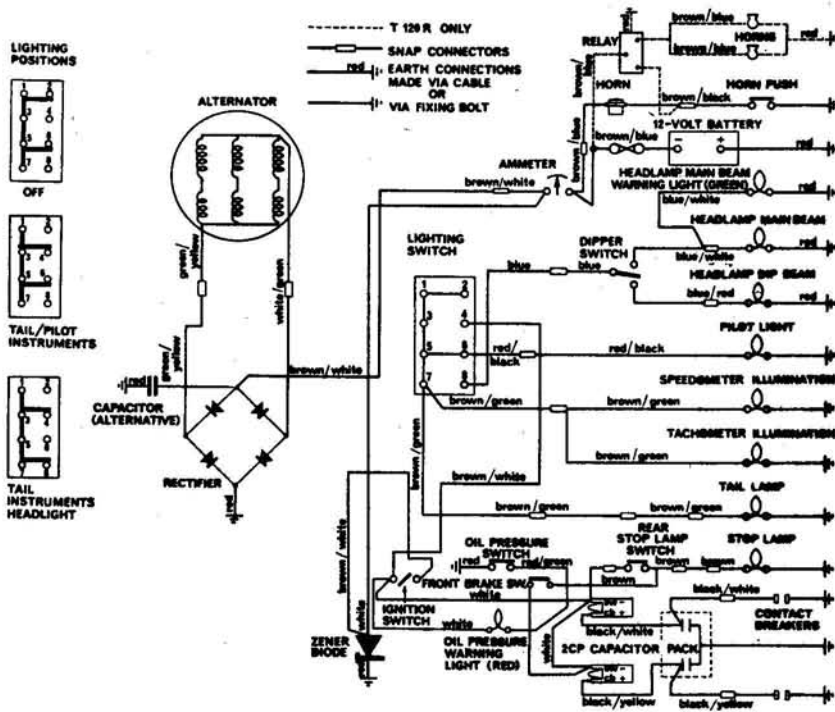


TAIL INSTRUMENTS HEADLIGHT

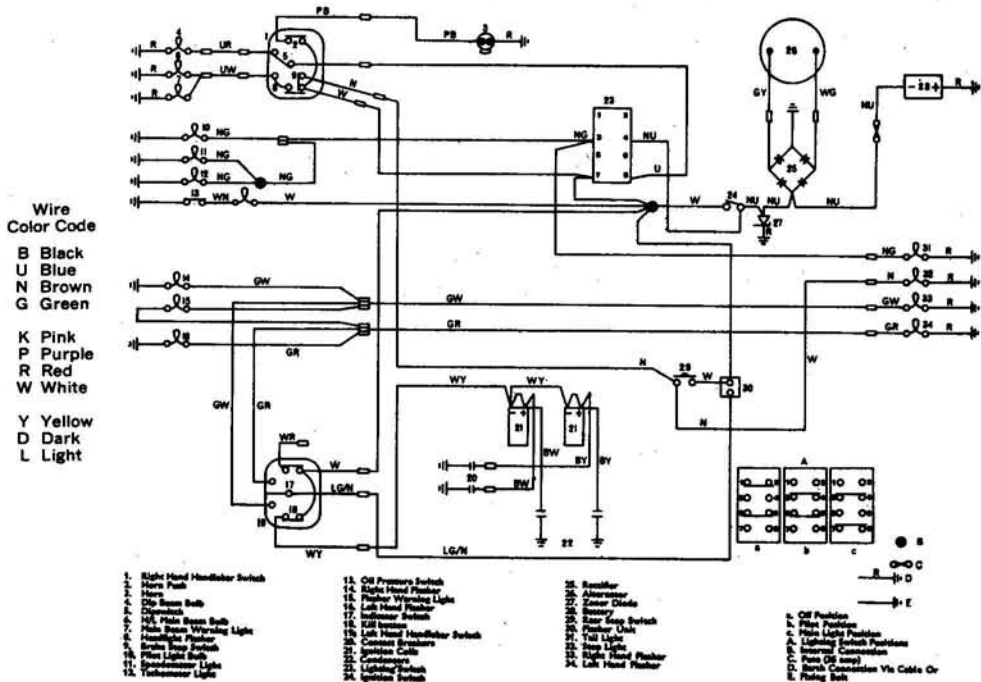


500 with 12-volt system and separate headlight Nos. H49832 to H57083

WIRING DIAGRAMS

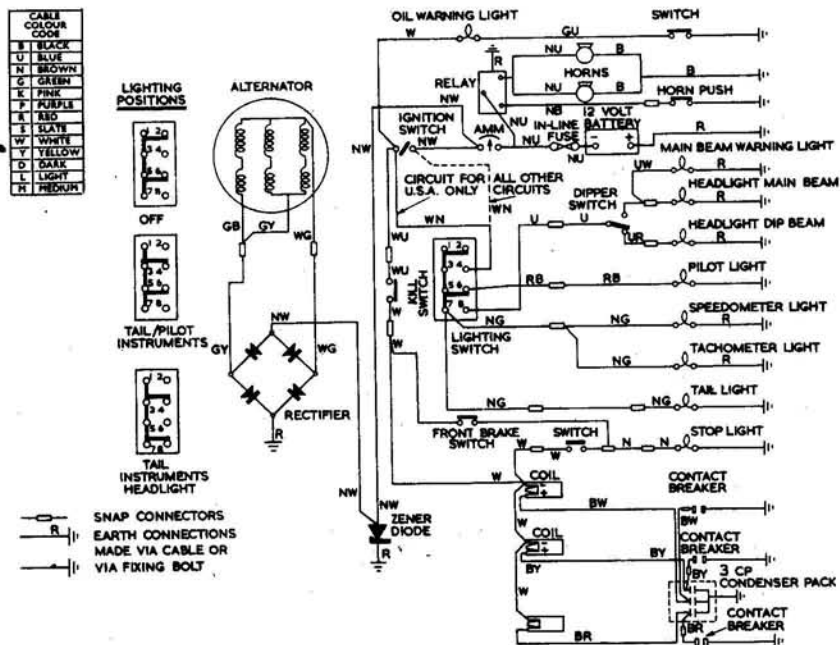
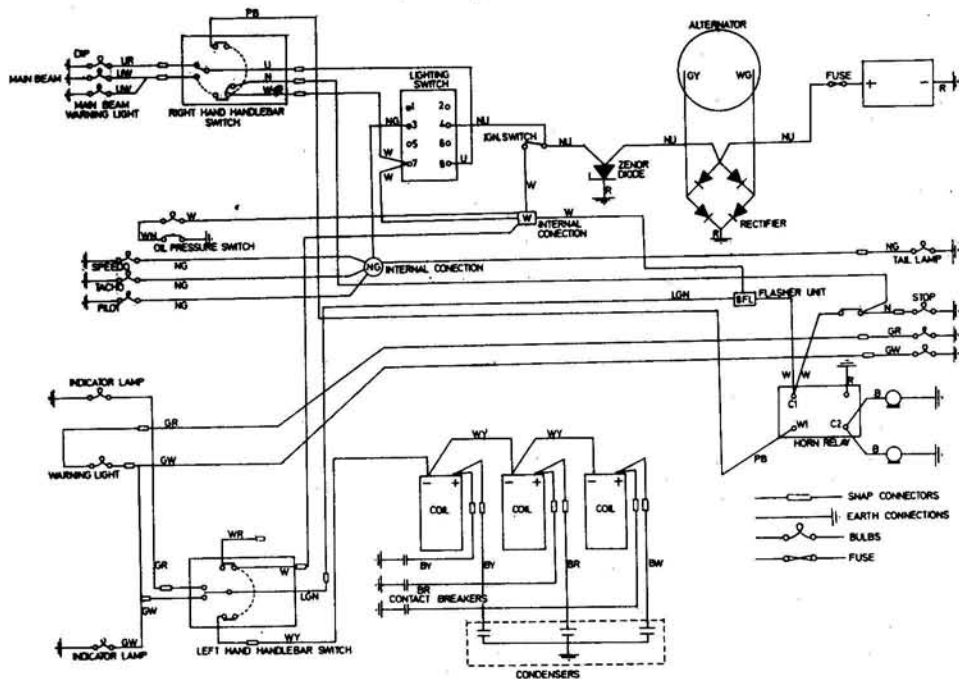


650



TR7V, T140V

WIRING DIAGRAMS

**Trident (4-speed)****Trident (5-speed)**

CHASSIS

WHEELS, HUBS AND BRAKES

TR25W
FRONT

Removal and Disassembly

1. Support the bottom of the engine with a wooden box or wire milk basket.

1094

positioning the bike so that the front wheel is about 6 in. off the ground.

2. Loosen the front brake cable at the handlebar adjuster, then disconnect it at the brake backing plate.

3. Remove the two axle securing nuts, slide the axle through the hub, then remove the front wheel assembly.

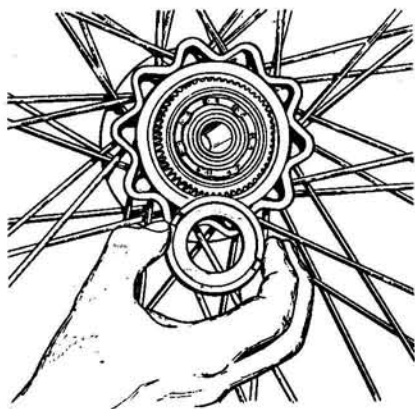
4. Separate the front anchor plate from the wheel and remove the right re-

tainer with Triumph special tool no. 61-3694 or a suitable substitute.

NOTE: *The retainer ring has left-hand threads.*

5. Remove the right wheel bearing by driving it out from the left side with the axle used as a drift.

6. Remove the backing ring and the inner retainer disc.



Rear wheel bearing retainer

NOTE: On machines equipped with double leading shoe brakes, the backing ring and retainer disc are replaced by a single part.

7. Remove the left wheel bearing circlip and drive the bearing (with retaining plates) out from the right side with the axle.

8. Remove the brake backing plate center nut and withdraw the brake shoe assembly.

9. On machines equipped with double leading shoes, lift up the edge of one shoe until it is free of the backing plate. Disconnect one end of each brake return spring and then remove the second shoe. Remove the pivot pin cotter key at each end of the lever adjustment rod and lift out the pivot pin. Remove the brake cam securing nuts and washers and disconnect the return spring from the front cam. Prey off the levers one at a time and remove the brake cams.

10. On machines equipped with single leading shoes, turn the brake operating lever to relieve the pressure of the shoes against the drum, then pull out the brake and backing plate assembly. Slowly release the operating lever until the return springs can be removed, then remove the springs and the brake shoes as shown in the accompanying illustration. Remove the operating lever securing nut and washers, then remove the lever and cam spindle.

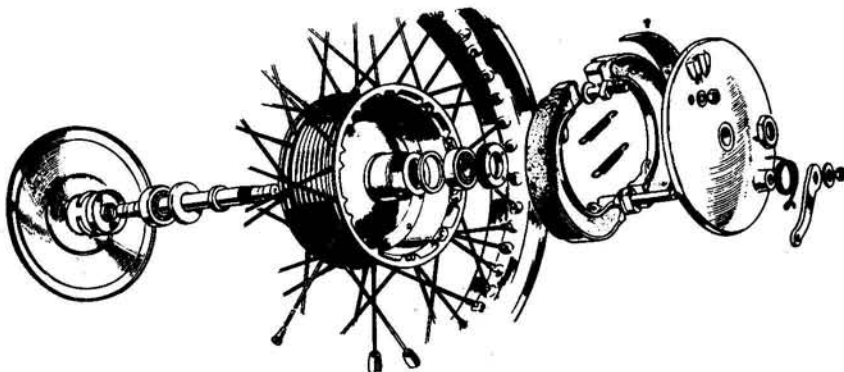
11. Thoroughly clean all parts (except brake shoes) in kerosine or a cleaning solvent and blow them dry with compressed air.

Inspection

Examine the ball bearings for any signs of pitting or excessive wear. Replace them both if there is any doubt as to their condition.

Inspect the anchor plate for any cracks or signs of distortion, particularly in the area of the brake cam housing. Check the return springs for general condition and signs of fatigue. Measure the drum diameter in several places and check for scoring, etc. If drum diameter is 0.010 in. greater than specified, replacement is in order.

Check the condition of the brake shoes. If oil-soaked, cracked, badly scored, or if the lining is worn down to the rivets, replace the shoes.



Front wheel assembly, single-leading shoe brake

If possible check wheel rim runout on a wheel stand. Tighten any loose spokes.

Assembly and Installation

1. On machines with single leading shoes, install the operating lever, cam spindle, and pivot pin. Fasten the return springs to their respective hooks on the brake shoes, then position the shoes over the cam and pivot pin. Snap the shoes in place by pressing on the outer edges of the shoes. Position the operating lever in a counterclockwise location then connect the return spring.

2. On machines with double leading shoes, first lubricate the spindles lightly, then install both cams—wedge shape out. Install the outside return spring on the front cam, then reinstall both brake cam levers and secure them with washers and nuts. Install the abutment plates on the anchor plate the tag side toward the anchor plate. Position the shoes with the radiused end toward the pivot pin and connect the return springs. This is most easily accomplished by installing one shoe, connecting the springs, and snapping the other shoe into place.

3. Coat the wheel bearings and retainers liberally with the recommended grease, then install the left inner retainer, bearing, and outer dust cap. Install the retaining circlip and then drive the bearing up against the circlip, using the shouldered end of the axle as a drift.

4. Install the right retainer disc and backing ring (one piece on machines with double leading brakes).

5. Using the shouldered end of the axle as a drift, drive the right bearing into place, then install the left-hand thread retainer ring.

6. The remainder of the assembly and installation procedure is a reversal of the removal and disassembly instructions.

7. Adjust the front brake.

Removal and Disassembly

1. Disconnect the speedometer drive cable, then remove the securing nut and the rear axle.

2. The distance collar that fits between the hub and the swing arm should drop out when the axle is removed, thereby facilitating wheel removal.

3. Remove the speedometer drive unit and unscrew the end cover.

4. Withdraw the wheel, leaving the brake hub assembly fastened to the swing arm.

5. Remove the left side bearing retainer.

NOTE: This bearing retainer has lefthand threads.

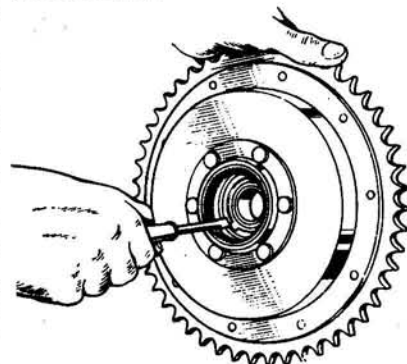
6. Using a drift slightly under $\frac{3}{4}$ in. diameter, drive out the hollow hub spindle. This will release the right bearing, inner collar, and washers.

7. Drive out the left bearing and thrust washer from the right side. Do not disturb the bearing oil seal unless it must be replaced.

8. To remove the brake hub assembly from the swing arm, disconnect the final drive chain and unscrew the brake adjusting rod sleeve. Remove the axle nut and disconnect the torque arm at the hub. Lift out the brake assembly.

9. The brake assembly can now be disassembled and inspected as previously described for the front brakes.

10. To remove the brake hub bearing, first drive out the hollow spindle from the left side and remove the bearing circlip. The bearing can then be driven out with a suitable drift.



Removing the rear hub bearing circlip

11. Do not disturb the chain sprocket unless it must be replaced. To remove it, bend back the locking tabs and remove the six securing bolts.

12. Thoroughly clean all parts (except brake shoes) in solvent and blow them dry with compressed air. Do not spin the bearings until they have been completely dried and lubricated.

Inspection

Examine all parts as previously described for the front wheel and hub. Replace the chain sprocket if the teeth points have become hooked or rounded.

Assembly and Installation

1. Assemble the brake hub in reverse order of disassembly. Liberally grease the bearings. Be sure to install the steel washer that fits between the bearing and circlip, otherwise the bearing will not seat properly.

2. Install the hub assembly, complete with brake shoes, etc., on the swing arm. Readjust the final drive chain.

3. Assemble the wheel hub in reverse order of disassembly. Liberally grease the bearings. Note that the bearings should be driven in place by applying pressure to the outer race only. Install the hollow spindle with the short end on the left-hand side, and install the bearing seals facing outward.

4. Install all the wheel and hub assembly in the reverse of the removal procedure. Do not forget the distance collar between the swing arm and hub. If the brake hub assembly was not removed, it will not be necessary to readjust the chain.

T100C, T100R, TR6R, TR6C, and T120R

FRONT

The front wheel assembly on the 500 and 650 cc models is basically the same as the arrangement used on the TR25W. It can be serviced in the same manner, except that on 500s, Triumph special tool no. Z76 must be used to remove the left bearing retainer ring, rather than tool no. 61-3694.

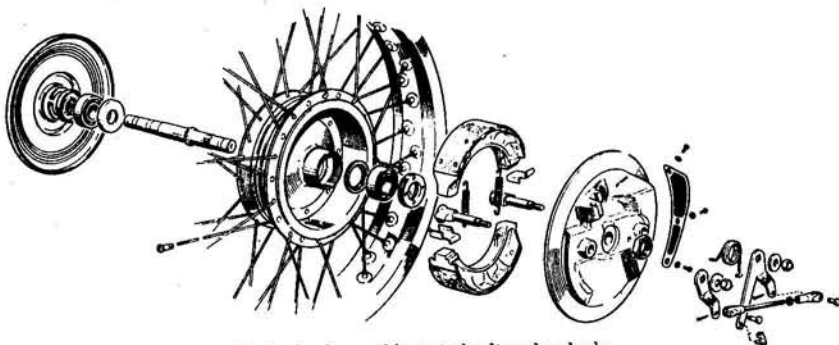
Use the accompanying illustrations for reference.

REAR

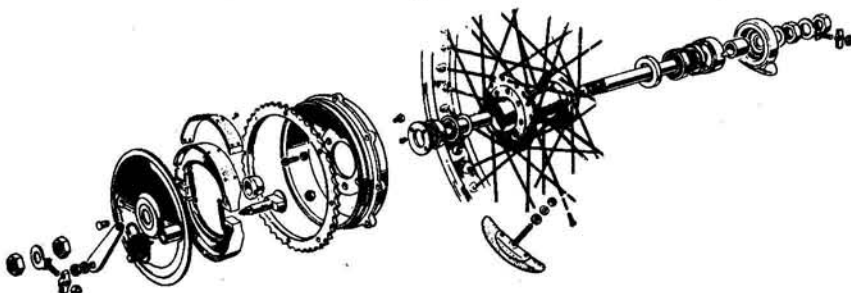
NOTE: The 500 and 650 cc models are equipped with either standard or quickly detachable rear wheels.

Removal and Disassembly (Standard)

1. Disconnect the rear brake adjuster and the final drive chain.
2. Loosen the front securing bolt and swing the chainguard up out of the way.
3. Disconnect the torque arm at the hub.
4. Disconnect the speedometer cable.
5. Loosen the axle nuts and slide off the wheel assembly.
6. Unscrew the backing plate retaining nut and withdraw the brake assembly. Service the brake assembly as described in the TR25W section.
7. Remove the wheel spindle, complete with speedometer drive, out of the right side.
8. Remove the slotted screw that locks the left bearing retainer ring in place.
9. Remove the retainer ring with tool no. 276 or a suitable substitute. The ring has left-hand threads.
10. To gain access to remove the left bearing, drive the central distance piece from the left side until the grease retainer collapses. The bearing can now be driven out from the right side, using a suitable, soft drift.
11. Remove the backing ring, collapsed grease retainer and central dis-



Front wheel assembly, twin-leading shoe brake



Standard rear wheel (500 and 650)

tance piece.

12. Drive out the right bearing and dust cap with a drift approximately 1% in. in diameter.

13. Thoroughly clean all parts (except brake shoes) in kerosine or cleaning solvent and blow them dry with compressed air.

Inspection

Examine all parts carefully as described in the TR25W section.

Assembly and Installation

1. Liberally grease the bearings and retainers.
2. Drive in the right grease retainer (new or straightened) and bearing. Install the dust cap after making sure that the bearing and the cavities on either side of the bearing are filled with grease.
3. Install the distance piece, right grease retainer and right bearing. Make sure everything is well packed in grease.
4. Bring the distance piece in line with the axle, then install the threaded (left-hand) retainer ring.
5. Install the retainer locking screw.
6. The remainder of the assembly and installation procedure is a reversal of the removal and disassembly instructions.

Removal and Disassembly (Quickly Detachable)

1. Disconnect the speedometer cable.

2. Unscrew the axle from the right side of the machine and pull out the distance collar.

3. Pull the wheel clear of the engaging splines and remove it out the back of the machine.

4. Remove the locknut on the right side of the axle sleeve and lift off the speedometer drive unit.

5. Disassemble the wheel hub and bearings as previously described for the standard rear wheel.

6. Disconnect the final drive chain, brake operating rod and torque arm, and then remove the axle sleeve nut.

7. Disassemble the brake components as previously described in the TR25W section.

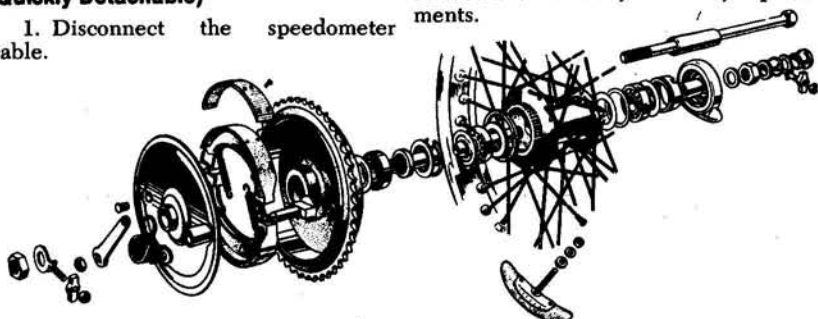
8. Press out the axle sleeve, then remove the bearing circlip located in the brake drum.

9. Pry out the retainer and felt washer, then drive out the bearing with a suitable drift.

10. Thoroughly clean all metal parts in kerosine or cleaning solvent, then blow them dry with compressed air. *Do not spin the bearings until they have been completely dried and lubricated.*

Inspection

Examine all parts as previously described and make any necessary replacements.



Quickly detachable rear wheel (500 and 650)

Assembly and Installation

Assembly and installation is a reversal of the removal and disassembly instructions. If brake work was performed and the hub was removed from the swing arm, it will be necessary to adjust the rear brake and the final drive chain. Make sure the bearings and retainers are thoroughly packed with grease and remember to soak the felt washer in oil before reassembly.

T150

Early models use a front hub not dissimilar to that described above for the TR25W. These models also used a rear hub like that of the 650 Twins (standard hub). Refer to the section above.

Note that some later model Tridents are equipped with the newer type forks (without external fork springs or fork gaitors), and these forks have four nuts on each axle cap which must be removed to remove the front wheel.

When refitting the wheel with this type of fork, place the front wheel assembly into the forks while engaging the brake anchor stud in the slot in the right fork slider. Refit the axle caps and replace all of the cap nuts, tightening them evenly until they are just a bit more than hand tight. Slacken all of them $\frac{1}{2}$ turn.

Pull the wheel to the right side of the machine until the brake anchor plate facing boss touches the mating lug on the fork leg. Holding the wheel in this position, tighten the axle cap nuts *evenly* to 15 ft lbs. Check that no gap exists between the facing boss and the fork slider. Retighten the anchor stud nut.

TR7V, T140V, T150V

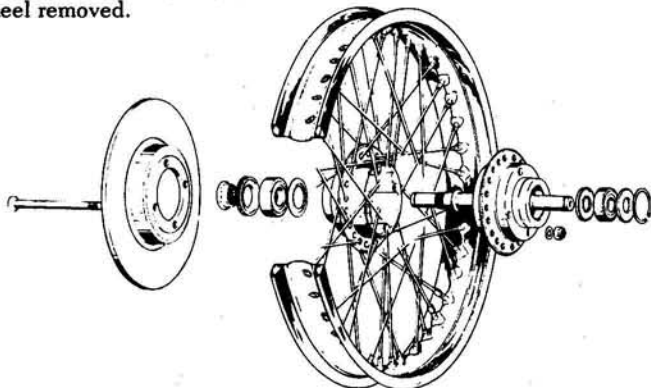
FRONT

Removal and Disassembly

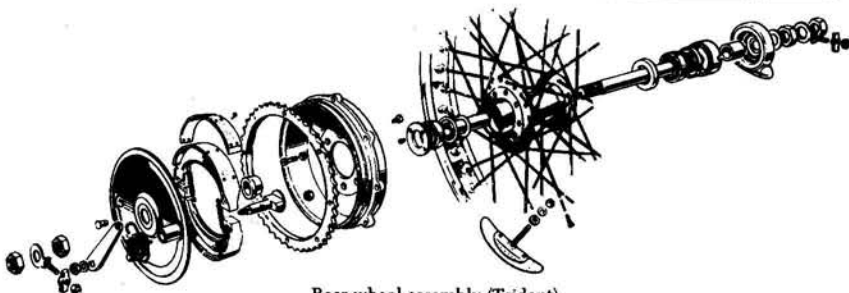
These models are equipped with a front disc brake and the latest type of front fork. This fork is easily distinguished from earlier units in that it is *not* fitted with either external fork springs or fork gaitors. The fork tubes are chromed, and the top of each slider is fitted with a small dust seal.

1. Support the machine so that the front wheel is off of the ground.

2. Remove the four axle cap nuts at the bottom of each fork leg, remove the caps, and take away the front wheel assembly. Do not apply the front (disc) brake with the wheel removed.



Front wheel assembly (disc brake)



Rear wheel assembly (Trident)

3. Remove the axle nut on the left side, then unscrew the bearing retainer ring with the Triumph tool 61-3694 or a suitable substitute. The retainer has a standard right-hand thread.

4. Remove the left side wheel bearing by driving the axle through the wheel from the right side. Remove the grease seal beneath the bearings.

5. Take off the circlip on the right hand side of the wheel, and insert the axle into the left hand side, driving out the right hand bearing along with its two grease seals (one on each side of the bearing).

Inspection

1. Clean all parts thoroughly in a solvent and blow them dry.

2. Check the bearings for wear, pitting, play in the bearing races, and rough or uneven rotation. Replace as necessary.

Assembly and Installation

1. Refit the inner grease seal for the right side wheel bearing. Lubricate the bearing thoroughly and refit it and the outer grease seal.

2. Replace the circlip for the right side bearing. Insert the shouldered end of the axle into the left side of the wheel, and use it to drift the bearing assembly up against the circlip.

3. Take out the axle, and then reinsert it into the wheel from the left in its normal position.

4. Replace the left-hand bearing grease seal, the lubricated bearing, and the retainer. Screw in the retainer until tight. Tap the axle from the right until the axle shoulder contacts the left side bearing. Replace the axle nut and tighten securely.

5. Engage the brake disc into the caliper and replace the fork caps. Tighten the four nuts on the left fork slider *first*, then tighten the nuts on the right slider. In both cases, tighten the nuts evenly and in an "X" pattern. Torque the cap nuts to 25 ft lbs.

REAR

Removal and Disassembly

1. Support the machine so that the wheel is about 12 in. off the ground.

2. Disconnect the rear chain and disengage it from the rear wheel sprocket.

3. Disconnect the speedometer cable at the rear wheel. Disconnect the brake anchor at the brake plate and remove the anchor from the machine after removing the nut and bolt at the other end.

4. Loosen the bolt securing the left side shock absorber to the swing arm. Lift the chainguard so that the sprocket will clear it.

5. Loosen the axle nut (right side) and pull the wheel assembly out of the machine. Remove the axle, brake assembly, and speedometer drive.

6. To remove the bearings, remove the speedometer drive ring from the right side of the wheel.

NOTE: This ring has a left-hand thread.

7. Remove the bearing retainer from the left side. Use Triumph tool No. 61-3694 to remove this retainer.

8. A drift is needed to remove the bearings and spacer. This drift should have dimensions as shown in the illustration. If this drift is not used, the spacer tube may be damaged, and will have to be replaced. Using the drift, insert it into either side of the wheel and knock out one of the bearings and the spacer tube out of the wheel.

9. Note that the bearing is an interference fit on the end of the spacer tube. Use the drift again to separate the bearing and the spacer tube, then reinsert the spacer tube in the hub, and use it and the drift to remove the remaining bearing. Separate this bearing from the spacer tube after removal.

10. Grease retainers behind each bearing may be left in place, but can be removed with a drift if desired by driving them out from the inside of the hub.

Inspection

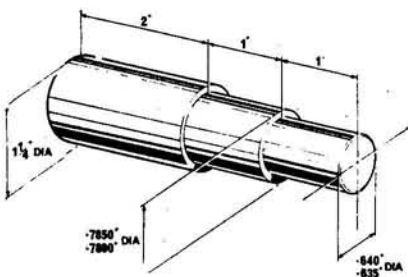
1. Check the condition of the bearings and seals. If the latter have been removed, they must be replaced.

2. Wash the bearings in a solvent and blow them dry. Check for worn, dam-

aged, or pitted balls, rough rotation, and excessive play.

Assembly and Installation

1. Replace the grease retainers if they have been removed.
2. Refit one of the bearings onto the spacer tube, and place the bearing and tube into the left side of the hub. Drift the bearing into the hub until it contacts the grease retainer. When doing this, apply force to the outer bearing race only.
3. Replace the washers and the left side retainer ring and tighten it securely. Refit the other wheel bearing driving it home as with the first, and replace and tighten the speedometer drive ring (left-hand thread).
4. The remainder of the procedure is a reversal of the removal instructions.



Drift for removing rear wheel bearings
(1973 and later)

FRONT FORK

Late models (including the TR7V, T140V, an T150V) are equipped with a telescopic fork of the "slim-line" pattern easily noticeable because of its chromed fork tubes and the absence of external springs and fork gaitors.

Other models have either rod damper or shuttle valve-type forks. In general, the shuttle valve types can be identified by its longer and narrower spring, and by its overall slimmer appearance.

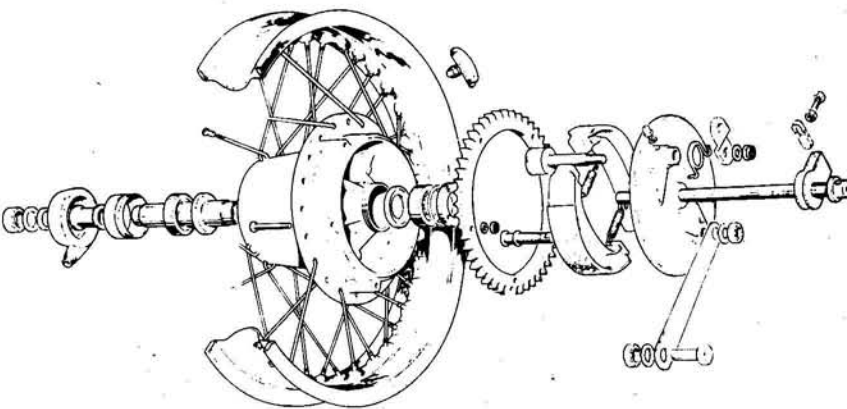
TR25W (Shuttle Valve Type)

REMOVAL

1. Drain the fork oil.
2. Remove the front wheel and fender.
3. Slide the boots clear of the top fork shrouds.
4. Remove the fork leg caps along with cable brackets.
5. Loosen the bottom yoke, fork pinch-bolts and screw Triumph special tool no. 61-3824 or a suitable substitute into the top of the fork stanchion.
6. Hit the tool sharply with a mallet and the stanchion taper will be freed of the top yoke.
7. The fork legs can now be removed.
8. After removing the fork legs, lift off the boots and main springs.

DISASSEMBLY

1. Wrap a piece of rubber around the fork leg and clamp the leg in a soft-jawed vise.
2. Remove the oil seal holder, using Triumph special tool no. 61-6017 or a



Rear wheel assembly (1973 and later)

suitable substitute. Turn the tool counterclockwise.

3. Firmly grasp the stanchion tube and move it back and forth against the top bushing until the bushing is driven out of the lower fork leg. At this time, the stanchion, complete with bushings and shuttle valve, can be removed.

4. To free the shuttle valve, remove the bottom retaining circlip, and let the valve slide out the top end of the stanchion.

5. Do not disturb the bottom bushing unless it is to be replaced. If it is, then remove the bottom bearing retaining nut and drive the bushing out with a hammer and chisel. Take care not to slip and damage the stanchion tube.

6. If it is necessary to remove the restrictor at the bottom of the leg, unscrew the bolt in the spindle cutaway.

7. To remove the oil seals from their holders, take out the loose backing washer from the threaded end of the holder, and drive the seal out through the exposed slot. Note the O-ring in the threaded end of the seal holder.

INSPECTION

1. Check the stanchion tubes for straightness by rolling them along a known flat surface. Any bow greater than $\frac{5}{32}$ in. requires that the stanchion be replaced. If less than $\frac{5}{32}$ in., the stanchion may be straightened.

2. Examine the top fork yoke for cracks and then insert the fork legs (if true) and tighten them down with the top caps. Take several measurements to ensure that the legs are parallel to each other and perpendicular to the top yoke. Check the bottom yoke in the same manner, but make sure at least $6\frac{1}{2}$ in. of the fork legs protrude above the yoke. The bottom yoke is made of malleable metal and, therefore, can be quite easily straightened if need be.

3. Examine the bottom fork legs for any damage. Insert the stanchion tubes (with new bottom bushing) and note the amount of free-play of the bushing within the bores of the bottom legs. If excessive, or any restriction of movement is noted, the bottom legs should be replaced.

4. Check bottom fork leg and front axle alignment by installing the axle and measuring their inclusive angle with a square. Check one leg at a time, then

both simultaneously.

5. Inspect the condition of the top and bottom bushings, and measure their inside or outside diameters (see specifications). Excessive wear, or too great a clearance between the bushing and its mating surface, indicates that the bushings should be replaced.

6. Check the main springs for any stress cracks etc., and measure its free-standing height. Both springs must be within $\frac{1}{4}$ in. of their original dimension.

ASSEMBLY

Assembly is basically a reversal of the disassembly procedure. Note the following:

1. Make sure the new bottom bushing is correctly seated before installing the retaining nut.
2. Note that the large end of the shuttle valve fits into the stanchion.
3. Thoroughly lubricate all parts in the fork before reassembly.
4. Replace the oil seals and apply locking compound to the holder threads.

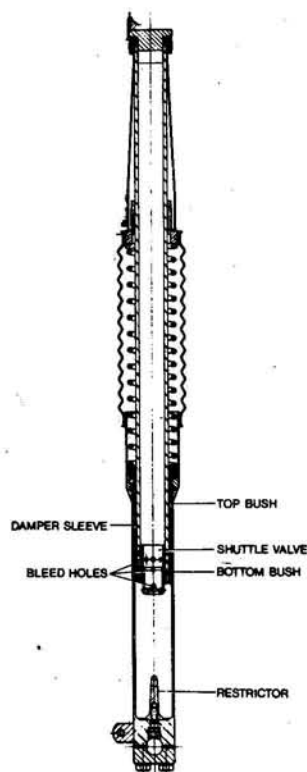
INSTALLATION

1. Slide the fork leg boots over the oil seal holders and install the main springs.
2. Insert one leg through the bottom and top yoke bores and install Triumph special tool no. 61-3824 on the top of the stanchion. Install the collar and nut, and tighten the nut until the stanchion is firmly locked in its taper.
3. Tighten the bottom yoke pinch bolts and then remove the special tool.
4. Slide the top of the fork boot over the shroud and secure it in place.
5. Repeat the previous steps for the remaining fork leg.
6. Install the front wheel and fender.

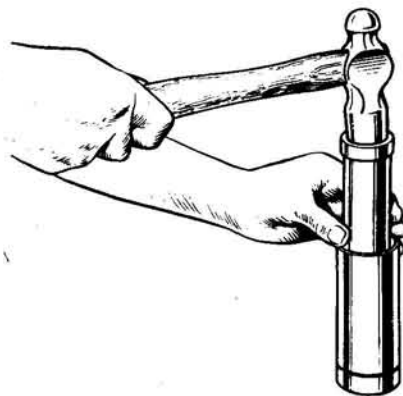
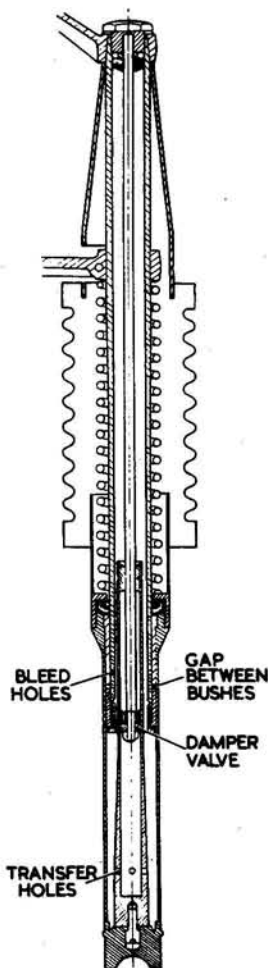
TR25W (Rod Damper Type)

REMOVAL

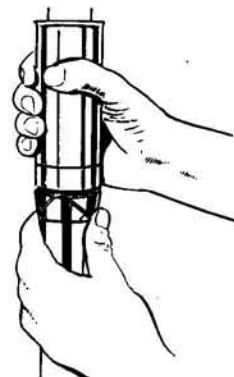
1. Drain the fork oil.
2. Remove the front wheel and fender.
3. Slide the fork boots off the top shrouds and loosen the bottom yoke pinch bolts.
4. Unscrew the fork leg caps and raise them high enough to loosen the damper rod locknut.
5. Remove the fork leg caps from the top of the rod damper.
6. Install Triumph special tool no.



Rod-damper forks



Removing the oil seal (rod-damper forks)



Installing twine for added protection (rod-damper forks)

61-3350 or a suitable substitute into the top of one fork leg.

7. Hold the bottom of the fork leg firmly, then strike the special tool sharply with a mallet. This will free the fork leg from its taper in the top yoke.

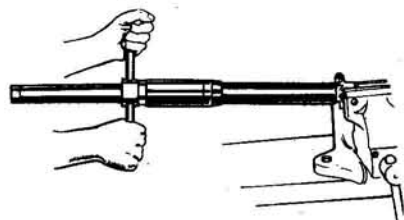
8. Remove the other fork leg in the same manner.

9. Remove the fork boots and main springs.

DISASSEMBLY

1. Clamp the fork leg in a soft-jawed vise at the axle lug.

2. Slide Triumph special tool no. 61-3005 over the main tube and engage the dogs at the bottom of the oil seal holder.



Removing the oil seal holder (rod-damper forks)

3. While applying pressure to the end of the tool, turn it counterclockwise and free the seal holder.

4. Remove the special tool and slide the seal holder to the end of the tube. Do not attempt to entirely remove the seal holder as damage may result.

5. The main tube assembly and lower sliding leg can now be separated.

6. Clamp the un-machined portion of the tube in a soft-jawed vise and remove

the large nut at the base of the shaft. Remove the bushings, spacer, and oil seal assembly.

7. Remove the allen screw that secures the damper tube to the lower portion of the fork leg.

8. Remove the two circlips at the top of the damper tube. This will free the damper rod with valve and bushing.

9. Remove the nut that secures the damper valve to the rod. Do not disturb the sealing washer and special retainer located just below the nut unless they require replacement.

10. If an oil seal requires replacement, position the holder with the bottom edge on a wooden block and drive out the seal with Triumph special tool no. 61-3007 or a suitable substitute.

INSPECTION

Examine all parts as generally described for the shuttle-valve-type fork. Compare measurements with those given

in specifications at the end of this section and made any necessary replacements.

ASSEMBLY AND INSTALLATION

1. Coat the outside of the oil replacement seals with gasket sealer and drive them into their holders with Triumph special tool no. 61-3007 or a suitable substitute. Grease the feather edge of the seal before further assembly.

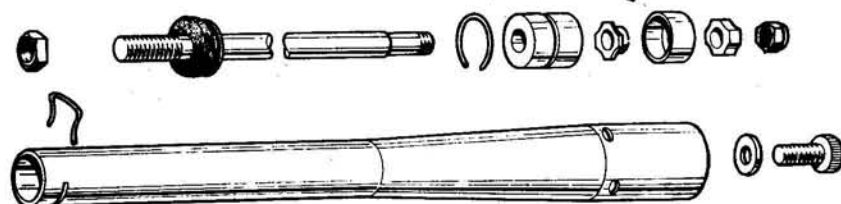
2. Make certain all parts are completely clean, then reassemble the remaining parts in reverse order of disassembly.

NOTE: When tightening down the oil seal holders, it's a good idea to wrap a piece of no. 5 twine around one of the last threads. This will provide additional protection for the seals.

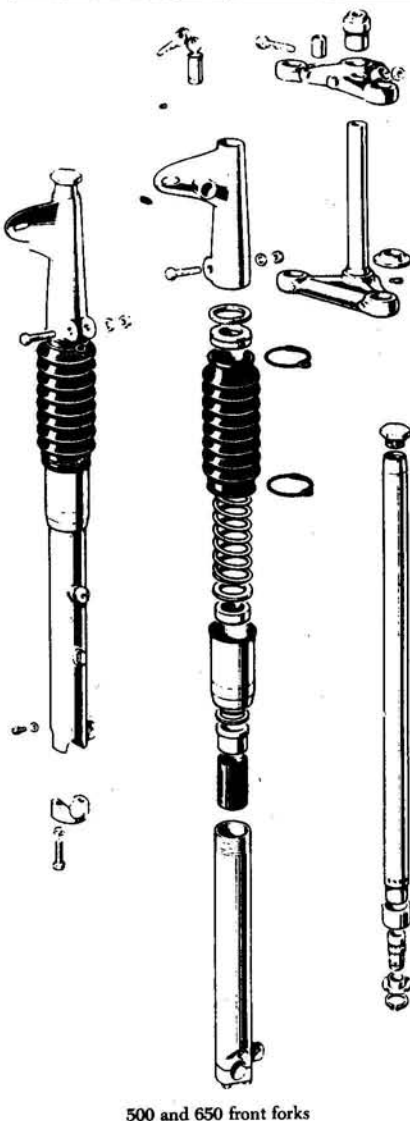
3. Triumph special tool no. 61-3350 must be used to set the fork leg in its taper, and special tool no. 61-3765 must be used to raise the damper high enough in the tube to screw on the fork leg cap.

T100C, T100R, TR6R, T120R, and T150

These machines are equipped with fork assemblies nearly, if not exactly, identical to those used on the TR25W.



Rod and damper assembly



500 and 650 front forks

9. Hold on to the fork and then give the underside of the top yoke a good swat with a mallet. This should free the fork legs for further disassembly.

10. Installation is a reversal of the removal procedure. Special tool no. Z161 must be used to seat the fork leg in its top yoke taper on 500 cc models; tool no. 61-3824 on 650 and 750 cc models.

TR7V, T140V, T150V

This type of fork may also be found on some 4-speed Tridents and 650 Twins.

REMOVAL AND DISASSEMBLY

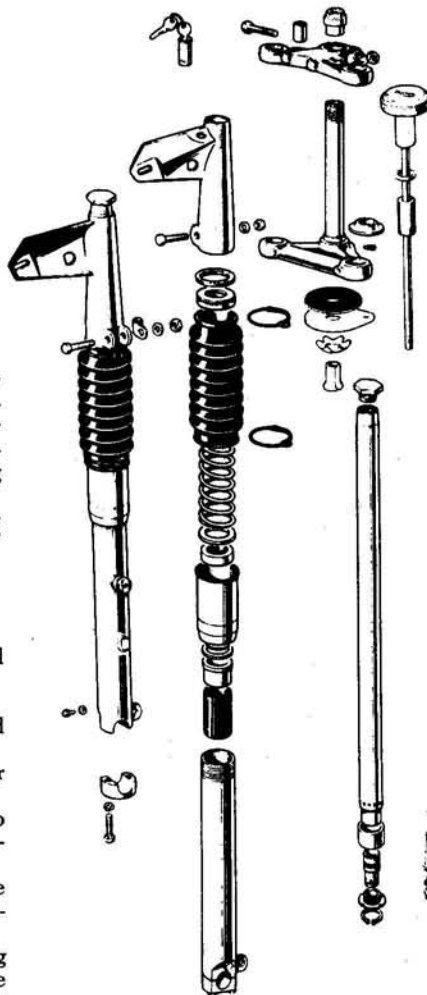
1. Before beginning work on the forks, it is advisable to have two fork slider oil seals, two damper valve oil seals as well as Triumph tool 61-6113. This tool is quite necessary to the disassembly procedure.

2. Drain the forks, remove the front wheel as previously described, remove the front fender.

3. Remove the handlebars by unscrewing the two self-locking nuts which secure the handlebar clamps to the fork crown.

4. Remove the fork tube cap nuts. Disconnect the instrument cables and lights, and put them in a safe place.

5. Disconnect the hydraulic brake line at the lower triple clamp and at the



Trident front fork assembly

Disassembly, inspection, and assembly procedures remain the same, but the removal and installation instructions vary slightly to suit various instrument arrangements and the use of a steering damper.

NOTE: Some late models 650 Twins and Tridents may use the "slim-line" forks. See below.

REMOVAL AND INSTALLATION

1. Drain the fork oil.

2. Remove the front wheel and fender.

3. Remove the headlight assembly.

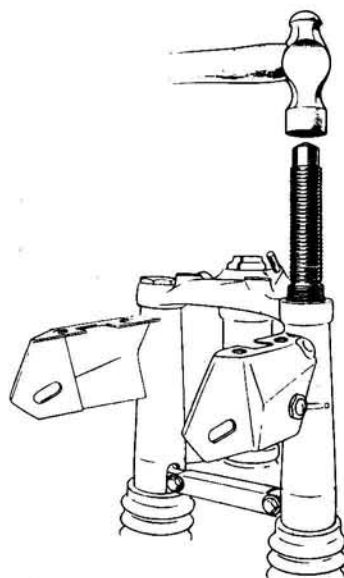
4. Disconnect throttle, choke, and front brake cables.

5. Disconnect any instrument and/or diode wiring.

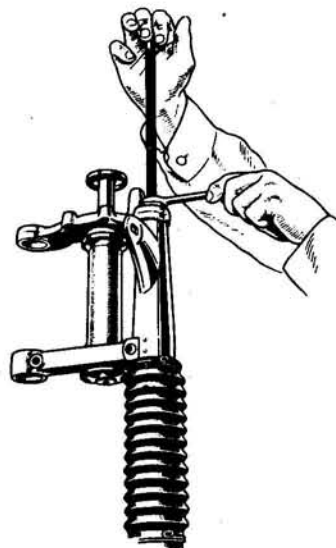
6. Remove the steering damper knob and loosen the top yoke pinch bolt. Unscrew the sleeve nuts.

7. On 500 models, also remove the steering damper anchor plate at the bottom of the frame head.

8. Remove the handlebar mounting bolts and swing the handlebar out of the way. It may or may not be necessary to disconnect all controls.



Removing the fork leg stanchion



Installing the fork leg with tool no. Z161

fork slider.

6. Remove the caliper and put it in a safe place.

7. Loosen the pinch bolts (allen head) at the back of each fork fitting in the fork crown.

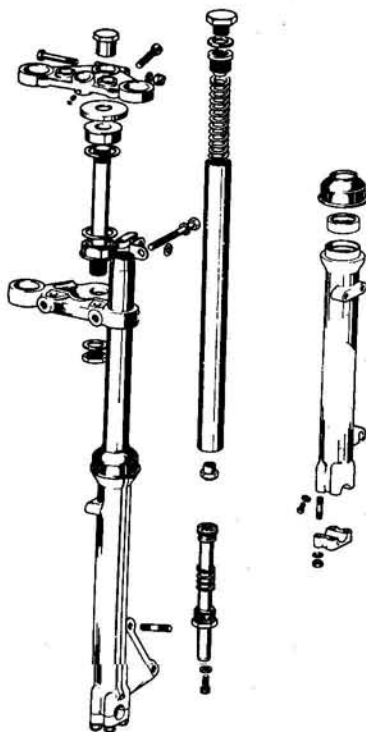
8. With an allen wrench, remove the cap screws from each fork tube, and lift out the fork springs.

9. Use special tool No. 61-6113 inserted down into the fork tube to hold the damper valve assembly in place while the allen bolt is removed from the bottom of the slider.

10. Remove the slider from the fork tube. Remove the fork tubes from the triple clamps by first loosening the pinch bolts on the lower triple clamp and yanking down on the tubes until free.

11. Lift the rubber dust cover off of the top of the slider. Remove the nut at the bottom of the damper assembly.

12. Take out the damper assembly. The damper assembly should not be taken apart unless absolutely necessary.



Late model "slim-line" front forks

The O-ring oil seal on the damper bleed valve should be removed and a new one fitted by hand.

13. Account for the sealing washer at the very bottom of each fork slider.

INSPECTION

1. Check all parts for wear or damage. Replace as necessary.

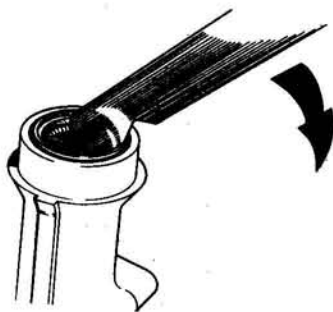
2. To replace the fork slider oil seal, use a tool similar to the one shown or a suitable substitute. The important thing is that the soft aluminum of the slider not be touched by the tool when removing the oil seal. Pry all around the circumference of the seal, gradually lifting it off its seat.

3. To replace the seal, cover the top of the fork tube with a thin plastic "sandwich bag" or something similar. Oil the lips of the seal, and slide it down over the top of the fork tube. Be very careful that the seal is not forced in any way. It is extremely easy to damage the seal.

Place the fork slider in position at the bottom of the fork tube, and bring the seal down to meet it.

A drift is needed to properly seat the oil seal in the slider or it will leak. After installation, remove the slider from the fork tube.

4. Clean all components thoroughly before reassembly.



Removing the slider oil seal

ASSEMBLY AND INSTALLATION

1. Refit the damper valve assembly into the bottom of the fork leg. Use a bit of thread locking compound on the damper retainer nut and tighten the nut to 25 ft lbs.

2. Locate the small sealing washer in the very bottom of the fork slider. Replace the dust cover atop the slider, and replace the slider on the fork leg.

3. Bring the slider up to meet the damper assembly and insure that the end of the damper rests on top of the sealing washer. Replace and tighten the allen screw in the bottom of the fork slider with the aid of the special tool.

4. Replace the fork leg assembly in the triple clamps. Push upward until the top of the fork tube is exactly flush with the top of the fork crown. Tighten the pinch bolts on the lower triple clamp and the fork crown to 20 ft lbs.

5. Replace the fork springs. Refill each leg with the correct grade and quantity of oil.

6. Smear the threads of the cap screws with a gasket compound, and tighten the screws to 40 ft lbs. Replace the instruments and the fork cap nuts. Tighten them to 40 ft lbs as well.

7. The remainder of the assembly procedure is the reverse of disassembly. Refer to "Front Wheel Installation" if necessary. Remember that the axle cap nuts on the left slider are tightened first.

ALIGNMENT

In the event that the fork alignment is not correct, loosen the axle cap nuts on the left slider, and tighten those on the right. Loosen the pinch bolts on the lower triple and the fork crown, including the pinch bolt just behind the fork crown center nut.

Pump the forks up and down several times and then retighten the axle cap nuts, the lower triple clamp pinch bolts, the fork crown pinch bolts at the fork tubes, and finally the fork crown pinch bolt behind the center nut. The nuts and bolts must be tightened in that order.

STEERING HEAD

TR25W

DISASSEMBLY

1. Remove the headlight assembly and speedometer head.

2. Disconnect the front brake cable and remove the zener diode and heat sink.

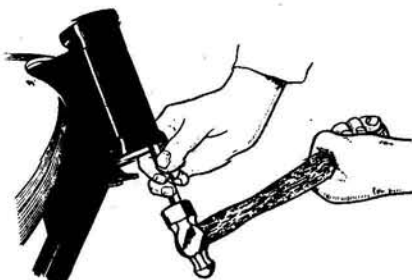
3. Protect the gas tank with a piece of cloth, then remove the handlebar mounting bolts and lay the handlebar on the tank.

4. Loosen the steering head clamp bolt and top yoke pinch bolt.

5. Remove the steering head adjusting nut.

6. Unscrew the fork leg caps and disconnect them from the damper rod (if so equipped).

7. Strike the underside of the top yoke smartly with a mallet. This should free the fork legs from their tapers in the top yoke.



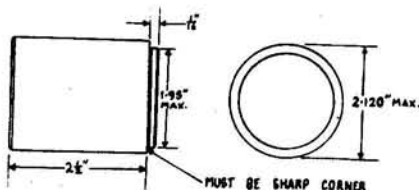
Removing the top bearing cone race

8. Locate the top yoke somewhere out of the way, then pull steering stem down and out of the head. Take care not to lose the bottom ball bearings as the stem is withdrawn.

9. Drive out the top cone race with a long narrow drift and mallet.

10. Pry out the bottom cone race by forcing it up with two levers.

11. Remove the cups by installing special tool no. 61-306.



Drift for cup removal (250)

INSPECTION

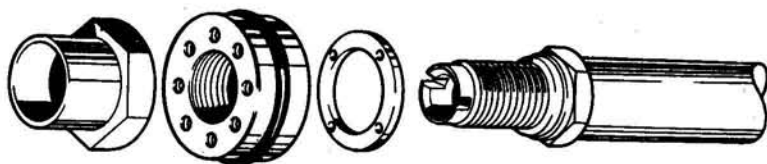
Examine the bearing balls for pitting, scoring, or flat spots and, if necessary, replace the bearings, cups, and cones.

Clean out the steering head bore and remove any burrs, etc., with emery cloth. Also clean up and inspect the stem itself.

ASSEMBLY

1. Install the bearing cups by driving them into position with a drift. Make sure the cups are square in their housings.

2. Drive the bottom cone into position



Damper assembly (1973 and later)

with a piece of pipe 1 1/4 in. in diameter and long enough to clear the column. Make sure it is squarely seated.

3. Liberally grease the bearing cups with the recommended lubricant and install the bearing balls.

NOTE: There should be forty bearing balls all together; twenty for each race.

4. Slide the stem back into the head and assemble the top cone and dust cover.

5. Install the top yoke and screw on the adjuster cap.

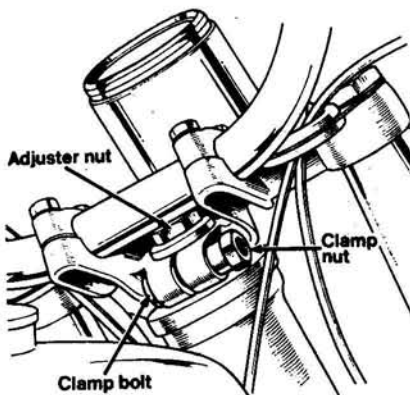
6. The remainder of assembly is a reversal of the removal procedure.

7. Adjust the steering head as described below.

ADJUSTMENT

1. Place a strong support under the engine so that the front wheel is about 6 in. off the ground.

2. Standing in front of the bike, attempt to rock the front fork back and forth. If there is any play, an adjustment will be necessary.



Steering head adjustment (250)

NOTE: It is very difficult to distinguish between steering head play and front fork bushing wear, so a more accurate method of determining whether an adjustment is necessary is by having a helper hold the fingers of one hand on the top head bearing race while the fork is being rocked. Any play will be easily detected by the helper.

3. Turn the fork from steering lock to steering lock. The movement should be free of any binding, etc. A "lumpy" feeling when turning the fork indicates that the bearings and races need replacement.

4. If an adjustment is necessary, loosen the steering head clamp bolt and the top yoke pinch bolt.

5. Turn the adjuster bolt until there is no rocking free-play. Make sure the bearings aren't too tight by centering the front fork and giving it a slight push to one side. The fork should fall freely until it reaches the steering lock.

T100C and T100R

Follow the disassembly and assembly instructions given for the TR25W, with the following exceptions:

1. When driving the bearing cones into position, use Triumph special tool

no. Z24 or a piece of tubing 9 in. long with a diameter of 1 1/8 in.

2. Note that there are forty-eight bearing balls total; twenty-four in each race.

Also adjust the steering head as previously described. Adjustment is achieved by loosening a pinch bolt at the rear of the top yoke and turning the steering head sleeve nut until the bearings are at their working clearances.

TR6R, TR6C, and T120R

Follow the disassembly and assembly instructions given for the TR25W, with the following exception:

1. When installing the bearing cones, use Triumph special tool no. 61-6009 or a piece of tubing 9 in. long with a diameter of 1 1/8 in.

Adjust the steering head as described above for the T100C and T100R.

T150

Follow the disassembly and assembly instructions given for the TR25W, with the following exception:

1. When driving the bearing cones into position use Triumph special tool no. D2218 or a piece of tubing 9 in. long with a diameter of 1 1/8 in.

Adjust the steering head as described above for the T100C and T100R.

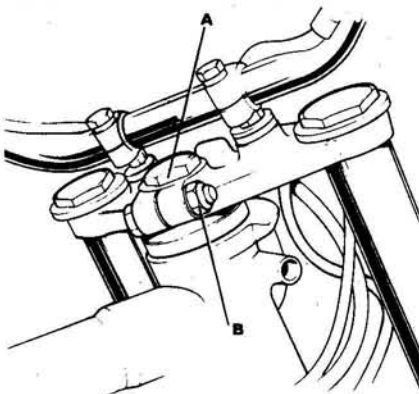
TR7V, T140V, T150V

DISASSEMBLY

1. Disconnect the brake line from the fork crown and lower triple clamp.

2. Disconnect the zener diode wires and remove the diode and heat sink from the machine.

3. Remove the headlight and the handlebar assembly. Remove the fork cap nuts. Place the instruments aside.



Steering head adjustment nut A and pinch bolt B (TR7V, T140V)

4. Support the machine so that the front wheel is far off the ground. Remove the front wheel and fender as described above.

5. Loosen the fork crown pinch bolt in back of the large adjuster nut, and loosen all of the pinch bolts on the fork crown and lower triple clamp.

6. Remove the fork legs from the triple clamps.

7. Remove the large adjuster nut from the fork crown and take off the fork crown while holding the lower triple clamp in place. Strike the underside of the crown with a soft-faced mallet if necessary.

8. Lower the triple clamp and steering stem from the head lug. Remove the bearings from the steering stem and the head lug.

INSPECTION

1. Clean the bearings thoroughly in a solvent and blow them dry.

2. Inspect for wear, pitting or scoring, or fractures.

3. After the bearings are completely dry, lubricate them generously with bearing grease.

4. The bearing races in the head lug can be removed, if necessary, with the aid of a drift welded from the inside of the head lug. When replacing them, note that bearing abutment rings are fitted behind the races. Use Triumph tool No. 61-6121 to refit the races.

ASSEMBLY

Assembly is the reverse of the disassembly procedure. Note that the fork tubes must be installed flush with the surface of the fork crown. The fork spring retainer nuts will stand above the fork crown.

ADJUSTMENT

Adjustment of the steering head bearings does not necessitate the removal of any components.

1. Support the front wheel off of the ground.

2. Grasp the fork sliders, and attempt to move them forward and back, noting any movements as you do so.

3. Another method, which is also recommended, is to grasp the tip of the front fender and attempt to move the fork assembly up and down. Your other hand should be positioned beneath the steering head feeling for any movement of the lower triple clamp relative to the steering head.

4. The presence of play in the forks in either of these tests would indicate that the bearings must be adjusted.

5. Also note that the forks should be able to be turned from side to side without any binding or a "lumpy" feeling. The latter may indicate worn or broken roller bearings or dented races. See section above for bearing replacement.

6. To adjust the steering head bearings, loosen the fork crown pinch bolt just behind the large bearing adjuster nut, and loosen the adjuster nut itself.

Then tighten the adjuster nut until bearing adjustment is correct. Be certain that the adjustment is not made too tight. This will be noticeable by a wobbly feeling at low road speeds, the same as though a steering damper was tightened down too much. The forks should swing from side to side very easily.

After adjusting the bearings, retighten the fork crown pinch bolt, and recheck the adjustment.

REAR SHOCK ABSORBERS

DISASSEMBLY AND ASSEMBLY

The shock absorber consists of a sealed hydraulic damper unit, coil spring, dust

covers, and rubber end bushings.

1. Position the cam ring or adjusting ring in its lowest (light load) setting.

2. Clamp the bottom lug of the shock in a soft-jawed vise, then compress the spring by hand and have a helper remove the spring retaining collars.

3. If the rubber end bushings require replacement, drive them out with a suitable drift.

4. Inspect the damper unit for any signs of oil leakage, bending of the plunger rod, etc. Replace it if necessary. Examine the coil spring for any stress cracks, then measure its freestanding height and compare with specifications.

5. Assembly is a reversal of the disassembly procedure. If installing new end bushings, smear them with soapy water to aid assembly.

SWING ARM

The swing arm is mounted to the rear of the frame by a spindle supported in plain bushings. In conjunction with the rear shock absorbers, it serves as the rear wheel suspension system.

TR25W

REMOVAL AND DISASSEMBLY

1. Remove the rear wheel, chainguard, shock absorbers, and rear brake pedal.

2. Disconnect the brake light switch connectors and remove the switch with its bracket.

3. Remove the large spindle nut and washer on the right side of the machine.

4. Drive the spindle out of the swing arm bore with a suitable drift and mallet.

5. Tap the left side of the swing arm down and the right side up, using a mallet. This will free the swing arm from the frame plates.

6. Each swing arm bushing consists of two steel sleeves bonded together with rubber. The inner sleeves are slightly longer than half the width of the swing arm and are locked together, thereby putting the rubber under tension when the arm swings through its arc.

If it is necessary to replace the bushings, the rubber must first be burned out to facilitate removal. This can be done with a thin rod or strip of metal heated until cherry red.

7. When enough rubber has been removed, drive out the inner sleeves and then the outer sleeves.

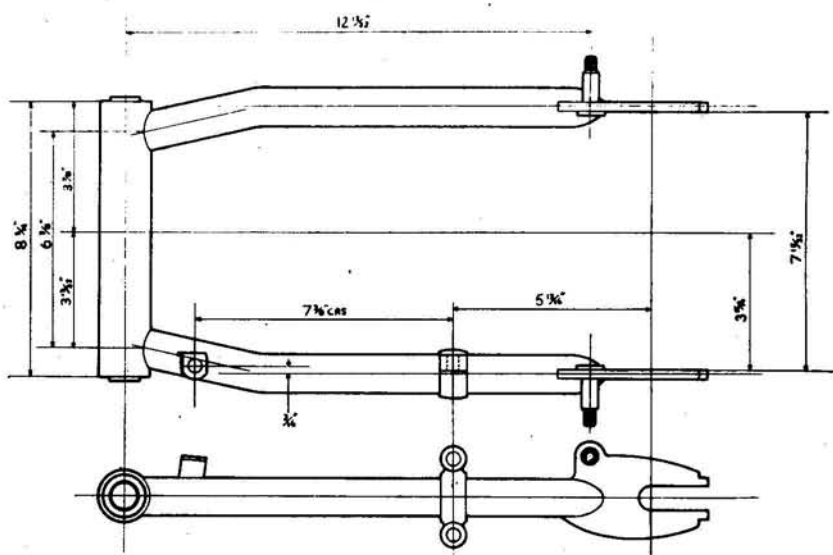
ASSEMBLY AND INSTALLATION

Assembly and installation is a reversal of the removal and disassembly procedure. Do not tighten the swing arm spindle nut until after the shock absorbers have been installed.

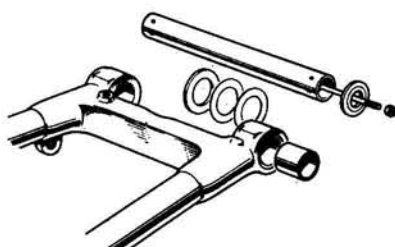
T100C and T100R (Before Serial No. H49832)

REMOVAL AND DISASSEMBLY

1. Remove the front chainguard bolt, disconnect the stoplight switch wiring and remove the switch operating clip from the brake rod.



Swing arm (250)



Swing arm bushings (500 before H49832)

2. Disconnect the shock absorbers from the swing arm.

3. Remove the swing arm spindle retaining rod and caps.

4. Using a threaded extractor (see illustration), draw the spindle out the right side of the machine.

5. Disconnect the chain and rear brake torque arm.

6. Disconnect the brake operating rod.

7. Remove the rear chainguard bolt and swing the chainguard out of the way. Disconnect the speedometer cable, loosen the rear axle nuts and remove the rear wheel.

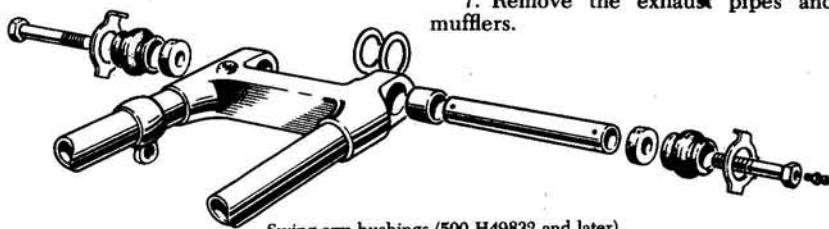
8. Remove the swing arm from the frame lugs. Take care to mark and separate the spacers.

9. Remove the swing arm bushings by driving them out with a suitable drift and mallet.

ASSEMBLY AND INSTALLATION

1. Press or drive in the new swing arm bushings. A drift can be fabricated out of 31/32 in. bar stock by machining 1 in. of one end to 1/2 in. diameter.

2. Line-ream the bushings to the bore size given in specifications, using



Swing arm bushings (500 H49832 and later)

Triumph special tool no. Z126 or a suitable substitute.

3. Assemble the swing arm to the frame lugs, using the same spacers that were removed. Lift the arm up and let it drop: the arm should just be able to move under its own weight. If movement was restricted, remove a spacer on each side and try again; if movement was too free, add spacers until the correct working clearance is obtained.

NOTE: Spacers are available in 0.003 and 0.005 in. sizes.

4. When the correct clearance has been obtained, grease the bushings and spindle, then press the spindle into position with the extractor tool used for removal.

5. Lubricate the swing arm grease nipple with the recommended lubricant, then assemble the remaining parts in reverse order of disassembly.

T100C and T100R (After Serial No. H49832)

REMOVAL AND DISASSEMBLY

1. Support the machine on its side stand or a wooden box, then disconnect the center stand spring.

2. Disconnect the chain and remove the rear brake adjuster.

3. Disconnect the brake torque arm from the hub.

4. Remove the rear chainguard bolt and swing the chainguard up out of the way.

5. Disconnect the speedometer cable, then remove the rear wheel.

6. Disconnect the rubber chain oiler tube.

7. Remove the exhaust pipes and mufflers.

8. Disconnect the spotlight spring and wiring connectors.

9. Remove the shock absorbers and rear brake pedal, complete with operating rod.

10. Remove both rider's footpegs.

11. Remove the small, front chain-guard and front, lower switch panel.

12. Remove the oil tank lower mounting nuts and tap the studs back through the mounting lug. Note the position of the distance washer that fits between the oil tank bottom bracket and frame mounting lug.

13. Remove the rear fender, front, bottom mounting bolt. Loosen the top and remove the bottom nuts and bolts that secure the front and rear part of the frame.

14. Straighten the tab lockwashers and remove both swing arm spindle end bolts.

15. Pivot the rear frame upward and support it in this position.

16. Remove both swing arm spindle distance pieces noting that the thicker one fits on the chain side.

17. Remove the swing arm spindle by tapping it out with a suitable, shouldered drift. The chain side of the spindle has an extra hole that will accept a C-wrench, should it become needed on reassembly.

18. Drive out the swing arm bushings with a suitable drift.

ASSEMBLY AND INSTALLATION

1. Install new bushings as described for the "T100C and T100R before serial no. H49832."

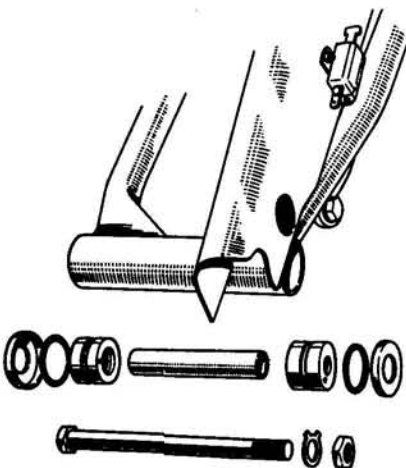
2. The remainder of assembly and installation is a reversal of the removal and disassembly procedure. Note that when installing the swing arm distances pieces, the ribbed sides must face the rear frame side plates.

TR6C, TR6R, T120R and T120 and T150V

REMOVAL AND DISASSEMBLY

1. Disconnect the chain and rear brake torque arm, then remove the brake rod adjuster.

2. Loosen the rear axle nuts and remove the rear wheel.



Swing arm bushings (650 and Trident)

3. Remove the two long and two short bolts that secure each of the rear engine mounting plates.

4. Loosen the rear chainguard bolt and remove the front chainguard bolt.

5. Disconnect the spotlight wiring connectors and remove the chainguard.

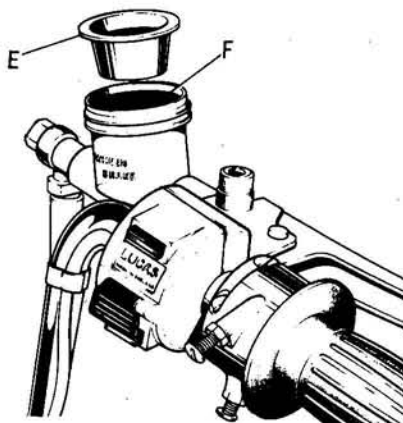
6. Remove the bottom shock absorber mounting bolts.

7. Disconnect the oil scavenge line from the oil tank for clearance, then remove the swing arm spindle locknut.

8. Unscrew the spindle until it is free to be withdrawn.

9. Remove the swing arm assembly and separate it from the end plates, outer sleeves and distance pieces.

10. Drive out the swing arm bushings with a suitable, shouldered drift.



Fluid reservoir diaphragm (E) and fluid level (F)

ASSEMBLY AND INSTALLATION

1. Install new swing arm bushings as previously described for other models.

2. Thoroughly lubricate all parts with grease, then assemble them in the order shown in the accompanying illustration. Tighten the spindle bolt until the swing arm will just move under its own weight.

NOTE: If the swing arm spindle is replaced, make sure the new one has the same thread pitch as the original.

3. To remove any spindle side-play, it is necessary only to remove the distance sleeve and file one end to shorten the length.

TR7V, T140V

REMOVAL AND DISASSEMBLY

1. Remove the rear wheel and the chainguard. Remove the shock absorbers.

2. Remove the swing arm spindle nut on the right side and pull out the spindle.

3. Take the swing arm out of the frame.

4. Remove the four dust covers (one on each side of the swing arm bush housings).

5. Note the location of the thrust washers (the thicker of the two is fitted to the right side of the swing arm); remove the spacers.

INSPECTION

1. Clean all parts thoroughly.

2. Check the bushes for wear or damage.

3. Check the dimensions of the bushes and spacer tubes against the standard values given at the end of this section. Replace any worn parts as is necessary.

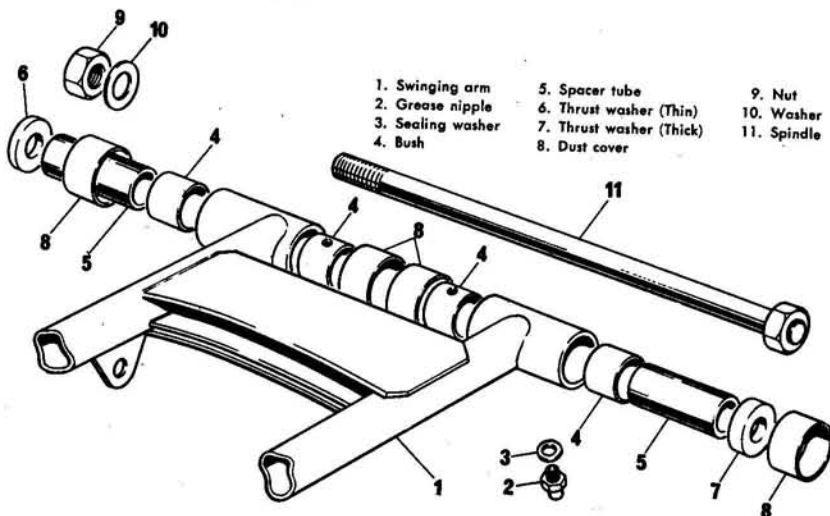
4. A special tool (No. 61-6117) is used to remove and install the bushes in their housings. Note its operation in the accompanying illustrations. A drift can also be used, provided that it has a narrow section 1 in. in diameter and a 1 1/4 in. shoulder.

Use some grease on the bushings to facilitate reassembly. Note that new bushes are pre-sized and need not be reamed to fit correctly.

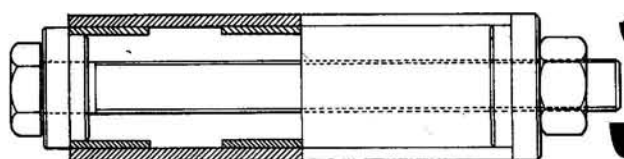
ASSEMBLY

Assembly is the reverse of the disassembly procedure. Refer to the exploded diagram for the correct placement of the parts. Replace the dust covers in their proper positions, then place the swing arm in the frame. Fit the thrust washers (they are of different thickness: the thicker is fitted to the right side of the swing arm). Replace the spindle and the spindle nut.

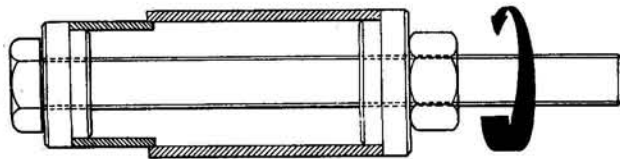
Replace the chainguard and rear wheel.



Swing arm bushings (TR7V, T140V)



Removing the swing arm bushings with the special tool (750 Twins)



Installing the swing arm bushings (750 Twins)

DISC BRAKE SERVICE

Maintenance

1. The hydraulic brake fluid level should be set at about $\frac{1}{4}$ in. from the top of the reservoir after the system has been bled. It is not necessary to add fluid to the system provided that there are no leaks in the lines. The fluid level in the reservoir will drop slightly as the brake pads wear.

2. The brake pads should be examined for wear at regular intervals. To do this, it will be necessary to remove them.

a. Remove the caliper's aluminum cover by removing the two phillips head screws.

b. Remove the two cotter pins. (These are indicated by the letter "B" in the illustration).

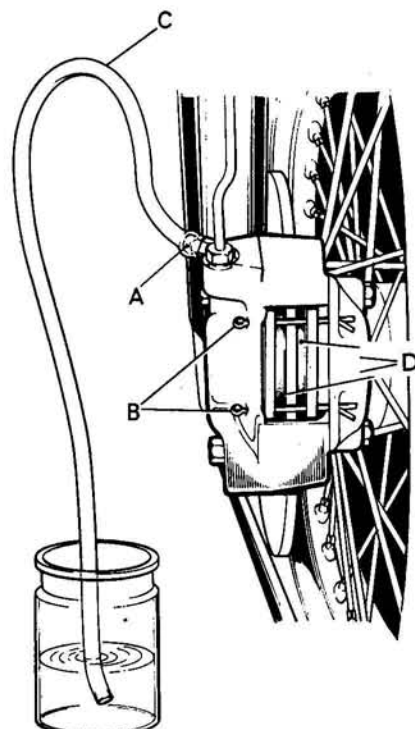
c. Pull out both pads.

d. Pads are bonded to the brake lining material. They must be replaced when the lining thickness is $\frac{1}{16}$ in. (1.6 mm) or less.

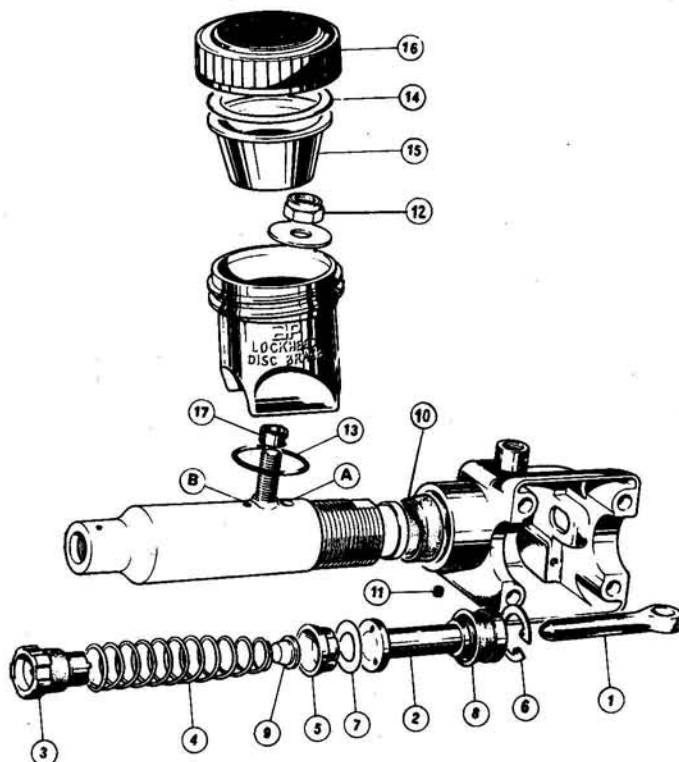
e. It is recommended that new cotter pins be used upon reassembly.

Bleeding

Any time any part of the brake system has been removed or the line is disconnected, it will be necessary to "bleed"



Bleeding the brake system. Note bleed nipple (A), brake pad cotter pins (B), and brake pads (D)



Master cylinder assembly

- | | |
|--------------------|----------------------------|
| 1. Pushrod | 10. Dust cover |
| 2. Piston | 11. Set screw |
| 3. Check valve | 12. Reservoir securing nut |
| 4. Return spring | 13. O-ring |
| 5. Primary seal | 14. Paper washer |
| 6. Circlip | 15. Diaphragm |
| 7. Piston washer | 16. Cap |
| 8. Secondary seal | 17. Spacer |
| 9. Spring retainer | |

Chassis Specifications

TR25W

WHEELS

Rim size and type (front)

Rim size and type (rear)

Spoke sizes:

Front (long) 20

Front (medium) 10

Front (short) 10

Rear (long) 20

Rear (short) 20

WHEEL BEARINGS

Front (left- and right-hand)

Rear (left- and right-hand)

Rear brake drum

Spindle diameter (front)

Spindle diameter (rear, left-hand)

Spindle diameter (rear, right-hand)

BRAKES

Front (diameter) twin leading shoe

Front (diameter) single leading shoe

Front (width) twin leading shoe

Front (width) single leading shoe

Rear (diameter)

Rear (width)

Lining thickness (front and rear)

WM2-18

WM3-18

10 s.w.g. x 6 in. (3.251 x 152.4 mm)

10 s.w.g. x $5\frac{1}{2}$ in. (3.251 x 132.55 mm)

10 s.w.g. x $5\frac{3}{8}$ in. (3.251 x 131.76 mm)

10 s.w.g. x 7.4375 in. (3.251 x 188.9125 mm)

10 s.w.g. x 7.375 in. (3.251 x 187.325 mm)

20 x 47 x 14 mm Ball Journal

20 x 47 x 14 mm Ball Journal

20 x 47 x 14 mm Ball Journal

0.8740-0.8745 in. (22.199-22.212 mm)

0.8745-0.8750 in. (22.212-22.225 mm)

0.685-0.686 in. (17.399-17.424 mm)

7 in. (177.8 mm)

1.557 in. (39.6875 mm)

1.125 in. (28.575 mm)

7 in. (177.8 mm)

1.125 in. (28.575 mm)

0.146-0.166 in. (3.96 mm)

the system, that is, to remove air pockets and bubbles from the system.

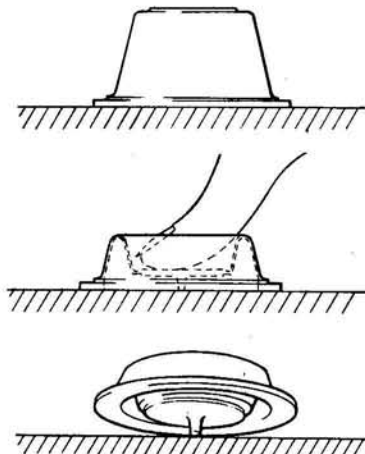
NOTE: Before beginning the operation, read the following points:

- Brake fluid drained from the system should not be used again.
 - Insure that the master cylinder reservoir is kept at least half full during the entire bleeding operation.
 - Take all precautions necessary to insure that the brake fluid does not come in contact with any type of painted surface.
- Refer to the illustration. Attach one end of a rubber hose to the caliper bleed nipple and immerse the other end in at least ½ in. of brake fluid contained in a jar. Note that the hose swings upward after leaving the bleed nipple. This is important.
 - Remove the fluid reservoir cap and take out the rubber diaphragm.
 - Loosen the bleed nipple from ½ to ¾ of a turn.
 - Insuring that the master cylinder reservoir is full of fluid, pull the brake lever all the way to the twist grip, holding it there for several seconds.

Note that the action of pulling the lever will force fluid and air bubbles through the hose and into the jar.

- Release the brake lever and repeat the operation, always maintaining sufficient amount of fluid in the master cylinder, until air bubbles no longer issue from the end of the hose.
- At this point, hold the brake lever on, and retighten the bleed nipple. Refill the reservoir to the proper level.

NOTE: The correct fluid level, given as ¼ in. from the top of the master cylinder reservoir, should be maintained. It is important to remember, however, that if the brake pads in the caliper are not new when the system is bled, the fluid level will rise in the reservoir when new pads are installed. Therefore, it may be necessary to remove some fluid from the reservoir when this is done.



Compressing diaphragm prior to installation

- Refer to the illustrations, and fold the diaphragm, as shown, before replacing it in the master cylinder reservoir. Install the paper washer in the cap, and screw on and tighten the cap securely.

Chassis Specifications (cont.)

TR25W

FRONT FORK

Type

- Springs—free length
- spring rate
- number of coils
- color identification

Bushings—Rod Damper Type

- Outer diameter (top)
- Outer diameter (bottom)
- Inner diameter (top)
- Inner diameter (bottom)
- Working clearance (top)
- Working clearance (bottom)
- Length (top)
- Length (bottom)
- Shaft diameter
- Sliding tube bore diameter
- Damper tube bush (outer diameter)
- Damper tube bush (inner diameter)
- Damper tube bush (length)
- Shuttle valve outer diameter (large)
- Shuttle valve outer diameter (small)

Bushings—Shuttle Valve Type

- Outer diameter (top)
- Outer diameter (bottom)
- Inner diameter (top)
- Inner diameter (bottom)
- Working clearance (top)
- Working clearance (bottom)
- Length (top)
- Length (bottom)
- Shaft diameter
- Sliding tube bore diameter
- Damper tube bush (outer diameter)
- Damper tube bush (inner diameter)
- Damper tube bush (length)
- Shuttle valve outer diameter (large)
- Shuttle valve outer diameter (small)

REAR SUSPENSION

Type

- Springs—free length
- spring rate
- color identification

SWING ARM

Bush type

- Bush diameter
- Housing diameter
- Interference fit
- Spindle diameter

T100, T100R

WHEELS

Rim size: Front and rear

Type:

Front

Rear

Spoke details:

Front

Rear: left-side

right-side

WHEEL BEARINGS

Front and rear, dimensions and type

- Front spindle diameter (at bearing journals)
- Rear spindle diameter (at bearing journals)

BRAKES

Type

Drum diameter:

Front

Rear

Lining thickness:

Front and rear

Lining area:

Front and rear

FRONT FORK

Type

Spring details:

- Free length
- No. of working coils
- Spring rate
- Color code

Coil-spring (hydraulically damped)

10.75–10.875 in. (273.05–276.225 mm)

34 in. lbs

20½

Red-green

1.4750–1.4755 in. (37.465–37.477 mm)

1.473–1.474 in. (37.414–37.439 mm)

1.250–1.251 in. (31.750–31.755 mm)

1.2485–1.2495 in. (31.711–31.737 mm)

0.0005 in. (0.0127 mm)

0.002–0.003 in. (0.0508–0.0762 mm)

2.125 in. (53.975 mm)

1.25 in. (31–75 mm)

1.248–1.249 in. (31.699–31.7246 mm)

1.475–1.477 in. (31.699–31.7246 mm)

0.6165–0.6185 in. (15.6591–15.7099 mm)

0.399–0.340 in. (8.6106–8.636 mm)

0.53125 in. (13.4937 mm)

1.498–1.499 in. (3.805–3.808 mm)

1.4935–1.4945 in. (3.792–3.799 mm)

1.3065–1.3075 in. (3.318–3.32 mm)

1.2485–1.2495 in. (3.168–3.172 mm)

0.0035–0.0050 in. (0.0889–0.127 mm)

1.0035–0.0065 in. (0.0889–0.165 mm)

1 in. (25.4 mm)

0.870–0.875 in. (2.221 mm)

1.3025–1.3030 in. (3.309–3.312 mm)

1.498–1.500 in. (3.802–3.81 mm)

1.018–1.016 in. (2.583–2.58 mm)

0.875–0.874 in. (2.221–2.22 mm)

Coil-spring (hydraulically damped)

8.40 in. (213.36 mm)

100 in. lbs

Green-pink (applies both to chrome or black springs)

Bonded rubber

1.250–1.253 in. (31.75–31.8262 mm)

1.247–1.248 in. (31.673–31.699 mm)

0.002–0.006 in. (0.0508–0.1524 mm)

0.810–0.811 in. (20.570–20.595 mm)

WM2-18

Spoke—single cross lacing

Spoke—double cross lacing

40 off 8–10 SWG butted 5¼ in. U.H.

20 off 8–10 SWG butted 7¼ in. U.H. 90°

20 off 8–10 SWG butted 7½ in. U.H. 90°

20 x 47–14 mm Ball Journal

0.7868–0.7873 in.

0.7862–0.7867 in.

Internal Expanding

8 in. } ±0.002 in.

7 in. }

0.183/0.197 in.

23.4/14.6

Telescopic with oil damping

Shuttle valve after H.57083

9¼ in.

12½

26½ in. lbs

Yellow-blue

Chassis Specifications (cont.)

T100, T100R

Bushing details: Material	Top bush	Bottom bush
Length	1 in.	0.870-0.875 in.
Outer diameter	1.498-1.499 in.	1.4935-1.4945 in.
Inner diameter	1.3065-1.3075 in.	1.2485-1.2495 in.
Stanchion diameter	1.3025-1.3030 in.	
Working clearance in top bush	0.0035-0.0050 in.	
Fork leg bore diameter	1.498-1.500 in.	
Working clearance of bottom bush	0.0035-0.0065 in.	
Shuttle valve:		
outer diameter (large)	1.018-1.106 in.	
outer diameter (small)	0.875-0.874 in.	
REAR SUSPENSION		
Type	Swing fork controlled by combined spring-hydraulic damper units. (Bolted up after H.49833).	
SPRING DETAILS:		
Fitted length	8 in.	
Free length	8 $\frac{3}{16}$ in.	
Mean coil diameter	1 $\frac{1}{4}$ dia	
Spring rate	145 in. lbs	
Color code	Blue-Yellow	
Load at fitted length	38 lbs	
SWING ARM		
Bush type	Phosphor bronze strip	
Bush bore diameter	0.8745-0.8750 in.	
Spindle diameter	0.8735-0.8740 in.	
Distance between fork ends	7 $\frac{7}{16}$ in.	

TR6R, TR6C, T120R

WHEELS	WM12-19 front	WM3-18 rear
Rim size: Front and rear	Spoke-single cross lacing	
Type: Front	Spoke-double cross lacing	
Rear		
Spoke details:		
Front: left-side	20 off 8/10 SWG butted 5 $\frac{1}{2}$ in. U.H. straight	
right-side	10 off 8/10 SWG butted 4 $\frac{3}{32}$ in. U.H. 78° head	
right-side	10 off 8/10 SWG butted 4 $\frac{1}{2}$ in. U.H. 100° head	
Rear: left-side	20 off 8/10 SWG butted 7 $\frac{1}{16}$ in. U.H. 90° head	
right-side	20 off 8/10 SWG butted 7 $\frac{1}{16}$ in. U.H. 90° head	
WHEEL BEARINGS		
Front and rear, dimensions and type	20 x 47 x 14 mm—Ball Journal	
Front and rear, spindle diameter (at bearing journals)	0.7862-0.7867 in.	
Q.D. REAR WHEEL		
Bearing type	$\frac{3}{4}$ x 1 $\frac{1}{2}$ x $\frac{9}{16}$ in. Ball Journal	
Bearing sleeve: journal diameter	0.7500-0.7495 in.	
Brake drum bearing	$\frac{3}{8}$ x 2 x $\frac{9}{16}$ in. Ball Journal	
Bearing sleeve: journal diameter	0.8745-0.8740 in.	
Bearing housing: internal diameter	1.9890-1.9980 in.	
BRAKES		
Type	Internal expanding twin leading shoes	
Drum Diameter:		
Front	8 in. \pm 0.002 in.	
Rear	7 in. \pm 0.002 in.	
Lining thickness:		
Front	0.183-0.193 in.	
Rear	0.177-0.187 in.	
Lining area:		
Front	24.4 sq in.	
Rear	14.6 sq in.	
Pre-set length of adjustable cam lever rod	6 $\frac{1}{2}$ in. between centers	
FRONT FORK		
Type	Telescopic-Shuttle valve damping	
Spring details:	Solo	Sidecar
Free length	9 $\frac{1}{4}$ in.	9 $\frac{1}{4}$ in.
No. working coils	12 $\frac{1}{2}$	15 $\frac{1}{2}$
Spring rate	26 $\frac{1}{2}$ lb in.	32 $\frac{1}{2}$ lb in.
Gauge	6 SWG	5 SWG
Color code	Yellow/blue	Yellow/green
Damper sleeve		
Length	2 $\frac{1}{2}$ in.	
Internal diameter	1.387-1.393 in.	
Material	Black polypropylene	
Bush details:	Top bush	Bottom bush
Length	1 in.	0.870-0.875 in.
Outer diameter	1.498-1.499 in.	1.4935-1.4945 in.
Inner diameter	1.3065-1.3075 in.	1.2485-1.2495 in.
Stanchion diameter	1.3025-1.3030 in.	
Working clearance in top bush	0.0035-0.0050 in.	
Bleed holes	8 holes $\frac{3}{16}$ in. dia	
Fork leg bore diameter	1.498-1.500 in.	
Working clearance of bottom bush	0.0035-0.0065 in.	
Shuttle valve:		
Outer diameter (large)	1.018-1.016 in.	
Outer diameter (small)	0.875-0.874 in.	

Flushing

Every three years, or if the system has accumulated any foreign matter, it should be flushed out as directed below:

1. Connect a hose to the bleed nipple, running the other end into a container, and squeeze the brake lever until all of the fluid in the system has been pumped out.

2. Fill the master cylinder reservoir with denatured alcohol and pump it out through the system in the same manner.

3. After all of the alcohol has been removed, fill the master cylinder with brake fluid, and bleed the system as described above.

Master Cylinder

REMOVAL AND DISASSEMBLY

1. Drain the brake fluid. Disconnect the brake line at the master cylinder.

2. Remove the brake lever and then the pushrod.

3. Remove the four screws which hold the master cylinder assembly on the handlebar, and remove the assembly.

4. Remove the reservoir cap, if this has not already been accomplished, and the paper washer and diaphragm.

5. Remove the nut inside the reservoir, and separate it from the master cylinder. Note the location of the spacer and O-ring beneath the reservoir.

6. Remove the set screw which locks the cylinder into the rest of the assembly, and unscrew the cylinder.

7. Remove the dust cover from the end of the cylinder. Use the pushrod, inserting it into the master cylinder, to push down the piston and remove the circlip.

8. Remove the secondary seal and piston, the piston washer, primary seal, return spring retainer, spring, and check valve. If the primary seal will not come out of the piston, try blowing into the brake line end of the piston.

9. Remove the secondary seal from the piston by stretching it over the piston flange.

INSPECTION

1. All seals and O-rings must be replaced.

2. Check the inside of the cylinder for scoring. Replace if necessary.

3. Clean all parts thoroughly in brake fluid only.

CAUTION: Do not clean the parts in any sort of solvent such as gasoline.

ASSEMBLY AND INSTALLATION

1. Fit the new secondary seal onto the piston noting that the seal lip faces the drilled end of the piston. Work the seal around the groove in the piston until it is properly seated.

2. Fit the check valve onto the large end of the return spring, and the spring retainer onto the other end. Insert the assembly into the cylinder, check valve first.

3. Fit the primary seal into the cylinder, inserting the lip end of the seal first. Do not force the seal, and make sure that the lip is not folded back upon installation.

4. Install the piston washer, convex side *outward* (towards the piston), and then the piston (drilled end piston), and then the piston (drilled end first). Depress the piston with the pushrod as on removal, and replace the circlip. Be sure the circlip is properly seated.

5. Fit the dust cover boot over the end of the cylinder.

6. Install the reservoir O-ring, spacer, and the reservoir.

7. Fill the reservoir with brake fluid, insert the pushrod into its place, and push inwards on the piston. The pushrod should be pushed in several times and then brake fluid should begin to flow out of the brake line connection at the end of the cylinder.

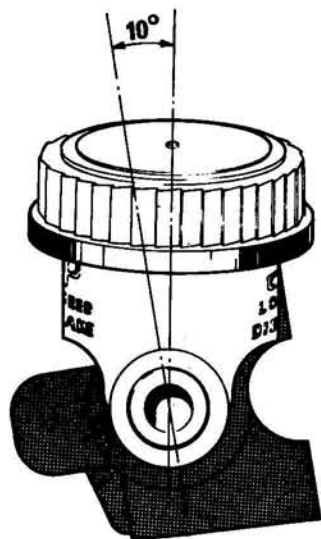
8. Drain the fluid.

9. The master cylinder must be properly located in the housing. Proceed as follows:

a. Remove the reservoir from the cylinder.

b. Insert the pushrod in place and install the brake lever and bolt.

c. Screw the cylinder into the housing while holding the brake lever on until the cylinder can no longer be turned.



Fluid reservoir installation angle

d. Refer to the exploded diagram of the master cylinder assembly. Note that the cylinder has two ports, designated "A" and "B" which flank the reservoir mounting stud. "A" is the main feed port, and "B" the breather port.

e. Place a finger over the main feed port "A" and blow through the brake line end of the cylinder. No air should escape.

f. Unscrew the cylinder while blowing through the cylinder until air just begins to escape from the breather port "B."

g. Unscrew the cylinder one full turn, and set the reservoir stud at about 10° from the vertical. This will allow the flat section on the threaded end of the cylinder to line up with the set screw.

Chassis Specifications (cont.)

T150

WHEELS

Rim size: Front and rear

Type:

Front

Rear

Spoke details:

Front: left-side

right-side

right-side

Rear: left-side

right-side

WHEEL BEARINGS

Front and rear, dimensions and type

Front and rear, spindle diameter (at bearing journals)

BRAKES

Type

Drum diameter:

Front

Rear

Lining thickness:

Front

Rear

Lining area:

Front

Rear

FRONT FORK

Type

Spring details:

Free-length

Number working coils

Spring rate

Gauge

Color code

Damper sleeve

Length

Internal diameter

Bush details: Material

Length

Outer diameter

Inner diameter

STANCHION DIAMETER

Working clearance in top bush

Length

Outer diameter

Inner diameter

FORK LEG BORE DIAMETER

Working clearance of bottom bush

REAR SUSPENSION

Type

Color code

Extended distance between center

Compressed distance between center

SWING ARM

Bush type

Bush bore diameter

Sleeve diameter

Distance between fork ends

REAR SUSPENSION

Type

Spring details:

Fitted length

Free-length

Mean coil diameter

Spring coil diameter

Color code

Load at fitted length

SWING ARM

Bush type

Bush bore diameter

Sleeve diameter

Distance between fork ends

WM2-19 front WM3-19 rear

Spoke-single cross lacing

Spoke-double cross lacing

20 off 8-10 SWG butted 5% in. U.H. straight (219.075 mm)

10 off 8-10 SWG butted 4 1/16 in. U.H.

95° head (118.0625 mm)

10 off 8-10 SWG butted 4 1/16 in. U.H.

80° head (118.0625 mm)

20 off 8-10 SWG butted 8 in. U.H.

90° head (203.2 mm)

20 off 8-10 SWG butted 8% in. U.H.

90° head (212-725 mm)

20 x 47 x 14 mm—Ball Journal

0.7862-0.7867 in. (19.9695 x 19.9822 mm)

Internal expanding 2 leading shoe

8 in. ± 0.002 in. (203.2 mm) ± 0.0508 mm

7 in. ± 0.002 in. (177.8 mm) ± 0.0508 mm

0.181-0.188 in.

0.165-0.175 in.

23.4 sq in. (150.967 sq cm)

14.6 sq in. (94-193 sq cm)

Telescopic-Oil damping

9.688-9.812 in. (246.075-249.225 mm)

15 1/2

32 1/2 in. lbs (4.485 kg mm)

5 swg

Yellow-green

2 1/4 in. (53.975 mm)

1.387-1.393 in. (35.2298-35.3822 mm)

Sintered bronze

Top bush

1 in. (25.4 mm)

1.498-1.499 in. (38.0492-38.0746 mm)

1.3065-1.3075 in. (33.185-33.2105 mm)

1.3025-1.3030 in. (33.0889-0.127 mm)

0.0035-0.0050 in. (10889-0.127 mm)

Bottom Bush

0.870-0.875 in. (22.098-22.225 mm)

1.4935-1.4945 in. (37.945-37.960 mm)

1.2485-1.2495 in. (31.712-31.7373 mm)

1.498-1.500 in. (38.049-38.1 mm)

0.0035-0.0065 in. (0.0889-0.165 mm)

Swinging fork controlled by combined coil spring-hydraulic damper units

Black

12.875 in. (32.66 mm)

10.375 in. (23.36 mm)

Pre-sized steel-backed-phosphor bronze

1.4460-1.4470 in. (36.7284-36.7538 mm)

1.445-1.4450 in. (36.6903-36.702 mm)

7 1/2 in. (190.5 mm)

Swinging fork controlled by combined coil spring-hydraulic damper units

8% in.

8% in.

1 1/4 in.

100 lb/in.

Green/green

28 lbs

Pre-sized, steel-backed—phosphor bronze

1.4460-1.4470 in.

1.4445-1.4450 in.

7 1/2 in.

h. Thread in the set screw and tighten it.

i. Refit the reservoir spacer, O-ring, and reservoir.

10. Install the master cylinder assembly on the handlebar and bleed the system as previously described.

Brake Caliper

REMOVAL AND DISASSEMBLY

1. Remove the caliper cover (2 screws), drain the brake fluid; disconnect the brake line from the caliper.

2. Remove the nuts which secure the caliper to the fork slider, and remove the caliper.

3. Remove the cotter pins which hold the brake pads, and remove the pads from the caliper.

4. Pry out the dust seal and the metal dust seal housing from both halves of the caliper.

5. With the aid of compressed air applied to the brake fluid inlet, eject each piston from its bore.

NOTE: Mark each piston for location after removal. Each must be reinserted into its own bore.

6. Pry out the fluid seals in each piston bore with a small, blunted screwdriver, being extremely careful not to damage the seal grooves.

CAUTION: The brake caliper halves must never be separated. If this has been done, the fluid passage seal should be renewed if damaged, and the caliper mating surface and bolts thoroughly cleaned.

Tighten the bolts to 35-40 ft lbs, and check the caliper for fluid tightness under maximum braking pressure.

The caliper should be returned to the manufacturer for an overhaul if the halves have been split.

INSPECTION

1. The dust seals and metal housings must be replaced.

2. The brake fluid seals must be replaced if they have been removed.

3. Inspect the pistons and piston bores for scoring or signs of seizure.

4. Clean all parts thoroughly.

ASSEMBLY AND INSTALLATION

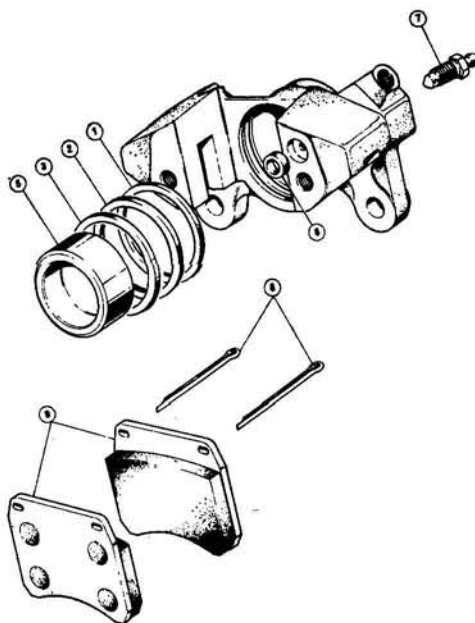
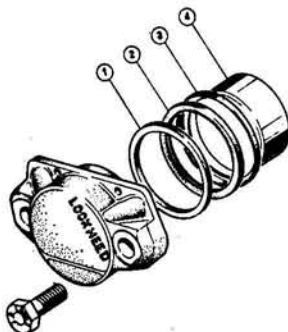
1. Smear the fluid seals with brake fluid and replace them in their grooves in the cylinder bores. Note that the larger side faces outward, toward the open end of the bore. Be sure the seals are properly seated.

2. Coat the pistons with brake fluid, and insert each of them, closed end first, squarely into its bore. Press them in as far as possible.

3. Coat one of the dust seals with brake fluid and fit it into a metal housing. Place this assembly into one of the bores with the dust seal on the inside (facing the piston in that bore). Place a suitable shaped plate over the dust seal assembly, and use a "C" clamp to press the assembly into the bore until the outer edges of the metal housing are flush with the bore surface.

4. Repeat this procedure with the other dust seal.

1. Fluid seal
2. Dust seal housing
3. Dust seal
4. Piston
5. Piston
6. Fluid passage seal
7. Bleed nipple
8. Pad pins
9. Pads



Caliper assembly

5. Replace the brake pads, securing them with new cotter pins.

6. Secure the caliper to the fork slider, tightening the nuts securely. Reconnect the lines, and bleed the system as previously described.

Brake Disc

1. Check the disc for scoring or other

damage.

2. Check for run-out with a dial gauge. Run-out should not exceed 0.0035 in. (0.089 mm). Run-out can be corrected for somewhat by loosening the four disc nuts and repositioning the disc. Retighten the nuts in an "X" pattern to 20 ft lbs.

Chassis Specifications (cont.)

TR7V, T140V

WHEELS

Rim size: Front

WM2-19

Rear

WM3-18

Spoke details:

Front

Spoke (inner) RH & LH

20 off 10 SWG 7.75 in. 96° head

Spoke (outer) RH & LH

20 off 10 SWG 7.85 in. 80° head

Rear

Left side (outer)

10 off 10 SWG 5.8 in. 10° head

Left side (inner)

10 off 10 SWG 5.7 in. 102° head

Right side

20 off 10 SWG 7.2 in. 135° head

WHEEL BEARINGS

Front and rear, dimensions and type

20 x 47 x 14 mm—Ball Journal

Front and rear, spindle diameter (at bearing journals)

0.7862-7.7867 in.

BRAKES

Front, type

Hydraulic disc

Disc diameter

10 in.

Friction pads, type

Mintex M64

Lining thickness

0.25 in.

Rear, type

Internal expanding, single leading shoe

Lining thickness

0.187-0.197 in.

Drum diameter

7.0 in.

FRONT FORK

Type

Telescopic, hydraulic damped

Spring:

Free length

19.1 in.

Compressed length

11.4 in.

Fitted length

18.5 in.

Maximum load

194 lbs

Color code

Orange

Stanchion diameter (top)

1.350-1.355 in.

(bottom)

1.3605-1.3610 in.

Outer member bore diameter

1.363-1.365 in.

REAR SUSPENSION

Type

Swing arm/hydraulically damped springs

Fitted length

8.0 in. (mid position)

Free length

9.5 in.

Spring rate

88 lbs/in.

Mean coil diameter

1.98 in.

TR7V, T140V

SWING ARM

Bush type	Phosphor bronze
Bush bore diameter	1.0 in.
Sleeve diameter	0.9972-0.9984 in.
Distance between fork ends	8.018 in.

T150V

WHEELS

Rim size: Front	WM2-19
Rear	WM3-19
Spoke details:	
Front	
Spoke (inner) RH & LH	20 off 10 SWG 7.75 in. 96° head
Spoke (outer) RH & LH	20 off 10 SWG 7.85 in. 80° head
Rear	
Left side (outer)	10 off SWG 6.3 in. 90° head
Left side (inner)	10 off 10 SWG 6.1 in. 101° head
Right side	20 off 10 SWG 7.5 in. 134° head

WHEEL BEARINGS

Front and rear, dimension and type	20 x 47 x 14 mm—Ball Journal
Front and rear (spindle diameter at bearing journals)	0.7862-0.7867 in. (19.9695 x 19.9822 mm)

BRAKES

Front, type	Hydraulic disc
Disc diameter	10 in.
Friction pads, type	Mintex M64
Lining thickness	0.25 in.
Rear, type	Internal expanding
Lining thickness	0.187-0.197 in.
Drum diameter	7.0 in.

FRONT FORK

Type	Telescopic, oil damping
Spring:	
Free length	19.50 in.
No. working coils	63
Spring rate	32.5 lbs/in.
Color code	Orange
Fork leg diameter: top	1.350-1.355 in.
bottom	1.3605-1.3610 in.
Outer member bore diameter	1.363-1.365 in.

REAR SUSPENSION

Type	Swing arm/hydraulically damped springs
Fitted length	8.0 in.
Free length	8.810 in.
Spring rate	110 lbs/in.
Mean coil diameter	1.98 in.

SWING ARM

Bush type	Steel backed phosphor-bronze
Bush bore diameter	1.4460-1.4470 in.
Sleeve diameter	1.4445-1.4450 in.
Distance between fork ends	7.5 in.

T150, T150V

Headlamp pivot bolts	10 ft lbs (1.383 kg/m)
Headrace sleeve nut pinch bolt	15 ft lbs (2.074 kg/m)
Stanchion pinch bolts	25 ft lbs (3.456 kg/m)
Front wheel axle cap bolts	25 ft lbs (3.456 kg/m)
Brake cam spindle nuts	20 ft lbs (2.756 kg/m)
Zener diode fixing nut	2-2.3 ft lbs (0.277-0.3174 kg/m)
Fork cap nut	80 ft lbs (11.06 kg/m)

Chassis Torque Specifications

TR25W

Fork leg cap nuts	50-55 ft lbs (6.913-7.604 kg/m)
Fork leg pinch bolts	18-20 ft lbs (2.489-2.765 kg/m)

T100C, T100R

Headlamp pivot bolts	10 ft lbs
Headrace sleeve nut pinch bolt	15 ft lbs
Stanchion pinch bolts	25 ft lbs
Front wheel axle cap bolts	25 ft lbs
Brake cam spindle nuts	20 ft lbs
Zener diode fixing nut	1½ ft lbs

TR6R, TR6C, T120R

Headlamp pivot bolts	10 ft lbs (1.4 kg/m)
Headrace sleeve nut pinch bolt	15 ft lbs (2.1 kg/m)
Stanchion pinch bolts	25 ft lbs (3.5 kg/m)
Front wheel axle cap bolts	25 ft lbs (3.5 kg/m)
Rear brake drum to hub bolts	15 ft lbs (2.1 kg/m)
Brake cam spindle nuts	20 ft lbs (2.8 kg/m)
Zener diode fixing nut	1.5 ft lbs (0.21 kg/m)
Fork cap nut	80 ft lbs (11.1 kg/m)

TR7V, T140V

Headlamp pivot bolts	10 ft lbs (1.4 kg/m)
Steering head bearing adjuster nut pinch bolt	15 ft lbs (2.1 kg/m)
Fork leg pinch bolts	25 ft lbs (3.4 kg/m)
Front wheel axle cap bolts	25 ft lbs (3.5 kg/m)
Rear brake drum to hub bolts	15 ft lbs (2.1 kg/m)
Brake cam spindle nuts	20 ft lbs (2.8 kg/m)
Zener diode fixing nut	1.5 ft lbs (21 kg/m)
Fork cap nut	80 ft lbs (11.1 kg/m)
Brake disc retaining bolts	20 ft lbs (2.8 kg/m)